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Journal of Applied Economic Sciences

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Trade in Services and Economic Benefits in an Emerging Market Economy

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Abstract:

This article presents an examination of the impact of trade in services on economic growth in an emerging market economy. The study unveiled the unexplored potential and challenges of trade in services in an emerging market economy. Time series annual data for Zimbabwe for the period 1970 to 2016 was used for the purposes of this study. The period 1970 to 2016 was selected mainly due to data availability. Time series data was extracted from the World Bank`s World Development Indicators and United Nations Conference on Trade and Development statistic databases. Trade in services was found to correlate with economic growth with an R^2 of 0.9796, an Adj. R^2 of 0.9740, a p-value of less than 0.05 at 5% level of significance and an $F (10, 36) = 173.30$, $Prob > F = .0000$. The variables were found to statistically significantly predict GDP per capita. Service imports and trade in services were significant in influencing economic growth. With service exports insignificant in influencing economic growth at 5% level of significance. Government policies were found to hinder trade in services in emerging market economies. These economies are closed with many restrictions in place. The study is expected to influence government policy in developing economies. The study will also go a long way in expanding the academic knowledge and as such contributing in filling the gap that exists within the body of knowledge.

Keywords: trade in services; services trade; services exports; economic growth; emerging market

JEL Classification: O11; O47; F14; F18; N77

Introduction

Services are increasingly becoming more important for economic growth and development. This notion has challenged the long-held theories of economic development in Africa. Recently, Sáez *et al.* (2015) state that for decades, the typical first steps on the path out of poverty have been increased agricultural productivity followed by growth in the manufacturing sector. However, over the last few years Africa has been growing along a very different trajectory. Across the region, agriculture's share of gross domestic product (GDP) has declined and manufacturing, rather than growing as theory may have anticipated, has stagnated (Sáez *et al.* 2015). Services, on the other hand, have been on an increase as measured by their share of total employment, exports and GDP. Trade in services is driving value addition and providing critical inputs to boost other economic activities.

The General Agreement on Trade in Services (GATS) is the first multilateral trade agreement to cover trade in services (World Trade Organization [WTO] 2013). Its creation in 1995 was one of the major achievements of the Uruguay Round of trade negotiations, from 1986 to 1993. The definition of services trade under the GATS is pronged into four, depending on the territorial presence of the supplier and the consumer at the time of the transaction. Pursuant to Article I: 2, the GATS covers services supplied in four modes, that is, Mode 1 - Cross-border trade, Mode 2 – Consumption abroad, Mode 3 - Commercial presence, and Mode 4 - Presence of natural persons.

According to WTO (2013), services have recently become the most dynamic segment of international trade. Since 1980, world services trade has grown faster, albeit from a relatively modest basis, then merchandise flows thereby defying wide-spread misconceptions (WTO 2013). Loungani *et al.* (2017) state that services exports have grown ten-fold since 1990. The rise in services exports is not confined to advanced economies; developing countries have strongly participated in that growth (WTO 2013 and Loungani *et al.* (2017). On the other hand, the United Nations Conference on Trade and Development (UNCTAD 2015a) reports that the service sector contributes to almost half of Africa's output, and a number of African countries have emerged as services-oriented economies. In many African countries, the services sector contributes substantially to GDP as well as absorbing a large proportion of youth employment and matter substantially for gender parity (UNCTAD 2015a). Dihel and Goswami (2016) argue that there is also ample evidence to support the resilience of services trade during the 2009 global financial crisis. Dihel and Goswami (2016) opine that as oil and commodity prices tumble

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globally, diversification into services exports will be critical for maintaining future growth in Africa. To Loungani *et al.* (2017), services may thus be a game-changer, offering an opportunity to sustain globalization.

Whereas developing countries` share of world services exports, on a Balance of Payments (BOP) basis, amounted to about 20% in 1980, it had risen to 24.5% by 2000 to reach 31% in 2010 (WTO 2013). WTO (2013), however, reports that this share would be far higher, in the order of 50%, if world trade was measured in net terms, disregarding imported content and considering only the value added (and traded) by individual economies. Though Africa is a marginal player in global services trade, with an export share of only 2.2%, the services sector represents an important source of export revenue that should be further exploited if Africa is to assume a major role as a global player in trade services (UNCTAD 2015a). To this end, however, very little is known about trade services in Africa and its prospective impact especially exports of non-traditional services, such as financial services which are often overlooked. Hoekman and Te Velde (2017) argue that, while much of the discussion on economic transformation centers on transforming agriculture and moving into manufacturing, services are an underexplored component of economic transformation strategies. To Dihel and Goswami (2016), the main challenge in exploring Africa's potential is the scarceness of data especially in informal trade services.

Although research has shown that trade in services is proving to be critical for Africa`s economic growth and development, the sector is being seriously threatened by a lot of challenges. The question that remains to be answered is whether Africa fully appreciates the role and contribution of trade services to economic growth and development or not? This article provides a review of trade in services in an emerging market country, Zimbabwe in an attempt to unveil the untapped/ignored sector as well as providing evidence of its contribution to economic growth and development. The article also provides an analysis of the relationship between trade in services and economic growth using an econometric model from a Zimbabwean perspective. It is the author`s expectation that this article will enhance the appreciation and understanding of trade in services as well as its economic benefits. The remainder of the article is arranged as follows: literature review followed by a brief research methodology followed by a data presentation and discussion of findings before concluding with recommendations.

1. Literature review

1.1 Trade services definition

According to the Centre for International Economics (2010), until recently, service trade has routinely been defined within a Balance of Payment (BoP) framework and covered only transactions in services between residents and non-residents. Service trade, when defined in this way, can be broken down by the type of activity to include transportation, travel, communications, construction, insurance, financial, computer and information, royalties and license fees, business, personal, cultural and recreational, and government services.

In practice, service trade defined in this way can involve some transactions in goods (for example, where an international visitor purchases goods in the country to which he or she travels). In an effort to cover the various means through which services are provided internationally, the General Agreement on Trade in Services (GATS) defines trade in services by reference to four modes of supply (OECD and WTO 2017). These can be summarized as follows:

- *Mode 1* (cross-border supply), analogous to trade in goods, occurs when a service is delivered from the territory of one World Trade Organization (WTO) member to the territory of another member. Examples of mode 1 include international transport and supply of services over digital networks, where the service supplier is not present in the territory of the member where the service is consumed;
- *Mode 2* (consumption abroad) involves the supply of a service in the territory of one member to the service consumer of another member. An example of supply through this mode is tourism;
- *Mode 3* (commercial presence) is the supply of a service by a service supplier of one member through the establishment of a commercial presence (subsidiary, branch or other forms of business establishment) in the territory of another member. Mode 3 can be relevant for all sectors, for example, the establishment and operation abroad of foreign insurance companies, hotels and supermarkets;
- *Mode 4* (movement of natural persons) concerns the supply of services through the temporary presence of a natural person of one member in the territory of another member. This mode of supply can involve the temporary movement of, for example, independent professionals (lawyers or accountants), or intra-corporate transferees whereby certain personnel are transferred from their parent company to a subsidiary in the territory of another member.

Centre for International Economics (2010) argues that on a global basis, and measurement problems aside, it is estimated that most service trade occurs via Mode 3, with the WTO reporting: cross-border supply

(Mode 1) — estimated to account for 35% of global services trade; consumption abroad (Mode 2) — 10% to 15% of service trade; commercial presence (Mode 3) — 50% of service trade; and presence of natural persons (Mode 4) — 1% to 2% of service trade.

1.2 Trade in services and growth

According to UNCTAD (2017a), the services sector has emerged as the largest segment in and driving force of the economy, contributing a growing share to gross domestic product (GDP), trade and employment. The sector contributes to productivity and economy-wide growth, as it provides essential inputs to other products and services. Loungani *et al.* (2017) state that in "The Wealth of Nations," Adam Smith questioned the social value provided by "lawyers, men of letters of all kinds…, musicians, opera-singers, etc." They argue that Adam Smith was expressing a bias against the service sector that holds to this day while Christina Romer lamented that there is a "feeling that is it better to produce 'real things' than services" (*New York Times* February 4 2012).

Meanwhile, services, which already account for 70% of world GDP and 50% of world employment, are also becoming an important part of trade (Loungani *et al.* 2017). Figure 1 and Figure 2 below shows Zimbabwe`s exports and imports of goods and services in USD millions as well as services value addition as a percentage of GDP from 1992 to 2015. Zimbabwe`s services value addition as a percentage of GDP has been trending above 50% except in 1994, 2006 and 2007 with 2007 recording the lowest at 45% while 2015 recording the highest of 59%. Zimbabwe`s services value addition has increased by 13% from 1992 to 2015. UNCTAD (2017a) reports that in 1980 – 2015, the share of services in GDP increased in all income level groups, including from 61% to 76% in developed economies and from 42% to 55% in developing economies. The increase in services output in this period largely corresponds to a decline in industrial output in developed economies and a decline in agricultural output in developing economies. To IMF, WB and WTO (2017), services comprise some two thirds of global GDP and employment, and a quarter of global trade (nearly half of global trade measured on a value-added basis).

Figure 1. Zimbabwe`s exports and imports of goods and services from 1992 to 2015 (BoP, current USD).

Zimbabwe`s exports and imports of goods and services (USD million)

Source: World Bank World Development Indicators

Figure 2. Zimbabwe`s Services value added as a percentage of GDP, 1992 to 2015

Zimbabwe`s services value added (% of GDP)

Source: World Bank World Development Indicators

In 2014, service exports accounted for nearly 25% of total exports (Loungani *et a*l. 2017) and have also come to play a central role in global production networks and value chains. According to IMF, WB and WTO (2017), global commercial services imports grew at some 5% a year during 2010–2015, compared to 1% growth for merchandise trade.

The growth in services trade has occurred despite the fact that policy barriers to services trade remain substantial in many areas (IMF, WB and WTO 2017). According to IMF, WB and WTO (2017), expanding services trade has been supported by new business models in areas like financial services and information and communication technology. While a haircut still requires a trip to the local barbershop, many other services no longer require the provider to be close to the customer as a result of the revolution in information and communication technologies developments, for example, financial services and consulting services can be delivered from anywhere. The rise in services exports is not confined to advanced economies. Services exports from developing countries have grown ten-fold since 1990 and at twice the rate of services exports from advanced economies; hence, developing countries' share has increased from 3% in 1970 to over 20% in 2014 (Loungani *et al.* 2017).

Loungani *et al.* (2017) further argue that this increase is not just due to higher exports of traditional services, but is also due to modern technology-enabled services as well, for example, business services (including R&D and consultancy), computer and information services, financial services, and intellectual property. The growth in the service sector has caused a lot of debate regarding the long-held notion regarding the role of industrialization in economic growth (Figure 3). The notion has widely recognized the role of the manufacturing sector in promoting broad economic growth while the services sector has been resilient to improvements in productivity (Baumol 1967 and Kaldor 1967).

Figure 3. Zimbabwe`s Sectoral value addition as a percentage of GDP from 1965 to 2015

Source: World Bank World Development Indicators

Agriculture is predominant in employment with estimates of above 60% of total employment in Zimbabwe followed by services accounting for 28% in 1999, 15% in 2004 and 25% in 2011 (Figure 4). This is actually contrary to global trends where services have dominated the labor market with global estimates showing services taking above 50.9% of the total global jobs as of 2011.

As in output, the importance of services is more pronounced in developed economies (where services jobs represent 75% of the total) than in developing economies (44%) (UNCTAD 2017a). Services have been the main job provider since the mid-2000s, including during the 2008–2009 global economic and financial crisis supporting the notion by Dihel and Goswami (2016).

Annually in 2001–2016, the importance of the construction, tourism and other business services sectors in the global job market increased, including in developing economies (UNCTAD 2017a). Employment in services is particularly relevant for women as, globally, women have the highest share of jobs in the sector, however, the situation is different in Zimbabwe where female are predominantly employed in agriculture (Figure 5). Agriculture accounts for more than 70% of total female employment while services accounts for between 13% and 26% while industry accounts for between 3% and 5%.

The participation of women in services jobs in developing economies is 41%, second only to the agricultural sector (UNCTAD 2017a). UNCTAD (2017a) reports that services employment is also important for

migrant workers as some host countries, such as Canada and the United States of America, rely heavily on migrants in their broad services sectors. Services-related policies are therefore relevant for inclusive employment, especially in the current context of persistent high levels of unemployment.

Figure 4. Employment by sector in Zimbabwe, 1999, 2004, 2011 (% of total employment)

Source: World Bank World Development Indicators

Figure 5. Zimbabwe`s Sectoral Female Employment, 1999, 2004, 2011 (% of total employment)

Source: World Bank World Development Indicators

Services are also prevalent in foreign direct investment, with announced greenfield investment in the last 10 years mainly concentrated in the services sector.

In 2012, services accounted for 63% of global FDI stock, more than twice the share of manufacturing, at 26% (UNCTAD 2015b). The primary sector contributed less than 10% to global FDI stock. UNCTAD (2015b) reports that in the period 2001−2012, the share of services in global FDI increased by 5% (to 63%) and offset by a comparable decrease in the share of manufacturing. Overall, since 1990, the share of services in world FDI stock has gained 14% points (from 49% to 63%) with a corresponding decrease in manufacturing (from 41% to 26%), while the share of the primary sector has been stable (at about 7%) (UNCTAD 2015b).

The reflects an analogous trend in the distribution of global GDP as well as increased liberalization in the sector, enabling large FDI inflows, particularly in industries traditionally closed to foreign investment such as finance and telecommunications. This shift has occurred in both developed and developing economies.

By 2015, services continue to hold over 60% of global FDI stock (UNCTAD 2016) with manufacturing and the primary sector accounted for 26% and 6%, respectively. The long-term shift toward services has plateaued since the outbreak of the global financial crisis (Figure 6).

UNCTAD (2017b) reports that data processing is another services industry whose representation among the top 100 MNEs is sharply increasing. The rapid international expansion of these companies, despite their

asset-light nature, has been fueled by rising global consumer demand for their high-tech products and services, and by the relative ease of expanding their sales abroad (UNCTAD 2017b).

Figure 6. Estimated global inward FDI stock by sector, 2001, 2007, 2015 (Trillions of dollars)

Source: UNCTAD (2017b)

1.3 Trends in services trade

In 2016, the largest global exporters and importers of services were mainly developed economies, in particular the United States and European countries, such as Germany, France and the United Kingdom and Ireland, Japan and Singapore as well as members of the BRICS, that is, China and India (Table 1).

Table 1. Main exporters and importers of services, 2016 (millions of dollars and percentage)

Main services exporters	Value of services exports	Share of global services exports	Main services importers	Value of services imports	Share of global services imports
United States	752, 411	15.6	United States	503, 053	10.7
United Kingdom	327, 176	6.8	China	453, 014	9.6
Germany	272, 738	5.6	Germany	312, 074	6.6
France	236, 760	4.9	France	235, 679	5.0
China	208, 488	4.3	United Kingdom	198, 653	4.2
Netherlands	179, 776	3.7	Ireland	191, 939	4.1
Japan	173, 821	3.6	Japan	184, 710	3.9
India	161, 845	3.3	Netherlands	169, 458	3.6
Singapore	149, 642	3.1	Singapore	155, 581	3.3
Ireland	146, 678	3.0	India	133, 710	2.8
Total	**2, 609, 334**	**53.9**	**Total**	**2, 537, 870**	**53.9**

Source: UNCTAD (2017a)

Zimbabwe`s exports are growing more strongly in transport, travel, insurance and other business services (Table 3). Although transport, travel and other business services are the largest categories for Zimbabwe, the trends are not consistent but they are, however, fluctuations year in year out (Table 3). Telecommunications and intellectual property have been constant at 1% as very low contribution compared to other countries especially the developed countries that are more specialized in these high value added categories. Table 2 shows Zimbabwe`s export share in total world exports from 2005 to 2015 with the major contributor being in government goods and services.

Table 2. Zimbabwe`s share in World Export of selected commercial services, 2005-2015 (percentage)

Service category	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Transport	0.022	0.013	0.010	0.007	0.006	0.010	0.011	0.009	0.009	0.009	0.010
Travel	0.022	0.020	0.013	0.011	0.014	0.013	0.014	0.015	0.014	0.014	0.015
Insurance and pension	0.026	0.022	0.019	0.017	-	-	-	-	-	-	-

Service category	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
services											
Financial services	0.002	0.002	0.001	0.001	-	-	-	-	-	-	-
Intellectual property	0.001	0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Telecommunications, computer and information services	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Other business services	0.000	0.000	0.000	0.000	0.007	0.007	0.007	0.007	0.006	0.006	0.007
Personal, cultural and recreational services	0.008	0.007	0.006	0.006	-	-	-	-	-	-	-
Government goods and services	0.045	0.041	0.036	0.012	0.035	0.035	0.034	0.035	0.038	0.040	0.064

Source: UNCTAD stat

Table 3. Zimbabwe`s exports of selected commercial services, 2005 to 2015 (% of total trade in services)

Services category	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Services	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Transport	35	26	28	29	18	27	29	25	24	24	23
Travel	41	47	43	44	48	43	44	47	48	47	45
Other services	**24**	**27**	**29**	**27**	**34**	**30**	**26**	**28**	**28**	**28**	**32**
Insurance	5	6	6	7	-	-	-	-	-	-	-
Financial services	1	1	2	2	-	-	-	-	-	-	-
Intellectual property	0	1	0	0	1	1	1	1	1	1	1
Telecommunications, computer, and information services	1	1	1	1	1	1	1	1	1	1	1
Other business services	0	0	0	0	22	20	17	18	18	19	19
Personal, cultural, and recreational services	1	1	1	1	-	-	-	-	-	-	-
Government goods and services	7	8	9	4	10	9	8	8	8	8	12

Source: UNCTAD stat

1.4 Services trade policy landscape

In Africa, services provide inputs to exports related to agriculture, energy and manufacturing. This requires services trade policies, such as adequate levels of openness and regulation (UNCTAD 2017a). Barriers to trade in services are not barriers at the border they are, rather, embedded in legal and regulatory frameworks and most typically involve government measures that discriminate between foreign and domestic services or suppliers (GATS Article XVII: National Treatment) (OECD and WTO 2017).

Services trade barriers may also take the form of nondiscriminatory measures that, for example, limit or restrict the total number of service suppliers or operations; the value of transactions; or the type of legal entity through which a supplier may provide a service (GATS Article XVI: Market Access). Taken together, market access and national treatment measures largely determine the extent to which there is international contestability and competition in a country's service market. According to OECD and WTO (2017), across modes of supply, services trade barriers may include, for example, monopolies, discretionary foreign investment screenings, foreign equity limits, caps on the number of licenses, restrictions on the temporary movement of natural persons supplying services, and discriminatory subsidies or licensing requirements.

Services trade policies also include measures closely related to the supply of services by foreign suppliers, whether across borders, through establishment, or by means of natural persons moving to supply services. Policies in services trade can have a fundamental economic impact, engendering significant costs, and limiting connectivity and related economic benefits. Furthermore, because services constitute inputs to merchandise trade, they are an important determinant of trade costs for goods. Yet restrictions to investment and cross-border trade in services remain high and widespread. The costs of cross-border trade in services are much higher on average than those of trade in goods. According to IMF, WB and WTO (2017), policies that inhibit

investment flows and the establishment of service suppliers, the cross-border delivery of services, or the free movement of professionals' bear importantly on services trade costs. Services trade restrictions protect domestic services suppliers from competition, allowing incumbents to charge inflated prices that harm consumers and make it more difficult for downstream users who need the services concerned to compete internationally.

Sectors such as professional and transport services, for example, tend to be more restricted than telecom, computer or distribution services. OECD and WTO (2017) state that developing economies have, on average, higher levels of restrictiveness in all sectors with the gap between developed and developing economies wide in telecommunication and financial services, two backbone infrastructure service sectors. These restrictive policies in services trade limit physical connectivity. With respect to transport and physical connectivity, higher levels of services trade restrictiveness in logistics, maritime and road transport are associated with greater delays in the domestic legs of transport (Nordås and Rouzet 2015).

According to Bertho *et al*. (2016) cited by OECD and WTO (2017), government restrictions in the shipping sector, that is, transport of containerized cargo on liner vessels, especially in relation to foreign investment, significantly increase maritime transport costs. Because most global trade in merchandise takes place through this mode of transport, these restrictions considerably reduce seaborne trade flows. Policy restrictions in the road transport sector increase the price of trucking services, and thereby increase trade costs, especially for landlocked countries like Zimbabwe. Raballand and Macchi (2009) argue that evidence suggests that the high price of transport in Africa is largely the result of government policies regulating the sector.

Services trade restrictions negatively affect foreign investment inflows. Countries with lower restrictiveness are significantly more likely to attract foreign investment in services than countries with more trade-restrictive regulatory frameworks. Zimbabwe is currently embracing easy of doing business reforms to attract foreign direct investment. Restrictions have serious implications on service exports, innovation and job creation as they limit investments in new technologies and network infrastructure, and restrain expansion in productive capacity, as well as curbing competition and availability of high-quality, low-costs services.

Restrictions in services trade limit trade in goods. Services trade policies also have implications in terms of connecting to the international trading system for goods. Hoekman and Shepherd (2017) argue that achieving a reduction in trade costs for goods largely hinges on improving the performance of the services used by the goods-producing enterprises, reducing their costs and increasing their diversity and quality. A body of country-specific studies has firmly established that openness in services trade positively affects the productivity of manufacturing industries (OECD and WTO 2017).

Recent research by Hoekman and Shepherd (2017) give emphasis on the role of FDI policies on the service sector. Hoekman and Shepherd (2017) find that openness in services trade in developing countries is a significant determinant of performance in manufactured exports, with inward FDI being the main channel through which services policies negatively affect exports. Hoekman and Shepherd (2017) `s finds are consistent with finds by OECD and WTO (2015) and Kowalski *et al*. (2015) whose findings suggest that investment openness is an important determinant of countries' participation in global value chains - even more important than tariff barriers. Restrictions also limit cross-border trade in services. However, though many countries are making reforms to reduce service trade restrictions, many have adopted tighter restrictions on the temporary movement of people to provide services through Mode 4, such as subjecting temporary services suppliers to tighter quotas and labor market tests, and shortened durations of stay.

1.5 Success in developing services sectors with transformative effects

To Hoekman and Te Velde (2017), trade in services, matter for economic transformation. However, economic transformation requires supportive policies and conducive environment. Regional and economic integration (where barriers to trade are reduced or eliminated to facilitate trade between regions or nations) is also critical for economic growth and development. Hoekman and Te Velde (2017) provide some examples of where developing countries have, through trade policy and other factors, successfully promoted the development of services sectors, and facilitated greater exports of specific services, with transformative effects.

- In Kenya, advances in mobile technology, liberalization of the financial system, the establishment of diversified financial hubs, a favorable tax regime and policy-led regional integration with the East African Community have helped to facilitate financial sector deepening, boost Kenya's trade in financial services and position the country as a regional financial hub. Kenya's financial services sector is now a generator of high-skill, high wage employment and an important contributor to total exports: the sector accounts for 2.8% of Kenya's total formal sector employment and contributes 4.6% of total services exports. However, there remain question marks over the extent to which the sector is linked to the rest

of the economy. Safaricom`s M-PESA service became a global leader in mobile-based financial services in the span of just a few years (Saez *at el.* 2015). The rapid development of the mobile money platform has expanded access to financial services for millions, especially small traders and rural communities. The mobile money platform has now gone global, operating in countries as widespread as India and Romania, but it began in Kenya and neighboring Tanzania.

- Bilateral trade and infrastructure development agreements have helped Lesotho to harness abundant water resources and favorable topography to successfully supply hydropower transmission services to South Africa.
- A combination of low costs, an abundant supply of relatively skilled labor, language proficiency (in English), and the development of software technology parks has helped to position India as a major global exporter of ICT services. India's ICT services sector generates sizeable export revenues: the value of ICT exports totaled USD103 billion in 2014 (and the sector contributes around 9.5% to Indian gross domestic product). The sector has also had a transformative effect on employment creation (especially for women and in outlying cities). Information technology (IT) and IT enabled services alone employ nearly 3.5 million people in India.
- Mauritius has successfully diversified into health and business tourism through the development of good quality supporting infrastructure (for example, health and conference facilities). In the case of health tourism, the number of foreign patients receiving medical treatment in Mauritius saw a 15-fold increase between 2005 and 2011, and the goal is to expand this number to 100,000 foreign patients by 2020 (USITC 2015). Revenues through the provision of these services are expected to reach USD1 billion by 2020.
- Ethiopian Airlines' extensive cargo capacity (the airline transported close to 200,000 tons of cargo in 2015), coupled with the successful expansion of the national carrier's regional network, has been instrumental in enabling exports from Ethiopia to be transported overseas quickly and cheaply. This has been especially beneficial for Ethiopia's export-oriented cut flowers industry, which has registered substantial growth over the past decade (the value of exports of cut flowers from Ethiopia to the rest of the world amounted to more than USD662 million in 2014, up from just USD12 million in 2005).
- Mauritius and Senegal have made extensive efforts to liberalize domestic regulations in the telecommunications sector to allow greater competition, thereby improving efficiency and making their ICT services exports more competitive internationally. The result has been significant growth in ICT exports. In Mauritius, for example, the value of ICT exports increased from USD0.3 billion in 2005 to USD1.3 billion in 2014, with the share of ICT services in total services exports increasing from 18.5% to 37% over this period.

1.6 Trade policy and regulatory quality

According to the Services Trade Restrictiveness Database by the World Bank, there are five broad categories of policy. These are determined according to their level of restrictiveness and are given an associated score. The scores are on a scale of 0 to 100, with 0 being the best and 100 the worst outcome.

The categories are as follows:
- Completely open (0);
- Virtually open, but with minor restrictions (25);
- Major restrictions (50);
- Virtually closed, with limited opportunities to enter and operate (75);
- Completely closed (100).

Saez *et al.* (2015) state that restrictions on foreign acquisitions, discrimination in licensing, restrictions on the repatriation of earnings and inadequate legal recourse all have a significant negative effect on investment inflows into service sectors. Borchert *et al.* (2014) argue that these restrictions can reduce the expected value of sectorial foreign investment by USD2.2 billion over a seven-year period.

Figure 7 below illustrates the relationship between restrictiveness and indicators of regulatory quality. A negative correlation of -0.5212 exists between the two. It must be noted that reducing restrictiveness does not necessarily improve regulatory quality. Rather as Saez *et al* (2015) suggest, governments must address both policies that impede service exports and those that improve regulatory quality so as to fully reap the benefits of liberalization. Overall, based on the categories of service trade restrictiveness, Zimbabwe has a high level of restrictiveness (64) (Figure 7) while the WGI rank of regulatory quality is very low (4 out of 100). Zimbabwe`s economy is between major restrictions and virtually closed, with limited opportunities to enter and operate.

Figure 7: Services policies and regulatory quality

Zimbabwe`s services policies and regulatory quality, 2015

Source: World Bank`s Worldwide Governance Indicators (WGI) & Services Trade Restrictiveness Database (STRD)

Note: World Governance Indicators Regulatory quality rank and Services Trade Restrictiveness Index (STRI) scale is 0 to 100. The WGI rank for regulatory quality is 0 to 100.

Figure 7 above shows that all service sectors are highly restricted in Zimbabwe with STRI of 75 being the highest. In Ethiopia, telecommunications, legal and retail remains completely closed (100) with finance at 90. In Zambia and Mozambique despite the liberalization of the telecommunications market, a de facto monopoly still exists in fixed-line telephony although there is competition in mobile telephony. Professional services are considered a key input for many productive activities within the value chain remains high at above 30 across a number of African countries with Zimbabwe recording a STRI of 60 while Ethiopia recording a STRI of 84. Zimbabwe has been affected by the economic empowerment policy that requires foreign ownership up to 49% and in some areas zero percent foreign ownership; these areas have been reserved for the local only. The following countries are completely closed (100) in rail freight domestic, Democratic Republic of the Congo, Cote d`Ivoire, Ethiopia (road freight domestic), Kenya, Nigeria and Senegal.

2.Methodology

2.1 Data sources for the study

Time series annual data for Zimbabwe for the period 1970 to 2016 was used for the purposes of this study. The period 1970 to 2016 was selected mainly due to data availability. Time series data was extracted from the World Bank`s World Development Indicators and UNCTAD stat databases.

2.2 Data Analysis and Interpretation

An econometric model was used to examine the impact of trade in services on economic growth. Economic growth was the dependent variable and trade in services being the explanatory variables with other control variables. The following equation (1) shows the general econometric model specification

GROWTH =f (SE, SI, TIS, INFL, FDI, GCE, POP, UEM)   (1)

where: GROWTH – Economic Growth, SE – Service Exports, SI – Service Imports, TIS – Trade in Services, INFL – Inflation, POP – Population growth, GCE – Government Consumption expenditure, FDI – Foreign direct investment, UEM – Unemployment

Table 4. Proxies used to measure variables

Variable	Measure
Economic growth (GROWTH)	GDP per capita (Current USD)
Service Exports (SE)	Service exports (BoP, current US$)
Service Imports (SE)	Service imports (BoP, current US$)
Trade in Services (TIS)	Trade in services (% of GDP)
Inflation (INFL)	Inflation, consumer prices (annual %)
Population growth (POP)	Population growth (annual %)

Variable	Measure
Government consumption expenditure (GCE)	General government consumption expenditure (% of GDP)
Foreign direct investment (FDI)	Foreign direct investment, net inflows (% of GDP)
Unemployment rate (UEM)	Unemployment, total (% of total labor force)

Source: Author`s compilation

The above proxies for variables were selected in line with other previous studies and data availability. The following general econometric model was used to examine the impact of trade in services on economic growth in Zimbabwe.

$$GROWTH_t = \alpha_t + \beta_1 GROWTH_{t-1} + \beta_2 TIS_t + \beta_3 X_t + \dots \beta_k X_{kt} + u_t \qquad (2)$$

where: variables $x_t, x_t, \dots, x_{kt}$ are a set of $k-1$ explanatory variables which influence $GROWTH_t$, and the coefficient estimates $\beta_1, \beta_2, \dots, \beta_k$ are the parameters which quantify the effect of each of these explanatory variables on $GROWTH_t$ and to make the model more realistic, a random disturbance term, denoted by u_t, is added to the equation to represent unobserved shocks in each time period whereas t denotes the time-series dimension, α is a scalar and β is $K*1$ and X_t is the tth observation on K explanatory variables. The presence of the parameters α_t, which represent different intercepts in each year, allows for aggregate economic growth to change over time.

The following comprehensive econometric model (Equation 3) below examined the impact of trade in services on economic growth in Zimbabwe.

$$GROWTH_t = \alpha_t + \beta_1 GROWTH_{t-1} + \beta_2 GROWTH_{t-2} + \beta_3 TIS_t + \beta_4 SE_t + \beta_5 SI + \beta_6 INFL_t + \beta_7 POP_t + \beta_8 GCE_t + \beta_9 FDI_t + \beta_{10} UNEMPL_t + u_t \qquad (3)$$

2.3 Preliminary diagnostic

Table 5 below denotes some pre-estimation diagnostic that was carried out.

Table 5. Correlation analysis

	GROWTH	SE	SI	TIS	INFL	POP	GCE	FDI	UEM
GROWTH	1.000								
SE	0.302	1.000							
SI	0.492	0.696	1.000						
TIS	0.213	0.845	0.712	1.000					
INFL	-0.232	-0.068	-0.071	-0.133	1.000				
POP	0.427	-0.402	-0.212	-0.352	-0.176	1.000			
GCE	0.598	0.451	0.388	0.325	-0.389	0.076	1.000		
FDI	0.034	0.411	0.566	0.387	0.045	-0.348	-0.009	1.000	
UEM	0.115	-0.323	-0.221	-0.274	-0.119	0.464	-0.118	-0.036	1.000

Source: Author`s compilation

Table 5 above denotes the correlation matrix between the variables. All the variables are positively correlated to growth except inflation. Contrary to theoretical literature, unemployment is positively correlated to growth in Zimbabwe.

2.4 Natural logarithms transformation

All the variables were first transformed into natural logarithms before being regressed as the use of natural logarithms has become standard in econometrics for reasons cited by Brooks (2008). The author was compelled by the reasons provided by Brooks (2008) to use log transforms in this study and these are:

- taking a logarithm can often help to rescale the data so that their variance is more constant, which overcomes a common statistical problem;
- logarithmic transforms can help to make a positively skewed distribution closer to a normal distribution;
- taking logarithms can also be a way to make a non-linear, multiplicative relationship between variables into a linear, additive one.

The descriptive statistics provides evidence of abnormality in the variables, hence the need for logarithmic transformation. The regression equation was expressed in 'double logarithmic form.' According to Brooks (2008), this means that both the dependent and the independent variables were transformed into natural logarithms, thereby rendering the coefficient estimates elasticity. This was done to avoid compromising the significance of the regression model (Maune 2017).

2.5 Data tests

Time series unit root test was conducted using the Augmented Dickey-Fuller, DF-GLS and Phillips-Perron unit-root tests for checking stationary of each of the variables for the entire study period, that is, 1970 to 2016. Other tests conducted included the Durbin-Watson test, vector auto-regression, vector error-correction model as well as the Johansen tests for co-integration. In none of the ADF regressions the author estimated was either ADF statistic even close to being significant at the 5% level except for two variables.

Satisfied that the series are nonstationary in levels, their co-integration is explored. To test for co-integration or fit co-integrating VECMs the number of lags was first specified as shown by the output below which used varsoc. In this VAR, FPE, AIC, HQIC and SBIC support a lag of length one. Table 7 below shows the results of the vector error-correction model.

Table 6. Selection of the number of lags

```
. varsoc lnGROWTH lnLGROWTH lnL2GROWTH lnSE lnSI lnTIS lnFDI lnINFL lnPOP lnUEM

   Selection-order criteria (lutstats)
   Sample:  1973 - 2016                          Number of obs      =        44
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
1	2636.28	.	121	.	6.9e-64*	-145.548*	-143.728*	-140.641*
2	2704.85	137.14	121	0.150	5.4e-63	-143.164	-139.525	-133.351
3	2827.76	245.82*	121	0.000	1.5e-62	-143.251	-137.792	-128.532

```
   Endogenous:  lnGROWTH lnLGROWTH lnL2GROWTH lnSE lnSI lnTIS lnFDI lnINFL
                lnPOP lnUEM lnGCE
    Exogenous:
```

Source: Extract from STATA/SE 12.0

Table 7. Vector Error-Correction model results

```
Vector error-correction model

Sample:  1971 - 2016                        No. of obs    =        46
                                            AIC           = -33.46873
                                            HQIC          = -32.99219
Log likelihood =   801.7808                 SBIC          = -32.19663
Det(Sigma_ml)  =   2.01e-29
```

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_lnGROWTH	2	.150886	0.0665	3.135334	0.2085
D_lnLGROWTH	2	.080635	0.7338	121.3155	0.0000
D_lnL2GROWTH	2	.110096	0.5121	46.17502	0.0000
D_lnSE	2	.297798	0.0151	.6767908	0.7129
D_lnSI	2	.218738	0.0210	.9437382	0.6238
D_lnTIS	2	.213419	0.0076	.3358007	0.8454
D_lnFDI	2	.965984	0.0229	1.030925	0.5972
D_lnINFL	2	2.13218	0.0011	.0469939	0.9768
D_lnPOP	2	.06221	0.0800	3.824709	0.1477
D_lnUEM	2	.241626	0.0048	.2133647	0.8988
D_lnGCE	2	.357376	0.0031	.1358751	0.9343

Source: Extract from STATA/SE, 12.0

2.6 Main regression analysis

This article examined the impact of trade in services on economic growth in an emerging market economy, Zimbabwe. A time series analysis was carried out to predict the impact of trade in services on economic growth in Zimbabwe for the period 1970 to 2016. GDP per capita was the dependent variable with services exports, service imports and trade in services being the independent variables while other control variables were also incorporated. These variables statistically significantly predicted GDP per capita with $F_{(10, 36)} = 173.30$, *Prob> F* = .0000, R^2 = 0.9796 and an Adj. R^2 of 0.9740. The independent variables added statistically significantly to the prediction, *p< .05*. However, trade in services negatively significantly correlate with growth in Zimbabwe. Table 8 below visually presents the results.

Table 8. Main Regression analysis, trade in services and economic growth in Zimbabwe

```
. prais lnGROWTH lnLGROWTH lnL2GROWTH lnSE lnSI lnTIS lnFDI lnINFL lnPOP lnUEM ln

Iteration 1:  rho = 0.0472 , criterion =  -.47895249

Cochrane-Orcutt AR(1) regression -- SSE search estimates
```

Source	SS	df	MS		Number of obs =	46
					F(10, 36) =	173.30
Model	23.5396473	10	2.35396473		Prob > F =	0.0000
Residual	.488987002	36	.013582972		R-squared =	0.9796
					Adj R-squared =	0.9740
Total	24.0286343	46	.522361614		Root MSE =	.11655

lnGROWTH	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
lnLGROWTH	.0617956	.1367625	0.45	0.654	-.2155716	.3391628
lnL2GROWTH	.0162907	.123814	0.13	0.896	-.2348158	.2673972
lnSE	.0828746	.0785904	1.05	0.299	-.0765141	.2422634
lnSI	.1984842	.0884468	2.24	0.031	.0191059	.3778626
lnTIS	-.2746756	.116296	-2.36	0.024	-.5105349	-.0388163
lnFDI	-.010639	.0191359	-0.56	0.582	-.0494485	.0281704
lnINFL	.0078459	.0089084	0.88	0.384	-.010221	.0259129
lnPOP	.5832781	.2569444	2.27	0.029	.0621706	1.104386
lnUEM	.0474263	.0781237	0.61	0.548	-.111016	.2058686
lnGCE	.2216591	.0561699	3.95	0.000	.1077412	.3355769
rho	.0471904					

```
Durbin-Watson statistic (original)       1.819045
Durbin-Watson statistic (transformed) 0.268488
```

Source: Extract from STATA/SE 12.0

The results of this model are in line with other empirical results. UNCTAD (2015a) reports that simple correlation coefficients between growth in the services sector and real GDP growth was 0.63 and coefficients between services growth and growth in exports was 0.19 between 2009 and 2012. UNECA (2015) also reports that across Africa, growth in services is strongly correlated with growth in GDP and growth in manufacturing value added. Evidence from economic development worldwide shows that the growth of the services sector tends to go hand in hand with GDP growth, with services accounting for higher shares of economic activities in richer economies (UNECA 2015).

The information provided by the model is critical for policy-makers as it provides grey areas and gaps that need special consideration and attention.

Conclusion and recommendations

This article examined the impact of trade in services on economic growth in an emerging market economy, Zimbabwe. A time series analysis was carried out to predict the impact of trade in services on economic growth in Zimbabwe for the period 1970 to 2016.

Trade in services is increasingly becoming an important component for economic growth and development the world over. The increasing role of services in economies across Africa is challenging long-held theories of economic growth and development. The services sector represents an important potential source of export revenue for Zimbabwe if fully exploited as its current export share is around 0.01% of total global exports. Services exports from developing countries have grown ten-fold since 1990 and at twice the rate of services exports from advanced economies. Developing countries` share has increased from 3% in 1970 to over 20% in 2014.

Improvements in information and communication technologies (ICTs), and the development of electronic infrastructure have greatly enhanced the ability of services to be produced in one location and consumed in another. Services have become predominant in employment with 2010 estimated to have accounted for half (50.9%) of global jobs. Employment in services has become relevant particularly for women globally as women now have the highest share of jobs in the sector although countries such as Zambia, Zimbabwe and South Asia employment is predominantly agriculture related.

In Zimbabwe employment is predominant in agriculture, accounting above 60% followed by services accounting for between 15% and 28%. Services have become prevalent to FDI inflows as 63% of global FDI stock went to services a figure more than twice the share of manufacturing (26%). Research has also shown a

correlation between trade in services and economic development (UNCTAD 2015b and UNECA 2015). Trade in services in Zimbabwe positively correlates with economic development with an R^2 of 0.9796 and a p-value of less than 0.05 at 5% level of significance. Services exports and imports were found to be positively and negatively correlated to economic growth respectively. However, the two variables were insignificant in influencing economic growth. Trade in services in Zimbabwe is highly restricted with a STRI above 50 for all service categories as of 2015 (Figure7).

There are quite a number of benefits that have accrued due to the developments in services trade although it`s potential is being hampered by a number of policy restrictions. Trade in services is one conduit that facilitates and coordinates the connections necessary to increase participation and boost competitiveness within the global value chains. The services sector provides key inputs into the production and trade of all products. Border measures have hardly any significant effects on international trade in services but domestic regulations are the ones which have the greatest impact on this trade. Most trade barriers in service sectors are non-tariff barriers (NTBs) and these include discriminatory regulations, licensing and certification requirements, and quotas.

More country specific researches need to be carried out to have a better appreciation and understanding of trade in services, its potential and challenges to economic development across Africa. The impact of cyber security risk needs to be taken seriously as it poses greater threats to trade in services across the globe. The role of financial technology (fintech) in trade in services needs also to be considered for economic growth and development. Policy-makers and the government need to clearly define the service agenda and strategy in their policies. A three legged approach that involves government, private sector and the academia is critical in formulating and designing trade in service policies.

References

[1] Bertho, F., Borchert, I. and Mattoo, A. (2016). The Trade-Reducing Effects of Restrictions on Liner Shipping, *Journal of Comparative Economics,* 44(2): 231-42. DOI: https://doi.org/10.1016/j.jce.2016.03.001

[2] Borchert, I., Gootiiz. B. and Mattoo, A. (2014). Policy Barriers to International Trade in Services: Evidence from a New Database. *World Bank Economic Review*, 28(1):162-188. DOI: 10.1093/wber/lht017

[3] Brooks, C. 2008. *Introductory Econometrics for Finance*, 2nd Edition, New York: Cambridge University Press. ISBN-10: 052169468X, 648.

[4] Dihel, N. and Goswami, A.G. 2016. *From Hair Stylists and Teachers to Accountants and Doctors: The Unexplored Potential of Trade in Services in Africa,* Washington, D.C. World Bank Group. Available at: https://openknowledge.worldbank.org/handle/10986/24968

[5] Hoekman, B. and Shepherd, B. (2017). Services Productivity, Trade Policy and Manufacturing Exports, *World Economy,* 40(3): 499-516. DOI: https://doi.org/10.1111/twec.12333

[6] Hoekman, B. and Te Velde, D.W. (eds.) 2017. *Trade in Services and Economic Transformation: A New Development Policy Priority,* London: ODI. Available at: http://set.odi.org

[7] Kowalski, P., Lopez Gonzalez, J. Ragoussis, A., and Ugarte, C. 2015. *Participation of Developing Countries in Global Value Chains: Implications for Trade and Trade-Related Policies*, OECD Trade Policy Papers, No. 179, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/5js33lfw0xxn-en

[8] Loungani, P., Mishra, S., Papageorgiou, C., and Wang, K. 2017. The Future Wealth of Nations: World Trade in Services*, IMF Research Bulletin*, 18(1): 4-7.

[9] Maune, A. (2017). The Role of Competitive Intelligence in Trade Facilitation in an Emerging Economy, *Journal of Economics and Behavioral Studies*, 9(6): 132-148. DOI: https://doi.org/10.22610/jebs.v9i6.2011

[10] Nordas, H.K. and Rouzet, D. 2015. *The Impact of Services Trade Restrictiveness on Trade Flows: First Estimates,* OECD Trade Policy Papers, No. 178, OECD Publishing. DOI: http://dx.doi.org/10.1787/5js6ds9b6kjb-en

[11] Raballand, G. and Macchi, P. 2009. *Transport Prices and Costs: The Need to Revisit Donors' Policies in Transport in Africa,* Bureau for Research and Economic Analysis of Development (BREAD), Working Paper 190, Washington, DC.

[12] Sáez, S., Mckenna, M. and Hoffman, B. 2015. *Valuing Trade in Services in Africa,* The Africa Competitiveness Report 2015, WEF, Geneva. Available at: http://www3.weforum.org/docs/WEF_ACR_2015/ ACR_Chapter2.2_2015.pdf

*** Centre for International Economics 2010. *Quantifying the benefits of services trade liberalization*, Report prepared for Department of Foreign Affairs and Trade, Canberra: Australia. Available at: www.TheCIE.com.au

*** International Monetary Fund, World Bank, and World Trade Organization. 2017. *Making Trade an Engine of Growth for All: The Case for Trade and for Policies to Facilitate Adjustment,* Geneva: World Trade Organisation.

*** OECD and WTO 2015. *Aid for Trade at a Glance 2015: Reducing Trade Costs for Inclusive, Sustainable Growth,* Geneva: World Trade Organisation.

*** OECD and WTO 2017. *Aid for Trade at a glance 2017: Promoting Trade, Inclusiveness and Connectivity for Sustainable Development*, Geneva: World Trade Organisation.

*** UNCTAD. 2015b. *World Investment Report: Reforming International Investment Governance,* Geneva: United Nations.

*** UNCTAD. 2016. *World Investment Report: Investor Nationality: Policy Challenges,* Geneva: United Nations.

*** UNCTAD. 2017a. *The role of the services economy and trade in structural transformation and inclusive development,* Geneva: United Nations.

*** UNCTAD. 2017b. *World Investment Report: Investment and the Digital Economy,* Geneva: United Nations.

*** United Nations Conference on Trade and Development 2015a. *Unlocking the potential of Africa's services trade for Growth and development,* Economic Development in Africa Report, UN, NY.

*** United Nations Economic Commission for Africa 2015. *Economic Report on Africa 2015: Industrializing through trade,* United Nations, Addis Ababa, Ethiopia.

*** USITC (United States International Trade Commission) 2015. *Factors contributing to the rapid growth of Mauritius' services economy,* USITC Executive Briefing on Trade, July.

Optimization Model of Bass

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Abstract:

The article considers the distribution of an innovative product based on the Bass model. It is proposed to find the external action function using the Pontryagin maximum principle method. The function found makes it possible to obtain a refined Bass model for forecasting the distribution of an innovative product. It is suggested to approximate the function of external influence with the help of time and price parameters of sales. Based on the Bass models and the refined Bass model, the numerical results of forecasting global computer sales, smartphone shipments, Apple iPhone for the period 2017–2020 are given.

Keywords: Bass model; innovation models; innovation management; forecasting

JEL Classification: C53; E37; O31; O33

Literature review

The process of distribution of the innovative product was considered by many authors, who in their studies were mainly based on the work of Bass (1969, 1994). Bass (1969) consider models for the diffusion of new products and technological innovations. In his research he considers consumer durables. The main idea of his research was that the probability that the purchase would be made at some point in time linearly depends on the number of previous buyers. The constants in the linear function define the parameters of the Bass model. They were asked to find the model parameters on the basis of a discrete product distribution analogue. Bass in his studies received regression models for eleven consumer durable products and, accordingly, the necessary characteristics for his model. The obtained models quite well describe the empirical distribution curve of the innovative product. Bass *et al.* (1994) in their work generalize the Bass model and include in their research an external function that depends on variables that reflect the price of the given product and the costs of its advertising. They showed that the Bass model is a special case of the Generalized Bass model (GBM). Comparison of GBM with other models of product distribution was made and the adequacy of the obtained model was proved. It is proposed to use GBM to plan the distribution of an innovative product. In general, Cooper and Kleinschmidt (1990) proposed the concept of reducing the length of the development cycle for new products. The monograph deals with innovative processes in the field of industrial goods. They are exploring 200 new products that are produced by more than 100 companies. The processing of the obtained results allows companies to make scientifically-based management decisions in the field of innovative product distribution.

Franses (2009) in its work considers the sale of goods of various categories: durable goods and utilitarian products. In his study, he uses a combination of statistical methods of modeling and takes into account the

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opinion of experts. When forecasting sales of durable goods, he uses the Bass model, and in finding future sales, utilitarian products are simple extrapolation methods.

Kotsemir and Meissner (2013) in their article consider the advantages and disadvantages of existing models of the distribution of an innovative product. Two models of the innovation process are compared. The first model assumes the concept of a strategy for promoting an innovative product in management at the level of firms and corporations. Management of innovation occurs within the company in various socio-economic systems. The second model assumes a global approach to the innovation process (conceptual approach). The main focus in this approach is the promotion of the innovative models themselves. Deep analysis of various innovative models is made, their advantages and disadvantages are examined, and their ability to describe real innovative processes is shown. The analysis carried out in this study showed that over the last 15–20 years the structure of conceptual models has a nonlinear character and due to the increase in the amount of knowledge and the increase in technological progress, the innovative process also becomes more complicated.

Chandrasekaran and Tellis (2007) critically examined existing models of diffusion of a new innovative product and considered the concept of terms a new product, innovations, diffusion in contemporary literature. The difference of this survey from the others is that they considered except for cumulative sales in the form of S-curve as well other types such as takeoff and slowdown. In addition, models for the distribution of a new innovative product based on both the Bass model and other diffusion models are considered.

Marinova and Phillimore (2003) offer to consider the evolution of innovative models in general and offer six generations of the innovation process: Black box mode; Linear mode; Interactive model; System mode; Evolutionary mode; Innovation milieu model. Based on the analysis of the promotion of innovative models of different firms, they showed that the innovative models of the last two generations move from the macro level to the microlevel. The innovative environment in which the innovation process occurs is described by microeconomic indicators, such as the location of the firm's location, etc. Innovative models also become purely microeconomic models. They also show that only the first three generations are consistent in relation to each other, and the remaining generations from a conceptual point of view can be considered as a complement (expansion) of the first three generations.

Sultan *et al.* (1990), Talukdar *et al.* (2002), Van Den Bulte and Stremersch (2004) in their works presented numerical results of the Bass diffusion model parameters depending on the country's economic potential. The average value of the innovation coefficient for a new product for developed countries is 0.001, and for developing countries - 0.0003. On average, this coefficient takes a value in the interval 0.0007–0.03. The average value of the imitation factor is in the range 0.38–0.53, for developed countries is 0.51, and for developing countries - 0.56. The marketing potential of sales of a new product for developed countries averages 0.52, and for developing countries - 0.17.

An analysis of the use of GBM to find the best advertising costs for the distribution of an innovative product is given in Fruchter and Van den Bulte (2011). In their studies, they showed that the optimal advertising company starts with minimal costs with an increase in advertising costs during the forecast period. This strategy is optimal when there is a reduction in the price of an innovative product. As a result of building a model, you must take into account the limitations of advertising costs. The built model offers the company the optimal advertising strategy for promoting an innovative product based on GBM.

Finding the best-selling price for a product using the example of LCD TVs Sony Corporation is reviewed in Oliinyk *et al.* 2018. With such a pricing policy of the corporation its profit will be maximum.

Krishnan and Jain (2006) examined how the initial advertising costs in GBM affect the further promotion of the product on the market. They showed that the further costs of advertising strongly depend on its initial level and it is necessary to obtain such optimal advertising costs that during the whole process of product diffusion in the market the profit was maximum. They showed that the optimal advertising is determined on the basis of three indicators: the ratio of advertising to profit; discount rate and advertising effectiveness. Depending on the ratio between these indicators, the optimal distribution of advertising costs is obtained throughout the entire period of diffusion of the new product on the market.

The process of distributing an innovative product is affected by the economic and financial condition of an enterprise. The optimal financial flows of an enterprise that affect the promotion of an innovative product are reviewed in Oliinyk (2017).

The task of dynamic management of technological innovations taking into account various types of risk is considered in the works of Babenko *et al.* (2017, 2018). The impact of these risks allows us to more adequately assess the degree of spread of the innovative product.

Mesak and Clark (1998) reviewed 18 different models that include the advertising metric. Based on these results, they came to the conclusion that the optimal value of advertising costs depends on how these costs are included in the model and their effects in the diffusion model. Teng and Thompson (1985) and Mesak and Clark (1998) found that the optimal level of advertising increases when the elasticity of the number of users relative to the cumulative number of users increases and the optimal level of advertising decreases when the elasticity decreases.

1. Purpose

The main purpose of this study is to build a model for the dissemination of an innovative product, taking into account its marketing characteristics. As one of the criteria for product distribution, it is proposed to use the utility function. For its practical implementation, the Pontryagin maximum principle can be used, where this function is one of the components of the optimization condition. Several variants of the utility function are considered, depending on the attitude of this corporation to risky operations in the market. One of the main factors affecting the promotion of a product on the market is its selling price. Proposed indicators of the distribution of three products in 2017–2020 are proposed depending on the firm's pricing policy.

2. Research Review

The aim of the study is to obtain a model for the dissemination of an innovative product, which is based on the Bass model (Bass, 1969) and the Generalized Bass model (GBM) (Bass *et al.*, 1994).

In the Bass model (1969) it is assumed that the number of potential adopters' *m* by the product being investigated is a random variable with the distribution function *F(t)* and the distribution density *f(t)* that satisfy the following relationship:

$$\frac{f(t)}{1 - F(t)} = p + qF(t) \tag{1}$$

where: p and *q* are the parameters of innovation and simulation of the product under investigation, respectively.

We introduce the cumulative function of potential users *N(t)* relation (1). Using relation (1), we obtain the following differential equation with respect to the function *N(t)*:

$$n(t) = \frac{dN(t)}{dt} = (p + \frac{q}{m} N(t))[m - N(t)] \tag{2}$$

Solving this differential equation, we obtain the relations for cumulative adoption *N(t)* and adoption itself n*(t)*:

$$N(t) = mF(t) = m \left[\frac{1 - \exp(-(p+q)t)}{1 + \frac{q}{p} \exp(-(p+q)t)} \right] \tag{3}$$

$$n(t) = mf(t) = m \left[\frac{p(p+q)^2 \exp(-(p+q)t)}{[p + q\exp(-(p+q)t)]^2} \right] \tag{4}$$

Thus, we obtain the dependencies between the functions *N(t)*, *n(t)* and the distribution function *F(t)* and the distribution density *f(t),* respectively.

Let's introduce the indicator *m** - the cumulative number of sales in the peak period and the relative indicator *f = m*/m.* Knowing the parameters of innovation *p* and imitation *q*, you can find the peak sales times T* and the total number of sales during this period:

$$T^* = \frac{1}{p+q} \ln(p/q) \tag{5}$$

$$f = 0.5 - \frac{p}{2q} \tag{6}$$

Using the results of Franses (2003), it is possible to find indicators of the distribution of an innovative product based on their peak values (5) – (6):

$$p = (2f - 1)\frac{\ln(1 - 2f)}{2T^*(1 - f)}\ ;\ q = -\frac{\ln(1 - 2f)}{2T^*(1 - f)} \tag{7}$$

For the transition from the continuous product distribution model to the discrete Bass (1969), use the relationship that is used in constructing the regression model:

$$X_t = N_t - N_{t-1} = p(m - N_{t-1}) + \frac{q}{m}N_{t-1}(m - N_{t-1}) + \varepsilon_t = a + bN_{t-1} + cN_{t-1}^2 + \varepsilon_t \tag{8}$$

where $a = pm$; $b = q - p$; $c = -q/m$; ε_t - is an independent error term.

You can find the parameters of the Bass model from the coefficients of the regression equation (8):

$$p = \frac{a}{m};\ q = -cm;\ m = [-b \pm (b^2 - 4ac)^{1/2}]/(2c) \tag{9}$$

Further improvement of models, taking into account economic and social factors affecting the process of distribution of an innovative product, led to the creation of the GBM and its modifications.

Bass *et al.* (1994) include an external function in the GBM model, which depends on the marketing variables (price, advertising, etc.):

$$\frac{f(t)}{1 - F(t)} = [p + qF(t)]x(t) = [p + qF(t)][1 + \beta_1 x_1(t) + \beta_2 x_2(t) + \ldots] \tag{10}$$

The number of users who adopted the innovation in the interval $[t_0; t]$ is described by the relationships:

$$N(t) = mF(t) = m\left[\frac{1 - \exp(-(p + q)\int_{t_0}^{t} x(t)dt)}{1 + \frac{q}{p}\exp(-(p + q)\int_{t_0}^{t} x(t)dt)}\right] \tag{11}$$

$$n(t) = mf(t) = m\left[\frac{x(t)p(p + q)^2\exp(-(p + q)\int_{t_0}^{t} x(t)dt)}{[p + q\exp(-(p + q)\int_{t_0}^{t} x(t)dt)]^2}\right] \tag{12}$$

Depending on the type of external action function $x(t)$, it is possible to determine the peak sales times and their number. Thus, in finding the function $x(t)$, we obtain predicted sales of an innovative product taking into account the factors of the external market (time, price, advertising, region, competition, *etc.*). We define this function as a generalizing characteristic of an innovative product that is already on the market.

3. Research methodology

When solving the task, finding the process of distributing an innovative product, it is suggested to use the following statistical and mathematical methods. To forecast sales of the innovative product 2017–2020, you need to use historical sales data for the product. Thus, when predicting global sales of computers, the historical period 1996–2016 was considered; when finding sales of Apple iPhone - the historical period 2007–2016; when finding the number of sales Global smartphone shipments - the historical period 2009–2016.

To check the time series for stationarity, use the Dickey-Fuller test (ADF-test). To approximate the time series, we use the regression analysis apparatus. When finding the optimal control of the external influence function, a method based on the Pontryagin maximum principle is used. The construction of the form of the external action function is based on the utility theory, namely, the utility function is constructed.

4. Theoretical foundation

Consider the process of spreading an innovative product on a time interval $[t_0, T]$ when optimizing the external impact function. It is necessary to predict the purchasing power of an innovative product with known sales at some historical period $[t_0, t_I]$ $(t_I < T)$. The parameters of the Bass model p, q, m are known. To find the characteristics of sales, we will use a method based on the Pontryagin maximum principle (Pontryagin *et al.* 1962). As a control function, we will consider the external action function. We will consider GBM.

5. Statement of problem

5.1 Statement of problem A: utility function

The equation of state of the system:

$$\frac{dN(t)}{dt} = (p + \frac{q}{m} N(t))[m - N(t)]V(t) \qquad (13)$$

Initial conditions:

$$N(t_0) = N_0 \qquad (14)$$

Management function has following form:

$$V(t) = x(t) \qquad (15)$$

The optimization function is given in the form:

$$\int_{t_0}^{t_I} U(t)dt + \alpha_1 N(t_I) \to \max \qquad (16)$$

where $U(t)$ - utility function (Mas-Colell *et al.* 1995).

Thus, it is necessary to maximize the integral equation (16) when the conditions (13)– (15) are fulfilled. To solve the problem, we apply the Pontryagin maximum method. We write the Hamiltonian function:

$$H(t) = \Psi(t)\{(p + \frac{q}{m} N(t))[m - N(t)]V(t)\} + U(t) \qquad (17)$$

where $\Psi(t)$ - auxiliary function.

For the auxiliary function transversality is carried out:

$$\Psi(t_I) = -\alpha_1 \qquad (18)$$

We consider the solution of the problem for various variants with respect to the optimization function.
Option A1. Consider the parameters of the optimization function in the form:

$$U(t) = 1 - \exp(-x(t)) \qquad (19)$$

The solution of the problem is reduced to the following system of equations:

$$\begin{cases} \dfrac{dN(t)}{dt} = (p + \dfrac{q}{m} N(t))[m - N(t)]x^*(t) \\ \dfrac{d\Psi(t)}{dt} = -[\Psi(t)x^*(t)(-p + q - \dfrac{2q}{m} N(t))] \end{cases} \qquad (20)$$

The initial conditions and transversality conditions have the form:

$$N(t_0) = N_0; \Psi(t_I) = -\alpha_2 \qquad (21)$$

The optimal control function:

$$x^*(t) = -\ln\{-\Psi(t)(p + q\frac{N(t)}{m})(m - N(t))\} \tag{22}$$

Option A2. Optimization function parameters:

$$U(t) = \ln(x(t)) \tag{23}$$

The solution of the problem reduces to the fulfillment of conditions (20) – (21), while the optimal control function has the form:

$$x^*(t) = \{-\Psi(t)(p + q\frac{N(t)}{m})(m - N(t))\}^{-1} \tag{24}$$

The solution of the corresponding problems leads to finding the external action function under the optimization conditions.

5.2 Statement of problem B: Least Squares (LS) in continuous production

It is necessary to find a refined model of GBM with the parameters found p, q, m in the historical period $[t_0, t_I]$ To do this, we find the external action function $x(t)$ in such a way that the square of the error of approximation of the refined Bass model and the original historical data was minimal. To solve this problem, we will use the Pontryagin maximum principle and call this algorithm the Integral Least Squares (ILS). As a result, we obtain the following relations:

The equation of state of the system:

$$\frac{dN(t)}{dt} = (p + \frac{q}{m}N(t))[m - N(t)]V(t) \tag{25}$$

Initial conditions:

$$N(t_0) = N_0 \tag{26}$$

Management function has following form:

$$V(t) = x(t) \tag{27}$$

The optimization function is given in the form:

$$\int_{t_0}^{t_I}[M(t) - n(t)]^2 dt + \alpha_2 N(t_I) \to \min \tag{28}$$

where $M(t)$ - historical data characterizing the distribution of an innovative product.

The solution of the problem is reduced to the following relations. The system of equations:

$$\begin{cases} \frac{dN(t)}{dt} = (p + \frac{q}{m}N(t))[m - N(t)]x^*(t) \\ \frac{d\Psi(t)}{dt} = -\{x^*(t)(-p + q - \frac{2q}{m}N(t))[\Psi(t) + 2(M(t) - (p + q\frac{N(t)}{m})(m - N(t))]\} \end{cases} \tag{29}$$

The initial conditions and transversality conditions have the form:

$$N(t_0) = N_0 ; \Psi(t_I) = -\alpha_2 \tag{30}$$

The optimal control function:

$$x^*(t) = \frac{\frac{\Psi(t)}{2} + M(t)}{(p + q\frac{N(t)}{m})(m - N(t))} \tag{31}$$

The fulfillment of relations (32) – (34) allows to obtain an optimal control function that characterizes the effect of external conditions on the process of distribution of an innovative product. In this case, the obtained model describes the historical data with a fairly accurate number of parameters (p, q, m, x(t)). To predict the further spread of the innovative product, it is necessary to obtain, as precisely as possible, the functional dependence of the external influence function on the factors of the historical period *x(t)* (time, price, advertising, *etc*.). This dependence can be obtained, for example, using multidimensional nonlinear regression analysis.

For one differential equation of the innovation product distribution in the form (31), the optimal external action function *x(t)* can be found more simply as a solution of the algebraic equation. In the future, when modeling the process of product promotion to the market, it will be necessary to consider the solution of more complex systems. We arrive at this formulation of the problem by taking into account the following effects in the process of distribution of the innovative product: the effect of interaction of one region on another (Kumar and Krishnan, 2002); the impact of one brand on another (Kalish *et al.* 1995, Krishnan *et al.* 2000, Lasiana *et al.* 2014, Guseo and Mortarino 2014), the uneven distribution of income among the population (Kandler and Steele 2009), accounting for competition and competing innovations for assistance of Lotka-Volterra model (Hung *et al.* 2014), consideration of two markets of early and basic (Muller and Yogev 2006), etc.

When considering the process of distribution of an innovative product taking into account the above effects, the proposed method of the Pontryagin maximum principle can be used to find the optimal function of the external action *x(t)*.

6. Numerical results

6.1 Global smartphone shipments

Consider the forecasting of sales of Global smartphone shipments 2017 – 2020 based on historical data 2009 - 2016. Table 1 presents the sales figures and the average price of smartphone sales in the historical period.

Table 1. Average price and quantity of sales Global smartphone shipments

Parameters	2009	2010	2011	2012	2013	2014	2015	2016
Global smartphone shipments, X_t, mln units	173.5	304.7	494.5	725.3	1,018.7	1,301.7	1,437.2	1,470.6
Global average selling price of smartphones, Pt, $	-	440	420	381	333	310	305	283
Global average selling price of smartphones, Prt	-	1.0000	0.9545	0.8659	0.7568	0.7045	0.6932	0.6432

Source: https://www.statista.com/statistics/263441/global-smartphone-shipments-forecast/; https://www.statista.com/statistics/510668/smartphone-average-selling-price-worldwide/; own calculations

In modeling the process of product distribution, we will consider two models: Model A and Model B.

Model A.

This model is based on obtaining characteristics of the Bass model on the basis of equation (8). Analyzing the data in Table 1, we get the following numerical values of the Bass model: p = 0.024615; q = 0.577041; m = 9,558.26 million units, while the regression equation (8) has the form: R^2 = 0.997; R^2_{adj} = 0.996; p_{value} = 0.

Model B.

By analogy with (8), we find the parameters of the Bass model on the basis of the following relation:

$$X_t = N_t - N_{t-1} = p(m - N_t) + \frac{q}{m} N_t(m - N_t) + \varepsilon_t = a + bN_t + cN_t^2 + \varepsilon_t \qquad (32)$$

Using (9), we obtain: $p = 0.007890; q = 0.437454; m = 13{,}034.81$ million units. The main characteristics of the regression equation (32): $R^2 = 0.9997; R^2_{adj.} = 0.9996; p_{value} = 0$.

To find future sales, we will use the relation (32), in which we substitute the condition $N_t = N_{t-1} + X_t$. Let us find the solution of the equation obtained with respect to the parameter X_t:

$$X_t = \{-(b-1) \pm [(b-1)^2 - 4(N_{t-1} + a)c]^{1/2}\}/(2c) - N_{t-1} \qquad (33)$$

Using the ratios $a = pm$; $b = q - p$; $c = -q/m$, you can get an indicator of the amount of future sales relative to the parameters of the Bass model. Taking into account the external influence function $x(t)$, the relation (33) takes the form:

$$X_t = \{-(b_1 - 1) \pm [(b_1 - 1)^2 - 4(N_{t-1} + a_1)c_1]^{1/2}\}/(2c_1) - N_{t-1} \tag{34}$$

where $a_1 = ax(t)$; $b_1 = bx(t)$; $c_1 = cx(t)$.

Considering the historical period, one can obtain the value of the external function *x(t)* for the proposed models. This function is found from the relation (10) using historical sales data. Table 2 shows the distribution of the external action function, in which the real sales of Global smartphone shipments coincide with the values obtained using the Bass model (10).

Let's find the regression equation in the interval 2010 – 2016 for finding the external function of the impact, depending on the time parameters and the sales price (*Pr*):

$$x(t) = a_0 + a_1 t + a_2 \Pr_t \tag{35}$$

Table 2: External action function for global smartphone shipments

Parameters	Model	2010	2011	2012	2013	2014	2015	2016
t		1	2	3	4	5	6	7
X(t)	Model A	0.9253	1.0182	1.0137	1.0195	1.0087	0.9709	1.0126
	Model B	0.9838	1.0137	1.0114	0.9862	0.9966	1.0114	0.9929

Source: own calculations.

The characteristics of the regression equation (35): R^2; R^2_{adj}; p_{value}. Table 3 presents the parameters of the regression equations describing the external action function.

Table 3: Characteristics of regression equations

Model	Model parameters					
	a_0	a_1	a_2	R^2	$R^2_{adj.}$	p_{value}
Model A	1.2773*	-0.0123	-0.2895	0.1856	-0.2216	0.6632
Model B	0.9864***	-0.0004	0.0213	0.1244	-0.3134	0.7667

Note: *, **, *** - Significant at 10%, 5%, 1% critical level
Source: own calculations.

Table 4 presents the distribution of sales of Global smartphone shipments in 2017–2020, depending on various options for the pricing policy of the firm. As a base price in forecasting, we use the price of the product in 2016. Option1 corresponds to the pricing policy at the base period level; Option 2 - increase in price every year by 5% compared to the base year; Option 3 - price reduction every year by 5% compared to the base year.

Table 4: Forecasting sales of Global smartphone shipments

Characteristics of the model	X_t million units				Selling price, P_t,$			
	2017	2018	2019	2020	2017	2018	2019	2020
Model A (*m*= 9,558.26 mln units)								
Bass Model ($x(t) = 1$)	1,165.36	752.58	398.87	183.63	-	-	-	-
Option 1	1,156.43	741.23	396.05	187.87	283	283	283	283
Option 2	1,145.58	731.55	394.49	191.89	297	311	325	340
Option 3	1,167.28	750.72	397.07	183.27	269	255	241	226
Model B (*m*= 13, 034.81 mln units)								
Bass Model ($x(t) = 1$)	1,358.22	1165.26	942.51	729.25	-	-	-	-
Option 1	1,354.71	1162.67	941.07	728.82	283	283	283	283
Option 2	1,355.53	1163.86	942.17	729.59	297	311	325	340
Option 3	1,353.88	1161.48	939.96	728.04	269	255	241	226

Source: own calculations.

When building a Bass model, one of the main characteristics is the total number of potential buyers. Consider how the Bass indicators are converted if the cumulative quantity of buyers' changes. Suppose that the innovation coefficient p remains unchanged, and the total number of customers m changes and, accordingly, the imitation coefficient q changes. In Appendix A (Table A.1), the parameters of the models considered for finding the external function (35) and the number of sales of Global smartphone are presented, depending on the change in the number of cumulative sales (Table A.2).

6.2 Apple iPhone worldwide

Consider the unit sales of the Apple iPhone worldwide 2017–2020. Table 5 presents the sales figures and the average selling price for Apple iPhone in the historical period 2007–2016.

Table 5: The average price and the number of Apple iPhone sales

Parameters	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Unit sales of the Apple iPhone worldwide, X_t, mln units	1.39	11.63	20.73	39.99	72.29	125.05	150.26	169.22	231.22	211.88
Average selling price of Apple iPhone, P_t, $	-	621	623	703	712	686	669	680	717	651
Average selling price of Apple iPhone, Pr_t	-	1,000	1,003	1,132	1,147	1,105	1,077	1,095	1,155	1,048

Source: https://www.statista.com/statistics/276306/global-apple-iphone-sales-since-fiscal-year-2007/;
https://www.statista.com/statistics/612937/smartphone-average-selling-price-iphone-and-android/; own calculations

To find the parameters of the Bass model, we will apply the algorithm proposed in 6.1. The main numerical characteristics of the proposed models are presented in Table 6.

Table 6: Bass model parameters

Model	p	q	M	R^2	$R^2_{adj.}$	p_{value}
Model A	0.0155	0.6173	1371.70	0.9685	0.9580	0***
Model B	0.0035	0.4554	1887.25	0.9856	0.9815	0***

Note: *, **, *** - Significant at 10%, 5%, 1% critical level
Source: own calculations.

Table 7 presents the parameters of the regression equations describing the external action function. Table 8 presents the distribution of sales of Apple iPhone worldwide in 2017–2020, depending on various options for the pricing policy of the firm. Changing the amounts of total sales, we obtain the corresponding parameters of the constructed models (Appendix B, Table B.1) to find the external impact function (35) and the estimated number of Apple iPhone sales (Table B.2) in the interval 2017–2020.

Table 7. Characteristics of regression equations

Model	Model parameters					
	a_0	a_1	a_2	R^2	$R^2_{adj.}$	p_{value}
Model A	-1.9205	0.0208	2.5493**	0.6517	0.5357	0.0422**
Model B	-0.0067	-0.0049	0.9544*	0.4584	0.2779	0.1588

Note: *, **, *** - Significant at 10%, 5%, 1% critical level
Source: own calculations.

Table 8. Forecasting sales of Apple iPhone worldwide

Characteristics of the model	X_t million units				Selling price, P_t,$			
	2017	2018	2019	2020	2017	2018	2019	2020
Model A (m= 1,371.70 mln units)								
Bass Model ($x(t) = 1$)	162.47	97.22	46.47	19.51	-	-	-	-
Option 1	155.93	98.35	49.91	21.37	651	651	651	651
Option 2	177.64	112.19	41.30	6.77	684	716	749	781
Option 3	134.22	78.66	43.32	23.78	618	586	553	521

Characteristics of the model	X_t million units				Selling price, P_t,$			
	2017	2018	2019	2020	2017	2018	2019	2020
Model B (*m*= 1,887.25 mln units)								
Bass Model ($x(t) = 1$)	197.26	166.82	132.95	101.39	-	-	-	-
Option 1	187.69	160.18	129.53	100.62	651	651	651	651
Option 2	196.41	172.43	140.45	107.54	684	716	749	781
Option 3	178.82	147.01	116.21	89.63	618	586	553	521

Source: own calculations.

6.3 Global Personal Computers market

Table 9 shows the unit sales to the global PC market (desktop computers, laptop computers, netbooks) in the period 1996–2016.

Table 9: Unit sales to global PC market (mln unit)

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
N(t)	70.9	80.6	92.9	113.5	134.7	128.1	132.4	168.9	189.0	218.5	239.4
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
N(t)	271.2	302.2	305.9	351.0	352.8	352.7	316.0	315.9	288.7	269.7	

Source: https://en.wikipedia.org/wiki/Market_share_of_personal_computer_vendors

Table 10 shows the average selling price of desktop PC in the period 2005–2016.

Table 10: Average selling price of desktop PC

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
P_t, $	805	726	727	692	615	605	593*	581*	569*	557*	544	530*
Pr_t	1.000	0.902	0.903	0.860	0.764	0.752	0.737	0.722	0.707	0.692	0.676	0.658

Note: * - values are obtained by approximating the data
Source: https://www.statista.com/statistics/203759/average-selling-price-of-desktop-pcs-worldwide/, own calculations.

To find the parameters of the Bass model, we will apply the algorithm proposed. The main numerical characteristics of the proposed models are presented in Table 11. Table 12 presents the parameters of the regression equations describing the external influence function in the interval 2005-2016. Table 13 presents the distribution of sales of global PC market in 2017–2020, depending on various options for the pricing policy of the firm.

Table 11: Parameters of the Bass model (1996-2016)

Model	*p*	*q*	*m*	R^2	$R^2_{adj.}$	p_{value}
Model A	0.0088	0.1974	6267.19	0.9790	0.9765	0***
Model B	0.0064	0.1808	6857.43	0.9773	0.9748	0***

Note: *, **, *** - Significant at 10%, 5%, 1% critical level
Source: own calculations.

Table 12: Characteristics of regression equations

Model	Model parameters					
	a_0	a_1	a_2	R^2	$R^2_{adj.}$	p_{value}
Model A	1.4581***	-0.0126	-0.4811	0.1961	0.0174	0.3745
Model B	1.6983***	-0.0205	-0.7259	0.2569	0.0918	0.2628

Note: *, **, *** - Significant at 10%, 5%, 1% critical level
Source: own calculations.

Table 13: Forecasting sales of global PC market

Characteristics of the model	X_t million units				Selling price, P_t,$			
	2017	2018	2019	2020	2017	2018	2019	2020
Model A (*m*= 6,267.19 mln units)								
Bass Model ($x(t) = 1$)	246.26	217.97	189.74	162.73	-	-	-	-
Option 1	240.66	210.93	182.28	155.67	530	530	530	530
Option 2	236.76	204.44	174.45	147.50	557	583	610	635
Option 3	244.56	217.38	189.97	163.49	504	477	451	424
Model B (*m*=6,857.43 mln units)								
Bass Model ($x(t) = 1$)	260.51	238.32	215.66	193.26	-	-	-	-
Option 1	255.13	229.44	204.59	181.15	530	530	530	530
Option 2	249.65	219.90	192.29	167.21	557	583	610	635
Option 3	260.58	238.85	216.50	194.29	504	477	451	424

Source: own calculations.

Appendix C presents the parameters of Models A and B for determining the external impact function (35) (Table C.1) and the number of sales of the Global PC market in 2017–2020 (Table C.2).

Consider the application of the obtained Problem A and Problem B for forecasting unit sales to global PC market in 2017–2020.

Consider the solution of Problem A. As a numerical example, consider Model B, the parameters of which are: p = 0.006338, q = 0.180771, m = 6,857.432 million units. We shall find models for the propagation of a product with allowance for the obtained optimal values of the external functions, depending on the proposed utility functions. Figure 1 shows the functions of controlling $x^*(t)$ the external impact for various models of product distribution.

Figure 1: Optimal control functions $x^*(t)$ for Problem A

Source: own calculations.

Based on the obtained opiate solution, Table 14 shows the sales values of the Global PC market for different models.

Table 14: Number of Global PC market sales, (mln units)

Model	2017	2018	2019	2020
Bass model	260.51	238.32	215.66	193.26
Option A1	270.00	244.52	218.48	192.87
Option A2	270.07	244.60	218.57	192.97

Source: own calculations.

Consider the solution of Problem B. The parameters of the Bass model are the same as in Problem A. The optimal control function, which satisfies condition (28) is a solution to the implementation of ILS. Table 15 shows the distribution of the external action function of the Bass model, obtained by analytical and numerical methods. In the numerical implementation, we set the following initial data: α_2 = - 6.425; N(1996) = 70.9 million units.

Table 15: The distribution of the external influence function in the Bass model

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
$x(t)$	1.273	1.163	1.099	1.107	1.095	0.904	0.828	0.928	0.923	0.955	0.949
$x^*(t)$	1.547	1.277	1.155	1.141	1.110	0.910	0.851	0.968	0.963	0.996	0.987
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
$x(t)$	0.985	1.020	0.978	1.079	1.064	1.065	0.972	1.006	0.965	0.958	
$x^*(t)$	1.022	1.050	1.003	1.100	1.078	1.075	0.981	1.014	0.976	0.970	

Source: own calculations.

An analysis of the solution obtained shows that the proposed algorithm for numerical solution (ILS) makes it possible to obtain a solution of the problem posed with a good degree of accuracy and coincides with the analytical solution in the nature of the distribution. Finding this function on the basis of solving the control problem will be needed when constructing a more complex model of the process of distribution of an innovative product, where it is necessary to consider a system of differential equations (for example, the early and the main diffusion period).

For further research, we check the external function for stationarity. To test the time series for stationarity, we use the extended Dickey-Fuller test (ADF-test) (Dickey and Fuller 1979). According to this test, the hypothesis of stationarity of this series is accepted.

7. Results

The paper considers a unified approach for determining future sales of an innovative product. This approach is based on the Bass model.

Future sales of Global smartphone are forecasted based on historical data 2009–2016. When modeling the process, use the time parameters and sales prices for the historical period. Indicators of the Bass model are based on the obtained coefficients of the regression equation. Two models of the product distribution process are considered. Model A is based on the relation (8) proposed by Bass (1994), and the coefficients of Model B are found from the relation (32). The peculiarity of Model B is that sales at the current time are based on total sales at this point in time. This can be obtained only in the historical period when real sales of the goods are known. An algorithm for obtaining predicted sales based on total sales in the previous period is proposed. The function of external influence is approximated by the parameters of time and sale price. The parameters of the regression equations allow us to speak about the adequacy of the models obtained. Analysis of the results shows that the process of distribution of the Global smartphone according to the Bass model takes place on a decreasing trajectory. According to the calculations received for Model A in 2017, it is planned to sell 1,167 million units, and in 2020 - 183 million units with a total sales market of 9,558 million units. Model B assumes a total sales market of 13,034 million units and a corresponding sale in 2017 will be 1,358 million units, and in 2020 - 728 million units. It is proposed to consider the number of future sales, depending on the price of the goods. Model B calculations show that when the product price is reduced / increased by 5% each year in relation to the base year 2016, there is an increase / decrease in sales by an average of 2.5% in 2017; 2018 - 5.3%; 2019 - 8.4%; 2020 - 12.3%. With an increase in the total sales market by 20% from 15,000 to 18,000 million units, there is an increase in sales at a constant and decreasing price and a decrease in sales - with an increasing price. Thus, according to Model B, at a constant price, there is an increase in sales in 2017 - by 0.2%; 2018 - 0.9%; 2019 - 1.5%; 2020 - 1.7%, and with a 5% price decrease, there is an increase in sales: 2017- 1.6%; 2018 - 4.2%; 2019 - 7.3%; 2020 - 10.7%.

When forecasting the unit sales of the Apple iPhone worldwide 2017–2020 we use historical sales data for 2007–2016. As a base price, we will use the 2008 sales price. In modeling future sales, we will use two prediction models that use time and price parameters. The characteristics of the regression equations obtained show the adequacy of the models obtained. The results of the calculations show that sales of Apple iPhone are increasing both with the increase in the price of the product, and with the increase in the total sales market. Increasing the market by 20% from 2,500 to 3,000 million units, there is an increase in sales at a constant price: in 2017 - by 2.3%; 2018 - 5.0%; 2019 - 7.9%; 2020 - 10.9%, and with an increase in price by 5% there is an increase in sales: 2017 - 4.8%; 2018 - 10.8%; 2019 - 18.1%; 2020 - 26.5%. On average, with an increase / decrease in the price by 5%, there is an increase / decrease in the number of sales in 2017 - by 8.8%; 2018 - 17.1%; 2019 - 23.4%; 2020 - 26.9%. The result can be analyzed as follows. The company conducts a very good marketing policy to promote this product on the market and therefore the price of the goods is not the main indicator of sales. There are other parameters that reflect the competitiveness of this product in the market (advertising, product quality, brand, *etc*.).

To obtain an adequate model, it is necessary to use not only the price of the product as parameters of sales, but also additional variables reflecting the characteristics of the product.

To forecast sales of the Global PC market, the historical period 1996–2016 is considered. Calculations of future sales are based on two models that use the theory of Bass. For forecasting sales, you can use the utility function, which depends on the external action function. The external function is approximated by the time parameters and the average selling price of desktop PC. The above calculations show that according to the Bass model, there is a decrease in PC sales in 2017–2020 from 260 million units to 193 million units. A similar result is also obtained in the modeling of sales, taking into account the utility function: a decrease from 270 million units to 192 million units. Accounting for the influence of the utility function is manifested in finding the optimal function of external influence on the entire product distribution interval. The form of the utility function characterizes the company's attitude to risky operations in the market. The forecast based on the use of refined Model B shows that increasing the market by 43% from 7,000 to 10,000 million units, there is a decrease in the number of sales at a constant price: 2017 - by 1.4%; 2018 - 2.3%; 2019 - 4.0%; 2020 - 6.9%, and with a 5% price decrease, there is an increase in sales: 2017-1.5%; 2018 - 4.5%; 2019 - 8.0%; 2020 - 11.9%, while the general tendency of decrease in the number of sales remains.

8. Discussion

When predicting the propagation of the products under investigation, the classical Bass model was used as a basis (Bass 1969, 1994). In this model, its parameters are based on a regression equation in which future sales are based on cumulative previous sales. It is proposed to find future current sales on the basis of cumulative sales during this period. For this, a recurrence formula is proposed for finding the predicted quantity of product sales based on cumulative sales in the previous period. The parameters of the Bass model obtained by this formula reflect the dynamic process of product distribution and the indicator of cumulative potential users increases in comparison with the calculations obtained using the classical Bass model.

The results of the research show that the simulation of the process of distribution of an innovative product can be carried out using the Pontryagin maximum principle method. The main problem in the study of this method is the assignment of an integral optimization function. It is proposed to set this function on the basis of the utility function. The choice of the utility function depends on the company's attitude to risky operations in the market and on the marketing policy of the firm. The use of the Pontryagin maximum principle device in the process of distribution of an innovative product is universal and suitable for almost all products on the market. The determination of the external action function in the form of an optimal control function makes it possible to obtain an improved Bass model. The form of this function allows you to get predictable sales of the product depending on independent variables: the sales price, advertising costs and other marketing parameters. Discussion is the question of both the choice of these variables in the construction of the model, and their mathematical form.

Conclusions

A unified approach is proposed for determining the process of distribution of an innovative product, based on the classical Bass model. The number of future sales is proposed to be found by the recurrence formula, depending on the cumulative sales in the previous period. To optimize the product distribution process, it is proposed to use the Pontryagin maximum principle. As a criterion of optimality, it is proposed to use utility functions, the kind of which depends on the company's attitude to risky operations in the market. The analysis of the obtained results shows that the external influence exerts a significant influence on the process of distribution of the innovative product. The choice of the function of this influence is one of the main tasks in the construction of the diffusion model. It is proposed to find this function using the Pontryagin maximum principle method.

The obtained updated model of Bass makes it possible to obtain predictable sales of the innovative product for the period 2017–2020. As an example, the following innovative products were considered: Global PC market, Global smartphone shipments, Apple iPhone. As a result of the calculations, the following main conclusions can be drawn. The PC market in 2017–2020 tends to decrease: 2017 - 264 million units, 2018 - 248 million units, 2018 - 237 million units 2018 - 222 million units with a total sales market of 10,000 million units. Sales of Global smartphone shipments in 2017–2020 will decrease from 1,389 million units to 878 million units, with a total sales market of 15,000 million units. The number of sales of Global PC and Global smartphone can be increased by reducing the price. Sales of Apple iPhone in the period under investigation 2017–2020 has the following trend: 2017 - 234 million units, 2018 - 249 million units, 2018 - 249 million units, 2018 - 236 million units with a total sales market of 3,000 million units. Unlike PC and smartphone sales, you can increase the number of

Apple iPhone sales by increasing the price of the product. This indicates a very good marketing activity of this company.

On the basis of the obtained results, it can be concluded that the found updated models allow obtaining predictable characteristics of sales of innovative products. The characteristics of the obtained models indicate their adequacy.

The subject of further research can be the production of a multidimensional nonlinear regression equation for finding the optimal control function. As independent variables, external factors affecting the distribution of the innovative product can be used. The process of distribution of innovative product is also influenced by other factors: the presence of the brand; accounting of competitors; regional characteristics of product distribution; availability of early and late markets, etc. The construction of models that take into account these factors and compare the results with other models can also be the subject of further research.

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References

[1] Babenko, V., Nazarenko, O., Nazarenko, I., Mandich, O., and Krutko, M. 2018. Aspects of program control over technological innovations with consideration of risks. *Eastern-European Journal of Enterprise Technologies*. 3/4 (93): 6-14. DOI: 10.15587/1729-4061.2018.133603

[2] Babenko, V., Romanenkov, Yu., Yakymova, L., and Nakisko, A. 2017. Development of the model of minimax adaptive management of innovative processes at an enterprise with consideration of risks. *Eastern-European Journal of Enterprise Technologies*. 5(4): 49-56. DOI: 10.15587/1729-4061.2017.112076

[3] Bass, F. M. 1969. A New Product Growth Model for Consumer Durables. *Management Science*, 15(5): 215–227. DOI: https://doi.org/10.1287/mnsc.15.5.215

[4] Bass, F. M., Krishnan, T. V. and Jain, D. C. 1994. Why the Bass Model Fits Without Decision Variables, *Marketing Science*, 13(3): 203–223. DOI: https://doi.org/10.1287/mksc.13.3.203

[5] Chandrasekaran, D. and Tellis, G. J. 2007. A Critical Review of Marketing Research on Diffusion of New Products. In Naresh K. Malhotra, *Review of Marketing Research*, 3: 39–80.

[6] Cooper, R.G. and Kleinschmidt, E. J. 1990. *New Products: The Key Factors in Success*. Chicago: American Marketing Association.

[7] Dickey, D. A. and Fuller, W. A. 1979. Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, 74(366): 427–431. DOI: http://dx.doi.org/10.1080/01621459.1979.10482531

[8] Franses, P. H. 2003. The diffusion of scientific publications: The case of Econometrica, 1987. *Scientometrics,* 56(1): 29–42. DOI: https://doi.org/10.1023/A:1021994422916

[9] Franses, P. H. 2009. *Forecasting Sales*. Econometric Institute. Erasmus University. Rotterdam. Econometric Institute, Report 2009-29.

[10] Fruchter, G. E., Van den Bulte, C. 2011. Why the Generalized Bass Model leads to odd optimal advertising policies. *International Journal of Research in Marketing*, 28(3): 218–230. DOI: https://doi.org/10.1016/j.ijresmar.2011.03.005

[11] Guseo, R. and Mortarino, C. 2014. Within-brand and cross-brand word-of-mouth for sequential multi-innovation diffusions. *IMA Journal of Management Mathematics*, 25(3): 287–311. DOI: https://doi.org/10.1093/imaman/dpt008

[12] Hung, H.-C., Tsai, Y.-S. and Wu M.-C. 2014. A modified Lotka-Volterra model for competition forecasting in Taiwan's retail industry. *Computers & Industrial Engineering*, 77: 70–79. DOI: https://doi.org/10.1016/j.cie.2014.09.010

[13] Kalish, S., Mahajan, V. and Muller, E. 1995. Waterfall and Sprinkler New-Product Strategies in Competitive Global Markets. *International Journal of Research in Marketing*, 12(2): 105–119. Available at: https://doi.org/10.1016/0167-8116(94)00008-C

[14] Kandler, A. and Steele J. 2009. Innovation Diffusion in Time and Space: Effects of Social Information and of Income Inequality. The Open-Access *Journal for the Basic Principles of Diffusion Theory. Experiment and Application,* 11(3): 1–17. Available at: diffusion-fundamentals.org

[15] Kotsemir, M. and Meissner, D. 2013. *Conceptualizing the innovation process-trends and outlook. Basic research program*, Working papers, Series: science, technology and innovation. WP BPR 10/STI/2013. DOI: http://dx.doi.org/10.2139/ssrn.2249782

[16] Krishnan, T. V., Bass, F. M., Kumar, V. 2000. Impact of a Late Entrant on the Diffusion of a New Product/Service. *Journal of Marketing Research,* 37 (2): 269–278. DOI: https://doi.org/10.1509/jmkr.37.2.269.18730

[17] Krishnan, T. V., and Jain, D. C. (2006). Optimal Dynamic Advertising Policy for New Products. *Management Science*, 52 (12): 1957–1969. DOI: https://doi.org/10.1287/mnsc.1060.0585

[18] Kumar, V. and Krishnan, T. V. 2002. Multinational Diffusion Models: An Alternative Framework. *Marketing Science,* 21(3): 318–330. DOI: http://www.jstor.org/stable/1558047

[19] Laciana, C. E., Gual, G., Kalmus, D., Oteiza-Aguirre, N. and Rovere, S. L. 2014. Diffusion of two brands in competition: Cross-brand effect. *Physica A: Statistical Mechanics and its Applications,* 413(C): 104–115. DOI: https://doi.org/10.1016/j.physa.2014.06.019

[20] Mas-Colell, A., Whinston, M. D. and Green, J. R. 1995. *Microeconomic Theory*. Oxford University Press.

[21] Marinova, D. and Phillimore J. 2003. Models of innovation. In Shavinina L.V. (Ed.). *The International Handbook on Innovation*. Oxford. Elsevier: 44–53.

[22] Mesak, H. I., and Clark, J. W. 1998. Monopolist optimum pricing and advertising policies for diffusion models of new product innovations. *Optimal Control Applications & Methods*, 19(2): 111–136. DOI: 10.1002/(SICI)1099-1514(199803/04)

[23] Muller, E. and Yogev, G. 2006. When does the majority become majority? Empirical analysis of the time at which main market adopters purchase the bulk of our sales. *Technol. Forecasting and Soc. Change*. 73(9): 1107–1120. DOI: DOI: 10.1016/j.techfore.2005.12.009

[24] Oliinyk, V. 2017. Optimal Management of the Enterprise's Financial Flows. *Journal of Advanced Research in Law and Economics,* Volume VIII, îFall, 6(28): 1875–1883. DOI: https://doi.org/10.14505/jarle.v8.6(28).22

[25] Oliinyk, V., Kozmenko, O., Wiebe I., and Kozmenko, S. 2018. Optimal Control over the Process of Innovative Product Diffusion: The Case of Sony Corporation. *Economics and Sociology*, 11(3): 265–285. DOI: 10.14254/2071- 789X.2018/11-3/16

[26] Pontryagin, L.S, Boltyanskii, V.G, Gamkrelidze, R.V. and Mishchenko, E.F. 1962. *The mathematical theory of optimal processes*. New York-London. Intersciene Publishers John Wiley & Sons, Inc.

[27] Sultan, F., Farley, J. U. and Lehmann, D. R. 1990. A Meta-Analysis of Applications of Diffusion Models. *Journal of Marketing Research*, 27(1): 70–77. DOI: http://www.jstor.org/ stable/3172552

[28] Talukdar, D., Sudhir, K. and Ainslie, A. 2002. Investigating New Product Diffusion Across Products and Countries. *Marketing Science*, 21(1): 97–114. DOI: https://doi.org/10.1287/mksc.21.1.97.161

[29] Teng, J.-T. and Thompson, G. L. 1985. Optimal strategies for general price-advertising models. In G. Feichtinger (Ed.). *Optimal Control Theory and Economic Analysis*, 2, Amsterdam: North-Holland; 183–195.

[30] Van Den Bulte, C. and Stremersch, S. 2004. Social Contagion and Income Heterogeneity in New Product Diffusion: A Meta-Analytic Test. *Marketing Science*, 23(4): 530–544. DOI: https://doi.org/10.1287/ mksc.1040.0054

*** Market share of personal computer vendors. https://en.wikipedia.org/wiki/Market_share_of_personal_ computer_vendors

*** Average selling price of desktop personal computers (PCs) worldwide/ https://www.statista.com/statistics/203759/average-selling-price-of-desktop-pcs-worldwide/

*** Global smartphone shipments forecast. https://www.statista.com/statistics/263441/global-smartphone-shipments-forecast/

*** Average selling price of smartphones worldwide/https://www.statista.com/statistics/510668/smartphone-average-selling-price-worldwide/

*** Unit sales of the Apple iPhone worldwide. https://www.statista.com/statistics/276306/global-apple-iphone-sales-since-fiscal-year-2007/

*** Apple iPhone and Android smartphone average selling price. https://www.statista.com/statistics/612937/smartphone-average-selling-price-iphone-and-android

The Effect of Dynamic Capability, User Ethics, and Top Management Support on the Quality Management Accounting Information Systems and Their Impact on the Quality of Decision Making. An Empirical Case of Local Governments in Indonesia

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Abstract:

This research aimed to predict to what degree dynamic capabilities, user ethics, and top management support influence management accounting information systems and the impact on quality decision making. Data in this research was collected through a questionnaire distributed to 128 municipalities and districts throughout West Java and Bali, Indonesia. The data analysis used for hypothesis testing was an approach using structural equation modelling with partial least squares. The research shows that dynamic capability and top management support have a significant influence upon the quality of management accounting information systems, but user ethics has no significant influence. Quality of management accounting information systems, dynamic capability, user ethics, and top management support have a significant influence upon the quality of decision making.

Keywords: dynamic capabilities; ethics; top management support; management accounting information system quality; decision-making

JEL Classification: D8; H7

Introduction

The high demand for transparency and accountability in local governments' performance has prompted governments to continue to innovate. Local governments are required to be more professional in managing all their resources, and able to accelerate in order to improve the implementation in all aspects, through creative and innovative policies tailored to the characteristics, abilities, and local wisdom in their respective regions. To improve the performance of local governance through regional innovation cannot be separated from the improvement of accounting information systems' quality so that regions can advance and also dare to make innovations. Local governments need an accounting information system that allows local financial managers to perform financial operations and automation of local financial reporting based on accounting principles contained in PP 71 the Year 2010.

In the local government environment, dynamic capability can be regarded as the ability of the government to perform various internal and external changes with its capacity to realize good governance through various policies (Neo and Chen 2007, Teece *et al.* 1997) Local governments are required to be more adaptive and anticipative to changes that occur in society, such as through public service innovation. Public service innovation is a must for local government, and one of the required changes is bureaucracy reformation. Implementation of

bureaucratic reforms in local government is still far from expectations. Based on an evaluation of the results of bureaucracy reform in 32 provincial governments, only three provincial governments had a Bureaucracy Reform Index above 60 ("Good" category), representing only 8.82% of the provincial population in Indonesia. For the regency or municipal government, the implementation of bureaucratic reform is worse than for the provincial government. Based on evaluation results of bureaucracy reform at 52 regency cities as evaluated in a pilot project, only five regency or municipal governments, or 0.97% of the 514 areas in Indonesia, had a Bureaucracy Reform Index above 60.

In addition to the issue of bureaucratic reform, there are also problems related to the performance accountability of government agencies. Based on the results of an evaluation of performance accountability of government agencies over the six years from 2010 until 2015 from the Ministry of Administrative Reform and Bureaucracy Reform (PAN-RB), as much as 91.8% of government agencies at the level of district and city were included in categories C, CC, and D, which means that they did not yet have a good system for managing performance. The current systems still needed much improvement and were shown to be unreliable. Other problems regarding the quality of management accounting information systems in local government can be seen from the results of a BPK RI examination of 533 LKPD, which showed that there were 6,150 internal control system weaknesses consisting of problems of accounting and reporting control systems, weaknesses in control system implementation of revenue and expenditure budgets, and weaknesses in internal control structure.

The other factors that affect the information system are ethics (Dillard and Yuthas, 2001). Phenomena related to ethical violations occur in many local governments, especially the problem of corruption. Base on data from the Ministry of Home Affairs, 343 district heads are in jurisdictions in the prosecutor's office, the police, and the Corruption Eradication Commission (KPK). Corruption in the management of local finances mostly derives from budgeting, taxes and levies, procurement of goods and services, grants and expenditures, and travel expenses. This is due to the lack of integrity, the lack of e-procurement, and the bureaucracy's vulnerability to the intervention of outside interests. In addition to the problem of corruption, ethical issues are also caused by integrity issues. Integrity is necessary in order to ensure a government that is clean and free of fraud. However, based on the Government Institution Performance Accountability Report in the Year 2015, the implementation of integrity systems in every government agency is still low.

The quality of an accounting information system is also influenced by top management support/leadership support. In the Regional Government, the regional head has a major contribution to the successful implementation of government activities. It can be said that the advancement of an area depends on the political will of the regional head. The phenomenon associated with top management's support in implementing the information system is seen in the Report on the Evaluation of the Performance Accountability System in Government Agencies (SAKIP) which shows far-reaching results. This is due to the lack of support from the leadership. Therefore, this study was conducted to determine the effect of dynamic capability, user ethics and top management support on the quality of management accounting information systems and their impact on the quality of decision making.

1. Literature review

1.1 Effect of dynamic capability on the quality of management accounting information systems

Organisations operate in an environment that cannot be fully understood (Burisch and Wohlgemuth 2016). The ever-changing environment will affect the design of management accounting information systems in an organisation (Strimuckas and Valanciene 2010, 377; Weetman 2010, 469) Dynamic capability requires an accounting information system that is capable of meeting the information needs for decision making within the ever-changing business environment situation. Therefore, the dynamic capability also demands a dynamic accounting information system. Organisations capable of identifying the external environment will be more effective in the use of accounting information systems (Kloviene and Gimzauskiene 2015). In other words, accounting information systems must be flexible so that they can assist decision making in a dynamic business environment (Prasad and Green 2015) and can facilitate changes and dynamic capability in ways that an organisation can respond to within rapidly changing environments (Sher and Lee 2004, Wohlgemuth and Wenzel 2015).

The government can create conditions for the growth and development of its people through policies, implementation, and evaluation. The government should be able to create a productive and innovative environment continuously by improving ways that can improve the quality of service. In other words, the government is required to perform dynamic governance (dynamic government capability). The key to dynamic governance lies in human resources and processes (Neo and Chen 2007, 383).

H1: Dynamics capability affects the quality of management accounting information systems

1.2 Effect of user ethics on quality management accounting information systems

Accounting is inseparable from various standards and regulations. Therefore, the quality of financial reporting (both for external and internal parties) closely related to the accounting information system cannot be separated from compliance with various regulations. Higher-quality financial reporting is judged by compliance with laws /rules or standards. Ethical behavior builds on knowledge, commitment, work ethic, and other factors that are not always related to the law. Ethical behavior will affect the quality of financial reporting, for example, through the prevention of earnings management (Labelle *et al.* 2010). This is in line with the results of research by Mulyani *et al.* 2016, which states that behavior is a factor affecting the success of the use of information systems.

Research conducted by Taicu (2013) states that professional organizations of management accountants around the world have developed professional ethical standards. Further Rogerson *et al.* (2000) state that ethical issues related to the implementation of information systems. This means that the increase in ethical behavior must be applied carefully and validated through employment, hence in this way it will improve ethical behavior in the use of information systems. Similar statements are also expressed by Ballantine *et al.* 2000 in the results of their research, which finds that ethical issues are important and cannot be separated from the information system. Furthermore, Olumoye (2013) reveals that ethics, in this case, related to the responsibility and accountability of a person, is necessary for activities for the development of information systems. The ethical framework should be integrated into the design of the system, as it will affect the behavior of its users and will affect the quality of financial reporting (Atkinson *et al.* 2012, Labelle *et al.* 2010). Dillard and Yuthas (2001) similarly expressed that various conditions related to ethics influence the information system.

H2: User ethics affects the quality of management accounting information systems

1.3 The Impact of top management support on quality management accounting information systems

One of the keys to the success of information systems in an organization is the support of top management (Dauth *et al.* 2017, Griffin and Morehead 2014, Mulyani *et al.* 2016, Raghunathan 1992). Top management support in an organization plays an essential role in enabling organizations to respond dynamically to various environmental changes. Top management is also instrumental in determining the direction of organizational success through its support of the change, including determining the various systems it needs (Griffin and Morehead 2014, Ragu-Nathan *et al.* 2004). Research by Doll (1985) indicates that top management support strongly influences the integration of information system development and implementation. Further research results by Raghunathan (1992) also show that the participation of top management can improve the alignment and effectiveness of information systems.

Law and Ngai (2007) state that the support of senior managers influences the successful implementation of Enterprise Resource Planning in an organization. Furthermore, Sohal, Moss, and Ng (2001) conducted a study of 500 top companies in Australia that showed that one of the failures in the implementation of systems in companies was lack of support from top management. Furthermore, Ragu-Nathan *et al.* (2004) also show that top management support has a significant impact on the integration of information systems. The results show that the integration of information systems requires cooperation and communication among various organizational units. Further research results by Lee *et al.* 2013 also point out that support from the top management team influences the integration of accounting information systems. Lie, Shiue, and Chen (2016) conducted a study of 118 organizations in Taiwan and concluded that top management support through knowledge sharing is a way to achieve information system success. Further research results by Mulyani *et al.* (2016b) also revealed that top management support is a factor affecting business intelligence systems.

H3: Top management support affects the quality of management accounting information systems

1.4 The influence of quality management accounting information systems on quality decision making

The fundamental purpose of a management accounting information system is to assist managers in making decisions through the information it generates (Choe 2004, 214; Kaplan and Atkinson 1998). The results of research by Kloot, Italia, Oliver, and Brooks (1999, 9) state that an adequate accounting management system can provide appropriate information for decision making. Further, Heidmann (2008, 61) mentions that a management accounting information system should be explicitly designed to make decision making more rational. Another study was conducted by Saeed and Abdinnour-Helm (2008), where they found that the availability of high-quality information in information systems is essential for helping users make decisions,

thereby improving the performance of managers. Research conducted by Caniels and Bakens (2012) states that one factor that affects the quality of decision making is the quality of information generated through accounting information systems.

Another study conducted by Mamary *et al*. (2013) states that the quality of information generated by the system affects the quality of managerial decision making. The study supports the results of research by Sajady *et al*. (2008), which concluded that the effectiveness of the application of accounting information systems could improve the decision-making process undertaken by managers, resulting in better decisions. Chitmun and Ussahawanitchakit (2011) also state that the management accounting system has a positive effect on the performance of decision making.

H4: The quality of the management accounting information system influences the quality of decision making

1.5 The effect of dynamic capability on quality decision making

Dynamic capability is significant for organizations living in an ever-changing business environment. It aims to stay ahead of the competition. Dynamic capability should be a significant focus in strategic management processes that will specifically affect the decision-making process (Sher and Lee 2004). Further research conducted by Neo and Chen (2007) states that the dynamic capability of the Singapore government affects decision making in creating and implementing policy.

Dynamic capability is closely related to environmental change. The results of research by Negulescu and Doval (2014) suggest that environmental factors are the highest factors affecting the quality of decision making. Further research conducted by Prasad and Green (2015) states that dynamic capability can assist management in making decisions in dynamic business environments through flexible accounting information systems. The results of research also support this by Kloviene and Gimzauskiene (2015), which states that pressure or changes from the environment will affect the decision making.

H5: Dynamic capability affects the quality of decision making.

1.6 The effect of user ethics on quality decision making

Decision making in an organization is inseparable from the role of managers as individuals who have behavior, be it ethical behavior or unethical behavior. The results of Trevino's (1986) study, which makes a model of cognitive moral development, show how one thinks to decide what is right and what is wrong about conditions that are being faced. After all, one's thoughts about what is good and what is bad will affect the decisions that one makes. Trevino (1986) concludes that the ethical behavior of a person affects the decision making. Another study conducted by Negulescu and Doval (2014) states that ethics influence the quality of decision making. Ethics becomes one of the trigger factors in achieving quality decision making. According (Zeni *et al.* 2016) developed a model of the stages of the decision-making process. In addition to identifying problems, it must also be through ethical evaluation and the importance of ethics. In other words, ethics affects the decision-making process. Ethical values influence the sustainability of a decision.

H6: User ethics affect the quality of decision making.

1.7 The impact of top management support on quality decision making

Top management has a huge role in planning and decision making for all levels and across functions within a company (Hilton and Plat 2014, 15). Support from top management is a critical factor in the success of an organization and will determine the success of the organization in responding to dynamic environmental changes (Ragu-Nathan *et al.* 2004). Results of research by Dauth *et al.* 2017 argue that the involvement of top management in various accounting policies will affect the quality of accounting information on which the decision is based. Thus, the quality of decision making will depend on top management support through its policies. Further research results from Al-Mamary *et al.* (2013) state that top management support to an integrated information system model affects the quality of managerial decision making.

H7: Top management support affects quality decision making.

2. Methodology

This research is quantitative research, and the method used is the survey method, conducted by a questionnaire. The target population is local governments in Java and Bali, of which there are 128 Respondents are heads of

sub-budgeting areas, heads of accounting sub-divisions, and heads of financial sub-divisions at BPKAD in every local government. Data analysis for hypothesis testing in this research uses the approach of structural equation modelling with partial least squares. The sampling technique uses probability sampling with a simple random sampling technique. The sample size is minimal in this study using the power analysis method, at the 5% significance level, the number of the most arrow direction pointing toward the dependent construct is three with statistical power 0.8 and to produce R^2 0.25, the minimum sample size required in this study was 59 samples (Hair, Mult, Ringle and Sarstedt 2014, 21). The sample represents 86 individuals from local governments.

3. Results and discussion

3.1 Testing convergent validity

3.1.1 Variable dynamic capabilities

Dynamic capabilities (DCs) are measured in three dimensions and consist of 12 indicators. The test results of each indicator are presented in Table 1.

Table 1. Main exporters and importers of services, 2016 (millions of dollars and percentage)

Latent Variables	Indicators	Loading Factors	T-statistic	Result	AVE	CR	Result
First Order							
Thinking Ahead (DC1)	DC1.1	0,932	67,158	Valid	0,776	0,912	Reliable
	DC1.2	0,851	23,356	Valid			
	DC1.3	0,858	28,151	Valid			
Thinking Again (DC2)	DC2.1	0,817	16,047	Valid	0,680	0,913	Reliable
	DC2.2	0,811	18,133	Valid			
	DC2.3	0,886	38,084	Valid			
	DC2.4	0,871	36,508	Valid			
	DC2.5	0,728	9,234	Valid			
Thinking Across (DC3)	DC3.1	0,893	36,131	Valid	0,755	0,925	Reliable
	DC3.2	0,878	33,861	Valid			
	DC3.3	0,856	26,485	Valid			
	DC3.4	0,848	24,600	Valid			
Second Order							
Dynamic Capabilities (DC)	DC1	0,932	61,086	Valid	0,648	0,957	Reliable
	DC2	0,950	69,884	Valid			
	DC3	0,946	77,463	Valid			

Table 1 is a recapitulation of CFA loading factor results of the second-order variable of DCs. In the first-order model, all indicators on thinking ahead (DC1), thinking again (DC2), and thinking across (DC3) dimensions have a loading factor greater than 0.50. This means that all indicators are valid as a measuring tool. All dimensions have a loading factor greater than 0.50. This means that all dimensions are valid as a measuring tool. The CR value of 0.957 > 0.7 and the VE value of 0.648 > 0.5 indicate that these dimensions are consistent (reliable) in measuring DC variables.

3.1.2 Variable user ethics variables

User Ethics (EP) is measured in five dimensions and consists of eight indicators. The test results of each indicator are presented in Table 2.

Table 2. Summary test reliability validity variable measurement model user ethics (EP)

Latent Variables	Indicators	Loading Factors	T-statistic	Result	AVE	CR	Result
First Order							
Competence (EP1)	EP1.1	0,909	60,811	Valid	0,816	0,898	Reliable
	EP1.2	0,897	34,591	Valid			
Confidentiality (EP2)	EP2.1	0,888	38,574	Valid	0,720	0,837	Reliable
	EP2.2	0,807	12,529	Valid			
Integrity (EP3)	EP3.1	0,907	46,988	Valid	0,840	0,913	Reliable
	EP3.2	0,926	93,160	Valid			

Latent Variables	Indicators	Loading Factors	T-statistic	Result	AVE	CR	Result
Credibility (EP4)	EP4.1	0,915	55,046	Valid	0,838	0,912	Reliable
	EP4.2	0,916	42,889	Valid			
Second Order							
User Ethics (EP)	EP1	0,878	34,730	Valid	0,591	0,920	Reliable
	EP2	0,818	22,791	Valid			
	EP3	0,878	34,558	Valid			
	EP4	0,853	18,042	Valid			

Table 3 is a recapitulation of CFA loading factor results of the second-order variable of EP. In the first-order model, all indicators in the competence (EP1), confidentiality (EP2), integrity (EP3), and credibility (EP4) dimensions have a loading factor greater than 0.50. This means that all indicators are valid as a measuring tool. All dimensions have a loading factor greater than 0.50. This means that all dimensions are valid as a measuring tool. The CR value of 0.920>0.7 and the VE value of 0.591>0.5 indicate that the dimensions are consistent (reliable) in measuring the EP variable.

3.1.3 Variable top management support

Top management support (DMP) is measured in five dimensions and consists of seven indicators. The test results of each indicator are presented in Table 3.

Table 3. Summary test reliability validity variable measurement model top management support (DMP)

Latent Variables	Indicators	Loading Factors	T-statistic	Result	AVE	CR	Result
First Order							
Resources (DMP1)	DMP1.1	0,897	41,308	Valid	0,824	0,904	Reliable
	DMP1.2	0,919	49,366	Valid			
Structural Arrangements (DMP2)	DMP2.1	1,000		Valid	1,000	1,000	Reliable
Communication (DMP3)	DMP3.1	1,000		Valid	1,000	1,000	Reliable
Expertise (DMP4)	DMP4.1	0,904	24,479	Valid	0,825	0,904	Reliable
	DMP4.2	0,912	38,220	Valid			
Power (DMP5)	DMP5.1	1,000		Valid	1,000	1,000	Reliable
Second Order							
Top Management Support	DMP1	0,885	25,693	Valid	0,625	0,921	Reliable
	DMP2	0,762	8,538	Valid			
	DMP3	0,805	16,983	Valid			
	DMP4	0,858	27,859	Valid			
	DMP5	0,801	18,076	Valid			

Table 3 is a recapitulation of CFA loading factor results of the second-order variable of DMP. In the first-order model, all indicators in the resources (DMP1) and expertise (DMP4) dimensions have a loading factor greater than 0.50, while all indicators in structural arrangements (DMP2), communication (DMP3), and power (DMP5) have loading factor >0,5, CR and VE are 1,000 because they are measured only by one indicator, indicating that the indicator is consistent. This means that all indicators are valid as a measuring tool. All have a loading factor greater than 0.50. This means that all dimensions are valid as a measuring tool. The CR value of 0.921 > 0.7 and the AVE value of 0.625>0.5 indicate that these dimensions are consistent (reliable) in measuring the DMP variable.

3.1.4 Variable quality management accounting information systems

The quality of management accounting information systems (KSIAM) is measured by four dimensions and consists of seven indicators. The test results of each indicator are presented in Table 4.

Table 4 is a recapitulation of CFA loading factor results of second-order management information system quality management variables (KSIAM). In the first-order model, the ease of use dimension (KSIAM1) with KSIAM1.1 indicator has the loading factor, CR and VE are 1,000 because it is measured only by one indicator. It indicates that the indicator is consistent in measuring the ease of use dimension (KSIAM1). Furthermore, on the dimensions of flexible (KSIAM2), integration (KSIAM3), and accessibility (KSIAM4), all indicators have a loading factor greater than 0.50. This means that all indicators are valid as a measuring tool. All dimensions have a loading factor greater than 0.50. This means that all dimensions are valid as a measuring tool. The CR value of 0.931 > 0.7 and the VE value of 0.658 > 0.5 indicate that the dimensions are consistent (reliable) in measuring the quality variable of the management accounting information system (KSIAM).

Table 4 Summary test reliability validity variable measurement model management accounting information systems (KSIAM)

Latent Variables	Indicators	Loading Factors	T-statistic	Result	AVE	CR	Result
First Order							
Ease of use (KSIAM1)	KSIAM1.1	1,000	-	Valid	1,000	1,000	Reliable
Flexible (KSIAM2)	KSIAM2.1	0,863	24,449	Valid	0,781	0,877	Reliable
	KSIAM2.2	0,904	71,620	Valid			
Integration (KSIAM3)	KSIAM3.1	0,950	71,869	Valid	0,894	0,944	Reliable
	KSIAM3.2	0,941	46,666	Valid			
Accessibility (KSIAM4)	KSIAM4.1	0,962	84,854	Valid	0,928	0,963	Reliable
	KSIAM4.2	0,965	104,401	Valid			
Second Order							
Quality Management Accounting Information Systems (KSIAM)	KSIAM1	0,828	36,307	Valid	0,658	0,931	Reliable
	KSIAM2	0,890	39,982	Valid			
	KSIAM3	0,846	22,306	Valid			
	KSIAM4	0,872	21,354	Valid			

3.1.5 Variable quality of decision making

The quality of decision making (KPK) is measured in two dimensions and consists of four indicators. The test results of each indicator are presented in Table 5:

Table 5. Summary test reliability validity variable measurement model quality of decision making (KPK)

Latent Variables	Indicators	Loading Factors	T-statistic	Result	AVE	CR	Result
First Order							
Improved Decision Quality (KPK1)	KPK1.1	0,904	35,675	Valid	0,818	0,900	Reliable
	KPK1.2	0,905	55,381	Valid			
Reduction of Time Needed to Make a Decision (KPK2)	KPK2.1	0,943	95,717	Valid	0,880	0,936	Reliable
	KPK2.2	0,933	67,860	Valid			
Second Order							
Quality of Decision Making (KPK)	KPK1	0,915	47,170	Valid	0,722	0,912	Reliable
	KPK2	0,929	74,218	Valid			

Table 5 is a recapitulation of CFA factor loading results of the second-order variable of KPK. In the first-order model, on the dimensions of decision quality improvement (KPK1) and reduction of time needed to make decisions (KPK2), all indicators have a loading factor greater than 0.50. This means that all indicators are valid as a measuring tool. All dimensions have a loading factor greater than 0.50. This means that all dimensions are valid as a measuring tool. The CR value of 0.912>0.7 and the AVE value of 0.722>0.5 indicate that the dimensions are consistent (reliable) in measuring the KPK.

3.2 Testing discriminant validity

The discriminant validity test is performed to test the correlation of each indicator with all the latent variables tested. The following shows the results of discriminant validity testing by comparing AVE roots and correlations between latent variables.

From the above test results, it can be seen that all variables have an AVE root value higher than the highest correlation between variables. So it can be concluded that the research model has good discriminant validity.

Table 6. Validity Test of Discriminant

	DC	DMP	EP	KPK	KSIAM
DC	0,805				
DMP	0,460	0,790			
EP	0,496	0,275	0,769		
KPK	0,681	0,653	0,537	0,849	
KSIAM	0,525	0,468	0,349	0,614	0,811

3.2.1 Full structural model testing results

The result of the full structural model estimation by using the second-order method is presented in Figure 1.

Figure1. Full structural model results (T-Values)

Table 7 summarizes the estimation results of the structural model of the relationship between the latent variables through the coefficient test path.

Table 7. Summary of coefficient of path and statistical test

Sub-Structure	Path	Path Coefficient	T-value	R-Square Partial	R-square Simultaneous
First	DC -> KSIAM	0,346	2,777	0,182	0,348
	EP -> KSIAM	0,100	1,081	0,035	
	DMP -> KSIAM	0,281	2,546	0,131	
Second	DC -> KPK	0,295	2,022	0,201	0,684
	EP -> KPK	0,217	3,477	0,117	
	DMP -> KPK	0,356	3,364	0,233	
	KSIAM -> KPK	0,217	2,131	0,133	

Through the recapitulation results shown in Table 7, it can be seen that in the first sub-structure, the dynamic capabilities (DC), user ethics (EP), and top management (DMP) variables give 34.8% of the influence on the quality of the KSIAM, while the remaining 65.2% of influence is from other variables.

In the second sub-structure, dynamic capabilities (DC), user ethics (EP), top management support (DMP), and quality management accounting information system (KSIAM) give 68.4% of the influence on KPK, while other variables influence the remaining 31.6%.

3.2.2 Hypothesis testing

The results of the significance tests for hypotheses are as follows:

Table 8. Hypothesis testing results

Hypothesis	Path Coefficient	$T_{-statistic}$	T_{value}	Conclusion
H1	0,346	2,777	1,96	Accepted
H2	0,100	1,081	1,96	Rejected
H3	0,281	2,546	1,96	Accepted
H4	0,217	2,131	1,96	Accepted
H5	0,295	2,022	1,96	Accepted
H6	0,217	3,477	1,96	Accepted
H7	0,356	3,364	1,96	Accepted

Based on Table 8, note that the t-statistic value is greater than the value for H1, H3, it can be concluded that the dynamic capability, top management support significantly influences the quality of management accounting information system, while user ethics has no significant effect on the quality of the management accounting information system (H2). Furthermore, hypotheses H4, H5, H6, and H7 have t-statistic values greater than the t-value, which means that dynamic capability, user ethics, top management support, and the quality of management accounting information systems significantly influence the quality of decision making.

Conclusions and discussion

The results provide empirical evidence that dynamic capability and top management support significantly influence the quality of management accounting information systems, while user ethics has no significant influence. Furthermore, dynamic capability, user ethics, top management support, and quality of management accounting information systems have a significant effect on the quality of decision making.

Dynamic capability demands a dynamic accounting information system as well. The results of this study provide empirical evidence that dynamic capability affects the quality of accounting information systems. This supports the results of Prasad and Green's (2015) study, which states that accounting information systems must be dynamic and quickly respond to any internal and external changes that occur (Prasad and Green 2015). Kloviene and Gimzauskiene (2015) state that organizations that can identify the external environment will be more effective in the use of accounting information systems. Dynamic capability affects the effectiveness and efficiency in converting the input to output.

The user's ethics of accounting information systems in local government is related to compliance with governmental accounting procedures and standards, while management accounting information systems are tools or media used to carry out their work based on established policies and procedures. Therefore, user ethics does not significantly affect the performance of accounting information systems, such as system integration, ease of operating the system, system flexibility, and ease of access. Improving the quality of management accounting information systems in government areas is more related to the needs of local governments concerned in order to improve transparency and accountability of governance. Improving the quality of accounting information systems related to the ethics of users of the system more to the fulfilment of optimal policies and procedures and on the discipline of work. The quality of management accounting information systems can be improved if the development plan for implementation gets full support from the leadership. Implementation of a successful accounting information system requires commitment, local resources, and the commitment of stakeholders who obtained from the communication conducted by the leadership to support both from the readiness to the sustainability of the implementation of the systems used.

Management accounting information systems in computerized and integrated local governments will have a significant impact on local financial transparency and accountability. Management of financial information with a good information system can minimize the occurrence of manipulation of public finance data. If financial information is online, on a local government website, it will increase the accessibility of stakeholders in obtaining the desired information to improve the accuracy and speed of decision making. Local government decisions are reflected in the various policies generated. Local governments are empowered to undertake various changes through innovations that can be undertaken to develop an appropriate policy and decision.

Decision making in an organization, including local government, is inseparable from the role of someone as an individual who has behavior, be it ethical behavior or unethical behavior. Such behavior is strongly influenced by various aspects related to ethics, such as competence, integrity, and credibility. Employees within the local government are required to comply with various codes of ethics, codes of conduct, and all established rules. In local government, regional heads or leaders have a very big role in planning and decision making. Support from heads of regions is a critical factor in the success of an area and will determine its success in responding to dynamic environmental changes. Support from the leadership will result in a policy that aligns each related field in preparing financial statements so that financial statements can be presented on time.

References

[1] Al Mamary, Y. H., Shamsuddin, A., and Aziati, N. (2013). The impact of management information systems adoption in managerial decision making: A review. *Management Information Systems,* 8(4): 010-017.

[2] Atkinson, A. A., Kaplan, R. S., Matsumura, E. M., and Young, S. M. 2012. *Management accounting information for decision-making and strategy execution.* 6th Edition. Pearson Education.

[3] Ballantine, J., Levy, M., Martin, A., Munro, I., and Powel, P. (2000). An ethical perspective on information systems evaluation. *International Journal of Agile Management Systems*, 2(3): 233-241.

[4] Boonstra, A. (2013). How do top managers support strategic information system projects and why do they sometimes withhold this Support? *International Journal of Project Management*, 31(4): 498-512.

[5] Burisch, R., and Wohlgemuth, V. 2016. Blind spot on dynamic capabilities: A system theoretical perspective. *Journal of Innovation and Knowledge,* 1(2): 109-116.

[6] Caniels, M. C. J. and Bakens, R. J. J. M. 2012. The effect of project MIS on decision making in a multi-project environment. *International Journal and Project Management,* 30: 162-175.

[7] Choe, J.-M. (2014). Impact of management accounting information and AMT on organizational performance. *Journal of Information Technology,* 19: 203-214.

[8] Chitmun, S. and Ussahawanitchakit, P. 2011. Management accounting systems sophistication and decision-making performance. *Journal of Academy of Business and Economics*, 11(3).

[9] Dauth, T., Pronobis, P., and Schmid, S. 2017. Exploring the link between internalization of top management and accounting quality: the CFO's internal experience matters. *International Business Review*, 26(1): 71-88.

[10] Dillard, J. F. and Yuthas, K. 2001. Responsibility ethics for audit expert systems. *Journal of Business Ethics*, 337-359.

[11] Doll, W. (1985). Avenues for top management involvement in successful MIS development. *MIS Quarterly*, 9 (March): 17-36.

[12] Duska, R., Duska, B. S., and Ragatz, J. A. 2011. *Accounting Ethics.* Wiley Blackwell.

[13] Eisenhardt, K. M., and Marten, J. A. 2000. Dynamic capabilities: What are they? *Strategic Management Journal,* 21: 1105-1121.

[14] Griffin, R. W., and Moorhead, G. 2010. *Myths, Recipes and Knowledge Bases in Organizational Analysis*. 9th edition. South Western, Cengage Learning.

[15] Giniuniene, J., and Jurksiene, L. 2015. Dynamic capability, innovation, and organizational learning: Interrelation and impact on firm performance. *Procedia- Social and Behavioral Sciences,* 213: 985-991.

[16] Hair Jr, J. F., Mult, T., Ringle, C., and Sarstedt, M. 2014. *A Primer on Partial Least Squares Structural Equation Modelling (PLS-SEM).* SAGE Publications.

[17] Hansen, D. R., Mowen, M. M., and Guan, L. 2009. *Cost management: Accounting and Control.* 6th Edition. South-Western, Cengage Learning.

[18] Heidmann, M. 2008. *The Role of Management Accounting Systems in Strategic Sense Making.* Germany: Deutscher Universitats-Verlag.

[19] Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M. A., Singh, H., Teece, D. J., and Winter, S. G. 2007. *Dynamic Capabilities Understanding the Strategic Change in Organizations*. Blackwell Publishing.

[20] Hilton, R. W., and Platt, D. E. 2014. *Managerial Accounting* is *Creating Value in a Dynamic Business Environment.* 10th Edition. New York, NY: McGraw-Hill.

[21] Kaplan, R. S., and Atkinson, A. A. 1998. *Advanced Management Accounting.* 2rd Edition. Prentice Hall International.

[22] Khrosrowpour, M., and Travers, J. 1991. *Managing Information Technology in a Global Society.* IDEA Group Publishing.

[23] Kloot, L., Italia, M., Oliver, J. and Brooks, A. 1999. Organizational Learning and Management Accounting Systems.

[24] Kloviene, L., and Gimzauskiene, E. 2015. The effect of information technology on accounting system's conformity with the business environment: A case study in banking sector company. *Procedia Economics and Finance*, 32: 1707-1712.

[25] Labelle, R., Gargouri, R. M., and Francoeur, C. 2010. Ethics, diversity management, and financial reporting quality. *Journal of Business Ethics*, 93(2): 335-353.

[26] Laudon, K. C and Laudon, J. P. 2014. *Management information systems–Managing the digital firm.* 13th Edition. England: Pearson Education Limited.

[27] Law, C. C. H., and Ngai, E. W. T. 2007. ERP systems adoption: An exploratory study of the organizational factors and impacts of ERP success. *Information and Management*, 44(4): 418-432.

[28] Lee, J., Elbashir, M. Z., Mahama, H., and Sutton, S. G. 2013. Enablers of top management team support for integrated management control system innovations. *International Journal of Accounting Information System*, 15(1): 1-25.

[29] Lie, J. C., Shiue, Y. C., and Chen, C. Y. 2016. Examining the impact of organizational culture and top management support of knowledge sharing on the success of software process improvement. *Computers in Human Behavior,* 54: 462-474.

[30] McLeod, R., and Schell, G. P. 2007. *Management Information Systems.* 10th Edition. New Jersey: Pearson Education.

[31] Mulyani, S., Jufri, D., and Citra, S. 2016. The effect of clarity of business vision and top management support on the quality of business intelligence system: Evidence from Indonesia. *Asian Journal of Information Technology* 15: 2958-2964.

[32] Mulyani, S., Rohail, H., and Fajar, A. 2016. The critical success factor for the use of information system and its impact on the organizational performance. *International Business Management,* 10(4): 552-560.

[33] Negulescu, O., and Doval, E. 2014. The quality of the decision-making process related to organizations' effectiveness. *Procedia Economics and Finance*, 15: 858-863.

[34] Neo, B. S., and Chen, G. 2007. *Dynamic governance, embedding culture, capabilities and change in Singapore.* World Scientific Publishing.

[35] Olumoye, M. (2013). Ethics and social impact of information systems in our society: Analysis and recommendation. *International Journal of Science and Research*, 2(11): 154-158.

[36] Prasad, A., and Green, P. 2015. Organizational competencies and dynamic accounting information system capability: Impact on AIS processes and firm performance. *Journal of Information System. American Accounting Association.* 29(3): 23-149.

[37] Raghunathan, T. S. 1992. Impact of the CEO's participation on information systems steering committees. *Journal of Management Information Systems,* 8 (4): 83-96.

[38] Ragu-Nathan, B. S., Apigian, C. H., Ragu-Nathan, T. S., and Tu, Q. 2004. Path analytic study of the effect of top management support for information systems performance. *The International Journal of Management Science*, 32: 459–471.

[39] Rogerson, S., Weckert, J., and Simpson, C. 2000. An ethical review of information systems development: The Australian computer society's code of ethics and SSADM. *Information Technology & People,* 13(2): 121-136.

[40] Saeed, K. A., and Abdinnour-Helm, S. 2008. Examining the effects of information system characteristics and perceives the usefulness of the post-adoption usage of information systems. *Information Management*, 45(6): 376-386.

[41] Sajady, H., Datsgir, M., and Nejad, H. H. 2008. Evaluation of the effectiveness of an accounting information system. *International Journal of Information Science and Technology*, 6(2): 49-59.

[42] Sher, P. J., and Lee, V. C. 2004. Information technology as a facilitator for enhancing dynamic capabilities through knowledge management. *Information & Management*, 41(8): 933-945.

[43] Sohal, A. S., Moss, S., and Ng, L. 2001. Comparing IT success in manufacturing and service industries. *International Journal of Operations & Production Management*, 21(1/2): 30-45.

[44] Susanto, A. 2013. *Sistem Informasi Akuntansi: Struktur-Pengendalian-Resiko-Pengembangan, Edisi Perdana, Cetakan Pertama.*Bandung: Lingga Jaya.

[45] Strimuckas, M., and Valanciene, L. 2010. Development of modern management accounting system*. Engineering Economics,* 21(4): 377-386.

[46] Taicu, M. 2013. Ethics in management accounting. *Scientific Bulletin- Economic Sciences Statistics and Financial Analysis*, 9(15).

[47] Teece, D. J., Pisano, G., and Shuen, A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal,* 18(7): 509-533.

[48] Trevino, L. K. 1986. Ethical decision making in organizations: A person-situation interactionist model. *Academy of Management Review*, 11(3): 601-617.

[49] Weetman, P. 2010. *Management Accounting.* 2nd Edition. England: Pearson.

[50] Wohlgemuth, V., and Wenzel, M. 2016. Dynamic capabilities and routinization. *Journal of Business Research*, 69(5): 1944-1948.

[51] Xu, H. J. 2014. *Enterprise Integration and Information architecture.* CRC Press.

[52] Young, R., and Poon, S. 2013. Top management support: Almost always necessary and sometimes sufficient for success: Findings from a fuzzy set analysis. *International Journal of Project Management*, 31(7): 943-957.

[53] Zeni, T. A., Buckley, M. R., Mumford, M. D., and Griffith, J. A. 2016. *Making "sense" of ethical decision making. The Leadership Quarterly.*

[54] Zolo, M., and Winter, S. G. 2002. Deliberate learning and the evolution of dynamic capabilities. *Organization Science,* 13(3): 339-351.

*** Audit Board of the Republic of Indonesia – Overview of Examination Results Semester I, 2016.

*** Ministry of Empowerment of State Apparatus. 2015. Report on The Performance of Government Agencies.

Dynamic Interactions between Major Macroeconomic Aggregates in Albania. A Vector Autoregression Approach

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Abstract:

The aim of this research is to investigate dynamic interactions between key macroeconomic variables in Albania and assess the state of equilibrium of the Albanian macroeconomic system. Growth, unemployment and inflation rates, government deficit, money supply, current account deficit, interests and exchange rates are some of the selected macroeconomic aggregates. Yearly time series of these aggregates for the period 1994-2016 have been used. The key concern is to investigate whether these variables are mutually co-integrating, whether they are in equilibrium or whether past history of some variables affect their or other variables future levels; and whether shocks to the system have been active or not. VAR analysis and co-integration techniques are used as research tools. It is found that the macroeconomic system is characterized by a relative stability and equilibrium is far from being full, as only part of major variables, such as inflation and growth, bank deposit and exchange rate have been in a relative medium to long-term equilibrium. Current and fiscal deficits and growth are not in long-term equilibrium. Based on the co-integration results, the overall performance of the economy during transition could be much better and so the performance of the public economic governance. The system has well absorbed external or from-within shocks and relatively good forecasts could be made for macroeconomic aggregates based on their current and lagged levels.

Keywords: equilibrium; dynamic impulse response analysis; macroeconomic aggregate; shock; VAR model

JEL Classification: C32; E00; E60; O11

Introduction

The macroeconomic framework of a country could be thought of as an ensemble or a system of key macroeconomic variables evolving over time. These variables may or may not interact, and in given periods of time this system may be or may not be in equilibrium, *i.e.* aggregates which describe it may be not co-integrated to each other. If they are interacting in some way or if they are co-integrated, we could say the system is in equilibrium. The degree of equilibrium is a relative issue; as we may have a fully co-integrated or equilibrated system, as well as a partly equilibrated system. The latter state we call a state of disequilibrium. As experience shows, even if in a certain moment a macro-system may seem in equilibrium, it is quite impossible for it to be fully integrated and it is even more impossible to safeguard this state during a long period of time. Stated otherwise, the disequilibrium state to a certain extent is quite unavoidable. Economic shocks from within the system or external shocks hitting the system from time to time contribute to the degree of disequilibrium and its duration.

For Albania, as a weak and small economy, macro-equilibrium could be difficult to achieve, and even more difficult to maintain it. What is important and helpful is to learn how macro variables have been interacting and whether the Albanian macro-system has been or not in equilibrium during transition. More explicitly our research goal is to provide empirical evidence about interdependences of major macroeconomic variables and state of equilibrium of the Albanian macro-system during the transition period (since1991). The state of equilibrium achieved and maintained indicates not only how stabile has been the macroeconomic system, but also how well the economy has performed during transition and how much effective has been the country's (macro)economic policy and the overall public governance during transition.

1. Literature review

We assume the reader is comfortable with some macroeconomic and financial terms, like GDP and GDP growth, unemployment, inflation, money aggregates, interest, and exchange rates, fiscal deficit, *etc.* Otherwise we suggest them have a beforehand look at some relevant literature such as (Gordon 1987, Mankiw 2010, Case *et al.* 2012).

Figure 1 shows the key ingredients (variables) of the macroeconomic system. At the center we have three major aggregates: growth, employment and inflation, symbolically representing a triangle. These are considered to be major because the society's interests clearly are faster growth rates, higher employment or lower unemployment rates, and lower inflation. All this impacts the living of people in a direct way.

Figure 1. Major macroeconomic variables and interrelationships between them

Source: Author

According to the economic wisdom, these variables are reciprocally related. The Philips curve describes an inverse relationship between inflation and unemployment in the short-run, but maybe not in longer run; alike, the Okun's law describes a negative relationship between unemployment and growth. Thus, more employment or les unemployment means more growth and, perhaps, more inflation; more inflation may negatively impact growth, faster growth may have an increasing and even a stabilizing role on prices. Moreover, employment may cause prices to upsurge. Thus, certain equilibrium must hold between these three aggregates, meaning that their evolution in time should be more or less at the same wave length if equilibrium should be maintained. In other words, it is possible to assess certain relationships between the three and forecast the level of each of them based on actual/and or past levels of the others. If not, the system of the troika is considered not to be in disequilibrium. This system of troika is under the influence of a broader macroeconomic environment. In Figure 1 this is shown by a system of fiscal and monetary policy aggregates/instruments. All these variables hit the system of troika externally, and if their action is effective it will update. In any case, in a well-functioning economic system, the relationships between the three key variables should remain more or less stable, otherwise the system is functioning poorly and measures to bring it back to an equilibrium state are needed.

Theory says that between environment variables themselves, and each of the troika variables, as shown in figure, there should exist certain reciprocal effects. What theory says about how effects from one variable to the others are transmitted? The mechanism is quite complex with actions and counteractions by different actors and factors, so in order to understand better this mechanism we must apply and keep in mind the rule "other things being unchanged". Sound macroeconomic policy framework and business environment are also needed for the mechanism to work.

In this context monetary policy has to play a crucial role, because monetary policy is one of the instruments a country could use to influence supply of money. Economic theory explains that if supply of money is sufficiently increased in some way (for example open market operations conducted by the central bank), interest rates tend to go down; this encourages investment hence the domestic output starts to raise at some point in time. Following that, employment is increased and aggregate demand also increases. This encourages even more investment through bank borrowing and puts pressure on interest rates which start to increase as well. Increased money supply and inflation also impact exchange rates national currency, which is depreciated. Moreover, if money supply increases, this puts pressure on prices, so inflation tends to go up. Higher inflation rates may encourage capital investment, but also uncertainty in the economy, thus decreasing efficiency of resource use, which negatively

impacts output. Higher inflation impacts also nominal interest rates and employment, which may discourage borrowing. Higher interest rates tend to increase the exchange rates. Depreciation of the exchange rate is likely to cause an increase in inflation again, because import prices become more expensive, because of higher domestic demand and less incentive to cutting costs. As far as the current account is concerned, depreciation of the national currency encourages exports and discourages imports, thus a negative impact on the deficit of the current account is expected. If the current account deficit increases, which may mean more imports, the country currency is likely to get stronger with foreign currency getting depreciated. Further on, a large and increasing current account deficit tends to have a negative effect on growth, and a country with positive GDP growth is likely to have a decreasing current account deficit. In relation with interest rates, a positive relationship between real interest rate and current account deficit as a % of GDP is likely to occur.

On the other side, as far as fiscal policy is concerned, if government spending is increasing, this may entail direct positive effect on output, because of increased government buying of goods and services. This may also produce a counteraction on interest rates by negatively influencing them. Private borrowing and investment is expected to increase with lower interest rates, what in turn may positively affect GDP.

Empirical research about relationships and/or equilibrium among macroeconomic and financial aggregates is immense. It takes place in various development contexts, and socio-economic systems. The interplay of factors-variables is also different in different countries. And the mass of change principle is also crucial for a factor to be or become effective in a complex interplay of actions and counteractions. Not to forget, a sound business climate is also a key factor for a high and sustainable macroeconomic performance; and theory may not work in a country where no sound business climate exists. Variety of methodologies used may also play some role in this aspect. So, it is expected that theory about said interrelationship may not be affirmed in every case and every country.

We suppose that key relationships for a general macro-equilibrium are those between inflation and growth, as far as these variables and their effects interest most both the public and governments. First, we tackle with the basic strand of empirical research, and then we follow with discussion of relationships among other variables themselves, and their relationships with both inflation and growth rate.

To begin with, Papademos (2003) states that majority of empirical evidence highlights a negative relationship between inflation and growth rate. As a specific evidence, Najaf (2017) analyzed the relationship between inflation and economic growth in Nigeria and found that high inflation affects negatively the economic growth. In some cases, positive relationships have been found, but this holds only for low level of inflation. However, as Andrés and Hernando (1999) show in the context of OECD, even in low or moderate inflation countries there is evidence of negative relationship between inflation and growth in the long run. This relationship may not be linear and can have breaks, or thresholds. Low or high initial inflation can also influence the nature of resulting relationship between inflation and growth. In general, price stability is helpful to economic growth. According to Fischer (1983), there should be a negative relationship, because inflation lowers real balances and reduces the efficiency of the production factors. Faria and Carneiro (2001) studied the relationship in the context of persistent high inflation in Brazil and found that inflation doesn't impact output in long run. Barro (2013) used data for 100 countries and found that an increase in average inflation by 10% brings about a 0.2% - 0.3% reduction in GDP growth rate. Using panel data regression techniques, (Ghosh and Philips 1998) affirm that increased inflation is one of the major determinants of growth with negative effect. In some case studies, such as for Zimbabwe but not only no relationship is discovered between Inflation and GDP, thus controlling inflation might be necessary but not a pre-condition to promote economic growth (Mukoka 2018). But, as Andrès and Hernando (1999) show the correlation between inflation and growth at the OECD level and found that the negative relationship between them is not supported by the experience of high inflation countries. Vickrey (1954) and Tobin (1972) argue that some doses of inflation could be helpful to growth, because it can facilitate working of the economic mechanism.

A lot of research deals with the role of monetary policy in relation with inflation and/or growth. Monetary policy as a set of policy instruments, such as interest and exchange rates, monetary aggregates, cannot be expected to enhance sustainable economic growth in the long run; but it can play as. Papademos (2003) argues a stabilizing role in the medium run and the best contribution monetary policy can make to growth is to maintain prices as stable as possible. Hsing and Hsieh (2004) used a VAR model for China and found that in long run, output reacts negatively to a shock in the interest rate, the real exchange rate, government debt, or the inflation rate; it reacts positively to a shock in government deficits or lagged output, positively to a shock in real money, and it reacts negatively to a shock in the real exchange rate, government debt, or government deficits. Its response to a shock in the inflation rate is found to be negative when government debt is used but found positive when government deficits are considered. Cheng (2006) used also a VAR model based on Kenya data, and found that a monetary policy shock (short-term interest rates) had significant negative effects on prices and negative effects on the

nominal effective exchange rate (NEER), whereas insignificant effects on output. The same effects are found for fluctuations of short-term interest rates on fluctuations of prices and NEER. Using quarterly data for Turkey, Berument and Pasaogullari (2003) found, contrary to the theory, that exchange rate depreciation had negative effects on output and inflation. Chuba (2015) used a restricted VAR model to study relationship between CPI and monetary expansion. As they argue, according to the quantity theory of money, CPI level is directly and significantly related with money supply. They found that monetary expansion is a major factor for price increase in Nigeria, though price change is not proportional to money supply change. Interesting results obtained by LE and Pfau (2009) using a reduced-form VAR model to study the monetary transmission mechanism in Vietnam. Variables taken into consideration were money, real output, price level, real interest rate, real exchange rate and credit. Relationship between money and inflation is not clear; credit and exchange rate channels are more important than the interest rate channel; money supply affects output level. Bhuiyan (2008) used a recursive VAR model to evaluate effects of monetary policy shocks on interest rates, exchange rates and inflation in Canada. Overnight interest rates and money aggregates are used as alternative measures of monetary policy. They found that a negative policy shock lowers ex-ante interest rates, lowers inflation expectations and real output, and strengthen the Canadian dollar. Raghavan and Silvapulle (2011) used a SVAR model with monthly data with the aim to discover how variables such as money supply, interest rates and exchange rates affect the Malaysian economy, before and after crisis (1997), when Malaysia adopted a pegged regime. They found that in the pre-crisis period all variables had significant effects on output, prices, interest and exchange rates. In the post-crisis period, it is only money shocks that tend to have effects on output. Mbongo, Mutasa and Msigwa (2014) used Ordinary Least Squares, VAR and Error Correction Model and found that money supply and exchange rates impact inflation in both short- term and longer-term periods. Current inflation also is dependent on lagged inflation. Bhuiyan (2007) used a VAR model with a forward-looking dimension into the monetary policy rule by including into the model also expectations on inflation, along with other variables, to identify dynamic responses of the exchange rate following a policy shock. Arratibel and Michaelis *(2014)* used a Bayesian time-varying VAR model is used to identify whether the reaction of output and prices to interest rate and exchange rate shocks has changed across time (1996 - 2012) in the Polish economy. They found that interest and exchange rates had time-varying effects on output and prices. Stotsky, Ghazanchyan *et al.* (2012), in a study for Eastern Africa found that investment and exchange rates are determinants of growth, but the exchange regime is not. Exchange rate and lagged inflation are determinants of inflation rate. Vladova and Yanchev (2015) used Granger causality in the case of Bulgaria and found that between money supply and prices exists a bi-directional causality. They use also a VAR model and found that the adjustment speed of money towards long-run equilibrium occurs relatively quickly (the coefficient of adjustment being 0.5).

Another strand of empirical discussion could be exploring the role of current account deficit in relation to inflation and growth. Solomon and De Wet (2004) examined the deficit-inflation relationship in the Tanzanian economy using co-integration analysis techniques based on data for the period 1967 - 2001. They found that budget deficit affects positively the inflation rate. Akbaş *et al.* (2014) used a panel causality test they found a bi-directional causality between current account deficit and GDP, but only unit-directional causality from short term capital flows (hot money, which normally has high interest and profitability rates) towards current account deficit and GDP growth, in the case of emerging markets (Brazil, China, Turkey, Poland, *etc.*). Şahin and Mucuk (2014) by analyzing Turkish quarterly data for GDP and CA deficit for period 2002 - 2013 with a VAR model found that CA deficit affects negatively GDP. Danmola and Dolateju (2013) used Johansen Co-integration, Ordinary Least Squares and Error Correction techniques; they confirm a long-run relationship between monetary policy (proxied by the money supply) and all considered components of the current account. Money supply was found to positively influence all the variables, except for exchange rate which influence is negative.

The effect of fiscal policy on inflation and growth is also largely discussed. Lee *(2010)* found that government spending shocks affect positively private consumption. In short-term a government spending shock induces a crowding out, but in mid-term and long-term private investment increases. It also induces short-term increase of interest rates because of foreign capital inflows, so real effective exchange rates increase and balance of trade decrease. Shocks of government spending for consumption contribute more to GDP than government investment shocks. With the aim to identify the degree to which fiscal policies/fiscal balance, affect current account, in the context of international trade balance, Roldán, Cuerva and Guerriero (2013) found that presence of fiscal rules seems to reduce the public deficit, but lack of them seems not to influence current account deficit. Lozano and Rodriguez (2009) found that government spending shocks are found to have positive and significant effects on output, private consumption, employment, prices and short-term interest rates.

Another interesting aspect of research has been discussing and investigating reciprocal relationships between interest rates, current account deficit and exchange rates. Faust *et al.* (2003) have investigated effects of

monetary policy shocks on exchange rates and international interest rates, using VAR methodology with high-frequency data. Tokuo and Hayato (2015) investigated the impact of exchange rate shocks on Japanese aggregate exports. It is found that yen's appreciation is one of the factors responsible for significant decline in exports. Ener and Arica (2012) have investigated the role of interest rates on current account balance. They analyzed panel data for 21 OECD countries for the period 1980-2009. They found as expected that there is a positive relationship between interest rates and current account deficit. Datta and Kumar (2011) found a negative relationship between inflation and growth in the case of Malaysia, but only in the short run; they also found in that case a stable long run relationship between inflation and budget deficit. Metin (1998) studied Turkey and found that an increase in the scaled budget immediately increases inflation. Nayab (2015) did not find a significant relationship between growth and deficit in the case of Pakistan. Hayati and Rahman (2012) found for Malaysia that there is not a long run relationship between growth and budget deficit.

In relation with employment, in some cases, such as Turkey, no long-run relationship between aggregate output and total employment has been identified, but there is a long-run relationship between aggregate output and non-agricultural employment (Şahin, Tansel and Berument 2103). Much empiric research reveals that there exists an inverse relationship between inflation and unemployment (Kasseh 2018).

In the context of Albania, Andoni, Osmani and Kambo (2017) and also Andoni and Osmani (2017) using regression techniques found that a negative relationship exists between inflation and growth, while a positive relationship exists between inflation and deficit, but no relationship was discovered between fiscal deficit and growth.

2. Methodology and data

The methods of GC (Granger causality), COI (co-integration) methods and VAR (Vector Auto Regression) including IRF (Impulse Response Function) are used to analyze data.

GC is a test used to assess potential interdependences among variables. If interdependent, then some degree of equilibrium between them is assumed and future levels of an endogenous variable could be forecasted based on previous (lagged) values of the same as well other endogenous variables. Essentially it is a F test (also LR or Wald test for omitted variables) applied to learn whether adding in a model lagged values of certain variables is significant or not.

Co-integration is a method used to learn whether two or more series are in long-run equilibrium. If two series are in equilibrium, then their behavior in time is similar to a certain degree. Engel-Granger, Durbin-Watson and Johansen tests could be used for this purpose. The name of VAR model is related with the name and contribution of Sims (1980). VAR is a method helping to assess interdependences between variables and make forecasts for levels of variables. VAR models can also be used for policy analysis and for making forecasts and analyze the effects of economic policies, as well as other external shocks. Two type of policy analysis could be made: surprise (unexpected) policy interventions, and changing policy rules (Stocky, Ghazanchyan *et al.* 2012).

Two non-stationary I (1) series are said to be co-integrated if there is a linear relationship between them that is stationary I (0). Unit root test (such as Dickey-Fuller test) could be used to test for co-integration of two series. Johansen co-integration test could be used to test for joint co-integration of more than two non-stationary series

In relation with VAR model there are three types of VAR models: reduced, recursive and structural. We use a reduced-type VAR analysis. The general form of the VAR model is as follows:

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_p Y_{t-p} + B_0 X_t + \ldots B_q X_{t-q} + C D_t + e_t, t = 1,2,3\ldots,T, \quad (1)$$

where: Y_t is a vector of *k* endogenous variables with lag *p*, X_t is a vector of *m* exogenous variables with lag *q*, D_t is a vector of deterministic variables (including a constant, trend, seasonal dummy variables, and other possible variables created by the analyst), A_i, B_j and C are parameter matrices to be estimated, e_t is the stochastic error term (white noise), called also *innovations, structural shocks* or *impulses*. A_i is a *k x k* matrix for i = 1, 2, …, p. B_j is a *m x m* matrix for j = 1, 2, .., q. The model is a system composed of *k* equations. If we impose $B_0 = 0$ then we have a model with only lagged endogenous and exogenous variables. If we impose restrictions B = 0 the VAR model is the standard VAR (p) model with only endogenous variables (and deterministic variables may be). VAR (p) model will look:

$$Y_t = a + A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_p Y_{t-p} + e_t \quad (2)$$

This form of VAR is also called the reduced-form VAR model. As (Sims, 1980) and (Gujarati 2003) argue, in a VAR analysis all variables could be considered endogenous, except for deterministic variables which are considered pure exogenous. In this case the Y symbol in the above system includes also exogenous variables. If

all regressors (right-hand side variables) for each equation are identical, each equation of the VAR model could be estimated separately by OLS (Ordinary Least Squares), otherwise they are estimated by GLS (Generalized Least Squares). To use GLS first it is used OLS, then based on the estimated equations errors the white noise covariance matrix is calculated:

$$\sum e = T^{-1} \sum_{t=1}^{T} e_t e_t^{'}$$ (3)

This matrix is then used to estimate VAR model by GLS method. Before starting the estimation, the VAR model should be specified. First, the optimal lag order should be specified. The lag order for endogenous variables is specified using the information criteria (AIC, HQ, *etc.*); the optimal lag order for endogenous variables is the one which provides the minimum value of the information criteria used. The lag order for exogenous variables is specified by the analyst himself. Then, one should check the system stability conditions (modulus of roots or eigenvalues of the companion matrix less the unit). After, zero restrictions on parameters may also be placed. These restrictions help to eliminate redundant regressors. There are various methods for the elimination of redundant regressors: Method of Sequential Elimination of Regressors (SER); the Top Down method, system SER method, LR test, *etc.* The two first methods are used for each equation separately; the third one considers the system as whole. Using SER for every equation means eliminating regressors with smaller *t* values, until there is no more *t* value smaller than a given threshold. Using Top-Down method for a given equation, means checking the contribution of each regressor, starting from the last one, to the information criteria; the regressors that should be eliminated from the equation are those which reduce most the information criteria. The system SER is like individual SER but all equations are taken into account and one regressor is eliminated in each step.

Following the estimation of VAR models, some regressors may result insignificant; however, a test for joint significance (F-test or LR-test) for the right-hand side variables can be made. If the test results show joint significance they are kept in the model even if separately they are insignificant.

Theoretically, in a VAR model all variables should be jointly stationary (variables must be integrated of order zero I (0)). If they are not stationary (and not co-integrated) they should be transformed into stationary by doing first or greater order differences. However, this operation doesn't guarantee satisfactory results. That's why some authors suggest working with variables in levels even when some variables are not stationary. But as Harvey (1990) and Gujarati (2003), one should bear in mind the effects of unit roots on the distribution of estimators.

Some extensions of the VAR technique called FAVAR could be used (Bernanke, Boivin and Eliasz 2003, Varlik, Ceylan and Berument 2015). FAVAR can be used to identify responses to shocks in monetary policy. FAVAR is supposed to provide better results than traditional VAR; if information included in VAR is not compete, FAVAR works better with large data sets.

The next stage of the analysis could be IRF (Impulse Response Analysis). If we take into consideration the model (2) it could be expressed as moving average (MA) process:

$$Y_t = a + e_t + \phi_{t-1} e_{t-1} + \phi_{t-2} e_{t-2} + \ldots$$ (4)

Here the coefficients φ are called the responses to shocks or impulses. For each lag *i* = 1, 2, 3 … we have a matrix of coefficients φ_l. The coefficients φ_{lij} show the response of the variable *i* to a shock in variable *j* at time *t+l* holding constant all shocks at all dates. IRF is considered as the centerpiece of the VAR analysis. IRF helps to investigate dynamic interactions between endogenous variables; the IRF traces out the response for several years in the future of the dependent variable in a VAR model to a shock of one standard deviation in the error term. For example, if we take into consideration the first equation of the system, a shock in e_1 affects Y_1 but since Y_1 appears also in the other equations (in lagged form), it impacts also Y_2. Exogenous and deterministic variables, if included as such in the system, are considered as fixed and not included in the IRF analysis. Essentially, IRF analysis helps to learn if and how much future levels of economic variables depend on shocks or fluctuations of themselves or other economic variables in the past.

At the end, the forecast error variance decomposition is carried out. The aim of this analysis is to show which variables shocks explain more of the variance of variable of interest.

More in depth technical information about VAR, Granger casually and co-integration techniques could be found in Gujarati (2003); Eviews 6 User's Guide; GRETL User's Guide; JMulTi Help System, Lütkepohl and Kratzig (2004), Lütkepohl (1991), Harvey (1990), Verbeek (2004), Stock and Watson (2001).

Our data are yearly time series about Real GDP Growth rate (GR), Unemployment rate (UN), Current Account Deficit (CA), Government Fiscal Deficit (GD), Inflation Rate (IR), M_3 money aggregate in logarithmic form (LM), US Dollar Exchange Rate (DR), and Net Bank Interest Rate (NI) as difference between lending rates with

deposit rates. We believe that the ensemble of these variables describes well the macroeconomic system of a country. All data were collected for the time horizon 1994 - 2016.

3. Analysis and results

First, we carried out a Granger Causality Analysis for any variable pair relationships. Results are summarized in the Table 1.

As we can identify, between GR and IR there are exists a bi-directional Granger causality. Thus, there exists some interdependence between the two variables, and future levels of both variables could be forecast based on their past values. This could also be interpreted as a state of certain degree of equilibrium between the inflation and growth. Between IR and LM exists a unidirectional causality, as past levels of LM can influence future levels of IR but not vice- versa. There is also in this case some interdependence between inflation and money. Between DR and CA exists a unidirectional causality, as past levels of DR can influence future levels of CA but not vice-versa. There is also in this case some interdependence between CA and DR; between IR and NI there is a unidirectional causality, as past levels of IR can influence future levels of NI but not vice- versa. There is also in this case some interdependence between inflation and interest rates. Between NI and LM exists a unidirectional causality, as past levels of LM can influence future levels of NI but not vice-versa. There is also in this case some interdependence between money and interest rates. At last, between GR and NI exists a unidirectional causality, as past levels of GR can influence future levels of NI but not vice- versa. There is also in this case some interdependence between growth rates and interest rates.

Table 1. Granger causality analysis results

Null Hypothesis	F-Stat.	Prob	Null Hypothesis:	F-Stat.	Prob.
IR does not Cause GR	3.880	0.042	IR does not Cause NI	6.456	0.008
GR does not Cause IR	10.42	0.001	NI does not Cause IR	0.387	0.685
UN does not Cause GR	1.260	0.309	IR does not Cause GD	0.922	0.417
GR does not Cause UN	0.443	0.649	GD does not Cause IR	1.911	0.180
IR does not Cause UN	2.426	0.120	LM does not Cause NI	3.796	0.044
UN does not Cause IR	2.472	0.116	NI does not Cause LM	0.461	0.638
IR does not Cause LM	0.660	0.530	GD does not Cause GR	1.070	0.366
LM does not Cause IR	21.35	0.000	GR does not Cause GD	0.680	0.520
DR does not Cause LM	0.092	0.912	NI does not Cause GR	1.832	0.192
LM does not Cause DR	3.604	0.051	GR does not Cause NI	4.871	0.022
DR does not Cause CA	5.333	0.016	DR does not Cause IR	0.944	0.409
CA does not Cause DR	0.440	0.651	IR does not Cause DR	0.277	0.761

In some pairs of variables, such as unemployment and growth, unemployment and inflation, inflation and government deficit, growth and government deficit, inflation rates and deposit rates there isn't any Granger causality. In the second step we performed the co-integration analysis. To do so we first identified the order of integration for each series using Dickey-Fuller unit root tests. Results are summarized in Table 2:

Table 2. Order of integration of the series

Variable	Integration Order	Variable	Integration Order	Variable	Integration Order
GR	*I(0)*	NI	*I(0)*	UN	*I(0)*
IR	*I(1)*	GD	*I(1)*	LM	*I(1)*
DR	*I(1)*	CA	*I(0)*		

Then, based on Engle-Granger method we tested if two series are co integrated. Based on this test, any pair of GR, IR and UN is not co integrated, because in order to be co integrated two series should each be non-stationary, or I(1). Based on this condition, GR and NI also are not co integrated, CA and DR are not co integrated, and GR and GD are also not co integrated. Variables IR, GD and LM are non-stationary; they could however be co integrated if there is a linear combination of them that is stationary.

Using Engle-Granger test we identified that IR and GD do not co-integrate, LM and IR also do not co integrate. Missing co-integration means lack of long-term equilibrium for a substantial part of the macroeconomic system.

The third element of our analysis is VAR and IRF analysis. Strictly speaking, to perform VAR and IRF analysis we should work with stationary series. Following Harvey (1990, 83) and Gujarati (2003, 853), VAR analysis based on differenced series may result in unsatisfactory analysis. So that they suggest working with levels of series instead, not forgetting negative effects of the unit roots on the model estimates. Thus, in our analysis we used series in levels.

We used a reduced-form VAR model and considered all variables as endogenous, as Sims and Gujarati indicate. More complex subsystems could be checked, but because of increased number of model coefficients the number of degrees of freedom for the model would be reduced and consistency of parameter estimates would be questionable, so we focus mainly on pair relationships.

In a VAR model we have as many equations as endogenous variables there are. Each of the variables is a function of past values of itself and past values of the other variables. In each case we first make tests for the optimal lag order. Since the VAR models are used mainly for forecasting rather than analysis, some model coefficients or variables might be insignificant, but jointly they might be significant. To this end, we test the so-called zero restriction hypotheses for each equation, for all lags of each variable and for all variables together.

We start our analysis by estimating a two-equation reduced-form VAR model for GR and IR, with optimal (as estimated) order 2:

$$GR_t = 3.691(*) - 0.849 GR_{t-1}(*) + 0.769 GR_{t-2} - 0.65 IR_{t-1}(**) + 0.742 IR_{t-2}(**) + e_{t1}, \tag{10}$$

$R^2 = 0.3966$, $P(F) = 0.07$

$$IR_t = 0.0765(*) + 0.067 GR_{t-1}(***) + 0.108 GR_{t-2} + 0.046 R_{t-1}(***) + 0.016 IR_{t-2}(*) + e_{t2}, \tag{11}$$

$R^2 = 0.645$, $P(F) = 0.001$

where: (***) means significant at 1% level of significance; (**) means significant at 5% level of significance; (*) means significant at 10% level of significance

Based on the P-value of the model and the significance level 10 %, both models are significant (the second is significant even for 1% significance level).

Using F test, for equation 1 all lags of GR result jointly insignificant; all lags of IR are jointly significant; all lags of two variables taken together are jointly significant. For equation 2 all lags for both variables are significant. Residual-based tests for this model confirm normality, lack of autocorrelation, and lack of ARCH effect (the error variance for future years is not dependent on past error variances). In addition, VAR inverse roots are calculated. Since these roots are less than one the system is stable (stationary). Figure 2 shows responses of GR and IR to shocks in GR and IR, or the so-called IRF analysis.

Figure 2. Impulse Responses analysis for GR and IR variables

On the horizontal axis we have a 10 years' period, while the vertical axis represents the responses (in standard deviations) of the dependent variable to the shocks of itself and to shocks of the other variables; in a reduced-form VAR a shock in a variable may cause responses on itself as well as on other variables of the model. As it is indicated by the Figure, a shock in GDP of one standard deviation brings about a change of about 3.5 standard response of GDP itself in the first year of the future time horizon, but the effect of the shock almost disappears after year three. A shock (of one standard deviation) in IR, simply a shock from now on, causes a negative response of GDP growth about 2.5 then it tends to disappear after year three. Similarly, the effect of a shock of GR on IR, and IR on IR itself also tend to disappear after year three in the future.

Another analysis we conducted aimed at explaining how the standard error (variance) of each variable is affected by shocks in each variable. This is the so-called the variance decomposition analysis. Table 3 shows the decomposition of the variance for the GR and IR according to GR and IR shocks in time.

For variable GR we can easily note that most of its variance is caused by shocks in GR itself (100% in the first year and 75.07% in the last year). But inflation as well is responsible for good part of the variance (0% in the first year and 24.9% in the fifth one).

Table 3. Variance decomposition for GR and IR variables

Period	GR			IR		
	std. error	GR	IR	std. error	GR	IR
1	3.49652	100.0000	0.0000	5.34421	74.1741	25.8259
2	3.91649	79.7063	20.2937	6.64518	49.1150	50.8850
3	4.21639	76.9744	23.0256	7.19185	56.5007	43.4993
4	4.29650	74.3809	25.6191	7.24626	57.0700	42.9300
5	4.35937	75.0700	24.9300	7.34420	56.3876	43.6124

Below we present results of the VAR modelling for IR and money LM. Two models are estimated, one for each variable:

$$LM_t = 3.168 + 0.695 LM_{t-1} - 0.132 LM_{t-2}(***) + 0.0406 IR_{t-1} + 0.155 IR_{t-2} + e_{t1}, \tag{12}$$

$R^2 = 0.793$, $P(F) = 0.00002$

$$IR_t = -4.627(**) - 0.124 IR_{t-1} - 0.399 IR_{t-2}(***) + 0.556 LM_{t-1}(***) + 0.311 LM_{t-2}(**) + e_{t1}, \tag{13}$$

$R^2 = 0.7769$, $P(F) = 0.00004$

Both models are significant. Based on F test, at a significance level 5%, for equation 1 all lags of LM result jointly significant; all lags of IR are also jointly insignificant; all lags of two variables taken together are jointly insignificant. For equation 2 all lags of IR result jointly significant; all lags of LM are jointly significant; all lags of two variables taken together are jointly significant. Residual-based tests for model two confirm normality, lack of autocorrelation, and lack of ARCH effect (the error variance for future years is not dependent on past error variances). In addition, VAR inverse roots are calculated. Since these roots are less than one the system is stable. Below we present decomposition of variance of IR to shocks in both IR and money (Table 4), and IRF analysis (Figure 3). We see that shocks in money provide substantial effect in the variance of IR growth (from 0.41% in the first year to 39.2% in year 5). Role of shocks on IR itself play also an important role.

Table 4. Variance decomposition for IR and LM variables

Period	IR			LM		
	std. error	LM	IR	std. error	LM	IR
1	4.23454	0.4118	99.5882	4.53902	100.0000	0.0000
2	4.93944	25.6787	74.3213	5.53817	99.9039	0.0961
3	5.85807	40.3731	59.6269	5.8562	98.2597	1.7403
4	5.955	40.1592	59.8408	6.00849	97.9920	2.0080
5	6.02846	39.2073	60.7927	6.11274	98.0528	1.9472

Figure 3. IRF analysis for IR and LM variables

The next VAR model is the one based on LM and DR variables:

$$LM_t=0.209+0.747LM_{t-1}(***)-0.114LM_{t-2}+0.0297DR_{t-1}-0.0027DR_{t-2}+e_{t1}, \qquad (14)$$

$R^2=0.779$, $P(F)=0.0000$

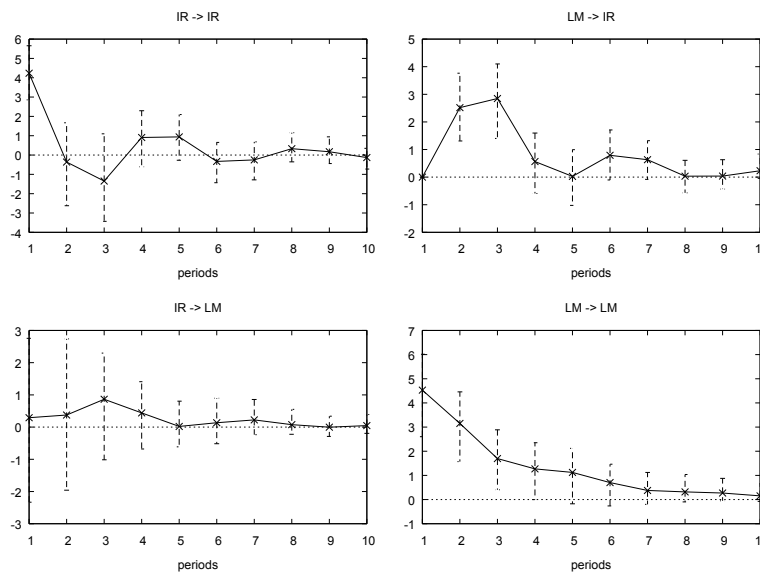$$DR_t=32.557(**)+0.328LM_{t-1}+0.320LM_{t-2}+0.844DR_{t-1}(***)-0.204DR_{t-2}+e_{t2}, \qquad (15)$$

$R^2=0.777$, $P(F)=0.00004$

Both models are significant. Using F test, at a significance level 5%, for equation 1 all lags of LM result jointly significant; all lags of DR are jointly insignificant; all lags of two variables taken together are jointly insignificant. For equation 2 all lags of LM are significant, all lags of DR are also significant, but lags for both variables are not significant. Residual-based tests for this model do not confirm normality, but they do for lack of autocorrelation, and lack of ARCH effect (the error variance for future years is not dependent on past error variances). In addition, VAR inverse roots are calculated. Since these roots are less than one the system is stable.

As indicated by Table 5 in combination with VAR model results, shocks in both variables play some roles. A shock in DR has strong effects on DR itself, but it shocks LM insignificantly. A shock in LM affects substantially DR and has a very strong effect on LM itself.

Table 5. Decomposition of variance for LM and DR

Period	LM			DR		
	std. error	LM	DR	std. error	LM	DR
1	4.69564	100.0000	0.0000	9.6228	7.8773	92.1227
2	5.81904	99.7774	0.2226	12.4089	5.0912	94.9088
3	6.1701	99.3570	0.6430	13.5459	7.8342	92.1658
4	6.29624	98.9843	1.0157	14.395	14.9193	85.0807
5	6.35147	98.7536	1.2464	15.0065	20.6477	79.3523

In Figure 4 above we present the decomposition table and IRF function for LM and DR responses. Figure 4 shows that a shock in LM has a continued positive response of DR, which seem to die out only many years after the shock occurred in LM. Next, we estimated a VAR model to analyze the relationship between DR and CA.

Figure 4. IRF analysis for LM and DR variables

$CA_t=19.577(***)+0.125CA_{t-1}-0.034CA_{t-2}-0.051DR_{t-1}(***)-0.0356DR_{t-2}+e_{t1}$,   (16)

$R^2=0.525$, $P(F)=0.01$

$DR_t=30.488+1.010CA_{t-1}-0.882CA_{t-2}+1.079DR_{t-1}(***)-0.347DR_{t-2}+e_{t2}$,   (17)

$R^2=0.694$, $P(F)=0.000$

      Using F test, at a significance level 5%, both models are significant; for equation 1 all lags of CA result jointly insignificant; all lags of DR are jointly insignificant; all lags of two variables taken together are jointly insignificant. For equation 2 all lags of DR result jointly insignificant; all lags of CA are jointly insignificant; all lags of two variables taken together are jointly insignificant. Residual-based tests for this model do not confirm normality, but they do for lack of autocorrelation, and lack of ARCH effect. Model results stable because VAR inverse roots result inside the unit circle. Since these roots are less than one the system is stable.

      To follow this analysis, since CA growth is a key variable, we would be more interested for the link DR to CA. As indicated by Table 6, in combination with VAR model, shocks in DR cause good part of the CA variance (9.2% in the second year first year and 45.8% in year 5).

Table 6. Decomposition of variance for DR and CA

Period	CA			DR		
	std. error	CA	DR	std. error	CA	DR
1	1.80338	100.0000	0.0000	11.283	1.6396	98.3604
2	1.89946	90.7748	9.2252	16.8653	4.7518	95.2482
3	2.20774	68.6746	31.3254	18.9889	4.5581	95.4419
4	2.43119	57.6645	42.3355	19.5048	4.3387	95.6613
5	2.51085	54.2109	45.7891	19.59	4.3275	95.6725

      Figure 5 shows that a shock in DR has long-lasting negative responses of CA until it almost dies out after year 6.

Figure 5. IRF analysis for DR and CA variables

Now we analyze the role of NI on GDP growth:

$$NI_t=3.453(*)+0.609NI_{t-1}(**)-0.063NI_{t-2}+0.349GR_{t-1}(**)-0.336GR_{t-2}(**)+e_{t1}, \tag{18}$$

$R^2=0.484, P(F)=0.02$

$$GR_t=1.867+0.425NI_{t-1}+0.175NI_{t-2}+0.050GR_{t-1}-0.414GR_{t-2}(*)+e_{t2}, \tag{19}$$

$R^2=0.271, P(F)=0.252$

The model for NI is significant, but the model for GR is not significant. For equation 1 all lagged effects for each of variables are significant but they are insignificant for all variables. For equation 2 all lagged effects are insignificant. Residual-based tests for this model do confirm normality, lack of autocorrelation, and lack of ARCH effect. Model results stable because VAR inverse roots result inside the unit circle.

As indicated by Table 7, effects of NI shocks on the variance of NI itself are large (100% to 84.8%, for the first and fifth year respectively), and response of NI to GR shocks also is substantial (from 14.9% to 15.2%, for the first and fifth year respectively).

Table 7: Decomposition of variance for GR and NI

Period	NI			GR		
	std. error	NI	GR	std. error	NI	GR
1	2.66084	100.0000	0.0000	3.84355	21.7342	78.2658
2	3.07862	85.1347	14.8653	3.9855	27.0262	72.9738
3	3.40225	86.7078	13.2922	4.41753	36.5091	63.4909
4	3.61591	84.8659	15.1341	4.43829	37.0834	62.9166
5	3.61937	84.8155	15.1845	4.43835	37.0828	62.9172

Figure 6 highlights that a shock in NI is followed by large responses of NI itself in future years and the effects die out after year 5. Responses of NI to shocks in GR seem to be fluctuating during, and they disappear after year 5.

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Figure 6. IRF analysis for GR and NI variables

Now we focus on inflation rate (IR) as a key variable of interest and Net Interest (NI):

$$NI_t=4.347(**)+0.340NI_{t-1}-0.097NI_{t-2}-0.062IR_{t-1}+0.28IR_{t-2}(***)+e_{t1}, \tag{20}$$

$R^2=0.54. P(F)=0.01$

$$IR_t=4.886+0.306NI_{t-1}-0.511NI_{t-2}+0.425IR_{t-1}-0.06974IR_{t-2}+e_{t2}, \tag{21}$$

$R^2=0.219, P(F)=0.379$

The NI model is significant but the IR model is not. For equation 1 lagged effects of NI are insignificant, lagged effects for IR and all variables taken together are significant. For the equation 2 the effects are insignificant at all lags. Residual-based tests for this model do not confirm normality, but they do for lack of autocorrelation, and lack of ARCH effect. Model results sta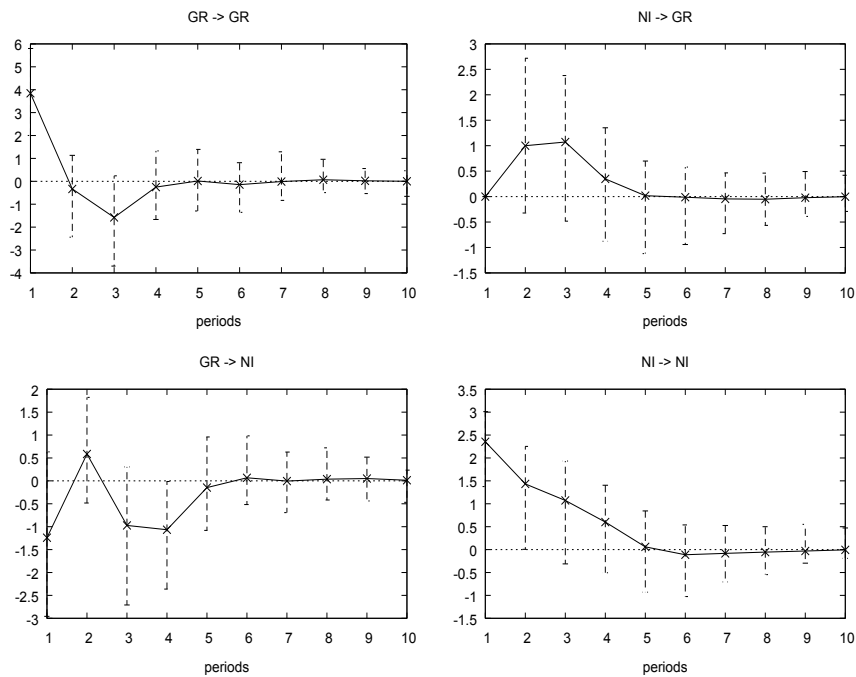ble because VAR inverse roots result inside the unit circle. Table 8 shows the composition of the variance for NI and IR variables.

If we look at Table 8, it easily identified the shocks in NI are responsible for the largest part of the NI variance (100% to 72.9%, respectively for the first and fifth years) but also effects of IR shocks play an important role (0% to 27.1%, respectively for the first and fifth years).

Table 8. Decomposition of variance for NI and IR

Period	NI			IR		
	std. error	NI	IR	std. error	NI	IR
1	2.51072	100.0000	0.0000	7.92187	43.8167	56.1833
2	2.59223	97.9730	2.0270	8.8368	46.7074	53.2926
3	3.18066	79.7769	20.2231	8.85608	46.5624	53.4376
4	3.60387	73.5399	26.4601	8.88332	46.3260	53.6740
5	3.63213	72.8666	27.1334	8.88957	46.3891	53.6109

Figure 7 highlights strong and positive responses of NI to shocks on NI itself and IR, which tend to last for many years after the shock.

Figure 7. IRF analysis for NI and IR variables

At last we investigated a mutual relationship between NI and LM. A mutual relationship may exist between the two variables, so we present estimation results for both models. Both equations are significant and lagged effects are significant only for LM for both equations. Both variables at all lags are jointly significant, residual tests are positive and VAR roots are inside the unit circle.

$$NI_t=3.428(*)+0.0745NI_{t-1}+0.0901NI_{t-2}+0.143LM_{t-1}(**)+0.051LM_{t-2}+e_{t1},\qquad(22)$$

$R^2=0.437$, $P(F)=0.0455$

$$LM_t=1.248+0.373NI_{t-1}+0.0068NI_{t-2}+0.724LM_{t-1}(***)-0.148LM_{t-2}+e_{t2},\qquad(23)$$

$R^2=0.788$, $P(F)=0.0000$

Figure 8 shows that both NI and LM shocks are followed by positive responses of NI for many years. Effects of NI shocks almost disappear after year 2, whereas effects of money LM seem to be more long-lasting.
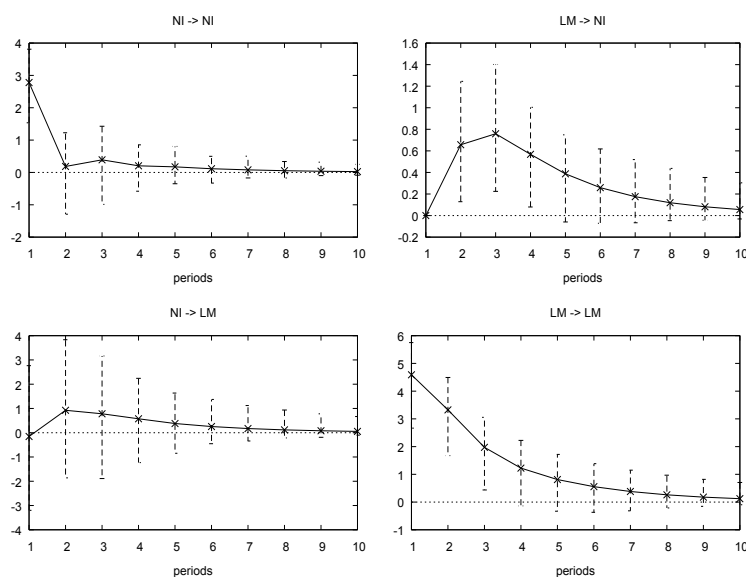
Figure 8. IRF analysis for NI and LM variables

In addition, as indicated by Table 9, LM shocks have a role on the variance of interest rates, though lower than the role of NI shocks on its own variance. The effect of LM shocks has a far larger effect on the variance of LM itself, than shocks in NI on LM variance.

Table 9. Decomposition of variance for NI and LM

Period	NI			LM		
	std. error	NI	LM	std. error	NI	LM
1	2.77945	100.0000	0.0000	4.59205	0.1118	99.8882
2	2.86207	94.7289	5.2711	5.74397	2.6668	97.3332
3	2.98658	88.7031	11.2969	6.12344	3.9734	96.0266
4	3.04702	85.6712	14.3288	6.27111	4.6307	95.3693
5	3.07636	84.3607	15.6393	6.33485	4.8983	95.1017

4. Discussion and conclusion

As expected, between inflation and growth in Albania there is a bi-directional causality, whereas between inflation and money supply there is a unidirectional causality, as past levels of money supply can influence future levels of inflation but not vice-versa. There is also in this case some interdependence between inflation and money.

Between exchange rates and current account deficit exists, as expected, a unidirectional causality, as past levels of exchange rates can influence future levels of exchange rates but not vice- versa. There is also in this case some interdependence between exchange rates and exchange rates.

Between inflation and net interest rate there is a unidirectional causality, as past levels of inflation can influence future levels of net interest but not vice-versa. There is also in this case some interdependence between inflation and interest rates.

Between net interest and money supply there is a unidirectional causality, as past levels of money supply can influence future levels of net interest but not vice-versa. There is also in this case some interdependence between money and interest rates.

At last, between growth and net interest there is a unidirectional causality, as past levels of growth can influence future levels of net interest but not vice-versa. There is also in this case some interdependence between growth rates and interest rates.

Contrary to economic wisdom and literature findings, the causality analysis for some pairs of variables didn't detect any Granger-cause effects; this refers to unemployment and growth, unemployment and inflation, inflation and government deficit, growth and government deficit, current account deficit and growth, exchange rates and growth, interest rates and current account deficit, *etc.*

Missing of co-integrations between growth, inflation and unemployment; growth and net interest; growth and government deficit; inflation and government deficit, as well as money supply and inflation, mean lack of long-term equilibrium for a substantial part of the macroeconomic system.

Based on VAR analysis for growth and inflation, it results that these variables could be forecast based their past values. It also confirmed literature findings of negative relationship between growth and inflation. IRF analysis showed that a shock in growth of one standard deviation brings about a change of about 3.5 standard deviation response of growth itself in the first year of the future time horizon, but the effect of the shock almost disappears after year three. A shock (of one standard deviation) in IR, simply a shock from now on, causes a negative response of growth about 2.5 then it tends to disappear after year three. Similarly, the effect of a shock of growth on inflation rate and inflation on itself also tend to disappear after year three in the future.

VAR analysis confirmed literature findings on positive relationship between money and exchange rates. It provided two significant models for exchange rates and money supply to be used for forecasting. It also showed that a shock in exchange rates has strong effects on exchange rates itself, but it shocks money supply insignificantly. A shock in money supply affects substantially exchange rates and has a very strong effect on money supply itself. Moreover, a shock in money supply has a continued positive response of exchange rates, which seems to die out only many years after the shock occurred in money supply.

Information provided by VAR model for the pair of variables current account and exchange rates is also in conformity with economic wisdom and empirical evidence as well. VAR provided two useful models for each variable, but since the causality is unidirectional from exchange rates to exchange rates and as indicated by VAR model, shocks in exchange rate cause good part of the exchange rates variance (9.2% in the second year first year

and 45.8% in year 5). IRF analysis showed that a shock in exchange rates has long-lasting negative responses of exchange rates until it almost dies out.

A VAR model for the relationship between growth and net interest resulted significant but it is not the case for the growth model. Thus, the latter cannot be used. As shown by the variance decomposition analysis, effects of net interest shocks on the variance of net interest itself are large (100% to 84.8%, for the first and fifth year respectively), and response of net interest to growth shocks also is substantial (from 14.9% to 15.2%, for the first and fifth year respectively). Based on IRF analysis, a shock in net interest is followed by large responses of net interest itself in future years and the effects die out after year 5. Responses of net interest to shocks in growth seem to be fluctuating and they disappear after year 5.

IRF analysis highlights strong and positive response of net interest to shocks in net interest itself and inflation, which tend to last for many years after the shock has occurred.

For the pair of variables net interest and money supply relationship both models resulted significant. Money supply shocks have a role on the variance of interest rates, though lower than the role of net interest shocks on its own variance. The effect of money supply shocks has a far larger effect on the variance of money supply itself, than shocks in net interest on money supply variance.

Among key variables that contribute to this state of equilibrium are growth, inflation and interest rates. In particular, inflation and growth rates are strongly dynamically interdependent, so they are in long run equilibrium. Growth rates and interest rates also seem to be strongly related and in long-term equilibrium. Money supply and inflation also seem to be dynamically interrelated. Significant co-integration between these variables contributes to the general state substantial equilibrium of the macroeconomic system. Some important aggregates are not enough, or even not at all co-integrated; growth and current account, growth and government deficit, current account and inflation, *etc.*, are not found to be significantly interdependent. The state of long-term equilibrium between two variables doesn't mean that in some point in time, because of shocks, disequilibrium has not occurred. Thus, it would be helpful to learn if such disequilibrium has occurred, and if yes what is the speed of adjustment towards long-term equilibrium. This would involve using Error Correction Models, which is beyond the scope of this research. In addition, why some variables are not in equilibrium needs further investigation, may be not only econometric in its sort.

In summary, major finding of this research are in line with findings of empirical evidence, not to forget that even worldwide research frequently has shown that in different countries and context the results are not the same, and they need not be the same for the Albanian case. We could certainly say that though macroeconomic stability has been pretended to be achieved for most of the study period, the Albanian macro-system for the whole period under investigation has not been fully co-integrating, *inter alias*, it has not been in full equilibrium. The macroeconomic system as a whole for the period in study in general shows serious partial co-integration or disequilibrium, as far as some of key variables resulted not to be strongly co-integrated. This means that the economy's performance during transition could be much better and so could be also the performance of the public governance. Though weak shocks might be a factor why effects of some variables on other ones are not clearly distinguishable, failing to show equilibrium between some variables. Moreover, the limited or non-efficient use of the country's resources could be a factor of why some relationships between variables result against expectations, or contrary to empirical evidence findings in some other countries.

Some limitations of the research

In our research we used a two-equation approach to describe the relationships between macroeconomic aggregates and define their state of equilibrium. Another approach could be using a single multi-equation system. But use of the latter approach would not be without consequences on the quality of the equation parameters estimates and the models themselves because of short time series. In the case of a single VAR system more general and simultaneous inferences about the state of macroeconomic equilibrium would be possible. Some unsatisfactory results may be related to short data series as a source of possible bias. Use of higher frequency data, such as monthly or quarterly data, could be a solution to this problem but such data for some key variables, such as GDP growth rates, in Albania are missing for most of the period under study. In addition, reliability of data for some of the variables might be another source of bias. There are indications that some series such as GDP, money supply, exports, *etc.* are measured with errors, which might have some influence on research findings. At last, in a complex economic reality, some relationships might be not discovered and theoretical expectations not met because of instantaneous interaction of many factors, and policy inefficiency in wider than macroeconomic context.

Some policy implications

There are indications that some aggregates are measured with errors, thus procedures, methods and measures to improve the quality of data produced by the corresponding public institutions (Institute of Statistics, Bank of Albania, *etc.*) are necessary.

Though institutionally macroeconomic stability seems good for most of the period under study, regular assessment of the equilibrium using more advanced methods such as econometric techniques should be done, to be sure this stability is true and enough sustainable. Government and other public institutions should use macroeconomic instruments should be used more effectively to achieve a more sustainable stability.

Macroeconomic stability is usually evaluated based on the troika of indicators: inflation rate, exchange rates and fiscal deficit. Other indicators should be used, such as current account deficit, trade balance, *etc.*, to ensure a better estimate of the macroeconomic equilibrium is made. When introducing policies, such as monetary, fiscal or trade policies the government should keep in mind that they affect not only the intended economic aspects, but they may impact certain equilibrium. Thus, the whole cause and effect chain should be analyzed before introducing these measures.

Since as found in this research some aggregates are not in equilibrium, against theoretical expectations, efficiency of the government is dubious. Thus, in depth analysis should be done to assess problems and causes why this equilibrium is missing, which could bring about significant improvement in the performance of the public institutions and government itself.

Scope for further research

Further research is required to analyze why some variables are not in equilibrium (such as unemployment and growth rate). This could imply analysis of the data producing systems and procedures, and policies intended to trigger growth and encourage employment. Attempts can be made to include in the equilibrium analysis other aggregates rather than those already included. At last, since relationships between aggregates can change over time it would be interesting to investigate and identify points in time when these changes occur, and also important periods of potential disequilibrium.

References

[1] Akbaş, Y. Lebe, F. and Uluyol, O. 2014. Analyzing the relationship among the GDP-current account deficit and short-term capital flows: The case of emerging markets. *Yonetim ve Ekonomi.* 21(2). Available at: http://dergipark.gov.tr/yonveek/issue/13701/165876.

[2] Andoni, M. and Osmani, M. 2017. Assessment of Relationship Between Inflation, Growth and Fiscal Deficit in Albania - An Econometric Approach. *European Scientific Journal*, 13(13). Available at: http://dx.doi.org/10.19044/esj.2017.v13n13p137

[3] Andoni, M., Osmani, M. and Kambo, A. 2017. An assessment of macroeconomic performance of Albania-a classical and threshold regression econometric approach. *European Journal of Business, Economics and Accounting*, 5(4). Available at: https://www.idpublications.org/wp-content/uploads/2017/06/Full-Paper-AN-ASSESSMENT-OF-MACROECONOMIC-PERFORMANCE-OF-ALBANIA-A-CLASSICAL-AND-THRESHOLD.pdf

[4] Andrès, J. and Hernando, I. 1999. Does Inflation Harm Economic Growth? Evidence for the OECD. NBER Working Paper, No. 6062. Available at: http://www.nber.org/papers/w6062

[5] Arratibel, O. and Michaelis, H. 2014. *The impact of monetary policy and exchange rate shocks in Poland evidence from a time varying VAR*. Working Paper Series, No 1636/February 2014, European Central Bank. Available at: http://finsys.rau.ro/docs/11.%20Roman.DianaGeorgiana.pdf

[6] Barro, R.J. 2013. Inflation and Economic Growth. *Annals of Economics and Finance*, 14(1): 85–109. Available at: http://aeconf.com/Articles/May2013/aef140105.pdf

[7] Bernanke, Ben. S., Boivin, J. and Eliasz. P. 2005. Measuring the effects of monetary policy: A Factor-augmented vector autoregressive (FAVAR) approach. *Quarterly Journal of Econometrics*. February 2005: 387-422. Available at: http://www.nber.org/papers/w10220

[8] Berument, H. and Pasaogullari, M. 2003. Effects of real exchange rate on output and inflation: Evidence from Turkey. *The Developing Economies*, Volume XLI, 4: 401–435.

[9] Bhuiyan, R. 2007. *The Effects of monetary policy shocks on exchange rates in a small open economy: A structural vector auto regressive (VAR) approach*. Available at: https://economics.ca/2007/papers/0597.pdf

[10] Bhuiyan, R. 2008. *The effects of monetary policy shocks in a small open economy: A structural VAR approach*. Available at: http://qed.econ.queensu.ca/pub/students/phds/bhuiyan/Paper02.pdf

[11] Case, K. E., Fair, R. C., and Oster, S. M. 2012. *Principles of Macroeconomics*. Tenth Edition. Prentice Hall.

[12] Cheng, K.C. 2006. *A VAR Analysis of Kenya's Monetary Policy Transmission Mechanism: How Does the Central Bank's REPO Rate Affect the Economy?* IMF WP/06/300. Available at: https://www.ijbcnet.com/3-8/IJBC-14-3802.pdf

[13] Chuba, M. A. 2015. Quantity theory of money: The empirical evidence in Nigeria. *European Journal of Business and Social Sciences*, 4(06). Available at: http://www.ejbss.com/recent.aspx

[14] Danmola, R. A. and Olateju, A. O. 2013. The impact of monetary policy on current account balance in Nigeria. *Journal of Humanities and Social Science,* 7(3): 67-72. Available at: http://www.Iosrjournals.Org

[15] Datta, K. and Kumar, C. 2011. Relationship between Inflation and Economic Growth in Malaysia-An Econometric Review. In International Conference on Economics and Finance Research (IPEDR) vol.4 (2011), IACSIT Press, Singapore. Available at: https://link.springer.com/chapter/10.1007/978-981-10-4451-9_6/fulltext.html

[16] Ener, M. and Arica, F. 2012. The current account-interest rate relation: A panel data study for OECD countries. *Journal of Business Management and Economics*, 3(2): 48-54. Available at: http://www.e3journals.org/JBME

[17] Faria, Joao. R. and. Carneiro, Francisco G. 2001. Does high inflation affect growth in the long and short run? *Journal of Applied Economics,* 4(1). Available at: https://ucema.edu.ar/publicaciones/download/volume4/faria.pdf

[18] Faust, J. Rogers J. H., Swanson, E., and Wright, J. H. 2003. Identifying the effects of monetary policy shocks on exchange rates using high frequency data. NBER Working Paper No. 9660, Issued in April 2003, NBER Program. Available at: http://www.nber.org/papers/w9660

[19] Fischer, S. 1983. Inflation and Growth. NBER Working Paper No. 1235. Available at: http://www.nber.org/papers/w4565

[20] Ghosh, A. and Philips, S. 1998. *Inflation, disinflation, and growth*. International Monetary Fund Working Paper 1998(68). Available at: http://dx.doi.org/10.5089/9781451961188.001

[21] Gordon, J. 1987. *Macroeconomics*. Fourth Edition. Little Brown & Company, Ltd.

[22] Gujarati, D. 2003. *Basic Econometrics*. Furth Edition. McGraw-Hill, Inc.

[23] Harvey, E. 1990. *The Econometric Analysis of Time Series*. Second Edition, The MIT Press.

[24] Hayati, N., Rahman, A. 2012. The Relationship between Budget Deficit and Economic Growth from Malaysia's Perspective: an ARDL Approach. In International Conference on Economics, Business Innovation (IPEDR) Volume 38, IACSIT Press, Singapore, Proceedings: 54-58. Available at: http://www.ipedr.com/vol38/ 011-ICEBI2012-A00020.pdf

[25] Hsing, Y. and Hsieh, W.-J. (2004). Impacts of Monetary, Fiscal and Exchange Rate Policies on Output in China: A VAR approach, *Economics of Planning*, 37(2): 125–139. Available at: https://link.springer.com/content/pdf/10.1007/s10644-004-7505-0.pdf

[26] Kasseh, A. 2018. The Relation between Inflation and Unemployment in the Gambia: Analysis of the Philips Curve. *Journal of Global Economy*, 6: 294 - 304. DOI: 10.4172/2375-4389.1000294. Available at: https://www.omicsonline.org/open-access/the-relation-between-inflation-and-unemployment-in-the-gambia-analysis-of-the-philips-curve-2375-4389-1000294-103195.html

[27] Le, Hung V. and Pfau, W. D. 2009. VAR Analysis of the monetary transmission in Vietnam. *Applied Econometrics and International Development,* 9(1). Available at: http://www.usc.es/economet/journals1/aeid/aeid9115.pdf

[28] Lee, L.-H. 2010. A Study on Macroeconomic Effect of Fiscal Policy by Sign Restrictions VAR. Available at: http://aacs.ccny.cuny.edu/2010conference/Papers%20and%20Presentations/Li%20Hua%20Lee.pdf

[29] Lozano, I. and Rodríguez, K. 2009. Assessing the Macroeconomic Effects of Fiscal Policy in Colombia, *Journal of Financial Economic Policy,* 3: 206 - 228. Available at: https://www.researchgate.net/ publication/227429684_ Assessing_the_macroeconomic_effects_of_fiscal_policy_in_Colombia

[30] Lütkepohl, H. 1991. *Introduction to Multiple Time Series Analysis*. Springer.

[31] Lütkepohl, H. and Krätzig, M. 2004. *Applied Time series Econometrics*. Cambridge University Press.

[32] Mankiw, G. 2010. *Macroeconomics*. 7th Edition. Worth Publishing House.

[33] Mbongo, J.E., Mutasa, F., and Msigwa, R.E. 2014. The effects of money supply on inflation in Tanzania. *Economics*, 3(2): 19-26.

[34] Metin, K. 1998. The Relationship between Inflation and the Budget Deficit in Turkey. *Journal of Business & Economic Statistics,* 16(4): 412-422. Available at: http://www.jstor.org/stable/1392610

[35] Mukoka, Sh. 2018. An Econometric Assessment of the Impact of Inflation on Economic Growth: A Case Study of Zimbabwe Economy. *Economics*, 7(1): 17-27.

[36] Najaf, R. 2017. The Causal Relationship between Inflation and Economic Growth in Nigeria. *Journal of Accounting and Marketing,* 6: 208 - 218. DOI: 10.4172/21689601.1000208. Available at: https://www.omics online.org/open-access/the-causal-relationship-between-inflation-and-economic-growth-innigeria-2168-9601-1000208.pdf

[37] Nayab, H. 2015. The Relationship between Budget Deficit and Economic Growth of Pakistan. *Journal of Economics and Sustainable Development,* 6(11): 85-90. Available at: https://iiste.org/Journals/index.php/DCS/article/viewFile/23097/23616

[38] Papademos, L. 2003. Monetary policy, Inflation and Growth. Available at: https://www.ecb.europa.eu/press/key/date/2003/html/sp031103.en.html

[39] Raghavan, M. and Silvapulle, P. 2011. Structural VAR Approach to Malaysian Monetary Policy Framework. Evidence from the Pre-and Post-Asian Crisis Periods. Available at: http://nzae.org.nz/wp-content/uploads/2011/08/nr1215397050.pdf

[40] Roldán, C.D. Cuerva, C. M., and Guerrero, J.J.R. 2013. On the relationship between the government balance and the current account deficit: fiscal consolidation in open economies, (Preliminary version). Available at: http://www.uibcongres.org/imgdb/archivo_dpo12611.pdf

[41] Şahin, A., Tansel, A., and Berument, M. H. 2013. Output-Employment Relationship across Sectors: A Long-versus Short-Run Perspective, The Institute for the Study of Labor (IZA) in Bonn Discussion Paper No. 7599 August 2013. Available at: http://ftp.iza.org/dp7599.pdf

[42] Şahin, I. E. and Mucuk, M. 2014. The effect of current account deficit on economic growth: The case of Turkey.11th International Academic Conference, International Institute of Social and Economic Sciences (IISES), Reykjavik, Iceland, 24 June 2014: 321-330. Available at: http://proceedings.iises.net/index.php?action= proceedingsIndexConference&id=3

[43] Sims, C. A. 1980. Macroeconomics and reality. *Econometrica*, 48: 1 - 48.

[44] Solomon, M. and De Wet, W. A. 2004. The effect of a budget deficit on inflation: The case of Tanzania. *South African Journal of Economic and Management Sciences*, 7(1): 100-116. Available at: http://sajems.org/index.php/sajems/article/view/1431

[45] Stock, J.H. and Watson, M.W. 2001. Vector Autoregression. *Journal of Economic Perspectives*, 15(4): 101-115. Available at: https://www.aeaweb.org/articles?id=10.1257/jep.15.4.101

[46] Stotsky, J. G., Ghazanchyan, M., Adedeji, O. and Maehle, N. 2012. The Relationship between the Foreign Exchange Regime and Performance in Eastern Africa. IMF WP/12/148. Available at: https://www.imf.org/external/pubs/ft/wp/2012/wp12148.pdf

[47] Tobin, J. 1972. Inflation and Unemployment. *American Economic Review*, 62(1).

[48] Tokuo, I. and Hayato, N. 2015. Impact of Exchange Rate Shocks on Japanese Exports: Quantitative assessment using a structural VAR model. RIETI Discussion Paper Series 15-E-029, March 2015. Available at: https://www.rieti.go.jp/jp/publications/dp/15e029.pdf

[49] Varlik, S., Ceylan, N. B., and Berument, N. H. 2015. Assessing the Effects of a Policy Rate Shock on Market Interest Rates: Interest Rate Pass-Through with a FAVAR Model, The Case of Turkey for the Inflation-Targeting Period. Available at: http://yoksis.bilkent.edu.tr/pdf/?doi=12292

[50] Verbeek, M. 2004. *A Guide to Modern Econometrics*. Second Edition. John Wiley & Sons Ltd.

[51] Vickrey, W. S. 1954. Stability through inflation, in Keneth K. Kurihara, ed., Post Keynesian Economics, Rutgers, University Press, Chapter 4: 89-122. Available at: https://www.amazon.com/Post-Keynesian-Economics-Kenneth-K-Kurihara/dp/0415607892

[52] Vladova, Z. and Yanchev, M. 2015. Empirical Evidence on the Relationship between Money Supply Dynamics and Prices in Bulgaria. DP/100/2015, Publications Division Bulgarian National Bank. Available at: http://www.bnb.bg/bnbweb/groups/public/documents/bnb_publication/discussion_2015_100_en.pdf

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Trends of Self-Employment in Kazakhstan: Towards Developed Labor Markets?

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Abstract:

This paper discusses some aspects of self-employment and the influence of a number of social and economic factors on this labor phenomenon, including GDP, the level of unemployment, the level of education, and the level of service share in a national economy. The authors use statistical data for the period of 2002 to 2016 from the official database of the Government of the Republic of Kazakhstan. Based on regression analysis, the authors reveal a trend of the level of self-employment and make a forecast for the next periods. Thus, the authors answer the question whether there is a dynamics of a decline in the share of self-employment in the developing market of the Central Asian republic, which was a part of the planned economy of the USSR, by analogy with the European market of self-employment and what are the prospects for this phenomenon of the market economy in Kazakhstan.

Keywords: self-employment, labor market, forecasting, regression analysis

JEL Classification: J24

Introduction

Throughout the world, self-employment forms a style of life and earnings for many people, gives them flexible working conditions and helps people to provide themselves with means of subsistence, especially during crisis periods.

There is a significant level of interest in self-employment among researchers around the world (Baitenizov *et al.* 2018). After a prolonged decline of self-employment in agriculture, a share of non-agricultural self-employment grows in many industrialized countries, partly because of new information and communication technologies, more favorable conditions for doing business in services (Drobnič 2014, Baitenizov *et al.* 2018) and forming a creative economy (Dubina *et al.* 2012). A certain proportion of self-employed in a labor market is a necessary component for effective competition (Salowsky 1978). Kirchhof (1996) demonstrates that the self-employed and, first of all, small business owners form the core of the US economy.

Maslova (1993) shows that self-employment is an important way to mitigate crisis situations in regional labor markets, since it prevents a surge of unemployment. The expansion of different forms of self-employment is a measure that meets interests of both individuals and employers, and society as a whole, so it may soften the imbalance in a labor market.

In general, at a stage of recession, self-employment can be "a kind of a safety pillow or substitute of a social protection system, restraining an outflow of labor into economic inactivity or unemployment" (Golenkova 2006). At a stage of economic growth, it became the main segment of growth in a number of jobs, "adjusting the prohibitive rigidity of labor laws in relation to employees" (Gimpelson and Kapeliushnikov 2005).

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In the European Union, the total share of self-employed specialists aged 15 to 64 was 14.0% by the end of 2016. The largest proportion of the self-employed was in Greece (29.6%). A relatively high rate was also in Turkey (20.2%). The fewest numbers of the self-employed were in Denmark and Sweden (8% and 7.8% respectively). The total share of the self-employed in Europe slightly decreased (by 0.7%) during 2007-2016. However, when interpreting these results, one should keep in mind that the statistics for 2016 were represented by 28 countries of the EU, and by 17 countries in 2007[4].

According to the official statistics of the Republic of Kazakhstan, the number of self-employed population was 2176.1 thousand people or 25.4% of the total number of all employed and 24.1% of economically active population by the end of 2017[5]. Thus, the self-employed people represent a significant part of the economically active population of Kazakhstan. This situation contrasts with the average indicators of European self-employment. In addition, a large part of self-employed people of Kazakhstan live in rural areas and their incomes are low (Patlasov *et al.* 2018), unlike self-employed people in Europe and the USA where freelancing is actively developed as a new form of self-employment.

There is no information on the category of "self-employment" in the database of the Russian Federal Service of State Statistics. However, a share of the self-employed population in the Russian Federation is also high, and this share is concentrated mainly in the informal sector of the economy. Official statistics informs that a proportion of population employed in informal sector is 20.5% of the total number of employed in the economy of the Russian Federation in 2015[6].

In 2016 the Russian government initiated to temporarily exempt self-employed from taxes under condition of their official registration in order to bring them out the informal sector. But only 1289 people, according to tax authorities, officially registered as self-employed throughout the country from 2017 to 01.04.2018[7], despite the announced tax vacations.

In order to determine an efficient market development strategy for self-employment, it is necessary to analyze the drivers and factors which influence on its development.

This article examines the impact of a number of socio-economic factors on self-employment, including GDP, the unemployment rate, the level of education, and the share of services in the national economy of Kazakhstan. The authors used statistical data for the period of 2002 to 2016 from the official database of the Government of the Republic of Kazakhstan for correlation and regression analysis. The level of self-employment was considered a dependent variable, and GDP, the unemployment rate, the share of services and the level of education were independent variables. The authors revealed a trend of the level of self-employment in Kazakhstan on the basis of available observations and made a forecast.

This article may be of interest of the readers of this journal for the following reasons. Exploring problems of self-employment in Kazakhstan using quantitative methods are especially relevant and important, as in the scientific literature there is no such research, and self-employment is an extremely important direction of development of the recent labor market of Kazakhstan and other emerging Central Asian economies.

Secondly, it is necessary to assess the dynamics of the development of this form of labor with statistical methods in order to understand whether there is a trend set by the developed economy of Europe in the developing Central Asian region.

Although self-employment in Europe has decreased slightly for almost 10 years, as the European economy develops self-employment using modern information and communication technologies and freelance, Kazakhstan have begun to build a market economy since 1991 and self-employment in this region is largely agricultural. Thirdly, we found that, unlike the study of Lunn and Steen (2000), correlation between the share of services and the level of self-employment is negative in our research because of specifics of Kazakhstan's mentality and economic conditions. Fourthly, this paper presents a new model of the impact of GDP on the level of self-employment in Kazakhstan.

In the next section of this article a literature review on the research topic is given. Section 3 describes statistical data and literature used. Section 4 discusses results of statistical analysis. Section 5 provides a forecast of the level of self-employment in Kazakhstan. The final section summarizes results of this study.

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[4] Electronic resource of European statistical data. Available at: URL://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfst_hhsety&lang=en

[5] Official data of the Government of the Republic of Kazakhstan. Available at: www.stat.gov.kz

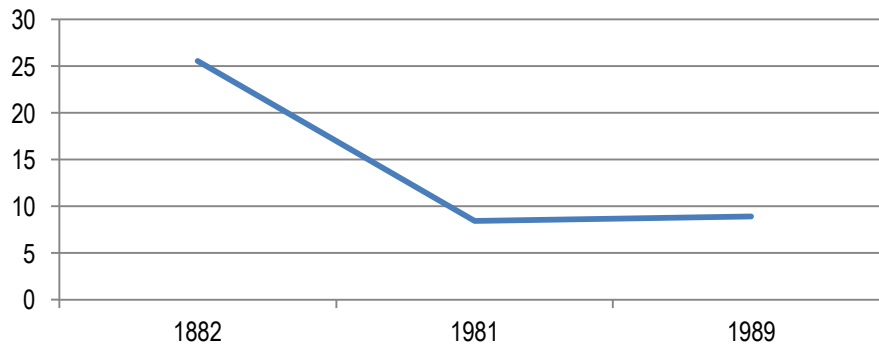[6] Official data of the Government of the Russian Federation. Available at: www.gks.ru

[7] Official data of the Government of the Russian Federation. Available at: www.nalog.ru/rn77/related_activities/statistics_and_analytics/selfemployed/

1. Determinants of self-employment: a literature review

This section presents a literature review, considering factors which influence on the development of self-employment.

Pfeiffer and Pohlmeier (1994) note increased attention to fundamental factors of self-employment both among politicians and economists in the early 1990s. The level of self-employment in West Germany had been decreasing several times for almost hundred years and began to grow just in the 1980s (Figure 1). A number of jobs in large businesses decreased by 0.85 million in the period of 1970 to 1987, at the same time small firms (less than 50 employees each) which makeup a basis of self-employment, additionally provided 1.5 million jobs.

Figure 1. The level of self-employment in West Germany for the period 1882 - 1989%

Source: Pfeiffer and Pohlmeier (1994)

Millán, Congregado and Román (2012) identify two groups of factors and corresponding formalized micro- and macro-variables which effect self-employment. The "micro variables" include the individual characteristics of a person who chooses self-employment at a certain stage of career (individual motivation, attitude toward risk, educational level, work experience, *etc*.). The second group of the self-employment variables ("macro variables") corresponds to many macroeconomic indicators characterizing a country's economy (GDP, an unemployment rate, a system of taxation, subsidies for small business, etc.).

Evans and Leighton (1989), studying determinants of changes in self-employment on the USA labour market in 1968-1987, conclude that about 90% of the changes in self-employment are due to age distribution of workers and their level of education ("individual variables"), tax rates and business conditions ("macro variables"). The interaction of these factors in time determines the changes in a level of self-employment. Thus, a level of self-employment declined as a result of a decrease in the average age of non-agricultural workers, as this was due to the increase in the birth rate in the 1960s in the USA. An increase in sectors of services and a decrease in sectors of industrial production, as well as an increase in "human capital", primarily - raising a level of education, positively effect a level of self-employment (Evans and Leighton (1989).

Among the main "macroeconomic" factors that can determine the changes in self-employment, researchers highlight the decline of the share of the employment level in industry during the era of "post-industrial society", that, on the one hand, leads to the increase of unemployment, and on the other hands, leads to the development of new, high-tech industries and, consecutively, increases the share of services which stimulate self-employment and freelance (Evans and Leighton, 1989).

Leoni and Falk (2010) identify such "individual variables" (by terminology of Millán, Congregado and Román 2012) as gender differences, age, and a field of knowledge as determinants of self-employment development. Perhaps, the interest in studying of the gender differences in behavior on a labor market as a factor of self-employment has become a part of the general trend of increasing interest in gender in research community. In particular, the analysis of publications registered in the Web of Science showed the following dynamics of publications in the field of gender studies (word "gender" as a subject): 1975-1984: 1542 publications, 1985-1994; 20666, 1995-2004: 93398, 2005-2017: 322833). The share of such publications in the total number of indexed publications has changed from 0.67% in 1991 to 8.44% in 2015 (Baitenizov *et al.* 2018).

Millán, Congregado and Román (2012), based on data from 1994 to 2001, found a positive correlation between the success in self-employment, education and work experience. Petrakis (2014) comes to a similar conclusion, based on quantitative assessment of the influence of individual's knowledge and culture on self-employment and the possibility of creating new start-ups.

Gimpelson and Kapeliushnikov (2014) identify a number of groups of factors that can affect a level of self-employment: macroeconomic factors associated with an overall level of economic development and a structure of economy; state of a labour market; institutions of a labour market; taxation; social policy.

It should be noted that an essential part of these factors is interrelated with a sphere of state regulation.

These researchers include to the macroeconomic factors a level of the real GDP per capita, sectorial structure of economy and demographic structure of labour force. It is quite difficult to determine their exact impact on self-employment, since it is impossible to unequivocally determine in which direction they correlate.

Thus, a high level of GDP per capita usually stimulates an increase a scale of enterprises themselves, because they get additional capital. It is also true that an increase in GDP per capita leads to a greater demand for different types of services, including personal ones, as well as for personalized goods. This effect gives an impetus to development of self-employment and small business. Therefore, to determine the impact of GDP per capita as a factor of the development of self-employment, additional empirical studies are needed, since the above trends operate in opposite directions. Gimpelson and Kapeliushnikov (2014) conclude that the negative trend predominates: low levels of self-employment more often characterise developed countries. This result was obtained in a number of studies with different samples of economies.

Industry specialisation of an economy in this research is also seen as a macroeconomic factor affecting the level of self-employment. So, self-employment does not require a large capital-labour ratio, so its significant part extends to rural areas in agriculture, retail, and services. Self-employed people form, as a rule, an insignificant part in extracting or processing in branches of industry. However, the mentioned studies do not enough sufficiently consider a share of services and urbanisation as a part of macroeconomic factors for the development of self-employment. In the opinion of the authors of this article, these macroeconomic factors have a significant impact on the forming and development of self-employment. So, according to the World Bank data since the 1990s, there has been a decline in a share of industry in GDP, as well as a ratio of employment to industrial production around the world. And, on the contrary, we see an increase in employment in a services sector in OECD countries, Europe and the world. (Table 1)

Table 1. Global trends of deindustrialization and increasing in a share of employment in services

Region	Industry (% of GDP)	Employment(% of industry)	Employment(% of services)
European Union	1991 – 31.0 2016 – 24.5	1991 – 34.5 2017 – 24.0	1991 – 55.7 2017 – 71.8
OECD	1995 – 33.9 2016 – 29.2	1991 – 30.0 2017 – 22.7	1991 – 60.5 2017 – 72.6
The World	1995 – 33.9 2016– 29.2	1991 – 23.1 2017 – 22.4	1991 – 33.6 2017 – 51.1

Source: World Bank national accounts data and OECD National Accounts data files[8]

Thus, we note the global trend of deindustrialization and parallel process of reindustrialization, development of new, high-tech industries, in which employment in the service sector is widespread and developed. This transition substantially changes a form and type of employment, forming self-employment, which is also prevalent in the service sector.

An article of Lunn and Steen (2000), where they consider self-employment as a part of its relationship with certain industries and localization in the United States, confirmed this hypothesis. These authors note that a level of self-employment is higher for immigrants, but differs significantly between ethnic groups. In addition, examining the factors affecting a level of self-employment, Lunn and Steen (2000) conclude that an increase in a share of the service sector has a positive dependence on the level of self-employment, but at the same time, an increase in urbanization is negatively correlated with the level of self-employment.

Studies on the relationship between unemployment and self-employment (Meager 1992, Reize 2004, Pfeiffer and Pohlmeier 1994) leave open a question of the nature of this relationship. For example, Pfeiffer and Pohlmeier (1994) note that along with a decrease of the number of jobs at large enterprises in 1970-1987, the number of small enterprises increased at the same time and even at a faster pace; therefore, a positive correlation between unemployment and s elf-employment is assumed. Reize (2004) also considers unemployment as one of the main factors for activating self-employment, which is a variant of getting out of unemployment. At the same time, as Millán, Congregado and Román (2012) note, people who have become self-employed as a result of

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[8] World Bank national accounts data, and OECD National Accounts data files. (URL: http://databank.worldbank.org/data/reports.aspx?source=2&type=metadata&series=NV.IND.TOTL.ZS)

unemployment have a little chance of self-development within a framework of self-employment, and so the authors suggest granting start-up subsidies to those who start their own business as an individual entrepreneur as an instrument for the development of self-employment. Thus, the authors of that study conclude about a certain tendency of unemployment impact on self-employment in case of stimulating and regulating measures by the Government.

A positive correlation between unemployment and self-employment rates in different countries was revealed by Hamilton (1986), Parker (1996), Scheutze (2000), but Blanchflower (2000) and Parker and Robson (2004) found a negative correlation between unemployment and self-employment, and Acs *et al.* (1994) found it statistically insignificant. Such different results even in countries with similar economic conditions have made it possible to formulate an assumption about a nonlinear relationship of self-employment and unemployment, as well as about a "distorting" effect of other factors (for example, GDP, income, benefits and social security, *etc.*) (Parker and Robson, 2004, Acs *et al.* 1994), consideration of which may reveal a positive correlation between unemployment and self-employment (Gimpelson, Kapeliushnikov 2014).

Results of studies on the relationship between self-employment and the level of country's economic development (GDP, GDP per capita, etc.) are also ambiguous. For example, a positive correlation between the level of self-employment and GDP is found by Evans and Leighton (1989) and Robson (1998), but a negative correlation between self-employment and GDP per capita is found by Robson (2007) and Pietrobelli (2004). An assumption about a non-linear relationship of self-employment and a level of economic development was made by Acs *et al.* (1994).

2. Data and methods

Based on the literature review presented in Section 2, the authors of this research conducted an empirical study of the discussed socioeconomic factors and their influence on the level of self-employment in the Republic of Kazakhstan.

In this study, quantitative indicators are used to assess factors of the development of self-employment in Kazakhstan, for the period of 2002 to 2016. These indicators are as follows:

- Gross Domestic Product (GDP) of the Republic of Kazakhstan;
- Unemployment rate in the Republic of Kazakhstan;
- A share of the total volume of services to the total volume of industrial production (goods, services) in the Republic of Kazakhstan;
- Gross coverage in higher education of the entire population of the Republic of Kazakhstan (defined as a ratio of a number of students, regardless of age, studying in institutions of higher professional education (colleges and universities), to the total population aged 18-22);
- The level of self-employment in the Republic of Kazakhstan (a proportion of the self-employed people to the total number of employees).

Using methods of correlation and regression analysis with statistical packages PSPP and R, we calculated the impact of 4 factors (GDP, unemployment rate, share of services in total production, education coverage) on self-employment and made a forecast of the level of self-employment for the period of 2017 to 2021.

In our research, we suggest a number of hypotheses concerning the influence of factors of the development of self-employment and its level in the Republic of Kazakhstan:

- There is a negative correlation between GDP and the level of self-employment. This hypothesis is formulated because of the tendency of the majority of Kazakhstan's citizens to have more paid and stable wage job. This tendency increases with economic growth, so a number of self-employed workers will likely decrease with creating additional jobs in economy.
- There is a positive correlation between unemployment and self-employment. This hypothesis is formulated because one of the ways out of unemployment is an independent search for income, i.e. self-employment. In addition, a high unemployment rate indicates problems with the search for jobs in an economy, so in this case more people become self-employed.
- There is a positive correlation between a share of the total volume of services in the economy and self-employment. This hypothesis is formulated because self-employment as an economic and labor phenomenon includes the sphere of services, in other words, with growing scope of services, the level of self-employment likely increases.
- There is a negative correlation between a level of gross coverage in higher education (GCHE) and self-employment. This hypothesis is formulated because more educated people in Kazakhstan prefer to work for hire in the public or business sectors, since self-employment in the Republic of Kazakhstan remains

predominantly a low-skilled and agricultural sphere of employment (Patlasov, Azatbek and Baitenizov 2018). A proportion of startups in self-employment of Kazakhstan[9]is also extremely small to have a significant impact on a level of self-employment.

In order to verify the formulated research hypotheses, an information and statistical data were formed based on the official database of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan.

The formed data include 5 corresponding indicators described above for the period of 2002 to 2016. Table 2 presents values of those indicators. The level of self-employment is a dependent variable in this study and GDP, an unemployment rate, the share of services in total production, and the indicator of education coverage are independent variables.

Table 2. Statistical data

Year	Level of self-employment	GDP, mln.tenge	Unemployment rate, %	Share of services	GCHE
2002	0.399	3776277.3	9.3	0.194	49.2
2003	0.394	4611975.3	8.8	0.196	50.85
2004	0.378	5870134.3	8.4	0.204	55.6
2005	0.361	7590593.5	8.1	0.196	57.16
2006	0.355	10213731.2	7.8	0.198	55.75
2007	0.348	12849794	7.3	0.230	52.5
2008	0.338	16052919.2	6.6	0.206	49.33
2009	0.337	17007647.0	6.6	0.226	49.60
2010	0.333	21815517.0	5.8	0.207	49.50
2011	0.328	28243052.7	5.4	0.188	53.14
2012	0.317	31015186.6	5.3	0.212	53.39
2013	0,306	35999025.1	5.2	0.241	50.9
2014	0.282	39675832.9	5.0	0.258	48.37
2015	0..254	40884133..6	5.1	0.357	48.44
2016	0.258	46971150.0	5.0	0.323	51.14

Source: compiled by the authors on materials of the Committee on Statistics of the Ministry of Education and Science of the Republic of Kazakhstan

3. Results and discussion

Results of the correlation analysis are presented in Table 3. As the analysis showed, the Pearson correlation coefficient between the level of self-employment and the GDP value r = - 0.96 (p <0.05). This result is statistically significant, therefore it can be argued that when richer the Republic of Kazakhstan becomes, the less number of self-employed people are in the total employment of the republic.

Table 3. Results of the correlation analysis

	Level of self-employment	GDP	Unemployment rate	Share of services	GCHE
Level of self-employment	1,00	-0,96; p<0,05	0,91; p<0,05	-0,84; p<0,05	0,37; p=0,17
GDP	-0,96; p<0,05	1,00	-0,94; p<0,05	0,76; p<0,05	-0,40; p=0,14
Unemployment rate	0,91; p<0,05	-0,94; p<0,05	1,00	-0,58; p<0,05	0,37; p=0,18
Share of services	-0,84; p<0,05	0,76; p<0,05	-0,58; p<0,05	1,00	-0,43; p=0,11
GCHE	0,37; p=0,17	-0,40; p=0,14	0,37; p=0,18	-0,43; p=0,11	1,00

Source: authors' own calculation

In addition, we found that the level of self-employment also strongly correlates with the unemployment rate (r = 0.91, p <0.05) and the share of total services to the total volume of industrial production (goods, services) (r =

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[9] Official data of the Government of the Republic of Kazakhstan.URL: www.stat.gov.kz

- 0,84, p <0.05). The correlation analysis did not reveal a statistically significant relationship between the level of self-employment and gross coverage in higher education. At the same time, the unemployment rate and the share of the service sector strongly correlate with GDP, therefore, the multicolinearity effect may appear in the corresponding regression model.

Having built a multifactor regression where the level of self-employment is a dependent variable, and GDP, the unemployment rate, the share of services and gross coverage in higher education are independent variables, it is found that in accordance with the level of statistical significance of the GDP factor (p = 0.53), this model cannot be used because it is unreliable (Table 4).

Table 4. Parameters of the multiple regression model

	B	Std.Error	Beta	t	p (>|t|)
(Constant)	,39	,05	,00	8,24	,00
GDP	,00	,00	- ,11	- ,65	,53
Unemployment rate	,02	,00	,57	3,98	,00
Share of services	- ,41	,07	- ,46	- 6,08	,00
Education coverage	,00	,00	- ,08	- 1,84	,09

Source: authors' own calculations

After excluding GDP, another multiple regression model were constructed (Table 5).That model is statistically significant and quite adequate (adjusted R^2 is 0.98).

Table 5. Parameters of the adjusted multiple regression model

	Estimate	Std. Error	t value	p(>|t |)
Constant	0,376	0,040	9,405	1,36e-06
Unemployment rate	0,019	0,001	13,551	3.30e-08
Share of services	-0,444	0,044	-10,055	7.00e-07
GCHE	-0,001	0,001	-1,928	0.0801

Source: authors' own calculations

Based on these results, we conclude that GDP affects self-employment indirectly through the unemployment rate, the share of services and gross education coverage in higher education (Figure 2).

Figure 2. A conceptual model of impact of GDP on the level of self-employment in Kazakhstan

Source: authors' own model

In addition, a level of self-employment depends, first of all, on an unemployment rate, which has the greatest impact in this model. The influence of the share of services to the total volume of industrial production (goods and services) on the level of self-employment is also significant, but negative, and the least impact, also negative, in this model is the Gross coverage in higher education (GCHE). The correlation analysis did not reveal a statistically significant relationship between the level of self-employment and GCHE, but the regression analysis shows a weak relationship of these indicators at a level of a statistical tendency (p <0.1).

The following conclusions can also be formulated:

- unemployment growth by 1% (for example, from the current level of 5% to 6%)increases the level of self-employment in Kazakhstan by on average 1.9% (from the current level of 25.8% to roughly 27.7%);
- an increase of the share of the service sector by 100% results in a decrease of the level of self-employment by on average 44.4%;
- one additional percentage of educational coverage in higher education reduces the level of self-employed population by on average 0.13%.

In order to understand how much the change in GDP leads to a change in the level of self-employment, we built an additional one-factor regression model, where a dependent variable is the level of self-employment and GDP is an independent variable.

Having constructed this model, we came to the following results: first, the model is statistically significant (p <0.00001) and adequate (R^2=0.93); secondly, the result of regression analysis can be interpreted as follows: an increase of GDP by 1 trillion tenge leads to a decrease of self-employment by on average0.29% (Table 6).

Table 6. Coefficients of the single-factor regression model

	Estimate/	Std.Error	t value	p(> |t|)
(Intercept)	39,49321	0,58775	67,19	<0.00001
GDP	- 0,29008	0,02285	- 12,70	<0.00001

Source: authors' own calculations

4. Forecast of the level of self-employment

The dynamics of the level of self-employment in the Republic of Kazakhstan is shown by Fig. 3. It can be seen from the chart that the level of self-employment is generally decreasing since 2002 to 2016.

Figure 3. The level of self-employment in Kazakhstan, %

Source: compiled by the authors

However, the level of self-employment in Kazakhstan has slightly increased in the crisis year of 2014, that may be due to the fact of job cuts and a decrease in vacancies in wage employment then.

The Pearson correlation coefficient between the level of self-employment and time is negative (-0.97, p<0.01). Single-factor regression analysis also confirms a statistically significant change of the level of self-employment overtime.

The check for homos elasticity of the residuals shows that the average value of the residuals, i.e. the difference between theoretical values and empirical values of the level of self-employment is equal to 0 with their normal distribution. In addition, the dependent and independent variables are also normally distributed according to the Shapiro-Wilk test. Using a predict function in R, the following predicted results were obtained based on this model (Table 7 and Figure 4).

Table 7. Forecast values of the level of self-employment

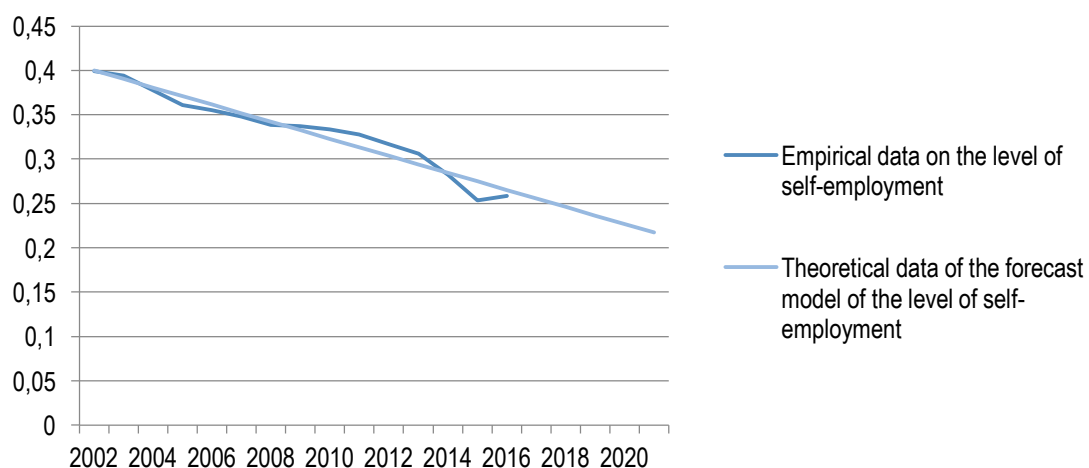| Year	Expected values, %	95% confidence interval		99% confidence interval	
		lower bound	upper bound	lower bound	upper bound
2017	25.57	24.37	26.76	23.90	27.23
2018	24.61	23.30	25.92	22.78	26.44
2019	23.65	22.22	25.08	21.65	25.64
2020	22.69	21.13	24.24	20.52	24.85
2021	21.73	20.05	23.40	19.39	24.06

Source: authors' own calculations

As follows from the forecast calculations, the expected level of self-employment will decrease. This forecast is justified by the fact that we expect to have the observed dynamics of GDP, a reducing of the unemployment rate, an increase of the share of services in industrial production and an increase of coverage in higher education in Kazakhstan.

Thus, the Ministry of National Economy forecasts GDP growth at the level of 3.8% in 2018. The World Bank forecast of prices for raw materials (e.g., the price of oil will be around $65 per barrel in 2018-2020) create an additional favorable external background for the economic growth of the republic.

These factors, as well as the stability of the political system of the Republic of Kazakhstan, effect of state programs aimed at creating jobs and raising the level of education, such as the "Program of Industrial and Innovation Development of the Republic of Kazakhstan for the period of 2015 to 2019"[10] and "Free professional technical education for all" in within the framework of the Program for the Development of Productive Employment and Mass Entrepreneurship for 2017-2021[11], confirm our conclusion.

Figure 4. Empirical and theoretical (expected) values of the level of self-employment in Kazakhstan

Source: compiled by the authors

The real data of the level of self-employment in the Republic of Kazakhstan for the 4th quarter of 2017 is 24,17%[12] that corresponds with our forecast.

Conclusion

Thus, according to the obtained results, we can formulate the following inferences:
- GDP mediated through an unemployment rate, the share of services to the total volume of industrial production (goods or services), gross coverage in higher education affects the level of self-employment (Figure 2);
- An unemployment rate is the most influential (with a positive correlation) on self-employment;
- The development of services in Kazakhstan negatively correlates with the level of self-employment, in contrast to our assumption and the research of other authors; this finding may be explained by the fact

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[10] Decree No. 1159 of the Government of the Republic of Kazakhstan of 30 October 2014.
[11] Decree No. 919 of the Government of the Republic of Kazakhstan of 29 December 2016.
[12] Official data of the Government of the Republic of Kazakhstan.URL: www.stat.gov.kz

that self-employed people become wage earners in new-opening businesses related to service, *i.e.* they preferred employed jobs in the Republic of Kazakhstan;

▪ Gross coverage in higher education makes the least impact on self-employment in Kazakhstan, *i.e.* if people have a higher education level, they have lower preference to earn their living by self-employment;

▪ The level of self-employment is expected to continuously decrease to around 20% by 2021, unless there are any drastic changes in the factors affecting the level of self-employment and maintaining the current trend.

So, the predicted level of self-employment in Kazakhstan corresponds to the European trend of decreasing the level of self-employment, however in Kazakhstan this decrease is more noticeable due to the higher level of self-employment compared to the EU countries and the global trend of lowering agricultural self-employment.

Despite the simplicity of the research models used in this study, it was possible to obtain new results and inferences, and a new conceptual model of the indirect influence of GDP on the level of self-employment of Kazakhstan was made. Kazakhstan's self-employment is still largely underexplored, especially with the using of statistical methods, although this topic is very relevant and urgent for research community in this field. This work is one of the first of a quantitative study of determinants of self-employment in Kazakhstan. Further studies should be aimed at more extended assessment and analysis of the influence of quantitative indicators of determinants of the market of self-employment, such as gender and age differences, as well as a share of services taking into account an unobserved sector of the economy, in the Republic of Kazakhstan and other Central Asian countries.

References

[1] Acs, Z., Audretsch, D. and Evans, D. 1994. Why Does the Self-employment Rate Vary Across Countries and Over Time? CEPR Discussion Paper 871.

[2] Baitenizov, D. *et al.* 2018. Freelance as a Creative Mode of Self-Employment in a New Economy. A Literature Review. *Journal of the Knowledge Economy*, in press.

[3] Blanchflower, D.G. 2000. Self-Employment in OECD Countries. Labour Economics 7(5): 471–505.

[4] Drobnič, S. 2014. Self-Employment. Encyclopedia of Quality of Life and Well-Being Research, 5763-5764.

[5] Dubina, I., Carayannis, E. and Campbell, D. 2012. Creativity economy and a crisis of the economy. *Journal of the Knowledge Economy*, 3(1): 1-24.

[6] Evans, D.S., Leighton, L.S. 1989. The determinants of changes in US self-employment, 1968–1987. *Small Business Economics*, 1(2): 111–119. DOI: 10.1007/BF00398629

[7] Gimpelson, V. and Kapeliushnikov, R. (Eds). 2014. *In the Shadow of Regulation: Informality in the Russian Labour Market*. Moscow: HSE Publishing House (in Russian).

[8] Gimpelson, V., Kapeliushnikov, R. 2005. *Non-standard employment and Russian labour market*. Moscow: HSE Publishing House, 36 (in Russian).

[9] Golenkova, Z.T., Won, C.C. 2006. Transformation of employment structure in Russia in the context of globalisation processes. *Society and Law*, 4(14): 38-45, in Russian.

[10] Hamilton, R.T. 1986. The Influence of Unemployment on the Level and Rate of Company Formation in Scotland, 1950-1984. Environment and *Planning*, A 18(10): 1401-1404.

[11] Lunn, J., Steen, T.P. 2000. An investigation into the effects of ethnicity and immigration on self-employment. *International Advances in Economic Research,* 6(3): 498–519. DOI: 10.1007/BF02294968

[12] Kirchhoff, B.A. 1996. Self-employment and dynamic capitalism. *Journal of Labor Research*, 17(4): 627–643. DOI: 10.1007/BF02685804

[13] Leoni, T., Falk, M. 2010. Gender and field of study as determinants of self-employment. *Small Business Economics*, 34(2): 167–185. DOI: 10.1007/s11187-008-9114-1

[14] Maslova, I.S. 1993. *Russian Labour Market*. M. Institute of Economics of the Russian Academy of Sciences. ISBN: 201-03396-2 (in Russian)

[15] Meager, N. 1992. Does Unemployment Lead to Self-employment. Small Business Economics, 4(2): 87-103.

[16] Millán, J. M., Congregado, E. and Román, C. 2012. Determinants of self-employment survival in Europe. *Small Business Economics,* 38(2): 231–258. DOI: 10.1007/s11187-010-9260-0

[17] Parker, S.C. 1996. A Time Series Model of Self-employment under Uncertainty. *Economica. New Series*, 63(251): 459-475.

[18] Parker, S.C., Robson, M.T. 2004. Explaining International Variations in Self-Employment: Evidence from a Panel of OECD Countries. *Southern Economic Journal*, 71(2): 287-301.

[19] Patlasov, O.Yu., Azatbek, T.A., Baitenizov D.T. 2018. New trends in self-employment in the Republic of Kazakhstan: from home-based work to creative services. The science of person: humanitarian researches, 1(31): 192-206, (in Russian).

[20] Petrakis, P.E. 2014. The Effects of Cultural Background and Knowledge Creation on Self-Employment and Entry Density Rates. *Culture, Growth and Economic Policy*,195-203. DOI 10.1007/978-3-642-41440-4_15

[21] Pfeiffer, F., Pohlmeier, W. 1994. Income, Uncertainty and the Probability of Self-Employment. Output and Employment Fluctuations. Part of the series *Studies in Empirical Economics*, 23-39. DOI 10.1007/978-3-642-57989-9_4

[22] Pietrobelli, C., Rabellotti, R. and Aquilina, M. 2004. An Empirical Study of the Determinants of Self-Employment in Developing Countries. *Journal of International Development*, 16(6): 803-820.

[23] Reize, F. 2004. Determinants and Success of Self-Employment. Leaving Unemployment for Self-Employment/Part of the series *ZEW Economic Studies*, 25: 47-107. DOI 10.1007/978-3-7908-2685-2_6

[24] Robson, M. 2007. Explaining Cross-National Variations in Entrepreneurship: the Role of Social Protection and political Culture. *Comparative Labor Law & Policy Journal*, 28(4): 863-892.

[25] Robson, M.T. 1998. The Rise of Self-Employment amongst UK Males. *Small Business Economics*, 10(3): 199-212.

[26] Salowsky, H. 1978. The decline of self-employment in industrial countries. *Intereconomics*, 13(11-12): 306-308.

[27] Scheutze, H.J. 2000. Taxes, Economic Conditions and Recent Trends in Male Self-Employment: A Canada-US Comparison. *Labour Economics*, 7(5): 507-544.

Structural Analysis of the Industrial System Development in Kazakhstan

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Abstract:

This article describes the issues of structural changes in the manufacturing industry of Kazakhstan. The applied method is the technique of evaluation of structural changes in the manufacturing sector. Modernization of the modern economy of Kazakhstan is worsened by undeveloped pre-conditions for transition to the postindustrial stage of development, disproportions in the structure of the economy due to its mineral and raw materials orientation, weak competitive environment, high share of the state sector. Governmental programs of Kazakhstan industrialization are analyzed in the article in order to evaluate their results according to the structural analysis of manufacturing industry development. The analysis reveals that some sectors of industry depend on state support. The efficiency of structural changes in the industry carried out under the state programs is evaluated.

Keywords: structural change; economic growth; GDP structure; manufacturing industry; structural economic policy

JEL Classification: L15; L16; L23; L32

Introduction

After the demise of the Soviet Union and the collapse of the socialist economic system, post-socialist countries faced the most difficult problems of integration into the world economy and adaptation to the conditions of open international markets. New circumstances demanded reforms to create the foundation for open market economy, including structural ones, to adapt to the changing conditions of world markets. Difficulties of this process have already been noted in economic literature (Spence 2013). In terms of openness, there is a huge pressure on the structure of the economy from the world market situation, which can lead to unbalanced growth and instability of the national economy in changing conditions of the world market (Akhmetshin *et al.* 2017).

In the history of the world economy, there are many examples of state economic policy that that failed. After the World War II, economists specialized in the problems of development made forecasts that were optimistic for Africa, but rather pessimistic for Asia. Unfortunately, at that time large volume of natural resources in Africa was considered the main factor for its sustainable growth. However, the results achieved over the next 50 years were diametrically opposed to this forecast. Africa's natural resources turned to be a curse for it, stimulating their seizure, but not achieving longer-term goals aimed to get the sustainable growth (Spence 2013). Another example was in the 1970s, when the exaggerated development of the Netherland's economy caused a "Dutch disease" (Kazhyken 2011).

The purpose of the state structural policy in such conditions is to give stability to the national economy and the main instrument is its diversification. Structural policy of the state is the complex of such methods and measures that form and implement a strategy of purposeful change of basic proportions of the economic system (Sukharev and Strizhakova 2014).

Following the independence of Kazakhstan, some structural reforms were implemented in the country's national economy. Basically, they were aimed to form the market economy and to adapt the subjects of the economy to new market conditions. Within these reforms, institutions of private property, entrepreneurship were established in the country, a privatization policy was carried out, regulatory and legal acts were taken to regulate and control the activities of various institutions of the market economy. New types of services, new products and even whole branches of the economy emerged. The formation of open economy and integration into the world economy was determined as priority guideline of the state economic policy. First of all, there was a necessity of foreign investments to solve these problems (Akhmetshin *et al.* 2017, Adamenko *et al.* 2017). In the USSR, Kazakhstan specialized in the production of mineral raw materials, that is why mining, oil and gas industries prevailed in the structure of the economy. However, these changes proved to be insufficient to ensure the independence of Kazakhstani economy from world prices for raw materials and development of new industries.

The results of any structural transformations in the economy should make changes directly to the structure of GDP, exports and imports, the balance of payments and also to the employment structure of the economy. Various programs aimed at diversifying the economy, primarily exports and reducing the import dependence of the Kazakh economy were actively implemented in Kazakhstan in different years, especially after the 2000s. They include such specific programs and strategies as Kazakhstan-2030, State Program on Forced Industrial-Innovative Development for 2010-2014 (GPFIIR), Concept of Innovative Development of the Republic of Kazakhstan up to 2020, State Program for Industrial Development innovative development for 2015-2019 "(GPIIIR), *etc*.

This article examines the structural changes in some sectors of the manufacturing industry in Kazakhstan based on the results of the implementation of GPFIIR for 2010-2014 and the first two years of GPIIIR for 2015-2019. In our opinion, such an analysis will make it possible to assess the results of implementing programs from the standpoint of structural changes in the economy.

1. Material and methods

The modern structure of the economy has developed historically as a consequence of "all-Union division of labor," where Kazakhstan had the role of a supplier of natural resources and agricultural products and a consumer of manufactured goods. After getting independence, Kazakhstan also turned out to be a supplier of raw materials in the world economy. As practice shows, this structure of the economy led to the situation where Kazakhstan's economic growth rates were directly dependent on the world commodity markets, primarily on the level of prices for fuel and energy resources. Rapid economic growth rates in the years of high prices for fuel and energy resources in the conditions of the prolonged global financial crisis were replaced by growth rate of 1% in 2016.

In these conditions, effective structural policy based on diversification of the economy becomes the main instrument for weakening the dependence of the economy on the world commodity markets and returning to a stable rate of economic growth in Kazakhstan. To do this, we need a detailed analysis of the structural reforms carried out during the years of industrialization of the economy with identification of their positive and negative sides. This study attempts to assess the structural shifts in some sectors of the manufacturing industry in Kazakhstan during the years of implementing industrialization programs and identify areas that could improve their efficiency in the future.

The theoretical, methodological aspects and practical issues of implementing structural changes in the economy have been studied in the works of foreign researchers, such as: Chenery (1979), Schumpeter (1934), Kuznets (1971), Rostow (1960), Peneder (2003), Pasinetti (1981), Fagerberg (2000), Kaldor (2007), Metcalfe *et al.* (2006), Nurkse (1952), Fabricant (1940), as well as Russian researchers: Krasilnikov (2001), Sukharev (2014), Butakova and Sokolova (2005), Titov (2006), Granberg (1987), Berkovich (1989), Kochkurova (2010).

The methodological pre-requisite for this study is the understanding that the structure of the economy is a complex multi-level phenomenon, and structural shifts are the result of both qualitative and quantitative changes in the economy that happens because of various factors. As a result, the specific research methods depend on the level of the analyzed problem.

The methods used in this article are: dialectical cognition, mathematical analysis, comparative analysis, deduction and induction. However, the main method is a quantitative analysis of the manufacturing industry in Kazakhstan, reflecting structural changes in the national economy over the years of implementation of industrialization programs. The purpose of this analysis is to assess the efficiency of the government's structural policy aimed at diversifying the economy and ensuring its stability in the context of volatility in world resource prices.

2. Results and discussion

At present time, almost in all theoretical and applied models of state regulation of market economy, structural policy is present as an element of the state economic policy (Sukharev and Logvinov 2015).

The main goal of structural reforms in Kazakhstan is to make the economy diversified and competitive. As a result of ongoing reforms, positive structural changes were observed in the economy, new industries and types of services appeared. But today the national economy extremely depends on the export of oil and other natural resources. Successful and rapid implementation of structural reforms is vitally important for Kazakhstan. However, current situation shows that due to implementation of these reforms we have serious problems now (Rakhzhanov 2016). It is known that before the global financial and economic crisis of 2008, the economy of Kazakhstan developed mainly thanks to large demand and high prices for mineral resources that our country supplies to the world market. After 2008, Kazakhstan's GDP growth rates declined rapidly, as prices for mineral resources dropped because of the global economic crisis. Below is the diagram showing Kazakhstani GDP growth rates selectively in the recent years (Figure 1).

Figure 1. GDP growth rate of Kazakhstan (1996-2017), %

Source: Compiled by the authors. Ereport.Ru World Economy (2016)

However, the experts of the Asian Development Bank (ADB) made a forecast that GDP growth in Kazakhstan in 2018 and 2019 will be less significant than in 2017. In their opinion, one of the reasons is insufficient development of private entrepreneurship. The ADB report (Asian Development Bank, 2018) says "The industry is expected to grow by 5.0% in 2018, 4.5% in 2019, which will be provided by the exploration of oil and minerals. There will be some support from the state policy of industrialization and stimulation of production, that is necessary to make the subsector more competitive and achieve greater diversification". That means that in 2018 and 2019 the economic growth of Kazakhstan will continue to be provided mostly thanks to the commodity orientation of the national economy.

According to the report, the main driver of development is the increasing of private entrepreneurship. ADB experts believe that "... privatization is an important element of ongoing structural reforms, as it attracts new foreign direct investments outside the oil sector and supports the development of the capital market" (Asian Development Bank 2018). To do this, it is necessary to reduce the influence of the state on the economy, where the ongoing privatization will play a key role. The next necessary measure recommended by ADB specialists is the development of public-private partnership (Kolesnikov *et al.* 2018). In their opinion, "... the creation of constructive conditions will allow public-private partnerships to provide a wide range of investment projects that the government can not implement by itself, but success will depend on the development of capital markets and the rest of the financial system, in particular domestic capital markets, whose weakness remains the key obstacle for economic growth "(Asian Development Bank 2018).

In addition to ADB experts, Kate Mallinson (2017), a researcher at the Royal Institute of International Affairs Chatham House, thinks that "... given the difficult short-term prospects for the economy of Kazakhstan - due to whims in the oil and raw material markets, the continuing weakness of the banking sector and the pressure on the tinge the successful privatization program in 2018 is vital for economic growth". Structural changes should become a point of bifurcation in the economic development of the country in the conditions of global transformation of industry and the economy as a whole. In fact, structural changes are the most informative fact of the quality of

economic growth: the clearest examples of such changes are industrialization and the transition to service economy (Arutyunyan 2012).

As it was said before, in 2010 the Government of Kazakhstan adopted the "State Program on Forced Industrial and Innovative Development of the Republic of Kazakhstan for 2010-2014" (SPFIID) (Government of the Republic of Kazakhstan 2010). Now the country is implementing the "State Program of Industrial-Innovative Development for 2015-2019" (SPIID) (Prime Minister of the Republic of Kazakhstan, 2014). It is not completed yet, so it is too early to assess its full impact. It is the follow-up of a similar, already completed development program for 2010-2014.

The main purpose of GPFIIR was to ensure stable and balanced growth of the economy diversification and increase of its competitiveness. To assess and make practical recommendations for the further implementation of the program of industrial and innovative development for 2015-2019, we carried out structural analysis of the manufacturing industry in Kazakhstan based on the results of the GPFIIR for 2010-2014 and the first two years of the GPIIIR for 2015-2019. First, we selected some sectors of the manufacturing industry. To assess the structural changes in output, we evaluated the share of the type of economic activity (FEA) in the total manufacturing industry, the index, the mass and the rate of structural change (Table 1).

Table 1. Estimated values of indicators of structural changes in products in 2010-2016, %

Indicator	2010	2011	2012	2013	2014	2015	2016
Consumer goods industry							
Index	-6,12	-7,25	19,19	12,80	-6,54	15,41	-14,43
Mass	-0,06	-0,06	0,16	0,13	-0,07	0,16	-0,17
Rate	-6	-3,62	6,40	3,20	-1,31	2,57	-2,06
Refined products manufacture							
Index	17,98	0,19	35,63	17,17	-32,12	-16,94	3,08
Mass	1,29	0,02	3,02	1,98	-4,33	-1,55	0,23
Rate	18	0,09	11,88	4,29	-6,42	-2,82	0,44
Metal industry							
Index	13,35	-2,50	-10,84	-16,99	4,90	13,99	17,34
Mass	4,89	-1,04	-4,38	-6,13	1,47	4,39	6,21
Rate	13	-1,25	-3,61	-4,25	0,98	2,33	2,48
Pharmaceutical products manufacture							
Index	2,72	8,47	10,37	0,30	0,12	-0,46	-5,36
Mass	0,01	0,04	0,06	0,00	0,00	0,00	-0,03
Rate	3	4,23	3,46	0,07	0,02	-0,08	-0,77

Source: Compiled by the authors. Ministry of National Economy of the Republic of Kazakhstan (2018b)

As we can see from the Table 1, in the economic activity "Consumer goods industry" there was growth in 2012 and 2015, but in 2016 the results of the evaluation were negative. The weight of the structural change in the economic activity "Metal industry" assumed a positive value for the last three years, which shows increasing of the share this FEA in this period. In the FEA of «Pharmaceutical products Manufacture", the share of products has steadily declined for 4 years. The rate of the structural change in the production of refined products reached its maximum in 2010 with rate value of 18%. The production of refined products grew at an average rate of 3.6% per year, consumer goods industry (-0.11). For the production of the last FEA products, the rate of change was below zero, which indicates practically no changes in this area.

As we can see from the Figures 1-3 the studies types of economic have shown unstable dynamics, the biggest structural changes in products was in such FEA as "Refined products manufacture " and "Metal industry". It is obvious that stable dynamics of development of these industries is related to their attractiveness and high profitability (Patriota *et al.* 2016). Stable development of industries related to the oil and other raw materials production characterizes exaggerated development of the manufacturing industry itself.

Figure 2. The mass of the structural changes in output for 2010-2016, %

Source: Compiled by the authors.

Figure 3. Index of structural changes in output for 2010-2016, %

Source: Compiled by the authors.

Figure 4. Rate of structural changes in output for 2010-2016, %

Source: Compiled by the authors.

Another major factor for assessing structural changes is fixed investment. The data for analysis is shown in Table 2.

Table 2. Estimated values of structural change indicators for fixed investments in 2010-2016, %

Indicator	2010	2011	2012	2013	2014	2015	2016
Consumer goods industry							
Index	254,92	-67,90	-30,68	57,21	13,13	33,96	-42,39
Mass	1,71	-1,62	-0,23	0,30	0,11	0,32	-0,54
Rate	254,92	-33,95	-10,23	14,30	2,63	5,66	-6,06
Refined products' manufacture							
Index	-40,07	34,62	-7,28	71,09	-23,24	134,45	32,20
Mass	-3,55	1,84	-0,52	4,70	-2,63	11,69	6,56
Rate	-40,07	17,31	-2,43	17,77	-4,65	22,41	4,60
Metal industry							
Index	23,51	14,59	-17,87	3,35	-4,26	-5,93	-7,33
Mass	8,39	6,43	-9,03	1,39	-1,83	-2,43	-2,83
Rate	23,51	7,30	-5,96	0,84	-0,85	-0,99	-1,05
Pharmaceutical products' manufacture							
Index	-76,37	71,50	55,21	117,69	71,12	-38,98	-16,68
Mass	-0,73	0,16	0,21	0,70	0,93	-0,87	-0,23
Rate	-76,37	35,75	18,40	29,42	14,22	-6,50	-2,38

Source: Compiled by the authors. Ministry of National Economy of the Republic of Kazakhstan (2018a)

As we see, the index of the structural change in the manufacturing industry shows decline in consumer goods industry, pharmaceutical products manufa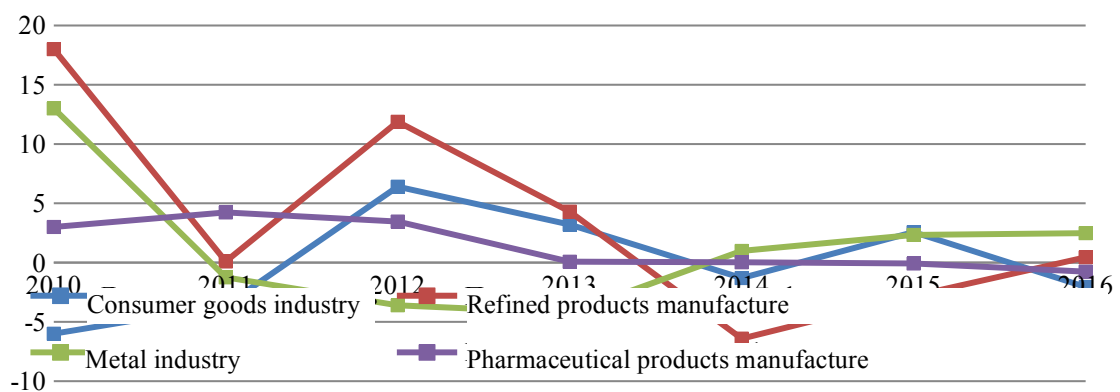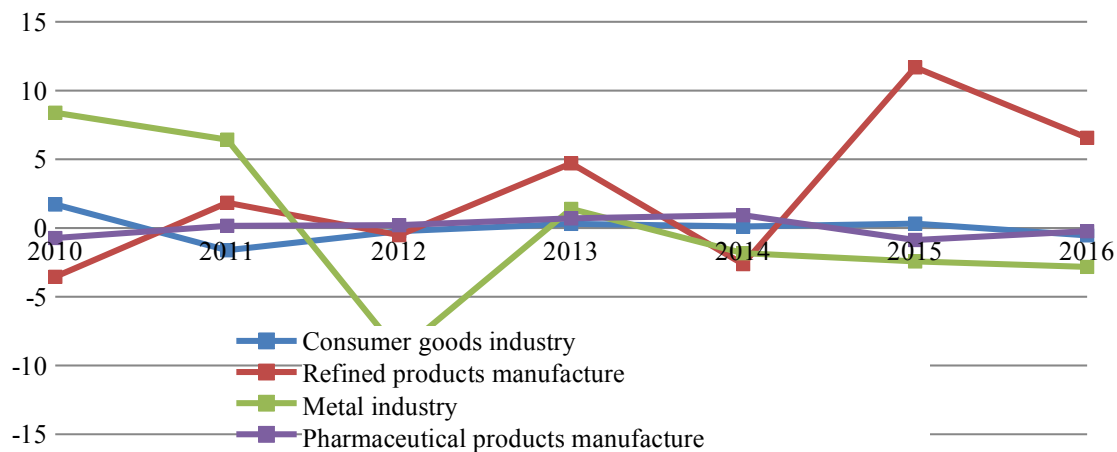cture, metal industry and insignificant increase in refined products manufacture. Fixed investment for refined products manufacture were mostly positive, except for temporary fluctuations (no more than a year).

The mass of the structural change shows the crisis years for specific sectors of the manufacturing industry. For example, 2011 was the most crises for the consumer goods industry, 2010 was for refined products manufacture, 2015 was for pharmaceutical products manufacture, and 2012 for metal industry, where the corresponding figures take the maximum negative value (Figures 5-6).

Figure 5. The masse of the structural change in fixe investments in 2010-2016, %

Source: Compiled by the authors.

The rate of the structural change in fixed investment allows us to see the speed of growth of the volumes of investments in certain sector of manufacturing industry. For example, in refined products manufacture, the rate is 2.1% per year, in pharmaceutical products manufacture it is 1.79% (Figure 7)

Of course, the state program on accelerated industrial-innovative development (GPFIIR) for 2010-2014 allowed creating certain background for the further development of the industrial sector: a system of development institutes was established, a number of necessary regulatory legal acts were adopted, and certain instruments were created. As a result of implementation of GPFIIR, the trend shifted towards a higher level of manufacturing industry, but it remains relatively low (Satybaldin 2016).

This program provided a basis for structural changes in the real sector of Kazakhstani economy. Under the program, the most of the infrastructure, legislative and institutional structures have been created for further industrialization. The Kazakhstan Institute for Industry Development prepared analysis that revealed that 28 new

manufacturing sectors appeared over the years of implementing this program, including such as production of communicative, electric lighting equipment, fiber optic cables, products for the car industry, etc. (Kulseitov 2015). Now there is further industrialization of the economy ongoing in Kazakhstan under the state program for industrial and innovative development for 2015-2019.

Figure 6. The index of the structural change in fixed investments in 2010-2016, %

Source: Compiled by the authors.

Figure 7. Rate of structural change in fixed investments in 2010-2016, %

Source: Compiled by the authors.

Conclusions

Thus, the conducted study lets us make the following conclusions:

- The implementation of the industrialization program of 2010-2014 failed to ensure the stable development of such priority sectors of the manufacturing industry as pharmaceuticals and consumer goods industry.
- Analysis of Table 1 showed that the indicators during 2010-2014 were positive and demonstrated stable growth dynamics, but starting from 2015 they started to decline dramatically, and some of them were negative in 2016. In our opinion, this is explained by changing in the priorities of SPFIID for 2010-2014 and SPIID for 2015-2019. Despite the fact that SPIID for 2015-2019 is a follow-up of the previous program, it lacks some sectors that were previously identified as priority ones. Thus, the measures taken under the SPFIID for 2010-2014 in a number of manufacturing sectors could not create sufficient conditions for their further independent development. This means anticipation of shifting of priorities of state programs and lack of their continuity.
- Dramatic reduction in the state support for certain sectors leads to decreased share of manufacturing. This shows underdevelopment of self-reproduction market mechanisms and high dependence of manufacturing sectors on state support. Measures that should reduce the share of the state sector are being implemented slowly, so development of many sectors directly depends on state funding.

Thus, the results of structural analysis showed that measures aimed to change the economy structure should not be short-term. They should continue until stable independent development of the sector without strong state intervention. The most important, all measures on implementation of industrialization of Kazakhstan should have a multiplier effect, which shall ensure stable development of both traditional and new sectors of the industry, enhance high economic growth and competitiveness of the national economy in general.

References

[1] Adamenko, A.A., Zolotukhina, E.B., Ulanov, V.A., Samoylova, E.S., Chizhankova, I.V., Mamatelashvilli, O.V. 2017. Investment management activities of commercial enterprises. *International Journal of Applied Business and Economic Research,* 15(12): 11-21.

[2] Akhmetshin, E.M., Artemova, E.I., Vermennikova, L.V., Shichiyakh, R.A., Prodanova, N.A., Kuchukova, N.M. 2017. Management of investment attractiveness of enterprises: Principles, methods, organization. *International Journal of Applied Business and Economic Research,* 15(23): 71-82.

[3] Akhmetshin, E.M., Kolpak, E.P., Sulimova, E.A., Kireev, V.S., Samarina, E.A., Solodilova, N.Z. 2017. Clustering as a criterion for the success of modern industrial enterprises. *International Journal of Applied Business and Economic Research,* 15(23): 221-231.

[4] Arutyunyan, A.A. 2012. The Emergence of Structural Changes and Their Impact on Basic Economic Indicators. *STAGE: Economic Theory, Analysis, Practice,* 3: 55-61.

[5] Berkovich, L.A. 1989. *Interrelation of the Processes of Intensification of Production and Structural Changes in the Economy*. Novosibirsk: Nauchnaya publikatsiya.

[6] Butakova, M.M, and O.N. Sokolova, O.N. 2005. Innovative Component of Structural Transformation in Industry. *Proceedings of the Altai State University,* 2: 15-17.

[7] Chenery, H. 1979. *Structural Change and Development Policy*. N.Y., Oxford: Oxford University Press.

[8] Fabricant, S. 1940. *The Output of Manufacturing Industries, 1899-1937*. New York: National Bureau of Economic Research.

[9] Fagerberg, J. 2000. Technological Progress, Structural Change and Productivity Growth: A Comparative Study. *Structural Change and Economic Dynamics,* 11(4): 393-411.

[10] Granberg, A.G. 1987. *Problems of Territorial Economic Planning*. Novosibirsk: Nauchnaya publikatsiya.

[11] Kaldor, N. 2007. *Causes of Growth and Stagnation in the World Economy*. Cambridge: Cambridge University Press.

[12] Kazhyken, M. 2011. Structure of the Economy of Kazakhstan: The Main Characteristics of Disproportions and Their Causes. *Kazakh Economic Bulletin,* 1-2: 82-95.

[13] Kochkurova, E.V. (2010). On structural changes in the economy and their causes. *Terra Economicus,* 8(3): 55-62.

[14] Kolesnikov, Yu.A., Pavlyuk, A.V., Radachinsky, Yu.N., Rodionova, N.D. 2018. Problems of Implementation of Public-Private Partnership in Russia. *European Research Studies Journal,* 21: 187-197.

[15] Krasilnikov, O.Yu. 2001. *Structural Shifts in the Economy*. Saratov: Saratov State University. Nauchnaya publikatsiya

[16] Kulseitov, A. 2015. *Myths and Facts of the First Industrial Five-Year Plan*. Available at: http://expertonline.kz/a13611/

[17] Kuznets, S. 1971. *Modern Economic Growth: Findings and Reflection*s. Available at: http://nobelprize.org/nobel_prizes/economics/laureates/1971/kuznets-lecture.html

[18] Mallinson, K. 2017. *Kazakhstan – 2018*. Available at: http://voicesoncentralasia.org/central-asia-2018-scenarios-and-prognosis/

[19] Metcalfe, J.S., Foster, J. and Ramlogan, R. 2006. Adaptive Economic Growth. *Cambridge Journal of Economics,* 30(1): 7-32.

[20] Nurkse, R. 1952. Growth in Underdeveloped Countries: Some International Aspects of the Problem of Economic Development. *American Economic Review,* 42(3): 571-582.

[21] Pasinetti, L. 1981. *Structural Change and Economic Growth*. Cambridge: Cambridge University Press.

[22] Patriota, S.N., Cerutti, M.N., Mulholland, D.S., Marques, M.A., and Scheidt, G.N. 2016. Potential waste of agro-industrial in developing adsorbents of heavy metals. *Periodico Tche Quimica,* 13(25): 42-51.

[23] Peneder, M. (2003). Industrial Structure and Aggregate Growth. *Structural Change and Economic Dynamics,* 14(4): 427-448.

[24] Rakhzhanov, G. 2016. *How are Structural Economic Reforms Moving Forward?* Available at: https://forbes.kz/process/economy/strukturnyie_ekonomicheskie_reformyi_v_rk_vmesto_progressa_-_zastoy

[25] Rostow, W. 1960. *The Stages of Economic Growth. A Non-Communist Manifesto*. Cambridge: Cambridge University Press.

[26] Satybaldin, A.A. 2016. *The Economy of Kazakhstan: Global Challenges and the New Reality*. Almaty: Institute of Economics of the Komsomol of the Republic of Kazakhstan.

[27] Schumpeter, J. 1934. *The Theory of Economic Development*. Harvard: Harvard Economic Studies Publ.

[28] Spence, M. 2013. *Next Convergence: The Future of Economic Growth in the World Living at Different Speeds*. Moscow: Izdatel'stvo Instituta Gaydara.

[29] Sukharev, O.S. 2014. Structural Policy in the Russian Economy: Conditions of Formation. *National Interests: Priorities and Security,* 3(240): 2-8.

[30] Sukharev, O.S., Strizhakova, E.N. 2014. Structural Analysis of Industrial System Development. *National Interests: Priorities and Security,* 41(278): 26-40.

[31] Sukharev, O.S., Logvinov, S.A. 2015. *Management of Structural Changes in Economics*. Moscow: INFRA-M, Kurs.

[32] Titov, V.A. 2006. Methodological Approaches to the Analysis of the Structural Transformation of the Economy. *Transport Business in Russia,* 12-IV: 45-47.

*** Asian Development Bank 2018. Asian Development Outlook 2018. How Technology Affects Jobs. Available at: https://www.adb.org/sites/default/files/publication/411666/ado2018.pdf

*** Ereport.Ru World Economy. 2016. Growth Rates of GDP of Kazakhstan. Available at: http://www.ereport.ru/stat.php?razdel=country&count=kazakhstan&table=ggecia&time=1

*** Government of the Republic of Kazakhstan. 2010. The State Program on Forced Industrial and Innovative Development of the Republic of Kazakhstan for 2010-2014. Available at: http://www.government.kz/ru/programmy/2282-gosudarstvennaya-programma-po-forsirovannomu-industrialno-innovatsionnomu-razvitiyu.html

*** Ministry of National Economy of the Republic of Kazakhstan. 2018. Investments in Fixed Capital. Available at: http://stat.gov.kz/faces/wcnav_externalId/homeNumbersInvestment?_afrLoop=6763898848682854#%40%3F_afrLoop%3D6763898848682854%26_adf.ctrl-state%3D177cdk91yh_42

*** Ministry of National Economy of the Republic of Kazakhstan. 2018. Volume of Industrial Production of the RK by Types of Economic Activity. Available at: http://stat.gov.kz/faces/wcnav_externalId/homeNumbers_Industry?_afrLoop=6764043598912909#%40%3F_afrLoop%3D6764043598912909%26_adf.ctrl-state%3D177cdk91yh_102

*** Prime Minister of the Republic of Kazakhstan. 2014. State Program of Industrial and Innovative Development of the Republic of Kazakhstan for 2015-2019. Available at: https://primeminister.kz/ru/page/view/gpiir

Attraction of Foreign Direct Investment Inflows from the Transnational Corporations in the Condition of Transition Economy

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Abstract:

This study examines driving factors of foreign direct investment provided by transnational corporations. The authors address this question by examining how trade openness, financial development, exchange rate, infrastructure, corruption affecting on country attractiveness for investing by corporations. The researchers analyze data for the years 1998 –2017 of Republic of Kazakhstan in the framework of Eurasian Economic Union.

The authors find that foreign direct investment have a strong positive effect on trade openness and the exchange rate also shows significant positive small effects, while infrastructure shows a significant negative small effect. Further, the researchers find that Foreign direct investment (FDI) in developing countries can be mutually beneficial for both the host country and transnational corporations. Thus the article identifies the negative and positive effects of FDI for the host country, as well as dividing the importance of allocating FDI for the economic growth of the Republic of Kazakhstan.

Keywords transnational corporations; investment attractiveness; economic growth; sustainable development; foreign direct investment

JEL Classification: F23; F43; P33

Introduction

Transnational corporations provide additional financial resources to the recipient country through investments and taxes create jobs and generate skills, technology, management knowledge and corporate governance practices. On the other hand, TNCs get access to the market, natural resources associated with specific objects, cheap labor resources and take advantage of bilateral and multilateral trade policies. The active introduction of TNCs into Kazakhstan's economy began in 1994-1997, when the country's leadership focused on attracting foreign investors – transnational corporations. Since gaining independence, Kazakhstan has sought to become an active participant in the most important processes of globalization. Successful integration of the country into the world community

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implies the formation of a mechanism for optimal interaction with all its elements, including its main actors - transnational corporations.

1. Research Background

In the literature, the driving factors for attracting TNC, political and non-political factors were also identified (Fedderke and Romm 2006). The works of Tsai (1991), Ning and Reed (1995) and Lall *et al.* (2003), who consider these factors as (a) those that relate to the side of the "proposal" (*e.g.* skilled labor, research and development and infrastructure), (b) those that relate to "demand" (economic and social variables of the recipient country, including interest rates, tax and tariff levels, market size and potential, wage rates, income distribution, human capital, cost differences, exchange rates, large-scale policy, trade policy); and (c) "institutional factors" (*e.g.* culture, intellectual property rights, transaction costs, political risk, corruption and bureaucracy). In addition, Qiu (2003) considered the effects of comparative advantages as an incentive for foreign investors. The author found that the comparative advantage sector of the host country is more attractive for domestic FDI. In particular, he found that auto companies of the country of origin have weaker incentives for FDI than their textile firms, and therefore the host country's comparative advantages sector is more attractive for domestic FDI.

In particular, the literature identifies the following effects of FDI that affect the host economy positively or negatively:

- a positive "Vanguard effect", through which foreign aid from a specific donor country contributes to FDI from the same donor country. This means that foreign aid will help attract FDI from the same donor country, but it will not necessarily help attract FDI from other countries (Kimura and Todo 2010);
- a positive "financing effect", through which aid improves the ability of the recipient country to raise funds (by improving the balance of payments) repatriating profits from FDI (Harms and Lutz 2006);
- a positive "infrastructure effect", through which aid improves the economic and social infrastructure of the recipient country (for example, physical/economic infrastructure, including transport, telecommunications and electricity, and social infrastructure, including education, health (Harms and Lutz 2006, Kimura and Todo 2010) and, consequently, raises the marginal product of capital in the country.
- negative "effect of Dutch disease" by influencing the strengthening of the real exchange rate of the national currency for economic development as a result of the boom in separate sector of the economy. Theoretically, the cause of the boom does not matter, but in practice, the effect is usually associated with the discovery of mineral deposits or rising prices for exports of extractive industries. Indeed, given that FDI in developing countries is mainly invested in tradable sectors, foreign aid can prevent FDI through this channel, which distorts the allocation of domestic resources (Arellano *et al.* 2009). In particular, this can be due to the negative impact of revenues from natural resources in the manufacturing sector by raising the real exchange rate;
- negative "rent effect", through which foreign aid encourages non-productive leasing activities in the recipient country, which leads to a decrease in productivity (Harms and Lutz 2006).

2. Methodology

Transnational corporations provide additional financial resources to the recipient country through investments and taxes, create jobs and generate skills, technology, management knowledge and corporate governance practices. On the other hand, TNCs get access to the market, natural resources associated with specific objects, cheap labor resources and take advantage of bilateral and multilateral trade policies. The active introduction of TNCs into Kazakhstan's economy began in 1994 - 1997, when the country's leadership focused on attracting foreign investors –transnational corporations. Since gaining independence, Kazakhstan has sought to become an active participant in the most important processes of globalization. Successful integration of the country into the world community implies the formation of a mechanism for optimal interaction with all its elements, including its main actors - transnational corporations.

Today in Kazakhstan, according to UNCTAD, more than 1600 branches of transnational corporations with the number of employees - about 18 thousand people registered, that is about 0.12% of the total population of the country. It should be noted that the dominant positions in the economy of Kazakhstan, in terms of the number of branches of TNCs, are held by companies in Western Europe, others by companies from Asia and the United States. Analysis of the volume of attracted FDI for investing countries from the data of 2017 showed that the bulk of FDI came from developed countries, such as the Netherlands (28.9%), the United States (17.9%), more than

25% is given by Belgium, the United Kingdom, France and Switzerland, and only 4.8% by the end of 2017 - China, 2.4% - Korea, 1.7% - Japan. In total, about 116 states are investing in the economy of Kazakhstan.

Figure 1. FDI net inflows in Kazakhstan, in million US dollars

According to the National Bank of the Republic of Kazakhstan, for the period of 2006 to 2012, there is a significant increase in investment, which is due to the active phase of development of the Kashagan field, which is one of the five largest oil fields in the world. The operator of this field is NCOC, whose shareholders are KazMunayGas, ENI, Total, Exxon Mobil, Shell (16.81%), Conoco Phillips (8.40%), Inpex (7.56%). The amount of attracted FDI per capita in 2011 was $ 1,207.3, which is more than 2.5 times higher than in 2005 and 7.3% higher than in 2010. In 2014, Kazakhstan established the office of an Investment Ombudsman. In 2016, Kazakhstan introduced a one-stop shop, enabling investors to apply for more than 360 types of permits and licenses without having to visit multiple ministries or government agencies. As a result, in 2016 FDI inflows increased until $ 17,000.

Investments into mining were concentrated in the oil and gas subsector and metal mining subsector. Growing inflow of FDI into oil and gas was mostly attributable to the TengizChevrOil LLP's expansion project, which will require approximately USD 37bln in foreign investments in 2017-2022. Investments into this project are anticipated to increase further in 2018 as the company will start the construction of the main refinery plant. Currently, 90% of shares of Shymkentnefteorgsintez JSC are sold to Vitol Munai (Switzerland). Also, the company Vitol Munai is a large (43%) joint stock company Arawak. A 90% stake in AO Yuzhneftegaz - Hurricane Kumkol Ltd (Canada), a 60% stake in AO Aktobemunaigas - the Chinese National Oil and Gas Corporation, 60% of Mangistaumunaigas - Indonesian company Central Asia Ltd Petrol, a 95% stake in Karazhanbasmunai JSC - the company Triton (Canada).

Gross FDI inflows were primarily directed into the mining 55% as well as 23% manufacturing sectors. Nevertheless, 12% of FDI was invested in trade, another 3% in the transport industry, 2% in finance (Figure 2).

Figure 2. Sectorial breakdown of gross Kazakhstan FDI inflowing 2017, %

Kazakhstan's authorities are taking further steps to enhance investment climate in the country. Reflecting this, World Bank's annual Doing Business 2018 report ranked Kazakhstan as the most attractive country globally in terms of protecting minority investors. The country improved its rating from 3rd place in 2017 as the Government increased shareholder rights and role in major corporate decisions, clarified ownership and control structures while requiring greater corporate transparency. In addition, improvement in Kazakhstan's economic growth prospects and strong macroeconomic fundamentals have been reflected in its sovereign ratings. On 8 September 2017, Standards & Poor raised the outlook on the country's credit rating to stable while maintaining its BBB- rating, which makes Kazakhstan the best rated country in the region. The rating agency highlighted the improvement in monetary policy effectiveness and strong external positions, which facilitates TNC's confidence in economy of Kazakhstan.

The study examines empirical literature on the factors that determine the direction of the flow of FDI. In many cases, the results revolve around the following factors:

1.1 Infrastructure development

Studies of Musila and Sigue (2006) and Dupasquier and Osakwe (2006) on FDI show that FDI in Africa depends on infrastructure development. Other studies on developing countries as Mengistu and Adams, (2007), Cotton and Ramachandran (2001), in transition countries as Zhang (2001), the Western Balkan countries as Kersan-Skabic and Orlic (2007) and the countries of South-Eastern Europe as Botric and Skuflic (2006) demonstrate a significant role for infrastructure development in attracting FDI inflows. However, the results of a study on the flow of US FDI to Africa by Nnadozie and Osili (2004) find less conclusive evidence of the role of infrastructure in foreign direct investment.

The results of Anyanwu and Erhijakpor (2004) show that telecommunications infrastructures provide economic growth, openness and significantly increase FDI inflows to Africa, while credit to the private sector, export processing zones and capital gains tax have a significant negative impact.

1.2 Institutional, political factors and investment climate

According to studies, it appears that corruption and low transparency impede inflows of FDI (Voyer and Beamish 2004, Zhao and Du 2003, Habib and Zurawicki 2002, Kersan-Skabic and Orlic 2007) as well as securing property rights in South Africa (Fedderke and Romm 2006), and developing countries (Kapuria-Foreman 2007) affect FDI inflows from the use of 17 countries from 1994 – 2004. When studying the influence of the authorities on FDI inflows, the results of Hamfula (2007) show that corruption is unfavorable for import substitution rather than export promotion. Poor governance and tight regulatory regimes (Dupasquier and Osakwe 2006); foreign ownership flows in sectors open to FDI, policies to repatriate capital and remittances (Tarzi 2005), as well as government regulations and restrictions on ownership of shares by foreign companies turned out a negative impact on FDI inflows (Cotton and Ramachandran 2001).

Asiedu (2004) examines the impact of three types of capital control policies on FDI inflows: (a) the presence of several exchange rates; (b) restrictions on capital account and (c) restrictions on the repatriation of export earnings. The author argues that the effect of capital controls on FDI inflows varies from region to region and changes over time: in the 1970s and 1980s, none of the policies had a significant effect on FDI inflows, but in the 1990s all three were significant. However, the author believes that the control over the movement of capital does not affect FDI in the countries of South Africa and the Middle East, but negatively affects the flow of FDI to Latin America and East Asia. Ivanenko *et al.* (2018) highlighted in order to prevent projects of investors, legislation is needed to minimize investment risks, encourage insurance of investments.

1.3 Attraction of natural resources

Studies of Dupaski and Osakwe (2006), Aseidu (2002) and Deichmann *et al.* (2003), found that the availability of natural resources has a positive and significant effect on FDI inflows. In addition, Mohamed and Sidiropoulos (2010), using a group of 36 countries (12 countries in the Middle East and North Africa and other 24 developing countries), concluded that natural resources are the key determinants of FDI inflows in these countries.
Asiedu (2006), using these groups for 22 countries in South Africa for the period 1984 - 2000, also determined that those endowed with natural resources or have large markets attract more FDI. In addition, good infrastructure, an educated workforce, macroeconomic stability, openness to FDI, an effective legal system, less corruption and political stability contribute to the growth of foreign direct investment. Hailu (2010) conducts an empirical analysis of the determinants of demand for FDI inflows to African countries and concludes that natural resources, quality of labor, trade openness, market position and infrastructure conditions have a positive effect on FDI inflows, and the availability of stocks has a positive but little effect.

1.4 Development, labor productivity and cost of human resources

Reuters *et al.* (2010) study shows that FDI inflows are more strongly associated with improved human capital when FDI policies restrict foreign investors to work in certain sectors of the economy and when the government discriminates against foreign investors and domestic investors. In addition, the author believes that the relationship between FDI and the development of human capital is also more pronounced when corruption is low. Markusen (2001) believes that a high level of workforce is important for FDI inflows. Rodriguez and Pallas (2008) also found human capital as the most important factor determining domestic FDI. Nonnemberg and Cardoso de Mendonca (2004), in analyzing panel data for the period 1975-2000 for 38 developing countries, including transition economies countries, conclude that FDI is related to schooling, openness, risk and macroeconomic variables, such as inflation, risk, and average growth rates. Alsan *et al.* (2006) in the analysis of panel data of 74 industrialized and developing countries for 1980–2002 defined Gross FDI has a strong and positive effect on population health (life expectancy) as an indicator of human capital development in low- and middle-tier countries. Noorbakhsh *et al.* (2001) and Miyamoto (2008) showed a positive effect of human capital in general on FDI inflows, while Tarzi (2005) and Baeka and Okava (2001) refer to the labor productivity of workers and Khair-UZ-Zaman and *et al.* (2006) and Jeon and Rhee (2008) indicate labor costs.

1.5 Major macroeconomic and other factors

Chowdhury and Mavrotas (2006), using data for three countries: Chile, Malaysia and Thailand, the level of GDP is not caused FDI inflows in Chile, and in the case of Malaysia and Thailand there is strong evidence directed causality between GDP and FDI. The works of Klein and Rosnegren (1994), Jeon and Rhee (2008) are conclusive evidence that relative wealth significantly affects foreign direct investment, while Brahmasrene and Jiranyakul (2001) found out that real income is a significant factor determining FDI inflow.

In the research about China and India, the results of Zheng (2009) shows that market growth, imports, labor costs and political risks are the determining factors of domestic FDI for both countries. However, exports, market coverage and borrowing costs are important for China's FDI, while geographic and cultural factors are important for India's FDI. A study of Matveev (2009) for countries of Central and South-Eastern Europe found population, distance, GDP, risk, labor costs and corruption can largely explain the size of FDI flows in transition economies countries.

3. Application functionality

Based on the above theoretical structure and structure of the EAEU economy, as well as on the characteristics of FDI inflows to Kazakhstan, we use the following model for assessing the factors that determine FDI inflows in EAEU countries:

$$FDIijt = B_0 + B_1ijt + B_2(GDPPC)ijt + B_3(TO)ijt + B_4(Financialdev)ijt + B_5(ExchangeRate)ijt + B_6(Infrastructure)ijt + B_7(GDPGrowth)ijt + B_8(FDI1)ijt + B_9(Corruption)ijt + B_{10}(RuleofLaw)ijt + Eijt \quad (1)$$

where: i and *j* denote countries, *t* denotes time, and variables are defined as: FDIij - means a net inflow of FDI in% of GDP, GDPPC - Gross domestic product per capita (in US \$), TO - this is an indicator of openness, total trade (% of GDP), Financialdev - his is financial development (domestic credit to the private sector in% of GDP), ExchangeRate - official exchange rate to US dollar (annual average), «Infrastructure» - these are fixed and mobile subscribers (per 1000 people), GDPGrowth - real GDP growth rates (%), «FDI1» is the log FDI, «Corruption» - corruption perception index (percentile rank 0-100), RuleofLaw - represents the rule of law (percentile rank 0-100), B - coefficient vector, and Eijt represents many other influences on FDI that are supposed to behave themselves.

OLS Regression results

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Dep. Variable:	FDI ij	R-squared:	0.488
Model:	OLS	Adj. R-squared:	0.446
Method:	Least Squares	F-statistic:	11.71
Date:	Mon, 03 Oct 2018	Prob (F-statistic):	2.25e-10
Time:	13:54:19	Log-Likelihood:	- 88.560
No. Observations:	94	AIC:	193.1
Df Residuals:	86	BIC:	213.5
Df Model:	7		
Covariance Type:	nonrobust		

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===========================================================================
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	coef	std err	t	P>|t|	[0.025	0.975]
Constant	-11.5397	2.366	-4.877	0.000	-16.244	-6.836
GDPP	0.4863	0.137	3.548	0.001	0.214	0.759
Toit	2.0133	0.345	5.837	0.000	1.328	2.699
FinancialDev	0.0384	0.046	0.829	0.409	0.054	0.130
ExchangeRate	0.2747	0.055	4.967	0.000	0.165	0.385
Infrastructure	-0.1236	0.054	2.277	0.025	0.231	0.016
Corruption	0.3303	0.264	1.250	0.215	0.856	0.195
RuleofLaw	0.1363	0.345	0.395	0.694	0.550	0.822

Omnibus:	7.170	Durbin-Watson:		1.322
Prob(Omnibus):	0.028	Jarque-Bera (JB):		6.677
Skew:	-0.558	Prob(JB):		0.0355
Kurtosis:	3.678	Cond. No.		411.

According to the results trade openness have a strong positive effect on FDI, and GDP per capita and the Exchange Rate also show significant positive small effects, while Infrastructure shows a significant negative small effect. Moreover, Kazakhstan receive majority of FDI in sectors related to natural resources, as they are rich in minerals, oil and natural gas. Indeed, both theoretical and empirical literature showed that the need to ensure safe access to natural resources is one of the main reasons for TNCs to Kazakhstan, indicating one of the key characteristics of the country in terms of providing natural resources.

Conclusion

In general, the analysis of the activities of foreign TNCs in Kazakhstan makes it possible to single out the following series of trends:

Firstly, the concentration of transnational capital in the mineral and raw materials complex is conditioned by the fact that, under the conditions of globalization, a new international division of labor has actually formed, according to which Kazakhstan is regarded as a major supplier of raw materials, in particular hydrocarbon.

Secondly, the existing low efficiency of the contract management system. In general, the results of privatization programs and the contract management system were unambiguous. On the one hand, production stabilized, and the mills continued to provide jobs and social services to communities in the regions where they worked. For example, Ispat International (UK-India) took control over and controlled the iron and steel production of Arcelor Mittal, Samsung (South Korea) entered into transactions with Zhezkazgan and Balkhash copper combines, Glencore Trading (Switzerland) concluded commercial deals with Kazzinc.

Third, the problem of the activities of TNCs and respect for human rights remains unresolved. Thus, the mechanism for the recognition, observance and protection of human rights in developing countries, in particular, and in Kazakhstan is not sufficiently developed. Currently, experts note the lack of strong independent trade unions, there is no united movement of "green" and a powerful movement in defense of consumer rights. The access of citizens to justice and the adoption of environmentally significant solutions is to a certain extent limited. This, in turn, causes the fact that foreign multinationals, in order to obtain higher profits, in some cases violate basic human rights. Transnational corporations (TNCs) relocate their branches in Central Asia to Kazakhstan. Thus, the presence of major global players in our market is trust from investors.

References

[1] Alsan, M., Bloom D. E. and Canning, D. 2006. The Effect of Population Health on Foreign Direct Investment Inflows to Low- and Middle-Income Countries. *World Development* 34(4): 613-630.

[2] Anyanwu, J. C. and Erhijakpor, A. E. O. 2004. Trends and Determinants of Foreign Direct Investment in Africa. *West African Journal of Monetary and Economic Integration*, 21-44.

[3] Arellano, C., Lane, T., and Lipschitz, L. 2009. The dynamic implications of foreign aid and its variability. *Journal of Development Economics,* 88(1): 87-102.

[4] Asiedu, E. 2006. Foreign Direct Investment in Africa: The Role of Natural Resources, Market Size, Government Policy, Institutions and Political Instability. *World Economy*, 29: 63-77.

[5] Botric, V., and Skuflic, L. 2006. Main Determinants of Foreign Direct Investment in the Southeast European Countries. *Transition Studies Review,* 13(2): 359-377.

[6] Cotton, L. and Ramachandran, V. 2001. Foreign Direct Investment in Emerging Economies Lessons from sub-Saharan Africa. *World Institute for Development Economics Research Discu*ssion Paper No. 2001/82.

[7] Dupasquier, C. and Osakwe, P. N. 2006. Foreign direct investment in Africa: Performance, challenges, and responsibilities. *Journal of Asian Economics,* 17: 241-260.

[8] Fedderke, J. W., and Romm, A.T. 2006. Growth impact and determinants of foreign direct investment into South Africa, 1956-2003. *Economic Modeling,* 23: 738-760

[9] Habib, M., and Zurawicki, L. 2002. Corruption and Foreign Direct Investment. *Journal of International Business Studies*, 33(2): 291-307.

[10] Harms, P., and Lutz, M. 2006. Aid, governance, and private foreign investment. *Economic Journal,* 116(513): 773-790.

[11] Hailu, Z. A. 2010. Demand Side Factors Affecting the Inflow of Foreign Direct Investment to African Countries: Does Capital Market Matter? *International Journal of Business and Management*, 5(5): 104-116.

[12] Imashev, E. Zh., and Begeyeva, M. K. 2018. Territorial and branch differences in the investment attraction of industry of the West Kazakhstan region of the Republic of Kazakhstan. *Journal of Applied Economic Sciences*, Volume XIII, Summer 4(58): 1057-1067.

[13] Ivanenko, T., Hrushko, V., Frantsuz, A. 2018. Optimal investment decision making on the model of production enterprise with limited resources. *Investment Management and Financial Innovations*, 15(4): 61-68.

[14] Kimura, H., and Todo, Y. 2010. Is Foreign Aid a Vanguard of Foreign Direct Investment? A Gravity-Equation Approach. *World Development*, 38(4): 482- 497.

[15] Kersan-Skabic I., and Orlic E. 2007. Determinants of FDI in CEE, Western Balkan Countries. Is Accession to the EU Important for Attracting FDI? *Economic and Business Review,* 9(4): 333-350.

[16] Lall, P., Norman, D. W., and Featherstone, A. M. 2003. Determinants of US Direct Foreign Investment in the Caribbean. *Applied Economics,* 35(13): 1485-1496.

[17] Markusen, J. 2001. Contracts, intellectual property rights, and multinational investment in developing countries. *Journal of International Economics,* 53: 189-204.

[18] Mengistu B. and Adams S. 2007. Foreign Direct Investment, Governance and Economic Development in Developing Countries. *Journal of Social, Political and Economic Studies,* 32(2): 223-249.

[19] Miyamoto, K., 2008. *Human Capital Formation and Foreign Direct Investment in Developing Countries*. Development Centre on Financing Development.

[20] Musila J. W. and Sigue S. P. 2006. Accelerating foreign direct investment flow to Africa: From policy statements to successful strategies. *Managerial Finance,* 32(7): 577-593.

[21] Ning, Y., and Reed, M. R. 1995. Locational Determinants of the US Direct Foreign Investment in Food and Kindred Products. *Agribusiness: An International Journal,* 11: 77-85.

[22] Nnadozie, E., and Osili, U. O. 2004. *US Foreign Direct Investment in Africa and its Determinants*. UNECA Workshop of Financial Systems and Mobilization in Africa, Nov 2nd 2004.

[23] Ramiraz, M. D. 2006. Economic and Institutional Determinants of Foreign Direct Investment in Chile: a time series analysis, 1960 - 2001. *Contemporary Economic Policy,* 24(3): 459-471.

[24] Rodrıguez, X., and Pallas, J. 2008. Determinants of Foreign Direct Investment in Spain. *Applied Economics* 40: 2443-2450.

[25] Tarzi S. 2005. Foreign Direct Investment flows into Developing Countries: Impact Location and Government Policy. *Journal of Social, Political and Economic Studies,* 30(4): 497-515.

[26] Tsai, P.-L. 1994. Determinants of Foreign Direct Investment and its Impact on Economic Growth. *Journal of Economic Development,* 19: 137-63.

[27] Qiu, L. D. 2003. Comparing Sectoral FDI Incentives: Comparative Advantages and Market Opportunities. *Annals of Economics and Finance,* 4: 151-176.

[28] Voyer, P. A., and Beamish, P. W. 2004. The Effect of Corruption on Japanese Foreign Direct Investment. *Journal of Business Ethics,* 50: 211-224.

[29] Zhang, K. H. 2001. What Attracts Foreign Multinational Corporations to China? *Contemporary Economic Policy*, 19(3): 336-346.

[30] Zhao, J. H., Kim, S. H., and Du, J. 2003. The Impact of Corruption and Transparency on Foreign Direct Investment: An Empirical Analysis. *Management International Review,* 43(1): 41-62.

*** National bank of Kazakhstan database. Available at: http://www.nationalbank.kz/?docid=158&switch=english

*** UNCTAD (Online), FDI/TNC database. Available at: www.unctad-org/fdistatistics

Telecommunications Industry: Current State and Development Prospects

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Abstract:

With the development of market relations, as well as economic and political disasters occurring in the world, there are significant changes in the services sector. Under current crisis circumstances, the volume of services specifically inherent in a market economy significantly increases in Kazakhstan.

Problems of development of the services market in the system of structural changes in the economy, directions and methods of regulating socio-economic relations in the services sector, ways of its further transformation and development prospects need a deeper and more comprehensive scientific substantiation. The concept of development of the telecommunications services sector has not yet received a theoretical justification. With the help of telecommunications, globalization processes are enhanced by increasing the amount of information provided by the information and telecommunications infrastructure. The market dictates to telecommunications companies the task of constantly improving their competitiveness based on modernizing and optimizing business processes and introducing advanced scientific and technical developments into the activities of companies.

Keywords economy; industry; service; infrastructure; company

JEL Classification: M21; M29

Introduction

With the help of telecommunications, globalization processes are enhanced by increasing the amount of information provided by the information and telecommunications infrastructure. The market dictates to telecommunications companies the task of constantly improving their competitiveness based on modernizing and optimizing business processes and introducing advanced scientific and technical developments into the activities of companies.

The information base of the study was domestic and foreign methodical reference materials, official information of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, data of JSC Kazakhtelecom, as well as data published in periodical materials. When justifying the decision was used a systematic approach to the study of telecommunications services in the economy of Kazakhstan. In the process of work, methods of comparative analysis had used in accordance with which, the problem under consideration is analyzed in conjunction with economic processes occurring at various levels of government regulation.

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1. Research background

In recent decades, new opportunities in the field of creation and use of telecommunication means have attracted widespread attention. The rapid development and improvement of technologies in the field of communications over the past decades is called the telecommunications revolution, which entails changes in public and economic relations. Information technology and services have reached the international level and have led to the emergence of a global information and telecommunication system.

Special attention is required to the issues of improving telecommunications services in a globalized economy, when the influence of geo-factors enhances both the positive and negative impact of information resources on the life support system in society.

In modern conditions, the need for mechanisms for the timeliness and objectification of information services in the direction of ensuring social stability and economic security of the country is being actualized. In this context, it is necessary to develop appropriate institutional regulators for a wide range of telecommunications services. Among the scientists who have devoted their research to the telecommunications industry, it should be noted Taylor (1980), Griffin (2012), Reznikova and Demina (2015), Kucherenko (2016). From the number of scientific works devoted to the cellular communications market, it is necessary to single out Fomina (2014), Rozanova (2013). In Kazakhstan, the problems of the telecommunications market are considered in the works of Seilov (2016), Adilova (2015).

Despite the presence of a sufficient number of versatile scientific research on the functioning and development of the telecommunications services sector, the overall relationship with the development of the telecommunications services market and the socio-economic potential of the country, as well as the specifics of its monitoring, is not adequately covered. These circumstances determined the choice of the research topic. Currently, the service sector has grown into the largest sector of the economy: it accounts for 62-74% of the global gross domestic product, which is significantly more than the share of commodity trade, and 63-75% of the total number of employees.

The leading countries, the share of revenues from services, which exceeded percentage of GDP, include, in particular, Luxembourg (85%), France (77%), USA (76%), Belgium (75%), United Kingdom (75%). The service industry accounts for more than 50% of GDP in almost all countries of Western Europe and North America, as well as in some countries of Southeast Asia, for example, in Hong Kong (90%) and Singapore (69%). For such countries, the most diverse types of service activities harmoniously provide a high level of development of the service sector, as a rule: financially credit and educational, household and tourist, medical, telecommunication and other services. A high level of development of the service sector is also characteristic of a significant number of non-highly developed countries. For example, the share of services in GDP in 2007 was 65% in Jordan, 62% in Tunisia, 60% in Jamaica and 54% in Paraguay.

2. Methodology

For 10 years, from 2006 to 2015, the volume of services rendered in the Republic of Kazakhstan increased more than 4 times, reaching KZT5,517,811.784 million in 2015 (Figure 1).

Figure 1. Dynamics of the volume of services rendered in the Republic of Kazakhstan for 2006 – 2015

The highest growth rates of this indicator were observed in the pre-crisis years, when, against the background of rapid economic growth of the country, the volume of services rendered could grow by 40% per year. The beginning of the economic crisis in the country, in 2008 – 2009, instantly reflected on the growth rates of this sector of the economy. At the same time, it should be noted that the service sector quickly recovered from the influence of crisis phenomena (largely due to both the flexibility of its structure and the anti-crisis actions of the government of the Republic of Kazakhstan) and from 2010 began to show growth.

The development of the services market is currently the most important factor influencing the economic development of Kazakhstan. Due to the activity in the services sector, new jobs are created, the role of service in various sectors of the economy and material production sectors is increasing, and the share of services in the gross domestic product (GDP) structure is increasing. Analysis of the sales of services by economic activity are presented in the Table 1.

Table 1. Analysis of the sales of services by economic activity in the Republic of Kazakhstan

Indicators	2015		2016	
	Total	%	Total	%
Business services	262.622,5	5,5	278.573,6	5,3
Health and social services	1.969.098,8	41,2	2.190.117,5	41,2
Financial services	915.207	19,2	1.134.872	21,3
Distribution	251.767	5,3	2.28.493,8	4,3
Leisure, sports, culture	233.934,5	4,8	256.939,4	4,8
Telecommunication	210.727,6	4,4	235.065,3	4,4
Education	256.095,2	5,4	299.392,3	5,6
Construction and Engineering	676.060,8	14,2	694.357,9	13,1
Total	4.775.513,4	100,0	5.317.811,8	100.0
GDP	39.675.832,9		40.884.133,6	
Share of services in GDP		12,0		13,0

Source: compiled by authors

From Table 1 it can be seen that for some items of the types of economic activity of the services provided, there was a decrease: for business services, a decline of 0.2%, distribution by 1% and construction and engineering by 0.9%. Also, for some services, the share of sales volumes remained unchanged, although in absolute terms the figures increased: in recreation, sports and culture services in absolute terms there was an increase of 10%, in communication services by 9%. The largest share belongs to healthcare and social services -41.2%, the smallest communication services by 4.4%. Compared with 2014 year. At the same time, the share of services to GDP is 13.0%.

The large-scale introduction of information and communication technologies has an impact on the increase in labor productivity and the creation of conditions for the progressive development of domestic enterprises and their integration into the world economy. During the years of reforming the national economy, the telecommunications industry has undergone significant changes for the better. It has become one of the fastest growing sectors with long-term economic growth potential. Products of telecommunication companies contribute to improving the quality of life of people, developing modern business and efficiently managing the state, and strengthening international economic relations (Zhetiru and Elemesov 2014).

According to the Networked Readiness Index, published annually by the World Economic Forum organization, it is possible to track the development of information and telecommunication systems and assess the opportunities that they bring to a particular country. Since 2002, the World Economic Forum (WEF) and the European Institute of Business Administration (INSEAD), in the framework of a special annual series of reports on the development of the information society in the world - the Global Information Technology Report, publish ranking of countries according to the index. According to the 2016 WEF report on the network readiness index, Kazakhstan moved from the 40th position it held in 2015 to the 39th place (from 139 countries), while maintaining the traditionally leading position in the CIS region (Figure 2). Among the CIS countries, Kazakhstan has the highest index value. This is followed by Russia (4.5), Azerbaijan (4.3), Armenia (4.3). The first three places in the ranking were taken by Singapore, Finland, Sweden.

Figure 2. Dynamics of changes in indicators of the Republic of Kazakhstan in the NRI rating

In general, for the period 2012 - 2016, the index value for Kazakhstan increased by 0.6 points, and the country do 16 points improve position in the ranking. At the same time, the number of countries rated in the ranking varied from 139 to 148 countries. The Network Readiness Index assesses countries on 4 sub indexes: environment, availability, use and impact.

3. Application functionality

There are 2,720 companies registered and operating in 2016 on the telecommunications market, of which: 16 large and 27 medium-sized companies. In total, 598 communication companies operate on the market, the largest number of large companies are concentrated on the wireless telecommunications network market (10 companies). Companies whose main activity is the provision of wired telecommunications, in second place, companies providing satellite telecommunications services are only one in Kazakhstan's market, and small and medium-sized companies are mainly involved in other communication services. Data on the dynamics of the physical volume of services provided, in the period 2008-2016 presented in Table 2.

Table 2. Data on the dynamics of the physical volume of services provided, in the period 2012 - 2016

Subscriber type	2012	2013	2014	2015	2016	2016 to 2015 in %
Number of fixed-line subscribers, thousand units	4.361,4	4.393,0	4.353,4	4.147,8	3.925,2	94,6
Number of mobile subscribers, thousand units	30.235,4	30.364,9	28.595,6	26.309,3	25.534,8	97,1
Number of Internet subscribers, thousand units	1.607,2	1.976,0	2.100,9	2.305,6	2.352,7	102

Source: compiled by authors

From Table 2 it can be seen that in 2016 compared to 2015, the number of subscribers decreased both by fixed line by 5.4% and by cellular communication by 2.9%, which amounted to 3,925.2 units and 25,534.8 units respectively. However, this contributed to an increase in the number of Internet users by 2%, which amounted to 2,352.7 units.

Therefore, we can conclude that today the most promising, competitive and profitable activity in the telecommunications sector is the provision of wireless telecommunications services, are presented in Table 3.

Table 3. The dynamics of the main indicators of the telecommunications industry of the Republic of Kazakhstan 2013 - 2016

Indicators	2013	2014	2015	2016		2016 to 2015 in %
Revenues from communication services	597,9	647,3	673,4	684, 3	100	101,6
Including:						
long distance and international telephone services	40,5	42,6	41,5	34,4	5,0	82,9
from local telephone services	45,5	51,5	51,6	47,9	6,99	92,8
from data services	15	20,3	22,7	22,4	3,3	98,7
from the internet	105,6	137,9	169	194,1	28,4	114,9
from mobile	308,1	296,6	286,2	249,4	36,4	87,3
from TV shows	14,5	18,2	21	27,2	3,9	129,5
from other communication services	68,7	76,6	81,4	108,8	15,9	133,7

Source: compiled by authors

As can be seen from Table 3, the income structure of the industry practically does not change. Industry revenues show annual growth of about 0.9% of the previous year. The main revenues of the telecommunications

industry in 2015 were received from mobile services (249.9 billion tenge), broadband Internet access (194.1 billion tenges), as well as from other communication services (108.8 billion tenges).

The general structure of the communications industry in 2016 is shown in Figure 3. According to the information below, the highest income in 2016 was received from mobile communication (34%), Internet access (28.6%) and other services (21.8%).

Analysis of the data presented in Table 2, Table 3 and Figure 3 allows the following conclusions:

- currently, revenues from local telephone services have declined. If in 2015 revenues accounted for 6.9% of all revenues, then in 2016 - 6.2%. The decline was 0.7%. In order to increase the profitability of this type of communication, within the framework of the Information Kazakhstan-2020 Program, 98% of the population of the country, including rural areas, were provided with fixed communication;
- the dynamics of the physical volume of cellular services is reduced, as there is a decrease in the number of its subscribers. This affected the decline in revenues from cellular services. If in 2015 the income from this activity was 36.4% of all revenues, then in 2016 it was 34%. The decline was 2.4%. The main reason for the decline can be noted that the population has become less use of cellular communication and more write messages (WhatsApp), using the Internet connection.
- currently, there is an increase in Internet services. One of the reasons for maintaining this trend will be the development of 4G/LTE networks. The population of the country is increasingly using the Internet as a connection, due to its cheapness compared to fixed and mobile communications.

The general structure of the communications industry revenues for 2016 is presented in Figure 3.

Figure 3. Structure of the communication industry in 2017

According to the information below, the highest income in 2016 was received from mobile communication (34%), Internet access (28.6%) and other services (21.8%). Analysis of the data presented in Table 3 and Figure 3 allows the following conclusions to be drawn:

- currently, revenues from local telephone services have declined. If in 2015 revenues accounted for 6.9% of all revenues, then in 2016 - 6.2%. The decline was 0.7%. In order to increase the profitability of this type of communication, within the framework of the Information Kazakhstan-2020 Program, 98% of the population of the country, including rural areas, were provided with fixed communication;
- the dynamics of the physical volume of cellular services is reduced, as there is a decrease in the number of its subscribers. This affected the decline in revenues from cellular services. If in 2015 the income from this activity was 36.4% of all revenues, then in 2016 it was 34%. The decline was 2.4%. The main reason for the decline can be noted that the population has become less use of cellular communication and more write messages (WhatsApp), using the Internet connection.
- currently, there is an increase in Internet services. One of the reasons for maintaining this trend will be the development of 4G/LTE networks. The population of the country is increasingly using the Internet as a connection, due to its cheapness compared to fixed and mobile communications.

The fact of prompt information transfer is very important for the state, since this is the key to the success of the globalization of the information space. And in this regard, the development of the telecommunications industry

should be stimulated by the state, in order to fully meet the demand for services, expand their range and improve the quality of services provided.

Currently, Kazakhstan is implementing the State Program "Information Kazakhstan - 2020" (hereinafter - the State Program), approved by Decree of the President of the Republic of Kazakhstan dated January 8, 2013 No. 464, aimed at developing the information and communication technology sector, as well as the IT services market. This state program covers all strategically important directions of development of IT-services. At the same time, to increase the export potential of Kazakhstan. IT services, quality improvement, as well as the promotion of the development of cloud technologies in Kazakhstan, it is necessary to take additional measures:

- Increasing the export potential of Kazakhstani IT services; Taking into account the low share of information and communication technologies in the country's GDP (3-4%), measures are required for state support of IT services. For this purpose, it is planned to develop the export potential of Kazakhstani IT companies on the basis of the special economic zone: "Park of innovative technologies" Alatau and through the creation of innovation centers on the basis of the AOO" Nazarbayev University ". Measures will be developed to study the export potential of Kazakhstan's IT companies, in particular, a register of IT services for export to foreign markets will be formed. It is assumed that this registry will be updated annually.
- The introduction of "cloud" technologies; As part of the Program, work will be carried out to develop and actively promote the capabilities of domestic "cloud" technologies, the advantages of which are a flexible system of cost savings; scaling services, which means faster workflow; transparency. The use of "cloud" services allows you to purchase them as a service without operating costs, without using capital costs and thereby make the cost of the company's IT resources transparent to the business owner. Thus, the introduction of the service model of informatization of state bodies with the transition to the "cloud" platform will improve the quality of public services, the main recipients of which are the population.
- Improving the quality of electronic public services; In order to improve the quality of services, it is planned to study the issue of the development of a separate branch of legislation - information law. In addition, in the public service centers all public service centers will be provided with video surveillance cameras. It is planned to develop proposals for amending the legislation on permits and notifications regarding the non-alternative provision of electronic licensing services through the e-government portal.
- Increased Internet reach; In order to increase the coverage of the Internet by the Internet, within the framework of this program and current strategic and program documents, measures will be taken to increase the speed of fixed broadband Internet access. It is also planned to develop broadband access technology FTTH (Dzhakisheva 2016).

The globalization of telecommunications has affected the state monopoly. The main prospects for the development of the telecommunications market are precisely in the mobile communications segment. It is becoming more and more obvious that there is a need to get a telephone connection, access to the Internet, e-mail, fax, *etc*., regardless of location, as everyone aspires to mobility and so-called "geographical independence". Today, mobile communication is becoming a necessary attribute of modern life, occupying an increasingly large segment of the telecommunications market in Kazakhstan, despite the still high difference in the price of mobile and fixed communications.

Conclusion

Summarizing the above, the development of the telecommunications industry in the republic is an important factor and condition for the country's integration into the world community. The communications market in Kazakhstan is one of the fastest growing sectors of the economy. The share of communication services in the country's overall GDP level is on average 2%, which shows the real potential for the development of this industry. The stage of the life cycle of the industry is currently represented at the level of growth, which is also an attractive moment for potential investors whose contributions will ensure the further development of the industry.

Analysis of the current state of the country's telecommunications market, its pace of development and the level of its life cycle gives the right to argue that in the coming years, telecom operators will act towards maximizing market coverage with Internet services and the struggle to attract consumers, including from unattractive consumer segments. To effectively confront external competition, companies will begin to unite efforts, moving from competitive strategies to partner strategies.

References

[1] Adilova, A. 2015. Analysis of the project management of Kazakhstan and Kazakhstan. *National Academy of Management. Actual Problems of Economics*, 4 (166): 399-403.

[2] Dzhakisheva, U. 2016. *Prospects for the Development of Telecommunications Services and Ways to Improve Them*. Available at: http://group-global.org/

[3] Fomina, T. 2014. Analysis of the Market of Cellular Operators. *Young Scientist*. 18 (5): 466-468.

[4] Griffin, J. 1982. The Welfare Implications for Telecommunications Pricing. *Review of Economics and Statistics*, 64(1): 59-66. Available at: https://www.jstor.org/stable/1937943

[5] Kucherenko, Yu. 2016. *Telecommunication Markets in the World Economy and Prospects for their Development in Russia*. Moscow. 192.

[6] Reznikova, N., and Demina, E. 2015. *Management in Telecommunications*. Moscow. Eco-Trend. 392.

[7] Rozanova, N. 2013. *Economics of Industry Markets: A textbook for Bachelors*. Moscow. 906.

[8] Seilov, S. 2016. *Regulation of the Telecommunications Sector of the Republic of Kazakhstan*. Almaty. Atamura. 176.

[9] Taylor, L. 1980. *Telecommunications Demand: A Survey and Critique*. Cambridge: Ballinger Publishing Co. 455.

[10] Zhetiru, A., and Elemesov, R. 2014. Transnational Corporations in the Communications Market of Kazakhstan. *Bulletin of KazNU*, 2 (14): 275-279.

*** Indicators of the Information Society of the Republic of Kazakhstan. Available at: http://zerde.gov.kz/images/ Indicators of% 20informational society20 %%20PK.pdf

Food Security as a Formation Factor of the Import Substitution Potential of the Economy

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Abstract:

The article is devoted to the research of individual issues of food security in developed countries of the world at the present stage. The authors analyzed the current state of food supply of the Republic of Kazakhstan. It is also noted that the export of food products in the country is noticeably inferior to imports. In the nomenclature of imports, there is a significant proportion is taken by livestock products, which reduces the competitiveness of domestic goods. In order to ensure the food security of the country, aspects of the development of animal husbandry have been proposed to build the potential for import substitution of the economy of Kazakhstan. According to the results of the research, it was concluded that there are reserves in the country to replace food imports, and therefore to address the country's food security as well.

Keywords food security; agro-industrial complex; import substitution; export; import; animal husbandry

JEL Classification: M21; M29

Introduction

In the Address of the President of the Republic of Kazakhstan N.A. Nazarbayev to the people of Kazakhstan, called the "Kazakhstan – 2050 Strategy' noted the following: 'High growth rates of world population sharply aggravate the food problem. Already today in the world tens of millions of people are starving, about a billion people on a constant basis suffer from lack of food. Without revolutionary changes in food production, these terrible numbers will only grow" (Nazarbayev 2012). This position of the strategy confirms the urgency of the problem of food security in the global space, the reasons for the aggravation of which in the 21st century are recognized, on the one hand, high population growth rates compared to the growth rates of food production, and on the other hand, the tendency of reduction of basic resources used for agricultural production.

1. Literature review

In the Republic of Kazakhstan, where the state of the agrarian market is in constant development, these problems should be constantly studied, so that the development of the agrarian sector, which has great potential, does not lag behind other economic spheres of the country, and the management system of the economic sector allows for constant growth.

Theoretical and practical aspects of the assessment and food security at the global, national and regional levels, as well as at the level of individual households are reflected and developed in the scientific works of many Kazakh and foreign scientists: Zhanbekova (2013), Kaygorodtsev (2016), Abalkin (2010), Altukhov (2016), Belugin

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(2017), Nekhoda (2013), Grebmer (2016), Hubert (1975), Reinhard (2012). The materials of the Food and agriculture organization of the United Nations (FAO), the international emergency children's Fund (UNICEF), the World Bank, the analytical Agency Economist Intelligence Unit are devoted to the issues of ensuring and measuring food security.

The studied approaches to ensuring food security served as a theoretical and methodological basis for the study. At the same time, rapidly changing external conditions, the emergence of new risks and threats and the aggravation of existing ones in ensuring food security of the Republic of Kazakhstan dictate the need in the future to identify priority areas of food security on the basis of sustainable development of agricultural production, in order to increase the import-substituting potential of Kazakhstan.

In general, the problem of food security is a problem of all humanity and for all governments of the world is of great importance. In 1973, the concept of «world food security» was developed within the framework of the Food and agriculture organization of the United Nations (FAO), in which the term «food security» was officially introduced into global practice. Later, that concept began to characterize the state of the food market and economy in the country or group of integrated countries, as well as in the world. The content of the term food security was defined in 1974 in the Resolution «International obligations to ensure food security in the world» by the UN General Assembly as "ensuring guaranteed access of all residents and at any time to the world's food resources in the amount necessary for an active healthy life".

Thus, the process of food security provides:
- Physical availability of food;
- Economic availability of food;
- Food safety (Espolov 2013).

Comparing the interpretation of "food security" of foreign and Kazakh scientists (Altukhov 2016, Nekhoda 2013), the researchers came to a common opinion that food security is a state of the country's economy, which guarantees a stable supply of the processing industry with agricultural raw materials, the population - a sufficient number of safe and full-fledged food products, taking into account the income received, as well as relative independence from the import of raw materials and food.

2. Methodology

The main problem of food security in many countries of the world is that it does not provide an acceptable level of consumption of basic food products by its citizens, as a significant proportion of food is imported.

Because of that, it is illegal to talk about the achievement of food security of the country, when the consumer market is filled with imported food products, and domestic enterprises are unstable due to lack of raw materials for production or fierce competition. In global modern conditions, to ensure food security of the country, it is necessary to support and develop its own production of food raw materials and food products, reducing their imports. For the main groups of food products (meat and meat products, milk and dairy products, eggs, bread and bread products, potatoes, vegetables and fruits, vegetable oil, sugar, fish and fish products), imports should not exceed 30% of their domestic consumption. Many other countries adhere to the same policies: for example, a high level of food self-sufficiency is typical for the USA and France - about 100%, Germany - 93%, Italy - 78%; for the poor in the fertile soils of Japan, it is 50% (Chebotareva 2012). Data on imports and exports of agricultural products and food in a number of countries are shown in Table 1 below.

Table 1. Imports and exports of agricultural products and food in a number of countries, in millions of US dollars

Year	PRC			Russian Federation			Germany		
	Imports	Exports	Balance	Imports	Exports	Balance	Imports	Exports	Balance
2010	1396001,6	1577763,8	181762,2	228911,6	397067,5	168155,9	1066816,8	1271096,3	204279,5
2011	1743394,9	1898388,4	154993,5	306091,5	516992,6	210901,1	1260297,5	1482202,3	221904,8
2012	1818199,2	2048782,2	230583	316192,9	524766,4	208573,5	1161213,2	1410129,6	248916,4
2013	1949992,3	2209007,3	259015	314945,1	527265,9	212320,8	1187314,6	145095,9	-1042219
2014	1959234,6	2342292,7	383058,1	286648,8	497833,5	211184,7	1214955,7	149815,8	-1065140
2015	1679564,3	2273468,2	593903,9	182781,9	343907,6	161125,7	1057616,4	132854,1	-924762
2016	1587920,7	2097637,2	509716,5	182261,7	285491,0	103229,3	1060672	1340752	280080
2017	1843792,9	2263370,5	419577,6	228212,7	359151,8	130939,1	1173627,5	1450214,8	276587,3

Source: compiled by authors

The trade balance (the difference between the value of exports and imports) of food and agricultural raw materials in the People's Republic of China, the Russian Federation, the Federal Republic of Germany is steadily positive, which means the excess of exports over imports (the country sells more than it buys) (Table 1).

The study identified three main factors that affect the solution of the problem of food security in any country: current level of development of the agro-industrial complex (AIC), the strategy of import substitution, food availability.

In accordance with the Strategic development plan of the Republic of Kazakhstan until 2025, the policy of agriculture will be focused on increasing agricultural productivity, deepening the processing of agricultural products, ensuring food security of the country and the growth of export-oriented environmentally friendly products (Strategic Development Plan of the Republic of Kazakhstan until 2025. Decree of the President of the Republic of Kazakhstan 2018).

According to the Ministry of agriculture of Kazakhstan, the import of basic food products in the country is more than 60% of the total volume of imports. In 2017, Kazakhstan imported 4.0 billion USD worth of imported products, which is 5.0% more than in 2016. For example, meat is mostly supplied to the country by American companies, fruits and nuts are bought in significant volumes in Uzbekistan and Tajikistan, dairy products – in Russia and Belarus, tea – in India, coffee – in Kenya. In general, Kazakhstan imports large volumes of food products from Russia and other CIS countries.

The export of food products in Kazakhstan is significantly lower than the imports. The exception is made by products from grain, in particular wheat and wheat – rye flour. However, Kazakh entrepreneurs supply many other products abroad-meat (meat and meat products exports since 1990 (184.5 thousand tons) decreased by 576 times (3.2 thousand tons)), fruits and nuts, oils, honey, dairy products, cheeses, bakery products, sugar and other goods (Table 2).

Table 2. Exports/imports

Product label	2013	2014	2015	2016	2017	2017/2013, in % or times
Exports:						
Grain	1,338,106	1,135,006	832,543	816,969	829,415	62
Grain processing products	587,983	574,903	499,818	518,278	487,447	83
Potatoes, fresh of chilled	1,823	747	262	5,990	35,745	19,6 times
Sunflower seeds	26,482	52,621	53,171	55,074	89,241	3,37 times
Edible vegetables and its products	11,769	15,624	19,824	57,440	118,761	10 times
Edible fruits and its products	16,941	13,929	17,505	9,232	14,792	87,3
Meat and edible meat offal	27,333	53,320	42,500	42,155	43,812	1,6 times
Eggs and its products	765	33,444	5,002	6,789	15,583	20
Oil seeds and its products	56,375	62,706	53,768	64,004	116,006	2,05 times
Fish and its products	76,908	77,644	51,633	50,903	52,836	68,7
Imports:						
Grain	26,645	28,640	38,885	11,139	16,365	61,4
Grain processing products	32,293	27,928	26,333	20,020	23,576	73
Potatoes, fresh of chilled	22,965	14,559	15,643	1,626	8,539	37,1
Sunflower seeds	20,702	16,556	12,744	15,501	17,180	83
Edible vegetables and its products	265,292	251,532	224,482	123,279	158,312	60
Edible fruits and its products	596,872	606,277	455,212	417,186	437,169	73,2
Meat and edible meat offal	454,022	383,357	293,421	235,082	298,912	66
Eggs and its products	10,015	8,275	5,567	4,874	8,279	83
Oil seeds and its products	180,572	166,744	178,495	180,374	185,991	1,03 times
Fish and its products	60,587	54,890	49,501	50,655	59,974	98,9

Source: compiled by authors

The balance of exports and imports of key processed products also shows the import dependence of the Republic: condensed milk and cream –74,2%, canned fruits and vegetables – 70,5%, confectionery – 67,4%, cheese and cottage cheese – 58,3%, biscuit – 48,7%, sausages – 44,8%, white sugar – 40,2%, chocolate – 34,2%, butter – 32,8%.

In Kazakhstan, the indicator of food imports on average is 40%, it is well known that if the share of imports of food products exceeds the threshold of 10-15%, it is no longer a Supplement to domestic agriculture, but significantly suppresses it and leads to a narrowing of opportunities for its own development. This is also evidenced by the analysis of indicators of food security of Kazakhstan (Table 3), showing that the country is experiencing

problems with food security, as only six indicators achieved positive values.

To ensure the food security of the country, the priority directions of its development for the long term are proposed:

- formation process of mechanisms and regulators of state support for domestic agricultural producers in the field of investment and innovation activities;
- differentiation of the development of the agro-industrial complex, taking into account the natural-climatic and socio-economic conditions of the population's life (Table 4);
- development of a measures system to finally increase the availability of food for low-income cluster of people.
- availability of benefits to local producers supporting private agricultural business;
- increase the competitiveness of domestically produced goods by improving the product's quality;
- decrease in import dependence of the country.

Table 3. Food security indicators of Kazakhstan

Name of indicator	Standard	Fact (2017)	Deviation (+,-)
The volume of carryover stocks of grain remaining in storage until the next harvest	At least 25% of annual consumption (90 days)	285% or 1026 days	+936 days
Grain production per capita, tons	Not less than 1 ton	1,328	+0,328
Average calorie daily diet, kcal	Not less than 2353	3192	+839
The share of the population whose caloric intake is below the minimum acceptable level,%	Not less than 5	3,6	+1,4
Agriculture share (% of GDP)	Not less than 10	4,7	-5,3
Food imports (as% of consumption)	Not less than 20	31,3	-11,3
Self-sufficiency in the main types of food (in% of physiological needs):			
- milk;		82,1	-1,9
- chicken eggs;		79,8	-4,2
- slaughter meat;	Not less than 84	75,3	-8,7
- vegetables;		129,7	+45,7
- potatoes;		198,2	+114,2
- fruits, berries and grapes.		41,1	-42,9
Growth rates of production volume, ensuring the achievement of the threshold level of food security in 2017 (in % to the previous year):			
- milk;	Not less than 2,0	-1,5	-3,5
- slaughter meat;	Not less than 3,8	0,7	-3,1
- chicken eggs;	Not less than 8,5	1,1	-7,4
Composition of nutrients in consumed foods:			
- proteins, %	10-15	12,5	within the standard
- fats, %	15-30	33,9	-3,9
- carbohydrates, %	55-75	53,7	within the standard

Source: compiled by authors

Table 4. Priorities for the development of agriculture in the regions of Kazakhstan

Region	Crop production	Livestock
Akmola oblast (Akmolinskaya)	Grain production: wheat, barley; oilseeds: rapeseed	Dairy and beef cattle breeding, broiler poultry
Kostanay oblast (Kostanayskaya)	Grain production: wheat (hard and strong), barley; oilseeds: rapeseed and flax seeds	Dairy and beef cattle breeding, pig breeding
Pavlodar oblast (Pavlodarskaya)	Grain production: barley, buckwheat, millet; oilseeds: sunflower	Dairy cattle breeding, horse breeding
North Kazakhstan oblast	Grain production: wheat (hard and strong), barley; oilseeds: rapeseed and flax seeds; potatoes	Dairy cattle breeding, pig breeding

Region	Crop production	Livestock
Aktobe oblast (Aktyubinskaya)	Durum wheat (different areas), barley, feed crops	Beef cattle, sheep breeding
West Kazakhstan oblast	Durum wheat (different areas), barley, feed crops	Beef cattle, sheep breeding
Atyrau oblast (Atyrauskaya)	Vegetables, melons and gourds	Sheep breeding, camel breeding
East Kazakhstan oblast	Feed grain, sunflower seeds, feed crops	Dairy cattle, broiler poultry, sheep breeding
Karagandy oblast	Durum wheat (individual ranges), feed grains, fodder crops	Meat cattle breeding, sheep breeding, horse breeding, broiler poultry farming
Almaty oblast (Almatinskaya)	Feed grain (corn), oilseeds (beans, soybean), safflower, vegetables, sugar beets, fruits and berries	Dairy cattle, broiler poultry, sheep breeding
Zhambyl oblast	Vegetables, melons and gourds	Sheep breeding, dairy cattle breeding
Kyzylorda oblast	Rice, vegetable and melon crops	Sheep breeding, camel breeding
South Kazakhstan oblast	Vegetables and melons, fruits and grapes, cotton	Sheep breeding, dairy cattle breeding

Source: compiled by authors

Analysis of export-import operations indicates the need to develop a coherent import substitution policy. In the nomenclature of import the considerable specific weight is taken by production of animal husbandry. Livestock farming profile, in general, is typical for most European countries. If we take the statistics for the whole region, the share of livestock in total agricultural production is more than 50%, and in some countries, such as Germany, the Netherlands, Denmark and the UK, this figure reaches 80%. Meanwhile, the rapid growth since the early 2000s of meat production in Latin America continues to persist. The leaders of this region are Brazil, Argentina, Uruguay. They maintain leadership in meat supplies to the countries of the Eurasian economic Union.

Since ancient times, livestock farming in Kazakhstan land has its own features that can undoubtedly be attributed to the advantages that will allow this sector to make a significant contribution to the import substitution of the country. At the present stage, all the necessary resources for the development of the meat livestock industry in the country are available: the presence of natural pastures-180 million hectares; the fifth place in the world after China, Australia, the USA, Brazil, suitable for breeding up to 25 million conventional heads (current load-12 million conventional heads); 110 million hectares of pastures were provided with surface and underground waters; 6 million hectares of pastures were watered; the availability of water resources for irrigation an additional 2 million hectares; 50% of the population lives in rural areas and need to work and address social and domestic issues..

According to the Ministry of agriculture in 2017, the slaughter of cattle in live weight in all categories of farms in Kazakhstan amounted to 853,489.6 tons, which is 2.3% higher than in 2012, goats – 345,947.6 tons to 1.3 above, pigs in the period from 2013 have a tendency to a decrease of 2.2%, horses – 226,701.3, increased by 9,0%, camels an increase of 2.3%, there has been a decline in the growth rate of slaughter of stags on 146.9% towards 2016 (Figure 1).

Figure 1. Dynamics of livestock slaughter in live weight in all categories of farms in Kazakhstan

In the structure of slaughter of livestock in live weight in all categories of farms in Kazakhstan in 2017 are dominated by cattle – 54.4%, goats – 22.04%, the lowest weight are marals – 0.003% and camels – 0.801 (Figure 2). That trend has been maintained for more than 6 years. To further research the development process of the livestock industry in the country, the authors: conducted a survey of 371 existing farms engaged in animal husbandry and with slaughter sites of 15.2 thousand operating at the beginning of 2018; visited 21 farms for in-depth interviews with managers and specialists of agricultural formations.

Figure 2. Structure of slaughter of livestock in live weight in all categories of farms in Kazakhstan in 2017

Taking into account the fact that the government of Kazakhstan has set the task of solving the issues of import substitution and increasing the export of meat, the researchers concluded that the development of animal husbandry in Kazakhstan in recent years is characterized by positive trends in production and the number of livestock, but is constrained by a number of key factors:
- concentration of the specific weight of cattle in private households;
- lack and/or low quality characteristics of the food supply;
- low share of breeding cattle in the total population;
- lack of supporting infrastructure facilities of livestock (industrial slaughter points, cattle cemeteries);
- lack of technical and veterinary personnel;
- underdevelopment of the practice of distant-pasturing animal husbandry, the application of standard grazing of livestock and the use of anti-erosion adaptive grass leads to the development of desertification of pasture land near settlements.

Summarizing the above allows us to formulate the following activities for the meat industry development in Kazakhstan, using the experience of foreign countries with developed beef farming, such as Canada, USA, Uruguay and Australia as well:
- Development of a network of farms. The average optimal size of farms should be 100 head, as they are the most cost-effective and more resistant to market changes;
- Increasing the genetic potential of livestock breeds and fodder for intensive technologies;
- Supply on an industrial basis of the cultivation of repair heifers of meat and dairy type;
- Development of a balanced feeding system for animals with maximum use of coarse and succulent feeds;
- The restoration of degraded areas of pasture and creation of highly productive cultivated pastures;
- Use of progressive methods of keeping animals on farms;
- Implementation of a set of veterinary and preventive measures to ensure a high level of animal health;
- Creation of new, reconstruction and modernization of existing facilities for primary processing of cattle;
- Development of a network of mobile slaughterhouses for servicing remote points of livestock production;
- Creation of sites for processing of secondary products of slaughter-technical factories, skins, edible fats, pharmaceutical and perfumery raw materials, melange in the locations of meat-processing plants and workshops of primary processing of cattle.

The implementation of the above measures will partially solve the problem of food security of the country and reduce its import dependence, due to the production of goods with Kazakhstan content. What will contribute to the formation of a national brand, which should represent the country as a state with a unique potential in the field of livestock production.

3. Study case

To analyze the impact of investments in fixed capital in agriculture on the volume of gross agricultural output, we will build a model with a distributed lag (assuming a lag value of three):

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \beta_2 x_{t-2} + \beta_3 x_{t-3}$$

Using the Almon method, we obtain the following model with a distributed lag:

$$y_t = 1374678,93 + 1,10 x_t - 1,36 x_{t-1} + 2,59 x_{t-2} + 12,94 x_{t-3}.$$

Analysis of the model shows that an increase in the volume of investment in the fixed capital of agriculture by 1 million tenge in the current period will lead to an average increase in the volume of gross agricultural output by 1.1 million tenge in the same period. With an increase in investment in the current period by 1 million tenge, the gross output will decrease by 1.36-1.1 = 0.26 million tenge in a year. However, in two years, today's increase in investment will contribute to an increase in the gross output by 1.1-1.36 + 2.59 = 2.33 million tenge, and in three years by 1.1-1.36 + 2.59 + 12.94 = 15.27 million tenge. Calculate the contribution made by each lag:

$$w_0 = \frac{\beta_0}{\beta} = \frac{1,1}{15,27} = 0,072 \quad w_1 = \frac{\beta_1}{\beta} = \frac{-1,36}{15,27} = -0,089$$

$$w_2 = \frac{\beta_2}{\beta} = \frac{2,59}{15,27} = 0,170 \quad w_3 = \frac{\beta_3}{\beta} = \frac{12,94}{15,27} = 0,847$$

The results show that 84.7% of the total growth in gross agricultural output, caused by the growth in investment in fixed assets in this industry, occurs after three years; in two years this growth is 17%, and in the current period it is only 7.2%. At the same time, an increase in the volume of investments will contribute to a decrease in the volume of gross output in a year by 8.9%. The average lag of the model will be equal to:

$$\bar{l} = 0 \cdot 0,072 - 1 \cdot 0,089 + 2 \cdot 0,170 + 3 \cdot 0,847 = 2,79 \text{ (years)}.$$

Thus, the lag of 2.79 years indicates that most of the effect of the increase in the volume of investments in fixed assets in agriculture occurs after two and a half years.

The basis of the mathematical apparatus is a trend model of economic dynamics. Its main objective is to develop the forecast of the process being studied for the coming period of time. This approach assumes that the predicted indicator is formed taking into account a large number of multidirectional influences, which cannot be sorted out, or there is no information about them. In this case, the variation of this index is associated with the course of time, that is manifested in the formation of one-dimensional time.

Currently, the most commonly in the economy polynomial, exponential and S-shaped growth curves are used. To carry out predictive calculations in this paper polynomial form of the curve of growth is selected, which has the following form:

$$\hat{y}_t = a_0 + a_1 t \tag{1}$$

Parameters of polynomial curves are estimated, as a rule, by the method of the least squares, which lead to the system of so-called normal equations for determining the unknown parameters of selected curves.

For the polynomial (2) the system of normal equations has the following form:

$$\begin{cases} a_0 n + a_1 \sum t = \sum y_t \\ a_0 \sum t + a_1 \sum t^2 = \sum y_t t \end{cases} \tag{2}$$

The forecast based on the trend models (of growth curve) contains two elements: point and interval forecasts. The point forecast is a forecast of the only value of predicted index. This value is determined by the substituting into the equation of selected curve the value of time t, corresponding to the period of forecast development: t = n + 1; t = n + 2, *etc*. However, the exact coincidence of the actual data in the future and forecast point estimates is hardly possible. Therefore, point forecasts should be accompanied by bilateral boundaries, i.e.

indicating the range of values in which with a sufficient degree of certainty we can expect the predicted value. The determination of this interval is called interval prediction.

The interval prediction based on trend models is carried out by calculating the confidence interval in which with a certain degree of probability we can expect the actual value of a forecasted economic index. The calculation of confidence intervals in predicting using growth curves is based on the conclusions and formulas of the theory of regression.

However, it should be noted that regardless of the type and method of constructing economic-mathematical model, the problem of the possibility of its application for analysis and forecasting of economic phenomena can be resolved only after the determination of the adequacy of the model, *i.e.* the conformity of a model of researched process or object. The regression equation is always complementary to the linear correlation coefficient r_{yx}. There are different versions of the formula of the linear correlation coefficient, one of them is as follows:

$$r_{yx} = \frac{y\bar{x} - \bar{y} \cdot \bar{x}}{\sigma_x \cdot \sigma_y}$$ (3)

where: x - the dispersion of trait, y - the dispersion of trait.

The linear correlation coefficient is in the range: $-1 \leq r_{yx} \leq 1$. To estimate the quality of the selection of the linear function it is calculated the square of the linear correlation coefficient r_{yx}^2, called the coefficient of determination. It characterizes the proportion of dispersion of a resultant y, explained by regression fact in the total dispersion. Accordingly, the value ($1-r^2$) represents the proportion of dispersion y, caused by the influence of other factors not taken into account in the model.

After the linear regression equation found, both the evaluation of the significance of the equation as a whole and the individual parameters is carried out. The evaluation of the significance of the regression equation as a whole is given by the Fisher Coefficient F-test. At the same time the null hypothesis is advanced that the regression coefficient is zero and, therefore, the factor x does not affect the result y. Comparing the factor and the residual dispersion per degree of freedom, the value of F-test is calculated. As a result of the above mentioned calculation algorithm the models of predictive trends for certain types of food raw materials have been found and showed in the Table 5.

Table 5. Forecast of wheat yield (by example of leading countries in the relevant market)

Calculation index	Country	Trend model equation	Average squared error of estimation	Coefficient of determination., r^2_{yx}	the Fisher coefficient F-test	F-test table	Darbin and Watson, coefficient, d
Crop yield, center/ha	USA	Yt = 22.279 + 1.008 t	1.495	0.498	1.319	5.990	2.959
	Canada	Yt = 15.366 + 1.827 t	1.192	0.867	12.117	5.990	3.030
	Australia	Yt = 8.866 + 2.084 t	1.160	0.901	17.211	5.990	1.582
	Russia	Yt = 11.193 + 1.069 t	1.838	0.843	15.739	5.990	3.808
	Argentina	Yt = 12.188 + 2.298 t	1.369	0.887	14.832	5.990	2.468

Source: compiled and calculated by authors

According to the results of obtained predicted values, we can conclude that the quantitative target of wheat yields in Kazakhstan up to 2030 will be in the range of 22 to 33 kg/hectare (Table 6).

Table 6. Calculation of the predicted values

	The USA	Canada	Australia	Russia	Argentina	midband
2010	29,335	28,154	23,454	18,673	28,272	21,84
range: - lower - upper	26,293 32,376	25,730 30,578	21,094 25,814	14.935 22.412	25,488 31,056	
2015	30,343	29,981	25,538	19,742	30,57	23,28
range: - lower - upper	26,848 33,837	27,196 32,765	22,827 28,249	15.446 24.037	27,371 33,769	
2020	31,351	31,808	27,622	20,810	32,867	24,72
range: - lower - upper	27,451 35,250	28,700 34,915	24,597 30,647	16.017 25.604	29,298 36,437	

	The USA	Canada	Australia	Russia	Argentina	midband
2025	32,359	33,635	29,706	23,879	35,165	30,95
range: - lower - upper	28,021 36,697	30,178 37,091	26,341 33,071	16.547 27.211	31,194 39,136	
2030	33,367	35,461	31,79	27,948	37,463	33,20
range: - lower - upper	28,570 38,164	31,639 39,284	28,069 35,511	21.051 32.844	33,072 41,854	

Source: compiled and calculated by authors

According to the moderately optimistic scenario by the end of the forecast period the questions of ecologically clean food production should be solved. It means that not only large food industries, but also medium and small enterprises will adopt the system of total quality control and ecological safety of food products. The food products, arriving at the local and regional food markets, will have the same safeguards of environmental cleanliness as the food intended for export, that is, all products will correspond to international standards of quality and ecological cleanliness.

The moderately optimistic scenario emphasizes the role of humanization of the food reproduction. The complexity of this process lies in the dual nature of the market production, that is the most evident in the food sector. Food products in the condition of commodity-money relations have both the use-value and the value in the financial term. The natural desire of producers to increase the output volumes of highly profitable products in the food sector is often contrary to the interests of end consumers, who pay exactly for the use-value, that is, when buying food products a consumer is primarily interested in a balanced diet that provides a high physical and intellectual tone of his body. This market contradiction can clearly be seen on the example of confectionery products. As a rule, confectionery production has excess profitability, so producers aggressively advertise their products, using sophisticated methods of psychological pressure on buyers to increase the demand artificially. Powerful transnational corporations have special success in blowing up the excessive demand. However, the use value of the main part of confectionery products is clearly low, moderate positive effect is achieved only when there is limited consumption. Regular consumption of a significant amount of pastry is a factor of health risk as it increases the probability of violation of digestive system and cause severe diseases such as diabetes. In this context, the humanization of the reproduction of food should harmonize the interests of producers and consumers.

Unfortunately, even according to the moderately optimistic scenario, there is no objective reason to forecast perfect harmonization of the interests of producers and final consumers of food products. The process of harmonization is very difficult and very slow. It is appropriate to draw an analogy with the eradication of smoking. The struggle of many years against smoking in developed countries is faced with the powerful lobbying of economic interests of producers of tobacco products. Paradoxically, the allies of the tobacco companies are millions of consumers who do not want to give up the habit. However, it's observed the overall positive trend of gradual decrease in the number of smokers. Naturally, the deep-rooted tradition of malnutrition, including the tendency to eat very abundant, high-calorie food is much harder to overcome than the habit of smoking. It is important to note that high-energy food is quite adequate for workers engaged in intensive manual labor, but in the terms of information society, their share will decrease rapidly. However, the traditional paradigm of abundant nutrition has high inertia, so it will be long and rather difficult to overcome it.

Active process of urbanization in Kazakhstan is a powerful factor in the gradual transition from traditional approaches to food organization to a new paradigm focused on the needs of workers that fulfill intense intellectual labor. It can be predicted the wide spread occurrence of ideas of low calorie, varied diet that excludes the consumption of too spicy and fatty food. The state can initiate the spread of a new paradigm of nutrition, including through a network of public catering, serving officials. The elements of rational organization of food should be promoted within a nationwide campaign to introduce a healthy lifestyle. In the media, the idea of a balanced diet can be more precise by showing examples of a positive effect on health and intellectual activities of the adherents of the new paradigm of nutrition. In general, the moderately optimistic scenario, the reproduction process of humanization of food will be fairly slow, but the general trend of prioritizing the interests of end users is predicted as stable and irreversible. Additional impetus to this trend may provide comprehensive scientific studies of beneficial effects of rational organization of all elements of the regime of healthy eating to increase life expectancy, to improve the physical body tone, and especially to the intellectual ability, high prestige and practical relevance of which do not rise doubt in the conditions of the information economy (Koroleva 2011).

Conclusion

The country's food security is one of the strategic challenges faced by the government in its domestic and foreign policy. There can be no stability in a state that is unable to provide a sufficient level of consumption, there can be no independent foreign policy, the true sovereignty of the country, which depends on the state of the world food market.

Today, most of the main consumer products are imported to Kazakhstan – this situation is dangerous for the country's economy. World experience shows that the development of agriculture of the country ensures its food security. In this way, the problem of reliable food security of the country requires well-thought-out long-term and systemic solutions, the development and implementation of an effective long-term strategy for the development of the agricultural sector of the economy, focused on achieving food security and improving the living standards of the population.

Acknowledgement

References

[1]   Abalkin, L. 2010. *In search of a new strategy: To the goal through the crisis. Looking for a way in a changing world. Russia's interests, its economic security, capital flight and a new chance*. Moscow. 799.

[2]   Altukhov, A. 2016. The new agrarian policy is the basis for ensuring the country's food security. *Bulletin of the Kursk State Agricultural Academy*, 4(13): 2–6.

[3]   Belugin, A. 2017. Global Food Security Index and its application on the example of the CIS countries. *AIC: Economics, Management,* 4(11): 88–93.

[4]   Chebotareva, M. 2012. Food Security in Russia and the World: Essence and Problems. *Young Scientist*, 8(11): 149-151.

[5]   Espolov, T. 2013. Food security: Opportunities and priorities. *Agroalem*, 3(44): 38-39.

[6]   Grebmer, K. 2016. *Global hunger index: Getting to zero hun*ger. International Food Policy Research Institute, and Concern Worldwide. 47.

[7]   Hubert, K. 1975. A Theory on the Economic Effects of Food Aid in Recipient Countries. *Journal of Institutional and Theoretical Economics*, 131(2): 270–286.

[8]   Kaygorodtsev, A. 2016. *Economic and food security of Kazakhstan: Questions of theory, methodology and practice*. Scientific monograph. Ust-Kamenogorsk. 384.

[9]   Koroleva, O.N., Zhigilei, A.M., and Kryazhev O.I. 2011. *Best Available Technologies: Experience and Perspectives*. SPb. 123.

[10]   Nekhoda, E. 2013. Food security and government support for agriculture in the interpretation of the WTO. *Tomsk State University Bulletin*, 377(23): 123–128.

[11]   Reinhard, I. 2012. The use of stunting and wasting as indicators of food insecurity and poverty. Available at: http://www.sas.upenn.edu/~dludden/stunting-wasting.pdf

[12]   Zhanbekova, Z. 2013. The content of food security in the modern economy. *Scientific Journal KazEU Khabarshyssy*, 5(9): 55-68.

*** International Trade Center, https://trademap.org/Product_SelCountry_TS.aspx?nvpm=1%7c398%7c%7c%7c%7cTOTAL%7c%7c%7c2%7c1%7c1%7c3%7c2%7c1%7c1%7c1%7c1

*** Nazarbayev N. 2012. Message of the President of the Republic of Kazakhstan - the leader of the nation N. A. Nazarbayev to the people of Kazakhstan «Kazakhstan – 2050» Strategy». The new political course of the state.

*** Strategic Development Plan of the Republic of Kazakhstan until 2025. Decree of the President of the Republic of Kazakhstan. 2018. Available at: zakon.kz

*** Official website of the Committee on statistics of the Republic of Kazakhstan. Available at: www.stat.gov.kz

An Empirical Study on the Relationships Between Sales Revenue of Oil Company (Rosneft) and Industry Specific and Exogenous Characteristics

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Abstract:

In this paper we investigate the relationships between oil company sales revenue as a primary financial indicator and industry specific and exogenous characteristics, using a data set from 2013 to 2017. In order to achieve this aim we applied multiple regression analysis. Our empirical analysis reveals that index of industrial production, export oil duty, costs of oil production showed a statistically significant positive impact on sales revenues.

Results may be interpreted in the follow way. The positive correlation between sales revenue and costs of oil production may be explained that fact with increasing production output company costs of oil production rise too. The positive impact export oil duties on sales revenue is determined calculation method of payments. Positive coefficient of index of production indicates the nascent recovery of the real sector economy results in the increasing demand in downstream industries. Additionally, the values of future flows sales revenue in 2018-2019 were predicted. To conclude this study suggests to include the mineral extraction tax as explanatory variable that will allow estimate the effects of the tax maneuver.

Keywords: sales revenue; oil company; export

JEL Classification: G17; E37

Introduction

Oil industry plays significant role in Russian economy. According to the Federate State Statistics Service (Rosstat) the contribution of the oil industry to the Russian GDP in 2017 is 9.35%, share of mineral resources in export is 60.37%. There are many macroeconomic factors influencing oil industry development. Sales revenue is a basic indicator of financial analysis, reflecting volume of sold production. Its dynamics and changes predetermine financial sustainability, profitability and market position of the company. The advantage of using sales revenue in analysis is about its universal character, it takes part in calculation different financial ratios.

Therefore, investigation of factors influences this indicator on micro- and micro level may enable researchers to get more accurate empirical results. In terms of macroeconomic instability of Russian economy, the issues of financial sustainability oil companies are very relevant due to export-oriented nature of industry and its large share in GDP. Existing methical approaches give attention to the problems of liquidity, paying capacity, profitability, but they do not take into account exogenous and specific factors affecting development of oil companies. This paper proposes a model by which this gap can be overcome. The aim of our research is to determine correlation between oil company sales revenue (Rosneft) and such factors as oil price, oil production costs, dollar exchange rate, index of industrial production, export oil duty, capital investment (kind of activity - oil production), crude oil supply for processing, crude oil exports.

1. Literature review

There are many macroeconomic factors influencing oil industry development. For instance, Boyer and Filion (2007) assessed the financial determinants of Canadian oil and gas company stock returns and proved

positive relations of returns and crude oil and natural gas prices. Similarly, Dinica and Balea (2014) find positive relation between the evolution of Brent crude oil futures price and the price of the largest private oil company's shares in Romania.

Dayanandan and HanDonker (2011) find that crude oil prices positively and significantly influence the performance of oil and gas firms in terms of accounting measures of performance. Ramírez-Cendrero and Paz (2017) having analyzed the oil fiscal regimes in Brazil and Mexico, concluded that ones can largely explain the productive and investor performance. Russel Smyth, Parrish Kumar Narayan (2018) investigate the effects of oil prices on stock returns. Similarly, Wan and Chung-Wei (2015) determine nonlinear relationship between oil and financial variables and find that shocks in the stressed regime have stronger effects than the shocks in the normal regime. Greti and Guesmi (2014) study interdependence between oil price and stock market index in oil importing countries and exporting countries, using multivariate frequency approach, which allows them distinguish short-run and medium-run dependence. Filobokova, Pesotsky and Grigoreva (2016) offered a non-formalized methodology for identification type of financial situation, based on applying such indicators as net working capital and working capital. Luciano Rodrigues and Lucas Rodrigues (2018) apply a financial ratio analysis and calculate indicators, measuring the liquidity, profitability and debt of the plants. On next step authors classified sample of enterprises according values of financial coefficients. The results revealed high diversity financial positions in the industry and presence four different groups companies.

On the other hand, problems of interdependence sales revenue and derived from it characteristics are considered in traditional financial analysis which proposes different tools for assessment economic performance of organization. For instance, Buşe and Ştefan (2014) have used factorial analysis models in order to determine correlations between market capitalization and such elements as turnover, net profit, granted dividends. Their findings showed a strong direct correlation between market capitalization and turnover, trade rate of return and net profit. According to the analysis of the literature there are a lot of methodical approaches to determine financial position and evaluate probability of financial distress/default.

For example, Tinoco and Wilson (2013) used risk models for prediction financial distress and bankruptcy. Models have been made to explain corporate credit risk and include accounting, market-based and macro-economic data. As a result, authors proved the utility of combining data in financial distress prediction models for listed companies.

Tehrani, Mehragan and Golkani (2012) published an article, in which developed the model to evaluate corporate performance by using financial indicators including: liquidity, activities, leverage, and economic added value as input indices of Data Envelopment Analysis (DEA) model and profitability ratios as output ones. Sheremet, Saifulin and Negashev (2000) developed rating system of financial assessment, which includes next steps:

- collection and analytical processing of the initial information for the estimated period;
- selection the system of indicators used for the rating profitability and business activity;
- calculation of the final indexes;
- ranking of enterprises according resulting estimates.

The key elements under consideration: company profit, changes in the structure of assets and liabilities, accounts receivable, accounts payable.

Doncova and Nikiforova (2004) research the financial state of organization using a comparative analytical balance. Methodology supposes that enterprises are classified according to the degree of risk based on the actual rating of each indicator, expressed in points. These experts emphasize next financial characteristics: the structure of the organization's assets, liquidity, solvency, financial stability, business activity, profitability and the likelihood of bankruptcy. Ignatova and Prokofieva (2013) used rating assessment that enables determine current financial position of firms and identify their place among other participants in accordance with the criteria: financial potential, sustainability, activity, market position. Savitskaya (2010) researched causal relationships economic phenomena and processes by means of factor analysis, operating with amount of profit, break-even sales, financial stability, and unit cost of production. Author compares the actual results of an enterprise with the results of previous years.

Summing up the review of traditional techniques we can conclude next. The most popular basic elements distinguished by researchers are: liquidity, financial stability, profitability, analysis of financial results and probability of bankruptcy. There are common types of comparisons: comparison of "plan-fact", factor analysis, the comparison dynamics the factor and resulting indicators.

Realization of these approaches identified their main disadvantages: the complexity of the calculation procedures, the difficulty in determining the relationship between the examined indicators, the critical values of

the coefficients do not take into account industry specificity and exogenous factors. Thus, the problems of investigation key factors making effects on financial results oil companies become actual and requires appropriate solutions.

However, literature analysis showed that current publications mainly orientate on problems of increasing profitability, solvency and liquidity. So, despite of numerous different approaches there is essential disadvantage of traditional techniques: they do not take into consideration specific and exogenous factors of oil industry, importance of which is determined by high degree of state regulation and development peculiarities oil companies. This study differs because it proposes empiric model which fulfills this gap.

The rest of the paper is organized as follows. Methodology explains the empirical model and data set. Case studies provide empirical results. Conclusion contains recommendations for application and additional research.

2. Methodology

One of most efficient methods of prediction and evaluation correlations between independent variables and dependent ones are multiple regressions. In this research we intend to analyze interdependence between oil company sales revenue and exogenous and specific factors towards oil industry. Rosneft sales revenue is a subject of our empirical analysis. Rosneft is known as the huge oil company with the block of shares held by state. It became the world's largest oil producer in 2013.

Thus, we use next empirical model:

$$RV = F(INV, PRC, EXC, CUS, EXP, COS, SUP, IND, EXP) \tag{1}$$

So, equation (1) can be more specifically written as follows:

$$RV = \beta_0 + \beta_1 INV + \beta_2 PRC + \beta_3 EXC + \beta_4 DUT + \beta_5 EXP + \beta_6 COS + \beta_7 SU + \beta_8 IND + \varepsilon \tag{2}$$

The variable notations are presented in the Table 1.

Table 1. Variable notations of multiple regression

Factor	Symbol	Industry specificity / exogenous characteristic
Sales revenue	RV	Dependent variable
Oil price	PRC	Export-oriented nature of the industry (exogenous)
Dollar exchange rate	EXC	Export-oriented nature of the industry (exogenous)
Export oil duty	DUP	Export-oriented nature of the industry (exogenous)
Crude oil exports	EXP	Export-oriented nature of the industry (exogenous)
Oil production costs	COS	The high risk of the initial stages - oil prospecting and exploration drilling (industry specificity)
Crude oil supply for processing	SUP	Regional unevenness of oil and gas production (industry specificity)
Index of industrial production	IND	Close relations with industrial sectors of the national economy (industry specificity)
Capital investment (kind of activity - oil production)	INV	Large capital intensity of the stages of a single technological process (industry specificity); Complex nature of technological processes, requiring a large number of related and service activities (industry specificity)

Source: own processing

The quarterly data of investments, index of industry production, oil production costs, crude oil supply for processing, crude oil exports were obtained from official site Federal State Statistic Service. Information about export oil duty is presented on official site of Ministry of economic development of the Russian Federation. The data of dollar exchange rate came from the website of Central Bank of the Russian Federation. Data of sales revenue oil company Rosneft are presented on organization official site. The period under review is from 01.01.2013 to 31.12.2017, therefore the consequences of economic crisis 2008-2011 were excluded. Next step was investigation of interrelation between independent indicators themselves and oil company's sales volumes. Results are presented in the table 2 (correlation matrix).

According data of correlation matrix there is close relationships between next variables: oil price and dollar exchange rate (R = -0.99); dollar exchange rate and export oil duty (R=-0.96). In order to minimize the incidence of multicollinearity the step-by-step procedure of selection variables was used.

Table 2. Correlation matrix for variables used in the Table 1

	RV	INV	EXC	PRC	EXP	COS	IND	SUP	DUT
RV	1.00								
INV	-0.12	1.00							
EXC	0.12	0.37	1.00						
PRC	-0.11	-0.40	-0.99	1.00					
EXP	0.16	0.43	0.49	-0.51	1.00				
COS	0.76	0.21	0.51	-0.54	0.39	1.00			
IND	0.50	0.22	0.29	-0.30	0.48	0.36	1.00		
SUP	0.57	-0.26	0.27	-0.26	0.20	0.43	0.60	1.00	
DUT	-0.20	-0.41	-0.96	0.98	-0.56	-0.65	-0.28	-0.22	1.00

Note: correlation is significant at the 0.05 level (2-tailed)
Source: own processing

On the first step we choose COS from all explanatory variables because it has the biggest Pearson correlation coefficient 0.76. On the next step the pair of variables (COS; DUT) was identify as having the most significant impact on sales revenues (R^2 = 0.7306). Calculations results are shown in the Table 3.

Table 3. Calculations results of selection variables on the second step

Collection of variables	Pearson correlation coefficient	R^2	Adjusted R^2
(COS; INV)	0.814595	0.663565	0.623984
(COS; EXC)	0.824009	0.678990	0.641225
(COS; PRC)	0.847626	0.718470	0.685349
(COS; EXP)	0.777896	0.605123	0.558667
(COS; IND)	0.800979	0.641568	0.599399
(COS; SUP)	0.809818	0.655805	0.615312
(COS; CUS)	0.854756	0.730608	0.698915

Source: own processing

On the third step a group of three variables (COS; CUS; IND) having R^2 = 0.8210 seems to be the most appropriate (Table 4).

Table 4. Calculations results of selection variables on the 3rd step

Collection of variables	Pearson correlation coefficient	R^2	Adjusted R^2
(COS; CUS;INV)	0.868198	0.753768	0.707600
(COS; CUS; EXC)	0.885219	0.783613	0.743040
(COS; CUS; PRC)	0.856071	0.732858	0.682768
(COS; CUS; EXP)	0.855034	0.731084	0.680662
(COS; CUS; IND)	0.906099	0.821016	0.787457
(COS; CUS; DUT)	0.887755	0.788109	0.748379

Source: own processing

As adjusted determination coefficient on the third step increased an attempt was made to add the 4th factor to the regression model. But addition a new variable does not improve quality of the model. Therefore, it was decided to limit the three previously selected variables.

3. Case studies

For empirical estimations in our study we applied Ordinary Least Squares (OLS) estimation technique, which had been realized by means of SPSS software. This technique seems appropriate because of nature used data. Table 5 displays the results of our regression analysis with company revenues as the dependent variable and oil production costs, export oil duty, index of industrial production as independent variables.

Table 5. OLS regression results (absolute t-values in parentheses)

Dependent variable:	Sales revenue
Constant	-2,743,408,576.330 (-3.386)*
COS	146,925.331 (7.574)*
CUS	502,596.866 (2.843)*
IND	23042,861.541 (2.706)*
F-test	24.465
R^2	0.821
Adjusted R^2	0.788
Number of observations	20

Note: *Statistically significant at the 0.05 level.
Source: own processing

The F-statistic of 24.465 indicates that the null hypotheses that the regression equation is not statistically significant can be rejected at the 0.05 level of significance. This implies model does capture some relationships between the dependent and independent variables. R^2 = 0.821 indicates that regression equation accounts for 82.1% of the variance of sales revenue.

The ratio of the standard error to the average value of the dependent variable is 8.72%. The standard error is smaller in comparison with the mean values of the dependent variable (less than 10%). It is confirming the significance of the model.

In order to detect the presence of autocorrelation residuals (prediction errors) the Durbin–Watson statistic was applied. We defined lower and upper critical values at significance $\alpha = dl_\alpha = 1$, $du_\alpha = 1.68$. The calculated value d = 1.91. As $d > du_\alpha$ so we can accept the null hypothesis that there is no autocorrelation. All above mentioned confirms high quality of the proposed model. Thus we had identified three main factors affecting on sales revenue oil company.

One of the most surprising findings of this study lies in the absence of oil price or dollar exchange rate among explanatory variables due to weak impact on sales revenue. It is primarily due to the fact that the company actively integrates new assets. Beginning from 2013 to 2017, Rosneft had bought 12 oil companies, which financial indicators are shown together in the consolidated financial statements. Furthermore, it can be partly explained unpredictable changes these variables had been influenced mainly macroeconomic conditions including economic penalties, outflow of capital from the economy.

4. Forecasting oil company sales revenue

The quality of regression model allows its using in the forecasts. To calculate the forecast values oil production costs, index of industrial production, export oil duty the methods of moving average and exponential smoothing were used.

Method of the simple moving average (SMA) represents the unweighted mean of the previous n data. For example, a calculation average COS requires using next equation:

$$\overline{COS}_{SM} = \frac{COS_M + COS_{M-1} + \cdots COS_{M-(n-1)}}{n} = \frac{1}{n} \sum_{i=0}^{n} COS_{M-i} \tag{3}$$

where $\overline{COS}_{SM}$ predicted value of oil production costs, calculating with SMA method; n number of periods.

The simplest form of exponential smoothing for variable COS is given by the formula:

$$COS_{t+1} = \alpha COS_t + (1 - \alpha)COS_{exp} \tag{4}$$

where COS_{t+1} − predicted value of oil production costs, calculating with exponential smoothing method; t − preceding period; $t + 1$ − forecast period; COS_t −actual value oil production costs for preceding period; COS_{exp} − exponentially weighted average for the period preceding the forecast; α − smoothing ratio.

Other variables were calculated in a similar way. Aptitude of these methods and selection the most appropriate were evaluated by comparison average deviation. Sample details are reported in the Table 6.
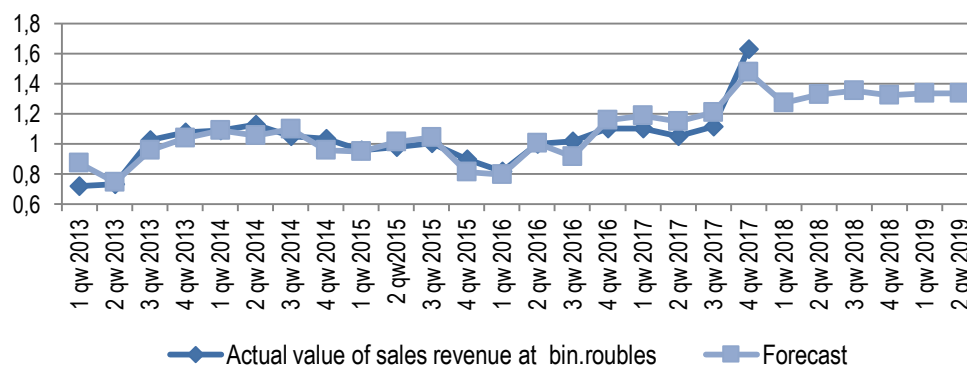
Table 6. Comparative analysis of used forecasting techniques

Costs of oil production						
	SMA		Exponential smoothing			
	2 quarters	3 quarters	α=0.05	α=0.1	α=0.8	α=0.9
Mean absolute deviation	786.544	524.363	693.490	693.570	950.310	1,221.981
Average deviation (%)	8.026	7.868	7.238	7.885	9.689	13.058
Mean-square error	368.433	560.59	748.110	748.190	974.215	1,201.704
Index of industrial production						
	SMA		Exponential smoothing			
	2 quarters	3 quarters	α=0.05	α=0.1	α=0.8	α=0.9
Mean absolute deviation	1.401	1.482	2.720	2.643	2.103	2.038
Average deviation (%)	1.407	1.488	2.730	2.654	2.126	2.065
Mean-square error	1.538	1.774	3.170	3.095	2.563	2.499
Export oil duty						
	Moving averages		Exponential smoothing			
	2 quarters	3 quarters	α=0.05	α=0.1	α=0.8	α=0.9
Mean absolute deviation	22.733	13.166	26.602	27.266	56.985	120.121
Average deviation (%)	19.024	8.371	21.390	21.957	53.106	125.180
Mean-square error	30.685	15.589	36.626	37.305	70.362	134.702

The results indicate that the most appropriate methods of forecasting are: exponential smoothing – for variable oil production costs (α = 0.05), moving averages – index of industrial production (2 quarters) and export oil duty (3 quarters). Next step was calculating necessary forecasting values. Using these findings, we forecasting of company revenue, which demonstrating smooth increase caused by the corresponding dynamics of the regression explanatory factors (Figure 1).

Basic reasons of positive sales revenue dynamic in future are considered to be predictable increasing oil prices, optimization of distribution channels in light of the continuing production constraints under the OPEC agreement, expected decrease in short-term financial liabilities and accordingly extension net cash flows.

Figure 1. Sales revenue forecast

Source: own processing

Conclusions

First of our findings demonstrates a positive correlation between sales revenue and costs of oil production because with increasing sales oil production costs rise too. According financial analysis rules the revenue growth should normally increase at a faster rate than total production costs. It should be pointed out that significant part of the revenue from export sales is denominated in US dollars, but costs are denominated in rubles, thus we observe changeable dynamics (Figure 3) mainly resulting from dollar/ruble exchange rate.

Figure 2. Growth rates of revenues and export oil duty

Source: own processing

Second finding shows significant positive relations between sales revenue and export oil duty. It was predetermined the export duty calculation method. Export oil duties is calculated according to the level of the world oil prices: as the world oil prices increase the sale revenue growing so export oil duties rise too.

One of significant results of this study lies in the positive coefficient of index of production. The nascent recovery of the real sector economy results in the increasing demand in downstream industries mainly from the manufacturing sector accounting for 2/3 of the industrial output. For instance, index of production coke and oil products is 101, 2 % in 2017 compared with index of production crude oil 100.4 % respectively.

So, we can conclude that despite unfavorable conditions Rosneft demonstrates positive dynamics financial indicators. It is results from effective asset-building policy, government support, and the profitability of the business throughout the whole value chain. In our opinion, the encouraging result of the research is interdependence between sales revenues and index of production that reveals inner sources of revival nation economy by the multiplicative effects of industries interaction.

Interpreting our study results we should underline restricts of proposed model.

Firstly, set of analysis variables is determined aims of research. We aim to get estimations of impact industry specific and exogenous characteristics on sales revenues large-scale Russian company. This implies that we do not consider factor relationships between financial indicators as it done in traditional financial analysis.

Secondly, practical value of our study is to be used as background for estimations effects proposed by the government "tax maneuver" involving a gradual zeroing the current value of export oil duty with simultaneous growth of mineral extraction tax (MET). To obtain relevant empirical results the MET variable must be included in the regression model.

Thirdly, researchers can use proposed empirical model along with traditional financial techniques, deepening analysis and increasing quality of management decisions.

References

[1] Boyer, M, and Filion, D. 2007. Common and fundamental factors in stock returns of Canadian oil and gas companies. *Energy Economics*, 29: 428–453. DOI: https://doi.org/10.1016/j.eneco.2005.12.003

[2] Buse, L, and Ştefan, I. 2014. Study on the Correlation between Economic and Financial Performance and Stock Exchange Performance in Romanian Companies from Oil and Retail Trade Industries. *Procedia Economics and Finance*, 16: 149 – 159.

[3] Creti, A, Ftiti, Z, and Guesmi, K. 2014. Oil price and financial markets in the main OPEC countries. *Energy Studies Review*, *Special issue*: 18-35. DOI: https://doi.org/10.15173/esr.v20i3.553

[4] Dayanandan, A, and Han Donker S. 2011. Oil prices and accounting profits of oil and gas companies. *International Review of Financial Analysis*, 20(5): 252-257. DOI: https://doi.org/10.1016/j.irfa.2011.05.004

[5] Dinica, M, and Balea, EC. 2014. International Crude Oil Futures and Romanian Oil Companies: Volatility, Correlations and Causality. *Procedia Economics and Finan*ce,15: 1396-1403.

[6] Doncova, L.V., and Nikiforova, N.A. 2004. *Analysis of Financial Statement*s. Second Edition. Moscow

[7] Filobokova, L., Pesotsky, Y., and Grigoreva, O.V. 2016. Non-formalized methodological approaches in small business financial management. *Polish Journal of Management Studie*s, 13(1): 59-68.

[8] Rodrigues, L.S., and Rodrigues, L.A. 2018. Economic-financial performance of the Brazilian sugarcane energy industry: An empirical evaluation using financial ratio, cluster and discriminant analysis. *Biomass and Bioenergy,* 108: 289-296. DOI: https:// dx.doi.org/10.1016/j.biombioe.2017.11.013

[9] Ignatova, E.A., and Prokofieva, Ya, L. 2013. *Methods of Financial Analysis*. Second Edition. Moscow

[10] Ramírez-Cendrero, J.M, and Paz, J.M. 2017. Oil fiscal regimes and national oil companies: A comparison between Pemex and Petrobras*. Energy Policy*, 101: 473-483. DOI: http://doi.org/10.1016/j.enpol.2016.11.009

[11] Savitskaya, G.V, 2010. *Analysis of the Economic Activity of the Enterprise*. Second Edition. Moscow

[12] Sheremet, A.D, Saifulin, R.S, Negashev E.V. 2000. *Methodology of Financial Analysis*, 3rd Edition. Moscow

[13] Smyth, R., and Narayan, P.K. 2018. What do we know about oil prices and stock returns? *International Review of Financial Analysis*, 57:148-156. DOI: http://doi.org/10.1016/j.irfa.2018.03.010

[14] Tehrani, R., Mehragan, M.R, and Golkani, M.R. 2012. A Model for Evaluating Financial Performance of Companies by Data Envelopment Analysis. *International Business Research*, 5(8): 8-15. DOI: http://doi.org/10.5539/ibr.v5n8p8

[15] Tinoco, M.F., and Wilson, N. 2013. Financial distress and bankruptcy prediction among listed companies using accounting, market and macroeconomic variables. *International Review of Financial Analysis*, 30: 394-419.

[16] Wan, J.Y., and Chung, W.K. 2015. Interactions between oil and financial markets - Do conditions of financial stress matter? *Energy Economics*, 52:160-175. DOI: http://doi.org/ 10.1016/j.eneco.2015.10.003

*** Federate State Statistics Service. The official website. http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/en/main/ (accessed 11.12.18)

*** Central Bank of the Russian Federation. The official website. http://www.cbr.ru (accessed 11.12.18)

*** Ministry of economic development of the Russian Federation. The official website. http://economy.gov.ru (accessed September 6, 2018)

*** Rosneft. The official website. https://www.rosneft.com (accessed 11.12.18)

Transport-Logistics Complex and Transformation of Economy in the Russian Federation

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Abstract:

The article reveals the features of Russian economy transformation from 2004 to 2015 in three directions: spatial, sectorial and institutional. The analysis of transformational processes is carried out by methods of statistical analysis, comparison of shares, index calculations and method of structural groupings. The study identified the impact of structural shifts in the economy on the consumption of transport and logistics services, and determined types of economic activities that specialize in the consumption of transport and logistics resources, as well as changes in the structure of intermediate consumption. Was concluded that consumption of transport, logistics and communications services tend to grow at comparable prices, despite the decreasing volumes of freight and passenger traffic. Active saturation in logistics sector occurs against a background of declining traffic and low value added growth of industry and transport, which can be seen as an inexpediency of a large number of logistics agents functioning.

Keywords transport-logistics; spatial transformation; sectorial transformation; institutional transformation; consumption

JEL Classification: D60; Q00; R49

Introduction

In the economic system of any country, continuous transformational processes occur, caused by both internal and external factors. Dynamics of Russian macroeconomic indicators showed significant transformational processes that have long been taking place in the economy's structure. The intensity and scale of these transformations testifies to the transitional nature of the Russian economy. Certainly, this period should be used for a purposeful modernization of the economy and the formation of a new effective national economic model. An important role in the processes of economy's modernizing and ensuring sustainable development of any country is given to the transport and logistics complex. In the post-industrialization era and the domination of tertiary sector, the role and importance of the transport and logistics complex in the economies of many countries is changing noticeably.

The results of many studies are quite obvious and once again confirmed that there is a strong relationship between logistics development and economic growth (Reza 2013, 120). This work is aimed to studying the structural shifts of these two components, the main task is to reveal the influence of structural shifts in the Russian economy on the need for transport-logistics complex services for understanding the prospects for its development, features and effectiveness of its functioning.

Territorial transport and logistics system – an assembly of transport and logistics elements that ensure the continuous movement of material and intangible flows in space and time between the components of territorial systems, aimed at satisfaction of needs arising in them. Transport and logistics carrying out the most rational and efficient movement of the product, participate in the formation of the total value added. At the same time, the value added of transport and logistics will have vague geographic boundaries, since transport and logistics services are not strictly tied to a specific territory and involve a large number of intermediaries.

The most commonly used indicator of economic growth at the country level is GDP. Economic development causes more demand for logistics services and hence leads to logistics development. The rapid growth of economic inevitably brings the huge demand of logistics. At the same time, in many countries logistics system has been increasingly recognized as one of the important driving forces for economic growth. Numerous studies have found positive correlation between transportation infrastructure investment and economic development, such as: Huang *et al.* (2006, 154), Garcia *et al.* (2008, 12), Sun (2009, 54), Liu (2010, 198), Lean *et al.* (2014, 98), Wang (2010, 396), Chu (2010, 93), Berechman *et al.* (2006, 542).

Even if there has been a link between transport use and economic growth in the past, there is no reason why this link should continue. In addition, GDP is not the only measure available to reflect real changes taking place in the economy (Banister and Stead 2002, 165). Results of some investigations on the contrary point to the

ambiguity in the spread of logistics. According to lifecycle theory, at a certain stage logistics can hinder the whole economy development (Cheng *et al.* 2010, 525). Logistic systems are considered as a factor of competitiveness of territorial systems. Logistics industry development policies have obvious role in promoting economic growth and improving logistics efficiency (Navickas *et al.* 2011, 233, Dou *et al.* 2014, 575). Transport and logistics are two inseparable interrelated and complementary elements of a single complex that function in territorial systems of any rank. Their activities affect absolutely all components of these social systems, involving them in the global transport and logistics turnover as producers and (or) consumers of various flows (Nikolaev 2013, 22).

Elements of the transport complex are networks of various transport's modes, consisting of nodes (point objects) and lines (communication routes), as well as vehicles (rolling stock) of economic entities. Elements of the logistics complex – warehouse and distribution infrastructure, providers of various logistics services, centers and systems of automated information flows processing, *etc.* (Hayaloğlu 2015, 525). Logistics system defined as consistent controlling mechanism in order to promote sustainable economic, social and environmental development (Pivnyak *et al.* 2015, 21). Logistics services comprise physical activities (*e.g.* transport, storage) as well as non-physical activities (*e.g.* supply chain design, selection of contractors, freightage negotiations) (Tseng *et al.* 2005, 1660). The intensive activity of transport and logistics elements leads to the emergence of new forms and objects in territorial and functional organization of transport-logistics systems (Rodrigue 2006, 11). These objects change the spatial interrelationships of territorial systems and transform the spatiotemporal structure of flows within countries and regions.

The transport and logistics industry is a branch with a multiply value added. Product can be handled several times to final consumption in the supply chain. The aim of supply chain management is to reduce costs by improving interaction and communication between all the actors forming the supply chain (Sitek and Wikarek 2012, 1113). Transport and logistics continuously contribute to the total value added, national income and foreign investment (Sezer and Abasiz 2017, 15), which must be taken into account in the spatio-temporal optimization of transport and logistics systems. Reducing transportation costs within ones supply chain can increase costs in subsequent and (or) previous stages of the chain. Transport (and logistics) intensity is inherent in all types of products and services. Structural changes in the economy of territorial systems inevitably affect the transport and logistics complex. Similarly, changes in the transport and logistics complex reflected on the economy's transformation.

1. Methodology

1.1 Data availability

To determine the dynamism and nature of modern transformational processes in economy, as well as to assess the location, role and efficiency of the transport and logistics complex in them, it is possible to use the macroeconomic analysis of the system of national accounts indicators. It is necessary to take into account that the statistical methodology and the statistical indicators' quality have a significant impact on the possibility of evaluation, analysis and comparison. Since 2008, the system of national accounts in Russian Federation has undergone a number of methodological changes, which affected a margin of error in the dynamic analysis. In 2016, the statistical office began to use a new classification of economic activities (ISIC). In this connection, since 2016, the data on the transport and logistics industry have been cleared of the indicators for communication services.

It is important to identify transport and logistics industry with the current economic classifications. The ISIC system does not identify logistics as a separate sector. Shepherd B. proposes to allocate narrow, medium and broad definitions of the range of activities included in logistics (Shepherd 2011). In this paper, a narrow definition is used.

1.2 Data analysis

It is wise to consider transformation processes through the indicators of national accounts (Eq. 1):

$$O = V + I \hspace{6cm} \text{Eq.(1)}$$

where: O – gross output; V – value added; I – intermediate consumption.

Despite the uncertainty about the transport and logistics value added (Shepherd 2011), it is one of the main criteria for the functioning of this industry (Skowron-Grabowska 2014, 125). There is a tendency to view logistics as a process that creates value (Rutner and Langley 2000, 74). There are significant opportunities for creating the added value in the area of logistics (Kilibarda *et al.* 2013, 13). Gross value-added (GVA) measured as the difference between the value of goods and services produced and intermediate consumption, thus representing the new value created in the production process.

The value added volume index shows the change in time of real value added without taking inflation into account (adjusted by the price index):

$$V_t^b = \frac{V_t}{I_p}; \; I_q = \frac{V_t^b}{V_b}$$

Eq. (2)

where: V_t^b – real value added (in current year in basic prices); V_t – nominal value added (in current year in nominal prices); V_b – value added in basic year; I_p – price index (deflator index); I_q – volume index.

In addition, an important indicator of the transformation processes in the economy is the share change of regions or industries in the aggregate indicators of the country:

$$\Delta_d^i = \left(\frac{y_i^t}{\sum_i^n y^t} * 100\% \right) - \left(\frac{y_i^o}{\sum_i^n y^o} * 100\% \right)$$

Eq. (3)

where: Δ_d^i – change in the *i*-th region's (or branches') share in the current period in comparison with the base period; $\sum_i^n y^t$ – the sum of all regions (or branches) in the current period; y_i^o – value of the *i*-th region (or branches) in the base period; $\sum_i^n y^o$ – the sum of all regions (or branches) in the base period.

Comparison of these two indicators allows revealing positive and negative structural shifts of different intensity.

1.3 Input-output tables and intermediate consumption

In this paper, for the analysis of structural shifts in the economy, Input-Output tables (IOTs) were used, that include interbranch balances of production and distribution of output. In this part, the most attention in the analysis is given to the indicator of intermediate consumption. The main objective of logistics defined as the right products in the right place at the right time at the right cost and in the right condition (Kondratjev 2015, 23). Among the main elements by which the effectiveness of the transport and logistics complex should be assessed: economization; timesaving (responsiveness); infrastructure wear; ecologization (sustainability); alternativeness (flexibility and simplicity); safety and quality assurance (Figure 1). One way or another, directly or indirectly many principles of logistics, which must be observed when organizing spatial and functional structure of transport-logistics complex, are reflected in intermediate consumption.

There are some difficulties with determine transport and logistics cost in full. Many authors aggregate expenditures into a measure of total logistics costs, and then to express it relative to GDP (Candemir and Çelebi 2015). Although it is the most common approach, expressing the value of logistics costs is in comparison with GDP may be misleading (Shepherd 2011). It is expediently to focus on logistics costs as a percentage of total costs, which is essentially a measure of intensity through basic input-output data to provide some initial information on sectors. The input-output framework, through the supply and use tables, sets out in more detail the production process and the flows of goods and services (Candemir and Çelebi 2017, 4696).

Logistics intensity is defined simply as the percentage by value of total intermediate input use accounted for by logistics services (Shepherd 2011).

The economization of the transport and logistics complex directly determines the volume of its intermediate consumption. Sectors that are less intensive in their use of intermediate inputs have higher productivity (Baptist and Hepburn 2013, 12). The following elements of logistic costs should be registered separately: personnel costs, space and area costs, route and network costs, costs for logistic equipment; load carrier costs, logistic material costs, logistic IT-costs, taxes, duties and insurance fees, planning and project costs, inventory holding costs (Gudehus and Kotzab 2012, 9).

Figure 1. The basic logic elements of transport complex

Source: Compiled by the author.

The impact on the environment and resource-saving is characterized by indicators of emissions to the environment (for example, greenhouse gases from transport) (Seroka-Stolka 2014, 304, Xiao *et al.* 2015, 9142), as well as intermediate consumption in terms of fuel and energy resources. Reducing pressure on the infrastructure occurs when the existing traffic flows are correctly distributed in space and time, taking into account the competitive characteristics of each transport's mode. As a rule, this is reflected in the reduction of current costs for servicing and amortization of the transport infrastructure, and therefore indirectly on intermediate consumption.

The time-saving can affect the reduction of operating costs, and consequently, intermediate consumption. Accident leads to additional costs for repairs, extra insurance, may lead to cargo damage (or health detriment) and the payment of penalties. Such costs will also fit into intermediate consumption. The flexibility of transport implies the choice of alternative routes and transport's modes of equal value and time. Thus, alternativeness and flexibility allow avoiding not only time loosing, but also unintended costs (*i.e.* intermediate consumption).

Inputs-outputs tables allow:
▪ assess the features of intermediate consumption in the country;
▪ determine the share of transport and logistics services in the consumption structure of the entire economy and individual industries;
▪ identify industries most actively consuming transport and logistics services, as well as features of intermediate consumption in transport-logistics complex.

The share of *i*-th industry in the total intermediate consumption of transport and logistics services (d_i^{tls}) (Eq. 4):

$$d_i^{tls} = \frac{q_i^{tls}}{q^{tls}} * 100\% \qquad\qquad Eq.\ (4)$$

where: q_i^{tls} – intermediate consumption of transport and logistics services in *i*-th industry; q_i^{tls} - intermediate consumption of transport and logistics services in the entire economy.

The share of transport and logistics services in the total intermediate consumption of *i*-th industry $(d_i^{tls\prime})$ (Eq. 5):

$$d_i^{tls\prime} = \frac{q_i^{tls}}{Q_i} * 100\%;$$

Eq. (5)

where: Q_i – total intermediate consumption in *i*-th industry.

Consumption percentage of products and services produced by *i*-th industry in the total intermediate consumption of the transport and logistics complex (d_{tls}^i) (Eq. 6):

$$d_{tls}^i = \frac{q_{tls}^i}{Q_{tls}} * 100\%;$$

E.q (6)

where: q_{tls}^i – transport and logistics complex consumption of products and services produced by *i*-th industry; Q_{tls} – total intermediate consumption in the transport and logistics complex.

Based on the comparison of these indicators, it is possible to identify industries that specialize in the consumption of transport and logistics services, and concentration sectors of intermediate demand for transport-logistics services. In this paper, was calculated analogue of the specialization coefficient (localization coefficient), (k_i^{tls}) (Eq. 7):

$$k_i^{tls} = \frac{d_i^{tls\prime}}{d_E^{tls\prime}};$$

Eq. (7)

where: $d_E^{tls\prime}$ – the share of transport and logistics services in the total intermediate consumption of the economy.

2. Results and discussion

2.1 Transformation processes in the economy (spatial, institutional and sectorial)

Spatial transformation of economy. Analysis of data on real value added from 2004 to 2016, revealed some changes in the spatial structure of the Russian economy. Since 2004, several axes of economic growth have emerged: the western longitudinal and southern latitudinal.

The first stretches from St. Petersburg and the Leningrad region through the Moscow region and along the western border of Russia to the south-western borders (Krasnodar and Stavropol regions, the Republic of Dagestan). The second axis begin in central Black earth belt and reaches the Sverdlovsk region, affecting the Saratov and Penza regions, the republics of Tatarstan and Bashkortostan. Contrary to popular belief, the city of federal significance Moscow during the period under review has significantly lost ground to many other regions of Russia in terms of real value added growth, which affected the reduction of contribution to GVA growth. If for the period from 2002 to 2006 Moscow provided 21.0% of the Russian GVA, then from 2012 to 2016, only 19.5%. Also, the Tyumen region (including autonomous districts), Kemerovo, Samara, Murmansk, Volgograd and Vologda regions, the Komi Republic, have significantly reduced their positions (Table 1).

Table 1. Leading regions in Russian Federation by the growth (or reduction) of GVA* in comparable prices (2004 to 2016)

Place	Region of Russia	I	II	Place	Region of Russia	I	II
1	Saint Petersburg	1.74	0.76	73	Yamalo-Nenets AD	1.36	-0.17
2	Moscow region	1.67	0.60	74	Vologda Region	1.15	-0.19
3	Irkutsk region	1.85	0.43	75	Komi Republic	1.13	-0.20
4	Krasnodar region	1.69	0.40	76	Murmansk region	1.01	-0.21
5	Belgorod region	2.24	0.38	77	Volgograd region	1.14	-0.26
6	Rostov region	1.76	0.36	78	Kemerovo Region	1.10	-0.37
7	Republic of Dagestan	2.38	0.35	79	Samara Region	1.19	-0.43
8	Republic of Tatarstan	1.62	0.32	80	Tyumen region	1.29	-1.11
9	Republic of Bashkortostan	1.66	0.31	81	Khanty-Mansiysk AD	1.17	-1.25
10	Sverdlovsk region	1.59	0.27	82	Moscow	1.36	-1.27

Note: The average volume index of GVA in Russia – 1.45; I – value added volume index in regions of Russia, coef. (2016 to 2004, in comparable prices); II – the change of region's contribution to GVA, pp. (2016 to 2004, in comparable prices). Source: Compiled by the author.

Thus, most regions with a growing contribution to GDP are located in the South, North Caucasus, North-West and Central Federal Districts (Figure 2).

Figure 2. Distribution of Russia's federal districts in terms of GVA

Note: growth from 2004 to 2016. Federal districts: CFD – Central; FEFD – Far Eastern; NCFD – North Caucasian; NWFD – Northwestern; SiFD – Siberian; SoFD – Southern; UFD – Ural; VFD – Volga
Source: Compiled by the author.

In general, it can be noted that concentration processes have intensified in the country: certain centers have continued to increase their dominance and pull together the bulk of the financial and investment flow. The countryside in many parts of the country has lost its economic importance and specialization. In distress many small and medium-sized cities turned out to be "hostages" of mono-specialization. All this is due to the economy's transformation, which was formed in completely different market and political conditions. At the same time, some regions of the country are developing intensively in connection with the exploitation of new mineral deposits, geopolitical and international trade processes.

Spatial transformation of the economic axe leads to a change in the geography of traffic flows and requires optimization of the transport network. New economic centers and emerging "growth points" need an efficient transport and logistics complex that can provide favorable conditions for the production of goods and services that are competitive on external markets. At the same time, the production liquidation or reduction leads to inefficient and under loaded sections emerge of the transport network, which otherwise might not exist or have a different configuration and properties.

Given that the formation and transformation of transport and logistics systems of countries and regions occurs over a long period of time and characterized by high capital intensity, economic agents participating in the processes of territorial division of labor are forced to use the existing elements of the system, even if this is reflected in a decrease in the efficiency of production and services, their implementation and competitiveness. As a result, the transport connectivity of economic objects does not always correlate with the actual cargo flows carried out within the framework of technical-economic, supply-marketing and other connections (Luchnikov and Nikolaev 2017, 216).

Institutional transformation of economy. Substantial transformations and structural shifts in the country's economy occurred in institutional terms – small and medium-sized private business began to play an increasing role. The share of small enterprises in the total gross value added of the country from 2004 to 2015 ranged from 11.9% to 15.1% (Figure 3). The maximum contribution of small entrepreneurship to the production of goods and services fell on the crisis 2008 year, after which the role of this segment in the economy was cardinally reduced. Since 2013, there has been an increase share of small business in the country's value added.

Figure 3. Small businesses' contribution into the Russian GDP, % (2004-2015)

Source: Compiled by the author.

The main imperfection of small business is the impossibility of realizing the scale effect that arises when resources are concentrated (material, information, *etc*.). In this regard, logistics costs for small companies are often much higher, and they have to resort to specific methods of building transport chains, for which a consolidation of several market participants is characteristic. In addition, small business is characterized by high mobility and narrow focus. Given this, increasing contribution of small business to the economy can create favorable conditions for the transport and logistics agent's activities. Since large companies, as a rule, have their own logistics units, their activities can limit the market of commercial logistics. At the same time, the volumes generated and offered for transportation by large-sized businesses are incomparably larger and more concentrated.

Thus, in different situations, two different transport and logistics systems will be formed. Due to the fact that generating potential of small businesses is much weaker, with their significant share in the economy, the flows will be smaller and more numerous. To ensure the conditions for the redistribution of flows on a global scale, it is necessary to use consolidating commodity flows mechanisms and forms. One of them is the agglomeration into a logistics park (or clusters), that positively impacts collaboration and transportation capacity sharing (Rivera *et al.* 2016, 288). On the contrary, with the dominance of large business, the flows will be more voluminous, with the predominance of their deconsolidation processes.

Sectoral transformation of economy. Also, cardinal transformations are observed in the sectoral structure of the country's economy (Figure 4). From 2004 to 2016, the largest increase in gross added value (in comparable prices) was shown by *financial intermediation* (by 5.3 times), the share of which increased from 3.5% to 9.5% (by 5%). Economic entities in the field of operations with *real estate, renting and business activities* and enterprises of sphere of *wholesale and retail trade* also strengthened their positions in the country's economy during this period.

Figure 4. Distribution of economic activities in Russia by changes in the share of GVA (% points) and GVA volume index (%), 2004 to 2016 (in comparable prices)

Note: A – Agriculture, hunting and forestry; B – Fishing; C – Mining and quarrying; D – Manufacturing; E – Electricity, gas and water supply; F – Construction; G – Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods; H – Hotels and restaurants; I – Transport, storage and communications; J – Financial intermediation;

K – Real estate, renting and business activities; L – Public administration and defense; compulsory social security; M – Education; N – Health and social work; O – Other community, social and personal service activities

Source: Compiled by the author.

Industrial economic activities significantly reduced the share in the country's economy, despite a small real increase of value added. Such changes in economy structure are explained by a shift in techno-economic paradigm, post-industrialization of the society and strengthened role of the tertiary and quaternary sectors in the economy. Sectoral economy transformation affects the change in the demand for transport-logistics services and the change in its functional characteristics. With the dominance of industrial production, transport carries out extensive supply-marketing function within the framework of technological relations. With the strengthening of the services and trade sector, distribution transportation is increasing. It is important to note that intra-industry innovation and technological changes aimed at reducing the resource and energy intensity of production lead ultimately to a reduction in traffic volumes also.

To characterize the consumption features in Russian economy, the Inputs-Outputs tables were used, which allow to correlate the volumes and structure of consumption of individual industries with their output and value added (Table 2).

Table 2. Consumption structure of resources produced by the certain economic activities in the Russian economy, % (at current basic prices)

Type of economic activity		2004	2011	2015
A	Agriculture, hunting and forestry	4.79	3.50	3.77
B	Fishing	0.33	0.15	0.15
C	Mining and quarrying	6.64	6.93	6.95
D	Manufacturing	33.17	30.07	29.84
E	Electricity, gas and water supply	4.54	5.16	4.39
F	Construction	5.69	7.13	6.35
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	13.83	12.08	11.36
H	Hotels and restaurants	0.83	0.88	0.92
I	Transport, storage and communications	8.51	7.85	8.38
	among them transport	n/a	6.36	7.10
J	Financial intermediation	2.25	2.62	2.55
K	Real estate, renting and business activities	7.65	11.81	13.03
L	Public administration and defense; compulsory social security	4.71	5.20	5.15
M	Education	1.69	1.72	1.52
N	Health and social work	2.39	2.50	2.66
O	Other community, social and personal service activities	1.62	1.39	1.48
-	Direct purchases abroad, committed by residents	1.36	0.85	1.29

Source: Russian Federal State Statistics Service. Input-Output Tables.

The basis for comparison is 2004, in which Inputs-Outputs tables began to be formed according to the ISIC classifier. In Russian economy from 2004 to 2015 (in current prices), the share of manufacturing in pattern of resources using decreased by 3.3%, trade by 2.5%, agriculture and forestry by 1.0%. Products and services of these economic activities began to be consumed in a smaller volume in relation to other industries. In the consumption structure, the share of services increased significantly, including real estate and rental transactions (by 5.4%). Other activities grew less significantly, including construction, mining, public administration, health, and financial activities.

The share consumption of transport and communication services for this period also declined slightly (from 8.5% to 8.4%), although in 2011 it was significantly lower – to 7.9%. Such instability and multidirectional trends over time reflect the dependence of the transport and logistics complex on the economic situation. Directly on the transport-logistics services (without communication) account for about 7% of all consumption in the economy.

2.2 Transport-logistics industry and economic transformations

The influence of transformation processes in the economy on the transport and logistics complex is presented in the form of a graph (Figure 5). The estimation of the demand for transport and logistics services is possible through the expenditure structure of the entire economy and certain economic activities.

Figure 5. Influence of economic transformations on the transport and logistics complex

The transport and logistics market is faced with problems such as the poor infrastructure of the Russian Federation, a huge geographical extent of the country, lack of investment and growing demand for transport and logistics services (Bogoviz *et al.* 2016, 280).

In Russia, the share of transport and communications services in the structure of used resources (in current buyers' prices) increased from 6.6% in 2004 to 7.4% in 2015 (Table 3). The highest share of expenses directly to transport and logistics services is observed in the sphere of trade (31.5%), mining (19.1%), public administration (14.6%), and in transport, storage and communications (27.7%). At the same time, greatest increment in the share of expenditures for transport and communication services is observed in fishing (by 4.3%), mining (7.9%), transport and communication (16.4%).

Thus, the self-consumption of resources in the transport and communications complex has significantly increased, mainly due to the intensification of the logistics component, which is aimed at processing and redistribution of flows in order to minimize the time of transportation, costs, pressure on the environment and infrastructure. Also, the growing degree of self-consumption is affected by the increasing degree of multimodality and interaction of different transport modes, which should also be seen as logistic process.

Table 3. Share (%) of transport and communication services in the consumption structure of certain economic activities in Russian Federation (in current prices of buyers)

Type of economic activity		2004	2015	
			Total	Transport and storage
A	Agriculture, hunting and forestry	3.6	3.6	3.4
B	Fishing	4.5	8.8	8.4
C	Mining and quarrying	11.4	19.3	19.1
D	Manufacturing	3.7	5.8	5.7
E	Electricity, gas and water supply	1.8	1.0	0.8
F	Construction	6.2	3.5	3.4
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	33.6	33.1	32.3
H	Hotels and restaurants	2.8	1.8	1.5
I	Transport, storage and communications	17.8	34.2	27.7
	among them transport and storage	n/a	32.3	31.5
J	Financial intermediation	1.1	4.8	0.9
K	Real estate, renting and business activities	6.2	3.5	2.2
L	Public administration and defense; compulsory social security	16.3	17.7	14.6
M	Education	3.5	4.6	1.9
N	Health and social work	6.3	3.1	2.2
O	Other community, social and personal service activities	9.4	7.4	3.8
Intermediate demand		9.5	12.0	10.8
Total resources used		6.6	7.4	6.1

The trade sector accounts for more than a quarter of the transport resources consumed. Thus, trade confirms the status of the economic activity most dependent on the transport and logistics complex. Although the dynamics reflect the declining role of trade, which accounted for 23.3% of overall transport and communications services in 2004, and 21.6% in 2015 (a decrease of 1.7%) (Table 4).

Table 4. The share (%) of economic activities in the total consumption of transport and communication services in Russia (in current prices of buyers)

Type of economic activity		2004	2015	
			Total	Transport and storage
Intermediate consumption		59.10	67.0	73.50
A	Agriculture, hunting and forestry	1.12	0.77	0.90
B	Fishing	0.09	0.11	0.13
C	Mining and quarrying	3.96	5.55	6.69
D	Manufacturing	8.75	11.86	14.18
E	Electricity, gas and water supply	0.70	0.40	0.38
F	Construction	2.42	1.43	1.67
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	23.33	21.62	25.66
H	Hotels and restaurants	0.13	0.11	0.11
I	Transport, storage and communications	8.87	18.39	18.08
	among them transport and storage	n/a	15.04	17.85
J	Financial intermediation	0.08	0.51	0.11
K	Real estate, renting and business activities	2.14	1.49	1.14
L	Public administration and defense; compulsory social security	5.56	3.65	3.68
M	Education	0.24	0.17	0.09
N	Health and social work	0.85	0.38	0.32
O	Other community, social and personal service activities	0.86	0.55	0.34
Final consumption		30.76	23.00	15.31
among them households		29.34	21.27	13.66
Export		10.10	10.00	11.20
Total use		100.0	100.0	100.0

Source: Russian Federal State Statistics Service. Input-Output Tables.

At the same time, during the analyzed period, the share of transport and communications in the consumption of its own resources has increased significantly (more than 2 times). Already in 2015 transport and logistics provided almost 18% of consumption of its own services. This again confirms the existence of sustainable processes in consumption resources produced within the complex. These processes are a consequence of the logistics' increasing role and intensive links of economic agents formed when transporting goods and passengers. Such interactions are characterized by multimodality, intermodality and intramodality (Rodrigue *et al*. 2017, 14, Nikolaev 2013, 20).

Also, a large share of transport and logistics services is consumed by manufacturing – more than 14% and mining – 6.7% (in 2015). Industrial enterprises are consistently characterized by a great dependence on the services of the transport and logistics complex (Figure 6), which has only been growing with the years. On the one hand, the share of transport and communication services in the consumption structure of manufacturing and mining industries increases. On the other hand, theirs share in the consumption of transport and communications services is also increasing.

Figure 6. Economic activities distribution by consumption of transport and logistics services (light points – tertiary and quaternary sectors of the economy), 2015:

Share in consumption of transport and logistics services, %

Note: A – Agriculture, hunting and forestry; B – Fishing; C – Mining and quarrying; D – Manufacturing; E – Electricity, gas and water supply; F – Construction; G – Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods; H – Hotels and restaurants; I – Transport, storage and communications; J – Financial intermediation; K – Real estate, renting and business activities; L – Public administration and defense; compulsory social security; M – Education; N – Health and social work; O – Other community, social and personal service activities

Source: Compiled by the author.

Thus, despite the reduction in the manufacturing industry's contribution to the gross value added formation, it significance in the consumption of transport and communication services is only increasing. The specialization coefficients (Eq. 7) by individual industries in Russian Federation confirmed the prevalent importance of transport and communication for such activities as trade (coefficient 4.47), mining and quarrying (2.61), public administration and defense; compulsory social security (2.39), fishing and fish farming (1.19). The highest coefficient of specialization has been identified in the field of transport and communications (4.62) (Figure 7).

Figure 7. Specialization coefficient in the consumption of transport and communication services in 2004 and 2015

Note: A – Agriculture, hunting and forestry; B – Fishing; C – Mining and quarrying; D – Manufacturing; E – Electricity, gas and water supply; F – Construction; G – Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods; H – Hotels and restaurants; I – Transport, storage and communications; J – Financial intermediation; K – Real estate, renting and business activities; L – Public administration and defense; compulsory social security; M – Education; N – Health and social work; O – Other community, social and personal service activities

Source: Compiled by the author.

It is important to understand that this situation does not characterize unambiguous negative processes in the country's transport and logistics system. Growth in the turnover of resources production and consumption within the complex is an objective consequence of logistic, when a different transport's modes interact during the flow carrying and a large number of intermediaries subjects appear (carriers, forwarders, warehouse agents, logistics companies, state corporations, *etc.*). Such activities undoubtedly increase intermediate consumption in the transport and logistics complex, and are not always accompanied by real growth of value added. In the case when the additional internal turnover contributes to the implementation of the basic logistics principles (overall reduction of transportation and production costs, minimization of pressure to environmental and infrastructure, *etc.*), it can be considered justified and rational. Conversely, the useless internal turnover in the transport and logistics complex (without rationalization and optimization) demonstrates the inefficiency and excessive activity of logistics companies that do not bring real benefits to the economy.

The structural analysis of transport-logistics services consumed in Russian Federation from 2011 to 2015 revealed that the share of supporting and auxiliary transport activities increased from 25.0 to 30.6% (Figure 8). At the same time, share of land transport services (including pipelines) decreased. This confirms the growing role of logistics, brokering and warehousing.

Figure 8. The structure of consumed transport services in Russia on the basis of data at current basic prices

Note: internal chart – 2011, external chart – 2015, %
Source: Compiled by the author.

In turn, transport and communication enterprises mainly consume products and services of three economic activities (Table 5). *First*, it is own resources. Self-consumption accounts for almost 35% of total intermediate consumption. If we consider the transport and logistics industry separately, the level of self-consumption reaches 32%. *The second* item of expenditure in the transport and communications sphere is manufacturing resources (vast majority is petrochemicals and machinery). The products and services of manufacturing industries account for more than 27% of total consumption. The third component in terms of costs is real estate, renting and business activities (almost 24%). In this segment, the transport and logistics industry mainly uses rental services for vehicles and commercial (logistics) real estate.

Table 5. The structure of intermediate consumption in the transport and communications complex of Russia (in current consumer prices)

	Type of economic activity	2004	2015	
			Total	Transport and storage
A	Agriculture, hunting and forestry	0.00	0.13	0.14
C	Mining and quarrying	5.78	1.09	1.25
D	Manufacturing	40.82	27.34	29.20
E	Electricity, gas and water supply	9.20	5.37	5.54
F	Construction	4.55	2.23	2.37
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	1.67	1.08	1.19
H	Hotels and restaurants	0.17	0.46	0.50
I	Transport, storage and communications	17.76	34.24	32.30
	among them transport and storage	n/a	27.68	31.52

Type of economic activity		2004	2015	
			Total	Transport and storage
J	Financial intermediation	1.52	3.67	3.86
K	Real estate, renting and business activities	17.75	23.47	22.81
L	Public administration and defense; compulsory social security	0.22	0.43	0.34
M	Education	0.16	0.19	0.20
N	Health and social work	0.14	0.14	0.16
O	Other community, social and personal service activities	0.26	0.17	0.15
Total consumption		100,0	100.0	100.0

Source: Russian Federal State statistics service. Input-output tables.

Thus, the three economic activities in 2015 accounted for 85% of transport and communications intermediate consumption. In 2004, these same activities provided 76% of the consumption. Absolute growth of intermediate consumption in the transport and communications complex in comparable prices from 2004 to 2015 was mainly due to consumption of own resources, that is, internal turnover. The growth of consumption of their own resources was due to a decrease in the share of industrial goods and services.

The increment of intermediate consumption due to self-consumption amounted to 57.9% (Figure 9). The dynamics of the transport and logistics intermediate consumption at comparable prices shows that there is actually no real reduction in the consumption of industry resources. A significant contribution to the intermediate consumption increment was made by the sphere of real estate, renting and business activities (31.9%). Also, the increment of intermediate consumption was observed in the financial sphere and in manufacturing industries.

Figure 9. Increment of intermediate consumption in transport and communications complex by economic activities from 2004 to 2016, in comparable prices (recalculation taking with deflator index), %

Note: A – Agriculture, hunting and forestry; B – Fishing; C – Mining and quarrying; D – Manufacturing; E – Electricity, gas and water supply; F – Construction; G – Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods; H – Hotels and restaurants; I – Transport, storage and communications; J – Financial intermediation; K – Real estate, renting and business activities; L – Public administration and defense; compulsory social security; M – Education; N – Health and social work; O – Other community, social and personal service activities
Source: Compiled by the author.

The dynamics of transported goods and passengers testifies to the useless growth in internal turnover of the transport and logistics complex. During the period under review, there is a tendency in the Russian Federation to reduce the volume of goods transported. If in 2004 by all types of transport 9.0 billion tons of cargo were transported, in 2016 it was only 7.7 billion tons (that is, almost 15% less). At the same time, until 2008 there was an increase in the volume of cargo transportation, which was interrupted by the global economic crisis of 2008-2009. After this crisis, despite the emerging positive trends, the volume of cargo transportation in Russia has not recovered, and since 2013, on the contrary, it has started to decline again (Figure 10).

Figure 10. Dynamics of transportation of goods and passengers in Russia 2004-2016

Source: Compiled by the author.

In the sphere of passenger transportation by public transport, there is a continuous decrease in the number of passengers transported, which is connected with the auto mobilization, the expansion of alternative (not fixed and unregulated) transportation options (vehicle rental, hitchhiking, car sharing, *etc.*), and the declining mobility of the population. If in 2004, 39.1 billion passengers were transported, in 2016 – only 18.7 billion passengers (a reduction of more than 2 times).

Thus, intermediate consumption growth in the transport-logistics sector, caused mainly by an increase in internal turnover, does not correspond to the dynamics of freight and passenger traffic. The growth of the internal turnover in the transport and logistics complex is a consequence of the increasing transport logistic, as well as the translation of the logistics services demand into the transport complex. With the invariance of traffic volumes, effective logistic activity is designed to reduce intermediate consumption both in the whole economy and in the transport-logistics complex. In reality, this does not happen: the volume of transport activity in the country is decreasing, and there is no reduction in intermediate consumption. This indicates the appearance of an additional number of logistics operations that do not bring real "dividends" in the form of cost reductions.

Conclusions

Formation and development of the transport and logistics complex in territorial systems occurs in close relationship with the economy's transformation. Any transformational shifts in the structure of the country's economy will inevitably affect transport flows and the logistics component. In turn, the transport and logistics complex determines the opportunities and intensity of transformational processes in the economy (in terms of spatial, sectorial and institutional changes).

In Russian Federation, the transformation of the economy is quite active in all three directions: changing the economic framework (it is spatially degrading, shrinking and consolidating), sectorial changes (the importance of industry is reduced against the backdrop of the development of the tertiary sector) and institutional transformations (active privatization and small business growth).

The transformation of the Russian economy influences the need for transport and logistics services:
- on the volume of demand (in absolute terms increased fourfold from 2004 to 2015, at comparable prices);
- on the features of transport and logistics services consumption, as well as on the structure of transport's consumption itself.

The activity of the most dependent on transport at present is trade, in which the share of transport services in the consumption structure is greatest. Also, trade accounts for the bulk of the transport output. The great importance of the transport-logistics complex is assigned to industrial activities, especially for mining, quarrying and manufacturing. With a reduction in the industrial's contribution to the total gross value added its share in the structure of transport services consumption increases. Even more noticeable shifts occurred in the part of self-consumption by the transport and logistics complex of its own resources. During the period under review, the

increase in intermediate consumption of transport and communications occurred primarily through the use of own resources.

The transport and logistics complex provided more than half of the total increment in the intermediate consumption of its own resources. The second economic industry, intensively increasing consumption of transport and communications services – real estate, renting and business activities (more than 30% of intermediate demand increment). Specialization coefficient in the consumption of transport and communication services shows that there was a change of the basic consuming industry: in 2004 it was trade, and in 2015 – transport and communications.

The growth of internal turnover in the transport and logistics complex is an objective consequence of the economy's and transports logistic. Thus, the internal turnover of the transport and logistics complex was the driving force of its development, which provided the few positive changes that occurred in it. During this time, the transport and logistics complex of Russia slightly increased its volume of gross value added at comparable prices. The intermediate consumption of transport and logistics has increased at an even more significant rate, which is an indicator of an inefficient system, given the declining volumes of traffic. This characterizes the emergence of a large number of logistics companies whose activities do not bring real "dividends" on a national scale in the form of cost reductions.

Acknowledgements

References

[1] Banister, D., and Stead, D. 2002. Reducing transport intensity. *European Journal of Transport and Infrastructure Research*, 2(3/4): 161-178.

[2] Baptist, S., and Hepburn, C. 2013. Intermediate inputs and economic productivity. *Philos. Trans. R. Soc. A.*, 371(1986): 1-21.

[3] Berechman, J., Ozmen, D., and Ozbay, K. 2006. Empirical analysis of transportation investment and economic development at state, county, and municipality levels. *Transportation*, 33: 537-551.

[4] Bogoviz, A.V., Ragulina, Y.V., Lobova, S.V., Zhukov, B.M., and Stepanova, O.M. 2016. Services infrastructure forming in the process of transport logistics stock movement. *International Review of Management and Marketing*, 6(6): 278-283.

[5] Candemir, Y., Çelebi, D. 2015. Connotations over the importance of logistics chains facing the global economy in transition: Some methodological issues. Paper presented at the *Second World Keynes Conference*, https://www.researchgate.net/profile/Yuecel_Candemir/publication/298402760_CONNOTATIONS_OVER_THE_IMPORTANCE_OF_LOGISTICS_CHAINS_FACING_THE_GLOBAL_ECONOMY_IN_TRANSITION_SOME_METHODOLOGICAL_ISSUES/links/56e9281408aea51e7f3cce28.pdf (accessed December 14, 2018).

[6] Candemir, Y., and Çelebi, D. 2017. An inquiry into the analysis of the transport & logistics sectors' role in economic development. *Transportation Research Procedia*, 25: 4692-4707.

[7] Cheng, G.P., Liu, W., Xie, C.W., and Zhou, J. 2010. The contribution of logistics industry to economic growth based on logis model. Paper presented at *International Conference of Information Science and Management Engineering*, August 7-8, in Xi'an, China.

[8] Chu, Z. 2010. Logistics and economic growth: A panel data approach. *The Annals of Regional Science*, 49: 87-102.

[9] Dou, S., Li, X., Li, X., and Gou, J. 2014. Study on logistics industry development policy of Beijing based on system dynamic. *Journal of Industrial Engineering and Management*, 7(2): 573-587.

[10] Garcia, C., Levy, S., Limão, S., and Kupfer, F. 2008. Correlation between transport intensity and GDP in European regions: A new approach. Paper presented at the *8th Swiss Transport Research Conference*, October 15-17, in Ascona, Switzerland.

[11] Gudehus, T., and Kotzab, H. 2012. *Comprehensive Logistics*. Springer-Verlag GmbH.

[12] Hayaloğlu, P. 2015. The impact of developments in the logistics sector on economic growth: The case of OECD countries. *International Journal of Economics and Financial Issues*, 5(2): 523-530.

[13] Huang, W., Li, W., and Liu, W. 2006. Analysis of the dynamic relation between logistics development and GDP growth in China. Paper presented at *International Conference on Service Operations and Logistics, and Informatics,* June 21-23, in Shanghai, China.

[14] Kilibarda, M.J., Andrejić, M.M., and Popović, V.J. 2013. Creating and measuring logistics value. Paper presented at the *1st Logistics International Conference*, November 28-30, in Belgrade, Serbia.

[15] Kondratjev, J. 2015. *Logistics. Transportation and warehouse in supply chain*. PhD Thesis, Centria University of Applied Sciences.

[16] Lean, H.H., Huang, W., and Hong, J. 2014. Logistics and economic development: Experience from China. *Transp. Policy*, 32: 96-104.

[17] Liu, S. 2010. A research on the relationship of logistics industry development and economic growth of China. *International Business Research*, 2(3): 197-200.

[18] Luchnikov, A.S., and Nikolaev, R.S. 2017. Directions for optimizing of the economic framework as an instrument for regional development. *R-Economy*, 3(4): 213-230.

[19] Navickas, V., Sujeta, L., and Vojtovich, S. 2011. Logistics systems as a factor of country's competitiveness. *Economics and Management*, 16: 231-237.

[20] Nikolaev, R.S. 2013. *Spatial and functional structure of the territorial transport-logistical system of the Perm region*. PhD Thesis, Perm State University.

[21] Pivnyak, G., Bondarenko, V., and Kovalevska, I. 2015. *New Developments in Mining Engineering 2015: Theoretical and Practical Solutions of Mineral Resources Mining*. CRC Press/Balkema.

[22] Reza, M. 2013. The Relationship between logistics and economic development in Indonesia: Analysis of time series data. *Jurnal Teknik Industri*, 15(2): 119-124.

[23] Rivera, L., Sheffi, Y., and Knoppen, D. 2016. Logistics clusters: The impact of further agglomeration, training and firm size on collaboration and value added services. *Int. J. Prod. Econ.*, 179: 285-294.

[24] Rodrigue, J.-P. 2006. Intermodal transportation and integrated transport systems: Spaces, networks and flows. Paper presented at *"Flowpolis: The Form of Nodal Space" conference*, November 2-4, in Las Palmas de Gran Canaria, Spain.

[25] Rodrigue, J.P., Comtois, C., and Slack, B. 2017. *The Geography of Transport Systems*. Routledge.

[26] Rutner, S.M., and Langley, C.J. Jr. 2000. Logistics value: Definition, process and measurement. *The International Journal of Logistics Management*, 11(2): 73-82.

[27] Seroka-Stolka, O. 2014. The development of green logistics for implementation sustainable development strategy in companies. *Procedia – Social and Behavioral Sciences*, 151: 302-309.

[28] Sezer, S., and Abasiz, T. 2017. The impact of logistics industry on economic growth: An application in OECD countries. *Eurasian Journal of Social Sciences*, 5(1): 11-23.

[29] Shepherd, B. 2011. Logistics Costs and Competitiveness: Measurement and Trade Policy. *Munich Personal RePEc Archive*, https://mpra.ub.uni-muenchen.de/38254/1/MPRA_paper_38254.pdf

[30] Sitek, P., and Wikarek, J. 2012. Cost optimization of supply chain with multimodal transport. Paper presented at *Proceedings of the Federated Conference on Computer Science and Information Systems*, September.

[31] Skowron-Grabowska, B. 2014. Value added in a logistics center. *Advanced Logistic Systems*, 4: 123-129.

[32] Sun, Y. 2009. Empirical analysis of Beijing logistics industry's GDP contribution to the national economy. Paper presented at the *First International Workshop on Database Technology and Applications*, April 25-26, in Wuhan, Hubei, China.

[33] Tseng, Y., Yue, W.L., and Taylor, M.A.P. 2005. The role of transportation in logistics chain. *Proceedings of the Eastern Asia Society for Transportation Studies*, 5: 1657-1672.

[34] Wang, A. 2010. Research of logistics and regional economic growth. *iBusiness*, 2: 395-400.

[35] Xiao, F., Hu, Z., Wang, K., and Fu, P. 2015. Spatial distribution of energy consumption and carbon emission of regional logistics. *Sustainability*, 7: 9140-9159.

Eurasian Economic Union: Obstacles and Prospects of Monetary Integration

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Abstract:

The article considers reasons and main trends in monetary policies convergence in five post-soviet countries of the Eurasian Economic Union (EURASEC). The achievement of this goal necessitates the identification of main features at the current integration stage of post-soviet countries, and disclosure of factors that both stimulate and restrict monetary integration. Based on the sociological survey it was analyzed the citizens' approach to the strengthening of integration within EURASEC and introduction of the single currency. It was proved that the negative attitude of citizens has mainly coincided with the dynamics of GDP, industrial production, currency rate and income from export with a one-year lag. Besides this, there were distinguished different periods of financial sector development and monetary policy transformation. Based on the macroeconomic indicators, it was concluded that some initially planned goals in consultations and single terminology had been achieved, there is progress in coordinating monetary and fiscal policies within the EURASEC that is crucial for monetary policies convergence. By using some pillars of optimal currency areas theories, it was identified some basic conditions for EURASEC further integration: targets for inflation are very similar, the single market was created, but still many discrepancies could be easily observed. Also it was proved the necessity to stimulate the countries' activity in increasing national currencies in mutual settlements, introducing the unified requirements to the foreign exchange market participants and reducing the level of dollarization. The three-year performance analysis proves the lack of reasons to introduce the single currency by 2025.

Keywords Eurasian Economic Union (EURASEC); integration; currency; foreign exchange market; dollarization; policy

JEL Classification: F20; F29

Introduction

Some years after the final collapse of the USSR, ex-soviet countries have started to look for integration options, establishing various types of alliances. During almost thirty-year period the focus of integration has been reallocated from developed countries towards closest countries. However, this process tends to be contradictive and ambiguous due to many reasons, some of which are raised in this article.

1. Research background

Many economists have analyzed the necessity of establishing monetary unions, defining factors and conditions, favoring the countries. For the first time the idea of the single currency was introduced in 1961 by Nobel laureate R. Mundell, during his analysis of monetary and fiscal policies under different foreign exchange rates and optimal currency areas. Mundell considers free capital and labor movement as one of the factors of single currency adoption. The result of single currency efficiency could be either positive or negative, and depends on associated transactional costs. Bayoumi (1994) proved the existence of optimal currency areas, as well as the fact that

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relatively small countries gain more advantages, than the monetary union itself. This conclusion was also confirmed by Alekseev (2014, 68-69), who proved that admission of countries with lower development level aggravates the alliance's prospects. Alesina and Barro (2004) justified that countries with significant share of foreign trade, high inflation and stable monetary policy with other parameters, similar to the anchoring country, are more interested in joining the monetary union. Ricci (1997) outlines, that higher efficiency of the monetary policy demands matured fiscal instruments and high capital mobility. McKinnon (1963) agrees higher benefits from monetary union for small countries, adding the openness of the economy. Fleming (1962) insists on close inflation rate for countries within the monetary union.

2. Methodology. Case studies

Besides traditional economic theories application, the sociological surveys' analysis was performed, as well as deduction and deduction ones, especially for the part of comparison fiscal and monetary policies.

Despite attempts to create the independent state in the shortest time period and relying on European and Asian partners, most of the post-soviet countries have admitted the need to maintain economic and political lies. As a result, during this period many international alliances have been created: Commonwealth of Independent States (CIS), Organization of Collective Security Treaty (OCST), Union State of Russia and Belorussia (USRB), Shanghai Cooperation Organization (SCO), Eurasian Economic Community, Customs Union (CU), Single Economic Space (SES) and Eurasian Economic Union (EURASEC) (Table 1).

Table 1. Participation of post-Soviet countries in integration groups

Countries	CIS 1991	OCST 1992	USRB 1997	SCO 2001	EurEC 2001	CU 2010	SES 2012	EURASEC 2015
Azerbaijan	+	-						
Armenia	+	+				+	+	+
Belarus	+	+	+		+	+	+	+
Georgia		-						
Kazakhstan	+	+		+	+	+	+	+
Kyrgyzstan	+	+		+	+	+	+	+
Moldova	+							
Russia	+	+	+	+	+	+	+	+
Tajikistan	+	+			+			
Turkmenistan	-			+				
Uzbekistan	+	-		+				
Ukraine	-							

Note: * Sign «-» is used for those countries that either leave the group or do not ratifications the charter/treaty.

However, during the 1990s and 2000s many timely and reasonable decisions, taken within the integration process, in military and economic spheres seemed to be declarative due to several reasons:
- geopolitical ambitions and expectations;
- strengthening of nationalistic attitudes;
- military operations in some countries;
- mutual distrust among countries' leaders and fear of Russian power;
- actions of developed countries and international organizations;
- accumulation of mutual contradictions and claims, especially in the part related to the former soviet property separation.

On the other hand, stimulating the integration activity trends have been appeared – necessity to ensure the national security, economics´ interdependency, failed expectations of rapprochement with western countries *etc*. The new integration spiral coincided with the crisis of 2008 - 2010, when particular CIS countries, faced with similar economic problems and lack of support from the developed countries, realized the urge of integration in order to return to the path of sustainable development. As a result, the Customs Union of Russia, Belarus and Kazakhstan (CU) was created in 2010, with the objective to guarantee the free movement of goods within the single customs territory, and since 2012 – the Single Economic Space (SES), with the free movement of goods, services, capitals and labor.

In 2011 it was taken one of the most important decisions, related to harmonization of financial markets legislation and increasing of mutual financial services trade among CU and SES. In particular, it was planned to

harmonize the legislation in banking, foreign exchange and stock markets, using the best practices from developed countries (Single economic space establishment). However due to inconsistency and planning faults those decisions were partially adopted.

In May 2014, Belarus, Kazakhstan and Russia, members of CU and SES, signed the agreement on the establishment of the Eurasian economic union that was also signed by Armenia and Kyrgyzstan in October and December 201, respectively. For this period of integration some particular features could have been recognized: inequality in economic development and competitiveness (Krasavina 2015, 380, the similar interest of integration strengthening from Russia and other countries, long-term goals and objectives, economic emphasis and its harmonization, including financial; clear definition of integration steps (Treaty on the Eurasian Economic Union):

- by 2016 — adopt the common terminology, harmonize the consumer protection (financial markets);
- by 2020 — harmonize licensing requirements for financial markets participants;
- by 2023 — harmonize financial markets supervising activities;
- by 2025 – establish a single supervisory authority for banking sector, implement mutual recognition of licenses and another permissive document.

Market economy requires the creation of appropriate institutions, i.e. foreign exchange market. The following periods in EURASEC could be defined:

- *Transitional period* (1991-1998), with the simultaneous increase of financial sector in the economy and changing of the world financial architecture. At this stage there was created the legislation (legal and regulatory requirements) in financial sector, the state monopoly for banking and insurance activities was abolished; national currencies were launched; stock and foreign exchange markets were created; legal and operational requirements for foreign exchange operations were defined; licensing mechanisms for banking and insurance sectors were established, as well as the requirements to financial market subjects; etc. This period was characterized by contractionary monetary policy (limitations for export cash, mandatory export exchange for export earnings, accounts opening for non-residents), control of capital movement and currency exchange rate control.
- *Development period* (1999-2008) – revising of regulatory framework, modifying of financial technologies, liberalization of monetary regulation and control. This stage was accompanied by monetary policy liberalization with the simultaneous control of foreign Exchange rate (abolition of currency ceilings and mandatory sale of export earnings).
- *Crisis and recovery period* (2009-2014), with the simultaneous world financial crisis and strict requirements to the financial and banking sectors either oat international and national levels, change in banking sector regulation, introducing of Islamic finance, tightening of foreign exchange regulation. This period was characterized by anti-crisis monetary policy and introducing more operations, subjects to currency control.
- *Modernization and integration period* (2015-present) – single market and free movement of goods/services, capital and labor, coordinated economic policy (including monetary policy), targeting of inflation rate and free flow of currency exchange rates, integrated exchange rate market, harmonized monetary policy.

Some results are already achieved by introducing single terminology for "legislation for monetary policy", "monetary restrictions", "monetary control authorities", "integrated monetary market" *etc.*; there defined measures for coordinating foreign exchange rates; the following terms are determined: "credit organization", "license", "supply of financial services", "financial service supplier", "financial service sector", "single financial market"; there is established the list of financial services.

One of the objectives for sustainable development for CIS countries is sustainability of their banking sector, expansion of regional trade and investment lies with payment settlement in national currencies that allows to reduce the foreign exchange risk. Since November, 2014 ministers of finance and economics meet together in order to discuss the most important economic issues. Already in December, 2014 the Economic Council announced the decision to prepare the Joint Plan to address the financial and economic issues, according to which there were guaranteed the increased role of national currencies in mutual settlements, equal access of commercial banks and borrowers to the CIS financial markets.

As a positive result establishing the EURASEC is the average increase of mutual trade share from 13,5% to 14,5%; in particular, in Armenia - from 26,3% to 29%, in Belarus – from 49,5% to 52,5%, in Kazakhstan – from 20,8% to 22,4%, in Russia 0 from 8,1% to 8,9%; in Kyrgyzstan this indicator decreased from 44,3% to 38,6% (Krasavina 2014). National currencies have played the specific role for mutual settlements. To achieve that, all
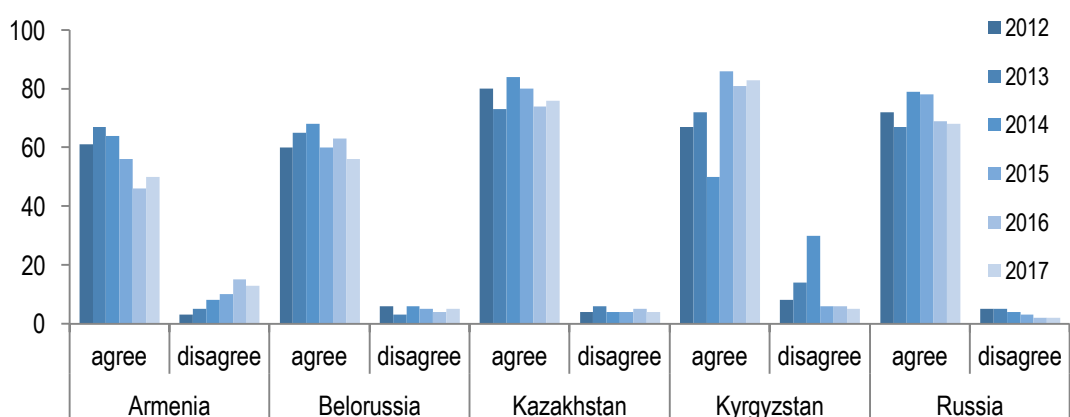
members of EURASEC lowered the dollarization level of their economies (the most significant level this indicator achieved in Armenia – 60%, and in Kazakhstan and Kyrgyzstan – approximately 50%), as it has influenced the confidence towards national currency and limited the authorities' flexibility in monetary policy determination. For example, in Belarus there was two times increase in foreign currency mandatory reserves requirement, whereas in rubles there was a decrease by 3,5% (Annual report of the National Bank of Belarus in 2016).

The approach for providing loans in foreign currency to individuals was also revised: in Kazakhstan it requires to prove a source of income in foreign currency, in Kyrgyzstan providing loans in foreign currency to individuals was abolished. Besides this, in Kazakhstan and Kyrgyzstan it turns illegal to establish prices in conventional currency, and in Kazakhstan all prices for e-commerce should been established in national currency (Annual report of the National Bank of Kazakhstan in 2016). As a result, the share of ruble in mutual settlements with other members of EURASEC reached in 2017 at 75%, whilst the share of dollar decreased up to 19% (shares of other EURASEC currencies was approximately 5%, this insignificant level is explained by weak liquidity and low capitalization of financial markets).

However, even for ruble could face different risks towards its share mutual settlements in 2018 (ruble devaluation). This correlates with the results of sociological survey, conducted by Eurasian Development Bank (more than 11,000 participated in the survey) (9-10), according to which the increase of share of ruble in mutual settlements is restricted by high currency risks (68,3% of respondents) and best business practices (51% of respondents). Moreover, 95% of respondents are expecting new currency crises that is partly confirmed by foreign exchange rate trends: since April, 2010 to April, 2015, the dollar rate grew in Armenia in 1,3 times, in Belarus - in 6,7 times, in Kazakhstan and Russia – more than twice, in Kyrgyzstan – in 1,5 times. The most acute situation was in 2014-2015, when devaluation of ruble and late correction of foreign exchange rates led to problems in mutual trade and decrease in investments.

As a result, the GDP in dollar decreased in 2015-2016. Despite the insignificant increase of GDP in all countries in 2017, the cumulative 3-year decrease since EURASEC establishment was 31% in Belarus, 29% in Kazakhstan, 24% in Russia (Krasavina 2014). Thus led to decrease of individuals' income in dollar equivalent. Besides this, the decline in industrial production (in 2015 – for all countries, except Armenia; in 2016 - in Belarus and Kazakhstan), budget deficit (in all countries, except Belarus) in 2015-2017 resulted in decrease of investments in Armenia, Belarus and Russia. These trends affected the necessity of maintaining the EURASEC that was estimated differently: before 2015 the waste majority of respondents in all countries (except Kyrgyzstan) supported participation in EURASEC; in 2015-2017 this indicator declined (Figure 1).

Figure 1. Results of sociological survey on supporting the EURASEC integration

Source: Social-economic statistics in EURASEC. Available at: www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/econstat/Pages/default.asp

In our perspective, this sharp decline in Kyrgyzstan in 2014 (from 72% to 50%) is partly explained by transfer payments shrinking from labor migrants in Kazakhstan and Russia by 20% and 2% respectively (due to national currencies' devaluation by 18% and 72% respectively). However, the attitude in Kyrgyzstan is the most unstable, showing either increase or decrease, but still with the highest share of alliance supporters among respondents. According to other sociological surveys, conducted by statistical offices in Kyrgyzstan, this trend is confirmed with slightly different results: in 2015 26% of population supported the joining the EURASEC, by the end of 2017 this indicator increased up to 92% (Bayoumi 1994). In our opinion, this result was ensured by facilitating workers' access to the countries within the union (to Russia, in particular), tax exemptions and free medical services.

The lowest level of support (50% in 2017) with the simultaneous highest level of opponents (13%) was noticed in Armenia. Apparently, it was based on deterioration of some economic indicators: dollar GDP decrease by 8% for three years, decline of employment level by 13% and currency reserves by 40% (Krasavina 2014), and limitations in trade with some countries (first of all, with Georgia and Iran). However, firstly, we found hardly possible to resolve all economic issues for such short time period; secondly, these results reflect crisis trends in economy since 2009; thirdly, positive trends need to be mentioned: external turnover and industrial production were increased, inflation was lowered.

Table 2. Correlation trends between export and average salary in EURASEC in 2015-2017

Countries	Foreign exchange rate			Export income			Average salary		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Armenia	Decrease		increase	-	increase		decline	increase	
Belarus	Decrease			Decrease		increase	decrease		increase
Kazakhstan	decrease	increase		Decrease		increase	decrease		increase
Kyrgyzstan	decrease	increase		decrease	increase		increase		decrease
Russia	decrease	increase		Decrease		increase	decrease		increase

Source: Social-economic statistics in EURASEC. Available at: www.eurasiancommission.org/ru/act/integr_i_makroec/ dep_stat/econstat/Pages/default.asp

Meanwhile, it is important to mention the positive correlation between survey data and foreign exchange rate, as well as with export income (with one-year lag) and salary dynamic dollar.

The Treaty of EURASEC defines principles and objectives of monetary policy (5): monetary policy harmonization, regulatory and legal requirements for integration processes in monetary sphere, increase confidence in national currencies, foreign exchange rates coordination, alignment of monetary policy legal requirements.

As a specific objective was mentioned the balanced foreign exchange rates, as direct quotation allows not only increase the share of national currencies under mutual settlements, but also decrease transactional costs. Introducing a single currency seems to be logical to conclude the process of political and economic integration for EURASEC countries, whose experience is based on the European one: in the EU the similar process took approximately 30 years. If we apply the same convergence conditions to the EURASEC countries, we'll conclude that Armenia and Kyrgyzstan do not satisfy them by budget deficit and public debt to GDP ratio, and Belarus, Kazakhstan and Kyrgyzstan – by the level of inflation. However, the state of European economies after the crisis of 2008, increase of debt burden turns the existing convergence conditions insufficient and inadequate (Valovaya 2012).

Initially the idea of single currency was proposed by the President of Belarus, Lukashenko A., in 1990s only for two countries – Belarus and Russia (Why Russia pushes the single currency idea within EURASEC), according to the Single State Treaty two parties on the 1 January, 2015 for introducing a single currency. However, it failed due to disagreement on the location of the issuing center. Secondly, many experts haven't agreed on the necessity of a single currency. Thirdly, unstable economic conditions prevent countries from further integration.

If we apply the optimal currency areas theory, we may find that some conditions are satisfied:
- floating exchange rate is introduced in all countries, except Kyrgyzstan, where is adopted controlled exchange rate;
- close inflation rates, in 2015 the gap was 9,3%, by the beginning of 2018 it was only 3%;
- free movement of capital;
- free movement of labor;
- all countries joined the article VIII of IMF Charter.

However, still exist low level of economics' openness, export diversification, instability of currency income etc. Unlike European countries, whose integration was based on manufacturing (Annual report of Moscow Stock Exchange market 2016), EURASEC countries focus more on financial integration, combining with the following obstacles (Annual report of the National Bank of Belarus in 2016):
- the gap in GDP per capita is more than 8,8 times; consolidated budget income is more than 2 times (18,9% to GDP in Armenia and 42,1% in Belarus);
- differences in banking system development (from 49% to GDP in Kyrgyzstan to 93% to GDP in Russia);
- different regulation of banking and insurance sectors and stock and currency markets (mega-regulation in Armenia, Belarus and Kazakhstan);

- different approaches to monetary policy (targeting of inflation in Armenia, Kazakhstan and Russia; targeting of money aggregates in Belarus and Kyrgyzstan);
- different approaches to fiscal policy (the gap in VAT rates is 8%, for corporate income tax is 10%, for individual income tax is 20%, with progressive rate in Armenia);
- lack of single financial center;
- disagreement between the countries-members on various economic issues.

Some authors focus on discrepancy in low productivity, complex demographic situation, and outdated tangible assets (Alekseev 2014, 68). As a result, the attitude towards single currency is ambiguous. According to the sociological survey, in 2016-2017 less citizens in all countries (except Armenia) supported the idea of single currency. The most significant decrease was observed in Kyrgyzstan and Russia (Figure 2). In Russia it may be explained by fears of economic deterioration due to support of less developed Armenia, Belarus and Kyrgyzstan. Results in Kyrgyzstan were more surprising, as in 2017 the GDP increased by 4,5%, industrial production by 11,5%, export capacity by more than 12%, with the most significant growth for turnover with Belarus – more than 4,8 times. It could be explained with expectation for closer cooperation with Asiatic countries (China, Vietnam *etc*.), decrease of re-export to Belarus, Kazakhstan, Russia and other CIS countries, stricter quality requirements.

Figure 2. Sociological survey results

Conclusion

Despite the mutual efforts of EURASEC members, still there are many obstacles for monetary integration (Table 3), that mostly deal with expectations regarding the Russian influence in the region. For instance, it is explained by ruble volatility in 2018 with its role its share in mutual settlements (75%), share of Russian in EURASEC export (63%) and import (34%).

Table 3. EURASEC monetary integration - analysis

For	Against	Concerns
Political support and coordinating of some aspects of economic policy	Heterogeneous economies' structure and differentiated economic development	Break of economic stability, deteriorating of inflation to unemployment ratio
Single economic an customs space	Lack of liquidity on the financial market	Renouncing national currency
Single market	Absence of single financial market and international financial center	Renouncing national monetary policy
Rapprochement of inflation rates	Different approaches to financial market regulation	Renouncing national fiscal policy
Rapprochement tax rates	Lack of harmonized fiscal and monetary policies	Strengthening of Russia
Increase of mutual trade and share of national currencies in mutual settlements	Foreign exchange risks	Loss of income from issuing activities by central banks
Will to join the monetary union	Lack of clear mechanism for single currency issuing	Future monetary crises

Based on our analysis, we may conclude that the monetary policy coordination is ongoing with the existing lack of economic basis for introducing a single currency. Due to deterioration of international economic environment, many expectations have not been fulfilled. That points out the urgency for defining the periods for monetary integration with simultaneous integration for other economic and industrial sectors that will compensate the partial loss of independency by members of EURASEC and under governmental regulation.

Reference

[1] Alekseev, P.V. 2014. Eurasian economic integration: Theory and methodology. *Economics. Tax. Law*. 2: 66-71.

[2] Alesina A., and Barro R. 2002. Currency Unions. *Quarterly Journal of Economics*, 117(2): 409–436.

[3] Bayoumi, T.A. 1994. Formal Model of Optimum Currency Areas. *IMF Working Paper*. 94/42: 537-554.

[4] Butorina, O.V. 2003. *International currencies: Integration and competition*. M: Business Literature, 368.

[5] Fleming, J.M. 1962. Domestic Financial Policies under Fixed Exchange Rates. *IMF Staff Papers*: 369-379.

[6] Glaziev, S.Yu., Tsushkin, V.I, and Tkachuk, S.P. 2013. *European Union and EURASEC: Similarities and differences in integration process*. Vikor Media.

[7] Golodova, Zh.G., and Ranchinskaya, Yu.S. 2014. Monetary policy in CIS countries: Main problems and trends. *Finance and Credits,* 6: 2–10.

[8] Kotlyarov, N.N., and Alekseev, P.V. 2014. Prospects of Eurasian integration. *Finance and Credits,* 6: 24–30.

[9] Krasavina, L.N. 2014. Renewal of the scientific school of international monetary, credit, financial relations in the context of global challenges. *Money and Credits,* 7: 27–34.

[10] Krasavina, L.N. (2015). The concept of a regional economic and monetary union: a difference from the theory of optimal currency areas. *Money and Credits,* 7: 33–40.

[11] McKinnon, R.I. 1963. Optimum Currency Areas. *American Economic Review*, 53: 717-725.

[12] Ricci, L.A. 1997. A Model of Optimum Currency Area. *IMF Working Paper* 97/76: 41 p.

[13] Valovaya, T.D. 2012. Tested by integration. *Russian newspaper,* 5.

*** Agreement between the Russian Federation and the Republic of Belarus on the introduction of a single monetary unit and the formation of a single emission center of the Union State. Available at: https://www.postkomsg.com/documentation/

*** Annual report of Moscow stock exchange market, 2016. Available at: https://www.moex.com/s1480

*** Annual report of the National Bank of Belarus in 2016. Available at: http://www.nbrb.by/publications/report/report2016.pdf.

*** Annual report of the National Bank of Kazakhstan in 2016. Available at: http://www.nationalbank.kz/cont/%D0%93%D0%9E_16_%D1%80%D1%83%D1%81%D1%81%D1%81%D0%BA.pdf

*** Annual report of the National Bank of Kyrgyzstan in 2016. Available at: http://www.nbkr.kg/DOC/28042018/000000000049847.pdf

*** EDB Integration Barometer – 2015. Article 46. Available at: https://eabr.org/analytics/integration-research/cii-reports/integratsionnyy-barometr-eabr-2015

*** EDB Integration Barometer – 2017. Article 46. Available at: http://russiancouncil.ru/upload/iblock/d71/edb-centre_2017_report-46_edb-integration-barometer_rus.pdf

*** EURASEC in numbers. Available at: http://istmat.info/files/uploads/55983/evraziyskiy_ekonomicheskiy_soyuz_v_cifrah_2017.pdf

*** Reference information of the Ministry of Foreign Affairs of the Republic of Belarus. Available at: http://mfa.gov.by/mulateral/ organization/list/e0e5d8b02b2fd7fc.html.

*** Review: Kyrgyzstan in EURASEC. Available at: http://www.stat.kg/ru/news/po-itogam-2017-goda-vvp-kyrgyzstana-vyros-na-45-procenta/

*** Single economic space establishment. Available at: http://economy.gov.ru/minec/activity/sections/integration/formuep

*** Social-economic statistics in EURASEC. Available at: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/ econstat/Pages/default.asp

*** The final document of the International Economic Forum of the CIS member states "Integration of new opportunities and ways out of the crisis". Available at: http://www.bc-cis.ru/forum/itog-2015

*** The long way to a single currency. Available at: http://eurasiancenter.ru/expert/20151015/1004272315.html

*** Treaty on the Eurasian Economic Union. Available at: http://www.consultant.ru/document/cons_doc_LAW_163855/

*** Treaty on establishment of a union state of Russia and Belarus. Available at: http://www.soyuz.by/about/docs/dogovor5/

*** Why Russia pushes the single currency idea within EURASEC. Available at: https://prodengi.kz/lenta/pochemu_rossiya_ pedaliruet_ideyu_valyutnogo_soyuza_v_eaes

Use of Information Technologies for Analysis of the Development of Intangible Types of Incentives and Motivation at a Commercial Organization

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Abstract:

Based on the analysis of the rotation of the workforce, the level of turnover of the staff was determined. The comparative analysis of modern methods of non-material incentives made it possible to single out the most preferable ones in relation to the medium-sized business enterprise being the object of the study. The main principles of the system of non-material incentives for employees in a commercial organization were considered. The task to improve the system of non-material incentives in a commercial organization was carried out on the example of a concrete enterprise.

Keywords: remuneration; motivation; non-material incentives; personnel management

JEL Classification: L22; O31; O35

Introduction

Under modern conditions, when the automation level of a number of industries reaches values comparable in their specific influence to the social significance of workers with the scientific and technological revolution of the early twentieth century, the increase in the efficiency of labor productivity of workers ceases to depend only on the level of wages, strict external control, the system of material incentives and punishments. An employee engaged directly in production can feel his social importance when he understands the meaning of his activity, represents his role in solving the organizational goals of the enterprise as a whole, and realizes his value. To create the necessary working microclimate, it is necessary to involve in the work with personnel the non-material incentives for employees in addition to the traditional material methods of remuneration and punishment.

If we consider the non-material stimulation as an external motivation that influences the behavior of a person in their workplace, then it is necessary to remembered that for any person, apart from the material component, an important aspect of life is the possibility of self-realization, personal progress and self-affirmation. Stimulation fulfills economic, social and moral functions. The economic function is expressed in the fact that the labor stimulation contributes to the increase in the production efficiency, which manifests in the increase of labor productivity and product quality (Kibanov *et al.* 2010).

The moral function is determined by the fact that incentives to work form an active life position and a highly moral climate in society. It is important to ensure a correct and justified system of incentives taking into account tradition and historical experience. The social function is provided by the formation of the social structure of society through a different income level, which largely depends on the impact of incentives on different people. In addition, the formation of needs and ultimately the development of the personality are predetermined by the formation and stimulation of labor in society.

1. Materials and methods

Stimulus is often characterized as an impact on the employee from the outside (from outside) in order to encourage him to work effectively. The dualism of the stimulus is that, on the one hand, from the point of view of the enterprise

administration, it is an instrument for achieving the goal (increasing in the productivity of workers, the quality of the work performed by them, *etc*.), on the other hand, from the position of the worker, the incentive is the possibility of obtaining additional benefits (positive stimulus) or the possibility of their loss (negative stimulus) (Egorshin 2003).

As indicated in many studies (Armstrong 2004, Kibanov and Durakova 2013, Odegov 2011, Vesnin 2011, Akhmetshin *et al.* 2018) all types of non-material incentives should be divided into three main types: social, moral and creative ones. The reason for this division is the difference in the source of funding for individual types of incentives, the difference in the formation of incentive programs depending on the specifics of the work process, the difference in the distribution of responsibilities and duties of individual branches of government. It should be also noted that there is no universally recognized classification of non-financial rewards, since each company uses its own incentive programs (Solomanidina and Solomanidin 2005, Melnichuk 2012).

The whole essence of forming an effective policy of non-material incentives for employees is to increase their interests to perform the official duties. In this case as Kibanov (2010), and Bazarov and Eremin (2010), emphasis it is important that an employee could have:

- the opportunity to realize his/her knowledge and experience;
- the opportunity to be timely informed about problems and changes (Kibanov and Durakova 2013, Kibanov and Ivanovskaya 2012);
- the opportunity to receive fair and equivalent remuneration for their work (Bazarov and Eremin 2010).

The technology for improving the system of non-material incentives for employees consists of two stages:
- Stage 1 – Diagnostics and assessment of personnel;
- Stage 2 – Development of a system of non-material incentives for staff.

In order to determine the effective strategy for applying methods of non-material incentives for employees of medium-sized businesses enterprises, a study of the existing system of remunerations and incentives based on the example of the commercial organization OOO "Rosmaslo" was conducted.

An analysis of the workforce movement in this commercial organization was carried out for determining the movement of personnel level. The analysis data are presented in Table 1.

Table 1. Analysis of staff turnover in a commercial organization

Indicators	Index	Amount, people		
		2014	2015	2016
Recruited employees, total	A	10	13	12
Employees disposal, total	B	9	12	14
Including those by their own volition	C	9	11	13
Number of employees at the end of the reporting period	D	95	96	94
Employees turnover ratio $K_{об}$ = A/DC$_{об}$ = A/D	$K_{об}$	0.11	0.13	0.13
Turnover disposal ratio $K_{выб}$ = B/DK$_{выб}$ = B/D	$K_{выб}$	0.09	0.13	0.15
Separation ratio $K_{тек}$ = C/DC$_{тек}$ = C/D	$K_{тек}$	0.09	0.11	0.14

Source: Compiled by the authors.

It follows from Table 1 that in 2016 the level of separation ratio in the organization has increased. This is due to an increase in the number of staff layoffs in 2016 compared to 2015. As one of the reasons for the positive dynamics of the number of layoffs, it was suggested to consider an insufficient stimulation of employees. To assess the current state of the employee incentive system at the enterprise being the subject of the study, an analysis of the organization's expenses for material and non-material incentives for employees was conducted, as shown in Table 2.

From Table 2 it can be seen that during the period under study the share of expenses for material incentives for workers of the organization's employees increased from 21.2% to 24.5%, with the negative dynamics of staffing remaining. It should be noted that the share of expenses for non-material incentives for the entire study period was very insignificant and was less than 1% of the total company's expenses ratio.

Table 2. Analysis of the expenses of the organization OOO "Rosmaslo" for material and non-material incentives of employees

Indicators	Year			Deviation			
	2014	2015	2016	2015 versus 2014		2016 versus 2015	
				abs., +/-	rel., %	abs., +/-	rel., %
Average number of employees, persons	95	96	98	1	101	2	102
The total amount of the organization's expenses for the wage fund, total, thousand rubles.	38,450	38,946	39,012	496	101.3	66	100.2
The amount of the organization's expenses for material incentives for employees per year, thousand rubles.	9,875	10,012	9,998	137	101.4	-14	99.9
The amount of the organization's expenses for non-material incentives for employees per year, thousand rubles, including:	948.7	954.2	971.8	5.5	100,6	17.6	101.8
– greetings, organization of holidays	208.4	212.3	198.4	3.9	101.9	-14	93.5
– employee's training	405.6	416.6	444.3	11	102.7	27.7	106.7
– other	334.7	325.3	329.1	-9.4	97.2	3.8	101.2
Ratio of the organization's expenses for material stimulation of work in the total cost fund,%	21,2	23,4	24,5	2,2	110,4	1,1	104,7
Ratio of the organization's expenses for non-material stimulation of work in the total cost fund,%	0,49	0,54	0,62	0,05	110,3	0,08	114,4

Source: Compiled by the authors.

In the course of the research conducted, all employees of the organization were interviewed on the topic "Preferences in the field of intangible incentives". The results of the survey are shown in Figure 1.

As can be seen in Figure 1, the opportunity for career growth traditionally holds a leading position, however, the second factor that influenced the positive attitude of employees towards the work turned out to be an opportunity to speak directly to the event management on the significant problems. Among the leading factors also the possibility of professional growth, i.e. training can be identified. The results of the study served as the basis for drawing up a strategy of incentive measures aimed at reducing staff turnover and improving the overall human resources (Gurieva *et al.* 2016, Akhmetshin *et al.* 2018).

Figure 1. Structure of intangible incentives for employees of OOO "Rosmaslo"

Note: 1 – career growth; 2 – communication channels with management; 3 – professional growth; 4 – work prestige; 5 – respect by others; 6 – other.
Source: Compiled by the authors.

2. Results and discussions

In the course of the research, it was revealed that various intangible needs may become the main motivations to work for employees, in addition to material incentives. On this basis, recommendations were developed to the management of the organization that would allow the creation of an intangible incentive system at the enterprise.

Based on the analysis, a program of measures to increase the effectiveness of non-material incentives was developed, presented in Table 3.

Table 3. Main directions for increasing in effectiveness of intangible incentives in a commercial organization for planned year

Problems	Activities to solve identified problems	Responsible for the preparation and conducting of activities
1. Lack of integrity of the collective and public recognition	▪ Publishing articles on the corporate site	▪ Head of the enterprise ▪ Human Resources Department
	▪ Formation of a honors board of the best employees	▪ Human Resources Department ▪ Head of the enterprise
2. Poor development of the career growth system	▪ Attestation of employees on professional qualities, inclusion in the staff of the company's employees. ▪ Directions - verification of theoretical knowledge, practical skills and fulfillment of individual tasks	▪ Head of the enterprise ▪ Human Resources Department
3. Lack of the direct communication with management	▪ Forming a sheet – entries to the head on personal matters daily from 8 to 9am and from 6 to 7 pm	▪ Head of the enterprise ▪ Head of the Human Resources Department

Source: Compiled by the authors.

In order to develop the career growth system, an annual certification was proposed, which main elements are presented in Table 4.

Table 4. Main elements of the attestation performance appraisal

Items	Content	Comment
List of organizers group	– head; – head of department.	The coordinator is the head.
Venue	– office.	Cozy atmosphere
Objectives of the event	– development of the system of career growth and culture; – evaluation of the level of vocational training.	For a more successful event, it is necessary to develop a Regulation on the attestation performance.
List of participants	Stuff employees: – trade representatives of category A (highest category), B (medium), C (low category); – factors; – stockmen.	List of participants is formed on the proposal.
Evaluators stuff	Head of the department: – master; – chief accountant.	
Procedure	– Solving of the theoretical problems; – Solution of the practical problem; – Combined practical and theoretical tasks; – Individual task.	– Checking the theoretical knowledge of job descriptions, the Labor Code of the Russian Federation, regulatory documents, *etc*.; – Solving of the practical problems.
Results evaluation	- Results assessment will be carried out on a point system.	When summarizing – the inclusion in the staff of employees who gained the most points.

Source: Compiled by the authors.

Conclusions

After the creation of the program of events, a questionnaire was developed. The survey involved 86 employees of the company: management and employees. These were 100% of the total number of the core staff.

As a result of the survey, the following information was received:
- more than 81% of respondents agreed that it is necessary to carry out the developed measures;
- about 96% are sure that the implemented measures should become a tradition for the company;
- more than 75% of the respondents are sure that the activities will contribute to improving the microclimate in the organization, developing career opportunities, and will reduce the staff turnover.

Thus, the results of the survey conducted helped to assess the social effects of planned activities. The developed measures are aimed at maintaining the psychological climate in the team, reducing staff turnover, building solidarity and loyalty of the team, opportunities for career growth as well as establishing relationships between employees, management and subordinates. The majority of the employees of the organization are sure that the events will contribute to improving the microclimate in the organization, reducing conflict, maintaining feedback with the management and, as a result, improving the performance indicators.

References

[1] Akhmetshin, E.M., Brager, D.K., Pokramovich, O.V., Andreyko, M.N., and Aleynikova, M.Yu. 2018. Modern theoretical and methodological approaches to personnel management in manufacturing enterprises. *Espacios*, 39(31): 11.

[2] Akhmetshin, E.M., Sharafutdinov, R.I., Gerasimov, V.O., Dmitrieva, I.S., Puryaev, A.S., Ivanov, E.A., and Miheeva, N.M. (2018). Research of human capital and its potential management on the example of regions of the Russian Federation. *Journal of Entrepreneurship Education*, 21(2): 1528-2651.

[3] Armstrong, M. 2004. *Practice of Human Resources Management*. Peter.

[4] Bazarov, T.Yu., and Eremin, B.L. (Eds.). 2010. *Personnel Management*. Academy.

[5] Egorshin, A.P. 2003. *Motivation of Work*. NIMB.

[6] Gurieva, L.K., Akhmetshin, E.M., Savicheva, A.N., Kataeva, V.I., and Norkina, A.N. 2016. Theoretical foundations of management of the organization: Development, types of structures, management methods of control. *International Business Management*, 10(10): 5406-5416.

[7] Kibanov, A.Ya. 2010. *Personnel Management Organization*. INFRA-M.

[8] Kibanov, A.Ya., and Durakova, I.B. 2013. *Personnel Management of the Organization: Strategy, Marketing, Internationalization*. INFA-M.

[9] Kibanov, A.Ya., and Ivanovskaya, L.V. 2012. *Personnel Management: Theory and Practice. Personnel Policy and Strategy of Personnel Management*. Publishing House Prospect.

[10] Kibanov, A.Ya., Batkayeva, I.A., Mitrofanova, E.A. and Lovcheva, M.V. 2010. *Motivation and Stimulation of Labor Activity*. INFRA-M.

[11] Melnichuk, A.V. 2012. Information and reference work on documents: the foundations of the organization. *Materials of the Afanasiev Readings*, 1(10): 192-197.

[12] Odegov, Yu.G. 2011. *Evaluation of the Work Effectiveness with Personnel, a Methodological Approach*. Alfa-Press.

[13] Solomanidina, T.O., and Solomanidin, V.G. 2005. *Management of Staff Motivation (in Tables, Charts, Tests and Cases)*. OOO «Journal Personnel Management».

[14] Vesnin, V.P. 2011. *Personnel Management. Theory and Practice*. Publishing House Prospect.

Good Corporate Governance Mechanism and Earnings Management: Study on Manufacturing Companies in Indonesia Stock Exchange

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Abstract:

The main objective of this study is to obtain empirical evidence regarding the impact of good corporate governance mechanism (GCG) on the earnings management (EM) of the manufacture companies listed in Indonesia Stock Exchange (IDX) year 2009 - 2012. The samples are collected through purposive sampling method in which, 58 companies are selected as they met the inclusion criteria. This study used Friedlan Model to measure the discretionary accruals (DA). The independent variables in this study are remuneration disclosure (RD), size of board commissioners (SBC), meeting frequency meeting board of commissioners (FMBC), frequency meeting of shareholders (FMS), managerial ownership (MO), and institutional ownership (IO). Multiple regression analysis is used to analyze the data. The results show that simultaneously, the independent variables do not have a significant impact on the EM, when tested separately, the FMS has a positive and significant effect on the EM the manufacturing companies listed in IDX.

Keywords earnings management; good corporate governance mechanism; remuneration disclosure

JEL Classification: G32; M41

Introduction

The increasing number of accounting scandals that occurred in less than two years leads to GCG issues receiving an increasing attention in academic research (Stanwick and Stanwick 2010). Weak corporate governance mechanisms and the lack of transparency are seen as the trigger for the onset of the financial crisis and various accounting scandals in Asia. As a result, the shareholders request and increase in the corporate governance mechanisms (Mohamad and Sulong 2010). Some of the companies involved in accounting scandals, such as Enron, WorldCom, Marconi, Parmalat, and others have dampened investor confidence on the management team and the financial statements (Klai and Omri 2010, Gideon *et al.* 2018). Relevant parties such as Enron, WorldCom, and Merck had allegedly EM. In Indonesia, some cases of EM that have occurred among others such as PT. Kimia Farma Tbk and PT Lippo Tbk, which also involves financial reporting that triggered by manipulation (Ujiyantho and Pramuka 2007).

Indriastuti (2012) explains that EM is an interference management in the financial reporting process with the aim to provide benefits to stakeholders. Gumanti (2001) also points out that EM conducted by the management in the financial reporting process of an organization are due to the fact that they are expecting a benefit or profit from their actions. Phenomena occurred a few years ago that many companies are already doing EM. The manager was given the authority to choose the method of accounting to be applied at the company, as long as the chosen method of accounting is in accordance with Generally Accepted Accounting Principles (GAAP). The various of

accounting methods provide an opportunity for managers to implement EM practices, where the manager will choose accounting methods that benefit him. According to Scott (2015), EM practices will reduce the benefits for investors. Excessive EM will lead to the financial statements, which are not disclosed honestly. When the managers excessive conduct EM, income statements give a biased viewpoint for shareholders, so that they can influence decision-making by shareholders.

Shareholders conduct monitoring of management through GCG. He and Ho (2011) study on corporate governance focuses on two main internal monitoring mechanisms. The first is a contractual mechanism to implement the compensation for the agent to align the interests of owners and agent, and the second is internal monitoring carried out by the director or directly carried out by shareholders. GCG mechanisms associated with company's internal monitoring according to He and Ho (2011) are remuneration, size of board of directors, board of directors meeting frequency, frequency of general meeting of shareholders, directors ownership and institutional ownership. Therefore, the motivation of this study is to use the mechanisms of GCG as independent variables and EM as the dependent variable of research at manufacturing companies listed in IDX period 2009-2012. The lack of effective mechanisms of GCG, in this case on the company's internal monitoring, will further expand the opportunity for managers to do EM practices. EM is done by the selection of appropriate accounting methods that are performed by using GAAP. EM leads to the manipulation of earnings or conflicting with GAAP, such as creating a fictitious transaction income or expenses, is illegal. According to Scott (2015), there are some patterns that lead management to do EM such as income maximization, income minimization, and income smoothing. Selected patterns can vary, depending on changes to contract, level of profitability, or political views.

One of the GCG mechanisms is MO (in this case, the director who is also a part of the management). If directors have an ownership, they could choose method or accounting policies to increase benefit for them. They can be engineered in the financial statements to obscure information obtained by other shareholders. They can cover some of the fraud transactions. In this case the MO is one of the factors that influence the occurrence of EM motives (Htay, Rashid, Adnan, and Meera 2012). Liu (2012) found that block shareholder (showed shareholder by non-affiliated directors) is the governance mechanisms that are not effective in preventing EM. Ujiyantho and Pramuka (2007) found MO has significant and negative effect on the discretionary accruals. Therefore, it is appropriate to use MO as one of the variables in investigating the EM practices.

Size of Board of Commissioners (SBC) is also GCG mechanisms used in this study. SBC is a fundamental internal control mechanism in a company (Honggowati *et al.* 2017). Rahman and Ali (2006) found a significant positive relationship between DA and the SBC. The greater of SBC is ineffective in performing its oversight function. Liu (2012) found EM has a positive relationship to SBC. However, Abed, Al-Attar, and Suwaidan (2011) found SBC has a negative effect on EM. Other GCG mechanism that can affect EM is IO. IO is company shares owned by the institution or agency (Indriastuti 2012). IO is one of the parties that can monitor agent as a portion of its holdings. IO will emerge supervision in improving the company's performance and will lead to an increase in the value of the company itself. High IO has power to control the actions of management. Ujiyantho and Pramuka (2007) found IO has no effect on DA. But the results of their research showed IO, MO, SBC have simultaneously affected on DA.

Remuneration is also a GCG mechanism in motivating managers to perform of EM. One of manager's motives in performing EM is to get bonus, remuneration or incentive. This study also tries to investigate the effect of disclosure of remuneration in the annual report on EM in companies listed on the Stock Exchange. Remuneration can be given as joint stock, stock options, short-term incentives, bonuses, *etc.* (Horak and Dumancic, 2009, He and Ho 2011). Weng, Tseng, Chen, and Hsu (2014) used equity-based compensation and found if managers get higher remuneration then it can increase the occurrence of EM. While the research conducted by Liu (2012) showed that the bonus does not have a significant relationship to EM.

According to He and Ho (2011), if the company made large and expensive changes in monitoring internal, but did not changes interaction and social processes among members of board of directors, a major change will not be able to control the behavior of management and protect interests of shareholders. Interaction and social process can be realized through a meeting board of directors. Therefore, involving meeting frequency of board of directors and general meeting of shareholders in this study is needed to see their effect on earnings management. González and García-Meca (2014) found frequent meeting of board of director shows the involvement of the directors in monitoring activity; they are more involved in terms of increased financial information, in which, it will reduce the occurrence of EM. Previous research related to GCG began in the 1930s that has been emphasizing on how the financial provider for companies to insure themselves gets a return on their investment. Caliskan and Icke (2010) state that according to Denis and McConnell (2003) in 1970 and 1980, many researcher emphases on governance at companies in the United States. In the early 1990s, research related to governance has done in other countries. In the beginning of the study focused on the majority of the world economy, such as in Japan,

Germany and the United Kingdom. Recent research related to corporate governance is being investigated around the world, including in developing countries or markets.

Company focuses on importance of GCG to protect interests of shareholders (Ranti and Stephen, 2011). The shareholders want the highest return on investment. Hopefully with GCG can align interests of shareholders with interests of managers. In Indonesia, EM practices have occurred in the Indonesian capital market. The practice also occurs in companies listed on IDX. In the financial statements of companies, there are found many errors in the presentation. Misstatements in the financial statements can be in form of an error in the assessment of finished goods inventory, fault-recording sales, and also in the process of assessment items were rated higher than need. The effect of misstatements would cause the income statement would be overstated. Widyaningdyah (2001) found leverage has a significant influence on EM, especially external resources, such as debt that is used to finance the company. Lin (2011) suggests that if low MO, management will opportunistic to do of EM, vice versa.

RD is developed by Horak and Dumancic (2009) that analyze remuneration recommendations qualitatively, however, Weng *et al.* (2014) used equity-based compensation, and Liu (2012) used a bonus plan. SBC is developed by Rahman and Ali (2006) and Liu (2012). FMBC and FMS are developed by González and García-Meca (2014) and Al-Najjar (2012). FMS is developed by Caliskan and Icke (2010) that analyze these variables qualitatively. MO is developed by Htay *et al.* (2012) and Liu (2012), and IO is developed by Ujiyantho and Pramuka (2007). Utomo and Bachruddin (2005) found application of EM in financial reporting periods prior to the IPO. This study uses a model by Friedlan (1994) to measure DA, the same model used in the study by Utomo and Bachruddin (2005). The difference is that Utomo and Bachruddin (2005) tested the application of EM at the time and after the initial public offering, which is one and two period of observation after the initial public offering.

Effect of Remuneration Disclosure on Earnings Management

There are three hypotheses in agency theory (Scott 2015). The hypotheses are bonus plan hypothesis, debt covenant hypothesis and political cost hypothesis. In accordance with the bonus plan hypothesis, everyone including the manager wants a high bonus. If remuneration is disclosed and given to managers based on their performance, in this case shown by the company's profit, managers choose accounting policies that increase the reported profit. Weng *et al.* (2014) found that managers with higher remuneration tend to manipulate earnings. In contrast, study by Liu (2012) shows different findings compared to Weng *et al.* (2014), that the bonus plan has no significant effect on EM. Therefore, it is appropriate to believe that there is a significant influence the RD to EM.

Effect of Size of Board of Commissioners on Earnings Management

SBC is also believed to affect the occurrence of EM. SBC is seen from the number of members of the board of commissioners. The number of members of the board of commissioners can determine the effective monitoring process at the company. The more the number of commissioners, the more complex the monitoring process will be. SBC can determine the effectiveness of supervisory functions undertaken by the board of commissioners. Liu (2012) uses SBC as a control variable in his study and uses Jones and modified Jones to calculate DA. Liu (2012) finds that EM has a positive relationship to the proportion of independent commissioners and SBC. Rahman and Ali (2006) also find that there is a significant positive relationship between DA and SBC. These results indicate that the larger board size makes the internal monitoring function less effective.

González and García-Meca (2014) found that SBC created communication and coordination problems that would reduce the monitoring function, and would improve EM. Their research found that SBC positively affected EM. Abed *et al.* (2011) study results show different results with other studies. Their results show that SBC has a negative effect on EM. This means that the larger SBC, the smaller the occurrence of EM. Based on the above explanation, hypothesis formulated: there is a significant influence the sizes of the board of commissioners to EM.

Effect of Frequency Meeting of Board of Commissioner on Earnings Management

There are two internal monitoring mechanisms in GCG (He and Ho 2011). The first mechanism is a contractual mechanism, which uses compensation to adjust shareholder interests to managerial interests. The second mechanism is internal monitoring performed by the board of commissioners or directly conducted by shareholders. The board commissioners have responsibility to exercise oversight of management. Al-Najjar (2012) examines FMBC as one of the activities of the council, including their monitoring role. FMBC can limit management behavior in excessive EM practices. González and García-Meca (2014) mention that frequent meetings indicate greater active role of the board of commissioners in tasks and performing monitoring functions and reduce the occurrence of EM practices. Their research confirms that FMBC affects the occurrence of EM. Based on the above

explanation, the hypothesis is: there is influence between the frequency meetings of board of commissioners on EM.

Effect of Frequency Meeting of Shareholders on Earnings Management

Internal monitoring can be done by the board of commissioners and shareholders (He and Ho 2011). Public meetings are one of the social interaction processes among shareholders of a company to support their supervisory role. With the large number of FMS can enhance the role of shareholder oversight of management, thereby limiting the management's movement in EM. Hemraj (2004) explains that the board of commissioners must perform a continuous supervisory function of the company, and shareholders have failed to carry out its oversight function and cause the audit committee to ensure that management performs their obligations more effectively. Shareholders must play a more active role by utilizing meetings or annual meetings to ensure that the board of directors or management is acting in the best interest of shareholders. This is one form of supervision that shareholders can take. The result of Hemraj (2004) study concludes that shareholders have failed to supervise and this can lead to motivation for EM in the company. Therefore, the hypothesis is: there is a significant influence between the frequencies of general meeting of shareholders to EM.

Effect of Managerial Ownership on Earnings Management

Disclosure of information is important in GCG mechanisms aims at protecting the interests of company shareholders (Htay *et al.* 2012). Disclosure is believed to be able to reduce information asymmetry, which can lead to EM. It can clarify the conflict of interest between shareholders of the company with management and make the company more accountable. If management has ownership in a company, management is the owner of the company itself. This means that management will directly provide instructions and monitor the management. Management who has substantial shareholding amounts will choose accounting policies that may affect profits to be reported for their personal gain. The variable of the director ownership in this study is developed from the study of Htay *et al.* (2012) and Liu (2012). Htay *et al.* (2012) finds that Social and Environmental Information Disclosure relate negatively to MO. That way EM has a positive influence on MO. Liu (2012) uses block shareholder variables as measured by using the ownership of shares owned by unaffiliated directors as the control variables and shows that block shareholders have no effect on EM. Based on the above explanation, our hypothesis is: there is a significant influence of director's ownership to EM.

Effect of Institutional Ownership on Earnings Management

One of the means that can supervise the EM practices is IO (Shaikh, Iqbal, and Shah 2012). IO can limit the behavior of managers. IO is an effective part of monitoring to ensure better management performance in creating value. The supervision of the institute encourages management to focus more on the company's performance, and suppress the manager's opportunistic nature. Ujiyantho and Pramuka (2007) conduct a study using percentage of IO and show that IO has no effect on EM. Therefore, our hypothesis is: there is significant influence of IO to EM.

1. Methods

1.1 Population sample

The population in this study is manufacturing companies listed on the IDX for the period of 2009 - 2012. There are 71 companies listed in manufacturing each year however only 54 companies have the complete data. Therefore, the sample of our study is 216 (54 x 4) annual reports during 2009-2012.

1.2. Variable operational definition

1.2.1 Dependent variable

EM is measured by DA. The method of calculating DA is developed by Friedlan (1994) and has been used in Utomo and Bachruddin (2005). Mathematically the total accruals can be expressed in the equation:

$TAC_{it} = NI_{it} - CFO_{it}$

where: TAC = Total Accruals Company *i* at year *t*; NI$_{it}$ = Net Income Company *i* at year *t*; CFO$_{it}$ = Cash Flows from Operation Company *i* at year *t*,

According to Utomo and Bachruddin (2005), there is a constant proportion between total accruals and sales in successive periods. This causes the total amount of accruals used to determine the magnitude of the

discretionary accruals value is the difference between the total accruals in the period under review which are standardized with sales in the observation period with total accruals in the pre-standard observation period with sales in the prior period prior. Mathematically DAs in each observation period are measured by:

$DAit = (TACit/SALESit) - (TACit-1/SALESit-1)$

where: DAit = Discretionary Accruals Company *i* at year *t*; TACit = Total Accruals Company *i* at year *t*; SALESi = Sales Company *i* at year *t*; TACit-1 = Total Accruals Company i year t-1; SALESit-1 = Sales Company *i* year *t-1*

1.2.2 Independent variable

Remuneration disclosure

RD is developed from the study of He and Ho (2011) and Horak and Dumancic (2009), Weng *et al.* (2014) and Liu (2012) observed the effect of bonus plan on EM. Weng *et al.* (2014) shows that managers with higher remuneration tend to manipulate income. However, Liu (2012) states that bonus plan has no significant effect on EM. In this study, the disclosure of remuneration will be seen from the annual report of companies listed on IDX. Measurement of RD is done by using dummy variable. In this variable, if there is RD in the annual report then the category is 1, and if not then the category 0.

Size of boards commissioner

This variable refers to the study by Horak and Dumancic (2009), which analyze qualitatively and the research conducted by Liu (2012) that uses the SBC a control variable. The measurement used in this variable is the number of members of the board of commissioners.

Frequency meeting of board commissioners

This variable is developed from Al-Najjar (2012) and González and García-Meca (2014) that used board activity. Board activity is measured by FMBC. This variable is measured by number of board meetings held in one year.

Frequency meeting of shareholders

This variable is developed from the study of Caliskan and Icke (2010). This variable also refers to the research by He and Ho (2011), which states that one of the internal monitoring mechanisms is done by shareholders. Other studies that use FMS are those conducted by Hemraj (2004). This variable is measured using the number of shareholder general meetings held in a year.

Management ownership

MO is developed from research conducted by Htay *et al.* (2012) and Liu (2012). In this study, MO is measured by the proportion of shares held by management.

Institutional ownership

This variable is developed from Ujiyantho and Pramuka (2007). This variable is measured using the proportion of shares held by institutional.

1.3 Data analysis

This study examines the effect of GCG mechanisms and internal monitoring on EM manufacturing companies listed on the IDX 2009 - 2012 with the following models:

$DA = \alpha 0 + \alpha 1RD + \alpha 2SBC + \alpha 3FMBC + \alpha 4FMS + \alpha 5MO + \alpha 6IO + e$

where: DA = Discretionary Accrual (Earnings Management), RD = Remuneration Disclosure, SBC = Size of Board of Commissioner, FMBC = Frequency Meeting of Board of Commissioners, MO = Managerial Ownership, IO = Institutional Ownership.

2. Results and discussion

Based on the Table 1, the multiple regression models to EM as following equation:

$DA = -0,743 + 0,601RD + 0,008SBC - 0,002FMBC + 0,190FMS - 0,179MO - 0,112IO$

The results of the test in Table 1 show that RD, SBC, FMBC, FMS, MO and IO have a greater significance value of 0.05. These results indicate that partially RD, SBC, FMBC, MO and IO have no significant effect on EM, whereas the frequency of general meeting of shareholders has a significance of 0.002 less than 0.05. This means that FMS has a significant effect on EM.

Table 1. Result of *t* test

Variable	B	Std. Error	t	Sig.
Constant	-0.743	.620	-1.198	0.232
Remuneration Disclosure	0.601	.596	1.008	0.315
Size of Board of Commissioner	0.008	.018	0.451	0.653
Frequency Meeting of Board of Commissioner	-0.002	.003	-0.685	0.494
Frequency Meeting of Shareholders	0.190	.061	3.103	0.002
Managerial Ownership	-0.179	.732	-0.245	0.807
Institutional Ownership	-0.112	.227	0.492	0.623

2.1. Effect of remuneration on earnings management

As seen in Table 1, the significance of RD is 0.315 indicating that there is no effect of RD on EM. This result is in line with Liu (2012) that also find similar result. However, this finding is differ with those done by Weng *et al.* (2014) that RD has a positive effect on EM. Liu (2012) conducts a study on 138 companies and use Jones Model to calculate the EM and it is found that the bonus plan has no effect on EM. This result is supported by Scott (2015) that points out the three hypothesis of positive accounting theory, namely, bonus plan hypothesis, debt covenant hypothesis and political hypothesis. This shows that the occurrence of EM in the company not only influenced RD and that EM can occur due to other factors beside the RD.

According to the bonus plan hypothesis, by using remuneration, management can maximize shareholders' wealth and create value for them as they increase their performance due to the remuneration. Therefore, it is also used as an excuse by the management to do EM hope to receive the remuneration. Such disclosure may also be aligning with management interests and shareholders. Despite the presence/absence of remuneration disclosure, management may also be doing EM if the company has a high debt to equity ratio. Based on debt covenant hypothesis, management is triggered to choose an accounting policy that can increase profit. Furthermore, according to the political hypothesis, if companies have high political costs, the management will choose accounting policies that reduce earnings. One of the management's objectives of reporting a smaller profit is to avoid the emergence of new rules, such as tax laws. By reporting a smaller profit, the management hopes to avoid a large tax amount. This hypothesis may also be resulting in EM.

One of the reasons of EM is done by the management to avoid risk. Furthermore, EM may be due to management's view that investors prefer stable corporate financial conditions, this is usually done by levelling the earnings that will be reported to the shareholders, in which, the goal is to convince investors and potential investors that the company is in a stable condition. Scott (2015) states income smoothing is the most attractive form of EM. Management does this smoothing profit due to their contract of employment agreement. Managers who are not risk takers do this to maintain their positions. Managers feel that they are dismissed from their positions if the profits they report do not match what the stockholders expect. Especially for the management with a single work contract period, if the manager succeeds in improving performance, then the manager continues to be employed, but if it fails, the employment contract is terminated.

Basically, the conflict of interest between principals and agents always creates problems. The existence of information asymmetry may also lead to accounting fraud. The results of this study indicate that the presence of remuneration within a company has no effect on EM that the management has various motives to do EM.

2.2. The effect of board of commissioners' size on earnings management

Based on the results of hypothesis testing (Table 1), it can be seen that SBC does not have any effect on EM (sig. = 0.653). This result is supported the study conducted by Uzun, Szewczyk, and Varma (2004) in the US in 1978 – 2001 that finds similar findings. Uzun *et al.* (2004) points out that SBC has no effect on the effectiveness of the board's monitoring function to prevent accounting crime in the company. This means that SBC will have no effect on EM.

This result is differing to the study by Rahman and Ali (2006) in Malaysia that show a positive and significant relationship between DA and SBC. González and García-Meca (2014) also find that SBC will create a communication and coordination problem that will decrease monitoring function and increase EM. Their study proves that SBC has a positive effect on EM. However, our results show that there is no effect of SBC on EM that

commissioners are coordinating and implementing their duties and responsibilities to increase company performance. The number of commissioners with their own specialties monitors and controls the management behavior that act in their own interests.

SBC has its own limitations or obstacles in performing supervisory functions on the occurrence of EM in a company. In a company, the board of directors is a solid working team. On the one hand, with the growing number of board of commissioners, each member can share their experience, knowledge and expertise to improve the monitoring function that ultimately can compress EM. Commissioner's board will motivate each other to give the best results for the company. But on the other hand, the large SBC will also create communication constraints between them so as to create problems in carrying out supervisory functions. A less effective supervision function will certainly create an opportunity for the practice of EM within a company.

On the other hand, the small SBC will facilitate mutual coordination between the members. Communication systems between commissioner's board will become easier to implement. But a small number can also create other obstacles. With fewer board sizes there will be limited opportunities for sharing expertise and information between the members. As the number of board member increases, the more members of the board can share information, knowledge and expertise, they also can motivate and mutually monitor each other. If the size of the board of directors is small, then this will also be an obstacle in performing supervisory functions in a company. Fixed earnings management can occur under such condition within a company. The effectiveness of the monitoring function performed by the board of directors may also be caused by the presence of directors who have or occupy important positions in other companies. Directors who have multiple positions or hold too many important positions in another company will have difficulty in focusing in supervising one company. As a result, SBC will not have an influence on the internal monitoring system, if in a company; there are members of the board of directors that have dual positions in other companies. The state of a company with a director that holds duplicate positions in another company will break the concentration of the board of directors in performing their duties and responsibilities.

2.3. The effect of frequency meeting of commissioners board on earnings management

FMBC is a GCG mechanism that is expected to monitor management behavior. Our result shows that FMBC does not have any effect on EM (sig. = 0.494). This result also supports the results of Uzun *et al.* (2004), which in his study found that there is no significant effect of FMBC on EM. But these results differ from those of González and García-Meca (2014) suggesting that more meetings indicate greater involvement of the board of directors in tasks and performing monitoring functions and may reduce the occurrence of EM practices. Their research illustrates that the number of board meetings will negatively affect the occurrence of EM practices. González and García-Meca (2014) conduct a study on non-financial companies listed in Latin America in 2006–2009 and uses Jones Modified Model that has been modified by Dechow, Sloan, and Sweeney (1995) to estimate the accrual components of earnings. The difference in company sector of the sample study may causes the differences in the results yield.

Board meetings are where board members share important information. Board meetings are also a place to coordinate with each other. The research results show that the frequency of meetings of the board of directors has no effect on EM because of other factors. One of them is caused by the number of boards of directors attending the meeting. The frequency of many meetings with the attendance of the entire board members will certainly affect EM. The frequency of frequent or regular meetings held without the presence or active participation of the director to attend the meeting will have no effect on EM.

The board of directors has the responsibility for monitoring to ensure the achievement of value creation for shareholders. Regular meeting which is one of the efforts to exchange ideas between boards of directors is one form of monitoring. This routine meeting is expected to keep the company on its original goal of creating value added for stakeholders. The monitoring function will only be effective with the participation of all boards of directors by being present and actively involved in regular meetings. If routine meetings are attended only by a few or even a small number of board members, the expected supervisory function arising from these meetings will not be achieved.

2.4. The effect of frequency of shareholders meeting on earnings management

Based on the result, FMS has a positive effect on EM (sig. = 0.002). This result is in line with the results of Hemraj (2004). Research conducted by Hemraj (2004) aims to observe the role of directors, shareholders and audit committees. Hemraj (2004) explains that the director must monitor the company effectively sustainably, and that shareholders have failed to carry out its monitoring function in the company and cause the audit committee to ensure that the director performs their duties more effectively. The result of Hemraj (2004) concludes that

shareholders have failed to conduct supervision and this can lead to EM. Shareholders' meeting is a place to communicate and coordinate among shareholders of the company. These meetings should be utilized effectively so they can be an effective monitoring tool for shareholders. Shareholders general meeting is a place for shareholders to play an active role, communicate with each other so that they can influence the actions and direct the management. For shareholders, in this meeting they can voice their rights and interests. The presence of shareholders in the meeting held will certainly play an important role in monitoring and determining the direction of company policy.

At annual general meetings, shareholders will ensure the achievement of their interests. In the general meeting there will be agency issues between the majority and minority shareholders, especially for the majority shareholders and other highly critical shareholders. They will use the opportunity in this meeting as effectively as possible to be able to ensure that their interests are met. There will be many meeting agendas discussed in annual shareholder meetings that will determine the direction of the company. The result of this shareholder meeting will also affect the management policy in carrying out its responsibilities. According to de Jong, Mertens, and Roosenboom (2006) at the general meeting of shareholders, the matters to be discussed include the adoption of annual accounts requiring shareholder approval, profit sharing, issue of shares plan, stock purchase plan, remuneration, appointment and dismissal members of the board of directors, and much more. Shareholders will mandate the board of directors to monitor the management performance. Good or bad supervision by the board of directors may affect the shareholder vote for remuneration or replacement of board members. This shows the importance of shareholders 'participation in shareholders' general meeting.

In a general meeting, all shareholders will be invited. At the annual general meeting, the shareholders are the parties who will approve the contracts to be made within the company and shareholders will elect a board member. Members of this board of directors will be acting on behalf of the shareholders. Members of the board of directors who are deemed to be able to increase the value of the company will be retained, but the director who is considered unable to increase the value of the company will be replaced. One of the agendas discussed in the shareholder general meeting is a bonus or remuneration for the board of directors. Remuneration is one of the feedbacks on management performance appraisal. The agenda of the general meeting of shareholders will discuss either the amount or form of remuneration that will be given. From the data on the agenda of the general meeting of shareholders listed in the company's annual report shows that from 216 annual reports, there are 124 annual reports revealing remuneration for directors in the agenda of general meeting of shareholders or equal to 57.4% of RD in the remuneration agenda for directors. The shareholders' decision on the remuneration policy will certainly have an effect on the management in determining the policies, including the accounting policies they use. The accounting policies employed result in EM.

2.5. Effect of managerial ownership on earnings management

In a company, if the owner as a management company, then this will be able to reduce conflicts of interest. But according to Htay *et al.* (2012), directors who have substantial shareholdings may not disclose their information to outsiders because they can use their discretionary ability to use resources owned by the company for their personal gain. From this study, the result of fifth hypothesis is MO has no effect on EM. This is apparent from the hypothesis test results p = 0.807. This result is not in line with the results of the Htay *et al.* (2012) study which finds Social and Environmental Information Disclosure negatively related to the ownership of directors which means that EM will have a positive influence on MO.

Ownership of shares in a company shows the power to be able to determine the direction of company policy. The greater the amount of stock ownership in the company, the greater the power it has. The smaller the number of stock ownership, the less power it has to participate in determining company policy. Less dominant shareholders have less dominant power over economic decision making such as investment decisions, financial decisions and other economic decisions. In contrast, minority shareholders have little power to influence decision making. The very small MO is almost non-existent is one of the factors causing no significant effect on EM. The relatively small shareholding of the director shows the director's weakness. In addition, small MO also causes them not to cover transactions in order to gain a share of their ownership. They lack the motivation to undertake or adopt policies that can make bias financial statements presented. As a result, MO has no effect on EM.

2.6. Effect of institutional ownership on earnings management

The last result showed IO has no effect on EM. This is apparent from the results of the hypothesis test p = 0.623. This result is in line with Ujiyantho and Pramuka (2007) research which found that IO has no effect on EM. These results also support the results of Uzun, Szewczyk, and Varma (2004) which also stated that IO has no effect on

EM. This result shows that IO is not effective in monitoring the behavior of management who want to take advantage of the company. IO with large number of shares they have should be able to control the direction of company policy. The higher number of institutional shareholders, the better internal controls was implemented by company. Agency theory explains that parties with large shareholdings can exercise control by using their power. Controls conducted by IO should be able to direct the management. But it turns out IO is not able to control or discipline the management.

The results of this study are in line with Ujiyantho and Pramuka (2007). IO is the owner who focuses more on current earning; consequently, the management may be triggered to take actions that will increase short-term profit, for example by manipulation. The existence of IO leads managers to be tied to meet the profit targets of investors, so managers will still tend to engage in EM. This result is also in accordance with Scott (2015) which mentions one of the hypotheses of positive accounting theory that is Bonus Plan Hypothesis. The measure of success is how much value the agents have created. Agents will make accounting policies under their contract. These policies include choosing operating policies, financial policies, and investment policies. The actions of these managers will affect the outcome of their performance. This final result will then be assessed, and managers will be paid in accordance with existing contracts.

To achieve the desired profit target of institutional investors, management practices EM. The greater income that they report to the institutional stakeholders, the more bonus they will get. As a result, managers choose accounting policies that can increase income or current earnings that will be reported to IO. This has caused IO to have no effect on EM in the company.

Conclusion

This study aims to examine the effect of GCG mechanisms on EM on firms listed on IDX period year 2009–2012. The existing data indicates during 2009–2012 there were 54 companies listed continuously on IDX. From the data obtained 216 company annual report. From the test results can be concluded that the model with independent variables as many as six variables simultaneous have no significant effect on the dependent variable (EM).

The test results also show that partially obtained that of the six independent variables; only one variable (FMS) has influence on EM in manufacturing companies listed on IDX period year 2009–2012. The frequency meeting of shareholders has a significant positive effect on EM. Other variables have no significant influence to EM.

This research has many deficiencies that still require improvement and development in future research. This study only observes manufacturing companies listed on IDX period year 2009–2012. The number of observation years is only four years. There are recent studies that have even used more samples, from different sectors of the company, and are not limited to just one sector. Some recent research on EM has also been using the modified Jones model.

Based on the limitations in this study, the implications for future research that can be submitted are that future research is expected to use more samples of the company or with more years of research. It is intended that the test results can obtain good results.

From this research, there is only one variable of GCG mechanism that has influence to EM that is frequency of shareholder meeting, so in future research is expected to add another GCG mechanism which has influence to EM, for example audit committee (Suprianto *et al.* 2017), proportion of independent commissioners, and others. Thus, it is hoped that the results of the research obtained provide better empirical evidence.

References

[1] Abed, S., Al-Attar, A., and Suwaidan, M. 2011. Corporate Governance and Earnings Management: Jordanian Evidence. *International Business Research*, *5*(1): 216–225. DOI: http://doi.org/10.5539/ibr.v5n1p216

[2] Al-Najjar, B. 2012. The Determinants of Board Meetings: Evidence from Categorical Analysis. *Journal of Applied Accounting Research*, *13*(2): 178–190. DOI: http://doi.org/10.1108/09675421211254867

[3] Caliskan, E. N., and Icke, B. T. 2010. Corporate Governance in Non-Financial Service Sector Firms Listed in the Istanbul Stock Exchange. *Journal of Leadership, Accountability and Ethics*, *8*(2): 90–106.

[4] de Jong, A., Mertens, G., and Roosenboom, P. 2006. Shareholders' Voting at General Meetings: Evidence from the Netherlands. *Journal of Management and Governance*, *10*(4): 353–380. DOI: http://doi.org/10.1007/s10997-006-9006-1

[5] Dechow, P. M., Sloan, R. G., and Sweeney, A. P. 1995. Detecting Earnings Management. *The Accounting*

Review, *70*(2): 193–225.

[6] Denis, D. K., and McConnell, J. J. 2003. International Corporate Governance. *The Journal of Financial and Quantitative Analysis*, *38*(1). DOI: http://doi.org/10.2307/4126762

[7] Friedlan, J. M. 1994. Accounting Choices of Issuers of Initial Public Offerings. *Contemporary Accounting Research*, *11*(1): 1–31. DOI: http://doi.org/10.1111/j.1911-3846.1994.tb00434.x

[8] Gideon, B. D., Puspitasari, E., Ghani, E. K., and Gunardi, A. 2018. Earnings Quality: Does "Principles Standards versus Rules Standards" Matter? *Journal of Applied Economic Sciences*, Volume XIII, Spring, *2*(56): 586–596.

[9] González, J. S., and García-Meca, E. 2014. Does Corporate Governance Influence Earnings Management in Latin American Markets? *Journal of Business Ethics*, *121*(3): 419–440. DOI: http://doi.org/10.1007/s10551-013-1700-8

[10] Gumanti, T. A. 2001. Earnings Management dalam Penawaran Saham Perdana di Bursa Efek Jakarta. *Indonesian Journal of Accounting Research*, *4*(2).

[11] He, L., and Ho, S.-J. K. 2011. Monitoring Costs, Managerial Ethics and Corporate Governance: A Modeling Approach. *Journal of Business Ethics*, *99*(4): 623–635. DOI: http://doi.org/10.1007/s10551-010-0672-1

[12] Hemraj, M. B. 2004. Corporate Governance: Directors, Shareholders and the Audit Committee. *Journal of Financial Crime*, *11*(2): 150–157. DOI: http://doi.org/10.1108/13590790410809077

[13] Honggowati, S., Rahmawati, R., Aryani, Y. A., Probohudono, A. N. 2017. Corporate Governance and Strategic Management Accounting Disclosure. *Indonesian Journal of Sustainability Accounting and Management*, *1*(1): 23–30. DOI: http://doi.org/10.28992/ijsam.v1i1.24

[14] Horak, H., Dumancic, K. 2009. Recommendation for Remuneration in Croatian Company Law and Corporate Governance. *The Business Review*, *12*(2).

[15] Htay, S. N. N., Rashid, H. M. A., Adnan, M. A., and Meera, A. K. M. 2012. Impact of Corporate Governance on Social and Environmental Information Disclosure of Malaysian Listed Banks: Panel Data Analysis. *Asian Journal of Finance and Accounting*, *4*(1): 1–24. DOI: http://doi.org/10.5296/ajfa.v4i1.810

[16] Indriastuti, M. 2012. Analisis Kualitas Auditor dan Corporate Governance terhadap Manajemen Laba. *Eksistansi*, *4*(2).

[17] Klai, N., Omri, A. 2010. Corporate Governance and Financial Reporting Quality: The Case of the Tunisian Firms. *International Business Research*, *4*(1): 158–166. DOI: http://doi.org/10.5539/ibr.v4n1p158

[18] Lin, F.-L. 2011. Is Earnings Management Opportunistic or Beneficial in Taiwan? Application of Panel Smooth Transition Regression Model. *International Journal of Economics and Finance*, *3*(1): 133–142. DOI: http://doi.org/10.5539/ijef.v3n1p133

[19] Liu, J. 2012. Board Monitoring, Management Contracting and Earnings Management: An Evidence from ASX Listed Companies. *International Journal of Economics and Finance*, *4*(12): 121–136. DOI: http://doi.org/10.5539/ijef.v4n12p121

[20] Mohamad, W. I. A. W., and Sulong, Z. 2010. Corporate Governance Mechanisms and Extent of Disclosure: Evidence from Listed Companies in Malaysia. *International Business Research*, *3*(4): 216–228. DOI: http://doi.org/10.5539/ibr.v3n4p216

[21] Rahman, R. A., and Ali, F. H. M. 2006. Board, Audit Committee, Culture and Earnings Management: Malaysian Evidence. *Managerial Auditing Journal*, *21*(7): 783–804. DOI: http://doi.org/10.1108/02686900610680549

[22] Ranti, O. O., and Stephen, O. 2011. The Role of Non-Executive Directors in the Profitability of Banks: A Study of Universal Banks in Nigeria. *International Journal of Business and Management*, *6*(2): 248–257. DOI: http://doi.org/10.5539/ijbm.v6n2p248

[23] Scott, W. R. 2015. *Financial Accounting Theory* (7th ed.). Toronto: Pearson.

[24] Shaikh, A. M., Iqbal, M. J., and Shah, S. Z. A. 2012. Institutional Ownership and Discretionary Accruals: Empirical Evidences from Pakistani Listed Non-Financial Companies. *Information Management and Business*

Review, 4(4): 217–222.

[25] Stanwick, P. A., and Stanwick, S. D. 2010. The Relationship between Corporate Governance and Financial Performance: An Empirical Study of Canadian Firms. *The Business Review*, *16*(2).

[26] Suprianto, E., Suwarno, S., Murtini, H., Rahmawati, R., and Sawitri, D. 2017. Audit Committee Accounting Expert and Earnings Management with "Status" Audit Committee as Moderating Variable. *Indonesian Journal of Sustainability Accounting and Management*, *1*(2): 49–58. DOI: http://doi.org/10.28992/ijsam.v1i2.16

[27] Ujiyantho, M. A., and Pramuka, B. A. 2007. Mekanisme Corporate Governance, Manajemen Laba dan Kinerja Keuangan (Studi pada Perusahaan Go Publik Sektor Manufaktur). In *Simposium Nasional Akuntansi X*. Makassar.

[28] Utomo, R. M., an Bachruddin, B. 2005. Analisis Manajemen Laba pada Penawaran Perdana Saham di Bursa Efek Jakarta. *Sinergi: Kajian Bisnis Dan Manajemen*, 17–34.

[29] Uzun, H., Szewczyk, S. H., and Varma, R. 2004. Board Composition and Corporate Fraud. *Financial Analysts Journal*, *60*(3): 33–43. DOI: http://doi.org/10.2469/faj.v60.n3.2619

[30] Weng, T.-C., Tseng, C.-H., Chen, C.-H., and Hsu, Y.-S. 2014. Equity-based Executive Compensation, Managerial Legal Liability Coverage and Earnings Management. *Journal of Applied Finance and Banking*, *4*(3): 167–193.

[31] Widyaningdyah, A. U. 2001. Analisis Faktor-faktor yang Berpengaruh terhadap Earnings Management pada Perusahaan Go Public di Indonesia. *Jurnal Akuntansi Dan Keuangan*, *3*(2): 89–101.

Assessment of the Economic Security of the Region (on the Example of Chelyabinsk Region)

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Abstract:

The topic of economic security of the region is relevant, given the current economic and social instability, it is necessary at the regional and federal levels to ensure equal opportunities for the development of regions, so that the economic situation in each of them meets the security requirements, as much as possible excludes problems associated with negative social and economic development. The main component of the economic security of the country is the economic security of the regions, which is characterized by the specifics of economic development. The purpose of the article is to develop the directions of the decision for improving the economic development of the region in order to stabilize its economic security. The dialectical-materialistic method of cognition and the general scientific, special and private-scientific methods based on it are used in the work. In particular, the work uses logical, comparative, methods of analysis (namely statistical, etc.), synthesis. The article examines the main approaches to the concept of economic security in general, as well as the economic security of the region, financial security, also examines approaches to the methodology for assessing the economic security of regions, analyzed statistical data and compared them with other regions.

Keywords: economic security; region; economic development; economic security

JEL Classification: R13; R58

Introduction

Security as the protection from risks is one of the most important aspects of the activities of society, the state and the individual. Certainly, the guarantee of successful development and independence of the country, the condition of stability and efficiency of vital activity of society and the state, the achievement of success is ensured by economic security.

In recent years, the problem of ensuring the economic security of the Russian Federation and its individual regions, including the regions of the Urals Federal District, has attracted close attention of politicians, economists, scientists, the public and is one of the most important national priorities. This is connected, primarily, with the imperfection of the economic system in the country, the different degrees of development of different regions, the influence of political factors on its development and the need of conduction the active reforms in the economy.

Problems of economic security have been the subject of research by many economists, among which are Abalkin (1994), Tatarkin (1996), Senchagova (2011), Orlova (2012), Ponçano (2017) and others.

They represent the economic security as the most important qualitative characteristic of the economic system, which determines the ability of a given system to implement the support of normal living conditions of the population, as well as maintain a sustainable resource supply for the national economy, and also determines the ability to consistently realize the interests of a national-state nature (Abalkin 1994).

The current stage of development of the Russian economy is characterized by the key value of regional security issues, which are associated with the idea of developing socio-economic relations and national unity. All-Russian economic trends have a strong impact on each region, which is reflected in the security problems of the region aggravated by its features (geographical location, climatic conditions, structure of economic industries, national composition of the population, cultural and historical traditions, etc.).

In this situation, the organization of purposeful activities related to the prevention and overcoming of dangerous trends of economic development, and ensuring the economic security is gaining relevance (Panina 2017).

Many scientists define the economic security of the region as a combination of current conditions, factors and states that characterize steadiness, stability and progressive in the development of the economy within the framework of the territory, is also defined as some independence and integration with the economic development of the country, and this is reflecting in the following directions:

- the ability to conduct their own economic policies within the framework of the country;
- the ability to respond at sharp geopolitical changes in the country;
- the ability to implement major economic measures due to economic miscalculations (federal level) or local economic disasters (region);
- the possibility, within the framework of an agreement, of rendering assistance to neighboring territories, the unstable situation in the economy of which will negatively affect the interests of the region within the framework of the economy (Kotilko 2006).

And, nevertheless, the problem of ensuring economic security at the regional level cannot be called sufficiently studied. All this is due to several reasons. First, the specificity of the economic development of each region, projected on solving tasks within the framework of economic security of the region and requiring a certain modification of the indicators used, which characterize, in modern conditions, the economic security of a particular region. Secondly, consideration of the problem of ensuring the economic security of regions from several methodological positions, often contradicted to each other. Thirdly, the lack of unification of statistical data of the region, used as an assessment of the level of its economic security (Kalinina 2010).

These circumstances make it rather difficult to work out general principles for assessing the level of economic security in the region, specific measures to ensure security, taking into account the specifics of the development of the territory, causing a certain modification of objectives, specific actions of authorities and measures.

The economic security of the region, within the framework of consideration of the essence of the category, as well as threats and measures of provision are considered by such authors as: Kalinina (2010), Lavrut (2013), Uskova (2011) and others. The issues of assessing the economic security of a region are considered by the authors as Kremlev, Fedorov, Sergeev, Bigday, Mirokhina, Katsapov (Kremlev *et al.* 2007) and Bigday *et al. (*2016) and others. The above indicates the need for system research, the main purpose of which is development of directions to ensure the economic security, given the transition of the regional economy to the level of sustainable development.

The theoretical significance of the study lies in expanding and supplementing the theoretical aspects of the economic security of the region. The practical significance lies in the fact that the problem of regional economic security is one of the rather complex; its solution leads to the development of recommendations aimed at improving and implementing the mechanism of sustainable development of the region and working out the conditions of its safety.

1. Literature review

Traditionally, economic security is considered as the most important qualitative characteristic of the economic system (as already noted earlier), which determines the ability to support the qualitative conditions of human vital activity, sustainable resource provision and the realization of national-state interests.

The basis of the definition of security, which is enshrined in the Law of the Russian Federation "On Security" (Federal Law of the Russian Federation…2015), is its understanding as a state of protection. Security in

the given context is defined as a state of protection of vital important interests from internal and external threats, as regards the state, society, and the individual. For today, there are plenty of different interpretations of the term "economic security". Given this, can be determines the essence of the concept and form it in a Table 1.

Table 1. The essence of the country's economic security

Author	Explanation
Arkhipov *et al.* (1994)	The ability of the economy to provide effective satisfaction of social needs at the national and international levels ;
Shlemko and Binko (1994)	This situation of the national economy, which allows you to save the resilience to internal and external threats and is able to satisfy the needs of the individual, society and the state;
Bogomolov (2009)	The system of organizational-economic and legal measures to prevent economic threats;
Senchagov *et al.* (2011)	Such a state of the economy and institutions of power, at which the guaranteed protection of national interests is ensured, social directivity of the policy, sufficient defense potential even under unfavorable conditions of the development of internal and external processes;
Gorodetsky (1995)	Reliable protection of national-state interests in the sphere, which is provided with all necessary means of the state
Savin V. (1995)	This is a system to protect the vital interests of the country;
Oleynikov E. (2004)	The state of effective use of economic resources to prevent threats and ensure the stable functioning of the economic system in the present and future (100%);
Abalakin L. (1994)	This is aggregate of conditions and factors that ensure the independence of the national economy, its stability and sustainability, the ability to constantly update and self-develop. The state of the economic system, which allows it to develop dynamically and efficiently, to solve social tasks and in which the state has the possibility to produce and implement into life the independent economic policies.

Source: Compiled by the authors

Western scientists as Cable (1995), Kirshner (1988), Yong (2008), Luciani (1988), Losman (2001) understand the term "security" more narrowly and specifically, the basis of this vision is an understanding of protection from threats, primarily "external", especially those with a malevolence of opponents' actions. This is sufficiently different from the understanding of given category by Russian scientists.

Economic security is a complex phenomenon that manifests itself in many aspects:
▪ it can be considered from the point of view of the factors influencing the resilience of the national economy and the political independence of the country;
▪ it is possible to analyze various levels of economic security — the state level, the level of regions, the level of enterprises;
▪ the subject of the study may be industry aspects of economic security (food security, environmental safety, etc.);
▪ a separate aspect of the analysis of economic security may be the institutional-legal aspect; can be highlight a separate directions or integral prevention mechanisms to certain manifestations of the threat to economic security.

Of course, the main condition for a rational economic policy is its maximum approach to the political, economic and defense doctrine of the state. The fundamental interest of each state as an institution is its security.

So, the difficulty of determining economic security is in that it is a synthetic category of political economy and political science, and in practice it is determined in accordance with specific historical conditions and development prospects. Therefore, it is impossible to offer a universal definition of economic security. It is important that this definition served understand the essence of the phenomenon, and on this basis – the realization of a system of practical actions by the state leadership, all branches of government that ensuring the economic security of the country.

Economic security (countries, region) is considered in two dimensions:
▪ Social-economic (general economy), which concerns such a development of the country's economy, is able to ensure long-term development in conditions of international competition. In this plane, separate types of economic security should be distinguished, namely: social, financial, raw materials, energy, environmental safety;
▪ The defense-military, which is a rather complex and multidimensional phenomenon and requires the definition of the concept of economic security of defense, as the ability of a state (group of states) to develop the military-defense industry and accumulate defense-economic potential.

Regarding the current conditions, characterized by incessant competition for sales markets, energy and other resources within the framework of the countries, carried out using political, economic, informational ways of influence, the regions, which finding in themselves all these reflections and influences, are quite significant (as a part of the country). External negative impacts may adversely affect the state of the country's territories. Dangers in this situation are always present, but do not necessarily lead to the execution of a threat. Therefore, security as a state of absence of danger does not exist, and a clarification of the definition of the economic security of a region is required.

According to Kalinina (2010), the essence of the region's economic security is in the possibility and ability of its economy to gradually improve the quality of life of the population at the level of generally accepted standards, resist the influence of internal and external threats at optimal costs of all types of resources, ensure the socio-economic and socio-political stability of the region. Some understandings by the authors of the category essence of economic security of the territory are presented in Table 2.

Table 2. Economic security of the territory in the authors understanding

Author and year of publication	The definition of economic security mentioned in the publication
Bigday, Mirokhina, Katsapova (2016)	The property of the economic system to be ready and able to ensure economic growth, meet social needs, protect both from external and internal threats, to the implementation of which contributes an effective management system.
Fridman, Rechko, Pisarov (2015).	The state of the regional economy, generating growth of regional competitiveness and resistant to impact of internal and external threats.
Economic Security Strategy of the Russian Federation for the period up to 2030 (2017)	The state of protection of the national economy from external and internal threats, which ensures the economic sovereignty of the country, the unity of its economic space, the conditions for the implementation of the strategic national priorities of the Russian Federation (Presidential Decree of Russian Federation 2017).

Source: Compiled by the authors

Some types of security can be definitely attributed to the economic security of the region (investment, financial, energy security), others are directly related to it (social, demographic, transport), and still others are indirectly related to the economic security of the region.

The basis for paying taxes to the budget, for refinancing the production process creates a financial result that ensures the financial security of the region. In turn, the last one has a fairly broad interpretation, including: tax, currency, budget, banking system, monetary-financial circulation, *etc*. Nikulina and Sinenko (2013) are defined the financial security as the protection state of the regional financial system, which includes budget, social, financial and production components from threats, both external and internal, that violate the sustainability of given system (consisting in the ability to provide the necessary level of budget revenues in comparison with expenditures and consumer needs). There is a certain relationship between financial and investment security in the ability of the former to influence the investment process, with the ability to influence the region's sustainable growth and competitiveness of the economy.

In a number of publications, when assessing the financial security of a region, use indicators in such spheres as:

- budget sector: the ratio of the regional budget deficit to the gross regional product (hereinafter – GRP) (%); the ratio of external regional debt to GRP (%); the ratio of domestic regional debt to GRP (%);
- financial sector: current accounts payable (rub); current receivables (rub); the volume of inter-budget transfers from the federal budget per capita (rubles);
- monetary sector: the level of dollarization of money circulation;
- foreign economic activity: consumer price index; export coverage ratio of imports; volume of foreign direct investment per capita (thousand US dollars), *etc*.

Some authors include to the financial security the issues affecting foreign economic activity. At the present stage, scientists are using various methods to assess the level of economic security that can be divided into groups:

- observation and comparison with threshold values of the main macroeconomic indicators (Glazyev 1997);
- expert evaluation with subsequent ranking of territories by the level of threats;
- assessment based on research of the dynamic of change in the main macroeconomic indicators;
- multidimensional statistical analysis;

- assessment of the consequences of security threats using economic instruments (quantification of damage).

The methodic of assessing economic security proposed by Ivanov (2012) is sufficiently interesting. In this study, the author considers it fair to assert that the level of economic security of a particular region depends simultaneously on the following four indicators: stable functioning and development of the region; stable development and functioning of the insurance market and the capital market at the regional level; in the framework of the aggregate of enterprises operating in the region – an indicator of the level of economic security and sustainability; regarding the totality of individuals who live in the region – an indicator of the level of economic security and sustainability. In Table 3 we will present some of them and in further we will carry out them an assessment of the economic security of the region.

Table 3. Indicative indicators of the regional security level

Indicator	Criteria for evaluation		
	1 point	2 points	3 points
Volume index of GRP	<1	=1	>1
Foreign trade turnover	<1	=1	>1
Industrial production index	<1	=1	>1
Agricultural product production index	<1	=1	>1
Index of investment into fixed capital	<1	=1	>1
Index of dynamics of retail turnover	<1	=1	>1
Revenues / expenses of the consolidated budgets of the region	<1	=1	>1
Dynamics of per capita incomes of the population	<RF	=RF	>RF
Real disposable monetary income of the population	<RF	=RF	>RF
Real wages	<RF	=RF	>RF
Unemployment rate,%	<RF	=RF	>RF

Source: Compiled by the authors based on the article by Ivanov (2012)

Thus, the presented methodic for assessing the level of economic security in the region includes the following steps:

- sampling and introduction into the program the absolute values of static indicators for the period;
- calculation of indexes of growth of indicators (each subsequent year to the previous one) is a dynamic indicator for a given period;
- development of criteria for evaluating static and dynamic indicators on a three-point scale based on a comparison with the average level of indicators in the Russian Federation;
- quantitative (point-based) assessment of indicators in accordance with the system of criteria;
- determining the weight of indicators; the weight of a specific indicator is determined by dividing the unit by the number of estimated indicators;
- weighted assessment of the values of indicators by multiplying the point by the weight of the indicator;
- determination of the final assessment of the indicator by summing the estimates.

Initially, the evaluation values of the level of economic security are proposed to conduct using a scale:

- from 1 to 1.99 points – regions with a level of economic security below the average;
- from 2 to 3 points – regions with a level of economic security above the average.

Summarizing the results of the analysis of literary sources, it can be said that ensuring the economic security of the region is one of the priority tasks, as well as a priority moment in the complex of the country's security problems.

2. Methodology

The main research method for analyzing the economic security of a region is the method of research of statistical data or statistical analysis.

In this context, you can use the system of indicators, which, in turn, reflects the development of the region. It gives an opportunity to characterize the state, trends (Table 4).

Table 4. The main indicators characterizing the economic development of the region

Direction	Indicators
General indicators	- Gross regional product;
Industry	- Industrial Production Index; - Agricultural product production index;
The international cooperation	- Export; - Import; - The ratio of exports and imports (foreign trade turnover);
Investment activities	- Index of investment into fixed capital;
Population monetary income	- Dynamics of per capita incomes of the population; - Real wages; - Real disposable income of the population;
Trading	- Index of dynamics of retail turnover;
Employment	- Unemployment rate,%;
Financially – budget system	- Revenues / expenses of the consolidated budgets of the region.

Source: Compiled by the authors

The revealed changes with the help of the proposed indicators will help to identify favorable or unfavorable trends in the development of the region. These indicators are studied taking into account the dynamics for a certain time interval (several years).

The empirical base of the research is presented by the Chelyabinsk region as the main subject of the research. Chelyabinsk region was formed on January 17, 1934. The region includes 319 municipalities, including 16 urban districts, 27 municipal districts, 242 rural settlements, 27 urban settlements, as well as 7 inner-city districts of the city of Chelyabinsk. Total area is 88.5 thousand sq. km. The regional center is Chelyabinsk. The population size on 1.01.2018 is 3,492.7 thousand people. At the end of 2017, among regions of the Russian Federation, the region ranks 3rd on the livestock and poultry production for slaughter in live weight, 5th in production of eggs, 6th in terms of the volume of products shipped in manufacturing, 15th on turnover of retail and on the volume of paid services, 15th place for housing construction, 27th place in terms of investment in fixed assets (Pletnev and Nikolaev 2014).

The main stages of problem research are:
- the study and analysis of the theoretical foundations of economic security as a whole the country, and the region, as well as financial security as an element of the economic security of the region, methodic of assessing the economic security of the region, the main approaches to understanding these categories and assessment; the basis is on statistical data on the region;
- the second stage is represented by the study of selected indicators: their comparison and dynamics, the main period of 2015-2017.
- the third stage is a comparison of the development of the region with other regions.
- the fourth stage – to calculate indicators of economic security for the region.
- the fifth stage – the holding of generalization and conclusions regarding economic security and existing threats, the ways of their solutions are proposed.

3. Results

The aim of the study was the possibility of obtaining a general development trend of the regions of the Russian Federation on the example of the Chelyabinsk region. Based on the analysis of statistical data, it is possible to draw certain conclusions and construct analytical charts and tables.

Considering the indicators proposed for analysis, Figure 1 shows the dynamics of the gross regional product of the Chelyabinsk region.

Figure 1. Dynamics of the Gross Regional Product indicator

The gross regional product of the Chelyabinsk region increased by 5.8% compared to 2016 (in the Strategy by Option 1 – 102.2%, Option 2 – 104%). The positive dynamics of the GRP produced is associated with the growth of industrial production by 5.3%. The main indicators characterizing the economic development of the Chelyabinsk region are presented in Table 5.

Table 5. The main indicators, characterizing the economic development of the Chelyabinsk region

Indicators	Values by year			Change, units	
	2015	2016	2017	2016	2017
Volume Index of Gross Regional Product	0.995	0.995	1.058	0.000	0.063
GRP, billion rubles	1,170.310	1,164.130	1,232.200	-6.180	68.070
Industrial Production Index	0.980	0.964	1.053	-0.016	0.089
Investment in the fixed capital	0.836	0.847	0.980	0.011	0.133
Agriculture Products	1.079	1.027	1.025	-0.052	-0.002
Tax and non-tax revenues of the consolidated regional budget	1.089	1.085	1.089	-0.004	0.004
Consolidated budget expenditures of the region	1.081	1.051	1.033	-0.030	-0.018
Average monthly cash income per capita	1.061	0.999	0.980	-0.062	-0.019
Real disposable income of the population	0.931	1.000	0.947	0.069	-0.053
Real wages	0.938	0.978	1.039	0.040	0.061
Retail turnover	0.827	1.000	0.973	0.078	-0.027
Export	0.800	0.913	1.258	0.113	0.345
Import	0.601	0.999	1.689	0.397	0.690
Foreign trade turnover	0.744	0.932	1.363	0.189	0.431
Unemployment rate	7.000	7.100	6.638	0.100	-0.462

In the structure of industrial production, manufacturing industries have the largest share, with an industrial production index of 105.7%, incl. the metallurgical production index grew by 7.2%. The demand for the products of metallurgists is actively supported by pipe rolling and defense enterprises. Positive dynamics persists in the extraction of minerals (an increase of 8.6% in 2016) as a result of reaching the design capacity of new extractive industries, as well as in water supply and water disposal (by 5%).

In 2017, there was a steady increase in the production of textiles and clothing, the production of leather, leather goods, food production, the production of motor transport vehicle, and electrical equipment. A positive impact on the dynamics of GRP in 2017 was also made by the acceleration of the increase of agricultural production, whose output grew by 2.5%, as well as a significant increase in construction: the volume of construction work increased by 15.2%.

Investments in fixed assets for 9 months of 2017 amounted to 115.2 billion rubles, reporting data for 2017 are not available (in the Strategy, 284 billion rubles under the first option and 302.9 billion rubles under the second option).

The foreign trade turnover of the Chelyabinsk region excluding the countries of Eurasian Economic Union (Armenia, Belarus, Kazakhstan, Kyrgyzstan) amounted to 5,488.8 million dollars (136.3% compared to the same period of 2016). By 2017 are decreased: the average monthly per capita income by 1.9% and amounted to 23,025.2 rubles: real disposable income of the population by 5.3% and amounted to 94.7%.

Retail trade turnover in 2017 amounted to 491.3 billion rubles, which is 2.7% in comparable prices lower than the level of 2016 (across Russia – an increase of 1.2%). The decline of retail turnover in 2017 was due to a decrease in non-food products turnover, which has shrunk by 6.2%, while there is noting an increase in the turnover of food products, including drinks, and tobacco products by 1.5%. In 2017, there was noting an improvement in the labor market situation, which was characterized by a decrease in:

- the number of citizens who applied for assistance in finding a job;
- registered unemployment and labor market tensions;
- the appeal to employment centers of citizens dismissed to reduce.

The level of registered unemployment in the Chelyabinsk region has decreased. The budget policy of the region was aimed at fulfilling obligations to the residents of the Chelyabinsk region and maintaining financial stability in the current economic conditions. The trend of growth in revenues of the budget of the Chelyabinsk region has been preserved. In 2017, the expenditure commitments of the region were fulfilled in full.

The result of a targeted policy to improve the efficiency of budget spending is to reduce the budget deficit and public debt of the Chelyabinsk region. Thus, the deficit of the regional treasury, planned for 2017 in the amount of 10 billion rubles, has been completely eliminated. For the first time in the last five years, the regional budget was executed with a surplus, which amounted to 7 billion rubles. We will compare the main indicators of economic security of the region with other regions: Nizhny Novgorod Region, Perm Territory and Sverdlovsk Region (Figure 2).

Figure 2. Dynamics of the index of the physical volume of the GRP of the regions

Source: compiled according to the data of the official website of the Federal State Statistics Service

The dynamics of the indicator of index of the physical volume of the gross regional product in comparison of the regions presented makes it possible to note the positive dynamics in the Chelyabinsk region relative to other regions. Imagine the dynamics of the index of industrial production in the framework of compared regions (Figure 3).

Figure 3. Dynamics of the industrial production index of the regions

Source: Compiled according to the data of the official website of the Federal State Statistics Service

In this situation, it is also possible to note the prevailing growth of indicator in the Chelyabinsk region relative to other regions, and nevertheless, a positive dynamic is observed in all regions. Let us present the dynamics of the agricultural production index in the framework of the compared regions (Figure 4).

Figure 4. Dynamics of the index of agricultural products production of the regions

Source: Compiled according to the data of the official website of the Federal State Statistics Service

On the basis of compared indicators, we can also note that the Chelyabinsk region with respect to other represented regions, according to this indicator, is at a higher level.

The dynamics of the indicator – of the retail trade turnover will be presented in Figure 5

Figure 5. Dynamics of the retail trade turnover index of the regions

Source: Compiled according to the data of the official website of the Federal State Statistics Service

In this situation, the advantage by indicator in the Novgorod region, the Chelyabinsk region has an average value among the compared regions. The dynamics of the indicator – of the foreign trade turnover is presented in Figure 6.

Figure 6. Dynamics of the index of foreign trade turnover of the regions

Source: Compiled according to the data of the official website of the Federal State Statistics Service

In the commodity structure of export prevail: metals and products from them (88.8%), engineering products (5.6%), consumer goods (1.9%), mineral products (1.6%), food products (1.1%), products of chemical industry (1%). The main import items are engineering products (54.9%), metals and products from them (19.1%),

mineral products (10.8%), products of chemical industry (7.7%), consumer goods (4%), food products (3%). The dynamics of the indicator – the unemployment rate is presented in Figure 7.

Figure 7. Dynamics of the level of regional unemployment

In the dynamics, a decrease in the unemployment rate is observed, however, in comparison with the analyzed regions, the unemployment rate in 2017 in the Chelyabinsk region is the highest. Dynamics of indicator – revenues of the consolidated budget in Figure 8.

Figure 8. Dynamics of consolidated budget revenues of the regions

In comparison with the regions, the Chelyabinsk region has a fairly high level of income. We have carried out the calculation of economic security indicators for the region on the proposed methodic (Table 6).

Table 6. Assessment of the level of economic security for the Chelyabinsk region

Indicators	2015	2016	2017	Point-based assessment of indicators			Weight	Weighted assessment of indicators		
				2015	2016	2017		2015	2016	2017
Volume Index of Gross Regional Product	0.995	0.996	1.058	1	1	3	0.077	0.077	0.077	0.231
Industrial Production Index	0.980	0.964	1.053	1	1	3	0.077	0.077	0.077	0.231
Investment in the fixed capital	0.836	0.847	0.980	1	1	1	0.077	0.077	0.077	0.077
Volume Index of Gross Regional Product	0.995	0.996	1.058	1	1	3	0.077	0.077	0.077	0.231
Industrial Production Index	0.980	0.964	1.053	1	1	3	0.077	0.077	0.077	0.231
Investment in the fixed capital	0.836	0.847	0.980	1	1	1	0.077	0.077	0.077	0.077
Products of agriculture	1.079	1.027	1.025	3	3	3	0.077	0.231	0.231	0.231

Indicators	2015	2016	2017	Point-based assessment of indicators			Weight	Weighted assessment of indicators		
				2015	2016	2017		2015	2016	2017
Revenues / expenses of the consolidated budget	0.972	0.984	1.002	1	1	2	0.077	0.077	0.077	0.154
Average monthly monetary incomes per capita	1.061	0.999	0.980	1	1	1	0.077	0.077	0.077	0.077
Real disposable monetary income of the population	0.931	1.000	0.947	2	3	1	0.077	0.154	0.231	0.077
Real wages	0.938	0.978	1.039	2	3	3	0.077	0.154	0.231	0.231
Retail turnover	0.827	1.000	0.973	1	2	1	0.077	0.077	0.154	0.077
Export	0.800	0.913	1.258	1	1	3	0.077	0.077	0.077	0.231
Import	0.601	0.999	1.689	1	1	3	0.077	0.077	0.077	0.231
Foreign trade turnover	0.744	0.932	1.363	1	1	3	0.077	0.077	0.077	0.231
Unemployment rate	7.0	7.1	6.6	1	1	1	0.077	0.077	0.077	0.077
Assessment of the level of economic security of the Chelyabinsk region							1.000	1.308	1.538	2.154

Source: Compiled and calculated on materials of the official website of the Ministry of Economic Development of the Chelyabinsk Region

The assessment made shows an increase in the level of economic security of the region. The achievement of high assessments of the level of economic security of the region became a consequence of the influence of such economic security factors as:

- reducing unemployment level due to active employment policies;
- high income level of the population;
- high level of foreign trade turnover;
- a high level of income-to-expenditure ratio of the consolidated budget, the presence of a surplus relative to other regions;
- high level of index of industrial production and agricultural production.

Summarizing the results of the analysis made, it was determined that one of the main threats to the economic security of the Chelyabinsk region is a decline in investment activity; here we can also note a decrease in retail trade turnover. The level of investment activity is the main factor, and problems in the area of the development of investment activity lead to consequences and affect at all other factors of a complex indicator of economic security of the region. In addition, we can note the need for further growth of the region, both in the framework of industrial production and in agriculture production.

4. Discussion

The Chelyabinsk region in 2017 year was represented with the following trends – the index of industrial production for the first time in a long time headed for an increase. Back in April, Governor Boris Dubrovsky reported that the region was beginning to "push off from the bottom," and in ten months the figure rose by 4.8% compared with last year (Report of the Governor…2017). These results suggest that the economy has moved into a steady growth phase. In this situation, one of the prospects is the further development of production in the framework of mining. Some experts hold the same opinion. One of the "islands of stability" and even growth, within the framework of economic security, for the region is mining. Traditional for the Southern Urals, economic sphere, with a long history, today has the largest inflow of investments, it contains promising investment projects. In one of his recent works, Chelyabinsk economist Sergey Gordeev confirms that it is no coincidence (Gordeev 2016). In his opinion, it can be said that today the economy of the Chelyabinsk region at a new, modern technological and environmental level returns to the traditional, determined by nature itself and historical experience to the competitive advantages of the region, to the development of the mining industry. Unlike many other spheres, it has a substantial raw material base, is provided with human and scientific potential, large investments, infrastructure, advanced technologies and is competitive enough. Nevertheless, an industrial specialization of the region is observed, which, according to the author of this article, can become the opposite weight in the economy and lead to its weakening, which necessitates diversification

Negative moment as a result of the study is a decrease in investment in fixed assets. In this context, it is possible to present the opinion of specialists in the field of economics. Not every company is ready to invest in the

opening and modernization of production. The Southern Urals is pursuing a negative trend that emerged a few years ago, according to the results of January-September 2017. The Chelyabinsk region was on the 60th place in the rating of regions in investments to fixed capital. This is evidenced by the calculation of the level of economic security within the framework of the dynamics of this indicator. Growth has not reached 100%, the volume of investments is falling, and this trend, unfortunately, will be increase only – sure some specialists of a various levels companies, one of which is Sergey Kolobov, Director of "ProfKapitalService" (Kolobov 2017). Business is leaving the Chelyabinsk region, and one of the most attractive areas is the Republic of Kazakhstan, where unprecedented conditions have been created. This trend is the only indicator of the investment climate. He calls the cancellation of benefits on tax of movable property as a kind of investment tax. In early September, the Ministry of Finance and the Ministry of Economic Development and Trade of the Russian Federation announced the decision to the regions to determine by themselves, leave or cancel benefits. The Chelyabinsk region then publicly stated that it would not preserve benefits. In the meantime, the abolition of benefits, according to the authorities, should bring to the budget more than 3 billion rubles.

In general, it is possible to note the development of the agro-industrial complex. This is connected with the achievement of the optimal volume of production for certain types of agricultural products and with a decrease in the production of products in personal subsidiary farms. To well-growing agriculture, a new growth resource is needed – entry to export.

The annual growth of the gross regional product (GRP) of 5.8%, an increase in population of 200 thousand people and a 3-fold increase in labor productivity without an increase in the number of unemployed are further prospects for the Chelyabinsk region in case of the implementation of the Strategy-2035 target scenario (The Economic Development Strategy…2017).

The topic of addressing the issues of economic security in the region is currently debatable and ambiguous, requiring a comprehensive approach. The author's position is that objective reality dictates the need for intensive study of issues, characterizing the emerging threats to the economic security of the region, such as relatively low investment activity, decline in retail turnover, and the need for further development of all industries of the region's economy.

Conclusions

Conducted research provides an opportunity to draw generalizing conclusions. Economic security is a qualitative characteristic of the economic system, which determines the ability to realize national and the state interests, also the ability to sustain the resource supply of the national economy, the ability to maintain the quality of human vital activity conditions. All-Russian economic trends are characterized by incessant competition (sales market, energetic and other resources) within the framework of the countries, which uses such methods of influence as political, economic, informational, all this has a strong influence on each region, it is reflected in the security problems of this region, aggravated by its features. In this context, the essence of the economic security of the region is the possibility and ability to gradually improve the quality of life of the population at the level of generally accepted standards, the ability to confront internal and external threats with optimal costs for all types of resources, the possibility of ensuring the overall stability of the region.

The level of economic security of the Chelyabinsk region in 2017 has significantly increased relative to previous periods; such a dynamic is due to the positive trend of indicators of the socio-economic development of the region, which is also the right direction for the regional development. At the same time, there are certain threats regarding the economic security of the Chelyabinsk region, which consist in a rather low investment activity, a decrease in retail trade turnover. The first component is quite a significant factor, since it is investment activity that is the driver of economic growth in any region. In this situation, there is a need to take measures to eliminate the emerging threats to the economic security of the region.

The author's position regarding to the ways of solving problems is as follows:
- The economic prospects of the Chelyabinsk region, while maintaining a narrow industrial specialization of the region, which may be strengthened by the support of industries (metallurgy, metal processing), look rather vague and depend on the situation on the domestic and global market. The industry of the region needs diversification, creation of new competitive industries based not only on the use of local raw materials and metal. Given the need to diversify the region's economy and avoiding narrow industrial specialization, the implementation of support of investment projects in the industries of light, food industry, high-tech industries whose enterprises are located on the territories of the Chelyabinsk region is needed. In this situation, tax preferences or benefits can be used. The experience of France is very interesting: in order to encourage R&D expenditures there are actively use the tax incentives,

such as a tax credit for research expenses (Credit d'impot recherche) and assignment of the status of "Young Innovative Enterprise" (Jeune entreprise innovante). Depending on the volume of investments of small and medium enterprises in scientific research, the state calculates the amount of the tax rebate. In the event that the amount of the tax credit is greater than the tax payable by the enterprise, the state pays the company a difference.

- further development of the agro-industrial complex is necessary; in this situation, the development of exports can become the main focus. In this direction, we need to move along with the neighboring regions – thus, much more can be achieved both in terms of conquest the foreign markets and in terms of internal processes, including automation, import substitution for feed additives, medicines, *etc*.

It is also quite important to use the experience of other countries in solving these problems.

References

[1] Abalkin, L.I. 1994. Economic security of Russia: Threats and their reflection. *Issues of Economy,* 12: 4-13.

[2] Arkhipov, A., Gorodetsky, A., and Mikhailov, B. 1994. Economic security: estimates, problems, means of support. *Issues of Economics,* 12: 36-44.

[3] Bigday, O.B., Mirokhina, A.A., and Katsapova, V.V. 2016. The essence of economic security of a system at the meso-level and its estimation on the example of the Stavropol territory. *Vestnik SevKavGTI,* 1(24): 7-12.

[4] Bogomolov, V.A. 2009. *Economic Security*. Examen.

[5] Cable, V. 1995. What is international economic security? *International Affairs,* 71(2): 312-317.

[6] Friedman, Yu.A., Rechko, G.N., and Pisarov, Yu.A. 2015. Economic security, economic protection and competitiveness: a regional aspect. *Bulletin of the Kuzbass Technical University,* 1: 122-125.

[7] Glazyev, S.Yu. 1997. The Basis for ensuring the economic security of a country: an alternative reformation course. *Russian Economic Journal,* 1: 33-39.

[8] Gordeev, S. 2016. The Ways of Development Chelyabinsk Region Were Prompted by Nature Itself. *Arguments and Facts.* http://www.chel.aif.ru/society/industry/puti_razvitiya_chelyabinskoy_oblasti_pod skazala_sama_priroda

[9] Gorodetsky, A. 1995. Security issues of the Russian economy. *Economist,* 10: 44-50.

[10] Ivanov, A.V. 2012. Methods of assessing the economic security of the region. *Regional Economics: Theory and Practice,* 48(279): 47-56.

[11] Kalinina, N.M. 2010. Economic security of the region: the essence, threats and measures to ensure. *Siberian Trade and Economic Journal.* https://cyberleninka.ru/article/v/ekonomicheskaya-bezopasnost-regiona-suschnost-ugrozy-i-mery-obespecheniya

[12] Kirshner, J. 1988. Political economy in security studies after the cold war. *Review of International Political Economy,* 5(10): 64-91.

[13] Kolobov, S. 2017. Chelyabinsk Region Pushed Off from the Bottom: Experts Called the Main Results of the Business. *Business Quarter.* http://chel.dk.ru/news/chelyabinskaya-oblast-ottolknulas-ot-dna-eksperty-naz vali-glavnye-itogi-biznesa-v-2017-g-237096073

[14] Kotilko, V.V. 2006. Economic security of the Chelyabinsk region. *National Interests: Priorities and Security,* 4(7): 81-83.

[15] Kremlev, N.D., Fedorov, V.G., and Sergeev, M.F. 2007. Issues of assessing the economic security of the region. *Questions of Statistics,* 2: 42-48.

[16] Lavrut, N.S. 2013. Economic Security of the Regions as the Basis of the Country's Security. *Economics and Modern Management: Theory and Practice: Collection of Scientific Articles of XXII Intern. Scientific-Practical Conf.* https://sibac.info/conf/econom/xxii/31785

[17] Losman, D. 2001. Economic security. A national security folly? *Policy Analysis,* 409: 1-12.

[18] Luciani, J. 1988. The economic content of security. *Journal of Public Policy,* 8(2): 151-173.

[19] Nikulina, N.L., and Sinenko, A.I. 2013. Diagnostics of the financial security of the region. *Manager,* 4(44): 54-59.

[20] Oleynikov, E.A. 2004. *Economic and National Security*. Examen.

[21] Orlova, A.V. 2012. Evolution of the concept of "Economic security". *Scientific Notes of Belgorod State National Research University,* 19(138): 93-97.

[22] Panina, M.E. 2017. Economic security of the Chelyabinsk region. *International Scientific Herald,* 2: 165-172.

[23] Pletnev, D.A., and Nikolaev, E.V. 2014. The success of the middle business in the Chelyabinsk Region: Analysis of key areas of activity. *Bulletin of Chelyabinsk State University,* 21(350): 128-144.

[24] Ponçano, V.M.L. 2017. Water supply and sanitation network – Creation and activities. *Periodico Tche Quimica*, 14(27): 139-145.

[25] Savin, V.A. 1995. Some aspects of the economic security of the Russian economy. *Agrarian Bulletin of the Urals,* 9: 14-20.

[26] Senchagov, V.K., Maksimov, Yu.M., Mityakov, S.N., and Mityakova, O.I. 2011. Innovative transformations as an imperative of regional economic security: a system of indicators. *Innovations,* 5(151): 56-61.

[27] Shlemko, V.T., and Binko, I.F. 1994. *Economical Security of Ukraine: The Essence and the Ways to Ensure.* NISD.

[28] Tatarkin, A.I., Romanova, O.A., Kuklin, A.A., and Yakovlev, V.I. 1996. Economic security as an object of regional research. *Issues of Economy,* 6: 78-89.

[29] Uskova, T.V., and Kondakov, I.A. 2011. Threats to the economic security of the region and ways to overcome them. *Economic and Social Changes: Facts, Trends, Forecast,* 2: 37-50.

[30] Yong, J. 2008. Economic security: redressing imbalance. *China Security,* 3(2): 66-85.

*** Federal Law of the Russian Federation of 05.10.2015 N 285-FZ "On security". Available at: http://pravo.gov.ru/proxy/ ips/?docbody=&nd=102144301

*** Presidential Decree of Russian Federation from 13.05.2017 N 208 'On the Strategy of Economic Security of the Russian Federation for the period up to 2030'. 2017. Available at: http://kremlin.ru/acts/bank/41921

*** Report of the Governor of the Chelyabinsk Region on the Results of the Activities of the Government of the Chelyabinsk Region in 2017. Available at: http://pravmin74.ru/vystuplenie-gubernatora-chelyabinskoy-oblasti-borisa-dubrovskogo-pered-zakonodatelnym-2

*** The Economic Development Strategy of the Chelyabinsk Region-2035: Goals, Objectives, Scenarios. 2017. Available at: http://mob.gov74.ru/htmlpages/Show/socioEconomicDevelopment/Rabochayagruppaporazrabotkeotr/Materialyporazrabotkestrategii

*** The Official Website of the Federal State Statistics Service. Available at: http://www.gks.ru/

*** The Official Website of the Ministry of Economic Development of the Chelyabinsk Region. Available at: http://mineconom74.ru/

Analysis of the Regional Food Subsystem Formation and Development

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Abstract:

The formation and the development of functional subsystems in the economic space of the Russian regions are based on the multitude of objective needs relevant to the current stage of economic growth, including the needs to provide sustainable development of the regions, obtain new competitive advantages, increase the investment attractiveness of the territory, *etc.* This refers to a regular process of functional and structural reorganization of the internal environment of territories, which is driven by post-industrial transformations. Food subsystem formation is of particular importance for the economic system of the Krasnodar Territory, since the region has significant and, in many ways, unique natural opportunities for creating food products, many years of experience in the development of the relevant profile of activities, significant scientific potential, and socio-economic infrastructure, high and sustainable share of the rural population. The methodological framework of this paper included the modern scientific approach to the study of the meso-level of the organization of economic relations, mechanisms for the intensification of regional development and systemic transformations of the internal environment of the territories, developed in compliance with the theory of regional economy and territorial management, evolutionary and institutional economic theory, modernization theory, theory of strategic management , theory of economic policy.

Keywords: region; organization; management; integration; differentiation; imperative; food subsystem; competitiveness

JEL Classification: M49; O11; O12; O13; Q14

Introduction

Each functional subsystem of the region has its specific features, because it is based on a peculiar combination of the production factors, resource categories and territorial infrastructure elements. The food subsystem, as an innovative method of territorial organization of resources, infrastructure elements and operative production factors in the region's internal environment, appears to replace former methods of organization, which are genetically related to the centralized economy. Unlike these former methods, the food subsystem is formed on the basis of self-development of relations between the territorial market actors; and capital combinations, which provide competitiveness, are particularly important for this subsystem.

The food subsystem can be established in the internal environment of those regions which have the necessary prerequisites for this. In many territorial markets of Russia, the share of imported food products increases year by year; accession to the WTO only complicated the terms of competitive interaction between the participants of the food market and additionally intensifies the search for new forms of organizing contractual relations and ways of connecting reproduction processes.

1. Research background

Various theoretical and applied aspects of the scientific problem of the food subsystem formation and development in the internal environment of contemporary Russia's regions have been studied by many foreign and Russian researchers.

Conceptual aspects of the formation and development of spatial economic systems have been studied in the fundamental researches of Arrighi (2006), Weber (1990), Granberg (2006), Isard (1996), Kleiner (2004), Sapir (2001), de Soto (2004), Stiglitz (2003), Schumpeter (1982) and others.

Various aspects of the transformations in the internal environment of the regional economic systems of contemporary Russia are revealed in the works of Anoshkina (2006), Belousova (2011), Butov, *et al.* (2000), Ermolenko (2008), Zelinskaya (2010), Ketova (1998), Kerashev (2005), Novoselov (1999), Ovchinnikov and Kolesnikov (2008), Popov (2010), Prokhorova (2010) and others.

Problems of developing the local food market, which is a priority for a number of regions of Russia, have

been studied by Belokrylova and Bochkov (2008), Korolyuk (2009), Nechaev (2009), Pchelintsev (2004), Risin (2006), Sibirskaya (2003), Tamov (2007), Tyaglov (2005), Chepurnykh *et al.* (2006).

The studies by Bessonova (1997), Inshakov (2003), Kirdina (2001), Myrdal (1972), North (1997), Polterovich (2005), Williamson (1996), and others have been devoted to the institutional arrangement of the internal environment of local economic systems.

At the same time, the analysis of domestic and foreign studies on the stated scientific problem makes it possible to conclude about the insufficient development of a number of its essential aspects, including the nature of systemic formations in the internal environment of the regions; content and forms of functional subsystems localized in the internal environment of the regions

Under the conditions of the completion of market transformation and integration of Russian national economy into the global economics, all levels of spatial organization of economic relations, including relations developing in the internal environment of the country's regions, are intensively reorganized. The main resources are concentrated at this level for further development of regional economic systems.

Generalization of the analytical results related to the processes of differentiating and integrating economic relations in the economic system of contemporary Russia, which can be fairly defined as "spatial economics", enables to identify the major tasks of functional and structural transformations at the sub-regional level of the economic relations organization:

- development of the local markets through the use of resource base available within the territory; it should be taken into account that many local markets are still forming (land markets, housing and utilities services markets, intangible assets markets, *etc.*);
- institutional arrangement of the regions' internal environment for the purposes of normalizing their evolutionary process; this environment is heterogeneous, as it was formed with the involvement of functional elements, organizational structures and institutions of different nature and development levels;
- provision of an adequate level of competitiveness for the regional economic systems in the face of global integration and postindustrial transformations, and formation of qualitatively new competitive advantages enabling these systems to meet the basic needs for their functioning and development;
- reduction of bureaucratic barriers in the internal environment of the regions initiating such phenomena, as "capital flight" and "shadow restructuring" of territorial economy; gradual transition to the flexible mechanisms of territorial management and regulation of the local markets (Granberg 2006).

2. Materials and methods

While studying the complex spatial systems distinguished by functional, structural and institutional heterogeneity, which also include the regional economic systems of contemporary Russia, the practice proves the efficiency of forming heuristic combinations from compatible elements developed within the framework of various methodological approaches. This also relates to the research of different localizations, emerging in the internal environment of regional economies.

Proceeding from the specific features of relations in this environment, and taking into account the major tasks of functional and structural transformations at the sub-regional level of economic relations organization, to achieve the research objective in terms of methodology, it is advisable to ensure the heuristic potential enrichment of the systemic approach, in unity of its functional and structural components, with the cognitive opportunities of institutional approach in the study of sub-regional transformations at the meso-level (Ermolenko and Chernyavskaya 2012, Jensen 1986).

The following principles should provide the framework for the proposed approach to studying the localization of economic formations functioning consistently in the regional economies and having a definite potential for self-organization and self-development towards formation of the systemic interaction between the elements included in them:

- supporting cognitive potential of the systemic approach by methodologically compatible resources of the institutional approach;
- considering the need to take into account a dual nature of the economic formations under study, since they are formed in a climate of natural processes of market interactions, and also under the influence of the regional forces of sociopolitical nature (the economic policy of territorial authorities; the influence of non-governmental organizations, *etc.*);
- positioning the specified formations at the appropriate level of the relations organization in the model of global economic system.

- The proposed enrichment of the heuristic potential of the systemic approach with cognitive opportunities of the institutional approach makes it possible to achieve a number of substantial results of the conducted research:
- to educe and systematize the main kinds of economic localizations in the internal environment of the regional economic systems (the territorial industrial or agricultural complexes, clusters, new industrial areas, economic zones with special development scenarios, *etc.*);
- to identify functional orientation of the specified localizations (for a certain category of public demand, interests of any group of economic entities, *etc.*), and also to estimate the levels of relations development between the elements included in them and stability of these localizations as well as their ability to adapt to different transformations of the internal environment;
- to reveal linkages between the local markets' development and transformation of relations in the internal environment of the regions, in other words, to estimate whether impetuses for the local markets are adequate to the forms of localizing the relations established within the regional economic systems;
- to determine the methods of the institutional arrangement in specified localizations, i.e. to find such rules of law, traditions, corporate procedures, contract types, statuses and forms of conduct, with the help of which the established relations are being strengthened and reproduced (Kerashev 2005).

Summarized analytical results related to the development of localization forms in economic relations in the regions' internal environment – territorial complexes, clusters, special areas, *etc.* – leads to a series of conclusions:

- There is a tendency to the systemic organization of the region's internal environment, in other words, a tendency to the formation of aggregated functional subsystems at the sub-regional level in it, having a potential for the self-organization and self-development; owing to such subsystems, regional economy ceases to be a simple set of enterprises and industries, but acquires the nature of a systemic economic actor, which aspires to institutionalize its own status, and achieve its subjective potential through the active economic policy, formation of the contractual relationships with other economic actors, creation of the mechanisms to protect the interests of the region, its population, commercial organizations and so on. At the same time, the considerable specification of a number of meso-levels of economic relations organization is taking place in the model of global economic system (Table 1).
- The process of formation and development of such sub-regional economic systems is of a dual nature, because it is characterized by the interaction of dialectic pair of opposites: first, reasonably determined (regular) evolutionary process of the contractual relationships in the space of interaction between the local (territorial) market actors (Ovchinnikov and Kolesnikov 2008); second, the process of institutional arrangement of economic relations in the internal regional environment, which was organized in favor of a certain group of entities, and active transformation of these relations based on the achievement of normative and regulatory capabilities, which are typical for territorial elements of governmental authorities, large corporations, small business associations and other entities of this environment.
- The transition of sub-regional economic systems from a path of sustainable development to the crisis one takes place in case of a conflict (an intense confrontation that excludes constructive synthesis) between the specified pair of opposites (Prokhorova 2010).

Table 1 - Sub-regional level of economic relations organization in the pattern of global economic system

Levels of the economic relations organization	Characteristics of the economic relations organization levels and reproduction processes
Mega level	The reproduction of a global product and system of the world economy relations, global space of integration and differentiation
Meso-level 1 (mega-macro)	The reproduction of a product complex and a system of relations within the framework of a TNC (transnational corporation), group of countries, international space of integration and differentiation
Macro level	The reproduction of the GNP and an economic system of a particular country, national space of integration and differentiation
Meso-level 2 (meta-regional)	The reproduction of total product and economic system within the framework of a group of regions, meta-regional space of integration and differentiation
Meso-level 3 (regional)	The reproduction of the GRP and economic system of a territory, regional space of integration and differentiation
Meso-level 4	The reproduction of a total product and functional economic sub-system which is steadily

Levels of the economic relations organization	Characteristics of the economic relations organization levels and reproduction processes
(sub-regional)	localized in the internal environment of a territory, sub-regional space of integration and differentiation
Meso-level 5 (local)	The reproduction of a total product and economic system of the local community, municipal space of integration and differentiation
Micro level	The reproduction of a total product and a system of relations of commercial or noncommercial organizations, the integration and differentiation space controlled by the owners of the capital or parties to a non-commercial organization
Meso-level 6 (micro – mini)	The reproduction of a partial product and sub-system of economic relations in the internal environment of organization, sub-organizational space of integration and differentiation
Mini level	The reproduction of a partial product at one or several workplaces, the integration and differentiation space controlled by fractional employees

Let us specify the conclusions made above with regard to the process of economic localizations development aimed at meeting the food requirements.

Such localizations have existed in the internal environment of the Russian regions for quite a long time (at least since the 1930s), which has been reflected in the functions and structure of the territorial economic policy, as well as in such category forms, as the "regional food sector", "food program", *etc.*

There is a fair idea established in the modern scientific literature that specified localizations are quite heterogeneous in functional, structural, institutional and other terms. In particular, they are characterized by significant gaps in the levels of technological, organizational and economic development, competitive ability and investment attractiveness of certain business processes, as well as their economic entities' belonging to the various economic structures. Over the past decade this heterogeneity became a significant obstacle for addressing strategic objectives necessary for an effective meeting the food requirements of the resident population of Russian regions, and also for ensuring the territorial food security.

Among the academic community, the economic localization is known in its conceptual form as "territorial AIC" (territorial agrarian and industrial complex), and this form fails to adequately reflect the content of the relevant objective relationships, because it reduces their diversity to the result of one of the completed and outlived processes of agro-industrial integration into the centralized economic system (the 1970s–1980s). It is inefficient to reduce the mentioned diversity of relations to the conceptual construct referred to as a "food component of a territory", defining the localization under study only very tentatively, in a quite abstracted way.

Summarizing the provisions mentioned above and also based on the systemic paradigm of the modern economics, it is appropriate to propose a new scientific idea, which enriches the concept of economic relations development at the sub-regional level of their organization – the idea of consistent transformation of the current food component of the regional economy into the functional subsystem of the similar grade, having the ability to self-organization and potential for self-development, being adequate to the conditions of global integration of economic relations and post-industrial transformations. Accordingly, the specified transformation promotes systemic development of the regional economy and creation of full-fledged regional economic systems in the economic space of contemporary Russia on its base.

To some extent, the territorial component of the Food Program of the 1980s was a historical prototype of the proposed idea. Assessing the potential of this idea with regard to the current period, it should be taken into account that the food component of regional economy, being initial in relation to the subsystem of our interest, includes heterogeneous elements, which is illustrated by the results of its institutional and economic analysis given in Table 2.

Table 2 - Results of institutional and economic analysis of the food component structure of regional economy

Current basic institutions of the component	Established transferred and newly created institutions
The traditions and norms of allocating investment support and providing government care for agriculture	-
The focus on rent by the major part of food market players	Farming in agricultural element of food component
The traditional predatory attitude towards basic asset (land) which takes part in the food reproduction process	Contracting as a way of communication between the of local food market players
Stable predominance of collectivism over individualism in frame of institutional organization of component	-

The surviving functions and structural elements of economic relations of the centralized economy	New established functions and structural elements of economic relations
Projecting the structural organization of the territorial AIC onto the food component	Agency function of the local food market players
Local authorities' function of "command" over the food reproduction actors	Structure of the holding companies' financial control over the food reproduction elements, which are interesting for them
Function of redistribution of significant income part formed in the frame of food component	Speculative function in the movement of local food markets
Structure of the land latifundium	Sharing of the local food markets between several top-rank players
-	Creation of effective capital combinations

Summary of the analytical results given in Table 2 enables to conclude that the condition of institutions and economic relations of the initial regional component makes it possible for the phenomenon of heterogeneity to emerge within the framework of formation and development of regional food subsystems (Risin 2006).

The phenomenon of the heterogeneity means the combination of various types of coordination in such subsystems for an extended period of time, in other words, consolidation of a temporary compromise between the "old" and "new" institutions and economic relations (Rubina and Rubin 2009).

The heuristic potential of the modern theory of contracts is highly sought for in the research of functional subsystems of a sub-regional level (Artemov *et al.* 2013). If local market players cooperate for a long time in the framework of a system of sustainable contracts which are strategically important and prospective for them (a phenomenon of assets specification), a systemic kind of relations between the market players starts to be formed based on the regular reproduction of such interaction, and it is organizationally embodied in a certain functional subsystem of the region.

However, this is only one part of the process of our interest. It should be considered that territorial economic localizations form in the pattern of contemporary Russia's economy with the close involvement of relevant links of the powerful vertical of governance. Such circumstance is determined by the method of institutional arrangement of an enormous economic space of the Russian Federation. In the "spatial economics", in context of human factor deficit and existence of enormous and mostly uncultivated territories, the government has to bear the burden of social responsibility for the creation of overall conditions and organization of reproduction process. Since the forces of horizontal economic interactions in the "economy of space" pattern are often insufficient to provide sustainable reproduction development, the focus shifts to the potential of powerful impact in the formation and development of economic systems.

Proceeding from the dual nature of the process of the functional subsystems formation and development in the regional internal environment, it is appropriate to define an objective economic basis of this process – the forces of natural attraction (self-organization) of the local market players linked steadily with the help of contracts coming and possessing resources and factors of economic process (Belousova and Chernyavskaya 2011). The specified forces of natural attraction have the following properties:

- first, they are only applicable to those market players which are compatible (complimentary) in functional and institutional terms, which means they are capable of self-organization in the market space;
- second, such forces are oriented towards the formation of the systemic relations between the local market players, in other words, finally, towards creating effective capital combinations in the market space and obtaining the relevant synergetic effect.

3. Results

The generalization of analytical results of the specified natural attraction forces in the local food market makes it possible to define specific features (generic differences) of the regional food subsystem:

- the functional orientation to meet the interrelated complex of food needs of the local population, accordingly, change in the specified complex of needs leads to the functional and structural transformation of this subsystem, which means this subsystem has the appropriate potential to adapt to the changes (Belousova 2011);
- the formation of this subsystem based on the specification of interaction between the local food market players (mutual adaptation of assets, contract types, forms of conduct of the parties to a transaction), which determines the need for a special tool for developing the specification in the system of regional

economic policy;
- the combination and entwinement of various risks in the space where the food subsystem forms; the food subsystem is characterized by high economic risks, because it involves economic actors of agrarian structures, food industry, *etc.*;
- the need for targeted institutional and infrastructural support of this subsystem formation process, which is induced by the significance of stable provision of demands for food products and the level of risks in the food subsystem (Bzhasso 2014, Bershitsiy *et al.* 2016, Dudin *et al.* 2017, Cozzani and Zanelli 2007, Gubinelli and Cozzani 2008);
- the concentration of the most valuable resources and factors of economic processes creating the territorial food fund; owing to such concentration, various options of effective capital combinations can appear in the food subsystem, implementation of these options results in the efficient functioning of this subsystem;
- the consolidation and development of competitive advantages of the region in the systemic food supplies; it is rightful to conclude that the food subsystem provides an innovative type of expanded reproduction of the specified competitive advantages under the conditions of accelerating the post-industrial transformations.

The summary of the analytical results related to the conceptual notions of the evolutionary process imperatives presented in the modern scientific literature enables to renovate the concept of "imperative" with regard to the study of process of functional subsystems emerging in the internal environment of the region. In the context of our research, the specified concept appears in a new interpretation – as a significant form of manifestation of objective economic laws in a number of transformation processes aimed at creating and developing functional subsystems in the internal environment of the region:
- transforming a set of norms of the territorial regulatory framework, and creating a special group of sub-regional norms;
- updating the objectives and instruments of regional economic policy, including the formation of its systemic sub-regional component.

Evaluation of the demands existing at the meso-level in transformations specified above viewed from the perspective of new interpretation of the "imperative" concept helps reveal a number of imperatives relevant to the process of the regional food subsystem formation:
- The imperative of the region's system competitiveness, which focuses the food subsystem formation on the creation of conditions for a regular and qualitative update of the regional competitive advantages in meeting the demands for food. In this context, of the regional food subsystem has the following fundamental advantages over the territorial agribusiness: first, the agribusiness was formed in the centralized economic system upon a command received from "above" and it is a quite rigid structure, while the food subsystem is formed by the natural forces of market attraction and belongs to the category of soft and adaptive structures; secondly, there are new competences concentrating, combining and intersecting in the food subsystem, which ensures a sufficient synergetic effect.
  Under current conditions, the core competences of the subsystem become the source of competitive advantage (Hamel and Prahalad 2002), because new knowledge, forming such competences, provides the access to the extended set of markets, makes a considerable contribution to the benefits of the final products perceived by the consumers, and complicates the tasks of their reproduction for rivals. The core competences are backed up by the innovative intangible assets and human capital of the emerging food subsystem; hence strategic objective is to accumulate specified assets of higher priority.
- The imperative of the region's food security, within the framework of this subsystem, implies expanded reproduction of the aggregated instruments protecting against risks and threats which arise in the sphere of food supplies for the territory. In this regard, let us underline the immediate threat of the scientific potential loss as a basis of the further food subsystem development. Thus, in the Russian Federation, the amount of articles published annually and containing significant results of scientific studies decreased by more than 30% during the period of market transformations (1993 - 2010). This process has been accelerating: over the period of 1999-2003 Russian scholars accounted for 3% of total amount of publications in the world scientific publications, whereas over the period of 2003 - 2009 their share became less than 2%, amounting to 2.1%, in 2014 and 2.31% in 2015.
  The reproduction approach to the regional food security achievement is shown in Figure 1. The food

security instruments of the Krasnodar Territory formed in line with the reproduction approach are presented in Table 3.

Figure 1. The reproduction approach to the achievement of food security of the region

Table 3. The food security instruments in the economic system of the Krasnodar Territory

Threats to the food subsystem	The food security instruments
The local food market players' own working capital deficit	Improvement of the effectiveness of the state investment support, creation of conditions for financial stability and paying capacity of the local market players
Low investment attractiveness of food business	Creation of new competences (technologies of deep and complex processing of food raw materials, methods of storage and transportation of agricultural products, *etc.*)
Rise in price of the credit resources	Implementation of a system of soft loans for successful participants in the food business
High level of physical wear and technological obsolescence of basic capital elements	Development of bank lending and lease instruments for renewal of the basic capital elements, research and development support
Shortage of experienced personnel	Development of employees' training and proficiency enhancement system within the framework of innovative development model of the regional food subsystem
Imbalance in the development of the food component	Development of the relevant system component of the regional economic policy
Disintegration of the food component of the regional economic system	Deeper transformations of this component, formation of the food subsystem

- The imperative of the investment attractiveness of the regional system, which links the food subsystem development to the movement of investment flows as a base of evolutionary process in current "financial" economy. To ensure investment attractiveness of the regional economic system means to create the following main conditions in the process of this food subsystem formation and development:
  - *first*, concentration of exclusive competences attractive for investors in the framework of this subsystem;
  - *second*, creation of the adequate mechanism for protection of property relations between all players in the local food market;
  - *third*, the need to foster effective cooperation between financial and real sectors of the regional economic system, which provides investment transformation into innovative transformations of the food subsystem assets and the regional system in general.

The analytical results of the forms of interaction between the organizations of financial and food sectors are given in Table 4. The data given in Table 4 reveal that there are significant gaps between the financial sector organizations and the food sector organizations of the Krasnodar Territory in many aspects of interaction – in particular, a large discrepancy between increasing demands of the food component of the Territory's system for insurance, consulting and auditing services, and miserable percentage of the cost of these services in the food cost available in the local market of the region. In

fact, food business entities limit themselves to ordinary services of credit organizations (Stein *et al.* 2001, Trubilin *et al.* 2016).

Table 4. The estimation of forms of interaction between organizations of financial and food sectors in Krasnodar Territory

Type of financial organization	Financial services provided	Percentage of the cost of financial services in the cost of food products produced, 2016, %
Credit organizations	Cash and settlement services, money transfers, deposit products; general forms of credit activities, provision of credit for field works; mortgage services for rural areas, credit secured by purchased machinery, refinancing of credits granted to the citizens involved in the private subsidiary farming	5.10
Insurance organizations	Insurance: crop and perennial plantings, farm livestock, water bodies, agricultural machinery/equipment; agricultural products for the period of storage, agribusiness property, crops, risks; liability of directors and executives; life and health of personnel.	0.21
Investment funds, companies, consultants	Financing of agribusiness investment projects. Arrangement of securities issues, support in public offering (IPO), advising on issue, offering and sale of securities. Legal services for investment projects and investment processes.	0.02
Accounting and auditing companies	Teacher training and proficiency enhancement for accountants, consulting services, evaluation, auditing, accounting records maintenance, financial consulting, business-planning, budgeting, financial analysis, management accounting.	0.02

To provide the investment attractiveness of the regional food subsystem, it is reasonable to use the potential of public-private partnership (PPP) – the institutional, organizational and economic alliance of government authorities and private sector entities.

The PPP is oriented to implement publicly important projects related to the development of sensitive economic industries creating public, private and mixed goods, which is typical for the food components of regional economic systems in contemporary Russia; at the same time, a significant part of these goods is created in their "shadow" sector.

The results, which were attained using different forms of PPP at all levels of economic relations organization, allow deriving a relevant investment effect when using PPP to develop the food subsystem. The heterogeneity of this subsystem mentioned above requires the use of specific instruments for mixed economy development, enabling to legalize a potential for development which can be found in the "shadow" sector of the region (Soto 2004). Thus, the scientific knowledge increment obtained in this study is represented by the following basic elements:

- the proposed new scientific idea enriches the concept of the development of economic relations at the sub-regional level of their organization - the idea of transforming the existing food component of the regional economy into a functional subsystem of the appropriate profile that has the capacity for self-organization and the potential for self-development, being adequate to the conditions for the global integration of economic relations and post-industrial transformation; developing previously obtained scientific results (Ermolenko 2008, Popov 2010, Sapir 2001), this scientific idea enables to activate systemic studies at the sub-regional level, revealing additional opportunities for increasing the competitiveness of the local food market players in contemporary Russia;
- the methodological approach is substantiated to the study of localization of functional subsystems in regional economies based on the following principles: the reinforcement of cognitive potential of the systemic approach with the methodologically compatible resources of the institutional approach; the need to take into account the dual nature of the functional subsystems under study; positioning of these subsystems in the model of the global economic system; developing previously obtained scientific results (Anoshkina 2006, Kleiner 2004, Risin 2006), this methodological approach makes it possible to uncover the interrelations between the development of local markets and the transformation of relations between the internal environment of the regions, and also to establish the way of institutional sequencing of the said functional subsystems;
- proceeding from the dual nature of the process of forming and developing the functional subsystems in

the internal environment of the regions, the objective basis of this process is disclosed: the forces of natural attraction (self-organization) of the players in the local markets which are sustainably connected with each other through contracts and have resources and factors of the economic process that are compatible (complementary) in functional and institutional terms; such forces are aimed at forming a systemic quality of interaction between the local market players, creating effective capital combinations in the market space and obtaining the relevant synergetic effect; developing previously obtained scientific results (Arrighi 2006, Prokhorova 2010, Williamson 1996), this objective basis makes it possible to determine the content and character of the development of the functional subsystems in the contemporary Russia's regions;

▪ the imperatives of the process of forming a regional food subsystem are revealed: a) the imperative of the region's system competitiveness; b) the imperative of the region's food security; c) the imperative of the region's investment attractiveness; in contrast to the previously obtained scientific results (Granberg 2006, Nechaev 2009, Ovchinnikov and Kolesnikov 2008), these imperatives set the vector of the system component of the territorial economic policy oriented to the formation of the region's food subsystem;

▪ the main restrictions are determined that arise in the process of the food subsystem development in the Krasnodar Territory under the influence of the above three groups of factors of the specified process: high volatility of the global food market and actual unpreparedness of the majority of actors involved in the food reproduction to the conditions of the WTO for the group of mega-factors; the lack or underdevelopment of many institutions of the national food market and inertial nature of state policy in the agribusiness field for the group of macro factors; a high level of corruption and available powerful mechanisms of administrative centralization of the capital of the local food market players for the group of meso-factors; in contrast to the previously obtained scientific results (Belokrylova and Bochkov 2008, Slepakov 2007, Sibirskaya 2003), knowing about these limitations it is possible to justify a long-term strategy for the development of the food subsystems of the Krasnodar Territory and make the necessary adjustments to the relevant component of the region's economic policy.

4. Analytics

The mission of the food subsystem differs from that of ordinary commercial and non-profit organizations. Let us define these differences:

▪ The needs of the regional economic system development and the specific conditions for its existence in the economic space of Russia, which outline the objective conditions for the formation of the social mission of the food subsystem. In this respect, the characteristic features of the organization of the Russian economic space are its exceptional heterogeneity and uneven development, largely conditioned by natural differences, the evolution of the Russian state, the complicated structure of economic development of the modern territory of the country, *etc.* The asymmetry can be singled out between the Russian regional economic systems existing in the main parameters: land area, number and density of population, income per capita, amount of regional wealth, the cost of operating capital and infrastructure facilities, and others.

This asymmetry lays the foundation for the formation of significant gaps in the development of regional systems, which is very pronounced in the economic space of the Southern Federal District (Table 5).

Table 5 - Main development indicators of the Southern Federal District in 2016

SFD territorial entity	Turnover of organizations,* RUB mn	Fixed capital investment, RUB mn	Cost of a minimum set of foodstuffs, RUB	Average monthly per capita incomes, RUB	Average monthly per capita consumer spending, RUB	Subsidies to the consolidate budget, % of the budget revenues
Republic of Adygeya	82,583.7	15,391	13,243.8	23,600	17,817	35.9
Republic of Kalmykia	47,291.7	13,510	12,953.4	14,569	7,441	53.6
Republic of Crimea	248,280.1	52,965	12,990.2	18,071	13,585	65.2
Krasnodar Territory	1,946,759.7	428,972	14,905.3	32,785	27,018	12.8
Astrakhan	320,735.0	118,625	12,925.3	22,760	17,684	23.0

SFD territorial entity	Turnover of organizations,* RUB mn	Fixed capital investment, RUB mn	Cost of a minimum set of foodstuffs, RUB	Average monthly per capita incomes, RUB	Average monthly per capita consumer spending, RUB	Subsidies to the consolidate budget, % of the budget revenues
Region						
Volgograd Region	735,293.1	181,485	12,971.0	20,739	16,088	19.6
Rostov Region	1,171,784.1	287,413	14,222.9	27,104	21,843	18.6
Sevastopol (federal city)	37,867.6	12,087	13,091.5	24,937	21,050	52.6
TOTAL	936,055.9	1,110,446	13,353.6	26,308	21,104	

Note: *2015
Source: Compiled by the authors based on FSSS, 2017

As can be seen from Table 5, all regions of the district were subsidized in 2016. These territories acted as actual objects of the nation-wide redistribution of budgetary and financial resources, which was implemented within the framework of the constructed "budget federalism" system. And although the common balance of budget flows associated with the action of the budgetary-taxation mechanism in the "center-regions" system is positive for the South of Russia, the overall "inflow" of financial resources into the region is weak. At the same time, the SFD has favorable conditions for the agribusiness development, high recreational potential, relatively low costs of processing enterprises development owing to the climate and infrastructure advantages, developed transit functions and seaports, as well as conditions for the development of large agglomerations (Strategy for the development of the Southern Federal District until 2025, 2008). But while these advantages are practically not implemented, in the structure of the Russian economy, the South of Russia stands aloof from the most capacious and promising markets, centers for political and economic decision-making, and a poorly competitive region on the global scale.

- The priority position occupied by the food subsystem in the regional economic system of many, if not all, regions of modern Russia (Table 6)

Table 6 - Structure of production of the regions of the Southern Federal District in terms of types of economic activity, 2016

SFD territorial entity	Mineral resource extraction, as % of total	Production of energy, gas, water, as % of total	Processing enterprises as % of total	Agricultural output		Food production	
				RUB mn.	as % of total	RUB mn.	as % of total
Republic of Adygeya	0.92	0.70	2.05	21,365	2.17	29,201	4.30
Republic of Kalmykia	-	0.76	0.03	24,631	2.50	241	0.04
Republic of Crimea	4.72	7.81	3.14	67,101	6.82	31,896	4.70
Krasnodar Territory	15.17	30.14	35.00	402,846	40.94	346,695	51.10
Astrakhan Region	53.63	7.15	2.62	39,785	4.04	7,059	1.04
Volgograd Region	17.43	15.95	26.11	145,488	14.78	74,527	10.98
Rostov Region	8.14	35.69	30.45	280,942	28.55	184,619	27.21
Sevastopol (federal city)	-	1.80	0.59	1,889	0.19	4,289	0.63
Total SFD	100	100	100	984,046	100	307,571.7	100

Source: Compiled by the authors based on FSSS, 201

Table 6 demonstrates that the share of the economic system of the Krasnodar Territory in the SFD output indicators is most significant precisely in the context of food production; accordingly, the food subsystem formation and development are vitally important for this region (the Territory accounts for 40.94% of total SFD volumes in terms of agricultural output and 51.10% - in terms of food production). Table 7 presents the data on gross harvest and crop yields in all categories of the SFD households in 2016. The Krasnodar Territory has a strong lead in the SFD in production of grain crops, sunflower, sugar beet and potatoes, ranks 3rd in the district in terms of production of vegetables. The yield of such crops as grain, sunflower, sugar beet is much higher in the Krasnodar Territory than the yield indicators in other regions of the district.

Table 7 - Indicators of crop harvesting and yield in the regions of the Southern Federal District in 2016

SFD territorial entity	Grain and leguminous crops	Sunflower	Sugar beet	Potato	Field vegetables
Croppage, thousand t					
Republic of Adygeya	699.6	89.8	-	40.5	69.4
Republic of Kalmykia	500.1	4.2	-	8.6	16.6
Republic of Crimea	1,286.5	152.0	-	258.1	365.6
Krasnodar Territory	13,979.0	1,072.3	9,988.2	622.7	872.2
Astrakhan Region	29.2	-	-	315.3	905.3
Volgograd Region	4,524.4	813.4	-	415.7	923.2
Rostov Region	11,595.8	1,264.5	1,001.0	445.2	737.8
Sevastopol (federal city)	1.5	-	-	3.2	2.4
Crop yield, hwt/ha					
Republic of Adygeya	46.6	16.3	-	121	131
Republic of Kalmykia	25.6	10.9	-	127	138
Republic of Crimea	25.8	13.1	-	170	247
Krasnodar Territory	56.6	25.3	556	112	120
Astrakhan Region	29.7	-	-	246	379
Volgograd Region	24.0	14.3	-	134	294
Rostov Region	35.7	21.4	546	133	215
Sevastopol (federal city)	26.0	-	-	169	135

Source: Compiled by the authors based on FSSS, 201

- The correlation between the resources and provision of the population with food supplies at the present stage of its socio-economic development (Table 8).

Table 8 – Food supplies with agricultural products of own production in the Russian Federation, %

Agricultural products	2006	2007	2008	2009	2010	2016
Meat	63.0	65.5	66.6	70.6	72.2	90.5
Milk	82.3	83.1	83.2	82.9	80.5	88.9
Eggs	98.9	98.6	98.9	98.8	98.3	108.8
Potato	101.3	97.6	100.0	102.0	75.9	187.6
Vegetables, melons and gourds	82.8	80.2	86.8	87.3	80.5	99.1

Source: Compiled by the authors based on Rosstat (20170

According to the data given in Table 8, except for eggs and potatoes, Russia fails to independently meet its own demand for agricultural products, despite the fact that the country has the necessary conditions and considerable experience in their production.

It should be noted specially that the results of the analysis of food consumption in the Krasnodar Territory indicate that consumption of almost all products in the Kuban exceeds similar figures for Russia (except for dairy products). The enhanced nutrition of the region's residents is partly explained by the fact that they get higher incomes than on the average for Russia (Table 9). However, this circumstance further actualizes the formation and development of the food subsystem of the Krasnodar Territory as a priority structural unit of the internal environment of the region.

Table 9 - Distribution of population by the value of average per capita monetary income in 2016, as % of total

SFD territorial entity	Average monthly per capita incomes, RUB							
	below 7,000	7,000.1 – 10,000.0	10,000.1 – 14,000.0	14,000.1 – 19,000.0	19,000.1 – 27,000.0	27,000.1 – 45,000.0	45,000.1 – 60,000.0	Above 60,000.0
Republic of Adygeya	8.1	10.7	15.6	17.1	19.1	19.3	5.5	4.6
Republic of Kalmykia	22.2	18.7	19.9	16.0	12.8	8.3	1.4	0.7
Republic of Crimea	9.4	14.4	20.6	20.3	18.8	13.2	2.3	1.0
Krasnodar Territory	5.3	7.1	11.2	13.7	18.0	23.4	9.2	12.1
Astrakhan Region	9.4	11.5	16.0	17.0	18.5	18.2	5.2	4.2
Volgograd Region	7.7	12.0	18.0	19.2	20.0	17.1	3.8	2.2

SFD territorial entity	Average monthly per capita incomes, RUB							
	below 7,000	7,000.1 – 10,000.0	10,000.1 – 14,000.0	14,000.1 – 19,000.0	19,000.1 – 27,000.0	27,000.1 – 45,000.0	45,000.1 – 60,000.0	Above 60,000.0
Rostov Region	6.5	8.9	13.6	15.8	19.1	21.7	7.2	7.2
Sevastopol (federal city)	5.5	9.0	14.7	17.5	20.7	21.6	6.2	4.8

Source: Compiled by the authors based on FSSS, 2017

As can be seen from Table 9, the share of the population of the Krasnodar Territory in the groups with the lowest incomes was less than the corresponding indicator for other territorial entities of the Southern Federal District. In addition, the share of the population with the largest incomes in the Territory exceeds these figures for other territorial entities of the Southern Federal District (for example, 23.4% of the population of the Krasnodar Territory get income ranging from 27 to 45 thousand rubles per person).

Table 10 provides information on the distribution of the total amount of monetary income of the Krasnodar Territory by the 20-percent population groups with different income levels. Since 2000, the distribution of incomes of the population of the Territory has been polarized. One fifth of the population receives 47.2% of all income. The wealthiest fourth and fifth groups of the population together account for 69.8% of total income.

Table 10. Distribution of total monetary income of the population of the Krasnodar Territory

Indicator	2000	2005	2010	2016
Overall monetary income, %	100	100	100	100
Including breakdown by the 20-percent population groups: first (with the least income)	5.7	5.8	5.3	5.3
Second	10.5	10.6	9.9	9.9
Third	15.4	15.6	15.0	15.0
Fourth	22.8	22.8	22.6	22.6
Fifth (with the largest income)	45.6	45.2	47.2	47.2

Source: Compiled by the authors based on FSSS, 2016

For the purposes of our study, it is of interest to analyze the purchasing power of the monetary incomes of the population of the Krasnodar Territory with regard to food products, that is, the food equivalent of the average monthly per capita income (Table 11). According to the Table 11, over the last decade, the purchasing power of average per capita income of the population of the Krasnodar Territory has grown significantly by all indicators of food products. This again confirms the conclusion that the food subsystem is in demand in the region. The general trend of changes in purchasing power in recent years is characteristic: this indicator shows the progressive growth until 2016.

Table 11. Purchasing power of average per capita income of population of the Krasnodar Territory, food products, kg/month

Indicator	2008	2009	2010	2015	2016
Beef (except for boneless meat)	95.3	92.2	100.3	98.8	98.4
Pork (except for boneless meat)	88.4	87.3	97.2	110.1	117.9
Mutton (except for boneless meat)	80.5	79.7	82.2	90.3	89.0
Poultry (chilled and frozen)	162.3	164.2	185.9	223.7	232.0
Frozen fish (except for salmon varieties and fish fillet)	200.6	188.1	215.5	193.8	182.1
Liquid milk, liter	603.7	585.5	548.6	565.0	539.0
Chicken eggs, pieces	4,209.0	4890	5,548.0	5,302.0	5,240.0
Sunflower oil	206.0	268.4	315.5	318.3	278.2
Margarine	231.8	242.4	269.0	280.9	253.6
Butter	88.4	93.8	89.1	78.6	72.9
Sugar	624.0	553.7	525.5	571.6	575.7
Salt	1,649.5	1,571.5	1,689.7	2,114.3	1,986.1
Black baikhovi tea (including bagged tea)	59.8	32.9	35.7	33.6	30.4
Potato	811.1	976.4	928.9	1112.7	1,415.5
Cabbage	825.5	1,094.6	800.9	1042.3	1,297.2
Onion	747.2	877.3	732.3	968.1	1,232.7
Carrot	588.7	729.0	657.6	741.8	948.9

Indicator	2008	2009	2010	2015	2016
Apples	259.5	287.4	330.5	336.4	330.3
Wheat bread, rolls and buns	480.6	506.4	560.2	601.7	577.1
Rye and rye-wheat bread	621.1	648.8	710.1	751.9	708.4
Wheat flour	718.1	813.5	975.7	941.8	924.1
Vermicelli	388.9	393.6	454.6	495.2	465.3
Rice	380.3	364.4	446.5	461.5	466.5
Cereals	635.0	732.8	100.3	731.8	695.9

Source: Compiled by the authors based on Krasnodarstat Updated data, 2017.

▪ The need for a rational transformation of the existing territorial agribusiness in the conditions of the formation of the global food market and the evolution of competitive interaction between entities.

Estimating these circumstances, it should be noted that in recent years, the lack of equivalence in the exchange of agricultural goods with other sectors of the economy has significantly increased, the prices for energy carriers, mineral fertilizers, and agricultural machinery continue to grow. This means that the mechanisms of territorial agribusiness do not actually act in the interests of the region. Thus, producer prices for sold agricultural products grew by 2.4 times from 2007 to 2016, and prices for industrial products and services purchased by agricultural organizations increased by 4.9 times. Due to low profitability, the production potential has shrunk in agriculture more than in other industries. The lack of necessary cash inflows led to a sharp decrease in purchases of new machinery and equipment and excessive physical deterioration and technological obsolescence of the active part of the fixed assets of the territorial agribusiness enterprises. Therefore, even with the expansion of demand for domestic food products, growth in its production is constrained by internal resource limitations caused by the agribusiness mechanisms.

The economic situation in the agribusiness identifies the presence of a high proportion of unprofitable enterprises in its structure. Lowered level of agricultural technical equipment capability, reduction and aging of the machine and tractor fleet affected the condition of the material and technical base. The normal functioning of the local agribusiness is hampered rather by purely internal reasons – the lack of an effective system for the reproduction process management, the available inter-sectorial barriers, the disruption of sustainable links between agricultural producers and processing enterprises, the concentration of excessively high risks, insecurity of property rights, *etc.*, than the underdevelopment of the agrarian markets (Jensen 2001, Plotnikov *et al.* 2015, Trubilin *et al.* 2017).

Suppliers of production means for agriculture and food industry, formally included in the agribusiness, are not adapted to the needs of their customers. Two groups of economic entities should be distinguished among them:

▪ enterprises that work exclusively for the domestic market (agricultural machinery plants);
▪ enterprises with export potential (producers of mineral fertilizers).

The first group of entities, faced with a sharp contraction in the market of their products, found themselves in a deep crisis. The long-running processes of restructuring and modernization led its participants to a critical lag behind the growing needs of modern food production. The situation is aggravated by the fact that the organization of dealer networks of a modern type and the formation of leasing companies are restrained.

The second group of entities, representing export-oriented industries, did not suffer so much from narrowing demand in the domestic market, as they found their niche in the foreign market. At the same time, the development of its participation in the domestic market is limited by the gap between global and domestic prices for fertilizers, crop protection agents and other "currency" products. Accordingly, these products are becoming increasingly inaccessible to domestic agriculture, which belongs to the deep periphery of the world economy.

The disintegration of economic ties between the entities that are part of the formally retained agribusiness, the growing competition with foreign food market players, and, finally, inadequate provision of food supplies suggests the conclusion that the proposed food subsystem of the region has a mission which differs qualitatively from the territorial agribusiness.

Let us generalize the above statements and partial conclusions. The analysis of the institutional and economic conditions for the food subsystem formation in the regions – territorial entities of modern Russia enables to establish that its mission is conditioned by the objective circumstances:

▪ the strategic importance of ensuring the needs for foodstuffs for people's material lives; at the same time, it is necessary to take into account the regional specifics of these needs and their dynamic renewal in the process of post-industrial transformation;

- the rise of the role of the regions in the development of the economic system of contemporary Russia, which is reflected in the activation of regional economic policy, the growing importance of the contribution of food subsystems to the development of those regions that are considered to be the "breadwinners" of the country (the Krasnodar Territory, Stavropol Territory, Volgograd Region, *etc.*);
- the development of competition in the world food market and the need to update the competitiveness potential of the region, which focuses the attention of the territorial economic policy developers on the constant renewal of the competitive advantages of local food market players, as well as on the scientific and educational support for the development of food subsystems forming in the regions;
- the correlation between resources and food supplies of the population of the territory in the context of economic development intensification; one of the social mission aspects of the forming food subsystem is the effective use of available limited resources for provision of food products;
- the need for a rational transformation of the economic mechanisms of food supplies that have formed in the conditions of centralized management, since they do not provide satisfactory nutrition for the population, even in the regions of Russia with relatively high incomes and favorable conditions for food production (Table 12).

Table 12. Per capita (normative and real) consumption of a number of basic food products, kg/year

Food products	Institute of Nutrion norm	Normative amount acc. to FZ-44	Consumption in Russia				Consumption in the world		
			1998	2004	2011	2016	Krasnodar Territory 2016	USA 2014	France 2011
Meat and meet products	81	37.2	44	49	62	68	73	118	89
Milk and dairy products	392	238.2	219	233	246	236	224	276	250
Vegetable oil	16	13.8	8.9	11.6	13.1	13.7	17.4	31	18.0
Fish and fish products	25	16.0	9.8	11.9	15.2	21.1	20.0	23	26.7
Eggs, pcs.	292	200	236	242	262	273	325	263	227
Sugar	41	22.2	33	37	38	39	50	59	38
Bread and bread products	110	133.7	118	119	119	117	132	132	148
Potato	118	107.6	123	128	129	113	94	56	55
Vegetables, melons and gourds	139	97.0	78	99	100	112	137	113	104
Fruits	71	23.0	31	45	53	61	68	99	114

Source: Compiled by the authors based on FSSS, 2017

5. Discussion

The social mission of the regional food subsystem is an important instrument of cognition, which enables to reduce significantly the level of uncertainty of ideas related to the phenomenon under study. There are two visions of the mission emphasized in the modern scientific literature:

- a strategic (applied) vision, in the frame of which the mission is exposed as a base of economic power, market individuality and commercial success of a certain subject (the food subsystem, in this case), and at the same time as the core of its *business* strategy;
- a conceptual (worldview) vision, in the frame of which the mission is exposed as a substance of this subject, some kind of a common source which combines all the types of its activities, and also ensures the continuity of all cycles of the reproduction process, accumulation of organizational capital, *etc.*

To achieve the goal of this research, it is important to understand the following interrelations: successive affinity between the conceptual and strategic visions of the food subsystem mission — the strategic vision is a result of concretization, enrichment of conceptual vision; the mission of this subsystem is conditioned by the set of objective factors typical for the process of its formation.

Conclusion

The analysis of institutional and economic conditions of the food subsystem formation in the regions – territorial entities of contemporary Russia reveals that its mission is determined by the objective factors:

- a strategic relevance of providing food supplies for material life of people; at the same time consideration must be given to the regional specificity of demands for food and their dynamic update in the process of post-industrial transformations;
- an increasing role of the regions in the development of economic system of contemporary Russia, which is reflected in activation of regional economic policy, enhancing importance of the contribution of food subsystems in the development of those regions which are referred to "breadwinners" of the country (the Krasnodar Territory, Stavropol Territory, Volgograd Region, *etc.*);
- the development of competition in the world food market and the necessity to update the potential of the region's competitiveness, which attracts attention of the territorial economic policy makers to the constant update of competitive advantages of the local food market players, and also to the academic support of the development of food subsystems forming in the regions;
- the correlation between resources and food supplies of the territory's population in the conditions of economic development intensification; one of the social mission aspects of the forming food subsystem involves using limited resources available for the food supplies effectively.
- the need for rational transformation of economic mechanisms of food supplies formed in the conditions of centralized economy, as they fail to provide adequate nutrition for the population even in those regions of Russian Federation, where the income is relatively high, and conditions for food production are favorable.

Applying the cognitive potential of the reproductive approach, and also summarizing the above statements and partial conclusions, it is appropriate to define the mission of the regional food subsystem as follows: it implies sustainable reproduction of food products and associated competitive advantages necessary for proper development of numerous entities of the region's economic system; this reproduction is based on the mechanisms specifying the relations of the local food market players, their core competencies, infrastructure and resource base of the territory.

References

[1] Anoshkina, E.L. 2006. *Regional formation: Institutional and economic bases*. Moscow: Academic Project.

[2] Arrighi, G. 2006. *Long twentieth century.* Moscow: Territory of the future.

[3] Artemov, O.Yu., Kozhanova, A.V., Makashov, I.N., Ovchinnikov, S.A., Ovchinnikova, N.V., and Chistyakova, K.A. 2013. *History of management thought:* Textbook. *Moscow*: Russian State University for the Humanities Press.

[4] Belokrylova, O.S., and Bochkov, A.A. 2008. Prospects for post-crisis modernization of the Russian economy. *Economic Bulletin of Rostov State University,* 6(4): 36-44. Available at: http://ecsocman.hse.ru/data/ 197/634/1219/journal6.4-4.pdf

[5] Belousova, A.V, and Chernyavskaya, S.A. 2011. Formation of the food subsystem of the region and tools for its development. *Bulletin of the Adyghe State University. Series 5 "Economics*", 4: 125-131.

[6] Belousova, A.V. 2011. Intensification of the development of the food subsystem in the Krasnodar Territory. *Business in the Law,* 6: 15-25.

[7] Bershitsiy, Yu.I., Saifetdinova, N.R., Tyupakov, K.E., Vasilieva, N.K., and Artemova E.I. 2016. Justification of the structure and size of major productive resources of agricultural organizations. *International Journal of Applied Business and Economic Research*, 14(10): 7267-7287.

[8] Bessonova, O.E. 1997. *Institutes of the Russian distributing economy: Retrospective analysis.* Novosibirsk IE and OPP SB RAS Press.

[9] Butov, V.I., Ignatov, V.G., and Ketova, N.P. 2000. *Bases of regional economy*. Moscow: University.

[10] Bzhasso, A.A. (2014). Key objectives of anti-crisis regional economies management. *Bulletin of the Adyghe State University. Series Economics*, 2(141): 30-35. Available at: http://vestnik.adygnet.ru/files/2014.2/ 3298/30-35.pdf

[11] Chepurnykh, N.V., Novoselov, A.L., and Merzlov, A.B. 2006. *Regional development. Countryside*. Moscow: Nauka.

[12] Cozzani, V., and Zanelli, S. 2007. An Approach to the Assessment of Domino Accidents Hazard in Quantitative Area Risk Analysis. *Journal of Hazardous Materials*, 130: 24-50.

[13] Dudin, M.N., Gayduk, V.I., Sekerin, V.D., Bank, S.V., and Gorokhova, A.E. 2017. Sixth technological mode and green economy as the basis of strategic reclamation of arctic territories. *Academy of Strategic Management Journal*, 16(SI 1): 71-81.

[14] Ermolenko, A.A. 2008. About the way of existence of the economic system of contemporary Russia. *Scientific Thought of the Caucasus,* 4: 5-11. Available at: https://cyberleninka.ru/article/v/o-sposobe-suschestvovaniya-ekonomicheskoy-sistemy-sovremennoy-rossii

[15] Ermolenko, A.A., and Chernyavskaya, S.A. 2012. *Conceptual aspects of the region's food subsystem development.* Maykop: Adyghe State University Press.

[16] Granberg, A.G. 2006.*The economic space of Russia: The problems of integrity and effective functioning.* Moscow: State University of Management Press.

[17] Gubinelli, G., and Cozzani, V. 2008. Assessment of missile hazards: Evaluation of the fragment number and drag factors. *Journal of Hazardous Materials*, 134: 12-40.

[18] Hamel G., and Prahalad K. 2002. *Competing for the Future. Breakthrough Strategies for Seizing Control of Your Industry and Creating Markets of Tomorrow*. Translated from English. Moscow: Olimp-Business.

[19] Inshakov, O.V. 2003. *On the development strategy of the Southern macro region of Russia.* Volgograd: Volzhsky State University Press.

[20] Isard, W. 1966. *Methods of regional analysis: an introduction to regional science.* Moscow: Progress.

[21] Jensen, M. 1986. Agency Costs of Free Cash Flow, Corporate Finance and Takeovers. *American Economic Review,* 26: 323.

[22] Jensen, M. 2001. Value maximization, Stakeholder theory, and the Corporate Objective Function. *Journal of Applied Corporate Finance*, 14(3): 8-21.

[23] Kerashev, A.A. 2005. *Functional content and principles of managing the macro-regional economic complex as an integrational formation.* Rostov-on-Don: The North Caucasian Center of Science of the Higher School Press.

[24] Ketova, N.P. 1998. *Regional economy*. Rostov-on-Don: Hephaestus.

[25] Kirdina, S.G. 2001. *Institutional matrices and the development of Russia*. Novosibirsk: RAS, Siberian Branch of the Institute of Economics and Industrial Engineering.

[26] Kleiner, G. 2004. Nanoeconomics. *Issues of Economics*, 12: 70-94. Available at: http://kleiner.ru/wpcontent/uploads/ 2014/12/Nanoe%60konomika.pdf

[27] Korolyuk, E.V 2009. *Formation of the land market in Russia: institutional and subjective approaches*. Krasnodar: FGU Rosinformresurs.

[28] Myrdal, G. 1972. *Asian Drama. An Inquiry into the Poverty of Nations*. Moscow: Progress.

[29] Nechaev, V.I. 2009. *Regional aspects of state regulation of agro-industrial production*. St. Petersburg: Lan.

[30] North, D. 1997. *Institutions, Institutional Change and Economic Performance*. Moscow: "Nachala" Economical Book Foundation. Available at: http://cee-moscow.com/doc/izd/North.pdf

[31] Novoselov, A.S. 1999. *Regional markets*. Moscow: INFRA-M.

[32] Ovchinnikov, V.N. and Kolesnikov, Yu.S. 2008. *Silhouettes of the regional economic policy in the South of Russia*. Rostov-on-Don: Southern Federal University Press.

[33] Pchelintsev, O.S. 2004. *Regional economy in the system of sustainable development*. Moscow: INH RAS Press.

[34] Plotnikov, V., Fedotova, G., Popkova, E., and Kastyurina, A. 2015. Harmonization of Strategic Planning Indicators of Territories' Socioeconomic Growth. *Regional and Sectoral Economic Studies, Euro-American Association of Economic Development*, 15 (2): 105-114.

[35] Polterovich, V.M. 2005. Institutional Traps: Is There a Way Out? *Social Sciences*, 36(1): 30-40. Available at: https://dlib.eastview.com/browse/doc/7438786;jsessionid=aaalNHGuBve8f8R_X4ntw

[36] Popov, P.A. 2010. *The system of regional economy*. Moscow: High School.

[37] Prokhorova, V.V. 2010. *Subregional resources and tools for the intensive development of territorial economic systems in contemporary Russia.* Moscow: Moscow State University Press.

[38] Risin, I.E. 2006. *Regional socio-economic policy: content and mechanisms for implementation.* Voronezh: Voronezh State University Press.

[39] Rosstat, 2017. Agribusiness of Russia in 2016. Moscow: Rosstat.

[40] Rubina, R.Ya., and Rubin, A.G. 2009. Economic security of the enterprise: concepts, internal structure, tendencies in the field of maintenance. *Production Organizer*, 41(2): 75-78.

[41] Sapir, J. 2001.*On the economic theory of heterogeneous systems: The experience of decentralized economy research*. Moscow: State University Higher School of Economics Press.

[42] Schumpeter, J. 1982. *The theory of economic development: the study of entrepreneurial profit, capital, credit, interest and the cycle of conjuncture.* Moscow: Progress.

[43] Sibirskaja, E.V. 2003. Integration structures as a basis for the development of the region. *Regionology*, 1-2: 94-98.

[44] Slepakov, S.S. 2007. *Competitiveness of the region's economy: Determinants and prospects*. Pyatigorsk: Bulletin of the Caucasus.

[45] Soto, E. 2004. *Riddle of capital*. Moscow: Olimp–Business.

[46] Stein J., Usher S., LaGatutta D., and Youngen J. 2001. A comparables approach to measuring cashflow-at-risk for non-financial firms. *Journal of Applied Corporate Finance*, 13(4): 100-109.

[47] Stiglitz, J. 2003. *Globalization: disturbing trends*. Moscow: Mysl.

[48] Tamov, A.A. 2007. *Strategy of development of regional agro industrial complex in market conditions (questions of theory and methodology).* Maikop: OOO "Quality".

[49] Trubilin, A.I, Gayduk, V.I., Belkina, E. N., Kalitko, S.A., Gorokhova, A.E. 2017. Infrastructure of the regional agrifood market: peculiarities of functioning and methods of improvement. *Revista Espacios*, 38(33): 41-52. Available at: http://www.revistaespacios.com/a17v38n33/a17v38n33p41.pdf

[50] Trubilin, A.I., Piterskaya, L.Y., Voroshilova, I.V., Tlisheva, N.A., and Baranovskaya, T.P. 2016. The anti-crisis strategy of reproductive processes state regulation in agriculture. *International Journal of Economic Research*, 13(9): 3885-3909.

[51] Tyaglov, S.G. 2005. *Ecologically sustainable development of the region: Factors, models, mechanisms*. Rostov-on-Don: RINH Press.

[52] Weber, M. 1990. *Selected works*. Moscow: Progress.

[53] Williamson, O. 1996. *The Economic Institutions of Capitalism. Firms, Markets, Relational Contracting*. St. Petersburg: Lenizdat. Available at: https://dahluniversitymanagementinstitute.files.wordpress.com/2016/10/w-1996.pdf

[54] Zelinskaya, M.V. 2010. *Integrated informative tools for the development of the regional economic system.* Krasnodar: YuIM Press.

*** FSSS, 2016. Social and economic situation of the Krasnodar Territory. Comprehensive report for 2016. http://www.gks.ru/region/docl1103/Main.htm

*** FSSS, 2017. Regions of Russia. Socio-economic indicators – 2017. Available at: http://www.gks.ru/free_doc/doc_2017/ region/reg-pok17.pdf

*** Strategy for the development of the Southern Federal District until 2025. The Economy of the Southern Federal District. 2008. No. 4793.

Parametric Models for Optimizing the Credit and Investment Activity of a Commercial Bank

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Abstract:

The relevance of the research topic is connected with the insufficient development in the theoretical and practical plans of models for optimal management of the banking portfolio, taking into account the changing parameters of the external and internal environments of the credit and investment activities of a commercial bank.

The article proposes a concept and an original economic and mathematical model for the parametric optimization of the credit and investment activities of a commercial bank. The parameters are considered to be endogenous factors that determine the regulator's policy - the Central Bank in the sphere of management of reserves, liquidity and credit risk of the banking portfolio. Using a parametric approach allows to quickly analyze the impact of the regulator's policy on the structure of the banking portfolio, the return-risk ratio and other indicators of banking activities. The criteria and composition of parametric models for static and dynamic variants are given and substantiated, the peculiarity of which is "linking" to the theory of a banking company, within which it is possible to build both full and private models of banking activity (optimization of interest rates, choice of priority loan applications, *etc*.).

The authors consider the problem of choosing the indicator of financial stability of a bank, which is proposed as a linear convolution of integral indicators of profitability of credit and investment activities and bank liquidity. A feature of this indicator is the simultaneous consideration of uncorrelated factors of external and internal environments that determine the credit and investment strategy of the bank.

Keywords: modeling; banking portfolio; credit; investment; deposits and loans; mathematical modeling; management strategy

JEL Classification: C01; D04; G2

Introduction

The goal of the research given in the article is to develop and adapt models and methods for optimizing credit and investment portfolios with an expanded set of quality criteria and taking into account endogenous and exogenous parameters determined by the conditions of banking and the bank's credit and investment strategy in practice, significantly influencing the structure and elemental composition of the banking portfolio.

The need to develop such models is associated with a resolution of the problem of forming an optimal portfolio of a commercial bank, taking into account the high variability of external and internal environment parameters, relevant for the Russian banking system, operating in the absence of "cheap" long-term sources for replenishing investment capital (Shvetsova *et al.* 2018, Takhumova *et al.* 2018, Vasiljeva 2017). We note that in the production plan this problem was considered in the author's earlier work (Gadzhiagayev and Khalikov 2016). Based on the analysis of the results of parametric modeling of the optimal bank portfolio, it is proposed and justified to use as a unique indicator of financial stability of a commercial bank, which characterizes the dependence of the profitability of working assets and the competitiveness of credit and investment activity on the changing parameters of external and internal environments (reserve standards, interest rates on deposits and loans, *etc*.), linear convolution of integral indicators of income and credit and investment activity and liquidity. A feature of this indicator is the simultaneous consideration of uncorrelated factors of external and internal environments that determine the structure and elemental composition of the banking portfolio. The next section provides an overview of the scientific literature that raises questions of the theory of bank portfolio lending. This is followed by the study itself in the form of presentation of theoretical results and calculations made. In the end, there are the results and conclusions.

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1. Literature Review

The issues of developing approaches and methods for analyzing, evaluating and managing credit portfolios of commercial banks and the results obtained on their basis are reflected in some detail in the works of Russian scientists and practitioners: Beloglazova and Krolivetskaya (2008), Borodin (1999), Burukhanova (2003), Egorova and Smulov (2002), Zhukov and Eriashvili (2012), Zaitseva (2014), Ievleva (2010), Kiseleva (2000), Kogan (1994), Krinochkin (2002), Maksimov and Khalikov (2016), Lavrushin (2014), Panova (1997), Purtikov (1999), Rodnina (2014), Sakovich (2013), Urazaeva (2000), Khalikov and Antikol (2012), Tsarkov (2012).

Particularly noteworthy results on the theory of banking portfolio lending are given in the works of authoritative Western authors: Brealey and Myers (1997), Brend (1994), Rose (1997), Sinkey (1994), Van Horne and Wachowicz (1994), Brigham (1992), Bush (2009), Daily (1971), Edgeworth (1988), Klein (1971), Murphy (1972), Sealey (1983, 1987).

The tools of economic and mathematical models and methods for assessing the quality and optimal management of a credit and investment portfolio of a commercial bank, given and used in the above works, can be divided into groups of "private" and "full" models of a banking company.

Models of the first group, among which we mention the models of Zaitseva (2014), Urazaeva (2000), Tsarkov (2012), are intended for solving individual problems of planning and managing portfolios of banking assets and liabilities (the choice of deposit and loan rates, cash flow forecasting, modeling of credit, interest risks and other parameters of the portfolio and individual loans).

Full models are used to justify comprehensive banking strategies and optimize a bank's credit policy for an expanded set of indicators of loan portfolio quality and credit efficiency. Among them, we single out the models of Bush (2009), Daly (1971), Murphy (1972), Sealey (1983, 1987) (in the static version), Kogan (1994), Burukhanova (2003), Gadzhiagayev and Khalikov (2016) (in a dynamic version), focused on the selection and optimal management of the criteria of profitability and risk, and taking into account the restrictions on current assets and liabilities, the loan portfolio.

Improving the lending patterns of Russian commercial banks is also associated with clarifying the criteria for optimality and limitations.

As part of the criteria, along with profitability and credit risk, it is advisable to take into account the liquidity of the temporary structure of the aggregate portfolio of assets and liabilities, which allows optimizing the credit strategy at the next time interval taking into account the correction of the volume and structure of the loan portfolio based on monitoring results and assessing its quality at the current time interval (Kunitsyna *et al.* 2018, Balynskaya *et al.* 2017).

Accounting for liquidity of the balance of active and passive operations in terms of volumes and terms in the criteria of credit activity contributes to solving the "traditional" for most Russian commercial banks (including large ones) noted in the works of a number of authors, for example, Krinochkin (2002), Purtikov (1999) problems of incompatibility of the "short" resource base (liabilities) and "long" risky assets - the main reason for the decline in their liquidity and financial stability.

Improving the efficiency of lending activities in modern conditions is most significant for medium-sized equity capital of universal commercial banks (engaged in retail, corporate lending and project financing), for which credit and investment activity is the main source of income and which are under external control of the regulator and internal shareholders and investors.

2. Discussion

Effective functioning of the country's banking system is the basis for the growth of its economy and social sphere (Vitik *et al.* 2016). It is for this reason that the reform of the banking sector is an important component of the development and strengthening of the market foundations of functioning of the national economy.

The bank manager who makes decisions on managing the portfolio of deposits and loans in conditions of incomplete and inaccurate information about the movements of financial markets is forced to take into account the allied risks associated with a possible decrease in return on and quality of assets and build a credit and investment strategy for the bank based on the goal of maximizing its value.

The existence of the issue of strategic planning of credit and investment activities with a focus on achieving the goal of increasing the market value of Russian banks is noted by Russian and foreign scientists (Beloglazova and Krolivetskaya 2008, Borodin 1999, Zaitseva 2014, Krinochkin 2002).

In its turn, this issue, formulated as the task of selecting the best available alternative for the management of complex socio-economic systems, which include commercial banks, in conditions of incomplete information and

the risks associated with it, is the subject of studying a whole complex of scientific disciplines, including economic and mathematical ones, using methods of system analysis, operations research, optimal management and mathematical modeling (Brealey 1997, Panova 1997).

We note that currently the mathematical theory of banks and banking has acquired a complete form, and the arsenal of models and methods for managing the banking portfolio is very diverse. In the work of G. Sinka (Egorova and Smulov 2002), a detailed analysis of the development of the mathematical theory of banking in the second half of the 20th century is given. The list of references cited by the author includes a considerable number (more than 60) of works in which various economic-mathematical models are used: optimization, stochastic, balance, stock, Markov processes, game theory, *etc*.

In the base of most approaches used to model banking activities lies the neoclassical concept of a commercial bank as a money market agent (Beloglazova and Krolivetskaya 2008, Burukhanova 2003, Kogan 1994, Krinochkin 2002) that provides intermediary services for transforming the "free" money of deposit holders into loan capital provided to borrowers on the basis of maturity, repayment and consideration. Interpretation of the bank as a "banking firm" allows to successfully apply the main findings of the neoclassical theory of a firm, including the relationships linking the efficiency of activity in the financial market with the maximum return on own and borrowed capital, the ratio of pricing for deposits and loans at the level of marginal costs of servicing the respective portfolios, etc. relating to modeling the "issue-costs" dynamics on the basis of ambiguous estimates of monetary resources involved in the bank's liabilities.

Modeling the activity of a commercial bank on the basis of a "production" approach is very promising in describing procedures for making a credit decision (Brand 1994), selecting rates for deposits and credits (Zhukov and Eriashvili 2012), agreeing on active-passive transactions based on balance models and forecasting financial flows of a commercial bank (Borodin 1999, Gadzhiagayev and Khalikov 2016). The above optimization and forecast models relate to the so-called "private" models that are oriented to the specific task of planning and managing the banking portfolio.

The solution of the complex task of optimizing this portfolio, taking into account the parameters of the external financial markets and market regulators, internal regulations and priorities of the bank's credit policy in the sphere of rates on loans and deposits, as Murphy (1972) rightly noted, requires the use of "complete" models, in the construction of which the orientation only on the neoclassical concept of the banking firm does not allow to adequately reflect these factors in the criteria and limitations, which implies the use of concepts and models of banking activity other than "production" ones.

3. Practical Justification. Results

To demonstrate the prospects of using the complete model of the "banking" firm for the tasks of optimizing banking activities in conditions of incomplete and inaccurate information on the deposit and loan markets, let us consider a parametric model for choosing the optimal variant of the credit and investment activity of a commercial bank in static and dynamic options.

In describing the parametric model of the bank, we will use the following variables and their designations: T is the time horizon for planning the credit and investment activities of the bank, t is the planning period ($t = 1, ..., T$); $I^{(t)}$ is the number of deposits opened with the bank by the beginning of the t period; $J^{(t)}$ is the number of loans and other investments included or considered from the position of possible inclusion in the bank's portfolio by the beginning of the t period; $D_i^{(t)}$ is the i-th deposit active in the t period;

$$D_i^{(t)} = D_i^{(t)} \left(\rho_i^{(t)} \right),$$

where: $\rho_i^{(t)}$ is the deposit rate for the t period; D_i is the nonlinear function that determines the dependence of the value of the deposit on the rate; $K_j^{(t)}$ are loans and other bank investments in the t period;

$$K_j^{(t)} = K_j^{(t)} \left(\gamma_j^{(t)} \right),$$

where: $\gamma_j^{(t)}$ is the loan rate for the t period; K_j is the nonlinear function that determines the dependence of the value of the loan on the rate.

Thus, $D_i^{(t)}$ and $K_j^{(t)}$ are respectively the elements of the bank's liabilities and assets for the t period, sensitive to changes in the relevant interest rates.

$$\sum_{i=1}^{I^{(t)}} D_i^{(t)} \leq DP^{(t)}, \tag{1}$$

where: $DP^{(t)}$ is the limit value of savings for the *t* period which can be placed in deposits;

$$\sum_{j=1}^{J^{(t)}} K_j^{(t)} + CK^{(t)} \leq DI^{(t)}, \tag{2}$$

where: $CK^{(t)}$ is the bank's own capital in liquid form (for the *t* period); $DI^{(t)}$ is the potential capacity of the investment market for the *t* period.

Inequality describing the bank's balance for the *t* period:

$$\sum_{i=1}^{I^{(t)}}(1 - r_{1,i}^{(t)}) \cdot D_i^{(t)} + CK^{(t)} \geq \sum_{j=1}^{J^{(t)}} \left(1 - r_{2,j}^{(t)}\right) \cdot K_j^{(t)}, \tag{3}$$

where: $r_1^{(t)}$ and $r_2^{(t)}$ are the mandatory reservation rates, respectively: $r_{1,i}^{(t)}$ is the standard for reserving funds in the Central Bank depending on the type of deposit; $r_{2,j}^{(t)}$ is the standard for deductions from the *j*-th loan (investment) to the bank's reserves depending on the risk of default.

The next limitation is for the gap-difference between the values of assets and liabilities sensitive to changes in the interest rate and subject to revaluation or repayment by a fixed time (stabilizer of the credit and investment strategy of a commercial bank):

$$\left| \sum_{i=1}^{I^{(t)}} D_i^{(t)} - \sum_{j=1}^{J^{(t)}} K_j^{(t)} \right| \leq S^{(t)}, \tag{4}$$

where $S^{(t)}$ is the amount of imbalance in the bank's credit and deposit structure that is limited for the *t* period.

In our case, the imbalance should be in favor of an active investment strategy of the bank, therefore, this restriction takes the form of this inequality:

$$\sum_{j=1}^{J^{(t)}} K_j^{(t)} - \sum_{i=1}^{I^{(t)}} D_i^{(t)} \leq S^{(t)}. \tag{4'}$$

The next limitation is for the current liquidity of the balance sheet of the bank's asset and liability operations:

$$\sum_{j=1}^{J^{(t)}} \left(\gamma_j^{(t)} - l^{(t)}\right) \cdot K_j^{(t)} \geq \sum_{i=1}^{I^{(t)}} \rho_i^{(t)} \cdot D_i^{(t)}, \tag{5}$$

where: $l^{(t)}$ is the standard for the current liquidity ratio for the *t* period which is determined by the regulatory authority (Central Bank).

Let us systematize the listed variables and parameters by the nature of influence of external (in relation to the bank) environment and intra-bank management (Table 1).

Table 1. Variables and parameters of the bank's parametric model

Variables and parameters	Factors of influence by the level of management	
	External environment	Intra-bank management
$\rho_i^{(t)}$ deposit interest rate	Inflation premium	Bank's premium for non-consumption
$\gamma_j^{(t)}$ credit interest rate	Credit risk accounted for in the rate	Spread affecting the profitability of banking operations
$r_{1,i}^{(t)}, r_{2,j}^{(t)}$ standards for deductions to the reserves	Reserve standard set by the central bank ($r_{1,i}$)	Share of reservation taking into account the risk of default ($r_{2,j}$)
$l^{(t)}$ current liquidity standard	Liquidity standard set by the central bank	-
$S^{(t)}$ limit value of GAP - the difference between assets and liabilities that are sensitive to changes in the rate of interest	General inflation risk	Parameter defined by the banking deposit and credit strategy

Turning to the analysis of the objective function of the bank's model, we note the following parameters that are most frequently encountered in banking practice:

- maximum interest margin (excluding the risk of loan default):

$$F_1 = \max\left\{\sum_{j=1}^{J^{(t)}} \gamma_j^{(t)} \cdot K_j^{(t)} - \sum_{i=1}^{I^{(t)}} \rho_i^{(t)} \cdot D_i^{(t)}\right\};$$ (6)

(or including that risk):

$$\max\left\{\sum_{j=1}^{J^{(t)}} \delta_j^{(t)} \cdot \gamma_j^{(t)} \cdot K_j^{(t)} - \sum_{i=1}^{I^{(t)}} \rho_i^{(t)} \cdot D_i^{(t)}\right\},$$ (6')

where $\delta_j^{(t)}$ is the share of non-repaid loans (depending, in particular, on the $\gamma_j^{(t)}$ rate);

- maximum weighted value of interest margin and bank reserves:

$$F_2 = \max \cdot \left\{\lambda_1 \cdot \left[\sum_{j=1}^{J^{(t)}} \gamma_j^{(t)} \cdot K_j^{(t)} - \sum_{i=1}^{I^{(t)}} \rho_i^{(t)} \cdot D_i^{(t)}\right] + \lambda_2 \cdot \sum_{j=1}^{J^{(t)}} r_{2,j}^{(t)} \cdot K_j^{(t)}\right\},$$ (7)

where: $0 \leq \lambda_1, \lambda_2 \leq 1$; $\lambda_1 + \lambda_2 = 1$;

- maximum interest margin (including or excluding for the risk of loan default) per rub. of income assets:

$$F_3 = \max\left\{\frac{\sum_{j=1}^{J^{(t)}} \gamma_j^{(t)} \cdot K_j^{(t)} - \sum_{i=1}^{I^{(t)}} \rho_i^{(t)} \cdot D_i^{(t)}}{\sum_{j=1}^{J^{(t)}} K_j^{(t)}}\right\}.$$ (8)

Among the listed criteria, none meet the task of sustainable long-term development of a bank: all of them are related to the management of the credit and investment activities of a commercial bank in the current time interval, criteria (6) and (6') correspond to the strategy of increasing the profitability of credit and investment activities, criterion (7) - to the sustainability of this activity, and the criterion (8) - to the return on income assets.

The long-term strategy of the bank which is aimed at stable growth of profitability and investment attractiveness of main activities, ensuring financial stability and risk reduction, should be based on the value indicators of either cash flows of the bank or elements of its capital, as a target. In this regard, we quote a paragraph from the work of Rose (1997): "Maximizing the value of the bank's share capital is a key task that has priority over the rest. If the value of shares does not rise to the level corresponding to the expectations of its shareholders, the bank may face the problems with attracting additional capital to ensure growth". Domestic researchers, in particular Egorova and Smulov (2002), Kiseleva (2000) *etc.*, also argue that the goal of strategic management of a commercial bank is to maximize its market value.

The cost of the share capital is an important cost indicator that adequately reflects the assessment of the main activity of a commercial bank. However, in Russian practice, it does not possess the necessary accuracy due to, first, the lack of reliable information on transactions with shares of most commercial banks, and, secondly, the peculiarities of the accounting system used.

In this regard, as an integral criterion for the quality of credit and investment activities of a commercial bank, we can offer an indicator of the discounted value of the accumulated interest margin:

$$F_4 = \sum_{t=1}^{T} \frac{\sum_{j=1}^{J^{(t)}} \delta_j^{(t)} \cdot \gamma_j^{(t)} \cdot K_j^{(t)} - \sum_{i=1}^{I^{(t)}} \rho_i^{(t)} \cdot D_i^{(t)}}{(1+e)^t},$$ (9)

where: T is the considered strategic horizon; e is the discount rate (generally, the weighted average cost of a bank's capital is constant (if the capital structure on the planning horizon remains constant) or a variable (otherwise).

If the strategic horizon exceeds a certain number (months, years) of planned periods (defined by expert banking analysts and pre-determined), then the system of limitations of the bank's parametric model must be expanded by a limitation on the minimum level of return on income assets (to stimulate the activity of the bank's credit and investment policy at each planned interval):

$$\sum_{j=1}^{J^{(t)}} (e_j^t - \varepsilon) \cdot K_j^{(t)} \geq \sum_{i=1}^{I^{(t)}} \rho_i^{(t)} \cdot D_i^{(t)},$$ (10)

where: ε is the threshold value of return on income assets.

Let us break down the set of indices of $I^{(t)}$ deposits and $J^{(t)}$ credits into sets $I^{(t)} = I_1^{(t)} + I_2^{(t)}$ and $J^{(t)} = J_1^{(t)} + J_2^{(t)}$, including in $I_1^{(t)}$ existing deposits, and $J_1^{(t)}$ - in the-credits and financed investments of past periods. We will consider such breakdown to be correct, namely, the liabilities and assets included in these sets satisfy the limitations (1) - (5), (10). The parametric model of the bank in the static option for the time interval t includes the criterion (8) (to the maximum) and the limitations (1) - (5), (10). Endogenous (controllable) variables of the model are the deposits available to the bank with indices from the set $I_2^{(t)}$ and loans with indices from the set $J_2^{(t)}$.

If we consider the dynamic option of the parametric model of a commercial bank, then we must additionally take into account a number of balance ratios that determine the dynamics of liabilities and assets.

In the structure of deposits, we will emphasize the DS on-demand term liabilities, interbank loans and DV promissory notes, other DP deposits. Assuming that $\Delta CK^{(t)}$ is the change in the bank's own capital in the t time interval, we write down the balance-sheet step-by-step limitations on the values that compose the liabilities of the bank:

$$DS^{(t+1)} = DS^{(t)} + \alpha_1 \cdot \Delta CK^{(t)},$$

$$DV^{(t+1)} = DV^{(t)} + \alpha_2 \cdot \Delta CK^{(t)}, \qquad (11)$$

$$DP^{(t+1)} = DP^{(t)} + \alpha_3 \cdot \Delta CK^{(t)},$$

$\alpha_1, \alpha_2, \alpha_3 \geq 0$, $\alpha_1 + \alpha_2 + \alpha_3 = 1$,

where: $\alpha_1, \alpha_2, \alpha_3$ are the shares of distribution of profits on liabilities.

In the structure of assets, in turn, we emphasize liquid AL (r_{AL} interest rate), medium- and low-liquid AS (r_{AS} interest rate).

We will write down the balance-sheet step-by-step limitations on the components of the bank's assets:

$$AL^{(t+1)} = AL^{(t)} + \alpha_1 \cdot \Delta CK^{(t)},$$

$$AS^{(t+1)} = AS^{(t)} + (\alpha_2 + \alpha_3) \cdot \Delta CK^{(t)}, \qquad (12)$$

where: the shares $\alpha_1, \alpha_2, \alpha_3$ of distribution of bank's own funds among the assets match with those in ratio (11).

The bank balance connecting the time intervals t and t + 1 is given by the ratio:

$$DS^{(t+1)} + DV^{(t+1)} + DP^{(t+1)} = AL^{(t+1)} + AS^{(t+1)}. \qquad (13)$$

The parametric model for optimizing the credit and investment activity of a commercial bank in a dynamic option includes the criterion (9) (to the maximum), within the step-by-step limits (1) - (5), (10) and the inter-period limitations (11), (12), (13). The composition of the endogenous (controllable) parameters of the dynamic model in comparison with the statistical option is expanded by including the variables α_1, α_2, α_3.

An important practical application of the considered dynamic option of the parametric model for optimizing the credit and investment activity of a commercial bank at the time horizon t ∈ [1; T] is the possibility of a complex assessment of the financial and economic condition of the bank by the end of the planning horizon based on the chosen integral financial stability indicator FU which is a linear collation of indicators of return on own capital and accumulated liquidity:

$$FU = \beta_1 \cdot \frac{T}{\sum_{t=1}^{T} CK^{(t)}} \cdot \frac{\sum_{t=1}^{T} \lambda_0^{(t)}}{(1+e)^t} + \beta_2 \cdot \frac{\sum_{t=1}^{T} \lambda_0^{(t)}}{T \cdot \max_{T=1,\overline{T}} \{DS^{(t)} + DV^{(t)} + DP^{(t)}\}}, \qquad (14)$$

where: β_1 and β_2 are the ratios of linear collation of indicators of profitability and liquidity ($\beta_1, \beta_2 \geq 0$, $\beta_1 + \beta_2 = 1$);

The first term is the discounted value of the accumulated interest margin attributable to the average (for the time horizon) value of the bank's own capital (return on own capital); the second term is the ratio of accumulated liquidity to the amount of capital raised over the time horizon into the liabilities of the capital (bank's balance liquidity risk indicator):

$$\lambda_0^{(t)} = \sum_{j=1}^{J^{(t)}} \delta_j^{(t)} \cdot \gamma_j^{(t)} \cdot K_j^{(t)} - \sum_{i=1}^{I^{(t)}} \rho_i^{(t)} \cdot D_i^{(t)} \text{ (liquidity gaps)}. \qquad (15)$$

4. Materials and methods

Model calculations are for un universal commercial bank, named the bank, according to data as of 31.10, 30.11, 31.12 2017. The main efforts of the bank are aimed at pursuing a balanced risk management policy, developing high-quality integrated banking services for clients and respecting their interests, expanding the range of banking services and improving reliability and investment attractiveness.

The credit portfolio of the bank (Table 2) is diversified, but the main amount falls on loans issued to non-state and commercial organizations (legal entities) for periods ranging from 181 days to 1 year and from 1 year to 3 years. The portfolio of bank deposits (Table 3) consists of funds received from individuals: residents and non-residents. The main share of investors is resident individuals, and in terms of the temporary structure, deposits with a period of 181 days to 1 year and from 1 year to 3 years prevail. JSCB has a large branch network. Each branch has its own correspondent account with the Central Bank of the Russian Federation.

To model the free balance $X^{(t)}$ of funds, a time series of the total daily balance of all correspondent accounts of the branch network was used. According to the approach using the quantitative characteristics of the time series, we obtain the minimum cash balance, using the ARIMA models - the average. The choice of the forecast value $X^{(t)}$ for further calculation of the potential volume $PV^{(t)}$ of the loan portfolio depends on the propensity for risk of the decision maker - the decision maker: if the decision maker is not inclined to risk, the minimum balance is chosen - the average.

According to the AR (1) model, the predicted value of cash balances on correspondent accounts of the bank as of January 31, 2018 makes 226,854,531 rubles. According to an alternative calculation, we get 51,344,104 rubles. Below we analyze the impact of the predicted value $X^{(t)}$ on the indicator $PV^{(t)}$ in comparison with $HV^{(t)}$ (free cash flow for placement in loans, calculated on the basis of liquidity ratios).

Table 2. Structure of the loan portfolio of the bank (thousand rubles)

Account	Group of accounts	Account name	Principal amount of debt				Arrears			
			30.09	31.10	30.11	31.12	30.09	31.10	30.11	31.12
45107	Loans to non-state financial organizations	For the period from 1 to 3 years	21,038	19,624	18,424	17,223	0	0	0	0
45201		Loan provided in case of shortage of funds in the settlement (current) account ("overdraft")	7,106	3 421	1,594	1,292	3,475	1 000	1,000	0
45204	Loans to non-state financial organizations	For the period from 31 to 90 days	46,000	54,917	63,170	36,593	0	0	0	0
45205		For the period from 91 to 180 days	84,924	65,328	96,738	55,000	0	0	0	0
45206		For the period from 181 days to 1 year	1,922,608	1,851,380	1,793,809	1,879,425	7,782	10 843	8,008	2,994
45207		For the period from 1 year to 3 years	2,370,884	2,466,601	2,645,250	2,547,422	120	240	15,000	0
45208		For the period over 3 years	10,500	9,972	9,445	8,917	0	0	0	0
45401	Loans and other funds granted to individual entrepreneurs	Loan provided in case of shortage of funds in the settlement (current) account ("overdraft")	271	391	400	399	0	0	0	0
45406		Loans for the period from 181 days to 1 year	660	440	330	220	0	0	0	0
45407		Loans for the period from 1 year to 3 years	6,770	7,120	12,380	20,120	0	0	0	0
45504	Loans and other funds granted to individuals	Loans for the period from 91 to 180 days	950	950	0	0	41	40	39	37
45505		Loans for the period from 181days to 1 year	188	151	1,538	1,478	19,295	19,295	19,295	0
45506		Loans for the period from 1 year to 3 years	22,189	13,626	12,837	12,020	2,527	2,523	2,496	2,491
45507	Loans and other funds	Loans over 3 years	60,025	63,674	61,398	58,966	10,424	10,665	10,937	11,088

Account	Group of accounts	Account name	Principal amount of debt				Arrears			
			30.09	31.10	30.11	31.12	30.09	31.10	30.11	31.12
	granted to individuals									
45509		Loan provided in case of shortage of funds in the deposit account ("overdraft")	2,309	2 523	2,401	2,644	0	0	0	0
47101		On demand	110	110	375	375	0	0	0	0
47801	Investments in acquired rights of claim	Rights of claim under contracts for the provision (placement) of funds, the fulfillment of obligations under which is secured by a mortgage	2,123	2,118	2,118	2,106	0	0	0	0

Table 3. The structure of the deposit portfolio of the Bank (thousand rubles)

Account	Group of accounts	Account name	Account balance			
			30.09	31.10	30.11	31.12
42301		Demand deposits	117,646	88,308	69,078	58 302
42304		Deposits for the period from 91 to 180 days	316,522	360,839	367,390	229 521
42305	Deposits and other funds raised from individuals	Deposits for the period from 181days to 1 year	1,877,872	1,474,985	1,601,485	1 582 315
42306		Deposits for the period from 1 year to 3 years	2,639,467	3,044,462	3,190,050	3 242 940
42601		Demand deposits	2,557	2,919	2,947	2 677
42604		Deposits for the period from 91 to 180 days	2,218	3,558	3,473	3 181
42605	Deposits and other funds raised from individuals - non-residents	Deposits for the period from 181days to 1 year	8,097	7,870	9,559	8 709
42606		Deposits for the period from 1 year to 3 years	13,394	13,007	13 614	13 641

Let us define the indicators $V^{(t)}$, $Y^{(t)}$, $P^{(t)}$ (the volume of the loan portfolio, the amount of repayments on previously placed loans, the amount of overdue debts) of the loan portfolio of the the bank (Table 4). $k2^{(t)}$ is the ratio of overdue debts? In this case, it can be argued that the bank controls the bankruptcy risk of the borrower, which allows keeping arrears at a minimum (well below the threshold) level.

Table 4. Calculated Values of Indicators $V^{(t)}$, $Y^{(t)}$, $P^{(t)}$ for the Bank, rub.

	As of 31.10.2017	As of 30.11.2017	As of 31.12.2017
$V^{(t)}$	4,607,075,604	4,770,102,627	4,660,931,379
$Y^{(t)}$	163,952,241	224,161,273	542,251,775
$P^{(t)}$	44,729,838	56,896,926	16,732,271
$k2^{(t)}$	0,97%	1,19%	0,36%

Let us calculate the outflow of liquidity for attracted deposits (Table 5).

Table 5. Calculated Values of the Indicator $L^{(t)}$ for the Bank, rub.

	As of 31.10.2017	As of 30.11.2017	As of 31.12.2017
$L^{(t)}$	1,086,640,558	403,996,492	497,316,987

Despite the gap in liquidity from current operations, the bank has a safety margin in the form of highly liquid assets (cash, cash in ATMs and payment terminals, cash in transit), which allows to keep the value of $PV^{(t)}$ positive. In November and December 2017, the bank did not experience difficulties associated with the outflow of liquidity, therefore, $⟦PV^{(t)}$ is significantly higher than in October.

Let us calculate liquidity ratios of the bank for the relevant periods (Table 6). The bank complies with all liquidity ratios (H2, H3, H4) in each of the periods considered. In addition, the bank has a significant reserve of instant and current liquidity.

Table 6. Values of Liquidity Standards H2, H3, H4 for Bank (actual and established by Central Bank of Russian Federation)

	As of 31.10.2017	As of 30.11.2017	As of 31.12.2017	Standard established by the Central Bank of the RF
Lam, thous. rub.	1,739,337.00	1,921,661.00	1,819,045.00	
Ovm, thous. rub.	1,651,383.00	1,720,600.00	1,812,673.00	
Ovm*, thous. rub.	501,282.00	505,072.00	502,844.00	
H2	151,23%	158,09%	138,88%	≥15%
Lat, thous. rub.	2,421,577.00	2,326,360	2,560,635.00	
Ovt, thous. rub.	2,046,146	2,049,639	2,672,092.00	
Ovt*, thous. rub.	525,325.00	531,768	528,059.00	
H3	159,23%	153,26%	119,43%	≥50%
Krd, thous. rub.	803,296	880,025.00	812,576.00	
OD, thous. rub.	133,110	86,684.00	39,482.00	
O*, thous. rub.	1,419,728	1 445 292.00	2,221,199.00	
H4	51.73%	57.44%	35.94%	≤120%

Based on the percentage excess of the actual value of the standard over the minimum (for H2 and H3) and maximum (for H4), we determine the free resources of the bank (Table 7).

Table 7. Free resources of bank, determined according to liquidity standards, rub.

	As of 31.10.2017	As of 30.11.2017	As of 31.12.2017
PH2	1,566,821,850	1,739,331,800	1,622,570,650
PH3	1,661,166,500	1,567,424,500	1,488,618,500
PH4	803,296,000	880,025,000	812,576,000
$HV^{(t)}$	1,566,821,850	1,739,331,800	1,622,570,650

Based on the fact that as of October 31, 2017, PH2 <PH3 and PH4> 0, we conclude that the amount of funds that the bank can invest in loans in November may amount to 1,566,821,850 rubles, incl. loans for a term exceeding 1 year - no more than 803,296,000 rubles. On 30.11 and 31.12.2017 the maximum amount of funds that can be invested in loans in December (January) is 1,739,331,800 rubles (1,622,570,650 rub.), including in loans with a term "from 1 month up to a year" in the amount of 1,567,424,500 rubles (1,488,618,500 rubles), loans for a period over a year in the amount of not more than 880,025,000 rubles (812,576,000 rub.). At the final stage of calculations, we determine the value of $W^{(t)}$. We will analyze the values of $\alpha \cdot PV^{(t)}$ depending on the proportion of α directed to loans, in comparison with the obtained values of $HV^{(t)}$ (Table 8).

Table 8. Estimated Values $\alpha \cdot PV^{(t)}$

Value α	$PV^{(t)}$			
	As of 31.10.2017	As of 30.11.2017	As of 31.12.2017 ($X^{(t)1}$)	As of 31.12.2017 ($X^{(t)2}$)
0,1	45,592,355	151,159,991	178,135,232	160,584,189
0,2	91,184,710	302,319,982	356,270,464	321,168,379
0,3	136,777,065	453,479,973	534,405,696	481,752,568
0,4	182,369,420	604,639,963	71,254,928	642,336,757
0,5	227,961,776	755,799,954	890,676,160	802,920,946
0,6	273,554,131	906,959,945	1,068,811,392	963,505,136
0,7	319,146,486	1,058,119,936	1,246,946,624	1,124,089,325
0,8	364,738,841	1,209,279,927	1,425,081,856	1,284,673,514
0,9	410,331,196	1,360,439,918	1,603,217,088	1,445,257,704
1	455,923,551	1,511,599,909	1,781,352,320	1,605,841,893

Note: $X^{(t)1}$ – under ARIMA model; $X^{(t)2}$ - using quantitative characteristics of the time series.

In Table 8 above, the cases in which the final value $W^{(t)}$, based on the cautious attitude to risk, are chosen to be $\alpha \cdot PV^{(t)}$, are indicated by color. We obtain that for α close to one, the dynamic model gives an estimate of the bank's free resources for placement in loans, which is close to the value of $HV^{(t)}$.

According to the results of the calculations, it can be argued that the parametric model of optimal management of the credit portfolio of a commercial bank in the dynamic version provides an adequate assessment of the amount of free resources of the bank to invest in loans on the date of consideration of loan applications. The calculations were carried out on the last day of the month, but the model is applicable to any intermediate date.

Conclusion

The essential feature of full models of a bank in static and dynamic variants is a rigid "linking" to the conditions of deposit-credit activities of banking organizations, determined by the requirements of the regulator (Central Bank) and the parameters of financial markets (market interest rates and demand for loans, taking into account and terms of crediting). However, actual banking practice demonstrates the need for prompt accounting in the models of credit and investment activities of a commercial bank for the variability of exogenous and endogenous parameters affecting the structure and elemental composition of the optimal banking portfolio.

Intensification of the operating, credit and investment and other types of banking activities in the context of the introduction of modern computer technologies and computer-aided settlement tools into the banking practice objectively contributes to the increase in assessment of the bank portfolio and the quality management decisions related to it. The tools of mathematical models and software used by banks should be adequate to the modern conditions of their activity and have the potential for a flexible response to changes in these conditions. The proposed approach and models of parametric optimization of the banking portfolio are adapted to the practical activities of the selected commercial bank and demonstrated compliance with this requirement.

References

[1] Balynskaya, N.R., Vasil'yeva, A.G., Gafurova, V.M., Kuznetsova, N.V., and Rakhimova, L.M. 2017. Effective management of the financial sustainability of subjects of the Russian Federation as the factor of social and economic welfare of the modern territory: An empirical. *The European Proceedings of Social & Behavioural Sciences,* 985–992. DOI: 10.15405/epsbs.2017.07.02.127

[2] Beloglazova, G.N., and Krolivetskaya, L.P. 2008. *Banking. Organization of a Commercial Bank.* Moscow: Higher Education.

[3] Borodin, A.V. 1999. Mathematical models and algorithms for managing a loan portfolio of a commercial bank. PhD diss., Moscow State University of Economics, Statistics, and Informatics.

[4] Brand, R. 1994. *Banking System and Control over Banking Activities in a Market Economy.* Munich.

[5] Brealey, R., and Myers, S. 1997. *Principles of Corporate Finance.* Moscow: Olimp-Business.

[6] Brigham, E.F. 1992. *Fundamentals of Financial Management.* New York: Dryden Press.

[7] Burukhanova, T.D. 2003. Optimization of the loan portfolio of a commercial bank. PhD diss., Financial Academy under the Government of the Russian Federation.

[8] Busch, A. 2009. *Banking Regulation and Globalization.* Oxford: Oxford University Press.

[9] Daly, G.G. 1971. Financial intermediation and theory of the firm: An analysis of savings and loan association behavior. *Southern Economic Journal,* 37(3): 283–294. DOI: 10.2307/1056180.

[10] Edgeworth, F.V. 1988. The mathematical theory of banking. *Journal of the Royal Statistical Society,* 11: 113–127.

[11] Egorova, N.E., and Smulov, A.M. 2002. *Enterprises and Banks: Interaction, Economic Analysis: Educational and Practical Manual.* Moscow: Delo.

[12] Gadzhiagayev, M.A., and Khalikov, M.A. 2016. Dynamic model of optimal management of a credit portfolio of a commercial bank with an additional criterion for liquidity of the temporary structure of assets-liabilities. *Entrepreneur's Guide,* 29: 72–85.

[13] Ievleva, A.A. 2010. Portfolio approach to retail credit activity of banks. *Finance and Credit,* 10: 51–57.

[14] Khalikov, M.A., and Antikol, A.M. 2012. Methods of accounting for transaction costs of stock market operations. *Vestnik of the Plekhanov Russian University of Economics,* 2: 53–59.

[15] Kiseleva, I.A. 2000. The system of mathematical modeling of banking in transition economies. PhD diss., Moscow State University of Economics, Statistics, and Informatics.

[16] Klein, M. 1971. Theory of the banking firm. *Journal of Money, Credit and Banking,* 5: 205–218.

[17] Kogan, V.I. 1994. *Modeling of processes of management of market structures in the transition period (for example, commercial banks).* PhD diss.

[18] Krinochkin, D.L. 2002. *Managing the risk of unbalanced liquidity of a commercial bank.* PhD diss., Financial Academy under the Government of the Russian Federation.

[19] Kunitsyna, N., Britchenko, I., and Kunitsyn, I. 2018. Reputational risks, value of losses and financial sustainability of commercial banks. *Entrepreneurship and Sustainability Issues,* 5(4): 943–955. DOI: 10.9770/jesi.2018.5.4(17).

[20] Lavrushin, O.I. 2014. *Money, Loans, Banks.* Moscow: Knorus.

[21] Maximov, D.A., and Khalikov, M.A. 2016. Prospects of institutional approach to production corporation assets assessment. *Actual Problems of Economics,* 183(9): 16–25.

[22] Murphy, N.D. 1972. Costs of banking activities: Interactions between risk and operating costs: Comment. *Journal of Money, Credit and Banking,* 4(3): 614–615.

[23] Panova, G.S. 1997. *Credit Policy of a Commercial Bank.* Moscow: ICC "DIS".

[24] Purtikov, V.A. 1999. Statement of the problem of optimizing the choice of a loan portfolio. *Bulletin NII SUVPT,* 2: 145–159.

[25] Rodnina, A.Y. 2014. Factors of competition in the Russian banking market: a regional aspect. *Theoretical Economics,* 1: 40–47.

[26] Rose, P.S. 1997. *Banking Management.* Moscow: Delo.

[27] Sakovich, M.I. 2013. Influence of Basel III standards to Russian banking sector. *Financial Analytics: Science and Experience,* 6(5). Available at: https://www.fin-izdat.com/journal/fa/detail.php?ID=55061

[28] Sealey, C.W. 1983. Valuation, capital structure, and shareholder unanimity for depository financial intermediates. *The Journal of Finance,* 38(3): 857–871. DOI: 10.1111/j.1540-6261.1983.tb02506.x

[29] Sealey, C.W. 1987. *Finance theory and financial intermediation.* Paper presented at the Conference on Bank Structure and Competition, in Chicago, USA.

[30] Shvetsova, O.A., Rodionova, E.A., and Epstein, M.Z. 2018. Evaluation of investment projects under uncertainty: multi-criteria approach using interval data. *Entrepreneurship and Sustainability Issues,* 5(4): 914–928. DOI: 10.9770/jesi.2018.5.4(15).

[31] Sinkey, J.F. 1994. *Financial Management in Commercial Banks.* Moscow: Catallaxy.

[32] Takhumova, O.V., Kasatkina, E.V., Maslikhova, E.A., Yumashev, A.V., and Yumasheva, M.V. 2018. The main directions of increasing the investment attractiveness of the Russian regions in the conditions of institutional transformations. *Espacios,* 39(37): 6.

[33] Tsarkov, V.A. 2012. Analytical study of the risk of loan default. *Audit and Financial Analysis,* 5: 233–244.

[34] Urazaeva, T.A. 2000. Pricing management of commercial bank deposits. PhD diss., Moscow State University of Economics, Statistics, and Informatics.

[35] Van Horne, J., and Wachowicz, J.M. 1994. *Fundamentals of Financial Management.* Moscow: Progress.

[36] Vasiljeva, M. 2017. The effect of dividend policy on company's market price per share. *Journal of Applied Economic Sciences,* Volume XII, Summer, 4(50): 995–1007.

[37] Vitik, S.V., Koptyakova, S.V., and Balynskaya, N.R. 2016. Methodology for assessing the efficiency of labor-related incentives at an enterprise. *International Business Management,* 10(4): 408–415. DOI: 10.3923/ibm.2016.408.415.

[38] Zaitseva, M.V. 2014. *Optimization of the loan portfolio of a commercial bank.* PhD diss., Russian State Social University.

[39] Zhukov, E.F., and Eriashvili, N.D. 2012. *Banks and Non-Bank Credit Organizations and Their Operations.* Moscow: UNITY-DANA.

Value Opportunities for Automotive Manufacturers in Conditions of Digital Transformation of the Automotive Industry

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Abstract:

The article examines the financial performance of automotive companies depending on the region, company size, product focus and business model. The correlation between the artificial intelligence development and the capital share in the manufacturing of transportation equipment in different countries was studied. The main pools of value opportunities for automotive companies based on artificial intelligence applications were determined. Value opportunities have been analyzed within all main process areas of the automotive manufacturer's value chain: research and development, procurement, supply chain management, manufacturing, sales and marketing, aftersales and services, and support functions. Value opportunities from customer-centric services such as innovative features of vehicles and mobile services were examined. The key steps of transformation strategy for automotive companies based on artificial intelligence in order to gain short-term benefits and long-term competitive advantages and value potential were proposed.

Keywords: artificial intelligence; value opportunities; automotive industry

JEL Classification: F21; L62; O31

Introduction

The automotive industry is a global lead industry with significant research and development investments. An active investment allowed it to continue global growth in 2017. Despite softening of growth in China and Europe and a slight volume decline in the USA and Canada, Mexican and Japanese production continues to drive global growth. Valuation multiples of publicly listed automotive companies are above their long-term average values, however, below peak values observed during the last several years. While European and North American producers trade at similar valuation levels, Japanese companies trade at a discount because of stagnation in their home market. High valuation levels are being supported by automotive companies' profitability growth as well as a surplus of cheap liquidity on the global stock market.

On the other hand, concerns about the impact of a changing automotive environment had a suppressing effect on valuations. Financial performance of automotive companies varies greatly depending on the region, company size, product focus and business model.

Profitability trends in the global automotive industry vary from region to region. For instance, China- and NAFTA-based manufacturers are currently more profitable than the average. Despite the fact that Chinese companies have seen a decline in margins in recent years due to intensified competition in their home market, they still achieve above-average growth and profitability with about 9% EBIT. European producers' margins have increased slightly due to leading technology positions in many segments and customer preferences. Japanese and Korean manufacturers remain at a low margin level of around 6% EBIT.

Profitability levels are currently in line across different company sizes. Large multinational companies with above EUR 10 billion revenues grew in line with the average but achieved above-average profitability. Large manufacturers with EUR 2,5-5 billion revenues gave up profitability to continue strong revenue growth. Midsize manufacturers with EUR 1,0-2,5 billion revenues increased profitability, mostly due to focused and technology-enabled product portfolio. In contrast, small suppliers lag behind in terms of both growth and profitability because of limited resources for innovation and expansion.

Profitability also depends a lot on the product focus of the company. Chassis suppliers have improved profitability to about 8% EBIT driven by ADAS (Advanced Driver Assistance Systems) and active safety. Tire suppliers grew at a slower rate but benefited from relatively low raw material costs. The profit levels of powertrain suppliers were restrained with intensified competition, innovation costs and the rise of electric vehicles. Exterior suppliers grew strongly while continuing to be profitable above average due to less focused production. Electrics and infotainment suppliers reduced profitability because of increased competition and changing customer requirements. The profitability rates of interior suppliers continued to stay under pressure.

The business model of the company also affects profitability. Product innovators outpace process specialists in terms of growth and profitability generating about 7% EBIT due to increasing demand for innovative products and solutions and high entry barriers through the intellectual property in many innovation-driven segments. Process specialists continue to face below average margins of around 6% EBIT because of lower innovation level that means lower prices and higher competitive pressure (Lazard 2017).

In the next years, the automotive manufacturers are going to face five main challenges. Firstly, slowing growth will put pressure on profit margins and allow automotive producers to look for new ways to grow. Secondly, the accelerated change of technological focus will require further investment in new technologies without a promise of quick returns. Thirdly, the emergence of software as a key success factor in the automotive industry will make many existing competencies of traditional automotive manufacturers obsolete and lead to the more intensive competition from new tech players. Furthermore, the commoditization of hardware parts will force producers to reduce costs and increase operational efficiency. In addition, the potential decline of automotive suppliers' valuations may be accompanied with growing investor pressure to increase shareholder value.

In order to succeed in the new automotive environment, manufacturers will have to transform their existing business models. Most of them need to rethink their overall strategy in order either to capture new growth opportunities or consolidate the market around the existing portfolio. Automotive companies will have to define a long-term technology roadmap and strategic positioning in the value chain including both product and service offering. They will also have to cut operating costs and ensure sufficient financing for the upcoming transformation simultaneously. It is crucial for automotive manufacturers to adapt organizational structure and governance model to manage successfully both emerging competencies and declining ones at the same time. Creating a new company mindset and culture to foster innovation as well as building up new partnerships for innovation is also essential.

1. Literature review

The problems of artificial intelligence have been actively investigated for the last 20 years. However, this field actively develops and offers new opportunities for all sectors of the economy. Issues of economic growth based on artificial intelligence have been studied by Acemoglu and Restrepo (2017) Aghion *et al.* (2017), Barkai (2017), Legg and Hutter (2007), Vincent (2015), Nilsson (2010), Zeira (1998) and others. However, the value opportunities for automotive manufacturers provided by artificial intelligence, as well as their quantitative assessment, have not been sufficiently studied.

Correlation between capital shares in the manufacturing of transportation equipment and automation

Artificial intelligence (AI) stands out as a transformational technology of our digital age. Questions about what it is, what it can already do and what it has the potential to become cut across technology, psychology, politics, economics, science fiction, law, and ethics (Chui *et al.* 2018). Artificial intelligence has come to the forefront of global discourse, garnering increased attention from practitioners, industry leaders, policymakers, and the general public. The diversity of opinions and debates illustrates how broadly artificial intelligence is being investigated, studied, and applied. For example, the number of papers published and tagged with the keyword "Artificial Intelligence" in the Scopus database of academic papers produced each year has increased by more than 9x since 1996. The number of the US active startups developing artificial intelligence systems has increased 14x since 2000. Annual venture capital investment into the US startups developing artificial intelligence systems has increased 6x since 2000 (Shoham *et al.* 2017).

The field of artificial intelligence is still evolving rapidly and even experts can hardly understand and track progress across the field. Practitioners, researchers, and developers of artificial intelligence define it in different ways. For instance, Nilsson (2010, 13) has provided such a useful definition: "Artificial intelligence is that activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment". From this perspective, characterizing artificial intelligence depends on the trust that one is willing to give to synthesized software and hardware for functioning

"appropriately" and with "foresight." According to this view, there is no difference between an arithmetic calculator and a human brain, but the matter is scale, speed, the degree of autonomy, and generality (Stone *et al.* 2016, 12). Artificial intelligence is also defined as "the capability of a machine to imitate intelligent human behavior" (Dictionary by Merriam-Webster) or "an agent's ability to achieve goals in a wide range of environments" (Legg and Hutter 2007, 9).

In the study of economic growth, artificial intelligence is considered to be the latest form in a process of automation that has been ongoing for at least 200 years since the Industrial Revolution which used steam and then electricity to automate many production processes. Perhaps artificial intelligence is the next phase of this process rather than a discrete break. It may be a natural progression from autopilots to autonomous cars. The automation of aspects of production has been a key feature of economic growth in recent decades (Zeira 1998, Acemoglu and Restrepo 2017). Artificial intelligence enables the automation of tasks that were previously thought to be out of reach of automation. These tasks may be either non-routine, like autonomous cars, or they may involve high levels of skill, such as legal services, and some forms of scientific lab-based research. An advantage of this approach is that it allows using historical experience on economic growth and automation for modeling economic growth based on artificial intelligence (Aghion *et al.* 2017).

Models that conceptualize artificial intelligence as a force of increasing automation suggest that an upswing in automation may be seen in the factor payments going to capital – the capital share. In recent years, the rise of the capital share in the USA and around the world has been a central topic of research (Barkai 2017, Kehrig and Vincent 2017). The automotive industry has invested most heavily in industrial robots during the past two decades (Acemoglu and Restrepo 2017). Figure 1 shows evidence on the capital share in the manufacturing of transportation equipment for the US and several European countries. The chart shows that the capital shares have increased since the 2008 - 2009 crisis in all of the countries under study. The capital share in transportation equipment shows a large increase in the US, Spain and Germany. For instance, the capital share has increased from 31% to 50% in the US, from 30% to 48% in Spain and from 32% to 46% in Germany. Interestingly, Italy and France exhibit weak growth in capital share since 1995. The absolute level differences in the capital share in transportation equipment are also interesting, ranging from nearly 50% in the US to around 30% in the United Kingdom in recent years.

Figure 1. The capital share in the manufacturing of transportation equipment in 1995-2015

Source: data from the EU-KLEMS project at http://www.euklems.net/ for the "transportation equipment" sector, which includes motor vehicles, aerospace and shipbuilding. Shares are smoothed using polynomial smoothing with a smoothing parameter 3.

2. Value opportunities for automotive companies based on artificial intelligence

Currently, the automotive industry is intensively discussing four disruptive and mutually reinforcing major trends – autonomous driving, connectivity, electrification, and shared mobility. These so-called ACES trends will fuel growth within the automotive market and change the rules in the transportation sector. Ultimately, they will lead to a shift from traditional to disruptive technologies and require automotive manufacturers to develop alternative business models.

Artificial intelligence is a key technology for all ACES trends. Autonomous driving relies inherently on artificial intelligence because it enables reliable, real-time recognition of objects around the vehicle. For the other three trends, artificial intelligence creates numerous opportunities to reduce costs, improve activity, and generate new revenue streams. Thus, artificial intelligence can help to optimize pricing by predicting and matching supply and demand for shared mobility services. It can also be used to improve maintenance scheduling and fleet management for transport companies and taxi services. These improvements will play an important role for automotive companies in the foreseeable future.

ACES trends are going to mark a great change for the automotive industry and beyond. Emerging products and services related to the ACES trends will both affect the business models of traditional industry players and open the market for new entrants. Many companies, which were previously focused on the other industries, are heavily investing in the ACES trends and technologies and may become important partners for traditional automotive companies. While automotive manufacturers can use new players' technology to unlock value potential from artificial intelligence, new players will get an opportunity to gain a share of the automotive market. To master the ACES trends, automotive manufacturers need to invest substantially into development and integration of all of them.

AI-enabled value opportunities for automotive manufacturers are represented with the improvement of processes and functions along the value chain, integration of innovative driving features into vehicles and emerging mobility services, which will require new business models in the automotive market. The value pool in processes improvement is represented with a post purchase cross and upselling, virtual prototyping and testing, in-line quality control, automated documentation of product data across its lifecycle, predictive service recommendations, automated guided vehicles with integrated navigation, well-focused advertising and data-based prediction in sales. The value pool of innovative vehicle features includes autonomous driving and ADAS features, personalized offers based on the customer's needs and voice control in a vehicle. The value pool in mobility services is represented with maintenance scheduling and advanced fleet management for shared vehicles, optimization of vehicle routes, pick-up and drop-off locations on the basis of traffic flow predictions as well as dynamic pricing for each ride. In short to medium term savings from process optimization are necessary to invest in innovative vehicle features and mobility services. The long-term potential from autonomous vehicles and shared mobility services will be realized later, while process optimization value can be captured early but grows slowly (McKinsey Center for Future Mobility 2018).

There are two types of AI-enabled value opportunities. Industry-wide value opportunities represent accumulated industry effect that can be achieved by automotive manufacturers regardless of their competitors' performance. In the short to medium term, the major share of the value potential in this area will come from processes improvement and generation of additional sales and revenue from ADAS or autonomous driving. Specific value opportunities depend on each automotive manufacturers' potential to outperform competitors. Every single company can outperform competitors in two ways - either by focusing on gaining share in the automotive market or by participating in the emerging mobility market. Importantly, the value from processes improvement is mainly accessible in the short to medium term, whereas the industry-wide value from autonomous driving features and mobility services is limited in the short term but increases significantly in the medium to long-term. In spite of the different time horizons for capturing the respective value opportunities, it is important that automotive manufacturers begin to invest in AI-related vehicle features and applications for mobility services. Capturing value from the processes improvement is crucial for automotive manufacturers who will have to invest in innovative vehicle features and mobility services to generate value in the next years.

Value opportunities may be generated within all main process areas of the automotive manufacturer's value chain: research and development, procurement, supply chain management, manufacturing, sales and marketing, aftersales and services, and support functions. Each of these areas is rather complicated and will be considered in detail further.

In recent years vehicle research and development has become a largely virtual process for all automotive manufacturers. Modeling of physical processes, such as mechanics, vibration, the spread of light and sound, is widely used at all stages of car development and improvement. However, optimizing car properties using

evolution strategies, genetic algorithms, and similar methods is still rarely used because of high computing power requirements. In particular, interdisciplinary optimization, which combines and optimizes several vehicle characteristics at once (for example, passenger safety, noise, vibration and harshness) can provide impressive results but is not widely used due to the allegedly excessive computation time with existing computing power. Nevertheless, this approach offers tremendous potential for more rapid and effective coordination between developers and departments participating in a common project of car development or improvement. Predictive models in automotive manufacturing can be based either on linear or non-linear regression methods, for instance, multiple regression, random forests regression, support vector regression, Gaussian process regression, and are used to make predictions based on relationships within the data set. Since the model must have good interpolation characteristics, cross-validation methods are commonly used to evaluate the predictive model on the training dataset. Such estimation is performed in order to adjust the parameters of the model and to find out its real capabilities without using a test dataset. These controlled training methods can be used to replace the long and labor-intensive modeling with a quick approximation model, which can be also used for other purposes. This also facilitates to run long adjustment processes faster and with greater transparency. However, modeling data is often oriented on specific areas of development because data management between its generation and use for analysis remains a bottleneck. The thing is that specific modeling data, which is being collected and stored by each department, is often organized in different ways, which makes it difficult to access and analyze with the use of machine learning methods. Furthermore, a large amount of the simulation results data requires effective solutions for data storage are for analysis based on machine learning. Therefore, such instruments as multi-disciplinary machine learning, learning based on historical data and cross-model learning based on artificial intelligence have a great potential to improve the efficiency of research and development in the automotive industry but are not fully exploited yet (Hofmann *et al.* 2017).

In the procurement process, artificial intelligence can be used to collect and analyze a wide range of data on suppliers, prices, delivery time and reliability, characteristics of raw materials, etc. to calculate indicators for suppliers' selection. Methods of data analysis enable determination of the vendor characteristics, which have the greatest impact on performance effectiveness and reliability of supplies. Optimizing analytics helps to determine specific parameters which automotive manufacturers can manage to achieve optimal conditions. Continuous monitoring and controlling of the procurement process generate information about the main factors of the company's success. Later this data can be used in predictive analytics for automatic generation of forecasts for next periods. The analysis of key parameters along with the corresponding optimizing actions can also be attributed to the mentioned forecasts. Thus, the use of artificial intelligence has great potential in the field of procurement, as it can reduce the influence of the human factor on the procurement process, optimize its cost and make it more transparent.

In the field of supply chain management, artificial intelligence can be applied in procurement, production and distribution logistics, as well as logistics of spare parts. Procurement logistics includes the technological chain from the purchase of goods to their delivery to the warehouse. At this stage, there is a lot of information about historical prices, discounts, delivery terms and reliability of supply, which can be used for prediction of purchase prices and vendor performance analysis. So intellectual optimizing analytics can be used to identify and optimize key value drivers in procurement logistics. Production logistics deals with planning and monitoring of internal transportation, processing and storage of goods. In this field, AI-based applications can enable identification of bottlenecks in the supply of production process with raw materials, optimization of stock levels, and minimization of storage time, which will significantly reduce storage costs. Distribution logistics is associated with the delivery of products to customers and can relate to both new and used cars. Since the main criteria here are costs and reliability of delivery, it is necessary to take into account all components of the supply chain, including the choice of transport mode and the optimal combination of individual cars on a truck. Optimizing analytics can be used in the field of logistics of used vehicles for distributing them through sales channels based on the prediction of reselling prices of particular vehicles to maximize revenue. In the spare parts logistics, artificial intelligence can be applied to predict the number of spare parts that have to be stored in the warehouse, depending on the car model, its age and the amount of them sold. Intellectual analytics and optimization should be combined with logistics modeling to identify and eliminate bottlenecks, especially in cases when the supply chain includes several agents. The logistics model should be based on information about suppliers (products, prices, delivery periods) and logistics (stock levels, the number of deliveries and their optimal volumes, production sequences) with the use of data analysis methods. Such a model can be also used to predict the effect of delivery delays on certain production processes. The use of intellectual optimizing analytics makes it possible to identify spare parts and suppliers that can lead to the shutdown of production in case of delivery delay. AI-based

scenario analysis in supply chain management also enables to determine the worst-case scenario for an automotive manufacturer and develop measures to avoid it.

Benefits from AI-based data analysis for each step of the manufacturing process are closely connected with continuous monitoring, recording and storing of all its parameters. Since a quality improvement and reduction in the number of defects are usually the main goals of production optimization, the data about the number of defects and their types should be clearly linked to the relevant process parameters. AI-based applications can also contribute to the optimization of energy consumption and performance of the production process per unit of time. Intellectual optimizing analytics can be applied online as well as offline. Off-line applications allow identification of variables that have a significant impact on the manufacturing process and correlations between these variables, which enables the timely correction of the company's goals. Such kind of analysis focuses on a specific problem and can provide its solution, but it is not directed at the continuous optimization of processes. The analysis, interpretation and implementation of the results are carried out manually. In the case of online applications, the procedure is automated and aimed at collecting and integrating data, its processing, modeling and optimization. As these applications provide process and quality data they can be used as a basis for modeling in each case of deviations in the manufacturing process. The resulting forecast values of the target variables may be automatically used to optimize them. This approach can be used in all production areas of the automotive industry after appropriate adaptation. In the future, a comprehensive analysis of all factors, processes and their stages that can potentially affect the overall quality of the product is also possible.

The main focus of sales and marketing is to maximize the effectiveness of attracting customers either by convincing people to become the company's clients or by making them stay ones. The success of marketing activities is usually measured in terms of sales volumes, and therefore it is important to distinguish marketing effects on sales from effects related to the overall economic situation in the country. Thus, measuring the success of marketing activities can be a difficult task, as it should consider a lot of factors. AI-based analytics can be used in marketing to achieve very important and interrelated optimization goals such as maximization of sales volumes while minimization of the marketing budget, maximization of profit from marketing activities, as well as optimization of the product portfolio. AI-based applications can be used not only for predicting additional sales figures over time as a result of a particular marketing campaign. Intelligent data analysis can be used in marketing to examine problems of customer outflow and customer loyalty. In a saturated market, the main priority for automotive manufacturers is to prevent the loss of customers. This requires individualized information about each customer, the degree of his satisfaction with the car and driving experience, as well as data on competitors, their products and prices. Since data are usually subjective, individualized customer outflow forecasts and optimal measures for their retention represent a complex issue that is always topical. In this regard, increasing the loyalty of existing customers is particularly important. The idea of "upselling", that is a proposal to existing customers to buy a more expensive car of the same brand as their next one, is closely connected with the loyalty of customers. To guarantee the success of such actions, the information about customer segments, marketing campaigns and correlated sales success is required for analysis. However, this data is largely inaccessible, because it is difficult to be collected systematically and is being characterized by different levels of reliability. Similar considerations apply to the optimization of the marketing complex. It means that the data should be collected and evaluated for longer periods to draw certain conclusions. Intellectual data analysis is crucial for optimizing of individual marketing campaigns with respect to a selected target group, such as mailing lists and phone calls, to deliver individualized messages and product offerings to current or prospective customers. Although intellectual optimizing analytics in the field of marketing is very promising, the difficulties with data collection, protection, its inaccuracy and subjectivity necessitate to develop a data collection strategy. The problem becomes even more complicated if it is necessary to take into account such factors as the brand image in the process of data analysis. In this case, the data has a certain level of uncertainty, requires additional analysis and is more suitable for determining trends than for quantitative conclusions. Nevertheless, AI-based optimization enables to determine whether marketing action will be successful or not as well as the direction to concentrate efforts on.

The use of artificial intelligence in the field of aftersales and services represents the great potential value opportunities for automotive manufacturers. In this area, it is necessary to take into account not only quantitative data, such as sales volumes, number of breakdowns and accident rates but also qualitative data regarding customer satisfaction and brand loyalty. Therefore, it is necessary to find and integrate various data sources, making them available for analysis and properly analyzing them in terms of the potential subjectivity of evaluations. Combined analysis of marketing activities and aftersales services can be used to optimize the business portfolio of the automotive company in terms of costs and efficiency. Furthermore, AI-based analytics

will be able to determine the factors that influence the occurrence of quality defects and could not be taken into account while manufacturing, and thus will reduce the number of defects in the future. In the leasing business of used cars, the evaluation of their residual value plays an important role. AI-based applications will be able to create individualized forecasts of the residual value of cars due to nonlinear forecasting models based on the company's own sales data. This will optimize the distribution channels of used cars considering the needs and preferences of customers in different regions and maximize the company's sales. The more individualized information about the client's socio-demographic characteristics, Internet search history, consumer behavior, driving behavior and vehicle usage will enable automotive companies to propose the optimal vehicle model and the method of its acquisition.

The use of AI-based applications to improve support functions, including HR, finance, and IT can provide a wide range of benefits for automotive manufacturers. Such applications can provide quick and unbiased staff recruitment based on information about the employee from all available sources. In addition, they allow analyzing the risk of cooperation with clients and other counterparties based on the diverse information. Furthermore, AI-based applications give an opportunity to enhance management due to intellectual analysis of the financial and economic activity of the company. Therefore, decision-making within the company will become reasonable, transparent, quick and effective. On the other hand, the improvement of business processes due to artificial intelligence can cause the mass reduction of office personnel.

For each of these seven main areas, AI-based applications can create value either due to data-based insight generation or process automation. In the first case, artificial intelligence enables the analysis of previously unavailable or indecipherable data in order to generate new insights, which can be used to make processes more cost- or time-efficient. For example, predictive maintenance use cases monitor images, sounds, and vibrations from machines to predict when maintenance is required in such a way that the maintenance timing and execution can be optimized. In the second case, artificial intelligence facilitates reducing the need for manual labor in certain processes due to the automation of tasks that could not be previously automated. For instance, crash test simulations can limit the need for costly, real-life crash tests. In some cases, the automation covers data analysis that was not previously available or was available only in a non-digital format. Table 1 summarizes the main benefits that artificial intelligence can provide for automotive manufacturers.

Table 1. The main benefits of artificial intelligence for automotive manufacturers

	Data-based insight generation	AI-based process automation
Research and development	▪ research and development improvement due to using outcome prediction for experiments; ▪ optimization of product features in the production process; ▪ data-driven product improvement according to customer preferences; ▪ wear and tear analytics;	▪ virtual prototyping and testing; ▪ automated documentation and modeling of product data across its lifecycle; ▪ automated data transfer between different systems;
Procurement	▪ supplier performance scorecard; ▪ cost factors optimization; ▪ optimization of stock levels; ▪ minimization of storage time; ▪ procurement organizational performance scorecard;	▪ linking procurement to back-office finance; ▪ comparative document analysis to convert documents into text and perform analysis; ▪ automated compliance management;
Supply chain management	▪ integrated pricing and inventory management across channels, including planning forecasts; ▪ on-line automation of warehousing; ▪ on-line utilization of transport capacity;	▪ automated guided vehicles and indoor navigation; ▪ automatic order placement and management;
Manufacturing	▪ predictive maintenance of assets through monitoring of parameters; ▪ in-line digital quality management due to visual control for real-time process optimization;	▪ advanced process control for real-time optimization; ▪ autonomous guided vehicles for intra-logistics; ▪ AI-based visual quality control for the final product or incoming parts;
Sales and marketing	▪ predictive analytics for sales; ▪ post purchase cross- and upselling; ▪ personalized marketing; ▪ cross-channel customer relationship management; ▪ guidance for customer interactions management;	▪ automation of the ordering process of goods and services; ▪ automatic placement of advertisements across channels;

After sales and services	▪ early recall detection and software updates; ▪ predictive service recommendations; ▪ assortment and storage level optimization for spare parts; ▪ remote maintenance for problems and breakdowns;	▪ automated order registration, handling, and payment; ▪ optimized and automated document processing and management; ▪ AI-based visual inspection of a vehicle for preliminary assessment of service effort;
Support functions	▪ analytics of financial data and reports to enhance managerial decisions; ▪ objective and effective staff recruitment; ▪ credit risk optimization by computation of customer risk score; ▪ AI-based prediction of IT problems to minimize downtime;	▪ automated prefilling of invoices; ▪ automation of accounts payable analysis; ▪ automated claims management; ▪ automated billing based on scans or pictures.

Source: generalized based on Hofmann *et al.* 2017; McKinsey Center for Future Mobility, 2018

McKinsey suggests that a substantial industry-wide AI-enabled value opportunity will reach a total accumulated value potential of around USD 215 billion by 2025. This corresponds to the value of nine EBIT percentage points for the whole automotive industry, or to an additional average productivity increase of approximately 1,3% per year – a significant value to boost the industry's regular above 2% annual productivity aspiration. The most value from artificial intelligence technologies (approximately USD 203 billion) will be found in processes along the automotive manufacturers' value chain. The largest absolute cost-reduction effects will be found in manufacturing (15%), procurement (4%), and supply chain management (16%). Sales and marketing also provide interesting value opportunities both due to cost reduction (13%) and additional revenue (0,9% increase in total revenue) from reducing the rebates given to customers and improving the upselling of vehicle features. Thus in procurement, supply chain management, and manufacturing, efficiencies lead to cost savings of USD 51 billion, USD 22 billion, and USD 61 billion respectively. In marketing and sales, AI-based applications both reduce cost and generate revenue, leading to a total value potential of USD 31 billion for this process (McKinsey Center for Future Mobility, 2018).

In contrast to process improvements, customer-centric services such as innovative driving features and mobility services will have a limited, short-term value impact on an industry-wide level. However, these services represent important value opportunities and will play an important role for automotive manufacturers to outperform competitors and gain market share as well as to participate in the emerging mobility market. On the one hand, producers can increase their market share and traditional vehicle revenue with a superior digital user interface and new features. On the other hand, some of them may actively participate in the mobility market with the estimated revenue opportunity of approximately USD 380 billion by 2025.

Despite the fact that this is a large revenue opportunity, producers' ability to generate profit will depend on their business model and the scale of offers. Innovative vehicle features and shared mobility services will lead to a disruption of the traditional automotive industry, although it is difficult to predict when and how this disruption will take place. However, it is certain that in the long term, the success of automotive manufacturers will depend on their ability to provide cutting-edge vehicle features and to operate successfully in the shared mobility market. Regardless of when and how the disruption of the automotive sector occurs, producers already need to prepare for transformations by building up partnerships for innovation and making the right investments.

3. Automotive industry transformation under the influence of artificial intelligence

In the short term, automotive manufacturers can take four strategic actions that represent individual success factors on the path to a holistic transformation in order to benefit from artificial intelligence:

▪ *Collection and synchronization of data from various sources.* Automotive producers need to ensure the availability, collection and generalization of data from existing systems in a structured way. Data should be synchronized, as it serves as the basis for further analysis and training of machine learning algorithms. This includes the unique identification of data coming from different systems and determining the relationships between them. In addition to collecting data from the internal environment, automotive producers should also collect data on customers, their use of vehicles and new technologies in the automotive field from third parties. More detailed knowledge of the driving modes will allow automotive producers to optimize their offer of mobile services, improve the quality of electric vehicle batteries, and manage the charging infrastructure.

▪ *Setting up partnerships for innovation.* Automotive manufacturers have to set a partner ecosystem to close knowledge gaps and minimize the investments needed to benefit from artificial intelligence

technologies. The partner ecosystem will consist of both common technology partners and specific partners for individual projects. Many of the partners will be new entrants to the automotive market bringing highly specialized capabilities to the industry. In addition to long-term strategic partnerships, many automotive manufacturers will need a short-term partnership to support the implementation and operation of AI-based applications, as well as data collection and setting up of a standardized artificial intelligence operating system.

Interestingly, the world-leading internet platform players are currently trying to enter the automotive and mobility markets with new data-driven business models in the dawning Internet of Things (IoT) era. The leading tech players from the USA and China and the most valuable companies of the world are all investing heavily into their automotive capabilities and seek to become interface owners in today's and tomorrow's vehicles. Tech players are aware that the next big computing platform will be the autonomous car and vehicles will be strongly interconnected with all IoT domains. If tech companies own the interface in the car, they have a chance to own the platform and gain data to enhance their artificial intelligence capabilities and further improve their customer access (Seiberth and Gruendinger 2018).

For instance, Google offers Android Auto, which is a smart driving companion bringing information on destinations, appointments, and weather conditions to the driver (Huet 2014). Google's sister company Waymo is at the forefront of the development of self-driving technologies (Fairfield 2016). Apple develops the CarPlay system as well as software related to autonomous driving (Charlton 2018, Webb and Chang 2017). Microsoft offers intelligent services for cars, including virtual assistants, business applications, office services and productivity tools with their Connected Vehicle Platform (Johnson 2017, Korosek 2017). Amazon brings their voice-controlled, intelligent personal assistant Alexa to cars, creating a seamless transition from home to the car (Ong 2017, BMW Group 2017). Alibaba is developing their own operating system AliOS, which includes touch screens, GPS maps and other smartphone-like functionalities (Clover and Fei Ju 2017). In China, there are four additional tech giants with automotive ambition: Tencent, Baidu, Xiaomi and Didi Chuxing. Tencent that is usually called Chinese Facebook announced about the development of their own autonomous driving system in November 2017. Baidu has launched Apollo, an open software platform for autonomous driving that that is like Android for self-driving cars. Baidu has gathered a network of more than 50 partners from automotive players Daimler and Ford and software vendors like Microsoft to electrical equipment suppliers like Nvidia, Intel, Bosch, Continental and ZF. Xiaomi recently teamed up with Baidu to enter the markets like the IoT gadgets, AI platforms and autonomous vehicles. Both companies want to join Tencent in the battle for autonomous driving software. Didi Chuxing, so-called Chinese Uber, having started with ride-hailing, diversified into artificial intelligence and autonomous technology now. Their ride-hailing offerings include taxi, private cars, social-ride sharing, chauffeur services and even bike-sharing. In December 2017 they outpaced Uber and became the most valuable startup company in the world. In addition, they are the only company that has all of the Chinese tech giants – Baidu, Alibaba and Tencent as investors.

While tech players are investing billions in respective offerings such as autonomous driving and connected mobility, automotive manufacturers are under pressure to develop their own data-driven value propositions. On the one hand, automotive is an industry that sells physical products (hard assets) and has limited benefit from zero marginal costs, however, that is gradually changing with an increasing share of value generated by software (Winkelhake 2017). On the other hand, automotive is one of the industries with the most data volume being generated and the IoT is enforcing industry convergence creating numerous data-enabled business opportunities (Seiberth 2015).

Unlike tech companies who have been investing in artificial intelligence research and development for more than 5 years, automotive manufacturers have not yet shown a consistent artificial intelligence approach. They still do not have a clear idea about the role of artificial intelligence and have not decided whether to view it as a core competence and transform their business models or to set temporary partnerships. Automotive producers and suppliers seem to recognize data as a key resource to their strategies, but they currently invest too little in the development of AI-based applications and building data-driven business models. In particular, Toyota announced establishing a new company, the Toyota Research Institute (TRI), to develop artificial intelligence technologies in two main areas: autonomous cars and robot helpers for around the home in 2015. The company planned to pump USD 1 billion into TRI over the next five years. However, any commercial products from TRI

are not expected any time soon (Vincent 2015). Ford is going to invest USD 1 billion during the next five years in Argo AI, combining Ford's autonomous vehicle development expertise with Argo AI's robotics experience and startup speed on artificial intelligence software for further advancement of autonomous vehicles. Founded by former Google and Uber leaders, Argo AI will include robots and engineers from inside and outside of Ford working to develop a new software platform for Ford's fully autonomous vehicle coming in 2021. Investment in Argo AI is supposed to strengthen Ford's leadership in bringing self-driving vehicles to market in the near term and create technology that could be licensed to others in the future (Ford 2017).

Although automotive manufacturers want to participate in an increasingly data-driven environment, they remain overly product-centric. They need to open their activities beyond the car to capture data-driven business opportunities. Successful companies should not keep themselves restricted to only one area of activity but have to build a comprehensive ecosystem encompassing virtually all areas of life. Therefore, they need to leverage digital ecosystems and enforce cooperation to become digital leaders. Furthermore, automotive manufacturers must learn how to capitalize on their strong brand reputation within the digital service domain. Companies that control the complete chain including hardware, data, insights and digital services will deliver the most superior brand experience (Seiberth and Gruendinger 2018).

- *Establishing the artificial intelligence operating system.* Automotive manufacturers need to create an operating system for artificial intelligence to enable scaling AI-based applications throughout all areas of their activity and beyond. Such a system should include the necessary infrastructure and specific services with a standardized interface for collecting and aggregating data from different systems. The operating system will become a scalable technical basis for the further implementation of artificial intelligence and the productivity increase of automotive manufacturers.

- *Building up a team for development in the field of artificial intelligence.* During the implementation of pilot projects, automotive manufacturers will be able to understand what resources and capacities are needed for implementation and operation of artificial intelligence and concentrate efforts on their acquisition. Some automotive manufacturers will independently develop applications in the field of artificial intelligence, while others will participate in the strategic partnership. However, regardless of the chosen strategy, automotive manufacturers must provide continuous support for the implementation of artificial intelligence in all areas of their activity.

These actions can help automotive manufacturers to initiate transformation to obtain short-term advantages of artificial intelligence. To ensure long-term advantages, automotive manufacturers will need to organize a continuous working process in the field of artificial intelligence, which consists of three stages:

- Identifying use cases and rapid implementation of pilot projects. The first pilot use cases should be implemented quickly, as they can become an early demonstration of the value created by artificial intelligence. Priority directions in the field of artificial intelligence should be determined for each division of the automotive company. Additionally, it is essential to ensure quick introduction and testing of development results. This will allow testing in a safe environment before large-scale implementation of artificial intelligence applications.

- Establishing the artificial intelligence core. To benefit from artificial intelligence, automotive manufacturers must develop an artificial intelligence core that includes a standardized data ecosystem, ecosystem of partners, and the artificial intelligence core team. The core of artificial intelligence will be crucial for its use in autonomous driving and shared mobility services. In these areas, artificial intelligence is a key factor in overcoming competition and gaining market share. Automotive manufacturers should give priority to artificial intelligence applications to ensure the best use of their resources. Developers should first focus on use cases that can be quickly tested and implemented before addressing more complex cases that require long-term planning and business process adjustments. In addition, automakers must hire a significant number of software engineers, as software becomes an increasingly important part of the business. Therefore, automotive companies should offer more attractive working conditions for software engineers and data scientists.

- Scaling up and full-scale implementation of artificial intelligence. Based on the results of pilot projects and using the core of artificial intelligence, automotive companies should develop and distribute artificial intelligence applications throughout the organization. Only, in this case, automotive manufacturers will be able to fully use the potential of artificial intelligence to improve business

processes. The capabilities identified during the implementation of pilot projects and their subsequent scaling should be used for the development of innovative features of vehicles and mobility services.

This three-stage transformation strategy based on artificial intelligence will allow automotive companies to gain short-term benefits in the processes and effectively prepare for capturing long-term value potential. For an individual automotive manufacturer, resources released in the short term should be reinvested, and capabilities and accumulated experience should be used to become a leader in innovative vehicle technologies.

Conclusion

The use of artificial intelligence in the automotive industry has considerable potential in the short and medium term. The most promising direction is the optimization of the main business processes along the value chain. The production of cars with artificial intelligence support and mobile services can provide automotive companies with a significant advantage in the long term, but in the short term, their potential is limited. To benefit from new AI-based value opportunities automotive manufacturers should enable collection and synchronization of data from various sources, set partner ecosystems, establish the artificial intelligence operating system, and build up teams for development in the field of artificial intelligence. Automotive companies already have to prepare for artificial intelligence transformations, implementing pilot projects in order to gain knowledge and short-term benefits. Then they must establish the artificial intelligence core for its full-scale implementation across the organization. This will allow automotive companies to capture the long-term value opportunities of artificial intelligence from ACES trends and autonomous vehicles.

References

[1] Acemoglu, D. and Restrepo, P. 2017. Robots and Jobs: Evidence from US Labor Markets, *NBER Working Paper* No. 23285. DOI: http://www.doi.org/10.3386/w23285

[2] Acemoglu, D. and Restrepo, P. 2017. The Race between Man and Machine: Implications of Technology for Growth, Factor Shares and Employment, *NBER Working Paper* No. 22252. DOI: http://www.doi.org/10.3386/w22252

[3] Aghion, P., Jones, B.F. and Jones, C.I. 2017. *Artificial Intelligence and Economic Growth*. Available at: https://web.stanford.edu/~chadj/AI.pdf

[4] Barkai, S. 2017. *Declining Labor and Capital Shares*. Available at: http://home.uchicago.edu/~barkai/doc/BarkaiDecliningLaborCapital.pdf

[5] Charlton, A. 2018. *Apple CarPlay: Everything you need to know*. Available at: https://www.techradar.com/news/apple-carplay

[6] Chui, M., Manyika, J., Miremadi, M., Henke, N., Chung, R., Nel, P., and Malhotra, S. 2018. *Notes from the artificial intelligence frontier: Insights from hundreds of use cases*, Discussion paper, McKinsey Global Institute.

[7] Clover, C. and Fei Ju, S. 2017. *China's tech titans set sights on car innovation*. Available at: https://www.ft.com/content/5e6c1012-ae8a-11e7-aab9-abaa44b1e130

[8] Fairfield, N. 2016. *On the road with self-driving car user number one*. Available at: https://medium.com/waymo/scenes-from-the-street-5bb77046d7ce.

[9] Hofmann, M., Neukart, F. and Bäck, T. 2017. *Artificial Intelligence and Data Science in the Automotive Industry*. Available at: https://arxiv.org/ftp/arxiv/papers/1709/1709.01989.pdf.

[10] Huet, E. 2014, *Google I/O: Android Auto*. Available at: https://www.forbes.com/sites/ellenhuet/2014/06/26/google-io-android-auto/#48ae206b5d39

[11] Johnson, P. 2017. *Microsoft Connected Vehicle Platform helps automakers transform cars*. Available at: https://blogs.microsoft.com/blog/2017/01/05/microsoft-connected-vehicle-platform-helps-automakers-transform-cars/

[12] Kehrig, M. and Vincent, N. 2017. Growing Productivity without Growing Wages: The Micro-Level Anatomy of the Aggregate Labor Share Decline, *Working Paper Series* 6454, CESifo Group Munich. Available at: http://www.cesifo-group.de/DocDL/cesifo1_wp6454.pdf

[13] Korosek, K. 2017. *Microsoft's Plan to Dominate Connected Cars*. Available at: http://fortune.com/2017/03/22/microsoft-connected-car-ip

[14] Lazard, B. R. 2017. *Global Automotive Supplier Study 2018 Transformation in light of automotive disruption*. Available at: https://www.rolandberger.com/en/Publications/Global-Automotive-Supplier-Study-2018.html

[15] Legg, S. and Hutter, M. 2007. *A Collection of Definitions of Intelligenc*e. Available at: https://arxiv.org/pdf/0706.3639.pdf

[16] McKinsey Center for Future Mobility, 2018. *Artificial intelligence: auto motive's new value-creating engine*. Available at: https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/artificialintelligence-as-auto-companies-new-engine-of-value

[17] Nilsson, N.J. 2010. *The Quest for Artificial Intelligence: A History of Ideas and Achievements*. Available at: https://ai.stanford.edu/~nilsson/QAI/qai.pdf

[18] Ong, T. 2017. *Garmin's Speak puts Alexa-powered navigation in your car*. Available at: https://www.theverge.com/circuitbreaker/2017/10/17/16481284/garmin-speak-amazon-alexa-car

[19] Seiberth, G. 2015. *Wie verändern digitale Plattformen die Automobilwirtschaft?* Available at: http://plattform-maerkte.de/wp-content/uploads/2015/10/Gabriel-Seiberth-Accenture.pdf

[20] Seiberth, G. and Gruendinger, W. 2018. Data-driven Business Models in Connected Cars, Mobility Services and Beyond, *BVDW Research*, No.01/18. Available at: https://bvdw.org/datadrivenbusinessmodels/

[21] Shoham, Y., Perrault, R., Brynjolfsson, E., and Clark, J. 2017. *AI Index 2017 Annual Report*, Stanford University. Available at: https://aiindex.org/2017-report.pdf

[22] Stone, P., Brooks, R., Brynjolfsson, E., Calo, R., Etzioni, O., Hager, G., Hirschberg, J., Kalyanakrishnan, S., Kamar, E., Kraus, S., Leyton-Brown, K., Parkes, D., Press, W., Saxenian, A., Shah, J., Tambe, M., and Teller A. 2016. *Artificial Intelligence and Life in 2030. One Hundred Year Study on Artificial Intelligence: Report of the 2015-2016 Study Panel*, Stanford University, Stanford, CA. Available at: http://ai100.stanford.edu/2016-report

[23] Vincent, J. 2015. *Toyota's $1 billion AI company will develop self-driving cars and robot helpers*. Available at: https://www.theverge.com/2015/11/6/9680128/toyota-ai-research-one-billion-funding

[24] Webb, A. and Chang, E. 2017. *Tim Cook Says Apple Focused on Autonomous Systems in Cars Push*. Available at: https://www.bloomberg.com/news/articles/2017-06-13/cook-says-apple-is-focusing-on-making-an-autonomous-car-system

[25] Winkelhake, U. 2018. *The Digital Transformation of the Automotive Industry*, Springer International Publishing. DOI: https://www.doi.org/10.1007/978-3-319-71610-7

[26] Zeira, J. 1998. Workers, Machines, and Economic Growth, *Quarterly Journal of Economics*, 113(4): 1091–1117. DOI: https://doi.org/10.1162/003355398555847

*** BMW Group. 2017, *Digital lifestyle at the BMW Group: Seamless in-car integration of Amazon Alexa in BMW and MINI*. Available at: https://www.press.bmwgroup.com/global/article/detail/T0274792EN.

*** Dictionary by Merriam-Webster. Available at: https://www.merriam-webster.com/dictionary/artificial%20intelligence

*** Ford. 2017, *Ford invests in Argo AI, a new artificial intelligence company, in drive for autonomous vehicle leadership*. Available at: https://media.ford.com/content/fordmedia/fna/us/en/news/2017/02/10/ford-invests-in-argo-ai-new-artificial-intelligence-company.html

Stock Market: Problems and Development Prospects

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Abstract:

According to the degree of development of the stock market, one can judge the state of the country's economy. The stock market in Kazakhstan, today, is not sufficiently effective, due to the fact that it cannot ensure fair pricing, free access of investors to the market and the protection of investors' interests. Also, the problem of the development of the stock market in Kazakhstan is legislation that does not reflect all the provisions of the work of investors and exchange participants. At present, the state of the securities market of the republic does not correspond to the level of economic development; therefore, the stock market does not fully fulfill its purpose. Because of this factor, the stock market capitalization does not increase at a rapid pace. The authors investigated the current state of the stock market of the Republic of Kazakhstan, the influence of macroeconomic trends on it. Based on the analysis, the complex tasks of activating the mechanism of the stock market were formulated, and specific recommendations were given on how to revive it.

Keywords globalization; investment; financial market; economy; securities

JEL Classification: G23; G12; C53

Introduction

The stock market of any country is closely connected with the development of the national economy, as well as with the events occurring in the global financial markets. The stock market is experiencing ups and downs under the influence of various economic and political, internal and external factors. The stock market is designed to ensure free flow of capital between its participants through the use of financial instruments - securities. The securities

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market is a mechanism for a dynamic flow of capital from one sector of the economy to another: buying securities of promising enterprises (counting on future dividends and exchange rate growth), investors and stock market entrepreneurs invest money in new technologies and production.

The study of the complex problem of improving the efficiency of the stock market in modern conditions requires the analysis of its essential characteristics, patterns and characteristics of development, a clear definition of its place and role in the economic system of Kazakhstan, taking into account the modern realities. The objective strengthening of integration processes carries not only opportunities, but also threats to the domestic securities market. In this regard, there is a growing need for an objective assessment of its current state, the search for directions and mechanisms for further development.

1. Literature review

Problems of the functioning of the stock market were considered in the works of famous scientists. At the same time, it should be noted that there is no unity of opinion regarding the term "stock market" itself. In particular, the monumental and authoritative textbook by Sharpe and Alexander (2016) and J. Bailey "Investments" identifies the concepts of the financial market and the securities market. In an even more voluminous American edition of The Directory of Modern Finance, the concepts of the securities market, the stock market and the exchange market are already identified (Logue and Gorham 2014).

Despite the generally accepted identification of the concepts of the stock market and the securities market, in our opinion, it is possible to distinguish between these terms based on their etymology. English terminology provides the concept of "stock market" for the stock market and "securities market" - for the securities market. If the word "securities" - "securities" means a wide range of financial instruments, including debt securities, financial derivatives (derivative securities), etc. up to commodity contracts such as futures and forwards, the term "stock" refers to a specific, narrow group of securities. As Toulz and Bradley (2017) point out, the word "stock" in North America usually means shares or property in a corporation.

Scarlet (2016) subdivides the stock market into the stock market, the debt market and the derivatives market. One of the Russian experts in the field of securities, Mirkin (2016), believes that the concepts of the stock market and the securities market coincide. Famous Russian scientist, Alekhin (2014) refers to the securities market money market. Stefănescu (2006) made a successful projection of a decision assisting system to design the activities and informational fluxes usually run by the management activity in order to establish the general requests which shall be provided by means of technologies for decision assistance for the management portfolio.

In Kazakhstan's economic literature as a whole, there is also a discrepancy in the interpretation of the conceptual apparatus of the stock market. Melnikov (2017) notes that "An important place in the financial market is occupied by the securities market, which is an economic relationship mediated by the movement of securities. It includes the stock market associated with the circulation of stock values: corporate securities - stocks and bonds and the market for government securities. The term "stock market" is associated with the name of the institution in which securities transactions were initially made and executed - the stock exchange".

In the works of the majority of Kazakhstan scientists as Adambekova (2017), Sakhanova (2017), Dodonov (2018), Bertaeva (2016) investigates the current problems of the financial market as a whole, including the stock market. The authors address the individual problems of the formation and development of the stock market, mainly of a macroeconomic nature, but to a lesser extent, issues of the corporate securities market, the state of its institutions and infrastructure, and the mechanism of financial support for the Kazakhstan economy are addressed through papers.

Of fundamental importance in the structure of the stock market is the nature of its financial instruments. This question is the most difficult and generates significant differences in the approaches of different authors. As the analysis showed, some authors refer to the financial instruments of the stock market:
- shares only;
- corporate securities;
- basic and derivative securities, as well as securities of financial institutions.

Based on the results of the study, we consider it appropriate to attribute the main and derivative securities, including government bonds, to the stock market instruments, but only those issued for investment needs.

The need for the development of the stock market is due to the search for additional financial resources to finance the economy and the social sphere, to regulate money circulation in the country. The main goal of the stock market development is to contribute to the effective regulation of the country's economy, accelerating financial stabilization and economic growth based on the revitalization of all market economy entities.

Meanwhile, modern trends in the development of integration processes, the growing influence of external risk factors, the insufficient degree of development of financial market instruments to meet the needs of the real sector in a new way poses the problem of activating the stock market as a mechanism of financial support for the economy. The key tasks of the new stage of the development of the stock market are the creation of conditions for attracting investment in the real economy and the protection of investors' rights.

In the field of economic theory, the investment process and the stock market as its most important mechanism generates serious problems of influence on economic growth and the redistribution of society's income. At each new stage of economic development, it becomes necessary to find new ways and methods for their solution.

2. Methodology

The most important task for Kazakhstan is to create conditions for the macroeconomic equilibrium and the functioning of the systems and mechanisms of a market economy that are adequate to the requirements of the modern stage. The dynamic equilibrium of the economic system and financial and credit levers is designed to be relatively stable and not to depend on fluctuations in the external economic situation. To this end, it is necessary to maximize the use of various sources and mechanisms for attracting investment, including through the development of the securities market. While in developed countries the securities market is the most dynamic segment of the financial market, the level of development of the Kazakhstan stock market does not currently correspond to the needs of the national economy.

This is due to several factors:
- specific features of the formation of the financial market in the context of the emergence of market relations;
- instrumental related to the lack of financial instruments;
- infrastructure related to the low efficiency of functioning of both market participants and the mechanism as a whole.

At present, the financial market is part of global financial and economic instability, the sources of which are located outside of Kazakhstan. Over the past decades, the republic has grown economically and, in many ways, has successfully integrated into world markets, in particular, it should be noted that the banking system is highly integrated into the global financial system. At the same time, it is impossible not to note the fact that this integration process was accompanied by an excessive increase in external borrowing and, as a result, an increase in the vulnerability of the national economy to external risks.

In modern conditions, the directions of development of the financial sector should take into account changes occurring on a global scale. Against the backdrop of increasing integration processes, coordinated unified approaches to the regulation of national financial markets are being developed (Basel III standards, Solvency II standards). Kazakhstan and its financial market do not remain aloof from global trends. There is an active introduction of the best international practices and regulatory standards.

In accordance with the adopted Concept of development of the financial sector until 2030, the goal is to create a competitive financial sector and increase its efficiency in the redistribution of resources in the economy based on the best international standards, including OECD standards. This task is supposed to be achieved in several stages.

Until 2020, the main efforts will be aimed at improving the stability of the financial sector by solving existing problems and enhancing its competitiveness, as well as responding appropriately and laying the foundation for the functioning of the financial market after 2020. At this stage, the completion of the transition period after the accession of Kazakhstan to the WTO, as well as the transition to international standards for regulating financial activities are expected. In the period up to 2025, it is planned to complete the process of harmonization of the legislations of the countries participating in the SES, determining the development of the financial markets of the countries. The main result of harmonization will be the creation of a supranational body regulating the financial market. In this regard, a change in the meta and role of national regulatory authorities is expected.

In the period after 2020, financial organizations will face challenges related to the rising penetration of financial services provided by global and regional leaders in the domestic market without commercial presence (through branches), and therefore domestic financial institutions must be able to win competition for consumers with players , risk appetite and possibilities of which are incomparably higher in the conditions of non-proliferation on them of the basic prudential standards and requirements. Under these conditions, the growth of competitiveness is impossible only due to an extensive increase in the scale of business, and it must be based on improving the

quality of business strategies and processes that allow quickly adapting new technologies to provide financial services to consumers.

In Kazakhstan, the necessary infrastructure has been created and the technical infrastructure of the stock market includes the Central Depository, the Kazakhstan Stock Exchange (KASE), broker-dealers with a first category license, registrars and custodians.

As of January 1, 2018, the securities market of the Republic of Kazakhstan was represented by 45 brokers and (or) dealers, 10 custodian banks, 21 investment portfolio managers, 2 transfer agents. On the securities market, 3 infrastructure organizations also operate: Kazakhstan Stock Exchange JSC, Central Securities Depository JSC and United Registrar of Securities JSC, which carry out exclusive professional activities on the securities market without a license. Kazakhstan Stock Exchange complies with the recommendations of the Group of Thirty - the de facto international standard for depository and clearing operations

At the end of 2017, the aggregate financial indicators of brokers and (or) dealers and managers of the investment portfolio increased compared to 2016: by assets - by 34%, and by own capital - by 21%. Asset growth is associated with an increase in the value of the securities portfolio. The increase in equity was affected by the increase in retained earnings in 2017 due to the revaluation of securities, as well as a significant increase in the authorized capital of one of the professional participants in the securities market. The total amount of liabilities also increased by 56%, growth was due to loan repos.

The realization of the economic interests of issuers occurs in the primary stock market, by placing securities among the first owners. Issuers attract investment funds by issuing securities. Permission to issue equity securities has given by the authorized state body. At this stage, the issuer acquires the necessary investment resources. As a rule, the first buyers of securities are large investment companies that carry out dealer activities in the stock market. In the Republic of Kazakhstan, the largest role, as the first buyers, is assigned to credit and financial institutions represented by accumulative pension funds, insurance companies, investment funds, and commercial banks.

The main purpose of the secondary securities stock market is to maintain a liquid securities market, which allows realizing the interests of investors. In this case, the investor has the opportunity at any time to sell owned securities at market value. Thus, investor confidence has maintained in the stock market as a tool for investing temporarily free funds.

The main ideology of the securities market, reflected in the legislation of the Republic of Kazakhstan, consists in the following principles:

- complete and reliable information on all types of securities issue available to every potential investor;
- qualification of securities market participants, on which, possibly, the financial well-being of the client depends.

Currently, in the financial market of the Republic of Kazakhstan, the state regulation of the securities market has carried out by the National Bank of the Republic of Kazakhstan (authorized body).

The analysis carried out suggests that in Kazakhstan market regulation is objectively necessary. First, it is directly related to the urgent need to find resources to finance immediate needs, both for public sector enterprises and for private entrepreneurs. Secondly, to finance the state budget. Thirdly, due to the formation of new indirect mechanisms of control over the money supply by the National Bank of the Republic of Kazakhstan.

Figure 1. The role of the exchange market in the economy of the Republic of Kazakhstan

Source: compiled by authors

The main indicator of the state of the securities market is its capitalization indicator. As can be seen from the data presented, the capitalization of the market for corporate securities has characterized by unstable trends. The decline in indicators occurred in 2012-2015 due use of the emerging negative trends in global capital markets. On January 1, 2018, the capitalization of the stock market amounted to 17.1 trillion tenge or 33.69% of GDP, while the capitalization of the bond market as of the same date amounted to 8.9 trillion tenge or 17.53% of GDP.

The peculiarity of the Kazakhstan securities market is the predominance of trading in government securities over the volume of corporate instruments. However, in recent years, a positive trend of growth in indicators of corporate securities issues can be seen in Figure 2.

Figure 2. Number of active issues of corporate securities

Source: compiled by authors

In 2017, 40 issues of non-state bonds were registered with a total amount of 1.6 trillion tenge and 8 bond programs with a volume of 0.6 trillion tenge. In 2017, 4 issuers defaulted on the payment of principal and accrued interest on the issued bonds: JSC Doszhan Temir Zholy (DTZ), LLP Buzgul Aurum, LLP APK-Invest Corporation, LLP ComTrade Product. Also, JSC Kazakhstan Kagazy during 2017 continued to be in default on the payment of principal and accrued interest on the issued bonds.

Table 1. Issuance of corporate shares, bonds and shares by issuers of the Republic of Kazakhstan

Indicator	4 quarter 2013	4 quarter 2014	4 quarter 2015	4 quarter 2016	4 quarter 2017
Number of current equity issues	1628	1614	1553	1416	1337
Number of current bond issues	359	367	397	391	393
Total	1987	1981	1950	1807	1730

Source: compiled by authors

According to the data in the Table 1, it can be seen that in the 4th quarter of 2017 compared to 2013, the number of active issues of corporate securities decreased by 13%, including a decline in equity issues, the number of bonds on the contrary increased in number. In general, the dynamics shows a decrease in the issuance of existing shares, as well as a slow increase in existing bond issues over the past 5 years. This dynamic suggests that the issue of bonds is more significant at the current stage of development of the stock market.

Corporate stocks and bonds are practically the main instrument for attracting investments in the Kazakhstan economy through the securities market. The dynamics of share market indicators for 2013–2017 years shows a sizable change in values, while the number of cancelled issues decreased by 2014–2015, then increased again by 2017. In addition, the number of joint-stock companies with current share issues decreases markedly (Table 2).

Table 2. Data on issues of shares and cancellation of issues (at the end of the period)

Indicator	2013	2014	2015	2016	2017
Registered Issues	24	24	24	26	28
Canceled issues	116	75	65	121	134
Number of joint stock companies with current equity issues	1.628	1.575	1.541	1.498	1.478

Source: compiled by authors

Analyzing the corporate securities market, let us consider the financial instruments of the securities market admitted to trading on the Kazakhstan Stock Exchange (KASE), see Table 3.

Table 3. Securities admitted to trading on KASE

	Number of issues	Number of issuers
Sector "Shares"	120	103
Sector "Corporate Bonds"	257	62
Sector " Investment fund securities "	6	5
Sector " Depositary receipts"	0	0
Sector " Securities of international financial organizations "	8	2
Sector "Securities of international financial organizations"	234	18
Sector "Derivatives"	0	0
Sector " Commercial Bonds"	5	4
Sector "Islamic securities"	0	0
Total	630	194

Source: compiled by authors

Data in the Table 3 shows that as of January 1, 2018, the number of issues of corporate shares and bonds included in the official list of KASE was 120 (19.05% of the total number of securities issues) and 257 (40.79% of the total number of securities issues) issues, respectively. Thus, the volume of corporate securities admitted to trading on the stock exchange is 69.8%. At the same time, the number of government securities issues amounted to 234 or 37.14% of the total number of securities issues.

A significant increase in the volume of the primary market was associated with the implementation of a program to improve the financial sustainability of the banking sector of the Republic of Kazakhstan, under which five second-tier banks attracted 620 billion tenge by placing subordinated bonds at KASE.

The capitalization of the market for shares and debt securities included in the official list of KASE, as of January 1, 2018, increased by as much as 63% as compared with January 1, 2014, and compared with last 2017 by 16%, which is large the result. In general, the rapid dynamics of growth of capitalization of KASE in securities of corporate issuers during the analyzed period, while the equity sector is gaining momentum, is significantly higher than the debt securities sector.

In absolute terms, the capitalization of shares of local companies traded on the stock exchange in Kazakhstan also lags far behind many world countries. So, it is almost 4 times less than in Poland and more than 11 times less than in Russia (Bayadan and Bagdasaryan 2017). An analysis of stock market capitalization in the EAEU countries has presented in Table 4.

As can be seen from the table 4, in terms of stock market capitalization, Russia ranks first among the EEU countries. In Russia, the capitalization of the stock market in 2015 amounted to $ 393.2 billion. The second place in the stock market capitalization is Kazakhstan. In the rest of the EAEU countries, the indicator of stock exchange capitalization of the stock market is significantly lower than in Russia and Kazakhstan. The exchange capitalization of the stock market in 2015 was $ 34.9 billion in Kazakhstan, $ 0.5 billion in Belarus, and $ 0.2 billion in Armenia and Kyrgyzstan.

Table 4. Capitalization of the stock market in the countries - members of the EAEU (in % of GDP)

Country	2013	2014	2015	2016	2017
Kazakhstan	22,6	23,5	26,3	23,0	34,9
Belarus	1,1	0,4	3,7	0,6	0,5
Russia	771,2	827,3	776,3	409,2	393,2
Kyrgyzstan	0,2	0,2	0,2	0,2	0,2
Armenia	0,1	0,1	0,2	0,2	0,2

Source: compiled by authors

Thus, studies show that the underdevelopment of the securities market leads to a number of adverse consequences for the financial industry in particular, and the economy of Kazakhstan as a whole. One of such negative influences is the acute shortage of long-term financing (for a period of more than five years) for the real sector of the economy - the shortage of "long money". At present, lending is mainly used as a source of long-term financing: from state financial organizations and from commercial banks (to a lesser extent).

However, a developed stock market, as world practice has shown, makes it possible to effectively solve the problem of a deficit of long-term financing, especially for capital-intensive projects. And the securities market in Kazakhstan, of course, has significant potential for development.

In recent years, important quantitative and qualitative changes have occurred in the country's economy as a whole and in the financial market. Evidence confirming these changes are recognition by the European Union and the US of Kazakhstan's market economy and appropriation by three leading authoritative international agencies — Moody's, Standard & Poor's, and Fitch.

A number of problems hampers the effective functioning of the stock market of Kazakhstan. Some of them are systemic in nature, reflect the relative youth of the Kazakhstan securities market and suggest equally systemic measures to overcome them. Others are rather of a local temporary nature and are associated with the impact on the market of the global financial crisis that broke out two years ago, the impact of which is still noticeable today.

Among the main factors hindering the development of the securities market:
- the impact of negative macroeconomic trends;
- the increasing trends of globalization, manifested in the mutual penetration of instruments of the stock market outside the country;
- insufficiently effective activity of rating agencies determining the pricing of stock instruments;
- high transaction costs, complex listing procedures, the need for an audit;
- the reluctance of the founders to lose control over the company as a result of "dispersion" of the share capital with the additional issue of shares - this is why most issues, unfortunately, are of a technical nature;
- lack of understanding of management about the feasibility of companies entering the stock market through the issuance of corporate securities;
- incorrect pricing, the yield on securities does not reflect the real state of affairs of issuers;
- imperfect technical infrastructure, lack of qualified intermediaries, a small number of listed companies.

Since 2013, the regulator has increased the requirements for the minimum size of the authorized capital of organizations planning to implement and carrying out licensed professional activities on the securities market, strengthened the requirements for the risk management system and software and hardware used in the implementation of professional activities. These measures were dictated by the need for an adequate level of protection of the rights and interests of investors in the securities market, minimizing the risk of manipulation of securities, and improving the quality of service.

Like any folded economic phenomenon, the stock market has an impact on the state of the economy and the social sphere. At the same time, in turn, other factors have a positive or negative impact on the parameters of its development. The openness of the economy of Kazakhstan, its involvement in the system of international relations, and its integration into the world economy make the domestic stock market vulnerable.

Kazakhstan financial institutions, unfortunately, do not ensure proper management of existing risks in the financial market, which prompts the real sector not to seek resources on the stock market, but to carry out self-financing.

The fundamental nature is the contradiction between the short-term resources provided by financial intermediaries and the long-term needs of financing economic growth. Hence the need to refinance the loans taken by enterprises, which comes up against the absence of derivatives that ensure hedging of interest risks.

The quality of management in Kazakhstan companies, both issuers and financial intermediaries, despite some progress, remains low. The main weaknesses of corporate governance include:

- the opaque ownership structure of joint stock companies (often information about shareholders, including beneficial owners, is not disclosed);
- insufficient number of independent members of the board of directors;
- the lack of generally accepted principles for determining the remuneration of top management;
- the absence (or non-disclosure) of the dividend policy;
- weakness of measures to prevent the use of insider information.

The potential of the stock market in Kazakhstan is quite large, especially considering that today the capitalization of the equity market to GDP is 20 times lower than in the European Union countries, and 45 times lower for debt.

The draft Action Plan for the implementation of the Securities Market Development Program of the Republic of Kazakhstan for 2016-2018 provides for the creation of conditions for the issuance of project bonds to finance investment projects.

The conclusion on the stock exchange of new investment projects together with state development institutions will allow solving the problem of financing newly created industries, giving impetus to the implementation of the Strategy of industrial-innovative development, and now the list of financial instruments will be significantly expanded.

With the development of the financial market, the expansion of the number of financial institutions and financial instruments, and plans to attract people's savings to the stock market, it became necessary to develop and adopt an additional law on the protection of investors' rights. This law should provide not only the protection of the rights and interests of investors, but also confidentiality with regard to information on financial assets and savings, which is extremely important for attracting individual investors to the financial market.

As a new direction of development of the Kazakhstan stock market, its regionalization can be proposed, which will be a kind of stimulator for the development of national rating systems for the emergence of an independent risk assessment of financial instruments and counter-partners in transactions.

The current state of the stock market in Kazakhstan has characterized by a lack of liquidity in the secondary market. Controlling stakes are in the hands of strategic investors, who are mostly not interested in selling shares to minority shareholders. Despite the significant volume of primary offerings on the domestic market of Kazakhstan, the secondary market remains illiquid. One of the main reasons for the low market liquidity is to dominate the market of institutional investors (pension funds), whose strategy is to hold debt instruments to maturity, without making a significant amount of active operations. In addition, there is no derivatives market.

The formation and development of the securities market in Kazakhstan took place against the backdrop of the formation of a new system of government and economic relations, initially conducted within the framework of state regulation and was inextricably linked with the process of privatization of state property. Over the years of its operation, the procedure for its state regulation and self-regulation has been significantly improved, the legal framework has been formed, having gone from scarce general legal provisions, not supported by any practical experience, to a structured system of many legal acts governing one or another of its aspects, quantitative and qualitative changes have occurred in its infrastructure.

However, despite the positive changes, the securities market of Kazakhstan today has not become an effective mechanism for attracting free cash and their transformation into investments, and does not have a significant impact on the development of the country's economy.

3. Study case

We believe that in this study we should conduct a quantitative test of the hypothesis about the existence of this trend, directly for the key indicators characterizing the long-term basic pattern of the development of the phenomenon being studied - the growth trend of the corporate securities issues.

For this purpose, a comparison of the average levels of a series has carried out: the time series is divided into two approximately equal parts according to the number of members, each of which is considered as a certain independent sample that has a normal distribution. If the time series has a tendency, then the averages calculated for each population should differ significantly (significantly) from each other. If the discrepancy is insignificant, insignificant (random), then the time series has no tendency. Thus, the verification of the presence of a trend in the studied series has reduced to testing the hypothesis of equality of the averages of two normally distributed sets.

We define the presence of the main trend (trend) of indicators "The number of active issues of corporate securities", according to the National Bank of the Republic of Kazakhstan for 2013-2017, presented in Figure 2. We divide the series into two parts: n1, n2. For each, we calculate the average values and sample variances:

$$\overline{y}_1 = \frac{\sum_{i=1}^{n_1} x_i}{n_1} \quad ; \quad S_1^2 = \frac{\sum_{i=1}^{n_1}(x_i - \overline{x})^2}{n_1} \tag{1}$$

$$\overline{y}_2 = \frac{\sum_{j=1}^{n_2} x_j}{n_2} \quad ; \quad S_2^2 = \frac{\sum_{j=1}^{n_2}(x_j - \overline{x})^2}{n_2} \tag{2}$$

Table 5. Calculated average values and sample variances

Number of active issues of corporate securities	$\overline{y}_1$	$\overline{y}_2$	S_1^2	S_2^2
Shares	1.598,5	1.362,3	20.949,14	25.887,51
Bonds	373,0	397,6	415,04	110,91

Source: compiled and calculated by authors

Let us test the hypothesis of equality of dispersion at the level of significance $\alpha = 0,05$.

$$H_0 : \sigma_1{}^2 = \sigma_2{}^2 \quad , \quad H_1 : \sigma_1{}^2 \neq \sigma_2{}^2$$

The answer to these questions is the F-distribution.
When the general dispersions are equal, the calculated value of the F-distribution takes the form:

$$F_{dist} = \frac{S_2{}^2/\sigma^2{}_x}{S_1{}^2/\sigma^2{}_y} \tag{3}$$

When the general dispersions are equal, the calculated value of the F-distribution takes the form:

$$F_{dist} = \frac{S_2{}^2}{S_1{}^2} \approx \frac{25887,51}{20949,14} = 1,235$$

For the indicator "Number of current corporate securities issues (Bonds)":

$$F_{dist} = \frac{S_2{}^2}{S_1{}^2} \approx \frac{110,91}{415,04} = 0,267$$

Table 6. Estimated value of the F-distribution

Number of active issues of corporate securities	F_{dist}
Shares	1,235
Bonds	0,267

Source: compiled and calculated by authors

where: $\sigma^2{}_x$ and $\sigma^2{}_y$ - general dispersions of two samples n_x and n_y; F- distribution is tabulated.

It is determined by two parameters v_1 and v_2 - degrees of freedom.

$v_1 = n_x - 1; \qquad v_2 = n_y - 1.$

$v_1 = 2 - 1 = 1; \qquad v_2 = 3 - 1 = 2.$

$F_{cr}(0,05; 1,2) = 200$

Because Fdist<Fcr (0,05; 1,2), there is no reason to reject the null hypothesis. According to the observation of the dispersion of the general sets are equal $\sigma^2{}_1 = \sigma^2{}_2$, corrected selective disperses (S_1^2 and S_2^2) differ insignificantly, (the discrepancy between them is random). Then you can test the main hypothesis:

$$H_0 : \overline{y}_1 = \overline{y}_2 \quad ; \quad H_1 : \overline{y}_1 \neq \overline{y}_2$$

For the indicator "Number of current corporate securities issues (Shares)":

$$Tcal = \frac{\overline{y}_1 - \overline{y}_2}{\sqrt{(n_1 - 1)S_1{}^2 + (n_2 - 1)S_2{}^2}} \sqrt{\frac{n_1 n_2 (n_1 + n_2 - 2)}{n_1 + n_2}} \approx$$

$$\approx \frac{11598,5 - 1362,3}{\sqrt{(2-1) \cdot 20949,14 + (3-1) \cdot 25887,51}} \cdot \sqrt{\frac{2 \cdot 3 \cdot (2 + 3 - 2)}{2 + 3}} \approx 3,661$$

For the indicator "Number of current corporate securities issues (Bonds)":

$$Tcal = \frac{\overline{y}_1 - \overline{y}_2}{\sqrt{(n_1 - 1)S_1{}^2 + (n_2 - 1)S_2{}^2}} \sqrt{\frac{n_1 n_2 (n_1 + n_2 - 2)}{n_1 + n_2}} \approx$$

$$\approx \frac{373 - 397,6}{\sqrt{(2-1) \cdot 415,04 + (3-1) \cdot 110,91}} \cdot \sqrt{\frac{2 \cdot 3 \cdot (2 + 3 - 2)}{2 + 3}} \approx 3,854$$

Compare T_{cal} with tabulated value t_{cr} (α, κ) – Student's critical distribution point *where* κ = n – 2 degree of freedom, α - given level of significance.

κ = 5 – 2 = 3; t (0,05; 3) = 3,18

Because $|T_{cal}| > t_{cr}$ (0,05; 3), there is no reason to reject the null hypothesis that the time series has a tendency, since the averages calculated for each population differ significantly (significantly) from each other. Hence the conclusion that the trend of indicators, "The number of active issues of corporate securities (Shares, Bonds)" is present.

Conclusion

On the basis of the conducted research, the problems constraining the development of the stock market are formulated. Ways to enhance the role of the securities market in the financial support of the economy are as follows:
- an increase in the number of issuers from the number of enterprises in the real sector of the economy by reducing transaction costs, introducing benefits and simplifying the procedure for entering the stock market;
- attracting funds from small investors to the investment process through the creation and operation of a system of state guarantees for the return of funds invested in the investment process, taking measures to protect "minority" investors, and developing collective forms of investment;
- development of the market infrastructure through the creation of a unified database for recording rights to securities, as well as accounting for the transfer of property rights on them, improving trading systems;
- further improvement of settlement and clearing technologies, aimed at improving the reliability of transactions in the Kazakhstan market;
- creation of technical systems that allow integrating the stock market of Kazakhstan into international trading systems with opportunities for local investors to trade in foreign markets and vice versa;
- development of the information base of the Kazakhstan stock market: raising the informational level of the website of the Kazakhstan Stock Exchange, stimulating the development of information and analytical companies covering the financial markets of the country, creating an information system accumulating information from issuers;
- expansion of the range of investment instruments traded on the Kazakhstan Stock Exchange, aimed at attracting new investors (shares of closed mutual funds, real estate funds, receipts of foreign issuers, futures on stock market indices, *etc.*).

In connection with the need to attract new issuers to the exchange, it is necessary to conduct a whole range of economic (including marketing) and liberal administrative measures to attract potential borrowers to the securities market. At the same time, we believe that only a holistic and continuous work to increase the awareness of potential borrower companies about the benefits of raising funds in the stock market can yield significant results.

It is advisable to identify and use opportunities to reduce transaction costs that accompany the placement and circulation of securities on the stock exchange. It is possible to introduce privileges and simplify the procedure

for entering the stock market, albeit on special trading platforms only for domestic, even retail investors, but with the condition of compulsory insurance of risks.

In order to stimulate the public offering of shares in the securities market and in order to ensure the necessary circulation and liquidity of shares, it is necessary, taking into account international experience, to consider the possibility and feasibility of introducing incentives for issuers whose shares are circulating with KASE and meet the criteria of public companies.

All the above gives reason to believe in the successful post-crisis stabilization of the stock market of the Republic of Kazakhstan and in overcoming the accumulated negative trends.

References

[1] Adambekova, A.A. 2017. *Financial market of Kazakhstan: Formation and development*. Almaty. 256.

[2] Alekhin, B.I. 2014. *Stocks and bods market. Introduction to stock operations*. Moscow. 158.

[3] Bayadan, A.A., and Bagdasaryan, A.M. 2017. Problems of development and integration of the securities market in the EAEU countries. *Bulletin of International Organizations,* 4(18): 12-29.

[4] Bertaeva, K.Zh. (2016). Management of financial institutions. *Karzy-Karazhat*, 2(15): 56-62.

[5] Dodonov, V. (2018). Kazakhstan stock market in the context of the global financial crisis. *Analytical Magazine Kazakhstan Securities Market*, 12(36): 78-96.

[6] Logue, W., and Gorham, L., 2014. *Handbook of modern finance*. Boston - New York. 132.

[7] Melnikov, V. 2017. *Fundamentals of Finance*. Tutorial for universities. Almaty. 497.

[8] Mirkin, Y.M. 2015. *Russian securities market: The impact of fundamental factors, forecast and development policy*. Moscow. 558.

[9] Sakhanova, A.N., and Isingarin, Z.S. 2017. *Problems and prospects of development of the stock market of Kazakhstan*. Almaty. 289.

[10] Scarlet, B. 2016. *Foreign stock markets: tools, structure, functioning mechanism*. Moscow. INFRA-M. 432.

[11] Sharpe, U., and Alexander, G. 2016. *Investment*. Moscow. INFRA-M .975.

[12] Ștefănescu, L. 2006. Concrete aspects concerning the system analysis in decision assistance for the management of a portfolio of derivate financial products, *Journal of Applied Economic Sciences*, Volume I, 1(1): 70-79.

[13] Toulz, R., and Bradley, E. 2017. *Stock market*. Moscow. INFRA-M. 303.

*** Report of the National Bank of the Republic of Kazakhstan. 2017. Official site of the National Bank of the Republic of Kazakhstan. http // www.nationalbank.kz.

*** The concept of development of the financial sector of the Republic of Kazakhstan until 2030.

Public Policy and International Investment Position in European Integration of Ukraine

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Abstract:

This research investigates the influence of public policy on the relationship between GDP and NIIP selected components, namely assets, liabilities, direct, portfolio and other investment of Ukraine in the context of Ukraine's aspirations for European integration. For the purposes of the research, we estimated the panel data of ratio analysis for Ukraine during the period 2000-2016. The results of our analysis showed that the shock changes in the NIIP structure were primarily due to the political and economic factors within the country, and were a consequence of the lack of systematic and balanced public policy of Ukraine. The correlation analysis revealed a statistically significant relationship between GDP and investment in the NIIP structure (direct, portfolio and other investment) and the independence of the GDP, assets and liabilities of NIIP of Ukraine during both short- and long-term periods.

Keywords investment; public policy; economic shocks; macroeconomic imbalances; transition countries; business cycle

JEL Classification: E60; F15; F21

Introduction

Strengthening the influence of macroeconomic crises on the course of business cycles of the world economies caused the creation of mechanisms and the formation of policies aimed at countering global imbalances. To ensure a sustainable growth of the world economies, in compliance with the G20 objectives, the deviations are measured through the Mutual Assessment Process by providing the recommended directions for public policy implementation (International Monetary Fund 2017a). In the EU, Macroeconomic Imbalance Procedure is used by the EU members in order to identify and correct the negative consequences of the macroeconomic developments. This procedure includes indicators of both internal and external deviations. The indicators of the external imbalances, among other things, include the evolution of current account and net investment positions of Member States (Directorate-General for Economic and Financial Affairs (European Commission 2017).

Understanding of the state of the country's investment position is quite important for the analysis of the domestic and foreign policy of the country. This indicator fixes the structural imbalances in the financing of the balance of payments, makes it possible to assess the investment attractiveness of the country, to understand its role in the international arena. However, it is not enough to evaluate only the static state of the international investment position in order to establish a balanced public policy for transition countries. It is necessary to test the influence of the country's net investment position on the course of its business cycle and to identify external and internal imbalances in accordance with the state of the economic conjuncture in the short and long term. Despite this, the scientists pay insufficient attention to the analysis of external imbalances of the European transition countries (Stojkov and Warin 2016), although these countries have periodic problems with external imbalances and

growth instabilities in Europe (Podkaminer 2015). Ukraine also belongs to such countries. Significant fluctuations inherent in the Ukrainian economy require further research, especially taking into account Ukraine's aspirations for European integration. In view of this, the purpose of this research is to conduct an analysis of net international investment position of Ukraine for 2000-2016 and test the relationship between the NIIP selected components and the GDP of Ukraine.

1. Literature review

1.1 External imbalances and debt crisis in the European Union

The overwhelming majority of scientists' research related to the study of external imbalances are aimed at explaining the debt crisis in the EU countries. However, external imbalances are justified not only by the consequences of the financial crisis of 2007 - 2008, but also by the low fiscal discipline of peripheral economies. The EU Member States, through relatively cheap lending sources in the European market, can finance current consumption instead of saving for the future as well as to finance import instead of the national production development (Keuschnigg and Weyerstrass 2015, Kutasi 2015, Podkaminer 2015).

Based on the results of the assessment of external imbalances for 1975 - 2011, Diaz-Sanchez and Varoudakis (2016) concluded that growth fluctuations in the Euro zone were triggered by unusually low interest rates. And considering the conditions of Economic and Monetary Union in EU, the shock consequences of disproportional external imbalances are shifted to the development of other economies. Excessive expansion of credit was one of the causes of crises, which Greece, Ireland, Portugal and Cyprus faced to (Alcidi *et al.* 2016). Cross-country foreign ownership of domestic debt securities plays significant role in the explanation of euro debt crisis (Lane and Milesi-Ferretti 2018).

A simple solution may be the implementation of stricter fiscal consolidation aimed at overcoming the crisis and at economic growth. If the Scoreboard parameter are not met, countries should be subject to special monitoring (Pera 2016).

1.2 The current account imbalances and net international investment position

The country's international investment position provides the information on the balance of the country's investment assets and liabilities, its role in relation to other countries and the world as a whole. In addition, the international investment position shows country's net foreign wealth. If net investment position is negative, the country is a net debtor for other countries in the world; otherwise - a net creditor.

Countries independently choose the strategy for forming a net investment position. If conduct the measurement by this indicator, it can be seen that developed countries as well as developing countries can be the debtor and creditor of other countries. In 2016, Japan was the biggest net creditor for other countries, and the USA was the biggest net debtor (IMF 2018). As for the EU countries, Spain was the biggest debtor in 2016, Germany was the biggest creditor; the overall state of the net investment position of the EU-28 countries was negative (Eurostat 2018).

The net international investment position of the country is generally considered in combination with the Balance of Payments because in this case it is possible to understand the positive and negative trends in the formation of the balance of the country. Big share of the country's credit debts may contain bad debts. At the same time, countries with a significant negative investment position (more than -35% of GDP) have a significantly higher default risk, because they will not be able to make payments on their liabilities.

However, the excessive surpluses of net investment position provide potential threats for the country, since they contain the risk of losing foreign assets in other countries. Fogli and Perri (2015) reached the same conclusion and showed that countries with larger net foreign asset on average suffered more from the volatility of the net foreign asset position. Such situation with assets was observed during the financial crisis of 2007-2008 in Europe (Wajda-Lichy 2015).

As for Ukraine, a successful position among the EU countries is a very important aspect of its European integration policy. The implementation of political and economic reforms aimed at balancing of Ukraine's economic development remains the main precondition for changing the model of Ukraine's cooperation with the EU. The comparison of the effects of changes in balance of Ukraine's international investment position on the changes in GDP should contribute to the development of clear strategies and programs for Ukraine's development aimed at achieving the goals of Ukraine's European integration.

2. Methodology

The first phase of the research provided an analytical analysis of the structure of the net international investment position in Ukraine. For this purpose, the ratios of the NIIP selected components to GDP and the coefficients of their year-on-year rate change were calculated. For the formation of a number of these NIIP components in the dollar equivalent for 2000-2016, an open electronic database of the National Bank of Ukraine was used, and for a number of data of Ukraine's GDP in dollar equivalent the database of the International Monetary Fund was used. The International Investment Position statistical information complies on the basis of the sixth edition of the Balance of Payments and International Investment Position Manual (BPM6, 2009). At this stage, the calculations were conducted to find the main causes of the shock changes in the NIIP structure and their influence on the business cycle in Ukraine.

In the second phase of the research, the hypotheses on the independence of NIIP selected components and GDP were tested by calculating Pearson Correlations correlation coefficients in the short- and long-term periods. The level of relation significance and the variability of the values were estimated by determining two coefficients: 2 Sample F-Test and P-value. If the P-value exceeded 0.05, we rejected the null hypothesis H_0: $\sigma_1 = \sigma_2$ and accepted the alternative hypothesis H_a: $\sigma_1 \neq \sigma_2$. The coefficients were calculated in the SigmaXL version 1.0 environment.

3. Case studies

There was a negative investment position (Figure 1) during 2000-2016 years in Ukraine, i.e. Ukraine's liabilities to other countries exceeded its assets. Moreover, in Ukraine there is a tendency to increase its liabilities to the outside world. In 2009 and 2015, there was a shock increase in the growth rate of liabilities in comparison with the previous year - by 54% and 36% respectively, which is not least because of the current policy. In 2015, the share of liabilities to GDP was 17.9%, and this is the highest value during the studied period. The growth of liabilities in Ukraine was largely formed due to the accumulation of long-term loans of other sectors of the economy. In 2016, the government guaranteed debt to GDP was 69.2% (compared with 11.7% of the state debt to GDP). A more negative threshold value for a negative net international investment position was observed in 2000, and then it was twelve-year period within normal range. But from 2013 to 2016, Ukraine's position once again reached the threshold value of -35% of GDP for this indicator. Unfortunately, such a policy of formation of net international investment position is a source of macroeconomic imbalances.

Analyzing the structure of foreign assets of Ukraine, one can see that other investment prevailed in the structure of assets (and made 80% of total assets) in 2016, including other sectors holdings of foreign currency cash that reached up to 66%. Reserve assets and direct investment made 13% and 7% of all assets respectively. Portfolio investment and financial derivatives did not make a big difference in the structure of assets, since their share in total volume did not reach one percent. The largest share of the liabilities structure is made up by other investment (50%), 38% of which is loans. Direct and portfolio investment make 31% and 32%, respectively, and special drawing rights (SDR) – 1% (National Bank of Ukraine (NBU) 2018).

More detailed review of direct investment shows that in 2016 the majority of the equity capital of Ukrainian investors was directed to Cyprus (93.8 % of all direct investment from Ukraine), the second most popular country for investment was the Russian Federation (1.9%). The specific feature was that the biggest volume of direct investment that came from Ukraine abroad during the entire period was from Donetsk region (94.1%). As for the growth rate of direct investment abroad, it was not uniform for the period 2000 - 2016. A peak growth of foreign direct investment abroad was recorded in 2007 (Figure 2) and it was connected with the extraordinary parliamentary elections in Ukraine. So, direct investment in Cyprus increased by 565.6 times in 2007.

In 2015 and 2016 direct investment in Ukraine reached their maximum value of 52% of GDP, although in absolute terms they decreased by 1% in 2016. The largest share of direct foreign investment in the economy of Ukraine in 2016 was from Cyprus - 28.3%, from the Netherlands - 17.1% and from the Russian Federation - 8.4%. Financial and insurance activities (23.2% of total investment), recycling industry (20.8%), wholesale and retail trade (14.5%) are still the most attractive fields for foreign direct investment in Ukraine (State Statistics Service of Ukraine (SSC of Ukraine) 2017).

During studied period (Figure 3), portfolio investment assets in Ukraine consistently make 0.1% of GDP (only in 2015 they reached 0.2% of GDP). Debt securities are the main part of their structure (97% in 2016). As for the formation of portfolio investment liabilities, the significant fluctuations are observed here, although their share, as compared with GDP, increased from 10% (2000) to 32% (2016). There were big drops in portfolio investment liabilities (the bottom was in 2008), and growth (the most noticeable one in 2009). In 2016, debt securities accounted for 84.4% of portfolio investment liabilities, and only 1.6% for equity and investment fund shares (NBU 2018).

According to the date of National Securities and Stock Market Commission (NSSMC) the shares of Ukrainian issuers are more attractive for investors from the Russian Federation (they own 29.83% of the total nominal value of securities) and from Cyprus (they own 15.89%).

Figure 1. Net international investment position of Ukraine

% of GDP   year-on-year rate change, %

Source: own calculations based on the data of the NBU 2018, the Eurostat 2017, the IMF 2017b.

During 2016, foreign investors withdrew their capital from the stock market of Ukraine, and in general the balance of investment of non-residents of Ukraine was negative (-84.88 billion UAH). Such a negative trend in the volume of foreign investment in the stock market has been existing since 2014, and is essentially due to the banking crisis and instability in the east of Ukraine. In three years, the negative balance in the volume of investment of non-residents increased more than 19 times through the derivatives of the stock market. In 2016, the biggest share of investment attracted in stock market derivatives was from Cyprus (+ 7.72%), but non-residents from the Virgin Islands (Britain) by 54.83% and from India by 27.85% (NSSMC 2018).

Other net investment during 2000-2016 was also changing unevenly. While for 2000-2010 the balance of other investment was negative, then from 2011 to 2016 inclusive, the balance of the position was positive. The growth peaks of other investment relative to GDP were observed in 2009 and 2015, while the bottom of active positions of other investment was recorded in 2003, 2008 and 2013 (Figure 4). Such fluctuations in the assets of other investment were determined within the account "currency and deposits" (that made 91.1% of other investment assets in 2016) and sub-account "other sectors holdings of foreign currency cash". Since the end of 2014, the volume of other sectors holdings of foreign currency cash has been reducing, due to the direction of currency cash to finance the current account deficit in Ukraine. Other investment liabilities in relation to GDP had similar periods of fluctuations. There was a huge accumulation in the structure of assets and liabilities of other investment in 2014 and 2015, that was again caused by economic and banking crisis, instability in the east of Ukraine.

The systemic banking crisis in Ukraine took place in 2014 - 2016, and led to direct fiscal expenditures of Ukraine to overcome the consequences of the crisis of 14% of GDP, and taking into account the direct losses of the private sector - about 38% of GDP. It was accompanied by the banking sector clean-up. 90 banks were recognized as insolvent ones, they together made about a third of the assets of the entire banking system before the crisis. The largest item of government direct expenditure was the expenditures on the banking sector restructuring. Funds were spent for the capitalization of private bank and other state-owned banks, financing payments to depositors of bankrupt banks. Also, significant volumes of refinancing loans, received by banks from the NBU, were lost (NBU 2017).

Figure 2. Direct investment of Ukraine

% of GDP

year-on-year rate change, %

Source: own calculations based on the data of the NBU 2018, the IMF 2017b.

Figure 3. Portfolio investment of Ukraine

% of GDP

year-on-year rate change, %

Source: own calculations based on the data of the NBU 2018, the IMF 2017b.

Such a dynamic structure of the net investment position causes an unequal influence on the growth of the Ukrainian economy. The conducted correlation analysis between GDP, NIIP, Assets, Liabilities showed that these variables are independent both for the long-term (Table 1) and for the short-term periods (Table 2). At the same time, while analyzing the NIIP selected components, it has been found that there was a close and statistically significant linear association between GDP and direct investment in Ukraine during the long- and short-term periods. That is, foreign direct investment influences the course of business cycle in Ukraine. The correlative relationship between direct investment (net) and GDP is negative: during the periods of the Ukrainian economy growth, the difference between the active and passive part of direct investment decreases, and vice versa, during the periods of economic decline - the difference between positions increases. The relationship between portfolio investment and GDP was registered only during the long-term period (Table 1). And again, the correlation coefficient between GDP and portfolio investment (net) is negative (as in the case of direct investment (net)). Also null hypothesis on the independence of other investment and GDP was rejected and an alternative hypothesis on the existence of an alternative hypothesis was accepted, *i.e.* hypothesis on the existence of an association between

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these variables. The correlative relationship between other investment and GDP only increased during the short-term (Table 2) period compared to the long-term one.

Figure 4. Other investment of Ukraine

% of GDP

year-on-year rate change, %

Source: own calculations based on the data of the NBU 2018, the IMF 2017b.

Table 1. The results of Pearson correlation analysis between the GDP and NIIP selected components (time series: 2000-2016; sample size = 17)

Hypotheses	Pearson Correlations	Standard Deviation	2 Sample F-Test*	P-value (2-sided)**
H$_{1.1}$: There is an association between GDP and NIIP of Ukraine	0.0884	9.044	32.5319	0.0000
H$_{1.2}$: There is an association between GDP and Assets	0.4034	32.028	2.5940	0.0652
H$_{1.3}$: There is an association between GDP and Liabilities	0.3200	37.877	1.8547	0.2274
H$_{1.4}$: There is an association between GDP and Direct investment abroad	0.7864	3603.6	0.0002	0.0000
H$_{1.5}$: There is an association between GDP and Direct investment in Ukraine	0.8797	22847	0.0000	0.0000
H$_{1.6}$: There is an association between GDP and Direct investment (net)	-0.8878	19449	0.0000	0.0000
H$_{1.7}$: There is an association between GDP and Portfolio investment assets	0.6260	57.449	0.8062	0.6718
H$_{1.8}$: There is an association between GDP and Portfolio investment liabilities	0.7097	11225	0.0000	0.0000
H$_{1.9}$: There is an association between GDP and Portfolio investment (net)	-0.7099	11172	0.0000	0.0000
H$_{1.10}$: There is an association between GDP and Other investment assets	0.7616	40564	0.0000	0.0000
H$_{1.11}$: There is an association between GDP and Other investment liabilities	0.8520	33965	0.0000	0.0000
H$_{1.12}$: There is an association between GDP and Other investment (net)	0.1918	10181	0.0000	0.0000
H$_{1.13}$: There is an association between GDP and Other sectors holdings of foreign currency cash	0.7190	33169	0.0000	0.0000
H$_{1.14}$: There is an association between GDP and Loans	0.7437	22083	0.0000	0.0000

Note: * Test of differences in the variability of GDP and the selected NIIP indexes (H_0: $\sigma_1 = \sigma_2$; H_a: $\sigma_1 \neq \sigma_2$); ** If the P-value is less than 0.05, we reject the null hypothesis H_0: $\sigma_1 = \sigma_2$.

Source: Source: own calculations based on the data of the NBU 2018, the IMF 2017b

Table 2. The results of Pearson correlation analysis between the GDP and NIIP selected components (time series: 2012-2016; sample size = 5)

Hypotheses	Pearson Correlations	Standard Deviation	2 Sample F-Test*	P-value (2-sided)**
$H_{1.1}$: There is an association between GDP and NIIP of Ukraine	0.7969	5.442	61.8949	0.0000
$H_{1.2}$: There is an association between GDP and Assets	-0.9648	27.906	2.3538	0.0967
$H_{1.3}$: There is an association between GDP and Liabilities	-0.9779	31.968	1.7937	0.2532
$H_{1.4}$: There is an association between GDP and Direct investment abroad	0.4193	85.104	0.2531	0.0090
$H_{1.5}$: There is an association between GDP and Direct investment in Ukraine	0.9793	9326.9	0.0000	0.0000
$H_{1.6}$: There is an association between GDP and Direct investment (net)	-0.9789	9294.5	0.0000	0.0000
$H_{1.7}$: There is an association between GDP and Portfolio investment assets	0.5165	36.969	1.3412	0.5639
$H_{1.8}$: There is an association between GDP and Portfolio investment liabilities	0.2335	3504.1	0.0001	0.0000
$H_{1.9}$: There is an association between GDP and Portfolio investment (net)	-0.2287	3494.5	0.0002	0.0000
$H_{1.10}$: There is an association between GDP and Other investment assets	0.9032	4986.0	0.0001	0.0000
$H_{1.11}$: There is an association between GDP and Other investment liabilities	0.9670	9346.3	0.0000	0.0000
$H_{1.12}$: There is an association between GDP and Other investment (net)	-0.9401	4822.9	0.0001	0.0000
$H_{1.13}$: There is an association between GDP and Other sectors holdings of foreign currency cash	0.5531	2733.1	0.0002	0.0000
$H_{1.14}$: There is an association between GDP and Loans	-0.3987	1844.2	0.0005	0.0000

Note: * Test of differences in the variability of GDP and the selected NIIP indexes ($H_0: \sigma_1 = \sigma_2; H_a: \sigma_1 \neq \sigma_2$); ** If the P-value is less than 0.05, we reject the null hypothesis $H_0: \sigma_1 = \sigma_2$.

Source: Source: own calculations based on the data of the NBU 2018, the IMF 2017b

Conclusion

This research investigates the influence of public policy on the relationship between GDP and NIIP selected components. Ukraine during the period 2000 - 2016 was a net debtor for other countries of the world and the negative value of the NIIP is growing during recent years and already exceeds the threshold of 35% of GDP. And taking into account Ukraine's aspirations for European integration, the balance of Ukraine's position should be carried out in accordance with the requirements of the Macroeconomic Imbalance Procedure. In addition, it is also essential to implement a systematic public policy in the financial field while state guarantees providing. The periods of shock growth of liabilities led to the accumulation of bad debts in Ukraine. There is a threatening situation with foreign direct investment too. In Ukraine, the most investment comes from offshore Cyprus, in fact it is only the reinvestment from the Ukrainian economy (93.8% of all direct investment from Ukraine was directed to Cyprus in 2016). The structure of the assets of Ukraine's international investment position also has to be balanced. In 2016, 66% of all foreign assets in Ukraine were other sectors holdings of foreign currency cash, which indicates the existence of a 'grey' currency market in Ukraine. Such a significant share of the currency in the other sectors holdings of foreign currency cash is a source of speculative fluctuations in the foreign exchange market and the instability of the national currency of Ukraine. The correlation analysis revealed a statistically significant association between GDP and investment in the NIIP structure (direct, portfolio and other investment) and the independence of the GDP, assets and liabilities of the NIIP of Ukraine during both long- and short- term periods. Taking into account the above, it can be summarized that the shock changes in the NIIP structure were caused primarily by political and economic factors inside the country, and were the result of the absence of a systematic and balanced public policy during the long-term period.

References

[1] Alcidi, C., Ansgar, B., Alessandro, G., and Gros, D. 2016. Macroeconomic adjustment programmes in the Euro area: An overall assessment. *International Economics and Economic Policy*, 13(3): 345-358. DOI: 10.1007/s10368-016-0350-6

[2] Angelini, E., Ca' Zorzi, M., and Forster van Aerssen, K. 2016. External and Macroeconomic Adjustment in the Larger Euro-Area Countries. *International Finance*, 19(3): 269-291. DOI: 10.1111/infi.12098

[3] Bettendorf, T. 2017. Investigating Global Imbalances: Empirical evidence from a GVAR approach. *Economic Modelling*, 64: 201-210. DOI: 10.1016/j.econmod.2017.03.033.

[4] Bianchi, J. 2015. Discussion of "Macroeconomic volatility and external imbalances by Alessandra Fogli and Fabrizio Perri. *Journal of Monetary Economics*, 69: 16-19. DOI: 10.1016/j.jmoneco.2014.11.005

[5] Borio, C. 2016. On the centrality of the current account in international economics. *Journal of International Money and Finance*, 68: 266-274. DOI: 10.1016/j.jimonfin.2016.02.006.

[6] Carrasco, C. A., and Hernandez-del-Valle, A. 2017. Revisiting the Factors behind European External Imbalances. *Journal of Economic Integration*, 32(2): 324-357. DOI:10.11130/jei.2017.32.2.324

[7] Carrasco, C., and Peinado, P. 2015. On the origin of European imbalances in the context of European integration. *Panoeconomicus*, 62(2): 177-191. DOI: 10.2298/pan1502177c

[8] Catão, L. A., and Milesi-Ferretti, G. M. 2014. External liabilities and crises. *Journal of International Economics,* 94(1): 18-32. DOI: 10.1016/j.jinteco.2014.05.003

[9] Chunming, Y., and Chen, R. 2015. Policy transmissions, external imbalances, and their impacts: Cross-country evidence from BRICS. *China Economic Review*, 33: 1-24. DOI: 10.1016/j.chieco.2014.12.006

[10] Cota, B., Erjavec, N. and Željko, B. 2017. External imbalances in emerging and advanced European countries. *Economic Research - Ekonomska Istraživanja*, 30(1): 1553-1571. DOI: 10.1080/1331677x.2017.1340179

[11] Diaz-Sanchez, J. L., and Varoudakis, A. 2016. Tracking the causes of Eurozone external imbalances: new evidence and some policy implications. *International Economics and Economic Policy,* 13(4): 641-668. DOI: 10.1007/s10368-015-0316-0

[12] Duczynski, P. 2012. On Net External Assets in Developed and Transition Countries. *Prague Economic Papers*, 21(3): 363-376. DOI: 10.18267/j.pep.429

[13] Evans, D.D. 2017. External balances, trade and financial conditions. *Journal of International Economics,* 107: 165-184. DOI: 10.1016/j.jinteco.2017.04.002

[14] Faiña, A., Lopez-Rodriguez, J., Montes-Solla, P., Romero, I., and Varela-Candamio, L. 2017. Regional Development and Structural Change: The Productivity Paradox of Spanish Peripheral Regions. *Advances in Spatial Science*, 101-128. DOI: 10.1007/978-3-319-49818-8_5

[15] Fogli, A., and Perri, F. 2015. Macroeconomic volatility and external imbalances. *Journal of Monetary Economics,* 69: 1-15. DOI: 10.1016/j.jmoneco.2014.12.003

[16] Gallegati, M., and Delli Gatti, D. 2018. Macrofinancial imbalances in historical perspective: A global crisis index. *Journal of Economic Dynamics and Control*, 91: 190-205.

[17] Gnimassoun, B., and Mignon, V. 2015. How do macroeconomic imbalances interact? Evidence from a panel VAR analysis. *Macroeconomic Dynamics,* 20(7): 1717-1741. DOI:10.1017/s136510051500005x

[18] Gourinchas, P.O., and Rey, H. 2014. External Adjustment, Global Imbalances, Valuation Effects. *Handbook of International Economics*, 585-645. DOI:10.1016/b978-0-444-54314-1.00010-0

[19] Gourinchas, P.O., Rey, H., and Truempler, K. 2012. The financial crisis and the geography of wealth transfers. *Journal of International Economics*, 88(2): 266-283. DOI: 10.1016/j.jinteco.2012.05.008

[20] Herzberg, A. 2015. *Sustainability of External Imbalances*. DOI:10.1007/978-3-658-07091-5

[21] Keuschnigg, C., and Weyerstrass, K. 2015. Macroeconomic Adjustment and Institutional Reforms in the Euro Area. *International Advances in Economic Research*, 21(3): 275-285. DOI:10.1007/s11294-015-9530-3

[22] Kolosok, S., and Myroshnychenko, I. (2015) Structural change and business cycle dynamics in transition economies. *Journal of Applied Economic Sciences,* Volume X, Spring, 1(31): 128-141.

[23] Kutasi, G. 2015. External Imbalances in the EU: A REER-based Explanation. *Intereconomics*, 50(5): 301 -308. DOI:10.1007/s10272-015-0555-x

[24] Kuznetsova, N. V., and Tarabukina, A.A. 2014. The European Union: It's Place in the World Economy and the Impact on the International Economic Processes. *Asian Social Science*, 10(15). DOI:10.5539/ass.v10n15p230

[25] Lane, P.R., and Milesi-Ferretti, G.M. 2018. The External Wealth of Nations Revisited: International Financial Integration in the Aftermath of the Global Financial Crisis. *IMF Economic Review*, 66: 189 - 222. DOI: 10.1057/s41308-017-0048-y

[26] Müller-Plantenberg, N.A. 2015. Boom-and-bust Cycles, External Imbalances and the Real Exchange Rate. *The World Economy*, 40(1): 56-87. DOI: 10.1111/twec.12322

[27] Neaime, S., Gaysset, I., and Nasser, B. 2018. The Eurozone debt crisis: A structural VAR approach. *Research in International Business and Finance*, 43: 22-33. DOI: 10.1016/j.ribaf.2017.08.002.

[28] Ojede, A., and Kishan, R. 2017. External macroeconomic imbalances and foreign direct investment inflows to developing countries. *Contemporary Economic Policy*, 35(3): 484-504. DOI: 10.1111/coep.12218

[29] Pera, J. Evaluation of the Macroeconomic Stability of Central and Eastern European Countries with a View Toward their Membership in the European Union. Multidimensional Risk Analysis. *Comparative Economic Research*, 19(3). DOI:10.1515/cer-2016-0021

[30] Podkaminer, L. 2015. Central and Eastern Europe: Trapped in integration? *Acta Oeconomica*, 65(s1): 83-106. DOI:10.1556/032.65.2015.s1.6

[31] Siranova, M., and Radvanský, M. 2017. Performance of the Macroeconomic Imbalance Procedure in light of historical experience in the CEE region. *Journal of Economic Policy Reform*, 1-18. DOI:10.1080/17487870.2017.1364642

[32] Stojkov, A., and Warin, T. 2016. Drivers of European Transition Countries' External Current Accounts: An LSDVC Approach. *Eastern European Economics*, 54(5): 405-436. DOI: 10.1080/00128775.2016.1188663

[33] Torój, A. 2017. Managing external macroeconomic imbalances in the EU: The welfare cost of scoreboard-based constraints. *Economic Modelling*, 61: 293-311. DOI: 10.1016/j.econmod.2016.10.009

[34] Van Nieuwenhuyze, C. 2013. Debt, Assets, and Imbalances in the Euro Area: An Aggregate View. *Applied Economics Quarterly,* 59(3): 209-233. DOI:10.3790/aeq.59.3.209

[35] Wajda-Lichy, M. 2015. Excessive current account surpluses in euro zone economies – problem of particular economies or the euro area as a whole? *Journal of International Studies,* 8(3): 99-111. DOI:10.14254/2071-8330.2015/8-3/8

[36] Wang, C., Hong, J., Kafouros, M., Wright, M. 2017. Exploring the Role of Government Involvement in Outward FDI from Emerging Economies. *JIBS Special Collections*, 75-109. DOI:10.1007/978-3-319-51715-5_5

[37] Zucman, G. 2013. The Missing Wealth of Nations: Are Europe and the US net Debtors or net Creditors? *The Quarterly Journal of Economics*, 128(3): 1321-1364. DOI:10.1093/qje/qjt012

*** Directorate-General for Economic and Financial Affairs (European Commission). The Macroeconomic Imbalance Procedure: Rationale, Process, Application: A Compendium. EU Law and Publications. Last modified January 17, 2017. Available at: https://publications.europa.eu/en/publication-detail/-/publication/0d8929d8-dd4a-11e6-ad7c-01aa75ed71a1/language-en.

*** Eurostat. International Investment Position Statistics - Statistics Explained. European Commission. Accessed February 21, 2018. Available at: http://ec.europa.eu/eurostat/statisticsexplained/index.php/International_investment_ position_statistics

*** Eurostat. Macroeconomic imbalance procedure scoreboard. A broad set of indicators for early detection of macroeconomic imbalances. European Commission. Accessed February 21, 2018. Available at: http://ec.europa.eu/eurostat/documents/16624/0/2-22112017-BP-EN.pdf/a1a391e8-1bcb-42a7-b585-f4b2a467d912

*** International Monetary Fund. IMF Data. International investment position by indicator. Accessed February 21, 2018. Available at: http://data.imf.org/regular.aspx?key=61468210

*** International Monetary Fund. Group of Twenty IMF report - IMF annual meetings. G-20 report on strong, sustainable, and balanced growth. IMF. Last modified October 2017a. Available at: http://www.imf.org/external/np/g20/pdf/2017/100617.pdf

*** International Monetary Fund. World Economic Outlook Database, October 2017. Ukraine: Gross domestic product, current prices (US dollars). IMF. Last modified October 2017b. Available at: http://www.imf.org/external/pubs/ft/weo/2017/02/weodata/weorept.aspx?sy=2000&ey=2016&scsm=1&ssd=1&sort=country&ds=.&br=1&c=926&s=NGDPD&grp=0&a=&pr.x=45&pr.y=14

*** National bank of Ukraine (NBU). Financial stability report. NBU. Last modified June 2017. Available at: https://bank.gov.ua/doccatalog/document?id=51942354.

*** National bank of Ukraine (NBU). International investment position of Ukraine (on the BPM6 basis). NBU. Last modified Winter 2018. Available at: https://bank.gov.ua/doccatalog/document?id=19975141.

*** National Securities and Stock Market Commission (NSSMC). NSSMC. Accessed February 20, 2018. http://www.ssmsc.gov.ua/user_files/ content/58/1499943860.pdf.

*** State Statistics Service of Ukraine (SSC of Ukraine). Investment of external economic activity of Ukraine 2010-2016."SSC of Ukraine. Accessed February 16, 2018. www.ukrstat.gov.ua

The Effects of Specific Allocation Fund (DAK) on Local Economic Development: A Mixed Method Analysis on Central Java Province, Indonesia

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Abstract:

The management of the Specific Allocation Fund (DAK) requires good governance. This argument seems logic based on the claim of some studies that there are problems in planning and implementation in DAK policy. Thus, the benefit of DAK on local economic development can be debatable. This study tries to examine the relationship between DAK and local economic development in 35 districts/cities of Central Java Province over the period 2010–2014. In addition, a case study on how DAK policy is planned and implemented at the district and provincial level is investigated. The econometric results show that DAK in education and health, trade infrastructure and supporting facilities, as well as infrastructure and transportation sector give a significant contribution on a rise in growth and a decrease in the number of poor people, respectively. However, qualitative analysis indicates that the good governance practices only take place on the planning and implementation aspect of DAK in infrastructure sector, though elite capture is still a major hindrance in its allocation process.

Keywords: DAK; local economic development; governance; Indonesia

JEL Classification: H720; H830; O110

Introduction

National development is the efforts undertaken by the government with the participation of all components of the nation in order to attain the aspired goal of a country. It is a means for achieving the welfare of the whole society. One strategy to gain benefit for such development is by improving local government capacity and by empowering local communities in the process of regional development through the implementation of decentralization and regional autonomy policies.

Recently, the central government of Indonesia has ratified Law No. 23/2014 on the Local Government (LG), where each of LG is granted an authority to regulate and to manage the interests of their community. Along with these policies, fiscal decentralization is also applied through the ratification of Law No. 33/2004 on the

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Financial Balance between the Central Government and Local Government, which are designed to increase the financial capacity of every local government.

The implementation of fiscal decentralization in Indonesia is basically funded by the Local Budget (APBD). However, since local own-source revenue (PAD) in most of local governments is very limited, the central government uses the mechanism of intergovernmental fiscal transfers such as balance funds, consisting of the Revenue Share Fund (DBH), the General Allocation Fund (DAU) and the Specific Allocation Fund (DAK). In principle, they should be viewed as a whole unified because these three components complement each other.

DBH, sourced from the State budget (APBN), is allocated to the regions with a certain percentage based on the producing region to finance the local needs in the context of decentralization. Type of government revenue that has been distributed in the state budget includes several types of tax and natural resources which are managed by the central government. The characteristic of the transfer is a block grant, which gives a full discretion in accordance with the potentials and needs of the region. Overall, the main purpose of such grant is to reduce the vertical fiscal imbalance between central and local government. Meanwhile, due to the discrepancy in fiscal capacities among local governments, DAU is aimed to address the problem of horizontal fiscal imbalance among sub-national governments. Such discrepancy comes from differences in capacity of local governments to generate their own-source revenue and shared-revenue. Similar to DBH, the characteristic of DAU is a block grant.

Moving to DAK, nowadays, there are several key concepts that have several implications for the implementation of policies in the management of DAK, as follows: First, DAK is a fund sourced from APBN and therefore, the determination of DAK allocation is discussed and agreed by the central government and the National Parliament during the State Budget Draft discussion each year; Second, DAK is only distributed to certain regions. Accordingly, further policies are required to determine the regions receiving DAK under the general, specific, and technical criteria; Third, DAK is allocated to finance specific activities that should in line with the national priorities and the local affairs. Those who receives DAK are required to provide matching funds (*e.g.* at least 10% of the total allocation).

Since its introduction in 2001, DAK has experienced a tremendous growth in the allocation and the coverage of sectorial activities. In the former, the total transfer of DAK to the regions in 2013 experienced a significant increase, *i.e.* 13 times more than in 2003. Similar condition also occurred in DAK sectors, where it initially only focused on few sectors such as Education, Health, Road Infrastructure and Irrigation, as well as Governmental Infrastructure. In 2013, it increased almost four-fold, to 19 DAK sectors in 2013. With such situation, the development of DAK sector is becoming inseparable from the dynamics of the potential and the problems in the regions, as well as the changes in policies at the central level.

If explored further, the annual DAK allocation is given mostly for Education sector which accounts for 35% of the total DAK allocated to the regions, followed by Road Infrastructure (17%) and health (10%). Meanwhile, the smallest composition in the total allocation of DAK is for Housing and Settlements, Land Transportation Safety, and Rural Transportation. Apart from this dynamic picture, DAK as a component of balance fund is actually not a substantial fund. In 2013, the total DAK was only accounted for 7.3% of the entire Regional Budget. In this case, DAK was accounted for 2.9% of the Provincial Budget and 8% of the District/City Budget, respectively.

Although DAK retains the smallest portion in APBD, it can be viewed as an equalization instrument to boost local capital expenditure since DAU and DBH are mostly used for the employee expenses (SMERU, 2008). In line with this argument, the World Bank's (2007) findings showed that largest expenditure for local government is for government administration, which constitutes 38% of total expenditure at the provincial level and 30% at the district/city level. As DAK is expected to generate a rise in local capital expenditure, following Sollow's growth model approach, this leads to better local economic development. However, recent studies show that governance in the DAK policy should be considered seriously by all stakeholders at both national and local level in a bid to give a real economic benefit to community (see SMERU, 2008, Bappenas, 2011, MoHA, 2013).

Since DAK is a part of a grand design of fiscal decentralization policy along with revenue and expenditure assignment, sub-national debt/borrowing, and other intergovernmental transfers, several scholars attempt to investigate the effect of fiscal decentralization on economic development. However, the result is far from conclusive, depending on the unit of analysis.

In the case of fiscal decentralization – growth nexus, Davoodi and Zou (1998) showed that there is a negative and significant relationship. While, Woller and Phillips (1998) found that there is no significant evidence in their cross-country studies. Similar results are found in the case of Indonesia, either using full sample of provinces (Aisyah 2008) or single province analysis (Elida 2013). With regards to fiscal decentralization and poverty relationship, Sepulveda and Martinez-Vazquez (2011) found that fiscal decentralization is positively and

significantly correlated with poverty measures. In Indonesia, Booth (2003) showed that fiscal decentralization is negatively and significantly correlated with poverty.

All of empirical studies mentioned above whether in the form of cross-country studies or a single-country analysis do not clearly explain the characteristic of intergovernmental transfers in their fiscal decentralization indicators. Also, they do not critically analyze how fiscal decentralization is more effective to contribute to the growth and poverty with good governance. Based on description above, this study tries to analyze the relationship between DAK and Local Economic Development in 35 districts/cities within Central Java Province in the period 2010 – 2014. Since governance data are not available at the sub-national level, we use qualitative analysis to complement econometric findings. We argue that the results can be explained to a large extent by looking how DAK policy is planned and implemented at districts/cities and provincial level. Concerned with the scope of study, obtaining qualitative information at all districts/cities in Central Java province will be costly. Therefore, a case study approach is chosen to sharpen the analysis.

1. Literature review

In general, there are two types of transfer from central governments to lower tiers of governments, where each has a different impact in the provision of public services and social welfare (Bahl and Linn 1994). An intergovernmental transfer is called as a block grant transfers if it is transferred without any conditions of use from the grantor. Meanwhile, if the use of the transfer is made after the determination of a specific program, then this type of transfer is categorized as a specific transfer. In this case, DAK in Indonesia is naturally a specific grant.

Furthermore, Shah and Mundial (1994) shed the light on the characteristic of specific transfer. He stated that if the basic public services and the welfare of society is a national priority but not a top priority at local level, then the specific transfer with non-matching grant is the best. However, as DAK is intended as a stimulus, it usually requires matching fund. From here, the discussion can be expanded into whether the matching grant should be open-ended or closed-ended. He then asserts that specific transfer with open-ended matching grant is suitable for correcting inefficiencies in the financing of public facilities, and for increasing spillover effect to communities outside the allocated regions. The fact that local governments in Indonesia have allocated closed-ended matching grant which accounts for 10% of total allocation from their budget is very contradictory with principle of fairness, particularly for region with low fiscal capacity. This will raise anxiety whether local governments with such fiscal capacity can deliver public service to their communities. Such phenomenon is understandable since they are already unable to cope with existing economics problems such as high poverty and unemployment rates.

Moving from theoretical of fiscal transfer, so far there are few studies that examine various aspects of DAK, although none has reviewed in detail the role of DAK in local economic development. SMERU (2008) found that DAK technical guidelines (Juknis) issued by the supervising Ministry/Institution at the central level are often belatedly distributed and do not fit in with the schedule of planning and budgeting in the regions. Furthermore, they reveal that the central government is not transparent in formulating the allocation, so that local officials need to lobby each ministry/institution in order to obtain a larger DAK allocation. In the aspect of monitoring and evaluation, most of local governments barely give a report on the use of their DAK. In line with SMERU's findings, Bappenas (2011) indicated that DAK does not contribute significantly to the objectives (outcomes and impact) of national development that include economic growth and HDI with its key variables. Thus, the planning of DAK should be implemented in a more bottom-up style, which integrates DAK into the planning cycle at the national and local level simultaneously.

While previous studies emphasize the problems of DAK at planning and implementation level, recently Ministry of Home Affairs (2013) tried to disentangle such problems at wider dimensions. For example, on the planning level, decision-making and allocation of DAK for each region are top-down where Regional Development Planning Board (Bappeda) as a key institution at local level is not involved in the planning of programs/activities funded by DAK. On the aspect of budgeting, the 10% matching grant of DAK encourages not only commitment of local governments to involve in achieving national priorities and local affairs, but it also creates disincentive for some regions with a lower fiscal capacity to provide such closed-ended matching grants. Meanwhile, problem of DAK implementation is related to the change and rigidity of Juknis during the implementation period. On the aspect of monitoring and evaluation, clearly both central and local governments cannot properly coordinate each other and implement a periodically monitoring and evaluation program.

Albeit DAK have several drawbacks as mentioned above, each local government within decentralization framework must have financial resources (*e.g.* from own-source, intergovernmental transfer, to even sub-national borrowing) to provide public services and to ensure welfare to their people. Such thinking is in line with fiscal

decentralization concept formulated by de Mello (2000). Accordingly, it refers to transfers or delegates the sources of income and expenditure to the regions by reducing government bureaucracy. Aside from this argument, it essentially allows local governments to provide public goods that better match local preferences than the national government since they have better access to local information (Hayek 1945). Also, one could argue that it can enhance participation, transparency, and accountability in decision-making process (Putnam 1993). Despite these benefits, decentralization is at risk to fall into efficiency due to corruption and local capture. This is due to fact that local governments are less intensely monitored than central government (Bardhan and Mookherjee 2000).

Regardless the pros and cons on decentralization, clearly the conceptual foundation of fiscal decentralization can be traced back from the framework of fiscal federalism theory. This theory is divided into two perspectives, namely the traditional or first-generation theory and new perspectives or second-generation theory. In the first-generation theory, Tiebout (1956) can be an entry point to explain efficiency argument. He introduces the dimension of competition amongst local governments on the allocation of public expenditure that enable people to move freely to choose a variety of public goods and services that suit their preferences. Here, only central government can satisfy the uniform level of provision of public good and services. Such a strong assumption lies throughout the framework of the first-generation theory. However, as each region in larger and more heterogenous countries has different preferences, such provision becomes inefficient and potentially creates conflict. In addition, this theory does not emphasize on how local governments' ability to generate their own-source revenue. Also, this theory does not explain the link between central government and local government through intergovernmental transfer and how such transfer creates disincentive effect on local government.

Meanwhile, the second-generation theory, built based on Musgrave's (1959) and Oates's (1972) framework, put more emphasize on the importance of revenue and expenditure assignment amongst levels of government. This theory explains how fiscal decentralization affects the behavior of local governments. It is based on two mechanisms for aligning the interests of local governments with economic prosperity. Accordingly, in the state where the market for goods and services are highly mobile, the competition among local governments is an important incentive tool for the provision of public services. Such competition will stimulate economic growth in the regions. Also, in this theory, the close linkage between local revenues and expenditures can also be an incentive for local governments to improve the economic prosperity of the regions. However, intergovernmental transfers from central government will lead to disincentive for local governments to increase their local revenues.

To sum up, the main differences of the two theories lie on their view on own-source revenue and intergovernmental transfer. In principle, the link between revenues and expenditures assignment in APBD as well as the contribution of intergovernmental transfers on local revenue will create incentives for every local government to implement economic reform, which in turn, lead to better social welfare. As a part of intergovernmental transfers, the characteristic and dynamic of implementation of DAK in Indonesia is interesting to be examined.

2. Methodology

In this essay, the role of DAK on local economic development will be investigated. Concerning the scope of the study, we will use a case study approach in the province of Central Java. Yin (2009) argues that a case study is an empirical inquiry that examines a contemporary phenomenon within its real-life context. This is particularly useful when the boundaries between phenomenon and context are not clearly evident. Here, Central Java consists of 35 districts and cities, which is the second largest behind East Java in terms of number of government lower tiers. Also, amongst other provinces in Indonesia, Central Java receives a quite big proportion of DAK, the second highest behind Papua.

To reach the objective of essay, this study will employ both qualitative and quantitative method. The author uses sequential explanatory strategy, which is characterized by the collection and analysis of quantitative data in the first phase of research, followed by the collection and analysis of qualitative data in the second phase that is built on the results of the quantitative analysis (Creswell, 2009). Overall, the research activities have lasted for 6 (six) months, started from May 2017.

On the qualitative method, we acquire information by using semi-structured interviews and focus group discussion (FGD). Since Central Java province consists of 35 districts/cities, we will not collect the qualitative information from all districts/cities. Instead, we will focus on stakeholders in the District of Pemalang since this region is categorized as best reporting by Ministry of Home Affair as (MoHA 2013). The first method, semi-structured interviews, is chosen to allow new ideas to be brought up. Basically, any type of interview can catch

historical information and personal opinion (Creswell 2009). In relation to our research, interviews have been implemented at three different layers, namely national, provincial, and district. Relevant government officer at Directorate of Regional Development (Ministry of Home Affairs), Directorate of Balancing Fund (Ministry of Finance), Directorate of Regional Autonomy (Ministry of National Development and Planning), and member of House of Representatives at Commission XI (Finance) has been the key informants of our research at the national level since they all directly involved in the allocation process. In addition, local and provincial government apparatus at Regional Development and Planning Unit (Bappeda), as well as member of Local Parliament were interviewed to capture specific information about planning and implementation aspect in DAK at sub-national level. Last, we conducted some interviews with local communities, the important element that should not be neglected, since they are the object of development.

The second method important in this research is FGD. It is very common in social research to collect general information from different perspective (Creswell 2009). As this method emphasizes perceptions amongst people who share relatively same point of view, such method can be useful to explore general information on planning and implementation of DAK in Central Java, Indonesia among key bureaucrats, NGOs, and communities. Such general information can be a baseline to capture more detailed and specific information when we conduct semi-structured interviews. To sum up, for the qualitative part, we have implemented a total of 3 FGDs and 10 interviews to ensure that triangulation process in obtaining information is valid.

On the quantitative method, it will be focused on econometric analysis. In measuring local economic development (LED) equation, our dependent variable of LED is approximate by the annual growth of Gross Regional Domestic Product (GRDP) (Y_1), and the number of poor people (Y_2), which are all taken from Regional Income Account compiled by BPS. The following a simple baseline panel model will be used as follows:

$$LED_{it} = \alpha_0 + \alpha_1 DAK_{it} + \varepsilon_{it} \tag{1}$$

where: the subscripts i denotes the 35 districts/cities in Central Java province; t denotes the year of observation, which is 2010 – 2014; ε is the corresponding disturbance term; α_1 is our main variable of interest which measures the impact of the degree of DAK on local economic development.

To capture the degree of DAK, we use share of sectorial DAK on total DAK. Here we map the contribution of several sectors such as: education and health sector (X1); housing and food sector (X2); marine, fisheries, environment, and forestry sector (X3); local government infrastructure and transportation sector (X4); as well as trade infrastructure and supporting facilities sector (X5) on total allocation of DAK that districts/cities received.

Since we want to capture individual-specific effects model allowing each cross-sectional unit to have a different intercept term, the α_0 is random variables that capture unobserved heterogeneity. Also, in this model, we need valid assumption of strong or strict exogeneity such that E ($\varepsilon_{it}|\alpha_i, x_{i1},...,x_{iT}$) = 0, t = 1,...,T, so that the error term is assumed to have mean zero conditional on past, current, and future values of the regressors. However, the preliminary chow test shows that pooled least square is an appropriate model. Thus, there is no need to use fixed-effect in the model.

3. Results

On the first model, it can be seen that only DAK in education and health (X1) as well as trade infrastructure and supporting facilities (X5) sector give positive and significant impact on the increase in GRDP growth (Y1). On the contrary, in spite of a positive effect in DAK of housing and food (X2), marine fisheries, environment and forestry (X3) and local government infrastructure and transportation (X4), its effect on the increase of growth can be ignored (see Table 1).

Table 1: Prediction model of annual growth in GRDP (Y1)

Variable	Baseline Model
X1	0,008* (0,004)
X2	0,009 (0,110)
X3	0,013 (0,014)
X4	0,007 (0,007)
X5	0,020* (0,001)

Variable	Baseline Model
F	3,052*
R²	37%
N	165

On the second model, of the five predictor variables, only DAK in infrastructure and transportation sector (X4) significantly affects the decrease in the number of poor people (Y2). Meanwhile, DAK in education and health (X1), housing and food (X2), marine, fisheries, environment and forestry (X3), as well as trade infrastructure and supporting facilities (X5) sector does not have any significant impact to reduce poverty (Y2).

Table 2: Prediction model of poverty (Y2)

Variable	Baseline model
X1	0,007 (0,080)
X2	0,029 (0,022)
X3	0,003 (0,028)
X4	- 0,044* (0,014)
X5	0,002 (0,002)
F	3,913*
R²	43%
N	165

From these two models, clearly DAK in education and health, trade infrastructure and supporting facilities, as well as infrastructure and transportation sector give a significant contribution on a rise in growth of GRDP and a decrease in the number of poor people, respectively. Such findings are somewhat surprising during our fieldwork in which we gathered qualitative information from relevant stakeholders at both local and national level.

On the planning aspect, except for DAK in infrastructure sector, most of respondents agree that the central government is not transparent in the allocation process. Due to this condition, elite capture practices take place in which some local governments can sway the policy of central government (*e.g.* either lobbying with stakeholders at Ministry of Finance, Technical Ministries, or both) to obtain or even to increase DAK allocation in their region. Apart from "direct interventions" from the Mayor and the Regents, head of local government units (SKPD) at district and provincial level, member of Local (district) and National Parliament can also influence DAK allocation (for similar discussion, see Sugiyanto *et al.* 2018).

Such elite practices can distort the determination of DAK allocation. According to the law and regulations, regions can only receive DAK on the fulfillment of three criteria: (1) general criteria based on the local fiscal capacity; (2) specific criteria based on local characteristics such as borderland areas, disadvantaged areas, littoral areas, disaster-prone areas, food-security areas, potential-tourism areas, and specific autonomy areas; and (3) technical criteria based on technical aspect from ministerial and agency that receive an authority to allocate. With these characteristics, regions which do not fulfill all three criteria cannot receive DAK. However, in practice, such criteria cannot be interpreted as a screening instrument, instead they overlap one another. In this case, a region which is not feasible in terms of general criteria can pass in terms of specific criteria. Likewise, a region which is not feasible in terms of specific criteria can succeed in terms of technical criteria. In other words, these criteria seem to be treated as an alternative to other criteria. Consequently, to obtain DAK, a region needs to pass any of these three criteria.

Moreover, although our respondents state that the formula of DAK allocation is recently disseminated at local government stakeholders, in which the specific criteria accounts for 80%, while the rest respectively accounts for 10%, such formula is very complex to be implemented due to the length of the counting process and the vulnerability of data requirements. In practice, aside from elite capture, political motivation still dominates the allocations process, which hampers the effectiveness of DAK allocation where it is supposed to reach those most in need. This is based on the fact that such process involves the discussion in the state budget between central

government and the National Parliament at Commission XI (Finance). One could argue that this formula can theoretically be predicted. In fact, most of respondent's state that the allocation and location of DAK sectors is totally unpredictable. In some cases, the allocation and location of DAK sectors in the previous year cannot even be relied upon as a prediction tool for the allocation and location in the next year period. Such condition leads to a phenomenon where the allocation of DAK sectors is often not based on the local needs. It can also disrupt the agenda of local governments, where they might be forced to face a complicated process in their local Parliament to change their annual plan (RKPD) and budget (APBD).

In addition to the problem of elite practices, political motivation, and unpredictability, every local government hold the yearly local development planning meetings (musrenbang) to capture the communities' aspirations. On the one hand, the allocation of DAK sectors to each region is under the authority of the central government (Ministry of Finance together with Technical Ministries and or Agencies). Thus, such top-down approach is actually unrelated to the annual and the mid-term local government development plan (RKPD and RPJMD) and musrenbang in particular. On the other hand, the law and regulations state that DAK must be allocated based on local government proposals. Here, local government officials claim that they use a participatory and a bottom-up approach in the form of the musrenbang to determine the location of DAK sectors. However, due to the limited amount of DAK received, not all development projects proposed by the community can be realized. Aside from the limitation of financing, our respondents state that community proposals are often not in line with the local development framework. In practice, local governments will prefer to decide on the location of DAK-funded projects based on local government work unit (SKPD) plans that accommodate a selective aspiration of the community.

On the implementation aspect, except for DAK in infrastructure sector, the central government is often late to release regulations concerning DAK and its allocation, clashing with local government planning timetables which often involve a very complex procedure in local Parliament. Moreover, such regulations are very rigid in the sense that local governments cannot do the activities outside the regulation. For example, in the case of DAK in education sector, the grants must be executed by involving a combination of three mechanisms of implementation, namely: (i). open-tender; (ii). closed-tender, and (iii). joint partnership between school committee and local government unit. The latter requires expertise from school committee and local governments' apparatus (*i.e.* designing and building the classrooms precisely according to technical guidelines). Thus, failure to comply such guidelines is categorized as a criminal action. Such situation intuitively creates "fear factor" amongst local governments' officers to execute their budget (for similar discussion, see Sugiyanto *et al.* 2018).

We also find that regulations with regards to DAK have been revised many times by the central government within the same budget year. Since DAK is not categorized as a multi-year project, every local government must spend the received allocation in the same budget year. Thus, with this uncertainty condition, local governments have three options. First, they do not want to execute the received allocation with the consequence that they will not receive the next-year allocation. Second, they opt to adopt "a wait and see" approach because they fear that regulations will be changed when they try to initiate the tender. Since changes in regulations involve alteration in implementation of the project, thus according to our respondents, this method is the safest option because it will provide guarantee of not being convicted in corruption case and will keep the chance of getting the allocation in the next period. At the same time, through this approach, communities can see the development of physical infrastructure in their regions even though the proportion of the use of DAK sector cannot be fully absorbed. Last, local government officers take a risk to execute the received allocation, without putting attention on the revised regulation in the future. In our cases, majority of respondents choose the second approach in the implementation of DAK sector, except for DAK in education where most of respondents opt the first option.

Based on planning and implementation aspect of DAK sector, we confirm that good governance practices occur only in infrastructure sector, even though it is still vulnerable with elite capture in the allocation process. On planning side, according to our respondents at national level, every technical ministry play a major role (80%) in determining DAK allocation, although the decision of allocation is in the hands of Ministry of Finance. In the case of DAK in infrastructure sector, local government unit of public work (Dinas PU) send and update periodically (*e.g.* every 6 months) their infrastructure data which based on local needs to Ministry of Public Work (MPW) through its online national system. Here, MPW ensures that such process involve transparency and accountability. To avoid unreliable data, MPW conducts a periodic monitoring together with their representative at province level to check the validity of data. However, all of technical ministries, including MPW, agree that elite capture in allocation process is still dominant. This is due to fact that most of local government stakeholders, whether in the form of direct and indirect interventions as mentioned earlier, sometimes make a deal privately with stakeholders at

Ministry of Finance or even use member of the National Parliament to alter the allocation and the targeted location of DAK.

On implementation side, we find that the process of arranging or even adjusting regulation concerning DAK in infrastructure sector always involve various stakeholders at local and national level. Thus, such condition will give flexibility for every local governments' stakeholder to implement the projects/activities. In addition to this finding, unlike other sectors, such regulation is valid for medium-term (5 years) which eases every local government to integrate DAK of infrastructure sector in their annual and mid-term development planning system (RKPD and RPJMD). Also, such action will solve the issue of timeliness over regulation that occurs in most of DAK sectors.

Conclusion

In this study, we reassess the relationship between DAK and local economic development in 35 districts/cities in Central Java province between 2010 – 2014. We also investigate governance aspect by looking on how DAK is planned and implemented at local and provincial level. The main outcome of the empirical examination is that DAK in education and health, trade infrastructure and supporting facilities, as well as infrastructure and transportation sector gives a significant contribution on a rise in growth of GRDP and a decrease in the number of poor people, respectively.

Although the result shows a promising sign, all sectors of DAK show evidence of elite capture. This occurs in the form of direct and indirect interventions when there is no transparency in the allocation process. Aside from elite capture, the effectiveness of DAK allocation is hampered by political motivation since the determination of DAK allocation in APBN involves an intense discussion between the central government and the National Parliament. Despite the formula of DAK allocation is recently disseminated at local government stakeholders, the allocation and location of DAK sectors cannot be predicted. Thus, the allocation of DAK sectors is often not based on the local needs. Also, it forces local governments to alter their planning and budgeting agenda.

On the implementation aspect, except for DAK in infrastructure sector, the central government is often late to release regulations concerning DAK and its allocation. Moreover, such regulations are very rigid where the activities of DAK-funded project in several DAK sectors do not give flexibility to local governments to perform. We also find that regulations with regards to DAK have often been revised many times within the same budget year. This will lead to a decrease in the quality of public service delivery.

Unlike other sectors, DAK in infrastructure sector can provide a good benchmark on how DAK is planned and implemented at districts/cities and provincial level. On the planning aspect, MPW has developed online national system where each local government unit can draw a portrait of their current infrastructure condition. On the implementation side, the decision-making process in setting up a regulation always gives flexibility on local government stakeholders to implement projects/activities. The sustainability of this DAK sector is also ensured by its medium-term regulation.

One could argue that the prominent evidence of elite capture in our case study can alter the sign of local economic development variable. However, as long as local elites' preferences are somewhat representative from those of the general population, elite capture can give the benefit to the community. This will produce "the imperfect accountability" mechanism in the absence of democracy (Persson and Zhuravskaya 2016), as reflected by the participatory and the bottom – up approach during musrenbang in our case study. Here, elite capture only takes place on the allocation process at the local level, instead on the location of DAK-funded projects.

In future research, it is essential to expand the time span of data and to make comparative analysis of a case study between region with low and high fiscal capacity. Thus, there is a need to incorporate this issue by applying different type of decentralization such as political and administrative, as well as examining an experiment based on a different type of intergovernmental transfers. Overall, the findings that DAK can increase economic growth and can reduce the number of poor people cannot be fully interpreted as a success unless local government adopts a good collaborative governance model (for another application, see Digdowiseiso *et al.*, 2018). Although DAK in infrastructure sectors provides a good framework with regards to the planning and implementation of DAK at districts/cities and provincial level, strengthening the role of the governor can also be an entry point and a very important agenda to explain how DAK is planned and implemented. In this case, the governor acts as the representative of the central government in the region can enforce the synchronization and the harmonization of both planning and implementation of inter-development and intra-development at district/cities within its working territory. This is to ensure that DAK is aligned with national priorities. Governor can also take an intermediary role that bridges the gap between expectation of central government with regards to DAK policy and aspirations of local governments within its working territory.

Acknowledgments

References

[1] Aisyah, S. 2008. *The Effect of Fiscal Decentralization on Economic Growth*. Thesis., International Institute of Social Studies, Erasmus University.

[2] Bahl, R. and Linn, J. 1994. Fiscal Decentralization and Intergovernmental Transfers in Less Developed Countries. *Publius*, 24(1): 1-19. DOI: https://doi.org/10.2307/3330701

[3] Bardhan, P. and Mookherjee, D. 2000. Capture and Governance at Local and National Levels. *American Economic Review*, 90(2): 135-139. DOI: https://doi.org/10.1257/aer.90.2.135

[4] Booth, A. 2003. Decentralisation and Poverty Alleviation in Indonesia. *Environment and Planning C: Government and Policy*, 21(2): 181-202. DOI: https://doi.org/10.1068/c0127

[5] Creswell, J.W. 2009. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage.

[6] Davoodi, H. and Zou, H.F. 1998. Fiscal Decentralization and Economic Growth: A Cross-Country Study. *Journal of Urban Economics*, 43(2): 244-257. DOI: https://doi.org/10.1006/juec.1997.2042

[7] de Mello, L.R. 2000. Fiscal Decentralization and Intergovernmental Fiscal Relations: A Cross-Country Analysis. *World Development*, 28(2): 365-380. DOI: https://doi.org/10.1016/S0305-750X(99)00123-0

[8] Digdowiseiso, K., Sugiyanto, E., and Djumadin, Z. 2018. Implementation of Irrigation Policy in the Decentralized Government: A Case Study of West Java, Indonesia. *Journal of Environmental Management and Tourism*, Volume IX, Summer, 3(27): 411 - 422. DOI: https://doi.org/10.14505//jemt.v9.3(27).02

[9] Elida, S.W.R. 2013. *The Effect of Regional Fiscal Policy on Regional Economic Growth: Study Case Provinces in Kalimantan, Indonesia*. Thesis, International Institute of Social Studies, Erasmus University.

[10] Hayek, F.A. 1945. The use of knowledge in society, *American Economic Review*, 35(4): 519-530. DOI: https://doi.org/10.1142/9789812701275_0025

[11] Musgrave, R. 1959. *The Theory of Public Finance.* McGraw-Hill*.

[12] Oates, W.E. 1972. *Fiscal Federalism*. Harcourt Brace Jovanovich.

[13] Persson, P. and Zhuravskaya, E. 2016. The Limits of Career Concerns in Federalism: Evidence from China. *Journal of European Economic Association*, 14(2): 338-374. DOI: https://doi.org/10.1111/jeea.12142

[14] Putnam, R.D. 1993. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press.

[15] Sepulveda, C.F. and Martinez-Vazquez, J. 2011. The Consequences of Fiscal Decentralization on Poverty and Income Equality. *Environment and Planning C: Government and Policy*, 29(2): 321-343. DOI: https://doi.org/10.1068/c1033r

[16] Sugiyanto, E., Digdowiseiso, K., Zulmasyhur., and Setiawan, H. D. 2018. Fiscal Decentralization and Routine Conflict in Indonesia. *Journal of Applied Economic Sciences*, Volume XIII, Summer, 58(4): 961-969.

[17] Shah, A. and Mundial, B. 1994. *The Reform of Intergovernmental Fiscal Relations in Developing and Emerging Market Economies*. World Bank.

[18] Tiebout, C.M. 1956. A Pure Theory of Local Expenditures. *Journal of Political Economy*, 64(5): 416-424. DOI: https://doi.org/10.1086/257839

[19] Yin, R.K. 2009. *Case Study Research: Designs and Methods*. Sage.

*** Ministry of Home Affairs (MoHA). 2013. *Laporan Akhir Dana Alokasi Khusus (DAK) Tahun 2012*. Directorate General of Regional Development.

*** Ministry of National Development Planning Board (Bappenas). 2011. *Analisis Perspektif, Permasalahan, dan Dampak Dana Alokasi Khusus (DAK)*. Directorat of Regional Autonomy.

*** SMERU Research Institute. 2008. *The Specific Allocation Fund (DAK): Mechanisms and Uses*. SMERU.

*** World Bank. 2007. Spending for Development: Making the Most of Indonesia's New Opportunities. *Indonesia Public Expenditure Review*, No. 42530. Available at: https://openknowledge.worldbank.org/handle/10986/6347 (accessed September 20, 2018)

The Economic Nature of Financial Leverage of Agricultural Production

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Abstract:

This article notes that the main formation of the market mechanism of financial and credit relations requires new scientific developments and recommendations in the field of development of the agricultural sector, improvement of financial relations in agricultural production and substantiation of the main measures of rational impact of finance on the development of agricultural production in a multi-structured agricultural sector. Based on the works of domestic and foreign economists in the field of problems and improvement of financial and credit policy, a theoretical study of the essence of financial leverage characteristic of the agrarian sector is given.

The analysis of the volume of financing of the agro-industrial sector in 2017, the composition of budget programs for 2016-2018 has been conducted, the reasons for the non-appropriation of budget funds are shown.

Keywords agricultural production; republican budget; economy; financial management; financial leverage

JEL Classification: C52; C53; Q14

Introduction

Financial management by adjusting the forms and methods in accordance with the requirements of the modern stage is a rational way to increase their role and importance in the management of the agricultural sector. This was reflected in the Message of the President of the Republic of Kazakhstan N. Nazarbayev to the people of Kazakhstan dated October 5, 2018. "Growth of the welfare of Kazakhstan: increase in income and quality of life": it is necessary to allocate at least 100 billion tenge annually (Nazarbayev 2018). A qualitatively new level of organization of the

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financial mechanism should be achieved, the long-term nature of financial levers and incentives strengthened, the organizational structure of financial system management improved.

1. Research background

Financial leverage and incentives are the most important subsystem of a financial mechanism. These are the specific forms and methods of mobilization and use of financial resources, with the help of which the functions of finance are realized, the purpose and role of this economic category are manifested. In the economic literature, considerable attention has been paid to the problems of organizing financial levers as the forms and method of the impact of finance on the efficiency of social production. Each economic category has its own specifics, manifested through certain forms and methods of expression of the corresponding relationship. It is these concepts - the forms and methods of implementing relations that appear in economic life as tools (levers) for managing the relevant processes. That is, financial levers (instruments) are the forms and methods of expressing financial relations associated with the formation and use of monetary incomes and funds. To specific forms - levers of control include: in income allocate value added tax, excise taxes, income tax, deductions for social insurance, income from state property, rental payments, *etc.*; in expenditures, expenditures on the economy (national economy) with further detailed elaboration for socio-cultural purposes (education, health care, social insurance and security, *etc.*), science, management (Melnikov and Ilyasov 2017).

The content of financial regulation is that it operates with specific methods and methods of distributing the value of the social product, which are classified as follows:

- types of regulation: economic, including financial and administrative;
- types of regulation: tax; budget; monetary and financial; customs; state credit; on-farm (intra-company within the enterprise, organization, corporation, holding, society and similar structures);
- forms of regulation: planning (forecasting); taxation; financing; corporatization; investment; government loans; self-financing (self-sufficiency); stimulation.

Methods of regulation: tax rates; fees; duties; norms and standards of deductions, payments, savings; norms and standards for the formation and use of funds; benefits and tax preferences; debt cancellation; advance payments of taxes, fees, deductions; declaration of income for tax purposes; declaration of goods and items in customs control; the size of sanctions for violation of financial discipline; balancing (budgets, financial plans); subventions, subsidies; indexation (income, funds); financial reserves; issue of securities (by the state and enterprises); quotation of currency and securities (Melnikov 2014).

Sychev (2015) gives the following definition of the essence of financial leverage: "Financial levers are forms and methods of expressing financial relations, generating and using monetary incomes and funds of monetary resources" and that many of them act as "financial indicators of the economic activities of associations and enterprises, and as tools used in the mobilization of financial resources to the state budget." Exploring the essence of financial leverage, Also, Sychev (2015) underlines that, unlike cash funds, they reflect one side of the organization of finance: either the formation of funds of funds or its use. The financial levers he considers: income, expenses, profits, net income of collective farms, profitability, payment for funds, turnover tax, water charge, income tax on collective-farm organizations, tax on bachelors, single and multi-family citizens, deductions for social insurance, insurance premiums and payments, subsidies, pensions, allowances and lump-sum payments.

Konstantinov (2018) writes that the peculiarity of financial methods of influence on production efficiency is manifested in their dual nature. On the one hand, these are funds of funds, financial resources, and on the other, financial and economic leverage. In the first case, these methods play the role of injections into the economic organism and are a necessary basis for national economic planning; in the second case, financial methods act as economic stimulants. They affect direct producers economically through material interests, prompting them to conduct production most efficiently. He considers payments to the budget and methods of financing the national economy, incentive funds and control with the ruble, punishing and encouraging sanctions, etc. to be specific forms of manifestation of financial and credit levers.

Allahverdyan (2018) emphasis that financial leverage, being forms and methods of financial relations, "is always associated with the formation and use of monetary funds". The financial leverage can be divided into two groups according to the forms and methods of their formation: those used in the process of distribution of national income and used in the redistribution of net income. In both cases, this is accompanied by the formation of monetary incomes and funds of either the state, or associations and enterprises. On this issue, Shermenev (2017) debates in this research that financial levers as forms and methods of financial relations "express that part of the production relations that arises about the distribution of the total social product through the formation and use of

monetary funds". Voznesensky (2018) notes this as "the process of forming and using various decentralized cash funds and incomes.

Bazarova (2016) explains that in the broad sense of the word, the system of financial leverage and incentives includes a set of centralized and decentralized funds of funds associated with providing expanded reproduction and other needs of society with the necessary financial and credit resources, with the development of science and technology and economic incentives for financial reserves; it covers a set of specific forms, standards and norms that reflect the relationship of enterprises, associations and industries with the state budget, credit system and higher organizations.

Balabanov (2017) writes that financial leverage is a method of operating a financial method. If the financial method answers the question: "How to influence?", Then the financial lever answers the question: "What to influence?". He considers financial leverage to include: profit, income, depreciation, rent, interest rates, financial sanctions, payment methods, types and forms of credit, *etc*.

2. Methodology

Thus, the research of economists allows us to identify two sides of the use of financial leverage. The first side is the formation of sustainable basic incomes of the state. The second is education, the use of funds of economic entities in order to meet the personal interests of production participants. Each economic category is characterized by its own individual specific forms of expression, including the category of finances, which are expressed through their forms and methods.

The scope of application of financial levers as methods and forms of the impact of finance on social production, including agricultural, is diverse. It is through financial leverage that the results are achieved by which finances affect social production. The financial aspect of the impact on production efficiency, considered in the researches of Birman (2015): "... the side of the financial aspect is to select and recommend those forms and methods of monetary relations that are most conducive to increasing the profitability (efficiency) of production".

The first and most important feature of financial leverage is the expression of financial relations between the participants of the expanded reproduction process, the state and the population, covering the entire set of economic relations. This feature comes from the law of commodity-money relations. The second feature follows from the nature of the complexity of their application in the process of formation and use of monetary fund's with the addition of stimulating and distributive functions. The third feature is the functioning of financial levers in the economic mechanism and its dependence on the existing methods of planning and management.

It is particularly important to focus on the fact that with the improvement of the economic mechanism, the forms and methods of their impact on the efficiency of social, including agricultural, production change.

Thus, the results of the study of the essence of financial leverage allow us to give the following definition: "Financial leverage is a set of forms and methods of financial relations associated with the formation and use of cash incomes and funds of monetary resources designed to influence the activities of economic entities in order to ensure support and effective development production.

The state has a large arsenal of financial levers for regulating agricultural production in the country:
- special procedure for lending to agricultural producers and associated agricultural enterprises;
- state support for insurance of producers of the agrarian sector;
- subsidies for the production of the most important food products;
- regulation of prices for goods and services for the enterprise;
- preferential taxation or a special procedure for self-sufficiency of agricultural enterprises;
- regulation of foreign economic activity (Ivanov 2017).

Agrarian and economic science and practice have developed a number of indicators that allow assessing the level of government regulation of the agri-food sector with varying degrees of accuracy. The most complex indicators of direct and indirect subsidies and taxes in the agri-food sector are equivalents of subsidies to agricultural producers (PSE) and consumers (CSE).

SAP measures all types of cash receipts (transfers) of the agricultural producer as a result of the agri-food policy - transfers from food buyers (as a result of price support in domestic markets and, accordingly, higher prices for agricultural products) and from taxpayers (as a result of direct expenditures from the budget). The principal formula for calculating the PSE is as follows:

$$SAPi = (Pfi^d - Pi^r) + (Si - Ti) \tag{1}$$

where: *Pfi* – internal purchasing (farm level) product price *i*; *Si* and *Ti* – respectively direct subsidies and taxes related to product *i*; *Pi^r* – as before reference price.

In the PSE, there are almost two types of components: (P^d -P^r) and (S+T). The first term is often called the price difference (price gap), it reflects not explicit (implicit) net subsidies (+) or taxes (-) actually received or paid by the manufacturer due to the fact that domestic prices differ from the equilibrium prices (reference). The second term is a net subsidy (+), that is, a cash transfer received by the manufacturer of product i in direct (explicit form), or a net tax (-), that is, a cash payment made by manufacturer of product i also in direct (explicit form). PSE can be calculated as a percentage:

$$\text{PSE}_\% = \frac{\text{PSE}}{\sum_i Pfi^d \times Qi + S - T} \times 100\% \tag{2}$$

where: *Qi* – sales volume of product *i*; PSE - gross or net PSE.

When calculating the PSE, the following types of measures of the state agri-food policy are considered.
- all measures affecting producer and consumer prices such as price support and foreign trade regulation (market price support). For example, minimum guaranteed prices, differential payments, production quotas and restrictions on land use or import tariffs and quotas, export subsidies and tariffs;
- all direct payments (taxes) to agricultural producers that do not lead to changes in consumer prices (direct payments). For example, compensation payments in the course of the reform of the UAP (unified agrarian policy) or production taxes;
- all measures that reduce production costs, including subsidies for resources and the main factors of production (reduction of production costs). For example, a soft loan or subsidy for the purchase of fertilizers, insurance or transportation subsidies;
- measures leading to a decrease in costs in agriculture in the long term, but not directly paid to producers (general services). For example, the development of rural infrastructure or market information systems, support for agricultural research;
- all other measures of implicit support for agriculture, the main elements of which are regional support measures and tax incentives. Positive equivalents mean positive support, that is, subsidizing of producers, a negative equivalent means evidence of negative support, that is, taxation.
- the PSE/CSE methodology is used by official international organizations to evaluate and compare national agri-food policies. For the first time, this methodology was developed by the American economist T.E. Jazling in the mid-1970s (within FAO). Then it developed in different directions in the OECD and the US Department of Agriculture. For the OECD, these indicators are today adopted as the main quantitative characteristics of the agri-food policy of member countries (Krylov 2012).

State support, in our opinion, can be carried out mainly by using appropriate forms and methods that can be divided into the main ones: financing, taxation, lending, insurance (Figure 1). Consider them in more detail. The initial beginning of the relationship of economic entities of the agrarian market with the state budget is economic financial relations that have a complex structure. The main source of covering the costs of managing agriculture and providing financial assistance to it was formerly the state budget. Now, in the conditions of market relations, agricultural enterprises have switched to self-financing. As a special part of the cost distribution, the state budget fulfills a specific public purpose - it serves the satisfaction of nationwide needs. The budget affects the economy through a budget mechanism. This shows the role of the budget as a tool to influence the economy as a whole, including agriculture (Melnikov and Ilyasov 2017).

The development of the system of financing of agriculture occurred simultaneously with the transformations in the agrarian sector of the economy. Under the conditions of a planned economy, enterprises conducted a farm on the basis of organizational plans approved by the government and income and expense estimates generated annually for a long time, being planned and unprofitable. Grants were issued from the state budget to cover the difference between the planned cost of production delivered to the state and the transfer price.

A significant part of the costs of agricultural enterprises was financed by direct and indirect allocations from the state budget, as well as the redistribution of funds through higher authorities. The main determining factor in the organization of finance of agricultural enterprises was the cost recovery system and included: a price system; redistribution of funds; centralized funds; budget financing; insurance; credit; budget subsidies.

The mechanism of redistribution of funds was widely used. From some enterprises (highly profitable) they were withdrawn and transferred to low-profitable or even unprofitable enterprises both in a planned manner during the year (planned redistribution of working capital and profits), and in a single order for the year. The redistribution of funds also occurred through centralized funds. Enterprises in the established amounts made contributions to centralized reserve funds and reserves (centralized incentive funds, centralized reserves of depreciation). Of these

funds, costs were reimbursed to enterprises that were in financial difficulties or who lacked their own funds for certain needs.

Figure 1. The system of financial relations in agricultural production

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┌─────────────────────────────────────────────────────────────────┐
│       The mechanism of financial relations in agricultural production      │
└─────────────────────────────────────────────────────────────────┘

┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│   Financing   │   │   Taxation    │   │   Crediting   │   │   Insurance   │
└──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘

┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│    Budget     │   │ In the generally │   │   Bank loan   │   │ Mandatory state │
│   financing   │   │ established order │   │               │   │   insurance   │
└──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘

┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│ Self-financing │   │ Simplified system │   │  Budget loan  │
│               │   │ (single land tax) │   │               │
└──────────────┘   └──────────────┘   └──────────────┘
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Source: compiled by authors

At the present time, almost all agricultural production is concentrated in private property. The role of the state is to determine the overall strategy for the development of the industry, create the conditions for the most favorable conditions, and solve general infrastructure problems, on the solution of which the successful development of agriculture in the republic depends.

State investment priorities in the field of agriculture are the following areas:
- institutional development;
- creation of conditions for the greatest crediting of the agrarian sector;
- information support of agricultural producers and other participants of the agricultural market and the development of an information and marketing system;
- solving common infrastructural problems, such as, providing elite seeds, creating a favorable phytosanitary and epizootic situation, developing pedigree business, veterinary services, *etc*.;
- improving the efficiency of irrigated agriculture and soil fertility of agricultural lands (Program of development of the agro-industrial complex up to 2020).

The system of state regulation and support of agriculture in a market economy is based on state programs (budgetary investment of state programs), which is a system of interrelated measures and measures of the state aimed at achieving certain goals and solving national problems. The main methods of financing expenditures for the development of agriculture are:
- non-repayable financing costs;
- allocation of funds from the budget on a returnable basis. An example would be the grain procurement program for updating state reserves; provision of agricultural equipment on a leasing basis;
- allocation of funds from the budget on a returnable and paid basis (all investment projects).

The goal of the modern period of state regulation of agricultural production in our republic is to ensure the country's food security, increase sales of agricultural products and their processing on domestic and foreign markets on the basis of competitiveness, improve the quality of products, rationalize government support for agricultural production, and form an effective agribusiness system. The main goal of the agri-food program is the stabilization of domestic agricultural production (Aimurzina and Kamenova 2017).

Thus, according to the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan, the gross output (services) of agriculture in 2017 amounted to 4,070.9 billion tenge, which is 8.1% more in physical terms than in 2015. At the same time, the gross output of crop production in 2017 amounted to 2,249.2 billion tenge, which is in real terms more by 9.4% than in 2015. Gross output of livestock products in 2017 amounted to 1,810.9 billion tenge, which is 6.7% more than in 2015.

The inflow of investments in the fixed capital of agriculture in 2017 compared to 2015 has almost doubled and amounted to 348.4 billion tenge. In 2017, 260.5 billion tenge was transferred from the state budget to support the agro-industrial complex, 1.5 times (by 86.8 billion tenge) more than in 2015.

According to the Government report on the results of 2017, the financing of the program was at the level of 387.3 billion tenge (Figure 2).

Figure 2 - Volumes of financing of the Program of the agro-industrial complex for 2017

Source: compiled by authors

In 2017, financing of agro-industrial complex from the republican budget, local budgets, as well as from other sources of financing in the total amount of about 359.7 billion tenge is provided, including:

- from the republican budget - 198.2 billion tenge;
- from local budgets - 144.5 billion tenge;
- from other sources - 17.0 billion tenge.

Thus, in 2017, the actual amount of funding for the implementation of the State Program exceeded its plan, due to the allocation of about 45.5 billion tenge from the national budget. At the same time, state support of the main consumers (beneficiaries), who are agricultural producers and the population, is carried out through subsidies, concessional lending, preferential taxation, the provision of services free of charge, *etc*. (Table 1).

Table 1. Expenditures on budget programs, thousand tenge

Name of budget programs	2016	2017	2018 plan
Increasing the availability of financial services	57.994.023	106.312.713	68.149.133
Targeted current transfers to the regional budgets, budgets of the cities of Astana and Almaty for reimbursement of part of the expenses incurred by the subject of the agro-industrial complex, with investments	25.486.968	76.006.434	38.033.190
Number of investment projects covered by subsidies, units	2.465	7.532	1.413
Targeted current transfers to the regional budgets, budgets of the cities of Astana and Almaty to subsidize the interest rate on credit and leasing obligations in the framework of the direction for the financial rehabilitation of the subjects of the agro-industrial complex	24.698.771	14.069.555	15.077.721
The number of subjects of agrarian and industrial complex participating in the program of financial improvement, a unit	307	238	240
Target current transfers to regional budgets, budgets of Astana and Almaty cities for reimbursement of interest rates on loans (leasing) for agricultural support	7.511.723	15.760.696	15.038.222
Number of the agro-industrial complex subjects included in the program, units	3.739	1.334	1.159

Source: compiled according to the data of Ministry of Agriculture of the Republic of Kazakhstan

Kazakhstan's practice shows that the creation of an organizational-procedural mechanism of program-targeted funding can be very costly, absorbing a significant part of the resources mobilized for the implementation of the program objectives (programs, subprograms, etc.). For the execution of budget programs in the implementation of which various executive bodies take on a long-term vision of development, forecasts of budget parameters for the planning period, which according to the forecast results should be indicative and can be refined

when developing the forecast for the next planning period, taking into account changes situations of socio-economic development, budget monitoring and evaluation of the implementation of budget programs, other internal and external factors.

3. Application functionality

For this study, we use the exponential smoothing method, the feature of which is that the procedure for finding the smoothed level uses only the previous levels of the series taken with a certain weight, and the weight decreases as it moves away from the point in time for which the smoothed level is determined row. If for the initial time series y1, y2, y3, ..., yn we denote the corresponding smoothed level values by St, t = 1,2, ..., n, then the exponential smoothing is carried out according to the formula:

$S_t = (1-\alpha)\ y_t + \alpha\ S_{t-1}$

Some sources give a different formula:

$S_t = \alpha\ y_t + (1-\alpha)\ S_{t-1}$

where: St - the value of the exponential average at time t; S_{t-1} - the value of the exponential average at time (t =1); α - smoothing parameter (0 < α < 1).

In practical tasks of processing economic time series, it is recommended (unreasonable) to choose the value of the smoothing parameter in the range from 0.1 to 0.3. There are no other precise recommendations for choosing the optimal value of the parameter *α*.

As for the initial parameter S_0, in problems it is taken either equal to the value of the first level of the *y1* series, or equal to the arithmetic average of the first few members of the series. The consistent application of the formula makes it possible to calculate the exponential average through the values of all levels of a given series of dynamics.

We will demonstrate the calculation carried out on the budget program "The number of AIC subjects participating in the program of financial rehabilitation, units". Using the least squares method, we find the trend equation:

y = 328.667 – 33.5 *t*

The empirical trend coefficients *a* and *b* are only estimates of theoretical coefficients *βi*, and the equation itself reflects only a general trend in the behavior of the variables in question. The trend coefficient b = -33.5 shows the average change in the effective indicator (in units of measurement y) with a change in the time period *t* per unit of measurement. In this example, with *t* increasing by 1 unit, *y* will change on average by -33.5 (Table 2).

Table 2. Evaluation of the quality of the parameters of the equation

t	y	y(t)	(yi-ycp)2	(yi-y(t))2	(t-tp)2	(yi-y(t)): yi
1	307	295.167	2055.111	140.028	1	0.0385
2	238	261.667	560.111	560.111	0	0.0994
3	240	228.167	469.444	140.028	1	0.0493
		785	3084.667	840.167	2	0.1870

Source: compiled and calculated by authors

We will analyze the accuracy of determining the estimates of the parameters of the trend equation, for which we will calculate the parameters: Standard error of the equation:

$$S_y = \sqrt{S_y^2} \tag{3}$$

$$S_y = \sqrt{S_y^2} = 2{,}98$$

F-statistics. Fisher criterion:

$$F = \frac{R^2}{1-R^2}\frac{n-m-1}{m} \tag{4}$$

$$F = \frac{R^2}{1 - R^2} \frac{n - m - 1}{m} = \frac{0,7276}{1 - 0,7276} \frac{3 - 1 - 1}{1} = 2,6715$$

Coefficient of determination:

$$R^2 = 1 - \frac{\sum(y_i - y_t)^2}{\sum(y_i - \overline{y})^2} \qquad (5)$$

$$R^2 = 1 - \frac{\sum(y_i - y_t)^2}{\sum(y_i - \overline{y})^2} = 1 - \frac{840,1667}{3084,6667} = 0,7276$$

We find from the Table 2, that: Fcr (1;1;0.05) = 161, *where* m is the number of factors in the trend equation (m = 1). Since F<Fcr, the coefficient of determination (and, in general, the trend equation) is not statistically significant.

The time dependence of *Y* on time *t* was studied. At the specification stage, a linear trend was chosen. Its parameters are estimated by the least squares method. The statistical significance of the equation is verified using the coefficient of determination and the Fisher criterion. It has been established that in the situation under study, 72.76% of the total variability of *Y* is explained by the change in the time parameter. It was also established that the parameters of the model are not statistically significant. Economic interpretation of the model parameters is possible — with each time period *t*, the value of *Y* decreases by an average of 33.5 units. The obtained estimates of the regression equation allow us to use it for prediction. By analogy of calculations, projected expenditures were obtained for the remaining budget programs (Table 3).

Table 3. Equations of trend models of projected indicators for the period 2019-2020

Name of budget programs	Equation trend models	RMS estimate error	Coefficient of determination, R²	F-criterion
Increasing the availability of financial services	Yt = 67330179,667 + 5077555 t	734,870	0,983	4,225
Targeted current transfers to the regional budgets, budgets of the cities of Astana and Almaty for reimbursement of part of the expenses incurred by the subject of the agro-industrial complex, with investments	Yt = 33962642 + 6273111 t	448,510	0,938	9,152
Number of investment projects covered by subsidies, units	Yt = 253354784855,33 – 526 t	1.791,34	0,871	3,065
Targeted current transfers to the regional budgets, budgets of the cities of Astana and Almaty to subsidize the interest rate on credit and leasing obligations in the framework of the direction for the financial rehabilitation of the subjects of the agro-industrial complex	Yt = 18233559 – 2870961,5 t	3.167,940	0,727	1,643
The number of subjects of agrarian and industrial complex participating in the program of financial improvement, a unit	t = 328,667 – 33,5 t	28,980	0,742	2,671
Target current transfers to regional budgets, budgets of Astana and Almaty cities for reimbursement of interest rates on loans (leasing) for agricultural support	Yt = 5243714,667 + 3763249,5 t	3.662,250	0,678	2,115
Number of the agro-industrial complex subjects included in the program, units	Yt = 4657,333 – 1290 t	910,394	0,806	4,016

Source: compiled and calculated by authors

The model, on the basis of which the forecast was carried out, with the obtained probability levels R², allows us to assert that while maintaining the existing patterns of development, the predicted value falls into the calculated value of the revealed trend of indicators (Table 4).

Table 4. Forecast values of the projected indicators for the period 2019-2020

Name of budget programs	2019	2020
Increasing the availability of financial services	87.640.400	92.717.955
Targeted current transfers to the regional budgets, budgets of the cities of Astana and Almaty for reimbursement of part of the expenses incurred by the subject of the agro-industrial complex, with investments	59.055.086	65.328.197
Number of investment projects covered by subsidies, units	2.751	2.225
Targeted current transfers to the regional budgets, budgets of the cities of Astana and Almaty to subsidize the interest rate on credit and leasing obligations in the framework of the direction for the financial rehabilitation of the subjects of the agro-industrial complex	8.327.632	3.517.107
The number of subjects of agrarian and industrial complex participating in the program of financial improvement, a unit	195	161
Target current transfers to regional budgets, budgets of Astana and Almaty cities for reimbursement of interest rates on loans (leasing) for agricultural support	20.296.713	24.059.962
Number of the agro-industrial complex subjects included in the program, units	503	-

Source: compiled and calculated by authors

The state program for the development of the agro-industrial complex for 2017–2021 is aimed at increasing the availability of financial services through the implementation of financial instruments, including through: expanding the access of agro-industrial complex entities to earthly funds provided by financial organizations through reducing interest rates, extending credit terms, shortening terms payback of investment projects through the provision of investment subsidies; the mechanism of financial recovery of the subjects of the agro-industrial complex in order to improve solvency, reduce the credit load and minimize the risks of bankruptcy of the subjects of the agro-industrial complex. The cost reduction in 2018 compared with 2017 under the program is associated with the transfer of subsidy costs to agro-industrial procurement organizations in the amount of value-added tax paid to the budget, within the calculated value-added tax to program 265 "Creating conditions for the development of processing agricultural products" and with limited possibilities of the republican budget. Also, the amount of non-development in the amount of 38 million tenge was due to the lack of applications from investors and agricultural producers, which indicates a lack of effective work of the responsible state bodies.

According to the program "Target current transfers to regional budgets, budgets of Astana and Almaty cities for reimbursement of part of expenses incurred by the subject of the agro-industrial complex with investments", aimed at encouraging agribusiness entities to invest in fixed capital, which will affect the increase in labor productivity in rural the amount of non-development amounted to more than 16 million tenge due to the lack of applications from investors in the Mangystau region, savings in public procurement on the Kostanay region field (operator granted certificate of completion in the amount of less than planned). It should be noted that the Accounts Committee, in the framework of a preliminary assessment of the draft republican budget for 2018–2020, noted an established trend of annual over fulfilment of indicators under subprogram 102 "Targeted current transfers to regional budgets, budgets of the cities of Astana and Almaty for reimbursement of part of expenses incurred by the subject of the agro-industrial complex with investments. This situation, according to the Ministry of Agriculture, is due to the emerging at a lower level (on average, 27%) of the planned (on average, 30%).

In the first Strategic direction "Development of the agro-industrial complex of the Republic of Kazakhstan" was not achieved in the planned volume. Goal 1. "Increasing production efficiency in the agro-industrial complex". 1 target indicator was not fulfilled, the number of projects implemented through PPP mechanisms (against the plan - 1 units, totaled - 0 units). With the full development of the allocated funds, 6 indicators of direct results are not fulfilled.

Poor-quality planning of indicators of direct and final results is noted. Thus, according to the budget program 250 "Increasing the availability of financial services", the number of investment projects covered by subsidies was increased from 1,625 to 6,846 units. (4.2 times). Only under the budget program "Improving the efficiency of the production of agricultural products by improving the use of financial measures of state support" the total amount of non-development amounted to more than 74 million tenge (Table 5).

Thus, there is a need to accelerate the work on the implementation of the methodology of influence and evaluation of invested funds, including loans and preferences provided for the achievement of indicators of direct and final results of budget programs focused on the achievement of strategic goals and indicators.

The development of agriculture and the entire agro-industrial complex will require various sources of financing - public, private, foreign. In general, the investment policy in agriculture in the near future should focus

on preserving and maintaining the existing production potential on the basis of its reconstruction and technical re-equipment, creating quickly paying back investment projects, developing a base for processing and storing products, purchasing modern technology to introduce new production technologies livestock and agriculture, creating the lack of infrastructure of the village, support and development of farms, *etc*. (Aimurzina and Kamenova 2018).

Table 5. Non-appropriation of budget funds by the budget programs of the agro-industrial complex in 2017

Indicator	Plan	Fact	Undevelopment, thousand tenge	% of completion
Expenses for budget programs:				
Increasing the availability of financial services	106.312 713,0	106.275 156,7	-37.556,3	99,96
Targeted current transfers to the regional budgets, budgets of the cities of Astana and Almaty for reimbursement of part of the expenses incurred by the subject of the agro-industrial complex with investments	76.224 873,0	76.208 665,6	-16.128,2	99,98
Targeted current transfers to the regional budgets, budgets of the cities of Astana and Almaty for subsidizing in the framework of guaranteeing and insuring loans to the subjects of the agro-industrial complex	1.781,0	-	-1.781,0	0
Targeted current transfers to the regional budgets, budgets of the cities of Astana and Almaty to subsidize the interest rate on loan and leasing obligations in the framework of the financial rehabilitation of the agro-industrial complex	14 002 750,0	14.000 799,7	-1.950,3	99,99
Targeted current transfers to regional budgets, budgets of the cities of Astana and Almaty for reimbursement of interest rates on loans (leasing) to support agriculture	15 609 062,0	15.591 447,5	-17.614,5	99,9

Source: compiled by authors

The basis of the methodology for determining the effectiveness of budgetary expenditures in terms of expenditure, laid down the distinction between criteria and indicators of social efficiency, as well as criteria and indicators of economic efficiency. Evaluation of the effectiveness of budget expenditures should be carried out at all stages of the budget process. Social efficiency is defined as the achievement of a certain qualitative, socially significant result per unit of expenditure, that is, the final (qualitative) results of budget expenditures are considered. Economic efficiency is defined as the achievement of a certain quantitative result per unit of expenditure, that is, the immediate (quantitative) results of budget expenditures are considered.

The weight of a group is defined as the ratio of the expenditures of regional budgets, taking into account the indicators of 2 groups: expenditures on social expenditures and budget expenditures aimed at the development of the regional economy.

The main general criterion for assessing the indicators of social and economic efficiency is the degree of compliance of the achieved results with their planned values. The deviation of the achieved values from the planned is calculated by the formula (6):

$$D = ((V_p - V_a)/V_p) * 100\%, \tag{6}$$

where: D - is the deviation of the achieved values of the indicator from the planned, V_p - is the planned (target) value of the indicator; V_a - actually achieved value of the indicator.

The calculated deviation value is assigned points on a scale in accordance with Table 6. If the deviation of the achieved values from the planned ones corresponds to the extreme positions (+ 21-100%; -30-100%), it is necessary to treat this with caution and carry out a detailed check, as this indicates either an extremely low level of budget planning or exposure to unaccounted external or internal factors.

Efficiency score for each section of the classification of expenses is assigned on a scale in accordance with Table 7.

Table 6. Estimated value of the deviation of the achieved value from the planned indicator

Deviation (with "+" sign)	Number of points	Deviation (with "-" sign)	Number of points
1-10%	2	0-10%	1
11-20%	3	11-20%	0
21-30%	4	21-30%	-1
31% and above	5	31% and above	-2

Source: compiled by authors

Table 7. Scale of the values of the integral indicator of the effectiveness of budget expenditures

Intervals of calculated values of the integral indicator, in % of the maximum value	Qualitative performance evaluation	Number of points
0-20%	Catastrophic level of efficiency	0,1
20-40%	Critical level of efficiency	0,2
40-60%	Low level of efficiency	0,4
60-70%	Satisfactory level of efficiency	0,65
70-90%	Average level of effectiveness	0,8
90% and above	High level of efficiency	1

Source: compiled by authors

Conclusion

Using this technique, you can get a general conclusion about the state of the effectiveness of budget expenditures in terms of their spending (Isakhova 2015). In order to improve the rationality of the use of budgetary funds, conduct a comprehensive audit of all government support measures for their effectiveness, eliminate duplication and mutual contradiction, which does not allow improving the effectiveness of measures aimed at balanced economic growth.

There is a need to develop an effective mechanism for the selection of long-term investment projects. If these projects in the future cease to generate income, it is necessary to immediately suspend their financing or abandon them and release the released resources to other more efficient projects. That is, it is becoming necessary to tighten monitoring over the use of budget and attracted funds, to carry out a thorough analysis of all resources expended, and their impact on the environment. The economy of Kazakhstan requires the improvement of methodological approaches to assessing the effectiveness of invested investment resources, the choice of effective state projects financed from the budget.

References

[1] Aimurzina, B.T., Kamenova, M.Zh., Omarova, A.T. *et al.* 2017. Financial Regulation in the Agro-Industry: Evidence from Kazakhstan. *International Journal of Economic Perspectives*, 11(2): 40-44.

[2] Aimurzina, B.T., Kamenova, M.Zh., and Omarova, A.T. 2018. Development of Agricultural Production. *Journal of Environmental Management and Tourism*, Volume IX, Spring, 1(25): 67-74.

[3] Allahverdyan, Ye. S. 2017. *The role of the financial and credit mechanism in self-supporting stimulation of social production*. Moscow. 198.

[4] Balabanov, A.I., and Balabanov, I.T 2017. *Finance*. Moscow. Finance and Statistics. 231.

[5] Bazarova, G.V. 2016. *The role of finance in the socio-economic development of the country*. Moscow. Finance and Statistics. 231.

[6] Birman, A.M. 2015. *Essays on the theory of finance*. Moscow. 253.

[7] Isakhova, A.S. 2015. *Improving the mechanism of effective use of budget funds in the regions*. Almaty. 173.

[8] Ivanov, V.P. (2017). Principles of financing agribusiness. *Economics of Agricultural and Processing Enterprises*, 1(9): 23-33.

[9] Konstantinov, Yu.A. 2018. *Financial methods to improve production efficiency*. Moscow. 127.

[10] Krylov, V.S. 2012. State regulation of agro-industrial production is an objective requirement of a market economy. *Achievements of Science and Technology of the Agro-industrial Complex*, 4(21): 3-11.

[11] Melnikov, V.D., Ilyasov, K.K. 2017. *Finance.* Almaty. 472.

[12] Melnikov, V.D. 2014. *State financial regulation of the economy of Kazakhstan*. Almaty. Karzy-Karazhat. 140.

[13] Nazarbayev, N. A. 2018. Message of the President of the Republic of Kazakhstan to the people of Kazakhstan Growth of the welfare of Kazakhstanis: Increasing incomes and quality of life. Available at: www.esep.kz

[14] Shermenev, M.K. 2017. *Finance*. Moscow. 300.

[15] Syche, V N.G. 2015. *Finance*. Moscow. 303.

[16] Voznesensky, E.A. 2018. *Debatable questions of the theory of socialist finance*. St. Petersburg. 157.

*** Conclusion to the report of the Government of the Republic of Kazakhstan on the execution of the republican budget. 2017. Astana. Available at: www.esep.kz.

*** Data of Ministry of Agriculture.

*** Strategic Plan of the Ministry of Agriculture of the Republic of Kazakhstan for 2017-2021.

Application of the Holt-Winters Model for Predicting the Cost and Profitability of Bank Bonds

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Abstract:

At present, management accounting as such is only beginning to develop in second-tier banks of the Republic of Kazakhstan. With regard to the evaluation of bank bonds, this feature is absent altogether. At the same time, the use of managerial issued bonds in relation to forecasting allows banks to make appropriate decisions in a timely manner.

In this article, authors made an attempt to use the Holt-Winters model to predict the value and profitability of bank bonds. It was also concluded that the introduction of management accounting for bonds will significantly strengthen the position of the bank in relation to attracted resources.

Keywords management accounting; second-tier banks; bonds: value; profitability

JEL Classification: M41; M42

Introduction

As a rule, the main task of management accounting is aimed at determining how to attract resources and how to distribute them in order to achieve an increase in bank performance. This formulation of the problem creates two components of management accounting in the bank: an internal assessment of the funds raised and an analysis of their distribution in order to make the right decisions to improve the bank's activities.

Currently, in the Republic of Kazakhstan, bank bonds are becoming increasingly popular, and they are becoming more attractive than deposits. This should encourage banks to use bond issues as a major source of attracted resources. At the same time, in the management accounting system when designing bonds, great attention should be paid to transfer pricing (funding matrix) and forecasting value and profitability.

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1. Research background

The issuer must constantly monitor the value and yield of their bonds. Management accounting must necessarily analyze the market for its own bonds. This is due to the fact that for budgeting in a bank, it is necessary to clearly know what resources should be allocated for interest payments, when it is better to buy out bonds in favor of the bank, how much investors are now willing to pay for bank bonds so that in the future, taking into account their rating A new bond issue is possible under the bond program.

In addition, the issuer should forecast the value and profitability of its own bonds in order to select the most suitable time for making deals for their redemption, as well as for their early redemption, if such has been specified in the prospectus for issuing bonds. As a rule, issuing bonds with a fixed coupon, which is often practiced by Kazakhstan banks, the bank bears the interest risk, which means that interest rates in the market may fall. As a result, the bank will have to pay higher interest, although in this period it could issue bonds at a lower interest. That is why, in order to avoid such risks, the bank needs to conduct management accounting of the value and profitability of its bonds and be able to early repay its debt. Instead of redeeming bonds, the bank may, for example, issue new bonds at interest much lower than the previous ones, since the market dictates new conditions for interest.

The big advantage of such early redemption of a part of bonds is that when the maturity of bonds comes, the bank will not have to find the full amount to repay the debt, the need for a cash amount will decrease, since part of the bond will be repaid ahead of schedule. At the same time, this policy should take into account the availability of short-term debt. If a bank has long-term bonds with a decrease in interest rates on the market and a large enough short-term debt, then in these conditions it will be irrational to repurchase their bonds, since the bank will need funds to refinance short-term debt.

Thus, management accounting of own bonds to banks is necessary. Unfortunately, at present Kazakhstani banks do not keep such records and, moreover, do not predict the cost and profitability of their own bonds. When budgeting for the current period, as a rule, a simple transfer of expenses on the payment of bonds on the future period. The sum of previous years is laid with a risk premium. It should also be particularly noted that the analysis of the bank's own bonds, tracking their value and profitability can tell a lot about the situation in the bank, and therefore requires compulsory management accounting.

2. Generation of the data

Since the cost and profitability of a bond are time series, we will use the method of time series analysis as a model. It should also be noted that the value and profitability of a bond is a trend reflecting the fluctuations of this indicator. In addition, there are systematic repetitive at times fluctuations around the average value of cost. Also, the amplitude of fluctuations in the value of a bond, as a rule, is constantly changing, although insignificantly compared with, for example, stocks, which indicates the presence of multiplicative seasonality. Such parameters suggest the possibility of applying the Holt-Winters model, but in a modified form.

The Holt-Winters model is applied if the data is displayed as a trend. It uses triple exponential smoothing, in which each period should be updated taking into account such components as the level, trend of the series and seasonality (Bermúdez 2010). The first smoothing component (row level) is the smoothed data value at the end of each period, the trend series component is the smoothed average growth value at the end of each period, the seasonality component is the smoothed oscillation amplitude value at the end of each period.

It should be noted that Holt's original model has undergone several different modifications. In our opinion, the modified Holt-Winters model with a decaying trend and multiplicative seasonality, which is often the only most accurate method for predicting seasonal data, is the most accurate and suitable for our purposes of forecasting the value of bonds in management accounting. Indeed, gradually, approaching the end of the circulation term, the amplitude of fluctuations in the value of bonds always weakens (fades out) and tends to its face value, since the bond is redeemed at its face value.

The forecasts created by the linear Holt method reflect a constant trend (increasing or decreasing) for an indefinite period in the future. Even more extreme are the forecasts generated by the exponential trend method, which include exponential growth or decline.

Empirical evidence suggests that these methods tend to over-predict, especially to increase forecast horizons. Motivated by this observation, Gardner and Mackenzie presented a parameter that "dampens" the trend towards a flat line in a certain period in the future (Chatfield and Yar 1991). The fading trend method has proven very successful and is probably the most popular method when forecasts are required automatically for many series.

Motivated by the improvements in performance prediction observed in the case of an additive damped trend, Taylor presented the attenuation parameter for the exponential trend method, leading to a multiplicative damped trend method (Taylor 2013).

The method estimates local growth T_t by smoothing successive differences (S_t-S_{t-1}) local level, S_t. The forecast function is the sum of the level and projected growth.

$$S_t = \alpha X_t + (1 - \alpha)(S_{t-1} + T_{t-1}) \tag{1}$$

$$T_t = \gamma(S_t - S_{t-1}) + (1 - \gamma)T_{t-1} \tag{2}$$

$$X_t^{\wedge}(m) = S_t + mT_t \tag{3}$$

where: X_t – bond yield values; $X_t^{\wedge}$ – yield forecast for m steps forward; S_t – the expected data estimate at the end of period t; T_t – smoothed trend at the end of period t; α – smoothing parameter for row level, ranges from 0 to 1; γ – smoothing parameter for the trend, is in the range from 0 to 1.

It should also be noted that this model was used in the prediction of online content (Szabo 2017) and jaw medicine (Ryen 2015). However, this method was not used to analyze forecasts for bank bonds, despite the fact that it is ideally suited for these purposes. In addition, as noted by Goodwin (2017), this method is still valid and quite applicable in practice.

We will calculate the forecasts on the cost and profitability of some bonds of Kazakhstan banks that are currently in circulation. All calculations will be carried out in Excel. To do this, we use the data of the Kazakhstan Stock Exchange and enter data from the period of issue of the corresponding bond. We have tested forecasts for the following bank bonds (Table 1).

Table 1. Data on bonds of some banks of the Republic of Kazakhstan

№	Name of the bank	Type and code of bond	Period of treatment	Coupon, in % per annum
1	Subsidiary organization of JSC VTB Bank (Kazakhstan)	Coupon bonds *bvtbb2*	17.07.14 – 17.07.19	8,0
2	JSC KaspiBank	Subordinated coupon bonds *csbnb10*	19.07.11 – 19.07.21	8,3
3	JSC Eurasian bank	Subordinated coupon bonds *eubnb13*	10.01.14 – 10.01.24	9,0
4	JSC Bank RBK	Subordinated coupon bonds *inbnb2*	02.05.13 – 02.05.20	9,5
5	JSC AsiaCreditBank	Coupon bonds *larib2*	16.07.12 – 16.07.19	8,0
6	JSC BankCenterCredit	Subordinated coupon bonds *ccbnb20*	11.11.08 – 11.11.23	7,5
7	JSC BankCenterCredit	Coupon bonds *ccbnb26*	16.03.15 – 16.03.22	8,5
8	Subsidiary Bank Home Credit and Finance Bank	Coupon bonds *hcbnb3*	25.05.17 – 25.05.20	15,0

Source: compiled by authors

The bonds were chosen based on the availability of trading consistency, circulation period and the period to maturity of more than 2 years, being in the listing sector of the Kazakhstan Stock Exchange.

The forecast was carried out for the next 6 months by the Holt-Winters method. In addition, MARE, MPE and forecast accuracy were calculated. MARE shows the average absolute error in percent and estimates how large the errors are compared to the value of the series. The MPE shows the degree of overestimate or underestimation of the forecast. The accuracy of the forecast shows the percentage of authenticity of the calculations. The higher the percentage, the more accurate the forecast.

MARE is estimated as follows:

$$MAPE = \frac{1}{n}\sum_{i=1}^{n}\frac{|Y_t - Y_t^{\wedge}|}{Y_t}$$

where: Y_t – the actual values of the value or profitability of the bank's bonds for the period analyzed; $Y_t^{\wedge}$ - values of the forecast model for the period t; *n* – number of periods.

The smaller the MAPE value, the better, because the smaller the forecast error. If MARE is taken from the unit, the forecast accuracy is obtained, which, on the contrary, is better if higher. The accuracy of the forecast of 90 percent and higher is considered quite high. In turn, the MPE is calculated as follows:

$$MPE = \frac{1}{n} \sum_{i=1}^{n} \frac{Y_t - Y_t^{\wedge}}{Y_t}$$

If MPE is less than 0, then the forecast is consistently overestimated; if greater than zero, then it is consistently undervalued.

3. Study case

These calculations of errors will make it possible to judge the significance of our forecasts of the value and profitability of bank bonds. Table 2 presents the results of forecasts for selected bonds of Kazakhstan banks.

Table 2. Results of forecasts on bank bonds

Indicators	2018						Forecast accuracy	MAPE	MPE
	July	August	September	October	November	December			
Coupon bonds BVTBb2									
cost	98,6	101,1	101,5	101,3	100,4	100,1	98%	2%	0%
yield	11,5	10,9	10,8	11,8	11,0	10,7	95%	5%	1%
Subordinated coupon bonds CSBNb10									
cost	88,5	88,5	88,5	88,4	88,4	88,5	96%	4%	-2%
yield	9,6	9,1	8,5	8,0	7,5	7,0	92%	8%	-3%
Subordinated coupon bonds EUBNb13									
cost	73,4	73,7	74,1	74,5	74,8	75,2	94%	6%	0%
yield	17,4	17,5	17,6	17,7	17,9	18,0	93%	7%	0%
Subordinated coupon bonds INBNb2									
cost	96,2	96,1	96,0	95,8	95,7	95,6	96%	4%	-4%
yield	12,6	12,8	12,9	13,0	13,1	13,2	95%	5%	1%
Coupon bonds LARIb2									
cost	90,0	89,6	89,3	89,0	88,7	88,3	98%	2%	-1%
yield	13,0	13,2	13,4	13,6	13,8	14,0	91%	9%	5%
Subordinated coupon bonds CCBNb20									
cost	74,6	73,8	73,0	72,2	71,3	70,5	96%	4%	-4%
yield	12,6	12,7	12,9	13,1	13,3	13,4	98%	2%	1%
Coupon bonds CCBNb26									
cost	89,4	89,4	89,5	89,5	89,5	89,5	95%	5%	4%
yield	10,8	10,7	10,1	10,2	10,3	10,4	96%	4%	1%
Coupon bonds HCBNb3									
cost	100,3	100,4	100,4	100,4	100,4	100,5	99%	1%	0%
yield	14,4	14,3	14,2	14,2	14,1	14,0	96%	4%	-3%

Source: compiled and calculated by authors

As can be seen from the results, which are reflected in Table 2, more accurate forecasts were obtained for the value of the bonds in comparison with the yield. This is due to the fact that there were significant fluctuations in the yield of bank bonds in 2017, when an increase in interest on the deposit market as a result of devaluation led to a fall in the value of bonds. We will analyze the forecast results obtained according to the Holt-Uintres model on bonds of VTB Bank (Kazakhstan) JSC (Figure 1).

Figure 1. Forecast of the value and yield of bonds of JSC VTB Bank (Kazakhstan)

Source: compiled and calculated by author

In the graph, the predicted values of the value of the bond are indicated in green, and the yield in yellow. As can be seen from the obtained data, reflected in Figure 1, the downward trend dynamics are expected for the value of BVTBb2 bonds (red line AB). The results of calculations by the Holt-Winters model showed an accuracy of 98% and no underestimation or overestimation of the predicted values. Indeed, less than a year is left until the bonds are redeemed and the value tends to the face value of the bond, since no one will buy the bond higher than it receives at maturity.
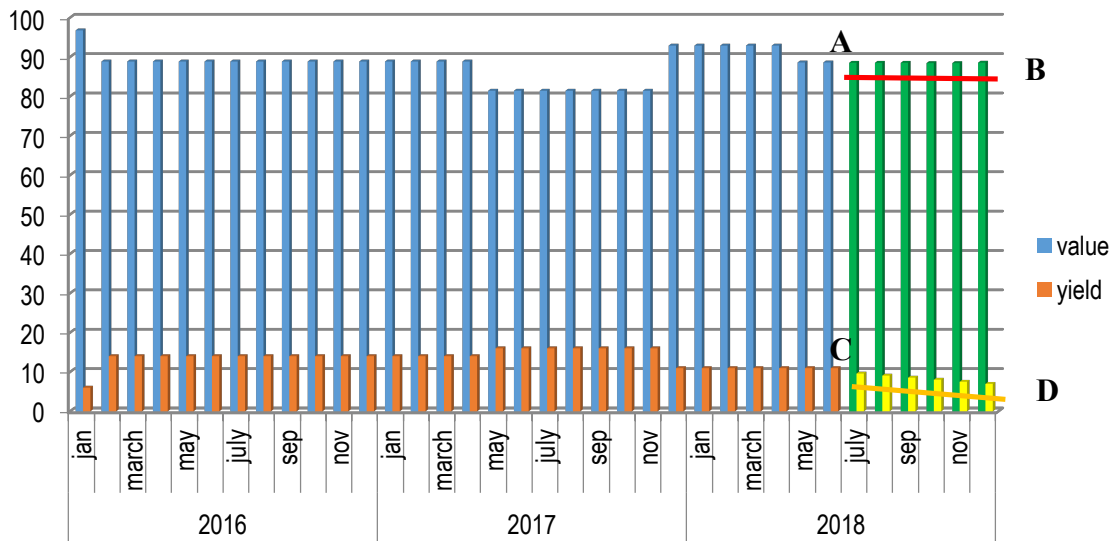
On the yield of BVTBb2 bonds, a slight decrease is also expected (orange CD line). In this case, for these bonds, the issuer needs to provide itself with liquid assets, since it will be necessary to redeem the bonds or think about issuing new bonds in order to offer them to the current holders. For this, it is necessary that the management reports on bank bonds contain a stanza reflecting the liquidity of the issuer. At the same time, if liquidity turns out to be insufficient, one should think about the issue of new bonds. It is also necessary to take into account the issuer's credit rating. According to the data of the Kazakhstan Stock Exchange JSC VTB Bank (Kazakhstan) were assigned the following ratings: Moody's: Ba2/negative/NP and S&P: BB +/stable/B (rating is presented according to the principle; long-term/forecast/short-term). In the first case (Moody's rating) means that there is a significant credit risk on long-term loans in national currency, while negative dynamics is expected in the medium term, the issuer has the category NotPrime (not first-class). S&P's rating is a little better. It means that the issuer has a much lower ability to fulfill its debt obligations than Kazakhstan issuers with higher ratings. At the same time, the issuer is relatively less vulnerable to the impact of adverse external conditions than Kazakh issuers with lower ratings. However, the impact of adverse changes in commercial, financial and economic conditions can lead to an insufficient ability of the issuer to fulfill its debt obligations in a timely manner. Having such ratings, the bank risks that when issuing new bonds instead of redeemable, it may not place them. In view of this, perhaps the best option would be to raise funds for the period of redemption of the bonds or to replace only a small part of the redeemed bonds with a new issue.

Consider the results of forecasts for subordinated bonds of JSC KaspiBank CSBNb10 (Figure 2). As the data in Figure 2 show, the results of cost estimates calculated using the Holt-Winters model indicate that a significant increase or decrease in the value of bonds is not expected (line AB). Despite a small increase in the tenth part of the cost according to the forecast, it does not make sense to take this into account, since there is an overestimate of the MPE forecast (-2%). Since before the redemption of another 3 years, the issuer does not need to take any measures now regarding these bonds.

In terms of profitability, downside forecasts (line CD). At the same time, the bank has the following credit ratings: Moody's: B1/positive/NP and S&P: BB-/negative/B. This means that the bank has a high credit risk, although positive dynamics of the rating is likely in the medium term. The bank is rated as NotPrime. The issuer is more prone to commercial, financial, economic adverse changes, but at the same time, it is characterized by a moderately high ability to repay its obligations in full and in a timely manner.

Figure 2. Forecast of the cost and profitability of bonds of JSC KaspiBank

Source: compiled and calculated by authors

At the same time, it should be noted that these bonds are subordinated. The bank issues such bonds, as a rule, for the replenishment of tier 2 capital, if the bank does not want or cannot issue additional shares. The issuance of such bonds indicates that the issuer has problems with capital adequacy, which the bank needs to pay attention, too. Consider the forecasts made by the Holt-Winters model for bonds of Eurasian Bank JSC (Figure 3).

Figure 3. Forecast of the cost and profitability of bonds of JSC Eurasian Bank

Source: compiled and calculated by authors

According to the results obtained, the bonds of EUBNb13 have a positive trend in both value and yield. At the same time, according to the MPE, there is no underestimation or overestimation of forecasts, although the accuracy is 94% and 93%, respectively. However, significant growth is not expected. For investors, a yield of 17.5%–18% on bonds is a very good investment option, with another 6 years to maturity. However, the bank needs to pay attention to its credit rating (Moody's: S&P: B/negative/B), which does not allow reducing the interest rate while designing new issue bonds. In addition, the bonds are also subordinated, which the bank should also pay attention to. At the same time, if you track the market for these bonds, then it can be noted that today investors agree to pay for these bonds far below par, which is also associated with an increase in interest rates in the market as a whole. It should also draw the attention of the bank to the fact that among the 10 types of bonds currently circulating in the market, there are 8 issues of subordinated bonds. This state of affairs should focus the attention of the bank's management on liquidity as well.

In the event of a deterioration in the financial position of the bank, namely, if it violates prudential standards (in particular with regard to capital adequacy and liquidity), the subordinated bonds will be converted into common shares, which means that the holders of such bonds will automatically become shareholders of the bank.

Let us analyze the results of forecasts for JSC RBK Bank (Figure 4).

Figure 4. Forecast of the cost and yield of coupon bonds of JSC RBK Bank

Source: compiled and calculated by authors

According to the results of the predicted value and yield of bonds INBNb2, the cost will gradually decrease (line AB), and the return, on the contrary, will increase (line CD). At the same time, the accuracy of forecasts was 96% and 95%, respectively, although there was an overestimation of forecasts in terms of the value of bonds, that is, most likely, the decline will be more significant. In this case, the newly subordinated bonds with maturity until 2020. The credit rating, in contrast to the previous considered banks, is much higher than S&P: B-/stable/B, which raises the position of the bank, albeit slightly. Despite the high credit risk, such an issuer has a certain degree of reliability (stability). In addition, out of 4 issues of bonds in circulation, 2 issues of subordinated loans, with the last 2017 under the program of the NBK. The desire of the bank to participate in the program to increase sustainability is associated with declining cash collection on loans issued. However, it should be noted that the acquisition of liquidity in this way may be insufficient if the crisis lasts longer than forecasted.

The yield of the bank's bonds is likely to increase due to a decrease in their market value, which will allow investors to purchase bonds at a price well below par. It is worth thinking about issuing bonds for the public.

Consider forecasts on bonds of JSC Asia Credit Bank (Figure 5). As shown by the results of Holt-Winters forecasting for LARIb2 bonds, a decrease in the value of bank bonds and an increase in profitability is expected. At the same time, the accuracy of the forecast for the cost was 98%, and for the yield of 91%. Since less than a year is left until the redemption of these bonds, liquidity is required to pay the debt. Out of 5 issues of bonds in circulation only one issue of subordinated bonds. S&P credit rating: B-/negative/B- is lower than that of all previous banks, which characterizes the bank's vulnerability to negative market changes. At present, it makes sense for the bank to buy back part of its bonds, since they are below par in the market.

Figure 5. Forecast of the cost and yield of coupon bonds of JSC Asia Credit Bank

Source: compiled and calculated by authors

Let us analyze the results of forecasts for bonds of Bank Center Credit JSC. In this case, we selected two types of bonds having data on cost and yield at KASE. These are subordinated bonds CCBNb20 and coupon bonds - CCBNb26 (Figure 6).

Figure 6. Forecast of the cost and profitability of bonds of JSC Bank Center Credit

Source: compiled and calculated by authors

As shown by the results of the forecasts for the bonds of Bank Center Credit Bank, the yield on both types will remain at the same level. At the same time, a noticeable decrease in value is expected for subordinated bonds. At the same time, the forecast for these bonds was compiled with an accuracy of 96% and 98%. The cost of coupon bonds will remain at the same level for the time being, which is quite logical, considering that the bonds were issued relatively recently in 2015 (subordinated were issued in 2009). In addition, at KASE there was no activity on coupon bonds of Bank Center Credit Bank CCBNb26. It should be noted that out of the 10 issues of outstanding bonds, 6 are subordinated. As the analysis of bonds of previous banks has already shown, this indicates problems with capital adequacy of the second level, as well as (bonds of the last issues) - with the provision of banks' funding by the National Bank of Kazakhstan.

Considering the rating on the bank's bonds, it should be noted that, compared with the previous analyzed banks, it is higher S&P: B/stable/B, kzBB +. This position strengthens the position of Bank Center Credit JSC in the Kazakhstan market of corporate bonds.

Since the maturity of both types of bonds is still quite long, the bank does not need to accumulate funds for redemption at the present time. However, the presence of such a large number of bonds in circulation requires high liquidity, since the bank needs to regularly pay interest. In such a situation, it makes sense to think about providing the possibility of reinvestment to bondholders. Such an approach in this situation will make it possible to somewhat reduce the need for a constant search for funds to pay out coupons.

Let's analyze the results of Holt-Winters forecasts for coupon bonds HCBNb3 (Figure 7). As the results of the projections for the HCBNb3 bond show, no significant changes in value and yield are expected in the next 6 months. At the same time, the accuracy of forecasts was 99% and 96%, respectively. Given the fact that these bonds were issued in March 2017 and will be redeemed in 2020, there is currently no need to take any significant actions with respect to these bonds. Their value is slightly higher than the nominal, which is caused by the high demand for these securities due to a good yield of 14%.

It should also be noted that today there are 3 bond issues in circulation, all of which are coupon bonds. Given that two of the issues in 2019 are due for maturity, the bank needs to think about extracting funds to repay them. The rating of Bank B + of FitchRatings with a stable outlook, the national rating is kzBBB. Such a rating and high yield caused the demand for coupon bonds HCBNb3 to exceed supply and they are today one of the most attractive investments for banks, insurance companies, and professional participants in the securities market of Kazakhstan. Given that an open repo (floating interest rate) operation is provided for these bonds, this is not the right time to close it, since the value of the bonds is still above par.
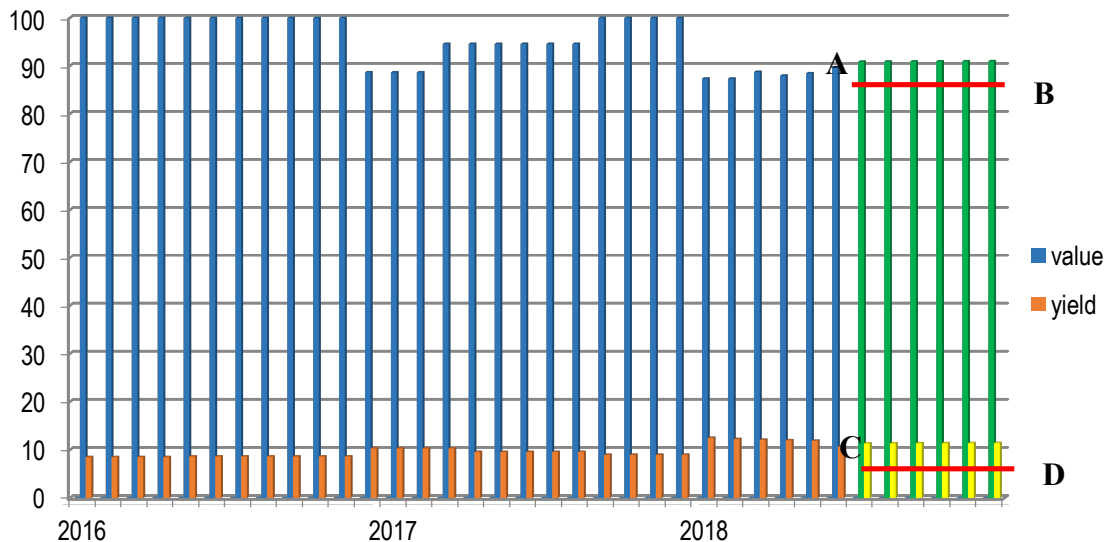
Figure 7. Forecast of the cost and profitability of bonds of JSC Home Credit and Finance Bank

Source: compiled and calculated by authors

Conclusion

Thus, we have determined that the efficiency of attracting resources through the issuance of bonds is closely related to their liquidity. If a bond is liquid and its holder is free to sell it in the secondary market, the bank can set a coupon for it much lower than other issuing banks of similar bonds. Secondly, the price of raising funds through the issuance of bonds depends on the rating of the bank. Thirdly, it makes sense to evaluate the correlation dependence of the value of bonds on market interest rates in order to determine its fair value and identify undervalued bonds. Fourth, it is necessary to conduct analysis of the bond market in order to plan and lay down the budget for bonds of new issues. All this necessitates management accounting in banks.

As a result, it can be noted that the introduction of management accounting for bonds in banks with the implementation of cost and profit forecasting will allow:
- determine the required parameters for the design of bonds of new issues;
- identify the most favorable time for repurchasing own bonds;
- signal to the bank about problems with capital adequacy of the second level;
- determine an attractive period for closing deals openly;
- to monitor the timely raising of funds for the payment of coupons and redemption of bonds;
- publication in the media about the high yield of bonds will increase the bank's rating
- effectively handle liquidity.

Holt-Winters model allows you to create forecasts for a given period with high accuracy. In this case, the smaller the forecast period, the more accurate the forecast. Predicting the value and profitability of its own bonds will allow the bank to make strategic decisions that will allow competitors to be one step ahead. After all, the evaluation of its bonds not only discloses information on the securities themselves, but also makes it possible to assess the situation in the bank as a whole.

In order to maintain management accounting for bank bonds, it is required to develop appropriate reporting forms that will visually track changes in the market for its own bonds. We intend to consider this issue in the next publication.

References

[1] Bermúdez J., Segura, J.V. and Vercheri, E. 2010. Bayesian forecasting with the Holt–Winters model. *Journal of the Operational Research Society*, 2(61): 164 -171.C

[2] Chatfield, C. and Yar, M. 1991. Prediction intervals for multiplicative Holt-Winters *Journal of the Royal Statistical Society*. 7: 31-37.

[3] Chatfield, C. and Yar, M. 1988. Holt-Winters forecasting: Some practical Issues. *Journal of the Royal Statistical Society. Series D (The Statistician)*, 37: 129-140. DOI: http://dx.doi.org/10.2307/2348687

[4] Goodwin P. 2017. *The Holt-Winters Approach to Exponential Smoothing: 50 Years Old and Going Strong*. Foresight. 33.

[5] Ryen, R., and Friedman, L. 2015. Training the gastroenterologist of the future: The gastroenterology core curriculum. *Gastroenterology,* 124(4): 1055-1104.

[6] Szabo G., and Huberman J. 2017. Predicting the popularity of online content. *Communications of the ACM*, 53(8): 80-88.

[7] Taylor, J. 2013. Exponential Smoothing with a Damped Multiplicative Trend. *International Journal of Forecasting*, 19 (22): 715-725.

*** Electronic resource: http://kase.kz/ru/bonds/show/

Technological Modernization of Industry

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Abstract:

The opportunities and prospects for the sustainable economic development of Kazakhstan largely depend on how well the country can take advantage of the conditions created by modern scientific and technical progress for qualitative changes in the development of productive forces. Without technological innovation, the growth of labor productivity, the creation of new and the modernization of traditional industries and agriculture and the services sector are impossible. Meanwhile, the current state of the economy of the republic has characterized by technological lag, dependence on imports, export orientation of primary industries, susceptibility to the influence of world market conditions; low efficiency and competitiveness are characteristic features of Kazakhstan industry. Therefore, the strategy of sustainable economic growth of the republic as an important element cannot but include a strategy for technological development.

Keywords modernization; technological development; industry; innovation; innovation potential; technological structure

JEL Classification: M15; M21

Introduction

In the annual Message to the people of Kazakhstan, the President of Kazakhstan N.A. Nazarbayev "The Third Modernization of Kazakhstan: Global Competitiveness". He underlines, "The first priority is the accelerated technological modernization of the economy" (Nazarbayev 2017). The peculiarities of the development process of advanced production technologies and the technical and economic level largely determine the possibilities for the further development of the country, the ability of the industry to restructure itself and respond adequately to changing business conditions, investment and consumer demand. The solution to this problem is possible in the context of industrial modernization.

In particular, based on the analysis of technological modernization of industry, the authors obtained the results of economic and mathematical modelling of this process in order to identify factors affecting the technological modernization of the industry as a whole.

Now, the modernization of the economy is a process of qualitative transformation of socio-economic relations, because of which a new, more technologically sophisticated level of production has achieved, the principles of exchange and distribution of benefits change, and consumption standards change (Vikulin 2017). Modernization of the economy, declared as one of the main strategic goals of the socio-economic policy of the state, involves overcoming the commodity nature of the national economy and increasing its competitiveness through the introduction of new technologies (Hamidullaeva 2014).

In general, the role of technology in the modernization of the economy and society is very significant. Change of technological structure determines the trajectory of development of both social and economic development. At the same time, the modernization of production cannot only consist in the renewal of fixed assets of companies. In turn, the technological modernization of the country's industry induces the technological development of industry.

1. Research background

The concept of modernization in the scientific circulation had used by foreign researchers in the middle of the 20th century to substantiate the uneven socio-economic development of countries and the reasons for their lag behind the countries of Western Europe. Although the phenomenon of modernization is not new and has been repeatedly used in the development process of certain countries (Korkeshko and Tuyakova 2011).

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At the moment, the modernization of the economy is a process of qualitative transformation of socio-economic relations, as a result of which a new, more technologically sophisticated level of production is achieved, the principles of exchange and distribution of benefits change, and consumption standards change (Vikulin 2017).

Modernization of the economy, declared as one of the main strategic goals of the socio-economic policy of the state, involves overcoming the commodity nature of the national economy and increasing its competitiveness through the introduction of new technologies (Hamidullaeva 2014).

Technological development of industry refers to the development of production activities within the industry (a certain type of economic activity) through the use of new equipment and technologies, highly qualified personnel and technological innovations, which in the long term is to ensure the competitiveness of the industry, improve the living standards of its employees and improve the quality of human potential in general (Folomev 2016). Thus, this type of development relates primarily to production activities (material production), while innovations may be associated with organizational changes in the non-production sphere.

The most important task in the study of technological development in industry is to assess its level. In this case, one should pay attention to the existing set of methods for constructing composite indices (integral indicators). In the practice of modern economic research, they had used primarily in the study of processes such as global competitiveness and innovative development. For example, the International Institute of Management and Development (IMD) periodically publishes the Yearbook of Global Competitiveness for 59 countries in which each state is assessed based on an analysis of 331 criteria in four main areas: state of the economy, government efficiency, state of the business environment and state of the infrastructure, including technological (ICT), science (research and development costs, scientific publications, degrees and Nobel laureates, intellectual property) and educational oh infrastructure. (IMD 2017)

Each area includes five factors. Thus, the country's overall competitiveness rating has based on 20 different indicators from four key aspects of economic life. Experts of the World Economic Forum in preparing the Global Competitiveness Index (Global Competitively Index), which has been calculated annually since 2005 based on the collected state statistics and annual reviews of the year, attach great importance to the impact of technology and innovation on global competitiveness. The index includes 113 indicators, divided into 3 large groups and 8 subgroups (Schwab 2018).

In 2000, the Commission (Pro Inno Europe) created a "map of the European innovation space", which compares European countries based on calculated indices of innovative development. For their development, data from Eurostat and other international resources providing information for analysis were used (Hollanders 2015). The methodology for calculating the index has improved every year and has reflected in the annual report entitled "European Innovation Scoreboard". Since 2010, in connection with the emergence in the European Union of the initiative "Innovative Union", which is designed to increase the innovative activity of the EU economy by 2014 and provides for the creation of a single European research space, the report be called the Scoreboard of the Innovation Union. Taking into account the foreign experience of building composite indices in the course of research conducted by the authors as part of a project to assess the technological development of industries, indicators were chosen that directly or indirectly characterize this process.

The main sources of data were the materials published by the bodies of the MNE RK Committee on Statistics, Institute of Economics, Institute of Economic Research. When further studying the statistical relationship between indicators using economic-mathematical methods, 10 indicators were taken, which show a close relationship to the resultant attribute.

The methodological basis of the research was the works of domestic and foreign scientists, an analysis of recent publications, in which studies of the current state of technological modernization of Kazakhstan are conducted, and also provides indications of the need to reform the industry, showed that a large number of works are devoted to these problems, among which authors should mention such, as Schumpeter (1982), Glazyev (2014), Asaul (2017), Ermakova (2017).

Schumpeter (1982) emphasis that only through the abandonment of obsolete technologies and organizational forms*, i.e.* through "creative destruction" one can proceed to the continuous progressive development of the economy. Hence, the true engine of economic development is not just investment, but investment in the creation of fundamentally new and improved products and technologies, forms of organization of production, management and labor.

Glazyev (2014) defines the task of technological modernization as the search for such a fundamentally new product, connected not with local changes, with breakthrough revolutionary technologies (2014). Asaul (2017) explores the phenomenon of innovative and innovative development of Russia. Ermakova (2017) defines the technological modernization of industry as an interrelated change in the material and technological base of a

complex of industries based on the introduction of technological innovations and the development of regional inter-sectorial innovation links in specific areas of specific industries. Martynov (2017) focused on interrelated key issues of technological modernization and parallel ongoing institutional economic transformations in the course of ongoing structural reforms.

Despite the diversity of works, it should be noted a clear lack of theoretical generalization and methodological substantiation of technological modernization at the level of industrial complexes and markets, as well as at the level of corporations and enterprises. At one time, Keynes (1973), Milan (2016), Krueger (2013) turned their attention to the problems of modernization and analysis of its effectiveness.

2. Methodology

Product modernization is the process of improving an existing product or product group, comprehensive product improvement and, finally, creating a new product or product group. Under the modernization of the technological process refers to measures to improve and establish the technological process in the enterprise, namely: reorganization of production, changing the structure of the production process (redesign), the purchase of modern equipment, the introduction of new technological solutions. Finally, functional modernization involves the revision and improvement of the infrastructure of the enterprise, the management process (procurement, supply, storage, implementation, *etc*.), the creation of a department for monitoring, training and advanced training of personnel. As a rule, an enterprise carries out grocery and technological modernization at an enterprise. However, the authors argue that the most important in recent years is the need for functional modernization of the enterprise and the industry as a whole, which allows us to reach a new level of management and operation of the enterprise, industry, country, and to increase their efficiency and effectiveness.

Modernization processes in countries had characterized by an active search for methodological approaches to renewing the potential of the industrial sector of the economy. The lack of an integrated approach to the implementation of strategic policies for economic restructuring does not ensure the efficiency of the operation of domestic enterprises, which leads to stagnation in industry, where structural reforms are mostly formal.

Modernization of industry is not possible without the modernization of its industries. The core of regional modernization in the economy is in the growth of labor productivity, in the social sphere - in raising the standard of living of the population, in the field of knowledge - in raising their level and the possibilities of their production and popularization. In general, regional modernization corresponds to the basic laws of the national, but is not its reduced counterpart.

At the same time, taking into account the "national models" of technological modernization, we should highlight a number of common features, namely: the dominant role of the state in the modernization mechanism, ensuring protection of consumer rights, building an effective judicial system, borrowing universal values of introduction and business ethics while maintaining traditions and values the maintenance of macroeconomic stability, the use of market-based methods for the allocation of resources, and the use of the opportunities created by the world economy oh, that eventually allowed the country to move from exogenous to endogenous economic development, where the main driving factor is not the pressure of external factors, and natural inner need and the possibility of development.

The question of the need to modernize the industry of Kazakhstan and the ideas related to the diversification of the economy had raised more than once. Similar discussions have been rising since 2000. The stabilization of the financial system became possible because of the introduction of its own national currency and the tightening of monetary policy in the 1990s. As a result, it was possible to reduce the level of inflation from 3200% in 1994 to 11% at the end of 1997. In 1997, the stabilization of the economic system began the rate of decline in industrial production declined significantly. During this period, the country's leadership developed a strategy economic development "Kazakhstan-2030", which, not only outlined new benchmarks and horizons for the development of the country, but also aimed the state and Kazakhstan society towards an economic breakthrough. This strategic document formulated the key directions of state policy in the area of consistent reform in all areas of economic, social and public life.

The systemic organizational, technical, administrative, budgetary and fiscal measures to modernize the outdated economic structure, stimulate the growth of innovative industries, increase the share of intellectual products in industrial output are developed in the program documents of the industrial innovation policy of the Republic of Kazakhstan:
- The State Program on Forced Industrial-Innovative Development of the Republic of Kazakhstan for 2010-2014;

- The Program for the Development of Innovations and the Promotion of Technological Modernization in the Republic of Kazakhstan for 2010-2014;
- Inter-sectorial plan of the scientific and technological development of the country until 2020, sectorial and regional development programs.

Thus, a key factor in the formation of the modern industry should be the technological re-equipment of key industries. Among them are engineering, transport, manufacturing, construction, agriculture. In the process of modernizing the economy, it is necessary to solve the tasks of developing high-tech industries and create the prerequisites for innovative development.

3. Application functionality

For the analysis of technological modernization of the industry, the following indicators were taken:
- the cost of innovation;
- the level of activity in the field of innovations in product and process innovations;
- the number of enterprises with product and process innovations;
- the share of innovative products in the total industrial output;
- the volume of investments in fixed assets;
- the coefficient of liquidation of fixed assets;
- coefficient of renewal of fixed assets;
- the coefficient of depreciation of fixed assets;
- the cost of fixed assets;

In the process of research, general scientific and special methods and such methods of scientific knowledge as statistical, graphic, expert, comparative and modelling were used (Table 1).

Table 1. Indicators of the technological state of industry of the Republic of Kazakhstan

Years	Share of innovative products in the total industrial output, in % (y)	Investment in fixed assets in mln. tenge (x1)	Coefficient of liquidation of fixed assets (x2)	Refresh rate fixed assets (x3)	Wear factor of fixed assets (x4)	Cost of fixed assets (x5) in mln tenge
2000	1,8	595.664	2.0	13,8	29,7	3.401.831
2001	2.0	943.398	1,7	13,2	33,1	4.004.036
2002	2,1	1.099.986	1,1	12,6	30,1	4.882.552
2003	2,2	1.327.864	0,9	14,2	32,2	5.707.379
2004	2,3	1.703.684	1,1	13,2	35,2	6.628.313
2005	2,5	2.420.976	1,7	17,1	37,1	7.573.663
2006	2,4	2.824.523	1,6	15,5	40,6	11.477.671
2007	2,1	3.392.122	2,1	17,5	37,8	13.943.019
2008	1,3	4.210.878	1,7	18,6	37.0	17.630.061
2009	1.0	4.585.298	1,6	16,1	37,9	22.359.227
2010	1,2	4.653.528	1,7	13,7	32,5	26.396.858
2011	1,5	5.010.231	1,2	13,4	35,4	29.399.975
2012	2,3	5.473.161	1,3	13,6	36,3	34.018.024
2013	3,2	6.072.687	1,2	12,6	38,9	39.673.580
2014	3,1	6.591.482	1,5	10,9	43,7	50.714.352
2015	2,5	7.024.709	2.0	16,4	36	66.594.199
2016	2,3	7.762.303	2,2	16,7	36	71.632.253
2017	1,59	8.770.572	2,1	16,7	35	71.632.253

Source: compiled by authors

For many years, the industrial sector of the Republic of Kazakhstan has been positioned as one of the leading segments of socio-economic development due to the "intellectual, innovative and multiplicative potential" concentrated in it.

The main task in the process of modernizing the industry of the country is to increase the opportunities in the field of independent research and the development of new technologies. In this regard, we consider the indicators affecting the technological modernization of the industry of Kazakhstan for 2003-2017 (Table 2).

Table 2. Indicators of research and innovation potential of the Republic of Kazakhstan

Years	Share of innovative products in the total industrial output, in %, (y)	Cost of innovation, in mln. tenge (x1)	Level of activity in field of product innovation and process innovation, % (x2)	Number of enterprises with product and process innovations (x3)	Number of organizations that created and use new technologies and technology objects (x4)
2003	2,2	26.933,10	2,1	320	578,00
2004	2,3	35.360,30	2,3	440	600
2005	2,5	67.088,90	3,4	500	630
2006	2,4	79.985,90	4,8	505	639
2007	2,1	83.523,40	4,8	526	648
2008	1,3	113.460,10	4	447	652
2009	1	61.050,90	4	399	660
2010	1,2	235.501,70	4,3	467	692,00
2011	1,5	194.990,90	5,7	614	705
2012	2,3	343.515,60	5,7	1.215	713
2013	3,2	431.993,80	4,8	1.062	664
2014	3,1	438.488,90	5,4	1.303	681
2015	2,5	662.972,30	5,6	1.781	865
2016	2,3	1.533.765,30	5,6	1.743	735
2017	1,59	907.231,20	5,7	1.770	704

Source: compiled by authors

As the data in the Table 2 shows, the cost of innovation and the level of activity in the field of innovation in product and process innovation are increasing every year, and the share of innovative products in the total industrial output and the number of organizations that have created and are using new technologies and objects of technology is decreasing.

In the framework of the State program of industrial-innovative development of the Republic of Kazakhstan, 103 investment projects were included in the Business Support Card from the Karaganda region (3 of which are republican projects: JSC Arcelor Mittal Temirtau, LLP Karaganda Complex Alloys Plant, LLP YDD Corporation) 785,4 billion tenge, with the creation of 11,598 new jobs. Of these, 86 projects were commissioned at 280 billion tenge, with the creation of 6,881 new jobs. For 2018, it is planned to launch 4 projects for 41.5 billion tenge, with the creation of 689 jobs. Of these, 2 projects have been implemented for 27.8 billion tenge, 449 new jobs have been created:

- modernization of machine-building production of Maker LLP with a design capacity of 11.9 thousand tons of products (industry - mechanical engineering). The project cost is 13.7 billion tenge, 99 jobs have been created;
- construction of a plant for the production of copper cathode LLP Sary-Arka Copper Processing with a design capacity of 6 thousand tons (industry - metallurgy). The project cost is 14.1 billion tenge, 350 jobs have been created.

By the end of this year, it is planned to launch another 2 projects worth 13.7 billion tenge, with the creation of 240 jobs:

- organization of production for recycling waste paper and pulp production of Karaganda Pulp and Paper Mill LLP (industry - production of paper and paper products) with a design capacity of 7,000 tons;
- increase in the productivity of the Mill Deserted JSC "AK Altynalmas" with a design capacity of 2.3 million tons of ore per year, 2900 kg of gold (the industry - the production of basic precious and non-ferrous metals).

According to the results of the State Program of Industrial Innovation Development of the Republic of Kazakhstan, it can be noted that enterprises are still dependent on foreign technologies and the ability to independently research and master new technologies is weak. To identify the degree of influence of various factors on economic growth rates, we built a correlation-regression model. At the first stage of forecasting, we selected the most significant factors affecting the technological state of the industry and its development trends in Kazakhstan. It:

- the cost of innovation, in mln. tenge
- the level of activity in the field of innovation in product and process innovation, in %
- number of enterprises with product and process innovations

The resultant sign is the share of innovative products in the total industrial output (Y%). The value of the share of innovative products in the total industrial output we took as a percentage equivalent. According to the average annual data for the period from 2003 to 2016, a correlation and regression analysis was performed and paired correlation coefficients were obtained, determining the closeness of the relationship between the variables. The following matrix of paired correlation coefficients was obtained:

Table 3. Results

	y	x1	x2	x3	x4
Y	1				
x1	0,29	1			
x2	0,19	0,53	1		
x3	0,54	0,84	0,67	1	
x4	0,08	0,58	0,68	0,78	1

Source: compiled and calculated by authors

Thus, among the factors considered, the number of enterprises with product and process innovations has the greatest influence on the share of innovative products in the total industrial output (r_{yx3} = 0,54). Regression models describing the relationship between the features had built for the industry of the Republic of Kazakhstan. Because of data approximation, the following regression equations had obtained:

$Y = 7,6 - 1,4 x_1 - 0,01 x_2 + 0,02 x_3 - 0,01 x_4$

That is, with an increase in the number of enterprises with product and process innovations by 10 units, the share of innovative products in the total volume of industrial products will grow by 0.02%. The value of the coefficient of multiple correlation R = 0,88 suggests that the relationship of the resultant trait with the rest is very close. To build a trend model, we took data on the costs of innovation for 14 years, we need to calculate the cost forecast for the next year, assuming that the trend of the series can be described by a linear model $Yt = a_0 + a_{1t}$. The results of the calculations are presented in Table 4.

Table 4. Calculation results

(Yt)	t	Yt*t	t2
26 933,10	1	26933,1	1
35 360,30	2	70720,6	4
67 088,90	3	201266,7	9
79 985,90	4	319943,6	16
83 523,40	5	417617	25
113 460,10	6	680760,6	36
61 050,90	7	427356,3	49
235 501,70	8	1884013,6	64
194 990,90	9	1754918,1	81
343 515,60	10	3435156	100
431 993,80	11	4751931,8	121
438 488,90	12	5261866,8	144
662 972,30	13	8618639,9	169
1533765,3	14	21472714,2	196
4 308 631,10	105	49323838,3	1015

Source: compiled by authors

Based on the amounts received, we compose a system of normal equations:

$14a_0 + 105a_1 = 4308631,1$

$105a_0 + 1015a_1 = 49323838$

Parameter values a_0 and a_1 can be found by solving the Kramer system. Using the assignment operation, we enter the values of the main determinant in the cells.

Table 5. The values of the main determinant

		14	105		
Δ =		105	1.015	=	3.185
		4.308.631,10	105		
Δ₁=		49.323.838,30	1.015	=	-805.742.455
		14	4.308.631,10		
Δ₂=		105	49.323.838,30	=	238.127.471

Source: compiled and calculated by authors

Calculate the parameters of the model:

$\alpha_0 = \Delta_1/\Delta = $ -252980,3626

$\alpha_1 = \Delta_2/\Delta = $ 74765,29692

As a result, we obtain the following linear trend equation:

Y_t = -252980,3626+ 74765,29692 * 15 = 868499,0912

Based on the data, we obtain a graph reflecting the dynamics of the levels of the series under study (Figure 1). Thus, from this Figure it is clear that we received a low forecast. This is evident from the diagram and is due to the choice of a linear model of the forecast. The coefficient of reliability of the approximation $R2$ = 0.6 Since the dynamics of enterprises with product and process innovations has no tendency, we use exponential smoothing and adaptive forecast. The basis for predicting the price of innovation was the R. Brown linear adaptive model: $y_t = \hat{a}_0 + \hat{a}_1 t$.

For the first five points of the time series, we estimated the *a0* and *a1* values of the model parameters using the least squares method for the linear model. Got the equation:

$y_t = 109{,}46 + 0{,}0963t$

Y_t = 315,1a_0 + 47,7 t

Figure 1. Linear model

The smoothing parameter was chosen equal to α = 0,3, then the discount rate β = 1-α = 1-0,3 = 0,7. We determined the initial conditions of the exponential means by the formulas:

$S_0^{(1)} = a_{0(0)} - \frac{\beta}{\alpha}\alpha_{1(0)} = 315{,}1 - \frac{0{,}7}{0{,}3} * 47{,}7 = 203{,}8$

$S_0^{(2)} = a_{0(0)} - \frac{2\beta}{\alpha}\alpha_{1(0)} = 315{,}1 - \frac{2*0{,}7}{0{,}3} * 47{,}7 = 95{,}5$

We calculated the values of exponential means for the following periods using the formulas:

$S_t^{(1)} = \alpha \cdot y_t + \beta \cdot S_{t-1}^{(1)};$

$S_t^{(2)} = \alpha \cdot S_t^{(1)} + \beta \cdot S_{t-1}^{(2)}.$

Corrected model parameters:

$$a_{0(t)} = 2S_t^{(1)} - S_t^{(2)} \qquad\qquad a_{1(t)} = \frac{\alpha}{\beta}\left(S_t^{(1)} - S_t^{(2)}\right).$$

Using the presented formulas, we obtained a model with corrected parameters:

$$\hat{y} = 315{,}1 + 47{,}7\tau, \quad \tau = 1, 2, \dots .$$

4. Results

In the process of the study, confidence intervals had built, which help to understand how far the resulting point estimate can deviate from the true value of the parameter. The obtained confidence intervals had presented in Table 7. Using this formula, we calculated the predicted values of enterprises that have product and process innovations until 2020, see Table 7.

Table 7. Predictive values of enterprises with product and process innovations until 2020

Years	No. of enterprises with product and process innovations
2003	384,8
2004	461,8
2005	533,5
2006	568,7
2007	592,8
2008	551,1
2009	492,6
2010	496,3
2011	583,6
2012	989,8
2013	1.117,3
2014	1.319,4
2015	1.703,7
2016	1.876,2
2017	1.876,2
2018	2.028,6
2019	2.181,1
2020	2.333,5

Source: compiled and calculated by authors

Thus, the forecast of the number of enterprises with product and process innovations by 2020, according to our calculations, will correspond to the value of 2,333.5. That is, an increase of 1.2%.

Figure 2. Exponential trend line

It should be noted that we received a more accurate forecast using the exponential trend line. The reliability coefficient of approximation R2 shows the degree of compliance of the trend model with the original data. Its value can lie in the range from 0 to 1. The closer R2 is to 1, the more accurately the model describes the available data. In our case, R2 = 0.9. Therefore, the following should be noted:

- technological modernization of industry as one of the main strategic goals of the state's social and economic policy, involves overcoming the raw material nature of the economy and increasing its competitiveness through the introduction of new technologies;
- the main task is to obtain advanced technologies, increasing the depth of their development and increasing the innovative potential;
- correlation and regression analysis showing that with an increase in the number of enterprises with product and process innovations by 10 units, the share of innovative products in the total industrial output will increase by 0.02%, the value of the multiple correlation coefficient R = 0.88 indicates that that the relationship of the resulting feature with the rest is very close;
- when building a trend model, we received a low forecast. The reliability coefficient of the approximation R2 = 0.6, which indicates that the relationship of the resulting feature with the rest is not very close;
- with exponential smoothing and adaptive prediction, the coefficient of confidence approximation R2=0.9, we received an accurate forecast.

Conclusion

At present, the mining industry of Kazakhstan has insufficient technological equipment, as compared with world leaders, which, in general, leads to low labor productivity and competitiveness.

Despite the fact that some of the fields in the country are equipped with modern equipment and advanced data transmission networks (21%), a significant part of the fields needs to be modernized. Since 56% of deposits are characterized by the absence of networks or their insufficient development, 23% of deposits require the complete replacement of equipment.

Technological modernization of the industry implies the introduction of innovations through the development of domestic technologies and the purchase of technologies abroad. Among the most significant constraints to the development of technological modernization of industry are limited financial resources, lack of qualified personnel, as well as limited infrastructure.

The following steps are necessary for the implementation of technological modernization of industry:

- borrowing technology, which implies a comparison of existing technologies and their foreign counterparts in order to minimize the cost of technological re-equipment of production;
- the key trend is the transition to a new technological level in accordance with the concept of Industry 4.0;
- attraction of borrowed capital, this in turn requires from enterprises a high-quality study of the investment project;
- promote innovative development of industry;
- the integration of industry, science and education is necessary.

References

[1] Asaul, A. 2017. *Modernization of the economy based on technological innovations*. St. Petersburg. 606.

[2] Ermakova, J. 2017. *Technological modernization of Russian industry: Strategy and organizational and economic factors (regional aspect)*. Ekaterinburg. Ural. 360.

[3] Folomev, A. 2016. *Scientific and scientific-technical potential: Content and methods of its measurement. Economic potential of Russia: Its development and effective use. Collection of scientific articles*. Moscow. 319.

[4] Glazyev, S. 2014. Technological basis of global dynamics and confrontation. *Partnership of Civilizations*, 3(4): 120-142.

[5] Hamidullaeva, L. 2014. Problems and prospects for the modernization of the Russian economy. *Basic Research*, 11(9): 2010-2015.

[6] Hollanders, H. 2015. *Innovation Union Scoreboard: Methodology report*. INNO Metrics Thematic Paper. Brussels: European Commission. 55.

[7] Keynes, J. 1973. *The Collected Writings of John Maynard Keynes*. London. 667.

[8] Korkeshko, O., Tuyakova, Z. 2011. Fundamentals of the strategy of technological modernization of the enterprise. *Vestnik OGU*, 13(132): 245-249.

[9] Krueger, A. 2013. An Empirical Industry Argument. *American Economic Review*, 72 (5): 1142–52.

[10] Martynov, A. 2017. Technological modernization is a component of economic transformation, *Finance*, 6(11): 19-25.

[11] Milan, S. 2016. *Gli effetti della ristrutturazione industriale sui costi di produzione: un'analisi disaggregate. Ristrutturazione produttiva net paesi mdustriali.* Bologna. 126.

[12] Nazarbayev, N. 2017. Message of the President of the Republic of Kazakhstan to the people. http://www.akorda.kz/ru.

[13] Schumpeter, J. 1982. *Theory of Economic Development*. Moscow. 485.

[14] Schwab, K. 2018. *The Global Competitiveness Report 2016–2017*. Geneva. World Economic Forum. 544.

[15] Vikulin, A. 2017. *Investment policy as a tool for the modernization of the Russian economy*. Moscow. 120.

*** Economic Development Strategy "Kazakhstan-2030". Available at: http://www.akorda.kz

*** IMD World Competitiveness Yearbook. 2017. IMD. Switzerland.

*** MNE RK Committee on Statistics. Available at: http://stat.gov.kz

Monitoring the Financial Status of Enterprises in the Agricultural Sector

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Abstract:

The article reveals the theoretical and practical aspects of monitoring the financial condition of enterprises, analyzes the theoretical views of a number of domestic and foreign scientists in the field of monitoring the financial condition of enterprises, analyzes the financial and economic indicators of agricultural enterprises of the Republic of Kazakhstan in order to justify the need to monitor the financial condition.

Keywords monitoring; agricultural enterprises; monitoring; state monitoring; financial management; financial sustainability

JEL Classification: M21; M42

Introduction

The agro-industrial complex is one of the important sectors of the economy, which forms the country's food and economic security, as well as the labor and settlement potential of rural areas. The role of agriculture in the economy of a country or region reflects its structure and level of development. Agriculture is an important sector of production, providing the population with food and raw materials for other industries. Agriculture in the structure of GDP of the Republic of Kazakhstan in 2017 amounted to 4.3%.

Agriculture is one of the key sectors of the economy of Kazakhstan. The level of development of the agricultural sector has always acted and continues to be a determining factor in the economic and socio-political stability of Kazakhstan's society. Being one of the priority directions of development of the republic's economy, agriculture has huge potential and large reserves. The diverse climatic conditions of Kazakhstan make it possible to grow almost all the cultures of the temperate thermal belt and develop animal husbandry.

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1. Research background

The exceptional place of the agro-industrial complex and the agrarian sector in the economy necessitates ensuring the financial sustainability of agricultural enterprises. Under the influence of the global economic crisis, enterprises of the agro-industrial complex are increasingly suffering from a reduction in demand for their products, balancing on the verge of zero profitability, often in the unprofitable zone. Diagnostics and constant monitoring of the financial sustainability of enterprises in the agricultural sector is an objective necessity in the framework of effective economic development of the state. To maintain economic growth, reduce the number of crisis enterprises, it is necessary to constantly monitor the financial condition of enterprises in all sectors of the economy. This task can be solved from the standpoint of the formation of a new organizational mechanism - monitoring the financial condition of enterprises.

Currently, the issues of financial monitoring, risk monitoring are of particular relevance in the world due to the crisis in the economy, the growing influence of external systemic risks. Monitoring financial stability is different from monitoring because it focuses on risks for the entire financial system (Tobiaz and Covitz 2013).

In economics, the analysis of the financial condition of enterprises, as a system of methods for studying business processes that form the financial state (stability or failure) of an enterprise and the financial results of its activities, is the subject of the fundamental works of such scholars as: Kovalev (2015), Sheremet (2016), Savitskaya (2015), Blank (2013), Stoyanova (2010), Kreinina (2017), Lyubushin (2016), Dyusembaev (2018) and many others. Among foreign scholars, one should single out the studies of Brigham (2017), Gapensky (2017), Braley (2017), Myers (2017).

The theoretical basis for monitoring the financial condition of enterprises is laid in the works of Karavanova (2016), Saparova (2017), Chernov (2013), Serdyukova (2016), Zaporozhtseva (2017), Gordina (2018), Kushubakova (2017), Davletova (2017), Rodionova (2015), Pakova (2014), Blank (2013), Abayeva (2014) and others.

Despite the fact that research issues and the development of various methods for analyzing the financial condition of enterprises in the economic literature receive much attention, the theoretical, methodological and practical aspects of monitoring the financial condition of enterprises are still insufficiently developed.

Most economists do not make certain distinctions between monitoring financial condition and analyzing the financial condition of a company. According to the authors of the article, the concept of "monitoring" is much broader than the concept of "analysis". Monitoring includes analysis, as one of the main stages of its implementation.

So, from the position of Karavanova (2016), "Analysis (monitoring) of the financial condition of the organization, assessment of its solvency is a necessary condition for the implementation of the state policy aimed at preventing the bankruptcy of organizations (enterprises), financial recovery and restructuring of insolvency". According to Saparova (2017) monitoring is understood as continuous monitoring of economic objects, the analysis of their activities as an integral part of management.

In economics, there is also no definite distinction between the concepts of "monitoring financial condition" and "financial monitoring".

So, for example, Chernov (2013) believes that financial monitoring (monitoring of financial status) is a system of continuous monitoring and analysis of the financial condition and the results of the organization. Serdyukova (2016) considers financial monitoring as a system of continuous observation, analysis and forecasting of financial indicators of enterprises, formed at the macro or microeconomic level, with the aim of ensuring the adoption of tactical and strategic management decisions of the appropriate level, as well as evaluating the effectiveness of decisions made. Zaporozhtseva (2016) defines financial monitoring as systematic monitoring of the main financial parameters of the external and internal environment of an enterprise, which characterize the degree of favored conditions for the fulfillment of an enterprise's mission.

Also, there is no distinction in the researches of Pakova (2014) between the concepts of "monitoring financial condition" and "financial monitoring". In her opinion, financial monitoring is a permanent system of continuous monitoring, analysis and forecasting of the financial condition of organizations in order to make effective management decisions and identify development trends.

However, the concepts of "monitoring financial condition" and "financial monitoring" should be differentiated as the legislation of the Republic of Kazakhstan clearly defined the concept of "financial monitoring" as a set of measures for collecting and analyzing information about operations with money and (or) other property received from financial monitoring.

Financial monitoring was introduced in order to prevent the legalization (laundering) of illegally gained income and the financing of terrorism. Thus, the concepts of "financial monitoring" and "monitoring of financial condition" have different contents.

According to Gordina (2018), monitoring of the financial and economic condition of an enterprise can be defined as specially organized systematic observation of the most important financial and economic indicators of an enterprise with the purpose of their evaluation and control, designed to diagnose the financial and economic condition of an enterprise, assess it in dynamics and forecasting development prospects.

From the position of Kushubakova and Davletova (2017) monitoring of the financial condition of organizations is a system of continuous monitoring of the financial condition, including the rapid collection of information, analysis of key financial indicators and making preventive and preventive nature based on the results of the analysis of management decisions.

According to the latter, financial monitoring is a type of financial monitoring. Rodionova (2015) believes that monitoring the financial condition of enterprises, as one of the elements of the crisis management system, is a system of data collection and calculation of indicators on the financial condition of enterprises formed at the micro and macro level, allowing to diagnose signs of bankruptcy, to monitor trends and the dynamics of the changes and also take into account the solvency of enterprises in order on this basis to make optimal management decisions for the region and country not in general.

Many authors believe that monitoring the financial condition of the company is the most important tool for managing the crisis of an enterprise. So, Blank (2013) considers that the implementation of continuous monitoring of the financial condition of an enterprise is a necessary condition for the early detection of symptoms of a financial crisis. Abayeva (2014) defines monitoring as the observation of the financial condition of an enterprise in the phase of approaching or the occurrence of insolvency, reducing the use of marketing potential and analyzing the possibilities of preventing or exiting the "crisis marketing" segment.

Based on the theoretical research, we determined the economic content of monitoring the financial condition of the company, its main components. From the point of view of the authors of this article, monitoring the financial condition of an enterprise is a system of continuous monitoring, analysis and evaluation of the financial condition of an enterprise based on key financial indicators in order to identify trends, forecast development prospects, prevent crisis situations and make optimal management decisions. When managing companies, such functions of financial management as planning, organization, accounting, analysis, control and regulation are implemented. But for effective management requires objective and timely information about the changes occurring in the controlled object. Obtaining such information by all market participants is possible on the basis of creating a system for monitoring the financial condition of the company.

2. Methodology

Financial monitoring is one of the most important functions of financial management in analyzing and assessing the availability, allocation and use of financial resources of an enterprise in order to ensure the sustainability of the enterprise and reduce risks.

Below are presented the main components of the monitoring system of the financial condition of the company (Figure 1).

Figure 1. Main components of the monitoring system of the financial condition of the company

Source: compiled by authors

Based on Figure 1, it is clear that all the main monitoring elements that make up its content are interconnected and condition each other: the goal determines the object and subjects of monitoring, the monitoring mechanism; the monitoring mechanism determines its tools. The main stages of monitoring the company's financial condition are: monitoring, analyzing and evaluating the actual financial condition, developing recommendations for improving the financial management strategy and forecasting the future financial condition, see Figure 2.

Figure 2 - The main stages of monitoring the financial condition of the company

Observation (information gathering)

↓

Analysis and assessment of financial condition

↓

Development of recommendations for improving the financial management strategy and forecasting the main parameters of the company's business.

↓

Management decisions and performance monitoring

Source: compiled by authors

Monitoring of the financial condition of enterprises is divided into external and internal monitoring. External monitoring can be divided into three main subspecies: state, banking, independent (auditing). However, it is important to conduct a state monitoring of the financial condition of enterprises.

Internal monitoring of financial status, as the most important function of financial management, is a systematic tracking of the main financial parameters of an enterprise to develop a favorable strategy for its development and risk reduction.

Internal financial monitoring should be conducted at the enterprise level in the interests of the company itself. However, in modern conditions for a more complete diagnos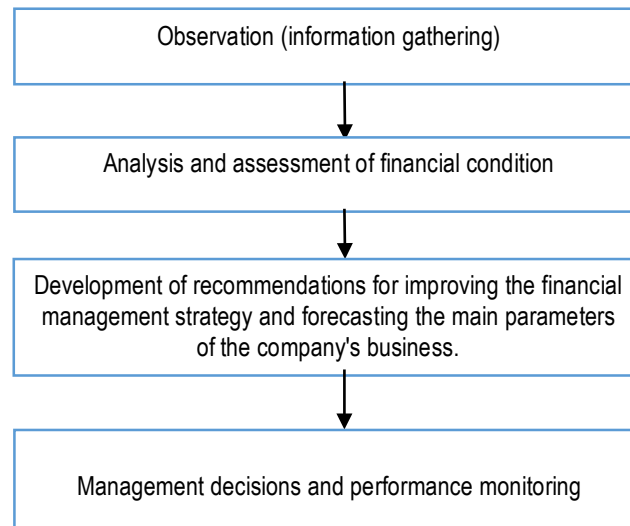is, timely identification of crisis situations in the economy, external state monitoring of the financial condition of enterprises is necessary. At present, the state only controls the bankruptcy proceedings of insolvent enterprises.

In Kazakhstan, monitoring of the financial condition of enterprises at the state level is not carried out. Currently, there is a shortage of analytical information about the financial condition of enterprises. Statistical information does not provide a comprehensive assessment of the state of enterprises; it assumes a review of the general macroeconomic situation only and does not reflect the specifics of the development results of a particular enterprise.

The introduction of state monitoring of the financial status of large and medium-sized enterprises will make it possible to identify risks in the economy as a whole, to predict the level of GDP, based on financial and economic indicators of the real sector of the economy. The main subjects of state monitoring of the financial status of large and medium-sized enterprises in various sectors of the economy should be the relevant ministries and departments.

In the agrarian sector of the economy, the creation of a center for monitoring the financial condition of agricultural enterprises under the Ministry of Agriculture will help improve the management of the agricultural sector. The creation of a center for monitoring the financial status of organizations in the agrarian sector of the economy under the Ministry of Agriculture will ensure an increase in the level of operational management of the industry. The entry of agricultural enterprises into the monitoring system will increase the level of financial transparency, which will make it possible to have a priority opportunity to receive state financial support.

Monitoring the financial condition of enterprises plays an important role in ensuring the financial sustainability of agricultural enterprises, increasing their profitability and productivity, in accordance with the objectives set out in the State Program for the Development of the Agro-Industrial Complex of the Republic of Kazakhstan. The problem of sustainability is important for enterprises of any industry. It has particular difficulty for agricultural production.

3. Study case

According to the SWOT analysis of the agro-industrial sector, given in the State Program for the Development of the Agro-Industrial Complex of the Republic of Kazakhstan for 2017–2021, low labor productivity and low profitability of agricultural producers are among the weaknesses of the industry. One of the main indicators of sustainable economic development of agriculture are indicators of the financial condition of the company.

The unstable financial condition of agricultural enterprises can be judged according to the financial and economic activities of enterprises in the agricultural sector (including forestry, fisheries) according to the statistics of the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan (Table 1).

Table 1. Main indicators of financial and economic activities of enterprises of the agricultural sector, in thousands tenge

Indicators	2010	2011	2012	2013	2014	2015	2016	2017
Volume of production and services rendered	264.272.608	348.753.215	378.814.200	386.604.011	407.044.177	377.436.411	430.218.540	487.396.865
Revenue from sales of products and services	274.179.900	35.8261.412	405.649.213	399.962.895	409.527.459	377.562.325	450.254.520	524.511.959
Cost price	25.4352.699	291.274.641	354.824.026	376.237.916	358.282.491	344.841.686	386.024.256	438.686.517
Non-manufacturing costs	60.041.160	66.543.332	94.800.933	84.801.266	103.467.562	166.643.830	156.242.744	125.085.752
Profit (loss) before tax	-7.877.309	37.772.181	22.500.272	-18.389.586	12.936.325	-53.659.366	4.705.667	71.608.610

Source: compiled by authors

The main indicators of financial and economic activities of enterprises of the agricultural sector indicate the instability of the financial state: for example, the value indicators profit (loss) before tax changes in steps that are positive, then negative (Figure 1). The negative value of such an important indicator of the financial condition of enterprises as profit before tax in 2010, in 2013 (a decrease compared to 2012 was 182%), and in 2015 (a decrease compared to 2012 amounted to 362%) indicates high risks in this sector of the economy.

In 2016, there is a slight increase in the financial performance of enterprises in the agrarian sector. Income from sales of products and services increased by 19% compared with 2015, and profit before tax increased in 2016 by 108.7%. Accordingly, product profitability was 0.9%.

The implementation of government programs for industry support was a significant factor in growth in agriculture (profit before tax increased 15 times compared with 2016). In 2017, for agriculture, a positive trend is the gradual process of product diversification. Thus, against the background of a general increase in acreage (by 1.7%), their decrease was observed for wheat in favor of legumes and oil crops. Profitability indicators (unprofitability) of enterprises of the agricultural sector of the Republic of Kazakhstan for the period 2010-2017 are shown in Figure 3.

Figure 3. Profitability indicators (unprofitability) of agricultural enterprises of the Republic of Kazakhstan (%) for the period 2010-2017

According to the statistics of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan in 2010, 2013 and 2015 there was a loss ratio of enterprises in the agricultural sector (including forestry and fisheries). The cause of unprofitability of agricultural enterprises (including forestry, fisheries) in 2015 was the increase in non-production costs, which in total was due to the weakening of the national currency exchange rate had a negative impact on domestic demand.

Indicators of the performance of enterprises of the agricultural sector of the Republic of Kazakhstan for the period 2012-2016 characterized by high variability, which indicates the presence of high financial risks in their activities.

The share of agricultural enterprises that received, suffered a loss for 2010-2017 fluctuates at a level not lower than 30% of all enterprises of the agrarian sector (Table 2). The largest share of unprofitable agricultural enterprises accounted for 2013 - 48.3%, and in 2015 - 39%. According to the statistics of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, the grouping of agricultural enterprises of the Republic of Kazakhstan that received income and loss for 2010-2017 are shown in Table 2. The share of enterprises that suffered a loss decreased in 2016 to 31%, in 2017 to 25% (in 2010, their share was 54%). This decrease was also affected by the decrease in the total number of enterprises in 2016 compared to 2010 by 54%.

Table 2. Grouping of agricultural enterprises of the Republic of Kazakhstan, which received income and loss for 2010-2017

Indicators	2010	2011	2012	2013	2014	2015	2016	2017
Total number of enterprises, units	694	654	649	613	601	371	374	355
Profit Businesses:	380	467	383	317	372	227	257	264
- % to total number of enterprises	54,8	71,4	59	51,7	61,9	61%	68,7	74,4
- amount of profit, in mln. tenge	30.040	55.937	56.230	30.882	62.636	54.233	81.428	98.558.992
Lost businesses:	314	187	266	296	229	144	117	91
- % to total number of enterprises	45,2	28,6	41	48,3	38	39%	31,3	25,6
- amount of loss, in mln. tenge	37.918	18.165	33.730	49.272	49.699	107.892	76.723	26.950.382

All this necessitates the search for new approaches to the financial management of enterprises and that will ensure conditions for their sustainable development, which is based on financial sustainability, as a reflection of the efficient formation and use of financial resources necessary for the normal functioning of the enterprise and as the main characteristic of financial sustainability enterprises.

The real conditions of the enterprises of the agricultural sector of the Republic of Kazakhstan determine the need for an objective and comprehensive monitoring of their financial condition, the need to find new approaches to financial management of enterprises in the agricultural sector, which will ensure conditions for their sustainable

development, which is based on financial sustainability, as a reflection of effective formation and use financial resources necessary for the normal functioning of the enterprise and as the main characteristics of the stability of the financial condition of the company.

One of the main problems of the practical application of the analysis, in the framework of monitoring the financial condition of the company, is the choice of financial indicators, both in terms of quantity and composition.

On the basis of systematization of the existing methods of analyzing the financial condition of the company, a system of indicators for analyzing the financial condition of the company has been formed, as part of monitoring. From the entire list of standard indicators for analyzing and evaluating the financial condition, we have included the most informative in our opinion factors in the system of indicators for monitoring the financial condition of enterprises:

- liquidity ratios: current liquidity ratio, absolute liquidity ratio, the ratio of own working capital;
- financial stability ratios: autonomy ratio, debt to equity ratio, maneuverability ratio, stock coverage ratio with own sources;
- profitability indicators: ROA return on assets, ROE return on equity, return on sales;
- indicators of business activity: the turnover ratio of capital (assets), the turnover ratio of working capital, the inventory turnover ratio;
- market activity indicators: earnings per share (Earnings Per Share, EPS), market value added (MVA), EVA (Economic value added).

Based on the analysis and survey of experts, the indicators that are most significant for assessing the financial condition of enterprises in the agricultural sector of the economy are identified. Taking into account the fact that a significant part of the agricultural enterprises of Kazakhstan have an unstable financial condition, an analysis of their financial activities makes it possible to evaluate the basic conditions and possibilities of their financial recovery.

The calculation of indicators of the financial condition of some large and medium-sized enterprises of the agrarian sector showed a discrepancy between normative values and low profitability, which characterizes the high financial risks of agricultural enterprises and justifies the need for continuous monitoring. When analyzing the financial stability of a company, it is necessary to evaluate the probability of bankruptcy, which is understood to be the insolvency of the debtor recognized by the court, which is the basis for its liquidation.

To assess the probability of bankruptcy in the world practice of forecasting financial stability and choosing a company's financial strategy, the five-factorial Z-model of the American economist, Professor E. Altman is widely used. To predict the likelihood of bankruptcy, the Altman five-factor model is used for joint-stock companies whose shares are listed on the market. In general, the Altman model is as follows:

$$Z = 3{,}3 \times K_1 + 1{,}0 \times K_2 + 0{,}6 \times K_3 + 1{,}4 \times K_4 + 1{,}2 \times K_5 \tag{1}$$

The accuracy of the forecast for this model on the horizon of one year is 95%, by two to 83%, which is a great advantage of this model. Table 3 shows the Z-score values and the probability of bankruptcy.

Table 3. Z-score values. The probability of bankruptcy

Z-score values	The probability of bankruptcy
1,81 and less	Very high
from 1,81 till 2,70	High
from 2,71 till 2,9	There is a possibility
3,0 and higher	Very low

Source: compiled by authors

Below is the definition of the probability of bankruptcy of the analyzed enterprises on the basis of the Z-model according to the financial statements for 2017. The initial data for calculating the coefficients are characterized by the data given in Table 4.

Table 4. Baseline data for calculating the coefficients of the five-factor model of Altman, E

Indicators	Enterprise 1	Enterprise 2	Enterprise 3	Enterprise 4
Profit before tax	913.027	(-5.557.174)	319.552	231.603
Balance currency	7.946.784	129.446.128	70.945.248	18.031.636
Equity	2.554.538	(-19.117.581)	8.063.209	14.231.430
Revenue (revenue) from sales	8.224.547	21.557.091	20.963.455	4.358.061
Borrowed capital	5.392.246	148.563.709	62.882.039	3.800.206
Net working capital (current assets - current liabilities)	740.669	(-15.793.754)	(-13.564.913)	7.833.053
Retained earnings	1.204.538	(-38.907.439)	(-24.349.417)	(-10.361.708)

Source: compiled by authors

The values of the five coefficients, according to the Altman model for Enterprise 1, were:

$K_1 = \frac{913027}{7946784} = 0,11;$ $K_2 = \frac{8224547}{7946784} = 1,03;$ $K_3 = \frac{2554538}{5392246} = 0,47;$

$K_4 = \frac{1204538}{7946784} = 0,15;$ $K_5 = \frac{740669}{7946784} = 0,09.$

$Z = 3,3 \times 0,11 + 1,0 \times 1,03 + 0,6 \times 0,47 + 1,4 \times 0,15 + 1,2 \times 0,09 = =0,363 + 1,03 + 0,282 + 0,21 + 0,108 = 2$

The result suggests that the probability of bankruptcy of the Enterprise 1 is high (Z value is up to 2.7). The values of the five coefficients, according to the Altman model for Enterprise 2, were as follows:

$K_1 = \frac{-5\,557\,174}{129\,446\,128} = -0,04;$ $K_2 = \frac{21\,557\,091}{129\,446\,128} = 0,16;$ $K_3 = \frac{19\,117\,581}{148563709} = -0,12;$

$K_4 = \frac{-38\,907\,439}{129\,446\,128} = -0,3;$ $K_5 = \frac{-15793754}{129\,446\,128} = -0,12.$

$Z = 3,3 \times (-0,04) + 1,0 \times 0,16 + 0,6 \times (-0,12) + 1,4 \times (-0,3) + 1,2 \times (-0,12) = -0,132 + 0,16 - 0,072 - 0,42 - 0,14 = -0,6$

The probability of bankruptcy of the investigated Enterprise 2 is very high (the value of Z is negative). The values of the coefficients, according to the model of Altman for Enterprise 3:

$K_1 = \frac{319552}{70945248} = 0,004;$ $K_2 = \frac{20963455}{70945248} = 0,3;$ $K_3 = \frac{8063209}{62882039} = -0,13;$

$K_4 = \frac{-13564913)}{70945248} = -0,3;$ $K_5 = \frac{-15793754}{70945248} = -0,2.$

$Z = 3,3 \times 0,004 + 1,0 \times 0,3 + 0,6 \times (-0,13) + 1,4 \times (-0,3) + 1,2 \times (-0,2) = 0,013 + 0,3 - 0,08 - 0,42 - 0,24 = -0,43$

The result suggests that the probability of bankruptcy of Enterprise 3 is very high (the value of Z is negative). The values of the coefficients, according to the Altman model for Enterprise 4, were:

$K_1 = \frac{231603}{18031636} = 0,01;$ $K_2 = \frac{4358061}{18031636} = 0,24;$ $K_3 = \frac{14231430}{3800206} = 3,7;$

$K_4 = \frac{(-10361708)}{18031636} = -0,57;$ $K_5 = \frac{7833053}{18031636} = 0,4.$

$Z = 3,3 \times 0,01 + 1,0 \times 0,24 + 0,6 \times 3,7 + 1,4 \times (-0,57) + 1,2 \times 0,4 = 0,033 + 0,24 + 2,22 - 0,228 + 0,48 = 2,7$

Conclusion

The obtained result indicates that the probability of bankruptcy of the investigated Enterprise 4 is also high (the value of Z is 2.7).

The application of mathematical models for forecasting the target indicators of the country's development program in the context of the sustainable development paradigm will have a beneficial effect on the entire management process and will contribute to improving the quality of development planning in the Republic of Kazakhstan, developing programs and their implementation (Omarova 2018).

Thus, in modern conditions the problem of financial insolvency of enterprises of the agrarian sector of the economy is very relevant. Agricultural enterprises are characterized by high bankruptcy risks.

Monitoring the financial status of large and medium-sized enterprises will facilitate the timely detection of signs of significant deviations from normal economic development and, thus, provide a real opportunity for the government and company management to take measures to prevent crisis situations. Also for the effective organization of companies, reducing financial risks, we propose to introduce at all medium and large enterprises an analytical system for diagnosing, evaluating and monitoring financial condition based on financial and management data, including consolidated reporting.

Monitoring the financial status of enterprises in the agrarian sector is a prerequisite for the implementation of state policy aimed at preventing the bankruptcy of enterprises, financial recovery and restructuring of insolvency (Aimurzina and Kamenova 2018). Monitoring the financial status of organizations of the agrarian sector of the economy will determine the main forecast parameters of the activities of enterprises of the agricultural sector, which will offer practical recommendations for the financial recovery of enterprises of the agricultural sector and ensure their financial sustainability. It will also allow identifying the main risks of enterprises of the agrarian sector and suggesting recommendations for improving the management of the finances of enterprises of the agricultural sector.

The study of monitoring the financial status of enterprises in the agricultural sector is relevant to ensure the financial sustainability of enterprises in the agricultural sector.

References

[1] Abaeva, N. 2014. *Anti-crisis marketing management and monitoring of the financial condition of enterprises*. Sochi. 231.

[2] Aimurzina, B., and Kamenova, M. (2018). Particular forms of management of agro – industrial complex in the sustainable development. *Journal of Environmental Management and Tourism*, Volume IX, Summer, 3(27): 639-647.

[3] Blank, I. 2013. *Management of financial stabilization of the enterprise*. Kiev. Nika-Center. 325.

[4] Blank, I. 2013. *Management of financial stabilization of an enterprise*. Kiev. 496.

[5] Braley, R., and Myers, S. 2017. Principles of Corporate Finance. Moscow. *JSC "Olymp-Business"*. 547.

[6] Brigham, Y., and Gapensky, L. 2017. *Financial Management*. SPb. School of Economics. 669.

[7] Chernov, V. (2013). Analysis of the financial policy of the enterprise. *Audit and Financial Analysis*, 2(7): 13-21.

[8] Dyusembaev, K. 2018. *Analyze financial statements*. Almaty. Economy. 451.

[9] Forged, S. 2015. *Bankruptcy prevention organizations*. Moscow. 202.

[10] Gordina, V. 2018. *Information-analytical system of monitoring the financial and economic status of industrial enterprises in the region*. 200.

[11] Karavanova, B. 2016. *Development of a financial management strategy for an organization. Moscow. Finance and Statistics*. 128.

[12] Kovalev, V. 2015. *Financial analysis: Methods and procedures*. Moscow. 314.

[13] Kreinina, M. 2017. *The financial condition of the company: Assessment methods*. Moscow. 425.

[14] Kushubakova, B., and Davletova, E. (2017). The content and indicators of monitoring the financial status of organizations. *Audit and Financial Analysis*, 3(9): 65-67.

[15] Lyubushin, N. 2016. *Analysis of the financial condition of the organization*. Moscow. Eksmo. 316.

[16] Omarova, A. 2018. Modelling of sustainable development. *Journal of Environmental Management and Tourism*, Volume IX, Spring, 1(25): 124-129.

[17] Pakova, O. 2014. Evaluation and monitoring of the financial status of organizations of the agrarian sector of the economy. *Financial Analytics: Problems and Solutions*, 10(23): 56-62.

[18] Rodionova, N. 2015. *Crisis Management*. Moscow. 223.

[19] Saparova, B. 2017. *Financial Management*. Almaty. 461.

[20] Savitskaya, G. 2015. *Analysis of the production and financial activities of agricultural enterprises*. Moscow. Infra-M. 651.

[21] Serdyukova, E. 2016. Modeling the financial condition of the organization in the framework of financial monitoring. *Economic Sciences*, 7(56): 268-269.

[22] Sheremet, A., and Negashev, E. 2016. *Methods of financial analysis of commercial organizations*. Moscow. Infra-M. 215.

[23] Stoyanova, N. 2010. *Financial management: theory and practice*. Moscow. Perspective. 289.

[24] Tobias, A., and Covitz, D. 2013. *Financial Stability Monitoring*. New York. Available at: http://www.federal reserve.gov/pubs/feds/2013/201321/201321pap.pdf

[25] Zaporozhtseva, L. 2017. *Internal monitoring of the financial sustainability of agricultural enterprises: Formation and development*. 212.

*** Official Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan. Available at: http://stat.gov.kz

Impact of Small and Medium Enterprises on the Economy

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Abstract:

The article has devoted to the development of small and medium enterprises (SMEs) in the Republic of Kazakhstan, which is recognized in the world as an effective lever for ensuring the economic growth of the country. The article considers the current state and scope of small and medium business, as well as the possibilities of its development in the future. Particular attention is paid to the creation of an SME enterprise around new innovative enterprises using various types of business cooperation. At the same time, recommendations on the use of the state support mechanism to accelerate the growth of SMEs in the production sector and the full realization of its technical, production and socio-economic potential are proposed.

For a more complete picture of the impact of small and medium enterprises on the economy of the Republic of Kazakhstan, a regression model was constructed describing the influence of the number of active SMEs and the volume of loans issued by banks to SMEs on the SME output.

Keywords small and medium business; investment; competitiveness; integration; entrepreneurship

JEL Classification: M21, M29

Introduction

Entrepreneurship is gaining momentum, covering all new areas of the economy and social strata. Its successful development can occur in the presence of such necessary conditions as private property, freedom of economic activity (Sedelev 2011).

Therefore, state support for small and medium-sized businesses remains an important and necessary tool that directly affects the growth of the economy and the welfare of Kazakhstanis, as a successful business causes a chain reaction: new jobs are opened, the income of Kazakhstanis increases and the economy as a whole is strengthening.

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1. Literature review

In the research of Dogil and Semenov (2013) they describe that doing business at an effective level is possible only if there is a certain social situation - an entrepreneurial environment, which means, first of all, the market, the market system of relations, as well as the personal freedom of the entrepreneur, *i.e.* personal independence, which allows him to make such an entrepreneurial decision, which, from his point of view, will be the most effective, efficient and most profitable.

Voevutko (2015) notes that in conditions of developing competition between countries, it is small and medium businesses that create the necessary atmosphere of competition, is able to quickly respond to any changes in market conditions, fill the emerging niches in the consumer sphere, creates additional jobs, is the main source of the middle class. Small businesses are very vulnerable to all market changes and shocks, because they have much less opportunities and resources compared to subjects of medium and, moreover, large-scale entrepreneurship. Therefore, the economic policy of developed countries is aimed at compensating these abilities of small enterprises and helping them act in the market as full-fledged subjects of competition.

According to Utebaeva (2014), the scientific articles state that the state policy is focused on stimulating the development of production with higher added value, forming auxiliary, servicing and processing blocks of small and medium enterprises through outsourcing and strengthening the local component in large projects, as well as the creation of clusters by combining the efforts of service and support enterprises of SMEs around large backbone companies.

According to Tulesheva and Muratbek (2018) despite the fact that the indicators of entrepreneurship development in the Republic of Kazakhstan and the developed countries of the world differ significantly, small and medium business (SME) managed to occupy a certain niche in the economy of Kazakhstan.

In a foreign edition of the World Bank, they note that Kazakhstan, despite the negative impact of the global crisis, continues to maintain the positive dynamics of the development of its economy. A certain role in ensuring the growth of the economy has been played by entrepreneurship, in the development of which some improvement trends have manifested themselves in recent years, especially in such forms as small and medium-sized businesses. Successful development of the state economy can be assessed by the state of small and medium businesses. The government and the Ministry of National Economy of the Republic of Kazakhstan are conducting targeted work in accordance with the instructions of the Head of State to support domestic entrepreneurs and improve the business climate. This is reflected in a significant improvement in Kazakhstan's position in international ratings. In the Doing Business rating (Doing Business - 2017), Kazakhstan ranks 35th out of 190 countries, with a final score of 75.09 out of 100. In the previous Doing Business rating (Doing Business - 2016), the value was 70.45, and with this value Kazakhstan was located on the 51st place.

In the Concept of entering Kazakhstan among the 30 most developed countries of the world, President of the Republic of Kazakhstan, N.A. Nazarbayev, has identified long-term priorities, and one of them is the development of small and medium-sized businesses. The development of this sector of the economy has become the main instrument of industrial and social modernization of Kazakhstan in the twenty-first century. The greater the share of small and medium businesses in our economy, the more stable will be the development of Kazakhstan (Nazarbayev 2014).

One of the key programs is the "Business Road Map - 2020", which the Cabinet of Ministers is implementing in order to post-crisis support for small and medium-sized businesses. Within its framework, the state subsidizes loans issued for new projects, as well as previously issued loans to SMEs. It should be noted that the Government of the Republic of Kazakhstan dated August 25, 2018 approved the state program for supporting and developing business "Business Road Map – 2020".

On January 1, 2016, the practical phase of the implementation of the Nation Plan "100 concrete steps to implement 5 institutional reforms". It was initiated 59 laws came into force that create a fundamentally new legal environment for the development of the state, the economy and society.

But we would like to note the fact that the support of small and medium businesses by the state covers only a small part of the business, which puts entrepreneurs in unequal competitive conditions. A high proportion of the shadow economy may indicate an unsatisfactory business climate in the country. At the same time, growth rates of SMEs are only slightly ahead of economic growth, which may indicate a weak effectiveness of government measures to develop the private business sector, and the presence of state support only preserves low-productivity business activities.

The weak development of small and medium businesses, in our opinion, is a reflection of the systemic problems of the economy: bias towards the commodity sector, a high proportion of the state in the economy and

the prevalence of corruption, an underdeveloped market business environment, weak business activity due to regulatory burden and shadow economy, limited business access to affordable loans, low incomes. Also, not all measures of state support for SMEs are effective due to the violation of market principles. These problems, in our opinion, do not allow small and medium-sized businesses to fully realize their potential and act as a driver of the economy, as a result there are serious doubts about the attainability of the stated goals of the state to bring the share of SMEs in the economy to 35% and 50%, respectively in 2025 and 2050 years.

Solving the above problems through the State Program "Digital Kazakhstan", greater openness of the economy, growth of urbanization in combination with technological development, will contribute to an increase in incomes of the population and the development of SMEs. Business, in turn, should improve its efficiency, compete for consumer money, and not rely on state subsidies.

SMEs that establish relationships with large companies will constantly feel custody on their part, figuratively speaking, they will be under their "wing" and their business opportunities will be implemented with the greatest efficiency. Expanding their activities, in the course of development, SMEs form a kind of foundation on which higher "floors" of a functioning economy will grow, with greater production potential and significant production and sales sizes. As a result, SME enterprises will gradually occupy a priority position in the economy, and the dominant position of large enterprises will decrease accordingly. But this does not mean that large-scale production will give way to the market structure of SMEs, losing its advantages. On the contrary, its importance will increase as the backbone enterprises, representing the most important market structure, which by its development multiplies the resource potential of the country, ensuring its economic security (Zamanbekov 2015).

2. Methodology

The process of globalization, characterized by increased flows of trade, capital and knowledge, the opening and liberalization of markets, led to the fact that large enterprises are forced to resort to a global search for partners. Outsourcing and the growing involvement of SMEs in the supply chains of large multinational corporations have provided them with many business opportunities. Consequently, the role and importance of SMEs is increasing every day.

According to Blinov (2017), if the state policy is "the line, course, setting goals and objectives and activities aimed at achieving them and carried out by the given state and its bodies in the center and in the localities, in the country and abroad", then under the state policy of supporting SMEs, in our opinion, it is necessary to understand the set of goals that reflect national interests in the sphere of SMEs, strategies, tactics and objectives of public administration, management decisions and methods for their implementation, developed and implemented executive branch for SME development. Meanwhile, the goals, strategies, tactics, tasks and methods can be revised on the basis of the situation in the world and national economies.

The socio-economic policy of the Republic of Kazakhstan for 2017–2021 is aimed at further implementing the new course of development of the Republic of Kazakhstan "Strategy Kazakhstan - 2050", taking into account the implementation of the State Program "Nurly Zhol - Path to the Future", aimed at creating a single economic market through the integration of the country's macro-regions on the basis of building an effective infrastructure on the hub principle to ensure the long-term economic growth of Kazakhstan, as well as the implementation of anti-crisis measures to support individual sectors of the economy in the face of deteriorating market conditions in foreign markets, and creating a model of the economy of Kazakhstan, defined in the five institutional reforms of the Nation Plan "100 specific steps".

Asenova (2013) in his scientific articles notes that one of the key indicators of Kazakhstan's long-term development is an increase in per capita GDP to $ 60,000.5 and the achievement of a 50% share of small and medium-sized businesses in the country's GDP by 2050. According to the OECD, achieving 50% of the share of SMEs in GDP, in turn, is possible by improving other indirect indicators.

As in many other countries, small and medium businesses play an important role in the economy of Kazakhstan. The role of small and medium businesses is determined by its contribution to the country's economy, which, according to the results of 2017, amounted to about 26% of GDP, providing 37% of employment. As we have already noted, the economy in Kazakhstan in 2017 was mainly provided by the raw materials export sector, while the domestic non-resource sector is in a depressed state, which can be clearly seen from the data on the share of SMEs in GDP, which fell by 1% to 25.6 % (Table 1).

Table 1. Indicators of SMEs in the economy for the period from 2007-2017 (in %)

Year	SME in GDP	Employed from everything	SMEs
2007	11	28	58
2008	17	27	62
2009	18	29	65
2010	21	32	75
2011	17	29	73
2012	17	28	71
2013	17	30	69
2014	26	33	79
2015	25	38	179
2016	27	36	192
2017	26	37	211

Source: compiled by authors according to the data of Ministry of national economy (MNE RK)

Based on such contradictory and inconsistent data presented in Table 1, it can be assumed that the contribution of SMEs to GDP was increased due to a change in estimates and adjustments, which resulted in the redistribution of gross domestic product in favor of SMEs, but not as a result of growth in its activity. Such chaotic changes in statistics make it impossible to qualitatively assess the state of SMEs and, among other things, can have a negative impact on government policies regarding business.

Over the past ten years, the contribution of SMEs to the economy has increased dramatically twice - in 2008, the contribution of medium-sized businesses jumped from 2% of GDP immediately to 10% of GDP; in 2014, the contribution of small businesses from 6% of GDP rose sharply to 16% of GDP. As a result, half of the 26% contribution of SMEs to GDP was the result of the redistribution of GDP in favor of SMEs, as well as the result of a partial increase in small business due to the increased coverage of individual entrepreneurs and medium-sized businesses. These innovations were strongly reflected in the indicators of medium-sized businesses, whose contribution for 2015–2017 fell by half to less than 5% of GDP, while the contribution of small businesses rose to 21% of GDP. Based on such changes, the structure of SMEs has become minimally dependent on medium-sized enterprises. However, as already noted, the increase in the share of SMEs in GDP was affected by a change in the criteria for classifying enterprises by dimension, which resulted in increased accounting and coverage of small businesses that include individual entrepreneurs. The fall in commodity prices automatically affected the activities of large enterprises, whose contribution to economic growth decreased accordingly.

The situation in the economy of Kazakhstan in recent years was not the most favorable for small and medium businesses. The number of SMEs showed mixed dynamics. The service sector for SMEs is the dominant activity, providing more than 70% of the output of products and services (Table 2).

Table 2. Sectoral structure of SMEs of the Republic of Kazakhstan for 2017 (% of output)

Indicators	IE	Small	Medium
Trade	32	22	13
Other	20	25	29
Construction	3	25	17
Processing	17	10	26
Transport	6	6	7
Mining	-	9	6
Property	22	3	2

Source: compiled by authors according to the data of Ministry of national economy (MNE RK)

According to estimates by the international consulting company McKinsey & Company, the largest growth potential of Kazakhstan SMEs is concentrated in high value-added sectors, namely professional services, transportation and logistics of cargo, financial services and telecommunications. The cumulative contribution of these sectors to the increase in the share of SMEs can be at least 74%.

Table 3. Sector growth potential and their possible contribution to the growth of the share of SMEs until 2050 (%)

Indicators	SME share in GDP	Growth potential	Contribution to growth in the share of SMEs
Professional Services	4	34	74
Transport and logistic	13	33	
Financial sector	7	39	
Telecommunications	18	20	
construction	37	45	8
Agriculture	36	41	6
Treatment	15	29	4
MMC	2	28	3
Oil and gas	2	28	3
Energy	13	8	1

Source: compiled by authors according to the data of Ministry of national economy (MNE RK)

The structure of output of SMEs by industry, depending on the size of the business, has significant differences. For individual entrepreneurs, the main areas of activity are trade (32%) and intermediary operations with real estate (22%), the share of the manufacturing industry is quite high - 17%. For small enterprises, important sectors are construction (25%), trade (22%) and industry (21%). For medium-sized enterprises, the main sectors are industry (34%), construction (17%), trade (13%).

The number of operating small enterprises since 2014 shows steady growth, in 2017 their number increased by 19 thousand to 209 thousand compared with 14 thousand, growth in 2016, see Table 4. (Data of the MNE for 2007-2017)

Table 4. The number of SMEs for the period from 2007-2017

Year	Medium	Small	Farms	Individual enterprises
2007	2	56	169	416
2008	4	58	169	476
2009	4	61	170	428
2010	9	66	170	416
2011	9	64	183	590
2012	8	63	165	574
2013	8	61	159	660
2014	5	75	153	695
2015	3	176	181	883
2016	3	190	181	813
2017	3	209	188	747

Source: compiled by authors according to the data of Ministry of national economy (MNE RK)

At the same time, in the same years, the economy showed very weak growth rates, and if we retreat for a longer period, it is clear that the number of small enterprises has been constantly decreasing since 2010.

Thus, we can conclude that in recent year's business has experienced serious difficulties associated with weak domestic demand, as well as its own low competitiveness. Compared to other countries, the number of small and medium-sized enterprises per 1,000 inhabitants in Kazakhstan is 12 (excluding IE) and close to their number in Russia, but seriously inferior to the indicators of developing and developed countries, where the level is 30 or higher (Nurmaganbetov 2018).

As notes Salyakhova (2016) in its article, small businesses dominate among enterprises in the EU; enterprises with up to 10 employees account for about 80% -97% of all enterprises, in Kazakhstan the situation is similar. Here it can be noted that small enterprises in Kazakhstan, in principle, belong to small businesses, for example, the average number of employees in small enterprises is 6 (number of employees in the number of enterprises), for medium enterprises the average number of employees is close to 140.

The SME sector currently provides employment to quite a significant part of the population. In 2015-2017, the number of employed is kept at the level of 3.1 million, which is 37% of the total number of employed population (Table 5).

Table 5. Indicators employed in SME RK for the period from 2007 till 2017

Year	Employed in SMEs, in mln.	Employed in SMEs in total employment, in %
2007	2,1	28
2008	2,2	27
2009	2,3	29
2010	2,6	32
2011	2,0	29,5
2012	2,4	28
2013	2,6	30
2014	2,8	33
2015	3,2	39
2016	3,1	36
2017	3,1	37

Source: compiled by authors according to the data of Ministry of national economy (MNE RK)

Of the total number of employed, approximately 40% are individual entrepreneurs and small enterprises, 11% are medium-sized enterprises and 9% are peasant farms. Those actually employed in individual entrepreneurs are probably significantly less, for example, people who rent apartments use private entrepreneurs to register their tax status, and their number is very significant (Table 6).

Table 6. Number of employed by size of business for the period from 2007 till 2017

Year	Medium	Small	Farms	IE
2007	259	586	543	733
2008	398	465	462	829
2009	405	551	466	874
2010	748	746	426	711
2011	689	539	427	772
2012	675	501	376	831
2013	712	528	347	991
2014	517	849	309	1136
2015	352	1185	287	1360
2016	353	1161	276	1288
2017	360	1257	286	1241

Source: compiled by authors according to the data of Ministry of national economy (MNE RK)

According to the data provided by the Statistics Committee of the Ministry of National Economy, the increase in the number of individual entrepreneurs was also accompanied by an increase in the number of people employed in them. Employment in small and medium businesses is unsustainable, but it is increasing; the share of people employed in SMEs has been growing by an average of 4% per year since 2007, with total employment growing by only 1%, indicating an increase in the role of SMEs as a source of employment.

In terms of industry, employment in SME is dominated by trade with a share of more than 20% of employees, construction 16%, industry 16%. Employment in individual entrepreneurs is half represented by the sphere of trade, for example, more than a third of retail turnover is formed by individual entrepreneurs.

For a more complete picture of the impact of small and medium-sized businesses on the economy of the Republic of Kazakhstan, we will build a regression model describing the impact of the number of active SMEs and the volume of loans issued by banks to SMEs on the SME output. The necessary data are presented in the following Table 7.

Table 7. Data of the regression model

Year	Output by SMEs, in mln. tenge	Credits issued by banks to SMEs, in mln. tenge	Spread (basis point) (Student copulas)
2009	5.366.936	1.708.189	663.374
2010	7.275.779	1.384.956	661.598
2011	7.603.804	1.341.385	846.111
2012	8.255.123	1.412.005	809.750
2013	9.165.412	1.283.440	888.233
2014	15.568.081	1.788.059	926.844
2015	15.699.405	2.060.455	1.242.579

Year	Output by SMEs, in mln. tenge	Credits issued by banks to SMEs, in mln. tenge	Spread (basis point) (Student copulas)
2016	19.609.010	3.002.974	1.186.629
2017	23.241.125	2.788.589	1.145.994

Source: compiled by authors according to the data of Ministry of national economy (MNE RK)

3. Study case

We introduce the notation: y – the volume of output by SMEs (million tenge), x_1 – volume of loans issued by banks to SMEs (mln. tenge), x_2 – the number of active SMEs (units). Construct a two-factor regression model of the following form:

$$y = a + b_1 x_1 + b_2 x_2,$$ (1)

We will estimate the parameters of the two-factor regression equation using the Regression analysis tool (Excel Data Analysis). As a result of data approximation, we obtain a regression analysis protocol, which is presented below.

Table 1 - Regression analysis protocol

Regression statistics				
Multiple R	0,934505395			
R- square	0,873300333			
Normalized R-squared	0,831067111			
Standard error	2.586.398,64			
Observations	9			
Analysis of variance				
	df	SS	MS	F
Regression	2	2,7665E+14	1,38325E+14	20,6780418
Remainder	6	4,01367E+13	6,68946E+12	
Total	8	3,16787E+14		
	Coefficients	Standard error	t-statistics	P- Value
Y- intersection	-9.859.846,173	4.045.054,45	-2,437506415	0,05064301
Variable X_1	5,212121895	2,215130254	2,352964068	0,05682776
Variable X_1	13,51262955	6,522034592	2,071842667	0,08367382

As a result, we obtain the following equation of multiple linear regression:

y = - 9859846,173 + 5,212x_1 + 13,513x_2

The coefficient of multiple correlation is R = 0,93 which indicates a close relationship between the resultant trait and two factor signs at the same time. The coefficient of determination is R^2 = 0,87 so 87% the variation of the dependent variable is explained by the resulting model. Check the statistical significance and reliability of the resulting regression equation.

From the data of the regression analysis protocol, we find that the observed value of the Fisher criterion is $F_{observ.}$ = 20,68. Critical Fisher criterion values at significance level α = 0,05 and the number of degrees of freedom k_1 = m = 2, k_2 = n – m - 1 = 6 *where n* – number of observations, *m* – number of factors, equally F_{crit}(0,05;2;6)=5,14. Due the fact that F_{observ} > F_{crit} (20,68 > 5,14) then we can conclude about the statistical significance and reliability of the resulting regression equation.

We give an economic interpretation of the obtained coefficients of the multiple linear regression equation:
- with an increase in the volume of loans issued by banks to SMEs by 1 million tenge, the volume of output by SMEs will increase by 5.212 million tenge;
- with an increase in the number of active SMEs by 1 unit, the volume of output by SMEs will increase by 13.513 million tenge.

Define the aggregate average elasticity coefficients:

$$Э_{yx_1} = b_1 \cdot \frac{\overline{x_1}}{\overline{y}} = 5,212 \cdot \frac{1863339,11}{12420519,44} = 0,79\%,$$

$$Э_{yx_2} = b_2 \cdot \frac{\overline{x_2}}{\overline{y}} = 13,513 \cdot \frac{930123,56}{12420519,44} = 1,01\%.$$

After analyzing these elasticities, we obtain that:
- with an increase in the volume of loans issued by banks to SMEs by 1% of their average level, the volume of output by SMEs will increase by 0.79% of their average level with a constant number of active SMEs;
- with an increase in the number of active SMEs by 1% of their average level, the volume of output by SMEs will increase by 1.01% of their average level, with a constant amount of lending by banks to SMEs.

Now we will determine which of the two factors considered has the greatest influence on the change in the volume of output by SMEs, for this we calculate the pairwise correlation coefficients using the Correlation analysis tool (Excel data analysis). The result is:

Table 2. Pairwise correlation coefficients

	y	x1	x2
Y	1		
x1	0,763160	1	
x2	0,884679	0,869707	1

Thus, we can conclude that the volume of output by SMEs is most influenced by a factor - the number of active SMEs than by a factor - the volume of loans to banks by SMEs.

One of the ways to increase the effectiveness of financial support for SMEs is the creation and development of a financial integration system in Kazakhstan, that is, increasing the interaction, in our case, of a SME entity with credit organizations (STB and MFI). Such integration will prevent credit squeeze in the context of often occurring economic crises in the modern economy by eliminating information asymmetry and reducing transaction costs. Including due to the further improvement of work of credit bureaus due to credit scoring. It is necessary to organize the collection of information from retailers, trade lenders or utilities.

Conclusion

At the meeting of the leaders of NPP "Atameken", N.A. Nazarbayev underlines that it's time for business to respond to the care, attention and support shown by the state. It is necessary to work on the constant involvement of citizens in the sphere of entrepreneurship, increasing its share in the economy.

Small and medium businesses are given great importance in the development of the economy of Kazakhstan. The Strategy "Kazakhstan-2050" emphasized the paramount importance of comprehensive support for entrepreneurship, due to which the contribution of SMEs to the economy should grow by 2030. "For this, it is necessary to improve the mechanisms of support for domestic producers and take all necessary measures to protect and promote their interests. The task of the present day is to create the necessary conditions and prerequisites for the transition of small enterprises and individual entrepreneurs to the category of medium-sized ones". It has been proven that an effective state support system increases the potential of SMEs in the direction of contributing to employment, GDP, creating innovations, ensuring sustainable development and inclusive growth.

In the modern world, the trend of digitalization of business and government relations is expanding. The state could assume the costs of creating a platform for comprehensive coverage of business operations using the blockchain technology, where the profile, history and, accordingly, rating (confirmed by specific transactions) for all business participants would be available. Within the framework of this accounting system, it would also be possible to implement the automatic generation of typical financial statements, which would reduce the costs of SMEs. This platform could provide fiscal incentives for small businesses to get out of the shadow through access to a potentially larger market and a streamlined transaction system. For example, at present, a huge number of services and goods are found through advertisements in the media, but there is no information about the reliability and quality of goods and services, as well as their providers, while most of these operations are in the shadows and are not regulated at all.

Since the development of SMEs is focused on the domestic market, it strongly depends on the income of the population. Accordingly, it is important to find sources of increasing the income of the population through the growth of quality employment, stimulation of promising urban agglomerations in combination with the development of the industry. Business, in turn, must compete for the money of consumers, and not for state subsidies. Small and medium-sized businesses in Kazakhstan primarily work for the local market and, accordingly, depend heavily on domestic demand, which is currently limited, and external conditions, primarily raw materials prices, are crucial for the economy. The reduction of the shadow economy and the new model of economic growth in the event of its successful implementation will significantly contribute to the increase in the share of SMEs in the economy.

Despite the government's attention to small and medium-sized businesses, practice shows that priority remains with large businesses, which can be seen at the level of large projects: various facilities for holding international events, financing major commodity projects and state-owned companies with borrowing at the state level, infrastructure facilities, financial support, where benefits are primarily received by large businesses.

State support of SMEs by the state should be equally accessible to all entrepreneurs, for example:

- reduction of real interest rates for all categories of business to a competitive level with neighboring countries through measures to reduce inflation and deepen the financial market;
- various distribution channels of resource support due to the distortion of the market environment, opacity, potential susceptibility to corruption, it is desirable to exclude;
- instead, it is necessary to focus on measures of non-financial support, providing the necessary infrastructure, deepening quality business education, minimizing regulatory influence, etc., that is, working in areas that ultimately benefit the whole society, and not individual entrepreneurs.

References

[1] Asenova, A.E., Tulepbekova, A.A. 2013. On the prospects for the development of small and medium-sized businesses in Kazakhstan, *Journal Problems of Modern Economy*, 4 (48): 329-334.

[2] Blinov A.O. 2017. *Small Business: Organizational and Legal Framework of Activity*. Moscow. 336.

[3] Dogil, L.F., Semenov, B.D. 2013. *Entrepreneurship and Small Business*. Minsk. High School. 264.

[4] Nurmaganbetov, A.S. 2018. Subjects and Tools of State Support for Small and Medium-Sized Businesses: An Institutional Approach. Astana. 201.

[5] Sedelev, V. 2011. *Entrepreneurship in the Republic of Kazakhstan*. Study Guide. Almaty. 158.

[6] Salyakhova E.K. 2016. Malyy biznes v zarubezhnoy praktike [Small business in foreign practice]. *NovaInfo.Ru,* 4(57): 199-207, in Russian.

[7] Tulesheva, G.B., Muratbek, K.A. 2018. Modern problems and prospects for the development of small business in Kazakhstan, *Symbol of Science*, 6(35): 68-75.

[8] Utebaeva, A.B. 2014. Evaluation of the development of small and medium-sized businesses in Kazakhstan. *Bulletin of the Kazakh National University, Economic Series*, 5(105): 65-72.

[9] Voevutko, A. Yu. 2015. State support for small and medium-sized businesses in Kazakhstan, *Finance of Kazakhstan*, 5 (32): 37-40.

[10] Zamanbekov, S. 2015. Industrial-innovative policy of the Republic of Kazakhstan as a basis for sustainable development and modernization of mechanical engineering, *Innovation and Investment*, 65.

*** World Bank. 2017. Doing Business 2017: Equal Opportunity for All.

*** Message of the President of the Republic of Kazakhstan N. Nazarbayev to the people of Kazakhstan. 2014. Kazakhstan's Way-2050: Common Goal, Common Interests, Common Future.

*** Program "Business Road Map 2020". 2017. Decree of the Government of the Republic of Kazakhstan of 2010 (with changes and additions as of December 29, 2017 No. 940)

*** State program of support and development of business "Business Road Map – 2020". 2018. Approved by the Government of the Republic of Kazakhstan dated August 25, 2018

*** Program of the President of the Republic of Kazakhstan. 2015. Plan of the Nation - 100 Concrete Steps.

*** The state program Digital Kazakhstan. 2017. Decree of the Government of the Republic of Kazakhstan No. 827 of 12.12.2017.

*** Strategic Plan of the Ministry of Finance of the Republic of Kazakhstan for 2017-2021, approved by order of the Minister of Finance of the Republic of Kazakhstan.

*** State Program Nurly Zhol for 2015-2019. 2015. Approved by the Decree of the President of the Republic of Kazakhstan dated April 6, 2015 No. 1030

*** Data of the MNE for 2007-2017.

*** Portrait of a businessman. 2017. Astana. Electronic resource: Review of the IBU of Kazakhstan. Available at: www.atameken.kz

Impact of Marketing of Deposit Money Bank Services on Customers' Patronage and Loyalty. Empirical Study of Five Deposit Money Banks in Nigeria

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Abstract

Marketing helps to attract its target customers thereby creating a relationship where exchange can be made possible. However, communication gap in deposit money banks constitute a major problem in the banking system and there is a need to bridge such gap as it affects customer's loyalty and patronage significantly.

The objective of this study is to examine the effects of marketing of deposit money bank services on customer patronage and loyalty. This study examined five (5) deposit money banks which were chosen at random. Guarantee Trust Bank (GTB), United Bank for Africa (UBA), Eco Bank Plc, First Bank Plc and Skye Bank Plc. Primary data was used in the course of the study through the use of questionnaires in ensuring that the necessary data were obtained for the analysis. A total number of one hundred and fifteen (115) copies of the questionnaire were administered to the customers of the selected banks. The copies of the returned questionnaire were a hundred and thirteen (113) which were coded in the Statistical Package for social science (SPSS 23). A linear regression model was adopted in order to measure the effect of the independent variables on the dependent variables. The study found that marketing of deposit money bank has a significant effect on customer patronage and loyalty.

The study concludes that marketing is highly essential to the survival of any bank thereby ensuring communication is effective between the bank and their customers. The study recommends that banks should ensure that effective marketing strategies such as; creating awareness of the products and services are developed by adopting marketing principles that will enable them to acquire more customers and have a long-term relationship with the existing ones.

Keywords: bank management; patronage; loyalty; working capital management; financial services

JEL Classification: M31; G21

Introduction

Marketing plays a very important role in the Nigerian banking system and as such the need for marketing cannot be overemphasized. According to Kotler (2000) and Giese and Cote (2000) "marketing is human activities that are directed at satisfying needs and wants through an exchange process". The main aim of marketing is to identify the wants and needs of customers and ensure that they are adequately met through exchange processes. Isibor, Ojo, and Ikpefan (2017) posited that growth is a vital and necessary condition for development in an organization. Thus,

marketing is very crucial to the growth of a bank and it is important to be adopted by banks in order to maintain its market share and profitability in the long run. This will put a bank at the edge of competition in the banking industry. Adebowale (2015), agrees with the fact that a major cause of increased competition and changes in the marketplace has been the need for banks to become more market-oriented and to engage in marketing activities. Marketing is aimed at meeting the desires of not just the customers but also the banks since the product has to be first of all marketed before it can be patronized by the customers which result in high returns and expansion to the bank.

To achieve an effective marketing system which results in an operational efficiency of the bank, the desire and the needs of the bank's target group has to be first of all determined before the bank's service can be built and rendered. This is why banks employs agents (marketers) to perform both retail and postal functions to process client's transactions rather than the branch tellers (Achugamonu, Taiwo, Ikpefan, Olurinola and Emena 2016).

This will create a focus for the bank on what is needed by the society so as to prevent waste of time, money, resources, investments and all other necessary inputs. According to Lawal (2014), marketing theories and practice are justified in the belief that customers use a product or service because they have a need, or because it provides a perceived benefit. Without the need for the product, it is as good as nothing to the customer's use and benefits. A bank must, first of all, identify the problems in the society, the needs and wants of the people and how best to meet this needs better than its competitors. The marketing department of a bank firm has to be well equipped with various avenues of attracting customers. For instance, a bank cannot survive without its customers in this competitive age and to achieve this, the bank's marketing department must strive to apply the necessary marketing strategies. Effective marketing can be achieved by creating an awareness of the bank's products and services and making them available to suit the needs of the customers thereby enhancing patronage. This will result in the satisfaction of the bank's customers which enables them to be loyal to the bank. Customers are in search of new and more improved products, and companies are forced to produce and supply new products that meet the taste, needs and expectations of the customers (Behzad, Ahmad, Seyed, and Majid 2013).

Marketing is the backbone of any organization because marketing helps to attract its target customers and thereby creating a relationship where exchange can be made possible. For banks, marketing creates a connection or a link between the bank's product and the customer and this means that a bank's product can only be marketed based on the perceived value that will benefit the customer. Customer oriented approach is widely focused on in marketing rather than on sales-oriented approach because it profits the bank in the long run, by building up customer relationship and loyalty. Sales oriented approach is dangerous to the health of a bank. Trying to persuade a market segment to buy something they do not want is highly costly and sometimes unsuccessful, (Lawal 2014). The bank has a major role in determining the level at which marketing plans and activities are implemented to achieve the necessary aim the firm wishes. The bank's ability to establish an organized marketing system ensures a highly effective implementation of marketing strategy to suit the primary objective of the firm, which is to make profit. The bank has to develop the capacity to produce the goods and services that will meet the needs of the customer and that will be of a great relevance to their daily activities. The bank also should have the ability to adapt to changing needs and wants of the customer. Failure of banks to do so will lead to the loss of potential and existing customers because other banks will come up with newer and better strategies, methods and ways of meeting the customer's needs and wants. We are in a competitive age and the state of the economy requires banks to be on top of their game in order to gain a competitive advantage over all other banks in order to increase their market share.

Banks should also consider the changes in the external environment such as technological environment, demographic environment, socio-cultural environment, legal environment, and economic environment so as to be updated regularly on the current trends in the banking industry. Yisa (1998) suggested that it was necessary for banks to be continuously informed of changes in its external environment and the opportunities and threats caused by such changes. Banks fold up these days because of their lack of sensitivity to changing environmental factors in addition to their lack of commitment to rendering quality services that meet the customers' needs. For example, the recapitalization of bank's capital base in 2005 had caused banks like Afribank, Spring Bank, and Bank PHB to be taken over by the Central Bank of Nigeria in 2011 because of their lack of sensitivity to changing environmental factors (legal factor) and poor performance. This has necessitated other banks to take the marketing of their products more seriously. Although banks render a wide range of services that may be popular and well known to majority such as the creation of accounts, deposits of money, withdrawal of money, savings etc., there are still some product developments that need to be considered in the banking sector. Marketing enables innovation and also inventions to take place through its various avenues. The marketing arm of the bank has a lot to offer to the banking sector. Marketing is the most useful and important tool for the banking sector and it aims at satisfying both

customers and bankers (Ikpefan 2013). It makes life easier for both the customer and the bank and also enables efficient delivery.

The problem in marketing most bank's product is the technicality and challenges that are associated with the characteristics of a service. Service is an intangible element and therefore needs to be aggressively marketed before it can be patronized. It is different from a manufactured product that is visible and that can be stored as a stock. Before 1989, armed chair banking was adopted, where banks were not innovative and the competition was low. Customer's patronage and loyalty were at a minimum level due to the unconducive atmosphere of the bank then, unbearable long queue to rude responses by bank's staff. The introduction of the structural adjustment programme (SAP) encouraged the growth of new deposit money banks which led to competition among Nigerian banks causing the adoption of various marketing principles. Due to the emergence of the new generation banking and other factors such as advancing technology, globalization, and recapitalization, banks were forced to imbibe the principle of competitive advantage in order to have a higher market share over other banks and maintain sustainability in the long run. Marketing is one of the prominent tools adopted by banks to gain a competitive edge. However, marketing has issues that are yet to be resolved in the banking sector. New products are being developed regularly but the lifespan of these products and services are becoming shorter due to the replacement of the products with newer and more upgraded version by competitors. The problem is that marketing has not been able to effectively communicate to the customers regarding the improvements of various existing products and the existence of new emerging services offered in the bank. Marketing has not been successfully used to ensure patronage of products with a short lifespan in order to generate bank's perceived revenue. Banks make little or no profits on their new products because relevant marketing tools were not applied in time before the products begin to decline. Although marketing enables innovation and invention. But, these developments are yet to be effectively communicated to the customers through the right channel. The marketing departments has not created a platform for communicating with the customers, such that customers are able to ask questions, offer advice and recommendation relating to the bank's services. Communication gap exists in the banks because it is assumed that customers are aware of the range of services offered by banks that suit them. But in reality, it is not so. Communication gap affects customer's loyalty and patronage and this problem is rampant among banks. Adebowale (2015) agrees that staffs are inexperienced at having an effective interaction which leaves customers dissatisfied.

The marketing department has not been able to effectively enlighten their customers. For instance, most customers raise complaints that they were unaware of the charges that accrue from certain services rendered to them. This complaint arises due to lack of knowledge or unawareness of some services rendered in the bank and the necessary conditions or cost attached to the offer of those services. There is also a delay in response to the complaint by customers. Without acknowledging the complaints of existing customers, there will be no room for improvement which leads to the loss of existing customers. Also, there won't be room for new and existing product development. Not only does the marketing department need to provide relevant information to the customers, they also need to disclose sufficient information to the customer. This is essential in order to enable the customers to decide whether or not a given or set of services is right for them. In doing so, customers will not only patronize such banks but will retain his or her loyalty to the bank. But this is not the case in the Nigerian banking sector where some banks are secretive when it comes to providing full disclosure of information, they tend to protect their public image, but sometimes this is to the detriment of the public. Due to deposit money banks habit of restraining information, customers' loyalty reduces so also their patronage. This constitutes a major problem to deposit money bank. Therefore, disclosure has to be made in form of public information that the public can have access to in order to ascertain whether or not the bank is operating in the public interest. The disclosure of information boosts public confidence in the banking sector which improves their banking habits. One of the main aims of marketing is to improve the working capital position of their banks in other to have sufficient credit and funds to run the affairs of the business (Osuma, Ikpefan, Osabohien, Ndigwe and Nkwodimmah 2018).

As earlier mentioned, some deposit money banks fail due to their unresponsiveness to changes in the external environment, banks face the challenge of losing to other competing firms. This constitutes a major problem to the banking industry especially in relation to the retention of customers and patronage by the customers. Marketing has not been properly used to detect and adapt to changes presented to the banks by the external factors which constitute threats and opportunities in the dynamic environment. This study aims to look at the positive effect marketing has on the deposits or customer base of the deposit money banks in relations to customer's patronage and loyalty. The above is section one of this paper. Section two dwells on literature review, conceptual framework, empirical review and gap in literature. Section three discusses the methodology while section four dwells on data presentation and analysis. This paper ends with findings, conclusion and recommendations.

1. Literature review

Marketing is a vital tool of the banking sector due to the fact that it provides a means of satisfying customers' benefit and not only does it benefit the customer but also the banker. It satisfies customer benefit by making provision for their innate wants and desires and also the banker by assisting them to identify and segment target customer. Marketing aims at serving and satisfying human needs and wants thereby making it a strategic factor in the economic structure of any society. Marketing is, therefore, a catalyst for the bank's performance and competitiveness in the new era of the banking industry. It is also agreed by Abiodun, George, and Afolabi (2014) that due to severe competition in the banking industry and changes in trends, banks are forced to adopt marketing strategies as a tool for success.

Marketing to the banking sector is also an essential tool when it comes to allocating their resources to the right segment of the market. Marketing aims to identify the basis of customers' unique needs, satisfying those needs, retaining customers and locating additional customers. According to Cherinet (2015), Customers are the main aim of marketing activities all around the world and success in terms of high profitability is impossible without the customers. This means that all the activities of marketing revolve around the ability to attract customers and retain them in order to aid the achievement of the bank's objective which is to increase deposit base and to make a profit. Marketing is emphasized to include activities that deal with being close to the customers, stressing on the satisfaction of customer and the building of customer relationship, understanding the customer value and the enhancement of product offering to better suit the needs of customers. Deposit Money Banks need to engage rigorously in strategic marketing if they want to succeed in achieving a competitive advantage. Orville and John (2014), agrees with the fact that the principal focus of strategic marketing is to effectively allocate and coordinate marketing resources and activities to accomplish the firm's objectives within a specific market. Deposit Money Banks need to identify customers' needs and also ensure that they are involved in scanning the environment through marketing research. There is also the need for the bank officials to identify clear and effective means that would engender the satisfaction of customers'. Bank marketing does not only include service selling of the bank but also is the function which gets personality and image of the bank on its customers' mind. The banking sector has changed phenomenally. Activities in the bank have transformed from the manual ways of providing services to electronic banking. This also connotes that the era of arm chair banking is over, banks are now involved in aggressive marketing to improve their market share and mobilize deposits (Ikpefan, Akpan, Osuma, Evbuomwan and Ndigwe 2018).

1.1. Conceptual framework

The concept of financial service marketing is the general idea and meaning of bank service marketing and customer patronage and loyalty. Bank service marketing is defined by Deryk, W. cited by Ikpefan (2013), as "identifying the most profitable market now and in the future, accessing present, and future needs of the customers, setting business development goals and marketing plans to meet them and managing the various services and promoting them to achieve plans".

What is bank service marketing?

Bank service marketing has been viewed in numerous ways by various researchers such as Ikpefan (2013), Lawal (2014), Adebowale (2015) and more recently, Mahtab and Abdullah (2016). There has been no standard definition of marketing as various researchers and writers have given their different opinion on what marketing is about. According to American Marketing Association (1985), Marketing is described as a process of planning and executing the conception, pricing, promotion, and the distribution of ideas, goods, and services in order to create an exchange that satisfies individual and organizational objectives. Wilson (2002) defined marketing as the identification of consumer's needs which consists of what goods and services are bought, why they are bought, by whom they are bought and how they are bought. By answering this question, it becomes clearer to banks on what customers are expecting and how they want their needs met. Wilson's definition is more of questions asked when undertaking marketing research in order to identify these needs and to meet them effectively through the results obtained from the market research. Marketing has also been defined by Bambgoye (1984) as the part of a management activity that aims to direct the flow of banking services to selected target customers in order to generate earnings.

The aim of marketing is to serve and satisfy human needs and wants to make it a strategic factor in the economic structure of any society, including a nation (Ogunsanya 2003) cited in (Ikpefan 2013). This implies that marketing is crucial in identifying the essential needs and wants of customers. Marketing research has to be done in order to identify the needs and making marketing plans to meet them in strategic ways which makes it an

important factor or force in meeting the various needs of the society and nation at large. Marketing seeks to attain a higher level of success by gaining a competitive edge over all other competitors in its overall activities in the banking industry. Firms try to optimize their earnings by identifying and meeting the needs of the market thereby applying the principles of marketing in attaining competitive advantage and increased market share.

Marketing is defined by Onyiriuba (2008) as internal and external, human and corporate, goal-directed activities in which the business engages with the aim of satisfying needs and wants of the customer. It is a business practice used as a corporate survival strategy of deploying human and material resources to identifying and satisfying the unfulfilled market needs which will yield returns to the business. When marketing is central to an organization, customer needs are emphasized and this is used as a means of surviving competition and increasing market shares and earnings in the long run. Marketing induces high switching cost to customers because since the firm is able to identify and meet their needs effectively, it becomes harder for the customers to leave making switching cost high. Customers seek a high level of satisfaction from deposit money banks and this requires a high level of inputs such as human and material resources to best meet customers' needs. Therefore, the marketing department must possess the unique skill to excel in their dealings.

According to Kotler (2001), the marketing department is responsible for the management of the following demand which includes; negative demand, no demand, latent demand that is a strong need that cannot be satisfied with existing products, declining demand due to change in taste and preference, irregular demand that is demand that varies by season, full demand and overfull demand. An effective and efficient marketing department assume a lot of responsibilities that partake in the acquisition of customers, so they concentrate on the various demands that customers are interested in satisfying. They deal with different needs of the customer and ensure that these varying needs are adequately met in order to retain their existing customers and attract new ones. Marketing helps to suppress negative demand by replacing the unwanted service with a new and upgraded one that would best meet the customer's needs. It arouses new demand by providing varieties of services that the customers can choose from.

According to Reekie (1972), marketing is the part of management activity that directs the flow of banking services to selected customers in a profitable manner. Marketing in any organization fosters banks activities and is one of the main mechanism for achieving profitability in the industry. Banks play a major role in the provision of financial services and are key participants in the national payment system. As such, banks now need to operate in situations of keen competition in their financial service activities, whether it may be canvassing of deposits, or extending their credit line or in selling ancillary services. With the liberalization of the banking sector and entry of more players, the banks need to become market-oriented with new and innovative schemes, at competitive prices available at the place the customer needs them; delivered with efficiency and quality of service.

The concept of consumer's patronage and loyalty

The style of providing financial services especially in the banking sector has been uniquely and previously described as "armchair". The description of a situation that negates the importance of marketing content and application for an improved level of customer satisfaction, customer loyalty, and brand equity was also negated (Okigbo 2001). The major indices of marketing performance as described by Afolabi (2008) includes customer satisfaction, loyalty and brand equity. Satisfaction of customer is what ensures continual patronage of the deposit money bank's offering. Banks need to be aware that the creation of value in their offerings is a major catalyst for continual patronage. Although bank practices in Nigeria have been seen to be effective according to the findings by Sani and Animashaun (2015), banks have been advised to continually improve on their marketing strategies in order to promote long-term patronage with the bank. Deposit money banks should also develop and maintain a long-term relationship with their customers because the nature of Nigerian business is mostly built on connections and contact with people so as to get their loyalty in turn. Customer loyalty is defined by the desire of customers to continue a relationship with the company. Loyalty is classified as repeat patronage by customers (Reibstein 2002) but the motive that inspires such repeat patronage is not revealed which makes a major difference between the two concepts, loyalty, and patronage. Continuous patronage is based on the perceived value that the customer continually receives in their dealing with the bank but in loyalty, the motive for continuous dealings with the bank is not unveiled. The behavior or motives could be based on habits, third person influence or random chances. Loyalty is a situation of lack of switching to other banks even with the absence of switching costs. Loyalty is the intention of repurchasing products and services and is deeply held by commitment. Such commitment has made the customer remain the bank's client without the intention of patronizing other deposit money banks. Customer loyalty is seen as a major factor in a company's success (Khan 2013). Loyalty is the commitment to do business with a particular organization which reflect in repeat purchase of goods and services. Loyalty can lead to recommending

bank's services to friends and associations. It is the demonstration of faithfulness despite occasional errors or indifferent service rendering.

According to Bagdoniene and Jakstaite (2007), customer loyalty is the highest valuable result of marketing efforts, this makes the development of customer loyalty as an important focus on marketing strategy. Building customer loyalty has become an intense strategy due to increased competition and globalization (Cherinet 2015). Loyalty has such benefits as lowering the price sensitivity of customers, reduced marketing expenditure on attracting new customers and increased profitability. If customers are able to pass on favorable word of mouth comments about the bank and its products, it is said that customer loyalty is attained. Customer patronage and loyalty go hand in hand, the difference being the level of commitment which has been devoted to the bank through loyalty. Customers' patronage is merely based on the perceived value from the bank's offering, excellent services, efficient delivery of their products and services and the responsiveness of their banks to changes in their needs and wants. According to Uppal (2010), the task of every bank is not only to create and win more customers but also to retain them in the business through consistency in the provision of an effective programme of customer-focused services. Retained customers in business are the satisfied and loyal ones with relative lifetime value that helps the business to maintain its competitive advantage which is relative to enhanced equity (Kotler 2004).

1.2. Empirical framework

Marketing has greatly impacted the Nigerian banking industry both locally and internationally in dealing with competition thus creating an awareness of the bank's services offered to the market. Marketing also improves the public image of banks. The study conducted by Ikpefan (2014) shows that marketing can either be a catalyst if effectively used or a lag if ineffectively used. He also stated that banks should build a loyal customer base, deal with competition from other banks in an effective and efficient manner, and ensure that products and services meet the needs of customers with an efficient channel of sales distribution. The study looked at the relationship between the marketing of banks product and the satisfaction of customers. It was concluded that marketing of banks products and services affects the efficiency of a banking system, and satisfaction of customers.

Adebowale (2015) found out that the need for quality services has made customers switch to other banks. He found out that customers are dissatisfied generally due to the inability of banks to ensure customers' focus and response are raised to give them maximum satisfaction. In his findings, he concluded that banks averagely apply marketing practices to gain a competitive advantage. The marketing practices include production concept, product concept, selling concept, marketing concept, societal marketing concept and relationship banking. The result of the findings rated the level of application of marketing practices by banks to be significantly low. He posited that banks need to be more proactive in their approach to providing qualitative services to their customers at highly affordable rates and must be available. Banks should be more strategic and should focus on client relationship, innovative product delivery system that is convenient to consumers and are most cost-efficient. He also posited that a holistic marketing which involves an aggressive marketing approach is to be advocated if customers' satisfaction is to be attained. Although, banks were applying the marketing practices, the results coming from the customers showed that the application requires overhauling and re-engineering if customer satisfaction is to be attained. The study conducted by Abiodun, George, and Afolabi (2014) shows that marketing practices in the Nigerian banking industry have recorded a low-level standard relative to global standard practice. The effects on the overall industry performance in terms of customer satisfaction and customer loyalty has been on the negative.

The study was conducted to examine the changing trends towards embracing marketing philosophy and the extent of banks' performance level in response to changing expectations of customers. Theoretical issues relating to marketing, customer philosophy, financial marketing, customer loyalty, and satisfaction, were explored to establish the key performance variables and the existing relationships amongst them. The result of the study shows that there is a significant relationship between the new trends towards marketing orientation, financial services in the banking industry and performance level. Improved marketing performance and training to enhance service delivery, customer satisfaction and customer loyalty across all banks in the Nigerian financial markets were recommended by the study. The study conducted by Okoye (2001) established that the banking industry should establish a marketing department that is good, adequate and efficient that will see to the satisfaction of customers' needs. The banks should embark on aggressive promotional activities in order that the customers are more informed regularly about the services offered by banks. This will enable the bank to be in a better position in this era of competitive banking. The study conducted by Dwivedi (2007) explained that finance functions are important but not as significant as the marketing functions. The resistance between the marketing and finance functions would be unfavorable to the smooth development and functioning of any business organization. Finance objectives like value maximization to shareholders are integral parts of any strategy adopted by the organization. But this objective

seems to have been lost amongst the flurry of marketing activities focusing on market share. Conscious efforts must be taken to avoid the missing core objective and for sales growth.

The study conducted by Dixit (2004) concludes that for successful marketing and to make it more effective, identify the customer needs by way of designing new products to suit the customers. The staff should be well equipped with the adequate knowledge to fulfill the customer's needs. We should adopt long-term strategies to convert the entire organization into a customer-oriented one. The study conducted by Mahtab and Abdullah (2016) shows that if marketing plans are improved for banking products, banks will be able to gain more clients and this will impact positively on customers' satisfaction, loyalty and the revenue trend of the bank. The study conducted by Lawal (2014) concluded that there is a positive relationship between financial marketing services and the profitability of banks in Nigeria. He also stated that Nigerian Banks appreciate the role of marketing in the achievement of the overall objective of the banks. He concluded that the practice of the marketing concept in the banks required towards customer's satisfaction will, lead to enhanced profitability. Satisfying the customers is yet to be seen in some of the banks as the essence of marketing efforts.

The study conducted by Sani and Animashaun (2015) focused on the examining the impact of marketing of financial products on the Nigerian banking system and to ascertain whether marketing of banks products enhances the success and efficiency in the Nigerian Banking system. It was concluded that the marketing of the bank's products has significantly improved the efficiency of deposit in banks and has enhanced customer satisfaction. The study recommended that all the units of the banks should be involved in the marketing of financial products and they should continue to treat their customer with high esteem. The study postulated that there has been substantial levels of effectiveness of marketing practices in Nigerian Banks and improved efficiency and customer satisfaction. But banks should continue to improve on their marketing strategies and bank management should introduce improved and consistent marketing principles that will enhance their profit objectives.

1.3. Gaps in literature

The study of marketing of deposit money bank services has been researched by scholars locally and internationally. Most studies have focused on banks performance financially in terms of customers' satisfaction without focusing on continuous patronage and loyalty of the clients. Most study focus on how marketing can be used to accelerate deposit money bank performance in terms of its financial position without focusing on its effect on bank performance in terms of customer patronage and loyalty. Performance in the banking sector has been based on the accomplishment of the company's financial targets and profit maximization, rather than on customer-based expectation such as value creation to encourage patronage and loyalty. In an attempt to fill this gap, this study intends to view the impact of marketing in deposit money bank directly on the customer patronage and loyalty and to expand on the already researched study in this area.

2. Methodology

Restatement of research hypotheses

To attain the objectives specified in this study, the following hypotheses were formulated:

- Hypothesis one:

H_0: Marketing of deposit money bank services has not impacted customer's patronage and loyalty;

H_1: Marketing of deposit money bank services has impacted customer's patronage and loyalty.

- Hypothesis two:

H_0: Marketing of deposit money bank services has not improved customer's loyalty and patronage over time through effective communication system and the free flow of information;

H_1: Marketing of deposit money bank services has improved customer's loyalty and patronage over time through effective communication system and the free flow of information.

- Hypothesis three:

H_0: Marketing of deposit money bank's services cannot be enhanced to improve customer patronage and loyalty;

H_1: Marketing of deposit money bank's services can be enhanced to improve customer patronage and loyalty.

Data source

For this study, primary data was used by the researcher to make a thorough analysis of the study problem at hand. The primary data was collected through the use of questionnaire distributed to the respondents selected in the population in the course of the research. Data was generated and results were also generated by processing the data obtained. The questionnaire administered was 115; 23 questionnaires for each bank was given to the customers who currently are account holders of the banks ranging from the ages of (18-23), (24-29), (30-35), (36-41), (41 and above). A questionnaire is a sequence of questions with the main aim of assembling information from the respondent. A questionnaire is, therefore, originated from the statement of the research problem, research objectives, research questions and the stated hypotheses.

Questionnaire design and assumptions

A total of 115 questionnaires was administered and each of the five selected deposit money banks had 23 questionnaires and it comprises of 33 questions in all. The deposit money banks were randomly selected from old and new generation banks. The new generation bank in Nigeria came on board from 1989. The structure of the questionnaire was in three sections. Section A contains the bio-data of the respondents which is retained in confidentiality. Section B is based on how to achieve the objective of the study.

Test for validity and reliability of research instrument

Based on the structure of the questionnaire formed, validation was obtained from the results from the respondents which were originated from the research hypotheses. The research questions are considered valid when it measures the variables for which it was conducted to measure. Reliability is important to access the consistency of the result obtained from the questionnaire. The result from the reliability test is stated in Table 1.

Table 1. Reliability test

Reliability statistics	
Cronbach's Alpha	No. of Items
.920	33

Source: SPSS 23 Analysis, researcher's computation, 2018

In order to validate the reliability of the primary data, the Cronbach's Alpha must be higher than 0.7. According to the reliability statistic tested using SPSS on the questionnaire, the Cronbach's Alpha gives a result of 0.9 which shows that the data is highly reliable as it is above 0.7.

3. Methods of data presentation and analysis

Statistical product and service solution package (SPSS) was the statistical tool used for this analysis. Analysis of data entails formation of categories, applying these categories to raw data through coding, presentation in tabular format and obtaining statistical conclusions. Coding operations was achieved by converting the data obtained to symbols and numbers that may be tabulated and counted. The method of analysis used was the linear regression. It was used to test the significance of the response by the respondents of the deposit money banks stated.

Overview of response rate

Customers of five different banks (GTB, UBA, Eco Bank, First Bank and Skye Bank) were sampled and copies of the questionnaire (a sample of the structured questionnaire is attached at the end of this study as Appendix 1) were administered to them to collect information relevant to the study. A total of one hundred and thirteen (113) completed questionnaire and valid responses were obtained out of the one hundred and fifteen (115), see Table 2.

Table 2. Questionnaire response rate

Questionnaire response rate Description	Number	Percentage (%)
Number of Questionnaire Sent	115	100%
Number of Questionnaire Not Returned	2	1.7391%
Number of Questionnaire Returned	113	98.2608%
Response Rate	113 out of 115	98.2608%

Source: *Field Survey, March 2018*

3.1. Data presentation and analysis

Hypothesis one

In order to test for the first hypothesis of this study, the researcher made use of linear regression. The first hypothesis is stated below:

H_0: Marketing of deposit money bank services has not impacted customer's patronage and loyalty

Table 3. Linear regression model summary

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.837[a]	.701	.698	.46777
a. Predictors: (Constant), marketing of deposit money bank service				

Source: SPSS analysis version 23, March 2018

From the Table 3, the R Square value indicates how much of the total variation in the dependent variables, customer patronage, and loyalty can be explained by the independent variable, marketing of deposit money bank services. The R Square value is .701 which means that the independent variable explains up to 70% of the total variation of the dependent variable which is relatively high as it is above 50%.

Table 3.1. ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	56.828	1	56.828	259.710	.000[b]
Residual	24.288	111		.219	
Total	81.116	112			

Note: a. Dependent Variable: customer patronage and loyalty; b. Predictors: (Constant), marketing of deposit money bank service; *Source*: SPSS analysis version 23, March 2018

The ANOVA table is the analysis of variance which helps to show the overall significance of a model and its good fit. In the ANOVA table, to determine the level of significance, the value on the sig. column must be less than 0.05. The table shows a p-value of 0.000<0.05 at F-statistics of 259.710 which indicates that the model is highly significant. Hence we reject the null hypothesis (H_0) Marketing of deposit money bank services has not impacted customer's patronage and loyalty and accept the alternative hypothesis (H_1).

Table 4. Coefficients [a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	.856	.526		3.394	.018
Independent	.053	.220	.837	16.116	0.000

Source: SPSS analysis version 23, March 2018

The coefficient table is also used to show the level of significance of the model. The table shows a p-value of 0.000<0.05 which indicates that the model is significant. Also, the Beta value under the unstandardized coefficients is significant as it not negative. Hence we reject the null hypothesis (H_0) Marketing of deposit money bank services has not impacted customer's patronage and loyalty and accept the alternative hypothesis (H_1).

Hypothesis two

In other to test for the second hypothesis of this study, the researcher made use of linear regression. The second hypothesis is stated below:

H_0: Marketing of deposit money bank services has not improved customer's loyalty and patronage over time through effective communication system and the free flow of information.

Table 5. Linear regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.724[a]	.524	.520	.56981

Note: a. Predictors: (Constant), communication system and free flow of information*; Source: SPSS analysis version 23, March 2018*

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The R Square value is .524 which means that the independent variable, communication system and free flow of information explain up to 52% of the total variation of the dependent variable, customer patronage, and loyalty which is moderately high as it is a little above 50%.

Table 5.1. ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	56.828	1	39.645	122.104	.000b
Residual	24.288	111	.325		
Total	81.116	112			

Note: a. Dependent Variable: customer patronage and loyalty; b. Predictors: (Constant), marketing of deposit money bank service*; Source: SPSS analysis version 23, March 2018*

The ANOVA table shows a p-value of $0.000 < 0.05$ at F-statistics of 122.104. This shows that the model is highly significant. Hence, we reject the null hypothesis (H_0) Marketing of deposit money bank services has not improved customer's loyalty and patronage over time through effective communication system and the free flow of information and accept the alternative hypothesis (H_1). Therefore, marketing of deposit money bank services has improved customer's loyalty and patronage over time through effective communication system and the free flow of information.

Table 6. Coefficients [a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	.817	.229		2.727	.007
Independent	.794	.072	.724	11.050	.000

Source: SPSS analysis version 23, March 2018

The Table 6 shows the p-value of $0.000 < 0.05$ which indicates that the model is significant. Also, Beta value under the unstandardized coefficients is significant because it is not negative. Hence, we reject the null hypothesis (H_0) Marketing of deposit money bank services has not impacted customer's patronage and loyalty over time through effective communication system and the free flow of information and accept the alternative hypothesis (H_1)

Hypothesis three

In other to test for the third hypothesis of this study, the researcher made use of linear regression. The third hypothesis is stated below:

H_0: Marketing of deposit money bank's services cannot be enhanced to improve customer's patronage and loyalty.

Table 7. Linear regression model summary

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.651a	.424	.419	.54877
a. Predictors: (Constant), marketing of deposit money bank service				

Note: a. Predictors: (Constant), communication system and the free flow of information*; Source: SPSS analysis version 23, March 2018*

The R Square value is .424 which means that the independent variable explains up to 42% of the total variation of the dependent variable which is moderately low as it is a little below 50%.

Table 7.1 ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	24.590	1	24.590	81.656	.000b
Residual	33.427	111	.301		
Total	58.018	112			

Note: a. Dependent Variable: customer patronage and loyalty; b. Predictors: (Constant), marketing of deposit money bank service; *Source: SPSS analysis version 23, March 2018*

The ANOVA table shows a p-value of 0.000<0.05 at F-statistics of 81.656. This shows that the model is highly significant. Hence, we reject the null hypothesis marketing of deposit money bank's services cannot be enhanced to improve customer's patronage and loyalty and accept the alternative hypothesis (H_1). Therefore, Marketing of deposit money bank's services can be enhanced to improve customer's patronage and loyalty.

Table 8. Coefficients [a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Constant	1.393	.318		4.377	.000
Independent	.687	.076	.651	9.036	.000

Note: a. Dependent variable: improvement in customer loyalty and patronage; *Source*: SPSS analysis version 23, March 2018

The coefficient table shows the p-value of 0.000<0.05 which indicates that the model is significant. Also, the Beta value under the unstandardized coefficients is significant as it is not negative. Hence we reject the null hypothesis (H_0) marketing of deposit money bank's services cannot be enhanced to improve customer's patronage and loyalty and accept the alternative hypothesis (H_1). Therefore, Marketing of deposit money bank's services can be enhanced to improve customer's patronage and loyalty.

4. Findings and recommendations

Findings

This is a summary of all the findings gathered from the analysis of the response after the administration of questionnaires. The findings of this research work are the empirical findings which were originated from the data obtained from the primary data used. The empirical findings of this research are generated as follows:
- From the simple linear regression test undertaken which states that marketing is highly essential to banking operations as it determines the quality of services rendered by the bank. This resulted to the conclusion that marketing of deposit money bank influences customer's patronage and loyalty.
- Marketing of deposit money bank services has improved customer's loyalty and patronage over time through effective communication system and free flow of information. This conclusion is supported by the analysis carried out to test if deposit money bank communication system is effective and banks' staffs are able to interact effectively with customers in terms of providing enough disclosure of bank's activities.
- The simple linear regression test undertaken to analyze if marketing can be further enhanced in deposit money banks to improve customer loyalty and patronage resulted in the conclusion that further enhancements can definitely be made to improve marketing on customer patronage and loyalty. Also, the result is validated in the study by Ikpefan (2014), which postulated that marketing can be better enhanced by adapting to changes in the industry and providing efficient services on a continual basis and also by engaging in staffs training and promotion. It also validated the study by Adebowale (2015), which posited that banks should improve more on their marketing strategies, aggressive marketing, client's relationship and service delivery. Also, banks should boost their product image through effective advertisement so that customers' perception of their products are enhanced. According to Uppal (2010), marketing can be enhanced by increasing customers and this can be achieved by gaining their trust, also marketing is more effective if the deposit money banks are information technology (IT) oriented. He also emphasized the fact that banks should deepen their information flow processes in order to further inform and educate customers on their products.

Recommendations

The study proffers the following recommendations:
- Since the result from the analysis of the first hypothesis shows that marketing has a significant impact on customers' patronage and loyalty, banks should ensure that marketing practices are applied to every aspect of the banks operations and that every department of the bank engages in marketing activities as increase in customers' patronage and loyalty is solely dependent on the application of marketing principles in the banks' daily operations.
- Marketing departments should create effective platforms for communication and the free flow of information that will enable customers to relate with banks' staff and have access to relevant information that will be beneficial to their choice of banks' products and services. These platforms should also enable the customers to offer advises and give recommendations on the improvement of the banks' services in form of an interactive forum. This will

enable the customer and also the bank to have a better understanding of the ways in which developments can be made to these services. Banks' staff should also be oriented on how to interact effectively and take note of every complaint or suggestions by the customer in order to boost the chance of the bank in retaining those customers. Rewards in form of promotion and increase in payment should be awarded to staff that complies with these requirements and that are able to please the customers and enables their satisfaction. Deposit money banks should also apply the right channels of communication that will foster patronage of these products and services.

- Banks' management should improve on their marketing strategies by developing marketing principles that will enable them to acquire more customers and to have a long-term relationship with the existing ones. Banks should also improve on their responsiveness to changing environmental factors in order to develop and maintain their market share and competitive advantage. Banks should be involved in technological advancements as more effective marketing activities will be achieved. Banks should also constantly improve on the quality of their services based on customers' changing wants and needs, competition and also based on the general trends in the external environment. This will help to gain more customers and to retain the existing ones.

- Banks should disclose sufficient information of their activities through public information and other promotional activities so that customers can make right decisions based on their preference of the products at their respective cost in order to reduce the level of complaints in terms of charges that are unknown to the customers.

Conclusion

The following conclusions were drawn based on the summary; marketing has a significant impact on customer patronage and loyalty; marketing through effective communication system and the free flow of information influence customers' patronage and loyalty; marketing can be further enhanced to improve customers' patronage and loyalty.

Acknowledgement

References

[1]. Abiodun, E.A., George, O.D. and Afolabi, M.A. 2014. The changing trend in marketing of financial services: an empirical study on bank performance in Nigeria. *International Journal of Business and Economic Development*, 2(2): 85 - 96.

[2]. Achugamonu, B.U., Taiwo, J.N., Ikpefan, O.A., Olurinola, I.O.,Emena, O.U. 2016. Agent banking and financial Inclusion: The Nigerian experience, Proceedings of the 28th International Information Management Association Conference-Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, pp. 4418 - 4430.

[3]. Adebowale B.A. 2015. Marketing of banking services and consumer satisfaction in the Nigerian banking industry. *British Journal of Marketing Studies.* 3(3): 1 - 11.

[4]. Afolabi, I. 2008. Marketing of Banking Services in Nigeria. *The Nigerian Banker*, 8(2): 5 - 8.

[5]. Bagdoniene and Jakstaite 2007. Estimation of loyalty programme from customers' point of view: Cases of three retail store chains. *Engineering Economics*, 55(5): 51 - 58.

[6]. Behzad, F.N. Ahmad, P. Seyed, H.S. and Majid, N. 2013. Marketing research services and their impact on perception of service users. *Intermediary Journal of Contemporary Research in Business,* 4(12): 472 - 477.

[7]. Cherinet, B.C. 2015. The effect of relationship marketing on customers' loyalty. Evidence from Zemen Bank. *Emerging Markets Journal*, 5(2): 58 - 70.

[8]. Dixit, V.C. 2004. Marketing Bank Products, *IBA Bulletin*, (April), p.15

[9]. Dwivedi, R. 2007. Managing Marketing - Finance Interface, *Journal of Commerce and Trade*, 2(2): 32 - 34.

[10]. Giese, J., Cote, J. 2000. Defining consumer satisfaction, *Academy of Marketing Science Review*, 1: 1 - 27.

[11]. Ikpefan, O.A. 2013. The impact of marketing of financial services in the Nigerian banking industry, *Journal of Business Administration and Management Sciences Research,* 2(6): 148 - 162.

[12]. Ikpefan O.A. 2014. Empirical evidence of financial services marketing in the Nigerian banking industry. *Journal of Applied Finance & Banking*, 4(1): 115 - 135.

[13]. Ikpefan, O.A., Enobong, A., Osuma, G., Evbuomwan, G.O., Ndigwe, C. 2018. Electronic banking and cashless policy in Nigeria. *International Journal of Civil Engineering and Technology*, 9(10): 718-731.

[14]. Isibor, A.A., Ojo, J., Ikpefan, O.A. 2017. Does Financial Deregulation Spurs Economic Development in Nigeria? *Journal of Applied Economic Sciences*, Volume XII, 8(54): 2339 - 2350.

[15]. Khan, M.T. 2013. Customers Loyalty: Concept & Definition (A Review). *International Journal of Information, Business, and Management*. 5(3): 168-191.

[16]. Kotler, P. 2000. *Marketing Management: Analysis, Planning, and Control* (11th Edition), Pearson Education Company. ISBN 0-536-63099-2.

[17]. Kotler, P. 2001. *Marketing Management*, Millennium Edition. A Pearson Education Company Upper Saddle River, New Jersey. Tenth Edition. ISBN 0–536–63099-2.

[18]. Kotler, P. 2004. *Marketing Management*, 12th Edition, New York: Macmillan Publishing.

[19]. Lawal, B.A. 2014. Effect of Strategic Marketing of Financial Services on Organization Performance. *European Journal of Accounting Auditing and Finance Research.* 2(9): 66 - 83.

[20]. Mahtab, N. and Abdullah, M. 2016. Marketing of financial and banking products: An example from Bangladeshi Bank, *Journal of Accounting Marketing*, 5: 159 - 170. DOI: 10.4172/2168-9601.1000159

[21]. Ogunsanya, A. 2003. *A Practical Guide to the Marketing of Financial Services*, Richmond Books limited, Lagos, pp. 56 - 60.

[22]. Okigbo, P. N. C. 2001. The Nigerian Financial System, Structure and Growth, 4th Edition, Lagos: Longman Group Ltd., pp. 20 – 28.

[23]. Okoye, S.C. 2001. Application of marketing concept in commercial banks (a case study of diamond bank limited, Enugu branch). M. Sc Degree of Marketing, University of Nigeria. Enugu Campus.

[24]. Onyiriuba L. 2008. Drives and Tasks in Bank Marketing. Published by NFS Data Bureau Limited, Lagos, Nigeria. ISBN: 978-978-083-933-8

[25]. Orville, C. W. and Jr. John, W. M. 2014. Marketing Strategy: A Decision - Focused Approach, 8th Edition. Published by McGraw-Hill/Irwin. Americas, New York, NY.

[26]. Osuma, G., Ikpefan, A.O., Osabohien, R., Ndigwe, C. Nkwodimmah, P. 2018. Working capital management and bank performance: Empirical research of ten deposit money banks in Nigeria. *Banks and Bank Systems*, 13(2): 49-61. DOI: https://doi.org/10.21511/bbs.13(2).2018.05

[27]. Reekie, W.D. 1972. Marketing in bank. *The Bankers Magazine* (UK), 97- 100.

[28]. Reibstein, D.J. 2002. What attracts customers to online stores, and what keeps them coming back? *Journal of the Academy of Marketing Science*, 30(4): 465 - 473.

[29]. Sani, D., and Animashaun, A.O. 2015. An Appraisal of Marketing of Financial Product in the Nigerian Banks. *Journal of Entrepreneurial Development, Education and Science Research*, 3(2): 217 - 233.

[30]. Uppal, R.K. 2010. Marketing of Bank Products - Emerging Challenges and New Strategies. *JM International Journal of Management Research*, 1(1): 35 - 41.

[31]. Wilson, J.O.S., and Williams, J.M. 2002. The Size and Growth of Banks: Evidence from four European Countries. *Applied Economics*, 32(9): 110 – 112.

[32]. Yisa, J.H. 1998. Marketing of Banking Services in Nigeria: Study of selected banks in Abuja. Department of Business Administration, Post Graduate School of Ahmadu Bello University Zaria.

Does Exchange Rate Regime Affect Economic Development? Evidence from Nigeria

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Abstract

The nexus between exchange rate regime and economic development was examined in this paper. Two distinct phases of exchange rate regimes namely, fixed and floating were adopted in the study. GDP per capita was adopted as proxy for economic development. Data analysis was based on the estimation method of ordinary least squares. Regression was conducted, in the first instance, to determine the overall effect of exchange rate regime on development using the full data sample (1970-2016). In the second instance, the data was disaggregated into fixed regime (1970-1986) and floating regime (1987-2016). The estimates for the full sample period, fixed regime, and floating regime show exchange rate as a significant impediment to development, with the strongest negative impact coming from the floating exchange rate regime.

Based on the above findings, we conclude that irrespective of policy adopted, exchange rate constitutes a major factor in the planning and implementation of development-oriented programmes and policies in a developing nation like Nigeria. However, the impact is far more severe when developing nations adopt liberalized exchange rate policies without first developing adequate industrial infrastructure to support a robust domestic production capacity.

Keywords: exchange rate management; economic development; fixed exchange rate; floating exchange rate

JEL Classification: E65; F41; O11; O24

Introduction

Exchange rate management refers to the institution of the mechanism for the determination of exchange rate. It relates to the policy adopted in managing exchange rate. Exchange rate policy has important implications for both the level and movement of exchange rate in an economy. Hence, the choice of an appropriate policy constitutes a major challenge for governments, particularly, in developing open economies. Essentially, the mechanism for the determination of exchange rate is managed by the Central Bank as an integral part of monetary policy initiatives. In Nigeria, the Central Bank of Nigeria is vested with the responsibility of managing the exchange rate of the domestic currency relative to those of its major trading partners with an overriding objective of maintaining macroeconomic stability and international competitiveness.

At the early stage of financial development and integration, nations are inclined to adopt fixed exchange rate policy as it tends to offer anti-inflationary benefits without compromising growth. However, with institutional and economic advancements, they tend towards a more flexible or floating regime to achieve considerable benefits associated with it (Rogoff, Husain, Mody, Brooks and Oomes 2003). This argument may be justified on the grounds that at the early stages of a nation's existence, it is largely dependent on primary production for local and foreign markets while relying on manufactured and manufacturing imports for consumption and industrial development.

Adoption of fixed exchange rate policy at this initial stage supports this development strategy as it renders imports cheaper and exports more expensive. Based on the assumption that implementation of the fixed regime supports development of local industries, nations are thereby expected to transit to a more flexible or floating regime in which exchange rate is determined by the strength of their economic fundamentals, particularly their productive capacity.

In the immediate post-independence period, Nigeria adopted the fixed exchange rate policy which, according to Obadan (2006), aimed at implementing the economic policy of establishing development-oriented projects and support import-substituting industries. Exchange rate movement during the period was characterized by relative stability and higher growth (Nzekwu 2006). This was the era of massive inflow of foreign exchange from agricultural and mineral exports. The attendant liquidity surfeit however became the nation's albatross as it encouraged all manner of imports without adequate attention to industrial development, leading to severe balance of payment problems and depletion of external reserves. Under the fixed regime, exchange rate management was rather passive as it was dictated by trends in the movement of the US dollar and the British pound sterling, Nigeria's major trading partners.

Following the collapse of the international oil market in the late 1970s and early 1980s, the drastic decline in foreign exchange earning exacerbated the balance of payment problem, leading to massive external borrowings from bilateral and multilateral sources. According to Uche (2000), inability to develop alternative foreign exchange income stream led to severe cuts in government expenditure. To resolve the structural imbalance in the economy, the structural adjustment programme (SAP) was introduced mid-1986. SAP aimed at promoting efficiency in resource allocation by opening up the economy to the operation of market forces. Exchange rate deregulation was a major component of the programme. This marked the turning point from fixed to floating exchange rate regime. With the deregulation of the mechanism for the determination of exchange rate, exchange rate management became a core macroeconomic function of the Central Bank of Nigeria so as to control unstable or volatile trends. This is necessary because, according to Mordi (2006), volatility induces distortions in production and consumption patterns as it creates uncertainty and risks for economic agents with destabilizing effects on the macro economy.

At inception, SAP recorded some measure of success as industrial capacity utilization responded positively to massive devaluation of the domestic currency due, largely, to switching from foreign to local manufacturing inputs (Moser 1995). Data from the Manufacturers Association of Nigeria (2005) show evidence of increase in local raw material utilization from 54.1% in 2003 to 57.5% in 2004 and then to 67.10% in 2005. However, industrial capacity utilization declined from 48.9% in 2003 to 45.02% in 2004 and to 44.06% in 2005. This suggests that beyond raw materials, there are other inputs that posed a challenge to industrial expansion in Nigeria and these inputs also have high foreign exchange content. For instance, Osisioma (1998) argued that there exists glaring evidence that the fundamental defects which informed the introduction of SAP such as high import dependency and weak industrial and technological base still persist. In one of the post-SAP budget speeches, the Federal Government of Nigeria (1989) explained that adoption of the floating exchange rate policy led to generalized increases in prices because of the high import content of local manufacturing. The high cost of imported industrial inputs adversely affected the operations of many small and medium scale businesses, leading to rationalizations, retrenchments and social problems like unemployment and poverty.

Over the years, studies have been undertaken by scholars across different climes to determine the link between different phases of exchange rate management and macroeconomic performance. However, while many of these studies have focused on the nexus between exchange rate and economic growth, not much attention has been given to the exchange rate-economic development nexus. Also, there is dearth of evidence on the link between exchange rate regime and economic development, particularly in less developed economies. This study extends the scope of literature in this area by analyzing the dynamics of exchange rate management and economic development in Nigeria.

1. Review of related literature

Exchange rate is a key decision-making variable in the investment process of economic agents and as such its stability or otherwise is a major concern to public and private sector managers. Exchange rate dynamics have important implications for business outcomes and so an efficient management of the mechanism for its determination continues to constitute a serious macroeconomic challenge to the design and implementation of economic development strategy in many developing countries. It is widely acknowledged in financial economic literature that stable exchange rate promotes economic growth and development. However, unstable or volatile exchange rate creates uncertainty and risk for economic agents with destabilizing effects on the macro economy (Mordi 2006). For instance, unstable exchange rate induces distortions in production and consumption patterns which may generate further macroeconomic shocks.

Exchange rate management is concerned with the design and implementation of an appropriate mechanism for the determination of an optimum exchange rate for the economy. Odusola (2006) posits that in managing exchange rate, most countries focus on exchange rate policy because whatever policy a nation adopts affects the prices of goods and services in the economy. Over the years, the Central Bank of Nigeria has adopted varied mechanisms for determining the exchange rate in Nigeria. Essentially, it has varied from a fixed exchange rate, through a two-tier foreign exchange rate to a variety of market-based but essentially managed exchange rate regimes (Okafor 2011). During the fixed regime, exchange rate was largely subjected to administrative management and hence passive as it was dictated by trends in the movement of the British pound sterling and the US dollar (Obadan 2006). However, following the adoption of SAP in 1986, exchange rate management in Nigeria has become a core macroeconomic policy function of the Central Bank of Nigeria with an overriding objective of achieving a realistic and stable exchange rate consistent with internal and external balance (Mordi 2006).

The choice of exchange rate policy adopted at any given time derives from the economic objectives of the government. The immediate challenge Nigeria faced as an independent nation was to transit from primary to secondary production and to facilitate the transition process, the fixed exchange rate was adopted. A direct consequence of the policy was an over-valuation of the domestic currency. Major objective of the policy was to fast-track the industrialization process through massive importation of industrial inputs and thereby enhance growth and development. However, over-valuation also raises the price of exports thereby compromising international competitiveness, leading to rationalization of the scale of operations in export industries with attendant negative implications for employment and employee welfare. Callison (2000) contends that over-valuation of a nation's currency rather than alleviate poverty through industrial development, perpetuates it by acting as an impediment to the promotion of a broad-based or diversified employment-oriented economic growth. He argues that currency over- valuation undervalues main resource endowments of developing economies (land and labor), leading to lower returns to their owners (farmers, farm workers, and industrial workers) while at the same time encouraging capital-intensive investments that offer fewer jobs. In Nigeria, for example, Okafor (2000) argues that massive investments in capital-intensive import-substituting industries during the fixed regime produced industries that rely heavily on imported industrial infrastructure which became foreign exchange guzzlers with very low value addition.

Advocates of the fixed regime also contend that the regime is characterized by macroeconomic stability and low level of inflation. Nzekwu (2016) argues that pegging of exchange rate can lower inflation by inducing greater policy discipline and boosting confidence in the currency. Also, Rogoff, Husain, Mody, Brooks, and Oomes (2003) contend that at the early stage of a nation's financial development and integration, fixed exchange rate policy tends to offer anti-inflationary benefits without compromising growth. However, they posit that with institutional and economic advancements, nations tend to achieve considerable benefits from more flexible or floating regimes.

Adoption of floating or variable exchange rate policy in Nigeria mid-1986, however, may not be reasonably defended on grounds of institutional and economic advancements as espoused by Rogoff, Husain, Mody, Brooks, and Oomes (2003). It was rather structural imbalance in the economy that necessitated its adoption. The Central Bank of Nigeria (1995) explained that the structural adjustment programme (SAP) was designed to restructure and redirect the economy, eliminate price distortions and diversify the export base of the economy. Adoption of the floating exchange rate policy is one of the main strategies to achieve the objectives of SAP. For a highly import-dependent economy with very weak productive capacity, SAP triggered a whirlwind of currency devaluations, leading to unstable or volatile exchange rate with adverse consequences for inflation, employment and economic well-being of citizens. Owing to the high import content of installed domestic production capacity, SAP led to generalized increases in prices which adversely affected the operations of small and medium scale enterprises (Federal Government of Nigeria 1989), leading to job cuts, factory closures and other social problems. Similarly, Nzekwu (2006) asserts that exchange policies may have some social impact on the economy. Citing health care as an example, Nzekwu argues that high cost of imported drugs may constrain the poor to use local herbs and shrubs or other local alternatives or go untreated.

Frequent episodes of exchange rate depreciation under the floating regime in developing economies lead to exchange rate volatility which affects production and consumption patterns thereby perpetuating poverty. For instance, unstable exchange rate, a major characteristic of the regime, fuels other macroeconomic shocks like inflation which erodes the purchasing power of the poor thereby aggravating poverty among the poor. Inflation further hurts the poor through inequitable income and wealth distribution by lowering output and employment. Also, persistent depreciation can lead to capital flight and other unwholesome practices like round-tripping and other corruption-inducing opportunities all of which impact severely on the poor. However, contrary to widely held opinion that currency depreciation fuels inflationary pressure, Callison (2000) argues that it is rather inflation that led to

currency depreciation in Zambia. He argues that financing fiscal deficits through mechanisms that increase money supplies faster than output growth leads to inflation which causes currency depreciation in nominal terms.

Elbadawi (2015) examined the effect of real exchange rate on poverty. Controlling for household consumption growth and initial inequality, the result shows direct poverty-reducing impact of real exchange rate devaluation. It specifically shows that poverty alleviation is enhanced if real exchange rate devaluation is below 50 per cent. This finding suggests that devaluation of the real exchange rate is a veritable poverty reduction tool for most developing economies since the median country in the sample survey was undervalued at only 12%.

The study by Omojimite and Oriavwote (2012) analyzed the influence of real effective exchange rate on poverty reduction in Nigeria between 1980 and 2010 using the techniques of vector error correction model (VECM) and vector auto-regression (VAR). The VECM result shows that real exchange rate movements have significant positive impact on poverty in Nigeria. Also, the VAR estimates show significant contribution of real exchange rate variations to poverty during the period. An earlier study by Qumer (2007) on the link between real exchange rate and poverty also reports positive effect of real exchange rate on poverty if income inequality is low and institutions are strengthened.

Hua (2011) examined the social and economic effects of real exchange rate using panel data, for 1987-2008, from 29 provinces in China. Generalized method of moments (GMM) was adopted for the study. The result indicates negative effect of real exchange rate appreciation on growth, with greater impact in coastal than in inland provinces. It also shows negative effect of exchange appreciation on employment, which implies negative effect on poverty.

A number of studies present evidence in support of the claim that stable and competitive exchange rate policies support development in Asian economies. For instance, the study by Rodrik (2008) on the nexus between real exchange rate and economic growth shows that a high real exchange rate (currency undervaluation) stimulates growth, particularly in very poor developing economies, through enhanced performance of the tradable (particularly the industrial) sector. Rodrik justified this result on the premise that the tradable sectors in developing economies suffer disproportionately from market and government failures arising from weak institutions and product market failures which keep them from converging toward the high income or developed economies. Evidence from Rapetti, Scott, and Ranzi (2011), Ramzi, Rapetti, and Scott (2009, 2012) and the recent study of Dumill, Frenkel, and Rapetti (2015) provides further empirical support for Rodrik (2008). Rapetti, Scott, and Ranzi (2011) not only confirmed the growth-inducing effect of real exchange rate in poor developing economies but also show that it has sizable impact on middle income countries. They also show that the effect of real exchange rate undervaluation decreases with the level of GDP per capita. A more recent study of Dumill, Frenkel, and Rapetti (2015) shows a close link between macroeconomic policy and macroeconomic performance in Argentina between 2003 and 2013. The study specifically shows that Argentina's drift from high growth performance to stagflation derives from policy shift from stable and competitive real exchange rate to one of populist orientation.

Evidence from financial economic literature suggests dearth of empirical literature on the nexus between exchange rate policy and economic development, particularly in developing economies. None of the reviewed works dealt on a comparative analysis of policy impact of exchange rate regimes on economic development. We consider a study of this nature relevant for policy formulation.

2. Methodology

The study was designed to achieve two major objectives. First, it was designed to determine the effect of exchange rate on economic development in Nigeria over the period 1970 - 2016, and second, to determine the effect of exchange rate policy on economic development. For the second objective, the study segmented 1970 - 1986 as the fixed exchange rate policy period while 1987 - 2016 was segmented as the floating exchange rate policy period. The *ex-post facto* research method was adopted for the study because it offers considerable degree of convenience in the use of historical data to explain economic phenomena. Being an event study, the methodology developed by Campbell, Lo and Mackinlay (1997) was adopted.

The study covers the period 1970-2016 and data on the variables (GDP per capita, exchange rate, inflation rate, external debt and interest rate) were obtained from secondary sources like the Central Bank of Nigeria Statistical Bulletin and the World Bank. GDP per capita, adopted as the dependent variable, was used as proxy for economic development. The regression estimates were obtained using the econometric technique of the ordinary least squares (OLS).

Model specification

This study extends and modifies the model in Omojimite and Oriavwote (2012). The authors conducted a study on real exchange rate and poverty in Nigeria in 1980-2010. The model adopted in their study is presented as follows:

LPCY = C_0 + C_1REER + C_2GSP + C_3PE + Ut   (i)

where: PCY = Poverty index, proxied as per capita GDP, REER = Real effective exchange rate, GSP = Absorption capacity, proxied as government spending, PE = Human capital development, proxied as primary school enrolment, C_0 = Intercept or Constant, L = Natural logarithm, Ut = Random variable.

The present study extends and modifies Omojimite and Oriavwote (2012) by (i) expanding the scope from 1980 - 2010 to 1970 - 2016 (ii) segmenting the data to capture the policy impact of two major phases of exchange rate management (iii) introducing a new set of controlled variables. The model adopted for this, therefore, is specified as follows:

GDPC = β_0 + β_1 EXD + β_2 EXR + β_3 INF + β_4 IR + ε_{it} (ii)

where: GDPC is GDP per capita, proxy for economic development, EXD is external debt as ratio of GDP, EXR is nominal exchange rate, INF is inflation rate, IR is interest rate, β_0 ..... β_4 represent coefficients to be estimated, $\varepsilon_{it\ is}$ random variable.

3. Analysis and discussion of results

In this section, the effect of exchange rate on economic development for the full data sample data (1970-2016) and under the two major phases of exchange rate management (fixed and floating regimes) was examined and the results presented and discussed.

Table 1. Unit root result

Variable	ADF Test @ Level	Prob*	Remark
GDPC	-5.713209	0.0001	1(0)
EXD	-4.355680	0.0607	1(0)
EXR	-4.880067	0.0014	1(0)
INF	-3.453548	0.0568	1(0)
IR	-4.175942	0.0019	1(0)

Note: Test critical values: 1% level = -4.170583; 5% level = -3.510740; 10% level – 3.185512
Source: Authors' computation, 2018; * MacKinnon (1996) one-sided p-values.

The unit root test was conducted to determine if the time series data is non-stationary, and hence possess unit root. Based on 10% level of significance, the unit root test shows that all the variables are stationary at their levels and hence integrated of order zero (1(0)). Since all the variables are stationary at their levels, evidence of long-run relationship (co-integration) was therefore assumed. This implies that the variable has a tendency to move together and not drift apart over the long-run, and therefore suitable making economic projections or forecasts.

Regression estimates

Table 2. Full sample result (1970 – 2016)

Dependent Variable: GDPC				
Method: Least Squares				
Included observations: 46				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.329969	3.275412	0.406046	0.6868
EXD	0.074756	0.063024	1.186162	0.2424
EXR	-0.224235	0.076095	-2.946779	0.0053
INF	-0.019436	0.076641	-0.253601	0.8011
IR	0.364511	0.179871	3.358651	0.0217
R-squared	0.597305	Mean dependent var		1.602174
Adjusted R-squared	0.518993	S.D. dependent var		7.792261
S.E. of regression	7.313968	Akaike info criterion		6.919771
Sum squared resid	2193.259	Schwarz criterion		7.118536
Log likelihood	154.1547	Hannan-Quinn criter.		6.994230
F-statistic	25.19483	Durbin-Watson stat		1.941957
Prob(F-statistic)	0.055735			

Source: Authors' computation, 2018

The regression estimates for the entire sample period (1970-2016) shows significant negative impact of exchange rate movements on economic development, an indication that the cumulative effect of exchange rate management in Nigeria has not supported development. With regard to interest rate, the result shows evidence of significant positive impact on economic development. The result indicates that over the entire period, the level of interest rate in Nigeria aided the implementation and performance of development-oriented policy initiatives in Nigeria. In terms of magnitude of impact, the result shows that 1% increase (depreciation) in exchange rate lowers per capita GDP by 0.22% and vice versa. This result supports *a priori* reasoning that price increases associated with exchange rate depreciation lowers the quality of life thereby perpetuating poverty. On the other hand, a 1% rise in interest rate raises per capita GDP by 0.36%. The positive relationship suggests improvement in allocation and use of financial resources as borrowing became more expensive. These results are significant at 5 per cent. The study, however, did not show significant impact of external debt. The R^2 and Adjusted R^2 values of approximately 60 per cent and 52% respectively show that the independent variables significantly explain variations in economic development. The Durbin-Watson statistic of 1.92 indicates very negligible or no effect of negative auto correlation in the model.

Table 3. Fixed exchange rate regime (1970-1986)

Dependent Variable: GDPC				
Method: Least Squares				
Included observations: 16				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	30.41676	15.07248	2.018033	0.0686
EXD	1.186255	0.781322	1.518267	0.1572
EXR	-0.733847	0.327029	-2.243981	0.0464
INF	-3.358162	0.217471	-2.646943	0.0278
IR	-2.784918	1.696623	-1.641448	0.1290
R-squared	0.405376	Mean dependent var		0.356250
Adjusted R-squared	0.325513	S.D. dependent var		9.583178
S.E. of regression	7.870392	Akaike info criterion		7.214399
Sum squared resid	681.3738	Schwarz criterion		7.455833
Log likelihood	52.71520	Hannan-Quinn criter.		7.226763
F-statistic	28.09780	Durbin-Watson stat		2.042175
Prob(F-statistic)	0.078696			

Source: Authors' computation, 2018

The result for the fixed exchange rate period (1970-1986) also shows significant negative impact of exchange rate on economic development.

Table 4. Floating or variable exchange rate regime (1987-2016)

Dependent Variable: GDPC				
Method: Least Squares				
Included observations: 30				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.600214	6.716292	0.833825	0.4123
EXD	0.055778	0.055499	1.005025	0.3245
EXR	-2.407649	0.084902	-2.445756	0.0218
INF	5.332974	0.079963	3.412365	0.0836
IR	-4.131896	0.295155	-2.446869	0.0588
R-squared	0.592728	Mean dependent var		2.266667
Adjusted R-squared	0.518365	S.D. dependent var		6.738276
S.E. of regression	6.398296	Akaike info criterion		6.700952
Sum squared resid	1023.455	Schwarz criterion		6.934485
Log likelihood	95.51428	Hannan-Quinn criter.		6.775661
F-statistic	15.79094	Durbin-Watson stat		2.015661
Prob(F-statistic)	0.162228			

Source: Authors' computation, 2018

This result indicates that the fixed exchange rate policy of the period did not promote development in Nigeria. Specifically, it indicates that a 1% increase in exchange rate (devaluation) decreases per capita GDP by 0.73%. Though the negative impact of the regime does not align with *a priori* theoretical expectations, it goes to

show the extent to which the Nigerian economy depends on importation for consumer and industrial goods. This explains successive currency devaluations during the period. Also, net over-valuation of the domestic currency rendered the nation's commodity exports uncompetitive. The cumulative effect of all these was a net outflow of foreign exchange. The result for inflation shows significant negative impact on development. The result indicates that as inflation increases by 1%, there is a 3.36% decline in per capita GDP. External debt and interest rate were shown to impact non-significantly on development during the period. The R^2 (41%) and Adjusted R^2 (32.6%) estimates show moderately strong explanatory power of the independent variables. The value of the Durbin-Watson statistic (2.02) indicates absence of negative auto correlation in the model.

The regression estimates for the variable or floating exchange rate regime (1987-2016) further shows exchange rate as a major player in the development process of the Nigerian economy. The result indicates that the floating regime is an impediment to economic development. Under the floating regime, the negative impact of exchange rate depreciation is strongest. 1% increase in exchange rate produced 2.41% decrease in per capita GDP, an indication of a drastic decline in living standard. Being an import-dependent economy, the high and variable exchange rate depreciations that characterize the floating regime obviously impacted negatively on Nigeria's development process. Both the level and movement of exchange rate have implications for macroeconomic performance. Interest rate was also shown to exert significant negative impact on development during the period, an indication that high interest rates associated with the deregulation policy did not support development-oriented programmes. The magnitude of impact is also more severely felt under the floating regime. Being a price variable, this outcome conforms to theoretical expectations. With regard to inflation, the study shows significant positive impact on development. This is not in agreement with theoretical expectations but it suggests that its level is still within development-supportive threshold. The effect of external debt on economic development was observed to be non-significant. The R^2 and Adjusted R^2 values of 59.3% and 51.8% respectively show that the independent variables significantly explain variations in development in Nigeria. The Durbin-Watson statistic of approximately 2.02 indicates no effect of negative auto correlation in the model.

Summary of findings, conclusion and recommendations

The study was designed to examine the link between exchange rate management and economic development in Nigeria by analyzing the impact of different exchange rate policies on per capita GDP. The regression result for the entire sample period (1970-2016) shows significant negative impact of exchange rate on economic development. When the sample period was segmented according to policies adopted in managing exchange rate in Nigeria (we chose to classify policies of exchange rate into fixed and floating avoid unnecessary overlap), it was also observed that exchange rate significantly impeded development in Nigeria and the impact was shown to be more severe than for the entire sample period. For the floating exchange rate regime, the result not only showed significant negative impact of exchange rate on development but the impact was far more severe than in the previous cases. The strongest negative impact of exchange rate was transmitted to the development process during the variable or floating exchange rate regime.

Result on the behavior of interest rate during the different phases of exchange rate management was mixed. For the entire sample (1970-2016), the result shows significant positive impact of interest rate on development. There is evidence of non-significant negative impact of interest rate on economic development during the fixed regime. However, the impact of interest rate on development became significantly negative during the floating regime.

Inflation had non-significant negative impact on development over the sample period 1970-2016 but when the data was segmented, the result shows significant negative impact of inflation on development during the fixed regime and significant positive impact on development when a policy shift to floating regime was implemented.

With regard to external debt, the study indicates non-significant positive impact on development over all the phases covered in the study, indicating that external debt is a weak predictor of development within the scope of this study.

Following from the above findings, we conclude that irrespective of policy adopted, exchange rate is a major factor in the planning and implementation of development-oriented programmes and policies in a developing nation like Nigeria. However, the impact is far more severe when developing nations adopt liberalized exchange rate policies without first developing adequate industrial infrastructure to support a robust domestic production capacity.

The study therefore recommends that a developing nation should not only start with the adoption of the fixed exchange rate policy but must ensure that implementation targets the development of vibrant institutional,

industrial and financial infrastructure in order to reduce dependence on consumer and industrial goods imports before transiting to the floating exchange management regime.

Acknowledgment

References

[1] Callison, C.S. 2000. The foreign exchange rate and poverty reduction through economic growth. Retrieved, 20/01/2018, from: http://pdf.usaid.gov/pdf_docs/PBAAD349.pdf

[2] Campbell, J.Y., Lo, A.W., Mackinlay, A.C. 1997. Event-study analysis, in Campbell, J.Y., Lo, A.W., Mackinlay, A.C. (ed), *The Econometrics of Financial Markets*, New Jersey, Princeton University Press: 48-55. Retrieved, September 20, 2017, from: https://www.nrc.gov/docs/ML1208/ ML12088A329.pdf

[3] Damill, M., Frenkel, R., Rapetti, M. 2015. Macroeconomic Policies in Argentina 2002-2013, *Comparative Economic Studies*, 57(3): 369-400.

[4] Elbadawi, I.A. 2015. Real exchange rate undervaluation and poverty, In *Economic Growth and Poverty reduction in Sub-Saharan Africa,* Oxford University Press: 259-296. DOI: 10.1093/acprof:oso/97801987 28450.003.0009

[5] Hua, P. 2011. The economic and social effects of real exchange rate – Evidence from the Chinese provinces, Paper prepared for the International Conference on Social Cohesion and Development, Paris-France, January 20-21.

[6] Mordi, C.N.O. 2016. Challenges of exchange rate volatility in economic management in Nigeria, *Bullion,* 30(3): 17-25.

[7] Moser, G.G. 1995. The main determinants of inflation in Nigeria, IMF Staff Papers, 42(2): 270-289.

[8] Nzekwu, G. 2006. Exchange rate stability and poverty reduction in Nigeria, *Bullion,* 30(3): 52-64.

[9] Obadan, M.I. 2006. Overview of exchange rate management in Nigeria from 1986 to date, *Bullion,* 30(3): 1-9.

[10] Odusola, A. 2006. Economics of exchange rate management, *Bullion,* 30(3): 38-44.

[11] Okafor, F.O. 2000. Micro-Credit: an instrument for economic growth and balanced Development, *African Banking & Finance Review*. 1 (1): 31-42.

[12] Okafor, F.O. 2011. *Fifty years of banking sector reforms in Nigeria (1960-2010): Past lessons: Future imperative*, First Bank of Nigeria Research Chair Report, Banking and Finance, Nnamdi Azikwe University, Awka, Enugu: Ezu Books Limited.

[13] Obadan, M.I. 2006, Overview of exchange rate management in Nigeria from 1986 to date, *Bullion,* 30(3): 1-9.

[14] Omojimite, B.U. and Oriavwote, V.E. 2012. An empirical assessment of the real exchange rate and poverty, *Asian Economic and Financial Review,* 2(1): 244-254.

[15] Osisioma, B.C. 1998. Problems and prospects of Accountancy profession in the next millennium, Paper presented at National Conference of Nigerian Accounting Association, Benin City, October 5.

[16] Oumar, D. 2007. Poverty and real exchange rate: Evidence from panel data, *Journal of African Development,* Spring, 9(1): 67-104.

[17] Rapetti, M., Skott, P., Razmi, A. 2011. The real exchange rate and economic growth: Are developing countries different? Working Paper, University of Massachusetts, Department of Economics, No. 2011-07. Retrieved, https://www.econstor.eu/bitstream/10419/64202/1/668006870.pdf

[18] Razmi, A., Rapetti, M., Skott, P. 2009. The Real Exchange Rate as an Instrument of Development Policy, Working Paper, University of Massachusetts, Department of Economics, Working Paper 2009-07. Retrieved, http://www.bresserpereira.org.br/terceiros/cursos/2011/Razmi,Rapetti,Skott-real_ exc hange_rate.pdf

[19] Razmi, A., Rapetti, M., Skott, P. 2012. The real exchange rate and economic development, *Structural Change and Economic Dynamics,* 23(2): 151-169.

[20] Rodrik, D. 2008. The real exchange rate and economic growth, *Brookings Papers on Economic Activity,* Fall: 365-412.

[21] Rogoff, K.S., Husain, A.M., Mody, A., Brooks, R., Oomes, N. 2003. Evolution and performance of exchange rate regimes, IMF Working Paper, 03(243). Available at: https://www.researchgate.net/publication/228288069_Evolution_and_Performance_of_Exchange_Rate_Regimes

[22] Uche, C.U. 2000. Poverty alleviation programme in Nigeria: Past, present and future, *Nigerian Journal of Banking and Finance,* 3: 1-24.

*** Central Bank of Nigeria 1995. Monetary policy in Nigeria, *CBN Briefs,* Research Department Series, 95/03

*** Federal Government of Nigeria 1989. *Budget Speech.*

*** Manufacturers Association of Nigeria 2005. Review of the Nigerian economy, *MAN Economic Review*

Problems of Food Market of Kazakhstan: Solution Approaches

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Abstract:

Goal of the present paper is the elaboration of directions of solving food market problems. Methods of study: Authors have used dialectical-materialistic cognition method and applied general scientific, specialized and particularly scientific methods. In particular, there are logical and comparative methods of analysis (statistical, *etc.*), synthesis.

The paper considers basic approaches to food market definition, defines structure and provides analysis of statistical data. Besides, there is a conclusion there are some problems related with food market of Kazakhstan, which are stipulated with influence of both – external (related with food products' import and export and economic relationship with importing and exporting countries) and internal (stipulated with creation of conditions for business development) factors, which, in turn, aggravate factors of external environment influence. The paper has practical value within the framework of organization and regulation of separate economic processes related with competitiveness of country, provision of its food supply security.

Keywords: food market; food products import; food products export; import substitution; food supply security

JEL Classification: F10; L66; Q18

Introduction

Upon conditions related with globalization and integration of Kazakhstan into world's economy there is the necessity of improving food provision at the current stage of development. The food supplies can be considered an initial component within the framework of each country's life sustaining, since it is one of the key factors defining state of health, population development potential, its well-being. As it was mentioned above, the most important and top-priority task of Kazakhstan economy development at the present moment is the food provision of population, which, in turn, is represented with food market, wholesale trade, organizational and economic mechanisms of functioning of market participants, as well as their interaction with account of processes of cooperation and integration, structural and institutional transformations (Khamukova 2006). If there is no food market regulation, there won't be the processes of food provision development.

In a broad sense, market is the specific sphere of commodities and money circulation. Kotler (1994) considers market "an aggregate of existing and potential buyers of goods". At the same time, according to the opinion of Dolan and Lindsey (1992, 19), "market is any interaction undertaken by people for the purpose of

trading with each other". McConnell and Brue (1992, 61) consider market "an entity or a mechanism throwing together buyers (bearers of demand) and sellers (suppliers) of separate goods and services". At last, Pindyck and Rubinfeld (2001, 771) in their joint work called "Microeconomy" consider market "an aggregate of buyers and sellers, interaction between which eventually provides the exchange opportunity".

Market plays rather significant role in country's economy, as far as its mechanism of competitiveness has impact on redistribution, volume and structure of production with account of all resources; performs the process of adjustment of price control response with reference to purchasing power; provides relieve of economy from non-competitive elements; has stimulant effect on consumer in terms of rationalization of choice of consumption structure according to his income. The present definition provides some market functions residing in provision of manufacturer-consumer relation with account of demand and supply; it also defines utility of goods and their cost; extends the sphere of using scientific-and-technical achievements, increases quality of goods and services.

Taking into account all above-mentioned issues, at the present stage of country development of great significance is the problem of food market formation together with economic and defensive security of state. The main conditions for preservation of economic security, as well as country's sovereignty, imply stability and balanced state of food market. Absence of own food supplies leads to depreciation of all the rest components of national security.

The essence of food market, its structural elements, as well as its role in country's economy are considered by such authors as Lokshin R.A., Matusevich V.A., Orlova A.V., Sharova A.G., Novoselov A.S. Among foreign authors studying food market in terms of food supply security there are: Barber E., James V.P.T., Convey J. The issue is also considered by Kornienko L., Lupashko-Stalsky I.P., Sayetgaliev R.Z., Serova E.V., Abdikerimova G.I., Baygushev A.N., *et al.*

The above-specified facts show the necessity of carrying out of system researches, the main goal of which is the elaboration of recommendations on market development, including provision of food supply security of Kazakhstan with account of transition of its economy to the stage of stable development.

The theoretical relevance of the study consists in extension and supplementation of food market theoretical aspects. The practical relevance consists in the fact the problem of food supply and, consequently, food market is one of the most complicated issues; solution of the problem stipulates elaboration of recommendations on improvement and realization of food market stable development mechanism, as well as elaboration of food supply security conditions.

1. Literature review

The issues of food markets are considered in significant number of scientific researches of foreign and FSU authors. Within the framework of the researches there is studying of such concepts as "food market" and "food supply security" with specification of the fact the food market development is the main condition of food supply security.

Thus, authors as Lokshin (1975), Matusevich (1970), Orlova (2012), Novoselov and Marshalova (2016) have defined the concept of food market as the sphere of communication, which on the basis of developed commodity-money relations provides satisfaction of population (demands) taking into account minimum marketing expenses (Zinchuk 2011). However, we cannot say the present formulation adequately reveals the whole essence of the concept, it rather denotes infrastructural component of market.
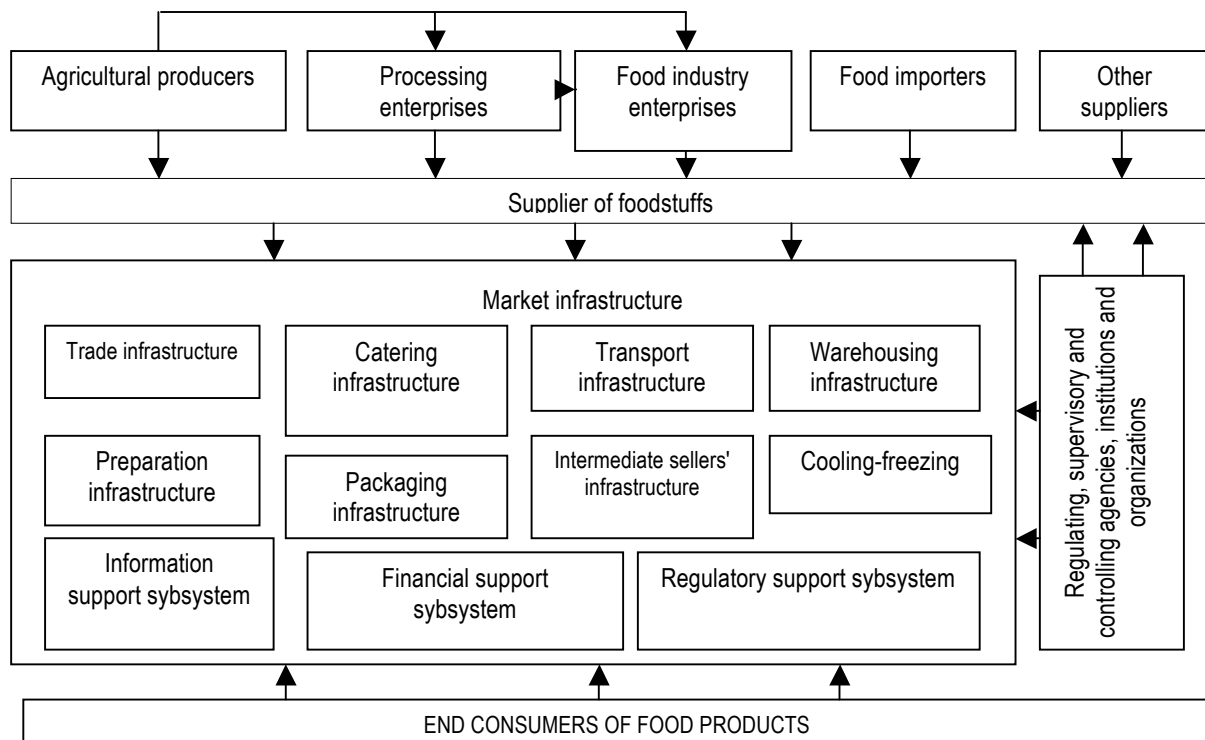
Other authors, such as Altukhov (2014), Goncharov (2001), Zinina (2010) consider food market an integral part of economy, the cover of which is represented with production, distribution, exchange and consumption of alimentary raw materials, including food products. The present approach underlines reproductive character of food market, continuity of which is provided with interaction of food market participants (Zinchuk 2011).

At the same time, according to such authors as Abdildin (1997), Espolov, Belgibaev and Suleymenov (2005), the term of "market" has two definitions (Tasmambetova 2016, 80):
– the synonym of communication sphere;
– the economic category being expression of definite social relationship.

In their opinion, market is represented in the form of mechanism that throws buyers and sellers together, as well as in the form of an entity represented with interrelations between separate economic agents that independently take some decisions. The interrelations between buyers and sellers leads to market formation – in other words, market is an aggregate of sellers and buyers, upon interaction of which as a result the possibility of exchange emerges.

Figure 1. Food market structure

Quite appropriate is the definition of food market suggested by Ilyina and Mirochitskaya (2000). In their opinion, food market is an economic system that unites independently interacting market participants (manufacturers and consumers) performing mutual exchange based on exact and authoritative information, while all decisions are taken by the participants on the basis of demand and supply on the market.
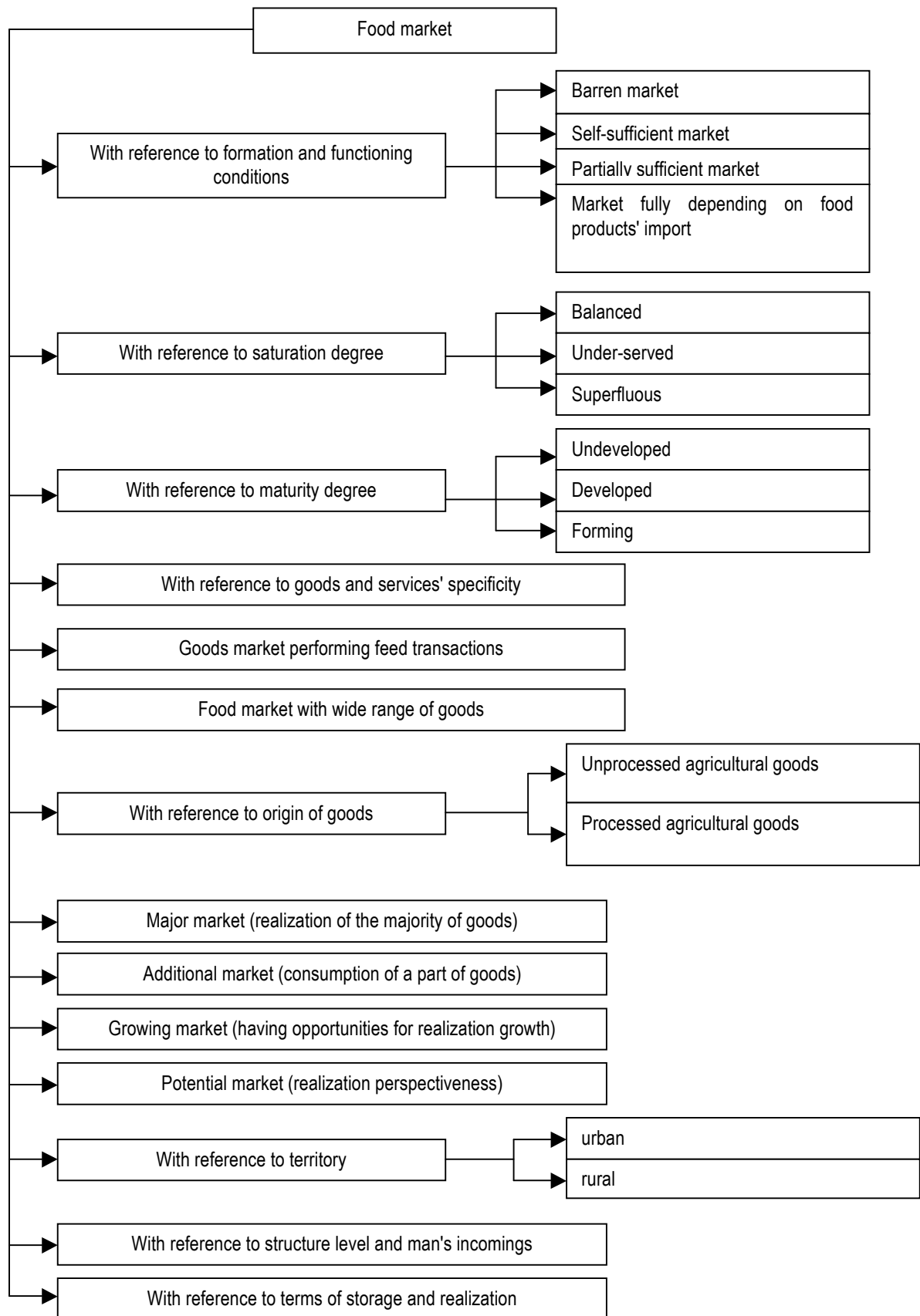
Thus, on the assumption of understanding of food market category by various authors we can make up the food market structure (Figure 1). According to suggested concepts, food market can be considered the sphere, within which there is an adjustment of buyers' demand for goods to their supplies. The structure of food market can be represented with the following elements: agricultural goods' production market, food processing market, consumer market. The main economic entities of food market are represented with: agricultural goods producers, processing and food industry enterprises, trading enterprises, companies rendering production and non-production services.

The economic literature dedicated to studying of food market provides developed systems of criteria for market classification represented with: conditions of formation, proceeding processes, involved participants, *etc*. Nuraliev (2003, 8) points out six basic criteria: territorial aspect, level of food provision, form and stages of commodity flow, making purchase and sales transactions scales; level and structure of incomes as per person, terms of storage and disposal of goods, product aspect.

However, there can be more expanded food market classification (Figure 2). As it was mentioned above, there are many approaches to defining food market. A number of authors consider it a complicated system related with production, processing, distribution, exchange and consumption of agricultural products. Other authors define it as a wide sphere of economic and commercial activity with application of labour.

Evaluation of nature and significance of food market allows consenting with the fact that market is represented with complicated economic system, where there is free interaction between manufacturer and consumer, free exchange based on authoritative information; and that it is characterized with internal and external manifestations.

Figure 2. Food market classification criteria

Source: Compiled by the authors using article materials (Tasmambetova 2016)

Consequently, the successful solution of problems related with foods production, quality increase and reduction of delivery terms will be promoted with:

– development of forms and methods of food market formation;
– improvement of regulating methods in the context of economy in symbiosis with self-regulating market;
– transformation of mutual relations within the framework of organizational-and-economic component in regard of agricultural entities, processing industry and trade.

The authors who conducted analysis of food market and considered it a system of economic relationship have noted that the aggregate of agricultural sector components, such as consumer goods market and production means market, represented effectively functioning system of markets forming specialized markets (agricultural goods, labor power, food products, finances, land, *etc.*) including market infrastructure, economic management mechanism and its elements.

The ultimate goal of food market effective functioning is the capability of optimal satisfaction of population's demands in respect of food supplies. At the modern stage of development food market can be considered quite competitive. Specificity of provided goods (food products differed with high degree of stable consumption) is one of the features of food market. The close association with economy branches emerging within the process of food market functioning is based on two aspects:

– dependence of food market on activity of other branches (food products suppliers);
– dependence between supplies of food products and effective work of economy branches.

The main function of food market is the formation of prices based on demand and supply and use of the prices in capacity of data base for defining wage rates upon conclusion of food products supply agreements. On the assumption of the foregoing we can point out a number of factors defining food market conjuncture, Table 1.

Table 1. Food market conjuncture factors

Group	Demand	Supply
Natural factors	Specialty of territory (country, region) in terms of cultivation of food products	Quality
Climatic factors	Like natural factors – differ with specialty of territory (country, region) and cultivation of food products in the territory	Natural management quality
Economic and political factors	Dependence on prices for food products in territory (country, region), population income level, elastic demand with reference to prices and incomings	Availability of tax-credit patronage; Amortization; Dependence on investment climate, resource-and-technology level of territory, competitiveness, economic relations with suppliers and consumers.
Cultural and moral factors	Dependence on the level of education, mentality (eating preferences)	Implies dependence on subsidies, subventions, social sphere institutions' state, social and economic development level
Socio-demographic factors	Dependence on number and structure of population, its increase, migration indicators, formed traditions and standards of people behavior	Implies dependence on settlement policy and employment volume and structure

Source: Compiled by the authors using article materials (Novoselova 2011, 137)

At the present time the relations between market participants are quite multidirectional. Consequently, the character of performed actions is also different. Such a situation, witnesses absence of stability and reduces reliability of food "chain".

Together with understanding of food market it is necessary to denote understanding of food supply security, as far as positive and dynamic development of the first aspect is the condition for achievement of the second one.

On the basis of analysis of the latest researches, including publications, we can point out various aspects of food supply security. Thus, there is studying of different aspects of food supply security provision problem based on materials of Food and Agricultural Organization (Kaygorodtsev 2017, 248). Besides, the issue is researched by foreign authors (from CIS and non-CIS countries). Kazakhstan scientists in their studies raise an issue concerning formation and development of food supply security provision system at the level of republic. Of separate interest are the works of such scientists as Alshanov (2006), Apsalyamov (2004), Gizatova *et al.* (2015).

Food supply security is an integral part of national and economic security, the condition for which, in term, is stable development of food market. To provide food supply security state uses definite means represented in Figure 3.

Figure 3. Food supply security provision mechanism

Source: Compiled by the authors using article materials (Grigoriev 2015, 14)

Territorial differences in balances of production and consumption of food products issue from natural-climatic conditions, self-sufficiency conditions, available resource potential and due to other specific features of regions. It is obvious that population at large should have opportunity of purchasing food products for personal consumption and physiological needs satisfaction, however increase of incomings differentiation aggravates the problem of physical and economic accessibility to food products for various social-demographic groups. Constant growth of gap in levels of population incomes influences both – the amount and the quality of food products consumption. A full-fledged food supply security system should be based on the following principles:

- self-sufficiency – the ability of state (region) to cover food demands of the bigger part of population of corresponding territorial unit by means of own production capacities;
- independence – the absence of dependence on import food deliveries;
- accessibility – the provision of every man with accessibility to food products in amount, quality and assortment corresponding to scientifically-grounded consumption standards;
- quality – the achievement of balanced and full-scale population's nutrition level due to consumption of high-quality and ecologically safe food products;
- balances – the level of consumption of high-quality food products with corresponding content of macro- and microelements being sufficient for performance of active and healthy life;
- sufficiency – which is defined by all population groups' accessibility to food products due to existing consumer demand.

Summarizing the results of literature sources' analysis we can say that provision of population with food products is the priority task of every country, as well as the priority issue in terms of every country's safety problems solution. Development of food market is the main condition for food supply safety, while the market's effective functioning implies its capacity to optimal satisfaction of population needs in terms of food products.

2. Materials and methods

The main research method upon analysis of food market problems is the method of statistical data study or statistical analysis.

Within the present context we will use the system of indicators that reflects structural component of food market. It allows us opportunity of giving characteristics of state and trends, including key elements: conjuncture, infrastructure, subjects (Table 2).

Table 2. Main indicators characterizing state of food market

Elements	Indicators
Conjuncture	– Dynamics of gross domestic product, food production volumes, gross output of agricultural products; – Dynamics of employment, real incomes of population; – Dynamics of food products import and export; – Dynamics of prices, *etc*.
Infrastructure	– Dynamics of sales turnover (trade transactions)
Subjects	– Sellers (leading sales networks of Kazakhstan), consumption dynamics

Source: Compiled by the authors using monography materials (Ulezko 2014, 18)

The changes revealed with use of suggested indicators will allow defining favorable and unfavorable trends, food market competitiveness degree, dynamics of national production share, subjects' adaptation to the conditions of country's economy.

The present indicators are studied with account of dynamics for definite time interval (a couple of years).

Empirical base of the research is represented with the Republic of Kazakhstan as the main research subject. The Republic of Kazakhstan is a unitary state performing presidential government. Administrative-territorial structure can be represented in the following way: 14 regions, 2 cities of republican status. As of 01.01.2018 the number of population makes about 18 mln. people. Ethnic structure of population is as follows: Kazakhs – the bigger part of population that makes about 63%, Russians – about 23,7%, within 2% there are Uzbeks, Ukrainians, Uigurs, Tatars, Germans, etc. Territory makes more 2,5 mln. square meters. North and West of the territory borders with Russia, East – with China, South – with Kyrgyzstan, Turkmenistan, Uzbekistan.

The main stages of researching the problem are:

– studying and analysis of theoretical aspects of food market, main approaches to its understanding and analysis of its indicators with use of statistical data;

– second stage is provided by studying of selected indicators: their comparison and dynamics within the period from 2015 to 2017;

– third stage includes summarizing and making conclusions in regard of problems of food market of Kazakhstan, offers directions for their solution.

3. Results

Goal of the study is the determination of general trends of food market of the Republic of Kazakhstan. On the basis of statistical data analysis there is a possibility of making definite conclusions and plotting analytical graphs and tables. Taking into account suggested indicators, in figure 4 there is dynamics of gross domestic product.

According to review data of SC NEM RK, the volume of GDP for 2017 made 48 trn. tenge, having increased 3% in real terms. The main contribution to GDP growth has been made by increase of mining industry volumes (11,3%), processing industry (5,7%), transportation and warehousing (4,7%), wholesale and retail trade (3,0%), transactions with real estate (2,1%), see Figure 4.

Figure 4. Dynamics of gross domestic product

Source: Compiled by the authors using materials of Statistics Committee of National Economy Ministry of the Republic of Kazakhstan (SC NEM RK)

Dynamics of food production volumes and gross output of agricultural goods is represented in Figure 5.

Figure 5. Dynamics of food production volumes and gross output of agricultural goods

One of the main drivers of growth within processing industry is represented with food products' manufacturing (the growth made 2% in comparison with previous period). On an annualized basis the gross output of agricultural sector products has increased 2,3%. The positive dynamics is observed in both – the crop husbandry (against the background of high grain crop) and the cattle breeding. Dynamics of labour market indicators is represented in Figure 6. For 2017 there are data of selective survey of population employment for 3rd quarter.

Figure 6. Dynamics of unemployment level

During the 3rd quarter of 2017 the share of employed population has increased 0,2% in comparison with 2016. In terms of branch economy there is increase of employed population in the spheres of trade (3,1%) and education (5,5%). Reduction of the share has been observed in building industry (7,3%) and agricultural sector (4,0%). Level of unemployment in 2017 has made 4,9%, which is less than in previous period.

In Figure 7 there is dynamics of population's real wage index (data for 2017 are represented as of 12.01.2017). It should be noticed that in 2017 there is reduction of real wage index. The share of population having incoming below subsistence line remains at the level of previous period.

Figure 7. Dynamics of population's real wage index and share of population having incomings below subsistence line, %

In Figure 8 there is food products structure.

Figure 8. Food products structure

The main share falls on agricultural products and food products' manufacturing, the share of the latter reduces in comparison with previous period. Dynamics of export and import is represented in Figure 9 (data for 2017 are represented as of January-September of 2017).

Figure 9. Dynamics of export and import

Taking into account the data represented in the figure we can observe growth in both indicators. In Table 3 there are dynamics and structure of export by some food products' groups. In 2017 there is increase of export as to CIS countries and the rest countries of the world, the main share falls on cereals (CIS countries – 401 mln. USA dollars, the rest countries – 356 mln. USA dollars).

Table 3. Dynamics and structure of export by some food products' groups

Group	2017			2016			2015		
	Total	Including		Total	Including		Total	Including	
		CIS	The rest countries of the world		CIS	The rest countries of the world		CIS	The rest countries of the world
TOTAL, including:	43.223,8	3.037,5	40.186,3	32.806,7	2.397,4	30,4	41.204,9	2.898,2	38.306,7
Live animals	1,8	0,8	1,0	1,4	0,5	1,0	1,3	0,6	0,7
Meat and meat and meat by-products	4,3	0,9	3,5	1,0	1,0	0,6	0,7	0,4	0,3
Fish, crustaceans, shell-fish, etc.	45,6	1,7	43,9	44,2	1,9	42,3	46,7	2	44,7
Products of milk, milk, eggs, natural honey, animal derived products	16,1	5,5	10,6	5,2	4,2	0,9	7,0	6,1	0,9
Vegetables, *etc*.	98,9	40,7	58,2	49,0	9,2	39,8	14,5	4	10,5
Fruits, nuts, *etc*.	1,3	0,1	1,2	0,9	0,1	0,8	5,4	0,2	5,2
Coffee, tea, *etc*.	0,4	0,0	0,4	0,4	0,0	0,4	1,9	1,3	0,6
Cereals	757,6	401,4	356,3	700,7	394,1	306,6	733,5	455,2	278,3
Flour and cereals products, *etc*.	475,6	147,5	328,1	501,6	166,5	335,1	490,7	238,1	252,6
Fats and oils (of animals, vegetable), *etc*.	94,4	42,8	51,6	53,2	27,4	25,8	45,9	28	17,9
Ready-to-eat products of meat, fish, crustaceans, shell-fish, *etc*.	2,0	1,0	1,1	1,0	0,7	0,3	2,4	2,2	0,2
Sugar and sugar confectionery	25,1	23,6	1,5	8,8	6,7	2,1	9,7	5,3	4,4
Cocoa and cocoa-related products	7,8	4,9	3,0	6,7	2,9	3,8	13,5	6,9	6,6
Ready-to-eat products of corn and cereals, *etc*.	23,3	14,1	9,2	24,2	14,0	10,2	34,2	23	11,2
Processed vegetables, fruits, *etc*.	2,6	2,2	0,4	3,2	2,6	0,6	2,1	1,4	0,7
Other food products	9,2	7,2	2,0	7,7	5,6	2,1	18,7	13	5,7
Alcohol and alcoholic-free drinks, vinegar	4,1	2,3	1,8	6,0	1,6	4,4	27,5	18,8	8,7

Source: Compiled by the authors using materials of the Ministry of Public Revenues of the Ministry of Finance of the Republic of Kazakhstan (MPR MF RK).

Sales turnover of various groups of products is as follows: flour and cereals products – 147 mln. USA dollars for CIS countries, 328 mln. USA dollars – for the rest countries; malt, starch, alant starch, wheat gluten, as well as vegetables and some edible roots and tuber crop – 40 mln. USA dollars for CIS countries, 58 mln. USA dollars – for the rest countries; fats and oils of animal and vegetable origin, their cleavage products, wax of animal and vegetable origin – 42 mln. USA dollars for CIS countries, 51 mln. USA dollars – for the rest countries.

In Table 4 there are dynamics and structure of import by some food products' groups.

Table 4. Dynamics and structure of import by some food products' groups

Group	2017			2016			2015		
	Total	Including		Total	Including		Total	Including	
		CIS	The rest countries of the world		CIS	The rest countries of the world		CIS	The rest countries of the world
TOTAL, including:	17.063,4	1.607,2	15.456,2	15.513,2	1.500,1	14.013,1	19.436,7	1.871,6	17.565,1
Live animals	13,6	3,4	10,2	10,4	1,7	8,6	15,5	1,7	13,8
Meat and meat and meat by-products	132,9	26,1	106,8	121,0	26,3	94,7	148,6	22,5	126,1
Fish, crustaceans, shell-fish, *etc*.	43,8	0,0	43,8	33,3	0,0	33,3	33,4	0	33,4
Products of milk, milk, eggs, *etc*.	105,5	46,8	58,7	88,9	40,3	48,6	88,5	39,3	49,2
Vegetables, *etc*.	149,6	86,0	63,6	117,9	79,8	38,0	216,7	122,1	94,6
Export of fruits, nuts	421,0	250,6	170,4	410,8	241,0	169,8	426,5	193,9	232,6
Coffee, tea	108,3	2,9	105,4	100,3	2,5	97,8	104,5	3	101,5
Cereals	3,5	0,2	3,2	2,2	0,4	1,8	7,3	2,6	4,7
Flour and cereals products, *etc*.	4,5	0,3	4,2	3,1	0,3	2,8	3,8	0,6	3,2
Fats and oils (of animals, vegetable), *etc*.	39,1	2,9	36,2	32,9	6,6	26,2	40,8	11,1	29,7
Ready-to-eat products of meat, fish, crustaceans, shell-fish, *etc*.	3,5	0,3	3,1	3,3	0,2	3,1	4,6	0,3	4,3
Sugar and sugar confectionery	160,2	21,1	139,1	214,9	41,7	173,2	193,1	60,6	132,5
Cocoa and cocoa-related products	78,5	27,8	50,7	75,9	23,2	52,7	73,1	30,1	43
Ready-to-eat products of corn and cereals, *etc*.	96,5	58,5	38,1	80,3	45,5	34,7	130,9	81,4	49,5
Processed vegetables, fruits, *etc*.	80,1	17,0	63,1	68,7	12,1	56,6	93,2	16,1	77,1
Other food products	100,7	1,8	98,9	86,8	1,8	85,0	106,1	4,3	101,8
Alcohol and alcoholic-free drinks, vinegar	104,4	19,1	85,4	89,2	16,6	72,6	120,8	25,2	95,6

Source: Compiled by the authors using materials of MPR MF RK

In general, in 2017 there is growth of food products' import. According to the data of Statistics Committee, production of meat in Kazakhstan in January-August of 2017 has made 591,2 thous. tons, which is equal to 83,6% of market demand. At the same time, import of this product category has made 116 thous. tons (16,4%). Major deliveries have been performed from Russia, Ukraine and the USA.

National production of sausages has made 59,8% of consumption (27,3 thous. tons), while import smoke products has made 40,2% (18,3 thous. tons). As a rule, generally there, deliveries of meat processing products from Russia and Canada.

At the same time, the share of Kazakhstan fish and seafood has at the market has reached 48,9% (24,6 thous. tons), while import has made 51,1% (25,7 thous. tons). The major suppliers are Russia, Norway, Greece.

The share of juices produced in Kazakhstan has made 83,2%, while import – just 16,8%. Besides, the share of national production of sunflower oil makes 74%, milk – 93,4%, dairy butter – 71,5%, cheese and damp and cottage-cheese – 56,8%, condensed milk – 36,8%, yoghurt – 85,8%.

Import substitution in the area of food consumption in Kazakhstan is much more successful, than in non-food area. By 2017 the share of food products' import has reduced from 47 to 35 items (Analytical service Finprom.kz). The process of import substitution in the area of sugar production has also become more intense, the share of import has made 21%. In 2015 this indicator was equal to 41%. In 2016 there was significant reduction of the share of meat and meat by-products import (excluding pork and cattle meat) – while in 2015 the import was at the level of 63%, in January-December of 2016 it has reduced to 37%. However, in 2017 this

indicator has gained some growth. In 2016 reduction of the share of food products' import varied within the range from 0,2 to 36 percentage points per year. In 2017 these indicators have reduced to 20%.

In Figure 10 there is trade volume dynamics.

Figure 10. Trade volume dynamics

Source: Compiled by the authors using materials of SC NEM RK

There is also growth of volumes of retail trading in value terms. The largest retail operators dealing with food products' realization in Kazakhstan are represented in Table 5 (data for 2017 are listed as of 08.01.2017). The first position in realization of products in 2017 is taken by "MAGNUM CASH & CARRY" LLP trading network with turnover making 11,06 bln. tenge.

The second position is taken by "SKIF TRADE" LLP with SMALL brand and turnover making 5,2 bln. tenge. The third leader is "METRO CASH & CARRY" LLP with turnover being equal to 4,6 bln. tenge.

Table 5. The largest retail operators dealing with food products' realization in Kazakhstan

Name	Location	Size of enterprise	Trade turnover, mln. tenge		
			2015	2016	2017
"MAGNUMCASH&CARRY" LLP	Almaty, Zhetysu district	Large enterprises (from 1001 people)	15.200,8	24.973,6	11.069,5
"SKIF TRADE" LLP	Almaty, Bostandyk district	Large enterprises (from 1001 people)	4.807,9	10.544,2	5.213,3
"METRO CASH & CARRY" LLP	Almaty, Auezov district	Large enterprises (from 501 to 1000 people)	3.970,2	7.773,8	4.681,1
"RAMSTORKAZAKHSTAN" LLP	Almaty, Medeu district	Large enterprises (from 251 to 500 people)	5.624,2	5.692,1	1.637,5
"ALMASTOR" LLP	Almaty, Bostandyk district	Large enterprises (from 1001 people)	1.980,5	2.539,9	1.248,4
"INTERFOOD" LLP – THE JOINT KAZAKHSTAN-GERMANY ENTERPRISE	Almaty, Medeu district	Large enterprises (from 501 to 1000 people)	2.238,7	1.401,7	313,2
"KENMART" LLP	Almaty, "ALMATY" district	Large enterprises (from 251 to 500 people)	153,2	360,9	172,5

Source: Compiled by the authors using materials of Emil Institution of Marketing and Social Researches.

Next, we'll consider the food market in terms of consumption and consumers' groups. According to the data of selective survey of households aimed at living standards evaluation, in 2016 there was differently directed change of food consumption by population. Main growth has been observed in consumption of potato, eggs, cereal products, milk and dairy products, oil and fats, Figure 11.

Figure 11. Food products' consumption

Main reduction of consumption refers to the following groups of products: fruits, fish and sea products, sugar, jam, honey, chocolate, confectionary, meat and meat by-products, vegetables. The most consumable group of food products (at average per head of population) in the Republic of Kazakhstan is represented with milk and dairy products, the least – with fish and sea products. Upon comparison of consumption of main food products types in rural and urban areas in 2016 the biggest differentiation is observed in consumption of eggs and cereal products.

In general, the volume of consumption as per head of population in Kazakhstan remains stable, the structure of consumption in the crisis period has not changed significantly. The first position by consumption of all 10 groups of food products is taken by Karaganda region – as of the first quarter of 2017 there is 232,1 kg of food products per man. The second position is taken by Pavlodar region (230,6 kg) and East Kazakhstan region (229,4 kg). Less products are consumed by habitants of Qyzylorda, Aqtobe and Zhambyl regions – 188,3 kg, 184,5 kg, 177,9 kg correspondingly (Emil Institution of Marketing and Social Researches 2017).

Comparing the level of food products' consumption, as well as their import and export, we can see definite disbalance that constitutes a menace for country's food supply security. There is impossibility of self-sustained provision of some groups of food products. Thus, the structure of households in the area has impact on food supply security by separate products.

4. Discussion

The problem of food market of Kazakhstan is quite urgent. In general, in 2017 there is a high share of imported products represented mainly with fruits, nuts and potato. The domestic production of these groups of goods covers only 21% of market, which is insufficiently. Vegetable and fruit growers of Kazakhstan cannot provide internal market even with the most common goods, such as frozen fries, not to mention dried fruits and various jams. The point is that vegetable and fruit growing in the country is performed by petty farmers who cannot purchase some production capacities, while major companies do not deal with processing due to the lack of supply guarantees, since small-scale farms cannot provide guaranteed volumes of raw material.

It should be noticed that in general the volume of domestic production of many types of goods has increased in recent 8 years. However, there is strong dependence on production specificity – the more efforts are required for processing, the less the share of consumption. Food manufacturing industry of Kazakhstan experiences obvious lack of capacities and investments (Akhmetshin *et al.* 2017).

In such a situation there is a necessity of strengthening the state support of farm in particular and agriculture in general. Problems of support and development of agricultural sector as one of the main directions of food market development have been raised at various times and are raised up to date. Moldashev A. (CEO of R&D of agro-industrial complex economy and rural areas' development) mentioned that among problems

impeding increase of production and export of agricultural goods there is a lack of processing capacities and facilities for keeping obtained materials. Besides, he noticed insufficiency of investments to agricultural sector (Kazakhstan is not able to provide food supply security 2015).

Gizatova and Amangolieva (2015, 15) mention that effectiveness of market's functioning is defined by agricultural sector development, which, in turn, is provided by the consistency of applied measures of state support. At the present time the issue is raised by deputy corps, particularly, the deputy of Mazhilis Roman Kim says: "The seeming high support on the part of state in the form of subsidies in fact makes about 3% of gross domestic product in agricultural sector, which ultimately has no impact on the end effect. At the same time the subsidies of neighbouring countries are higher: in Russia they make 10%, in Belarus – 18%. It is said nothing of the USA, where direct financing of agricultural sector makes 50 bln. dollars; or Japan, where the size of subsidies for rice growers reaches 700% of production prime cost (Tusupbekova 2018).

In 2017 there is increase of products' import – mainly of meat and milk. The problem is that there is a lack of wells, which does not allow pasturing cattle back from settlements and limits its number. Thus, there is a problem related with increase of production of meat and meat by-products, dairy products, *etc*. Consequently, the only solution is the import, which raises the problem of imported products' quality control. The problem can be solved with creation of controlling authority within the framework of the Ministry of Agriculture. Such a suggestion has already been made by agriculture minister Arman Evniev, who stated there was a necessity of establishing unified government authority that would deal with issue of food products' safety provision. Besides, this mechanism is not used to the full for protection of internal market from dangerous and adulterated imported products. Thus, for example, the imported frozen poultry meat is often re-frozen, which makes it dangerous. As a result, due to the lax control such products reduces competitiveness of national goods and makes all state support measures inefficient (Who bears responsibility for food safety in Kazakhstan 2018).

Thus, at the present moment all the issues of how to solve the problems of food market are quite controversial and ambiguous, they require a complete approach in terms of legislation, organization and finances. Author's position is that there is a problem of serious dependence of Kazakhstan on food products' import, which constitutes a menace for country's food supply security in particular and national security in general.

Conclusions

On the assumption of carried out study we can draw some generalized conclusions. Food market is a complicated organizational-and-economic system, within which on the basis of effective consumer demand there is formation of consumers' goods and services supply with account of agricultural goods (processing, distribution, exchange, consumption). The complicated organizational-and-economic system is represented with trade, foreign economic activity (international trade), infrastructure (production and non-production). Food market development is the main condition for country's food supply security. The Republic of Kazakhstan is rather developed country having great potential of land, water and labour resources, which is the condition for development of manufacturing of agricultural and other food products. However, there are definite problems related with food market development, which reside in tipping the balance of consumed products, as well as with import and export of food products, which in the aggregate constitutes a menace for country's food supply security. In such a situation there is a necessity of taking measures in the area of agricultural sector and elaborating state support mechanisms.

Author's position regarding approaches to solution of food market problems in Kazakhstan is as follows:

– It can be noticed that even within the framework of existing programs there should be significant expanding of state support measures' inclusion by redistribution of budgetary funds between separate directions and development of financing programs for agricultural enterprises. Under conditions of limited access to bank crediting at the local level of crucial importance is the emerging the role of agricultural production cooperatives and micro-financial organizations. The task of prime importance regarding agricultural production cooperatives is the solution of problem of funding at cost of local budget and funds of "Baiterek" National Holding. They should become the key institutions in realization of regional investment projects with high growth potential.

– It is also quite important to use other countries' experience in solution of the problems.

References

[1] Abdikerimova, G.I., and A.N. Baygusheva. 2014. *Food Supply Security of the Republic of Kazakhstan as the System of "Deep Knowledge"*. Available at: http://www.rusnauka.com/14_ENXXI_2014/Economics/12_ 169714.doc.htm

[2]   Abdildin, S.A. 1997. *The Principles of Self-Regulation Are Deeply Flawed*. Almaty: Atamura.

[3]   Akhmetshin, E.M., Artemova, E.I., Vermennikova, L.V., Shichiyakh, R.A., Prodanova, N.A., Kuchukova, N.M. 2017. Management of investment attractiveness of enterprises: Principles, methods, organization. *International Journal of Applied Business and Economic Research,* 15(23): 71-82.

[4]   Alshanov, R.A. 2006. *Kazakhstan at World's Agrarian Market: Potential, Problems and Their Solution*. Almaty: The Institute of world's market.

[5]   Altukhov, A.I. 2014. The Paradigm of the Country's Food Security in Modern Conditions. *Economics of Agriculture of Russia*, 11: 4-12.

[6]   Apsalyamov, N. 2004. Trends of Development of Food Manufacturing Industry in the Republic of Kazakhstan. *Transit Economy,* 5: 39-45.

[7]   Burdukov, P.T., and R.Z. Sayetgaliev. 1999. *Russia within the System of Global Food Supply Security*. Available at: www.duel.ru

[8]   Conway, G., and E. Barber. 1990. *After the Green Revolution. Sustainable Agriculture for Development*.

[9]   Dolan, E.J., and E. Lindsey. 1992. *Market: The Microeconomic Model*. Saint Petersburg.

[10] Espolov, T.E., Belgibaev, K.M., Suleymenov, Zh.Zh. 2005. *Agrarian Policy*. Almaty: Publishing house KazNAU.

[11] Gizatova, A.I., and Z.K. Amangolieva. 2015. Governmental Regulation of Food Market. Paper presented at International Research and Practice Conference "Science and Education of 21st century: Experience and Prospects", November 20-21, in Oral, Kazakhstan

[12] Goncharov, V.D. 2001. Methodology Issues of the Territorial Organization of the Food Industry. *Storage and Processing of Agricultural Raw Materials*, 4: 20-22.

[13] Grigoriev, E.O. 2015. Food Supply Security: Peculiarities of Formation at the Level of Regions. *Food Manufacturing Industry Economy,* 1(25): 13-18.

[14] Ilyina, Z.M., Mirochitskaya, I.V. 2000. *Agricultural Raw Materials and Food Markets*. Minsk: BSEU Publishing house.

[15] James, W.P.T., and C. Schofield. 1990. Available at: *Human Energy Requirements*. FAO/OUP.

[16] Kaygorodtsev, A. 2017. Food Security of Kazakhstan: Evaluation of State and Ways of Provision. *Actual Problems of Economy,* 6(144): 247-257.

[17] Khamukova, M.A. 2016. *Mechanism of Food Provision Regional Policy Realization: Materials of the Kabardino-Balkarian Republic*. Available at: http://www.dissercat.com/content/mekhanizm-realizatsii-regionalnoi-politiki-prodovolstvennogo-obespecheniya-na-materialakh-ka#ixzz573cZl6pt

[18] Kornienko, L. 2012. *Formation of Effective System of Food Supply Security*. Available at: http://www.mari.ru

[19] Kotler, F. 1994. *Basics of Marketing*. Moscow: Progress. Available at: http://htbiblio.yolasite.com/resources/12.11.15/Kotler_kratkiy_2007.pdf

[20] Lokshin, R.A. 1975. *Demand, Production, Trade.* Moscow: Ekonomika.

[21] Lupashko-Stalsky, I.P. 2002. The Role of International Agricultural Organizations in Provision of Food Supply Security in World's Countries. *Informational Bulletin of the Ministry of Agriculture of the Russian Federation*, 11. Available at: www.agromedia.ru

[22] Matusevich, V.A. 1970. Profitability of Cooperative Trade in Surplus Agricultural Products and Ways to Increase It. Candidate of Economic Sciences diss., Moscow Institute of Finance and Economics.

[23] McConnell, C.R., and S.L. Brue. 1992. *Economics: Principles, Problems and Policy*. Moscow: Respublika.

[24] Moldashev, A.B. *Problems of Agro-Industrial Complex Development*. Available at: http://www.minagri.kz

[25] Novoselov, A.S., and Marshalova A.S. 2012. Regional Development Policies and Local Government in the Russian Federation. *Journal of Contemporary Management*, 5(1): 73-84.

[26] Novoselov, S.N. 2011. Role of Food Markets within National System of Food Supply Provision. *Economy and Management*, 12(85): 136-139.

[27] Nuraliev, S.U. 2004. *Food Market: Problems of Establishing and Development Trends*. Volgograd: Publishing House of VSU.

[28] Orlova, A.V. 2012. Evolution of Concept "Economic Safety". *Scientifically-Practical Magazine Modern Economy: Problems and Decisions*, 8(32): 80-89.

[29] Pindyck, R., and D. Rubinfeld. 2001. *Microeconomy*. Moscow: Delo.

[30] Serova, E.K. 2001. Towards the Issue of Food Supply Security of Russia. "Open Economy" Expert Channel. Available at: http://www.opec.ru

[31] Tasmambetova, A.Z. 2016. Food Market as a Structural Element of Market Mechanism: Economic Essence, Content and Functions. *Herald of KRSU,* 16(2): 79-82.

[32] Tusupbekova, L. 2018. Food Supply Security in Kazakhstan is under the Threat. Available at: http://www.kaz pravda.kz/news/obshchestvo/deputati-mazhilisa-somnevautsya-v-prodovolstvennoi-bezopasnostikazahstana/

[33] Ulezko, A.V. 2014. *Food Resources Market within the System of Food Supply Security Provision in the Far East. Monography.* Voronezh. State Agrarian University of Voronezh.

[34] Zinchuk, G.M. 2011. Notions and Types of Food Market. *Almanac of Modern Science and Education,* 10(53): 111-113. https://elibrary.ru/item.asp?id=17341410.

[35] Zinina, L.I., Glukhova, T.V. 2010. Formation of the Regulatory System of the Regional Food Market. *Journal "Regionology"*, 2: 93-103.

*** Analysis of Food Products Market of Kazakhstan. Emil Institution of Marketing and Social Researches. Available at: http://www.marketingcenter.kz/

*** Analytical Service. http://Finprom.kz

*** Kazakhstan is not able to Provide Food Supply Security. 2015. Available at: https://qostanay.tv/ekonomika/kazahstan-ne-v-sostoyanii-obespechit-prodovolstvennuyu-bezopasnost

*** State of Affairs in Connection with the Lack of Food Supply Security in the World. 2012. Available at: http://www.fao.org

*** Statistics Committee of National Economy Ministry of the Republic of Kazakhstan. Available at: http://stat.gov.kz/

*** Who Bears Responsibility for Food Supply Security in Kazakhstan. 2018. Available at: http://www.matritca.kz/news/51346-kto-v-otvete-za-pischevuyu-bezopasnost-v-kazahstane.html

*** Ministry of Public Revenues of the Ministry of Finance of the Republic of Kazakhstan. Available at: http://kgd.gov.kz/ru

Strategic Methods for Managing Risk Insurance in Crop Production

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Abstract:

Doing any entrepreneurial activity takes place under conditions of risk and uncertainty. Agricultural production is distinguished by a special risk environment, since it manifests natural and climatic risks that are very dangerous and have the maximum effect on the final results of operations. At the same time, the economic damage caused by them is not only comparable to the scale of the financial results of commodity producers, but periodically exceeds them. Households also suffer losses as a result of the risks that are traditional for any commercial activity (production, marketing, financial): the size of these losses is large, difficult to estimate, and the consequences are disastrous. Therefore, the complex impact of agricultural risks obliges commodity producers to put stability and guaranteed result in the first place in the system of their interests.

Keywords crop production; strategic management; insurance; risk; insurance system; agricultural insurance

JEL Classification: M21; M29

Introduction

Today, insurance is a necessary sign of a civilized, modern and efficient business system. At the same time, insurance in agriculture and in our country in particular, is one of the riskiest sectors of the economy, since agriculture in Kazakhstan is carried out in unpredictable and unregulated natural and climatic conditions. At present, the existing fundamental shortcomings of the compulsory insurance mechanism in crop production make it necessary to develop new, principled and clear approaches to financial and credit policy, more relevant to the needs of agricultural producers.

Crop production in Kazakhstan is a successful and long-growing industry in agriculture with a large export potential, that the efforts of the government allowed domestic farmers not only to stand on their feet, but also to exceed the figures of the Soviet era. In addition, consequently, here the strategy takes into account the favorable situation for the country (which developed not by itself, but thanks to timely measures) in order to maintain the development trend in the future.

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1. Literature review

In theory, Gobbi insurance is considered as the distribution between many individuals of future, unknown and random needs. V.I. Serebrovsky, considering the theory of Gobbi as a fundamental idea, believed that the main purpose of insurance is to satisfy a random need. In fact, as insurance practice shows, insurance is intended, first, to satisfy the property and monetary needs of citizens and legal entities that arise when certain random circumstances occur (Gracheva and Boltinova 2011).

So, for example, Grave and Lunts (1960) under insurance in the broad sense of the word understood, first of all, a set of measures to create material and (or) cash resources, through which the damage is repaired, losses in the public sector are restored during natural disasters or accidents. In conditions when private ownership becomes predominant, when private entrepreneurship develops, there is a need to protect personal and property interests from not only unforeseen natural, technological and other phenomena, but also a wide range of risks associated with entrepreneurial activities from agricultural producers. It is in these conditions that insurance acquires special significance (Reitman 2016).

The existing insurance system in crop production is obligatory and determines the conditions of the standard policy of insurance of direct production costs, which all insurance companies and EIA are obliged to keep, including the crops and risks that have been insured, the amount of insurance for each crop at each regional and district level. However, at present insurance in agriculture is regulated by the Law of the Republic of Kazakhstan dated March 10, 2004 No. 533 "On Compulsory Insurance in Crop Production" aimed at financially protecting agricultural producers from possible losses in the event of crop failure and, although the existing agricultural insurance model is constantly changed and supplemented, it still has a number of unresolved problems that concern both insurers, who are less and less active in this market segment, and agricultural private producers, constantly reducing the demand for the services of insurance companies (Law 2004). The presence of a number of problems does not allow this type of insurance to reveal its potential and increase its share in the total market volume.

Given the importance of the agricultural sector in the country's economy and its dependence on natural and climatic conditions, insurance in crop production was classified as a mandatory species (Law 2006). However, compulsory insurance of farmland has not led to proper risk management in the agricultural sector.

In his research on risk management, Malashikhina (2014) notes that agricultural producers face many risks: price fluctuations, yields, partial or complete loss of resources, and changes in government policy. In addition, agricultural production is at risk of natural disasters and emergencies. Such natural hazards as drought, hail, flood, can lead to serious industrial losses.

Since Kazakhstan is located in the area of highly risky farming, where the average annual frequency of drought is 40% (2 years out of 5), and in the west of the country reaches 60% (3 years out of 5), the problem of frequent adverse weather events is further complicated by their systemic character, when droughts or floods affect vast areas of the country's agricultural lands, they can lead to massive (unpredictable) losses for agricultural producers (hereinafter referred to as agricultural farming). The consequences of adverse weather conditions also have an impact on the financial stability and solvency of agricultural producers, who are mostly borrowers for loans and most often, such loans are provided through government concessional loans.

In his publication, Kruglov (2011) explains that the insurers themselves note the unprofitability of insurance of agricultural crops associated with the presence of a high risk of farming in the regions of the country and the inadequacy of insurance tariffs. Unprofitability also depends on the activities of agricultural producers themselves, who do not seek to improve production technologies, and in some cases do not comply with certain crop standards, which often leads to yield loss even with a slight deterioration in weather conditions. Under these conditions, for the state an important task is to ensure the effectiveness of investments, as well as support and stimulate the growth of agricultural production.

2. Methodology

In the theory and practice of insurance, Zhuravlev and Sekerzh (2013) note that in many countries the state directly intervenes and regulates the situation on the domestic market of agricultural products, thus trying to reduce the problems associated with the risk in agricultural production. However, nowadays, in the context of growing globalization and the associated liberalization of markets, such risk management tools lose their legitimacy. In connection with this, in many, first, developed countries, the issue of developing and wider dissemination of risk reduction strategies based on market mechanisms and complying with WTO rules becomes relevant. Insurance is one of the tools whose use does not violate WTO rules and can potentially serve as an effective tool for stabilizing the incomes of agricultural producers and the rural population as a whole.

International experience in solving such problems is associated with the introduction of agricultural insurance schemes. Building a comprehensive system of agricultural insurance in the Republic of Kazakhstan on market conditions with the participation of professional participants of the insurance market and on the basis of advanced market technologies ensures the solution of three tasks simultaneously:

– consists in protecting agricultural producers from the loss of crops due to the influence of adverse weather events.
– to assist agricultural producers in gaining access to rural finance, which protects loans from default due to weather conditions.
– to improve the effectiveness of government programs to support crop production.

In the Republic of Kazakhstan, the Law "On Compulsory Insurance in Crop Production" is currently in force, which should provide at least minimal protection for agricultural producers. The purpose of compulsory insurance in crop production is to protect the property interests of the producer of crop production from the consequences of adverse natural phenomena that entailed partial or complete loss of the crop, through insurance payments in cases, amount and procedure stipulated by the Law of the Republic of Kazakhstan N 533-II "On Mandatory Insurance crop production "dated March 10, 2004 (with further changes and additions) (Law 2004). But after 10 years, the main problems of the current Law were revealed, which are as follows:

1) Systemic risk and lack of risk management. The problem of frequent adverse weather events leads to significant losses for insurers. For insurers, by virtue of the obligation of the Law, it is not possible to refuse insurance to an unfair agricultural producer even if there is an obvious moral hazard (fraud). The situation is aggravated by the fact that the Law does not provide for regional or global diversification of risks through reinsurance.

2) Insufficient insurance rates. The law defines the minimum and maximum rates for different crops. In practice, insurance premiums are calculated at the minimum rate due to fierce competition between insurers and mutual insurance societies (EIA), and this practice, as practice has shown, is not sufficient to form a reserve of future insurance payments, which jeopardizes financial stability and sometimes even solvency insurer and OBC. Also, for participating in insurance of EBC, the possibility of reducing the tariff below the minimum is provided for, which leads to insurance from the side of the EIA at tariffs 2-3 times lower than the minimum. Current tariffs were calculated in 2005 and have not been updated since then, which is unacceptable from the point of view of adequacy of tariffs to the level of risk.

3) Inefficiency of current government subsidies. Currently, state support within the framework of the Law is provided at the expense of 50% reimbursement to insurance companies and mutual insurance societies of the amount of insurance payments. The existing mechanism of subsidizing insurance payments reduces the motivation of insurance companies and the EIA for proper assessment of losses and contributes to moral hazard, which can lead to collusion between the insurer and the insurer to overstate the amount of insurance payments.

4) There is no regulation of mutual insurance societies. In connection with the departure of most commercial insurers from the crop insurance market due to high unprofitability and unfair competition, agricultural producers increasingly rely on cooperation with the Mutual Insurance Societies, which are most often established by them. Since the EIA is not subject to insurance supervision by the National Bank or any audit requirements, the risk of inadequate loss assessment and fraud by the EIA is high. In the absence of reserves of losses, solvency margins and reinsurance of the EIA can not provide any significant insurance coverage against natural disasters and, thus, can not be considered as underwriters and organizations that can handle the risks. At best, the MRA may act as a so-called mutual aid fund, whose obligations are limited to the amount of the annual insurance premium collected from its members. But such an approach can only work for diversified risks and is completely unsuitable for highly correlated risks, as a result of which annual losses can easily exceed premium charges.

5) Imperfect loss settlement system. Since the Law does not provide for the participation of insurers in inspecting insurers, analyzing agricultural production practices and restricting insurers 'participation in damage assessment, insurers have no incentive to properly take care of improving agricultural technologies and make their crops more resilient to climate change. As a result, the Law does not allow the insurer to refuse to pay insurance indemnity, even in cases of obvious fraud (for example, when agricultural producers argue that there was a crop loss due to a natural disaster, although the field was never planted).

Considering these moments, as Prosandeeva (2016) notes in her articles, certain forms of contracts, methods of payment, other documents are already quite typed, but the entire agricultural insurance service does not yet have a complete form that is clear and comfortable for the agricultural producer. This requires additional

work on its development, and, with the participation of all parties to agricultural insurance: insurance companies, associations of insurers and agricultural producers, government agencies and support for agricultural insurance.

In this regard, we would like to note that ensuring the country's food and economic security, the social importance of agriculture and its dependence on climatic and many other external factors require state support for this sector of the economy.

Shumilina (2012) in its publications on state support of the agricultural insurance system, states that a high degree of dependence of crop production on weather conditions is the main reason for the development and implementation of index schemes for insuring risks to agricultural organizations, which are based on the frequency of occurrence of certain adverse weather events, their size and intensity.

World experience shows that in most countries this support is carried out through various channels, among which insurance is not the last, the indicators of which are shown in Table 1 by the example of the EU member countries.

Table 1. Agricultural insurance indicators in EU member states for 2017

Country	The degree of insurance coverage,%	Insurance Subsidies	
		M€	% insurance premium
Austria	78	24	46
Cyprus	100	4,4	50
Czech Republic	35	7	30
Germany	43	0	0
Italy	8	180	67
Latvia	less that 1	0,05	50
Portugal	22	32	68
Spain	26	232	41
Total from EU		497	32

Source: compiled by authors according to www.actuary.kz

By the example of the EU member states, Cyprus can see 100% insurance coverage, 78% in Austria, 43% in Germany, 26% in Spain, *etc*. (Amanova and Saduakasova 2015). According to the National Union of Agricultural Insurers (NSA), the main group of risks that caused insurance claims are phenomena associated with drought, mainly atmospheric, and dry winds. They account for more than 72% of payments. The next most important is the risk of frost, which led to 21% of payments, then hail - about 5% of payments, and the list of winter freezing is less than 2%.

If we talk about the Republic of Kazakhstan, the procedure for receiving the insurance payment and confirmation of the insured event is so complicated that some farmers do not even apply for payment. Insurance rates do not take into account the actual risks of agricultural production, depending on the region. In such a situation, it is easier for farmers to pay a fine than to participate in the insurance system and receive an amount that is not commensurate with its risks.

According to the statistics of the National Bank of the Republic of Kazakhstan, as of January 1, 2019, the volume of insurance premiums in compulsory crop insurance collected by two insurance companies that did not refuse this type of insurance amounted to more than 394 million tenge (Table 2 and Table 3).

Table 2. Receipt of insurance premiums in crop production for the period from 2010-2017 (in thousand tenge)

Name of insurance/reinsurance organization	2010	2011	2012	2013	2014	2015	2016	2017
JSC DSK Halyk Bank of Kazakhstan Halyk - Kazakhinstrakh	212.311	242.993	179.813	232.164	161.787	105.462	102.735	83.089
JSC Grain Insurance	209.843	144.764	161.423	237.767	318.006	286.619	314.668	312.160

Source: compiled by authors according to Data of the National Bank of the Republic of Kazakhstan

Table 3. Insurance payments in crop production for the period from 2010-2017 (in thousand tenge)

Name of insurance (reinsurance) organization	2010	2011	2012	2013	2014	2015	2016	2017
JSC DSK Halyk Bank of Kazakhstan Halyk-Kazakhinstrakh	341.380	111.088	231.369	37.309	45.480	27.917	2.464	3.484
JSC Grain Insurance	336.588	447	677.258	270.285	941.659	128.659	19.238	72.482

Source: compiled by authors according to Data of the National Bank of the Republic of Kazakhstan

According to the Statistics Committee of the MNE RK, the main grain-producing regions, North Kazakhstan, Kostanay and Akmola regions sent 145.6 billion tenge to the industry, which accounted for the majority of investments in agriculture, forestry and fisheries (41.3%). In 2016, investment growth was also significant, at 46.7%. This increase in investment in the industry is largely due to the implementation of state programs to support agriculture. The total area under crops allocated for grain crops in 2017 remained almost unchanged and amounted to 15.4 million hectares. 78% of the area was set aside for wheat. At the same time, the state policy of agricultural development is aimed at diversifying the acreage and reducing the area set aside for wheat in favor of other crops. As a result, the sown area of wheat in 2017 decreased by about 4%, or by 459.5 thousand hectares. Kazakhstan has three largest grain-sowing regions: Akmola region (which accounts for 28% of the acreage of grain); Kostanay region (27%); North Kazakhstan region (20%).

3. Study case

Grain harvest, according to the Statistics Committee of the MNE RK, in 2017 amounted to 20.6 million tons, which is close to the results of 2016. This included 14.8 million tons of wheat (72% of the total grain harvest). In the Akmola region 4 million tons of wheat were harvested (27% of the total wheat harvest), 4.2 million tons in the Kostanay region (28%), and 3.7 million tons (25%) in the North Kazakhstan region (Table 4).

Based on the gross crop yield indicators for the last seven years, the data of which are shown in Table 4, we will build a trend model for wheat and other crops. Graphical analysis of the data showed that the best specification of the model is a parabolic trend.

Table 4. Indicators of the gross grain harvest in the Republic of Kazakhstan for the period from 2010-2017

Type	2010	2011	2012	2013	2014	2015	2016	2017
Crop	9,6	22,7	9,8	13,9	13,0	13,7	15,0	14,8
Other	2,5	4,2	3,0	4,3	4,2	4,9	5,6	5,8

Source: compiled by authors according to Data from the Committee of Statistics of the MNE RK

The general view of the model is as follows:

$$y_t = b_0 + b_1 t + \beta_2 t^2, \tag{1}$$

We will estimate the parameters of the trend equation using the regression analysis tool (Data Analysis in Excel). As a result of approximation of data for wheat, we obtain the protocol, which is presented below (Sedelev 2017).

Table 5. The estimated parameters of the trend equation using the regression analysis tool

Regression statistics			
Multiple R	0,653573153		
R- square	0,427157867		
Normalized R-squared	0,140736800		
Standard error	3,642392594		
Observations	7		
Analysis of variance			
	df	SS	MS
Regression	2	39,57190476	19,78595238
Remainder	4	53,06809524	13,26702381
TOTAL	6	92,64	
	Coefficients	Standard error	t-statistics
b_0=	24,157142860	5,676258888	4,255821190
b_1=	-5,501190476	3,253003365	-1,691111216
b_2=	0,627380952	0,397417614	1,578644053

Thus, the equation of the parabolic trend for the volumes of wheat harvest is:

$$y_t = 24{,}157 - 5{,}502t + 0{,}627t^2$$

Table 5. Approximation of the data for other cultures

Regression statistics			
Multiple R	0,893486765		
R-squire	0,798318599		
Normalized R-squared	0,697477899		
Standard error	0,526330514		
Observations	7		
Analysis of variance			
	df	SS	MS
Regression	2	4,386190476	2,193095238
Remainder	4	1,108095238	0,27702381
TOTAL	6	5,494285714	
	Coefficients	Standard error	t-statistics
Y- intersection	3,857142857	0,820226864	4,702531733
Variable X 1	-0,154761905	0,470063259	-0,329236336
Variable X 2	0,066666667	0,057427367	1,160886699

The parabolic trend for the harvest of other grains is as follows:

$$y_t = 3{,}857 - 0{,}155t + 0{,}067t^2$$

We define the predicted values of the considered indicators on 2019 year, for this, we substitute the value into the obtained trend equations. Then we get:
- for wheat, the forecast will be:

$$y_t = 24{,}157 - 5{,}502 \cdot 9 + 0{,}627 \cdot 81 = 25{,}464 \quad m\ln.tg$$

- for wheat, the forecast will be:

$$y_9 = 3{,}857 - 0{,}155 \cdot 9 + 0{,}067 \cdot 81 = 7{,}864 \quad m\ln.tg$$

In 2017, the wheat yield increased to 12.4 centners per hectare from 12.1 centners per hectare in 2016. The highest yield indicator was achieved in Zhambyl oblast - 21.1 c/ha, and in second place Almaty oblast - 20.1 c/ha. In 2016, a high wheat yield indicator was also observed in the South Kazakhstan region, but in 2017, the yield decreased to 16.4 c/ha.

According to Kiseleva (2013), in her researches concerning the stabilization of the financial situation of agricultural enterprises, undoubtedly, many factors influenced the yields, in particular, wheat, one of which was climatic conditions. At the same time, the weather risk is superimposed on the economic one, which complicates its identification and analysis. Therefore, as noted by Kurmanbaev, Alibayeva (2015) in their articles, it is necessary to identify effective ways to reduce agricultural risks, which are carried out on the basis of the development of scientifically based recommendations and require knowledge of the structure and sources of financial support provided by equipment, protection means in crop production, financial guarantees of insurance protection. The impact on the risk of the method of insurance means that other methods do not fully compensate for possible damage and losses from various risks.

The lack of effectiveness of the existing mechanisms for compulsory insurance in the plant growing industry in Kazakhstan forces the Ministry of Agriculture to make conceptual changes and propose a new bill. Therefore, at present, there are only two insurance companies left in the market that provide compulsory insurance in this segment. Initially, there were a little more players - six, but they refused the corresponding licenses under the influence of a very high level of unprofitability, exceeding 100% in recent years.

Thus, the use of digital technologies will increase the transparency of the insurance system and the credibility of the insurance mechanism as a whole, and an objective definition of insurance claims will be provided. This infrastructure will allow further transition to voluntary insurance in crop production.

Building a comprehensive system of agricultural insurance in the Republic of Kazakhstan on market conditions with the participation of professional participants of the insurance market and based on advanced market technologies ensures the solution of three tasks simultaneously:

– *the first task* is to protect agricultural producers from the loss of crops due to the influence of adverse weather events;
– *the second task* is to assist agricultural producers in gaining access to rural finance, which protects loans from default due to weather conditions;
– *the third task* is to increase the effectiveness of government programs to support crop production.

Taking into account the international experience and practices of other countries, as well as with the participation of the World Bank, together with the Swiss Secretariat for Economic Affairs (SECO) and the Global Environment Facility (GEF), which was described in the Insurance Market magazine, proposals were made for the development and implementation of a scheme agricultural insurance in the Republic of Kazakhstan based on the study of materials and technical support of the Government of Kazakhstan and the local insurance market in overcoming the adverse effects of climate change through the development of advanced insurance market first infrastructure that will support mass sale of the local insurance companies of obligatory and voluntary insurance products disasters.

Based on the analysis of the main problems of the current compulsory insurance system in crop production, the basic provisions of the new agricultural insurance system in the Republic of Kazakhstan may look as follows:

1) Due to the fact that, in accordance with the legislation of the Republic of Kazakhstan, the mandatory nature of the Law implies strict regulation of procedures and tariffs directly in the Law, in order to ensure the flexibility of the agricultural insurance system, it is advisable to abandon the mandatory nature of insurance and make the transition to imputed insurance. Imputed insurance means putting on the loss of the current Law and developing economic incentives that will allow agricultural producers to have material benefits when buying voluntary insurance (for example, access to cheaper credit resources, insurance policy - as collateral, participation in various programs of support and development of the agro-industrial complex). In turn, the requirements for voluntary insurance contracts that will be entered into for the purpose of access to programs with state support should be partially regulated (not in terms of tariffs and underwriting, but in terms of procedures).

2) For the successful operation and further development of the agricultural insurance system, it is necessary to create an infrastructure institute that will be responsible for collecting and processing statistical information for insurance purposes. The actuarial model, on the basis of which insurance tariffs are calculated, requires reliable statistical data, which is based not only on the reporting data of agricultural producers, but also on data from an objective remote monitoring (space monitoring system, with which you can monitor crops, determine crop type and forecast yield at certain sites). The centralized collection and processing of information by the infrastructure institute will provide up-to-date and reliable data that will be the basis for developing a policy of state support for crop production, a basis for calculating insurance rates and an analytical tool for evaluating the effectiveness of the agricultural insurance system in general.

3) For the effective functioning of the agricultural insurance system, taking into account its voluntary-imputed nature, it is necessary to subsidize part of the insurance premiums on the part of the state and state participation in guaranteeing catastrophic loss. State support through the organization of guaranteeing minimum payments in the event of catastrophic events can be organized through the Catastrophic Guarantee Fund, which will provide agricultural producers who have registered with the Fund guarantee payments in case of catastrophic weather events.

Conclusion

Serious problems constantly faced by agricultural production, as well as its specific features, reinforce the backlog of agricultural enterprises in the application of modern management tools. Strategic planning has not yet become part of the practice of most agribusiness entities. However, without developing a scientifically based strategy for the development of the industry at all levels of government, it is impossible to overcome crisis phenomena and lay the foundation for the advanced development of the agricultural sector of the economy.

Insurance is the most affordable and effective tool for managing agricultural risks, allowing you to cover a wide range of them. It is necessary to build a unified state system of agricultural risk management, within which the improvement of the most effective mechanism for protecting the property and property interests of producers - insurance - will be a central task.

Agricultural production annually suffers significant losses due to climatic, marketing and other agricultural risks, and the degree of compensation by the state for losses is very low. State support for insurance of agricultural risks is incomparably more effective than financial assistance provided by the state in adverse years, in the form of direct cash additional subsidies, credits, write-offs, *etc*. Insurance allows you to cover damages in a fairly high volume, it reduces the burden on the country's budget due to the fact that compensation is paid by the insurance business.

The dual nature of agricultural risk insurance is manifested in the fact that, acting as an effective regulator of the reproductive processes in agriculture, it must itself be the object of state regulation and support in order to ensure its own sustainability and, therefore, complete coverage of large-scale losses.

According to Nikitin (2016) agricultural production in modern conditions is characterized by a high degree of risk. Agricultural producers in the process of economic activity are faced with such risks as price fluctuations, yields, partial or complete loss of material resources. In addition, agricultural production is subject to the risk of natural disasters and emergencies, which can lead to serious production losses. Foreign experience of insuring agricultural risks indicates that insurance is not only a mechanism for protecting the property interests of producers themselves, but also of investments that are channeled into modern innovative technologies of agricultural production.

From the above, in our opinion, one of the effective risk management tools in agriculture can be a comprehensive insurance program for agricultural producers, which includes the inclusion of insurance of the main types of risks characteristic of agricultural production at reduced tariffs, which will ensure improved financial sustainability and sustained development agro formations.

References

[1] Amanova G.D., Saduakasova K.Zh., Temirova A.B. 2015. Problems of the agricultural production insurance system of the Republic of Kazakhstan. *International Journal of Experimental Education*, 3(3): 335-338.

[2] Gracheva, E.Yu., Boltinova, O.V. 2011. *Legal Basis of Insurance*. Moscow: Prospect. 411.

[3] Grave, K.A., Lunts, L.A. 1960. *Insurance*. Moscow. 56.

[4] Kiseleva, O. 2013. Stabilization of the financial situation of agricultural enterprises. AIC, *Economics, Management*, 7(10): 70-76.

[5] Kruglov, N.E. 2011. Risk management tools in agriculture: From diversification to weather futures. Kazan. 201.

[6] Kurmanbaev, S.K., Alibaeva, M.M. 2015. Justification of price and financial and credit mechanisms for the regulation of the agri-food market. Materials of the international scientific-practical conference "Prospects for the production and processing of agricultural raw materials in a market economy", Semey, 234-245.

[7] Malashikhina, N.N. 2014. *Risk - management*. Phoenix. 224.

[8] Nikitin, A.V. 2016. The Economic Mechanism of Insurance and Overcoming Risks in the Agriculture of Russia when Joining the WTO. Moscow. 220.

[9] Prosandeeva, T. I. 2016. Coordination of organizational and communication mechanisms for the institutional development of the agricultural insurance market. Marketing in Russia at the turn of the century: Realities, problems, and prospects. Moscow. INFRA-M. 105.

[10] Reitman, L.I. 2016. *Insurance*. Moscow. 17.

[11] Sedelev, B.V. 2017. Regression models and methods for assessing the parameters and structure of economic processes. Moscow. 240.

[12] Shumilina, T.V. 2012. State support for the system of agricultural insurance. Agriculture: A collection of articles. *International Scientific and Practical Conference*. Barnaul. Publishing house AGAU. 545.

[13] Zhuravlev, Yu. M., Sekerzh, I.T. 2013. *Insurance and Reinsurance. Theory and Practice*. Moscow. 148-149.

*** Law of the Republic of Kazakhstan. 2004. No. 533-II On Compulsory Insurance in Plant Growing (with amendments and additions as of July 05, 2011); Decree of the Government of the Republic of Kazakhstan Standard form of a compulsory insurance contract in crop production dated October 31, 2006 No. 1036.

*** Law of the Republic of Kazakhstan. 2006. On Mutual Insurance (with amendments and additions as of March 1, 2012); Law of the Republic of Kazakhstan of July 3, 2002 N 331 "On Plant Protection" (with amendments and additions as of March 1, 2012).

*** Electronic resource www.actuary.kz

*** Electronic resource http://www.naai.ru

*** Data of the National Bank of the Republic of Kazakhstan for 2010-2017.

*** Data from the Committee on Statistics of the MNE RK for 2010-2017.

*** Electronic resource https://kursiv.kz/news/otraslevye-temy/2016-04/strakhovanie-v-rastenievodstve-resheno-reanimirovat

The Tax Aggressiveness Behavior in the Companies Complying with the Sharia

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Abstract:

Tax aggressiveness is an attempt by the company to reduce the income tax payments to the state. The level of such aggressiveness is measured using the indicators of effective tax rate (ETR). The study analyzed the factors affecting the activity of aggressiveness of tax behavior. The independent variables consisted of the size of the company, ROA, Leverage, and Capital Intensity. Some previous studies provide controversial results so that they still give us opportunities to undertake similar studies in different time and places.

This study took the sample of companies that meet the criteria of sharia banks registered in Indonesia Sharia Stock Index (ISSI) in four years: 2011-2014. One of the considerations choosing that period is due to the lack of previous studies that used companies that meet the criteria of Shariah banks. It is strongly suspected that the companies differ in their tax aggressiveness activity compared with those that meet the criteria of conventional banks. Sharia companies emphasize accountability, transparency, fairness, and responsibility in the frame of sharia compliance so as to reduce the tax aggressiveness. This study utilized quantitative analysis and the data were taken using multiple linear regressions with SPSS. It was found that ROA, Company size, and capital intensity significantly affect the tax aggressiveness.

Keywords: taxation; tax aggressiveness; company size; ROA; leverage; capital intensity

JEL Clasiffication: E22; H21; H71

Introduction

The company conducted tax aggressiveness in order to reduce the tax obligation they have to pay to the state treasury through tax evasion or tax avoidance. It is allowed but for tax evasion, it is prohibited by the tax regulation. The smaller the amount of tax paid by the company, the more aggressive tax practice done by the company. Not all companies have the same opportunity to do tax aggressiveness. Some implemented tax aggressiveness moderately. It is due to being its broad scope with several factors such as company size and capability of the company (Noor, Fadzillah and Mastuki, 2010). The greater the company size, the greater the opportunity to do tax aggressiveness. Similarly, the greater the capability resources owned by the company, the greater the opportunity to practice tax aggressiveness.

This study is aimed to analyze empirically the factors that influence the practice of tax aggressiveness. The characteristics of the business activities also affect the company an opportunity to be involved in designing the tax. Companies in different sectors produce different associations in terms of tax planning (Noor *et al.*, 2010). Similarly, companies that meet the criteria of sharia are in contrast to those that do not meet the criteria for participation in the practice of sharia in taxation.

1. Literature review

The tax aggressiveness is due to the fact that companies that meet the criteria of sharia hold the principles of transparency and accountability as the values of Islam that must be obeyed. On the contrary, tax planning in the form of aggressive tax practices degrades the quality of financial reporting. To represent the companies that meet the criteria of sharia, the researchers selected the companies registered in Indonesia Sharia Stock Index (ISSI). This is a quantitative study because it tries to examine empirically the effect of ROA, firm size, leverage, capital intensity, and inventory intensity towards tax aggressive.

The researchers were motivated by the disparity of the results of previous research studies. As described earlier, the previous studies showed inconsistent or contradictory results, including on the relationship between firm size and tax aggressiveness. Studies by Noor *et al.* (2010), Zemzem and Ftouhi (2013) and Wang *et al.* (2014) found a positive effect of company size on the tax aggressiveness of while Khaoula and Ali (2012) could not explain the relationship between the company size and tax aggressiveness. On the other hand, studies by Hanum and Zulaikha (2013) found a negative relationship between company size and tax aggressiveness.

In addition, the relationship between tax aggressiveness and profitability also showed inconsistent results. For example, studies by Derashid and Zhang (2003), Adhikari *et al.* (2006), and Noor *et al.* (2010) provide

empirical evidence that tax aggressiveness negatively related to profitability. Again, studies by Zemzem and Ftouhi (2013) and Hsieh (2012) provide different findings that there is a positive effect of tax aggressiveness on the profitability. Also, studies by Hanum and Zulaikha (2013) could not either prove the effect of profitability on tax aggressiveness. The study of the relationship between the two variables, therefore, needs to be done again using the sample of companies that meet the criteria of sharia.

Considering the above gaps, this study tries to do the same study but entailing the the sample that was less investigated by previous ones, such as the companies that meet the criteria of sharia, as listed in the Stock Index Syariah Indonesia (ISSI) in Indonesia. This index is relatively new because the new release was in 2011 so that previous studies in Indonesia did not yet use this index as sample with the topic of tax aggressiveness. The study on tax aggressiveness has the goal to provide empirical evidence regarding the factors suspected to affect tax aggressiveness in the companies that meet the criteria of sharia.

It is expected that this study can demonstrate empirically the significant influence of the three variables (firm size, ROA and capital intensity) against the tax aggressiveness practices in the companies that meet the criteria of syariah. This study is also expected to support the results of previous studies on the impact of firm size, ROA and capital intensity towards the tax aggressiveness practice. This research is finally also expected to contribute the theoretical and practical contributions towards the government policies. Besides that, it is also expected to provide additional theory and literature in research on tax aggressiveness that there is not currently an explanation of similar practices occurring in companies that meet the criteria of sharia. The study is also expected to provide the potential with information for investing their funds, or in making decisions regarding the shares owned.

Based on the gap in the previous studies and the importance of providing the consistency of the results of the same study, the researchers in this study have some objectives as the following. First, the researchers want to find out whether (1) the company size affects tax aggressiveness, (2) Profitability affects tax aggressiveness, (3) Leverage affects tax aggressiveness, (4) Capital intensity affects tax aggressiveness and (5) Inventory Intensity affects tax aggressiveness.

1.1. The concept of Sharia

Companies that meet the criteria of sharia have a different philosophy. In this case, four characteristics of companies that meet the criteria of sharia such as accountability, transparency, fairness, and responsibility. Accountability interprets that every Muslim has the belief that they should be held accountable for their deeds in the hereafter. Muslims should follow the concept of transparency because as a Muslim he would not be involved in any sort of corruption or fraud so that they have to emphasize the need for transparency in everyday life. Fairness is one of the important characteristics in Islam and Muslims have to follow the concept of collective decision-making, political freedom, and tolerance in solving any problems. Every person work in the company is bound to work ethically and follow the teachings of Islam even in the commercial activities (Qureshi and Qurashi 2013).

1.2. The concept of tax aggressiveness

Tax aggressiveness is an act that has the objective to reduce taxable income through tax planning as well as using methods that are either classified or not classified as tax evasion. Although not all actions taken are against the rules, the more the methods used by the company should make the company assumed to be more tax-aggressive (Frank *et al.*, 2009). By doing tax aggressiveness, the company can minimize the payment of income tax they owe. The smaller the amount of the income tax expense paid by the company, the higher level of tax aggressiveness is. Conversely, the bigger the amount of corporate income tax payment, the lower the level of tax aggressiveness.

Tax aggressiveness can be done in which anyone does not violate the law (tax planning) as well as breaking the rules (tax evasion), but they should be more tax aggressive to be agents' unlawful actions. Hite and McGill (1992) and Murphy (2004) also argue that the tax aggressiveness reporting is a situation when a company conducts a policy of certain taxes and one day there is a possibility that the tax policy will not be audited or will give rise to a legal dispute. But, this action still has a potential risk of settlement and uncertainty that is complied with or non-complied with the law (Sari and Martani, 2010). Based the description above, the concept of tax aggressiveness can be described as an action that does not violate the law, as referred to tax avoidance or unlawful acts.

1.3. Empirical studies research accomplished

In their study, Noor *et al.* (2010) tested the effective corporate tax rate (ETR) for the implementation of official assessment system and self-assessment system in public companies listed on Bursa Malaysia. The study found that the larger company bears greater ETR. Company size in this study is proxied by the value of sales, so the greater the sales obtained by the company, the higher the tax to be paid. ETR high value indicates a low level of tax aggressiveness. ETR is lowering significantly associated with high leverage, greater investment in fixed assets, and lower investment in inventory. The study also showed that companies with a high ROA show lower ETRs. Companies with high ROA tend get tax incentive and tax provision from the the state. This can reduce taxable income so that it can make the tax paid by the company lower. In other words, the company has a low ETR.

The study of Lanis and Richardson (2012) examined the relationship between corporate social responsibility (CSR) and tax aggressiveness using samples of 408 public companies in Australia for the financial year 2008/2009. The study showed that the higher the level of disclosure of a company's CSR, the lower the level of aggressiveness of corporate taxes. This proves the existence of a negative relationship and statistically significant between CSR and aggressiveness taxes so that companies with social responsibility greater aggressiveness tend to be less in taxes. Additional findings from this study that the commitment to social investment and corporate strategy and CSR (including ethics and business conduct) of a company is an important element of the CSR activities have a negative impact on tax aggressiveness.

Khaoula and Ali (2012) examined the influence of gender diversity on corporate tax planning. Samples were selected from this study are 300 companies that are members of the S and P 500 over the period 1996-2009. This study proves empirically that gender diversity in the board does not have an influence on the activity of corporate tax planning. ROA significantly affect tax planning, while the size of the company and the size of the board do not have a significant relationship with the tax practices.

Hsieh (2012) attempted to detect variations in the sensitivity of the company's effective tax rate by using ROA, firm size, leverage, capital intensity and inventory intensity. The study sampled 421 companies listed on the Shanghai Stock Exchange and Shenzhen Stock Exchange in the period 1998- 2001. The study showed that all the variables have a significant effect on the aggressiveness of tax: company size and capital intensity negative effect while ROA, leverage, and the intensity of the positive effect of inventory.

Zemzem and Ftouhi (2013) examined the effect of the characteristics of the board of directors in the aggressiveness of tax behavior. Sampling 73 companies in France over the years 2006-2010, results revealed that the size of the board and the percentage of women on the board decreases the activity of the tax aggressiveness, while the size of the company and related ROA significantly positive. However, this study was not able to prove the proportion of external members and the duality of ownership affect the aggressiveness of tax.

Hanum and Zulaikha (2013) tested the effect of the characteristics of corporate governance (independent directors, audit committees, and institutional shareholders) to the effective tax rate (ETR). Samples from this study were 50 state-owned enterprises listed on the Indonesia Stock Exchange (BEI) in the period 2009-2011.The study found no effect of these three characteristics governance against aggressive tax. The size of the company has a negative effect on the aggressiveness of tax behavior. ROA, capital intensity, and the intensity of the inventory do not affect and leverage positive effect.

Richardson *et al.* (2013) examined the effect of the characteristics of the board of directors on the aggressiveness of tax behavior using 203 samples of public companies listed on the Australian Stock Exchange for the period 2006-2009. This study explains that companies that implement risk management systems and effective internal controls, involving big-four auditors, external auditors have a proportion less on non-audit services and internal auditors more independent practices result in decreased tax aggressiveness. Another finding is on the effect of the interaction between board composition and implementation of risk management systems and internal controls that can effectively reduce the aggressiveness of the tax.

Francis *et al.* (2014) investigated the effect of CFO gender on the aggressiveness of corporate tax. The study focused on companies in transition CFO male to female and then compares the level of aggressiveness of tax firms during the period before and after the transition. The study found that female CFOs associated with the aggressiveness of a lower tax than the CFO male counterparts. Overall, this study establishes that the CFO gender as an important determinant factor in tax aggressiveness.

Wang *et al.* (2014) studied the factors that affect ETR in public companies in China. The research began from 2007-2011. The auditor found no influence of the big-4 and international ownership of the ETR. In contrast, industry factors, asset mix, firm size, leverage had influence on ETR State ownership.

Rashid *et al.* (2014) studied the red flags to report tax on the value of the company. The samples used were 123 companies that abide by the rules of Sharia and is listed on Bursa Malaysia started from 2001 - 2012. The findings of the study indicate that the level of the tax reporting can affect the market value of the capital market. This study also provides empirical evidence of the possibility of manipulation of accounting red flags among the company's tax planning strategies which were sharia listed on Bursa Malaysia.

Boussaidi and Hamed (2015) tested the effect of several governance mechanisms against tax aggressiveness. Samples from this study are 39 companies listed on the Tunisian Stock Exchange (TSE) in the period 2006-2012. The study found that gender diversity in board and managerial ownership has a positive relationship with Effective Tax Rate (ETR) while an increase in the concentration of ownership of a negative effect on ETR profiles. The board and the external auditor has no significant effect on the ETR.

2. Methodology

2.1. Research design

This study is quantitative to examine the factors that affect tax aggressiveness. They are factors to be suspected to affect tax aggressiveness such as company size, profitability, leverage, capital intensity, and inventory intensity. It is also an explanatory study because it attempts to explain the factors that influence the practice of using a company's tax aggressiveness. The unit of analysis is the registered companies in Indonesia Sharia Stock Index (ISSI) during the period 2011-2014. The reasons are as follows: the company size is greater than WPOP and they have greater opportunity to practice tax aggressiveness. The previous studies did not use the companies registered in ISSI that is why they are lack of the criteria that is sharia being aggressively toward tax paying. This is the criteria that in practice, sharia companies have tax aggressiveness.

2.2. Population and sample

The companies whose shares were listed in Indonesia Sharia Stock Index (ISSI) were used as the sample with the panel data for four years. They were collected by using purposive sampling with the following criteria: (1) the issuers whose shares are registered in the successive ISSI and began in May 2011 till end of 2014; (2) The complete financial statement data of 2011 till in 2014; (3) during the study period have a value of inventories; (4) during the study period, the companied had reported earnings before tax (pretax income) and were positive; and (5) during the study period, they had a positive income tax expense. By using a purposive sampling, this study obtained 83 companies from the panel data of 332 (83 x 4 years).

2.3. Research hypothesis

The relationship between tax aggressiveness and company size

The company size has become a major concern of most studies of tax aggressiveness but with different results. Noor *et al.* (2010), Zemzem and Ftouhi (2013) and Wang *et al.* (2014) demonstrated empirically that the company size has a positive effect on the tax aggressiveness. On the contrary, studies by Khaoula and Ali (2012) showed the absence of a relationship between the company size and tax aggressiveness. Another one is by Hanum and Zulaikha (2013) and Hsieh (2012) also provided different results that company size negatively affects tax aggressiveness.

H1: The company size affects tax aggressiveness

The relationship between tax aggressiveness and profitability

Derashid and Zhang (2003), and Adhikari *et al.* (2006) showed empirical evidence that tax aggressiveness and profitability were negatively related (Noor *et al.* 2010). Noor *et al.* (2010) showed a negative relationship between tax aggressiveness and profitabilyy. On the contrary, Zemzem and Ftouhi (2013) and Hsieh (2012) provide different findings on the positive effect of the profitability towards tax of aggressiveness. Hanum and Zulaikha (2013), on the other hand, provided a different result which said that profitability does not affect the tax aggressiveness. Companies that have high profitability tend to be in low tax agressiveness because they take advantage of tax incentives and tax provisions to reduce taxable income. Thus, the ETR is low showing that the company is less aggressive in their tax planning.

H2: Profitability affects tax aggressiveness

The relationship between tax aggressiveness and leverage

Studies by Gupta and Newberry (1997), Buijink and Janssen (2000), Adhikari *et al.* (2006) and Richardson *et al.* (2013) found a negative relationship between tax aggressiveness and leverage (Noor *et al.* 2010). Studies by Hanum and Zulaikha (2013), Wang *et al.* (2014) and Hsieh (2012) gave different results that there is a positive relationship between leverage and tax aggressiveness. This is due to the company's total liabilities that may impose substantial interest expense in fiscal reports. Such efforts can lower incomes to be taxed (taxable income) resulting in low ETR. The ETR decline indicates that companies tend to decline in tax aggressiveness behavior.

H3: Leverage affects tax aggressiveness

The relationship between aggressiveness and capital intensity

Studies by Hanum and Zulaikha (2013) were unable to prove the relationship between the capital intensity and tax aggressiveness. This relationship has also been investigated by Gupta and Newberry (1997) and Hsieh (2012) found that the companies with a large proportion of fixed assets tended to have low tax aggressiveness (Noor *et al.* 2010) the number of major assets a company can result in depreciation of fixed assets in charge-setting. This can reduce taxable income (taxable income) and further provides a low ETR.

H4: Capital intensity affects tax aggressiveness

The relationship between tax aggressiveness and inventory intensity

Studies by Hanum and Zulaikha (2013) were unable to prove the effect of the inventory intensity against tax aggressiveness. On the contrary, study by Hsieh (2012) found a positive relationship between the inventory intensity and ETR. Companies with a solid inventory have higher ETRs (Noor *et al.* 2010). The companies with a lot of inventory can generate sales with a large amount so as to increase the taxable income. In turn, this can increase the amount of taxable income that shows the results increased ETR.

H5: Inventory Intensity affects tax aggressiveness

Model of the research

The study used research model that uses company size, ROA, leverage, capital intensity, and inventory intensity as independent variables and tax aggressiveness as the dependent variable. The following was the statistical formula:

$TA = \alpha + \beta_1 SIZE + \beta_2 ROA + \beta_3 LEV + \beta_4 CAPINT + \beta_5 INVINT$

where: TA = tax aggressiveness, SIZE = company size, ROA = return on investment, LEV = leverage, CAPINT = capital intensity, INVINT = inventory intensity.

2.4. Variable descriptions and indicators and data analysis technique

1. Tax Aggressiveness tax is proxied by ETR. ETR that is measured by income tax expense of operation (the income tax expense was reduced by deferred tax expense) divided by income before taxes.
2. Company size is measured by the log of total sales.
3. Return on Assets is measured by earnings before taxes divided by total assets.
4. Leverage of the company is measured by total liabilities divided by total assets.
5. The capital intensity is measured with fixed assets divided by total assets.
6. The inventory intensity is measured by inventory divided by total assets.

The data were analyzed using multiple linear regressions with SPSS software version 19, in the following order:
- descriptive analysis for the variables on the sample characteristics;
- the Test of the classical assumption (normality, multicollinearity, heteroscedasticity, and autocorrelation) was done too;
- test T and F were done test to test the hypothesis;
- calculate the R^2 of the model.

3. Result of the study

3.1. Data description

Based on the data produced by screening 144 companies, the shares are listed on the Indonesia Sharia Stock Index (ISSI) in the period 2011 to 2014. The sample used in this study is as follows:

    a. shares of issuers are successively entered in ISSI 2011-2014 144;
    b. data of Incomplete financial statements of 2011 s/d 2014 (4);
    c. not having a value of inventories (6);
    d. the Company reported negative earnings before tax (44);
    e. the Companies reported negative income tax expense (7).

The total sample was 83 companies which were observed for 4 years or as many as 332 observations. Regression equations of the study areas are the following:

    a. SIZE coefficient of -0024 shows that the bigger the company size, the smaller the company's possibility to practice tax aggressiveness, the company size is not increased by 1 unit TA resulted in a decrease of 2.4%.
    b. ROA coefficient of -0187 shows that the larger the ROA, the more the less likely companies to practice tax aggressiveness, meaning that the increase in ROA of 1% resulted in a decrease of 18.7% TA.
    c. LEV coefficient of -0.0006 LEV indicates that the greater the leverage, the less likely companies to practice tax aggressiveness, meaning that if LEV rose by 1%, then the TA will tend to decline by 0.6%.
    d. CAPINT coefficient for 0133 showed that the greater the capital intensity, the greater the probability of enterprise activity for tax aggressiveness, meaning that if the capital intensity is increased by 1%, the tax aggressiveness behavior the revenues rose by 13.3%.
    e. INVINT coefficient of 0001 indicates that the greater the inventory intensity, the greater the tendency of companies to conduct tax aggressiveness, meaning that if the inventory intensity is increased by 1%, the greater the tendency of companies practice tax aggressiveness by 0.1%.

3.2. Simultaneous and partial test

Simultaneously, the result of SPSS output shows that all the independent variables have a significant influence on the tax aggressiveness (Table 1).

Table 1. Results of F-Test

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	.453	5	.091	7.130	.000[a]
Residual	4.141	326	.013		
Total	4.593	331			

Source: SPSS

    Based on the results of SPSS output, it is known that there are three independent variables that significantly influence the probability of under 0.05 which is a measure of the company size, ROA, and capital intensity. The company size *t* statistic has a value of -2475 with a probability of 0.014. ROA has a value of *t* statistics for -3419 with probability equal to capital 0.001. Capital Intensity *t* statistic has a value of 4.228 with probability equal 0.000. Leverage and inventory intensity not significantly affect the aggressiveness of the tax due has a probability of above 0.05 (Table 2).

Table 2. Results of t-Test

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.542	.117		4.627	.000
SIZE	-.024	.010	-.138	-2.475	.014
ROA	-.187	.055	-.188	-3.419	.001
LEV	-.006	.039	-.008	-.143	.886
CAPINT	.133	.031	.234	4.228	.000
INVINT	.001	.046	.001	.019	.985

Source: SPSS

3.3. Discussion

3.4. Company size tax towards aggressiveness

The study found that for the companies whose shares are listed on the Indonesian Sharia Stock Index (ISSI), their company size has a negative and significant correlation with tax aggressiveness practices. The finding is in line with the results of a study conducted by Hanum and Zulaikha (2013) and Hsieh (2012) who also found the negative effects of company size on the tax aggressiveness. The larger the size of issuers listed on ISSI, the smaller the probability of tax aggressiveness.

The above evidence shows that the company has the potential to charge depreciation, maintenance costs, and other costs that are relevant to their fixed assets, so as to decrease the taxable income. This, in turn, can reduce the amount of taxes to be paid. Such a condition is the tax aggressiveness practice is lower, compared with those with size smaller company.

3.5. Profitability towards tax aggressiveness

This study shows evidence that the profitability of the companies listed on the Indonesian Sharia Stock Index (ISSI) has a negative and significant effect on the tax aggressiveness. This also supports the previous studies by Noor *et al.* (2010) that also proved there was a negative relationship between profitability and tax aggressiveness. The companies with a high level of profitability tend to practice low tax aggressiveness. Otherwise, the company with a low level of profitability is due to tend aggressively.

The companies with high profitability level have portfolios of tax incentives that can be utilized to reduce the tax rate they should pay. For example, income received in the form of dividends is not subject to income tax if the company has a share ownership level of at least 25% of the shares of companies with a certain level. On the contrary, the stake below 25% is subject to income tax at the rate 15%. This is why companies with a high level of profitability tend to practice tax aggressiveness is lower for the policy of tax incentives is stipulated in the tax regulations.

3.6. Leverage towards tax aggressiveness

This section provides a significant contribution to the theory and literature related to tax aggressiveness. This study, more importantly, provides exciting and different findings compared to previous research conducted by Gupta and Newberry (1997), Buijink and Janssen (2000), Adhikari *et al.* (2006) and Richardson *et al.* (2013) found a negative association between aggressive tax leverage, as well as research conducted by Hanum and Zulaikha (2013), Wang *et al.* (2014) and Hsieh (2012), giving the output of a positive relationship between leverage and tax aggressiveness.

The different result concerns the evidence that there is no significant relationship between the leverage and tax aggressiveness. The previous studies took the object of research in conventional companies. That was the limitation of liability or the company's debt against the assets of the company. Therefore, it provided the results of their positive or negative relationship between profitability and tax aggressiveness. On the contrary, this study deals the companies which meet sharia criteria. The different characteristic provides different results.

The findings of this study provide empirical evidence that leverage does not have a significant effect on the tax aggressiveness. This is because the average companies listed in Indonesia Sharia Stock Index (ISSI) have a low level of leverage in which they do not t undertaking tax aggressiveness relating to the tax obligation or debt (e.g. cost bung). Thus, this is different from the previous dealing with conventional companies that do tax aggressiveness taxes by decreasing or increasing interest costs.

3.7. Capital intensity towards tax aggressiveness

In this respect, this study provides interesting findings in which there are some differences compared to the previous studies. It shows there is a positive and significant relationship between capital intensity and tax aggressiveness. Studies by Hanum and Zulaikha (2013) were unable to prove this relationship while that by Gupta and Newberry (1997) and Hsieh (2012) found a negative relationship between capital intensity and tax aggressiveness.

Sharia companies with the high level of capital intensity tend to practice tax aggressiveness and it does not violate the rules or laws of taxation. It is commonly known as tax avoidance by utilizing a gap or loophole of the Act related to fixed assets and reviews the depreciation method that can provide the potential for greater tax reductions.

3.8. Inventory intensity towards tax aggressiveness

Leverage also contributes to the theory and literature of taxation. The on tax aggressiveness did not find the relationship between inventory intensity and tax aggressiveness. This study supports by Hanum and Zulaikha (2013). But, it is unlike the studies by Hsieh (2012) that found a positive relationship between inventory intensity and tax aggressiveness. In the context of context of sharia, the company seeks to present and report honestly all their inventories such as recorded sales with a reasonable margin. For that reason, that companies do not have the incentive or encouragement to practice tax aggressiveness associated with this inventory. Thus, it is different from what happened in conventional firms. In conventional companies, the positive relationship between intensity and aggressiveness tax inventory due to the cost of sales charged by the company in the calculation of taxable income. Therefore, it can reduce the amount of tax paid by the company. The reduced amount of income tax paid by the company indicates a high level of tax aggressiveness by the company.

Conclusion

The tax aggressiveness is part of tax planning applied by the companies in order to minimize or reduce the amount of taxes they are supposed to pay. This tax aggressiveness can be done by either lowering the amount of income or increase the amount of load that taxable income (taxable income) is reduced. Then, ultimately, it can reduce the amount of income tax that must be paid by the companies. Tax aggressiveness is a form of tax that is illegal tax evasion or tax avoidance which do not violate the law by exploiting loopholes in tax regulation. The researchers for more than 20 years have struggled to do empirical studies on the determinants that determine tax aggressiveness and provide different findings. The study does not justify that the entire practice of tax aggressive for it is unlawful as described by Frank *et al.* (2009). The study refers to previous studies which explain that the smaller the tax burden paid by the company, the more the company does tax aggressiveness in the practice of taxation.

The research determinants in assessing the tax aggressiveness practice still focus on the tax on conventional companies. However, this current study uses sharia companies which are assumed to have different phenomenon. It was found a strong relationship between tax aggressiveness and company size, ROA and capital intensity that meet the criteria sharia. This evidence supports the previous studies that these three variables significantly influence the way the tax aggressiveness does. The results of this study confirm the previous ones that the bigger the entity of sharia the lower the tax paid by the company because they can take advantage of tax incentives that can reduce the amount of income tax owed. This study also confirms the finding that a high level of profitability for sharia entity, the lower the tax rate to be paid for sharia entities that can take advantage of tax incentives as variable of the company size. This study also confirms that sharia entity with a high level of capital intensity less inclined to practice tax aggressiveness and they do not violate the rules or the tax laws.

This study provides additional findings it can contribute to literature theory of tax aggressiveness. There is no strong evidence that leverage and inventory intensity as the basis for sharia companies to practice tax aggressiveness. The findings in this study concerning the leverage can increase the wealth of empirical research results. The leverage of the sharia entity is not a significant determinant that can affect the level of tax aggressiveness.

References

[1] Adhikari, A., Derashid, C., Zhang, H. 2006. Public policy, political connections, and effective tax rates: Longitudinal evidence from Malaysia. *Journal of Accounting and Public Policy*, *25*: 574-595. DOI: 10.1016/j.jaccpubpol.2006.07.001

[2] Boussaidi, A. and Mounira Sidhom Hamed. 2015. The Impact of Governance Mechanisms on Tax Aggressiveness: Empirical Evidence from Tunisian Context. *Journal of Asian Business Strategy, 5*(1): 1-12. DOI: 10.18488/journal.1006/2015.5.1/1006.1.1.12

[3] Buijink, W., Janssen, B. 2000. Determinants of the variability of corporate effective tax rates (ETR): Evidence for the Netherlands. *MARC Working Paper*, University of Maastricht. Available at: https://core.ac.uk/download/pdf/6941696.pdf

[4] Derashid, C., Zhang, H. 2003. Effective tax rates and the "industrial policy" hypothesis: Evidence from Malaysia. *Journal of International Accounting*, *Auditing & Taxation, 12*: 45-62. DOI: 10.1016/S1061-9518(03)00003-X

[5] Francis, B. B., Hasan, I., Wu, Q., and Yan, M. 2014. Are female CFOs less tax aggressive? Evidence from tax aggressiveness. *The Journal of the American Taxation Association*, *36*(2): 171-202. Available at: https://doi.org/10.2308/atax-50819

[6] Frank, M. M., Lynch, L. J., and Rego, S. O. 2009. Tax reporting aggressiveness and its relation to aggressive financial reporting. *The Accounting Review*, *84*(2): 467-496. Available at: https://doi.org/10.2308/accr.2009.84.2.467

[7] Gupta, S., dan Newberry, K. 1997. Determinants of the variability in corporate effective tax rates: evidence from longitudinal data. *Journal of Accounting and Public Policy*, *16*: 1-34. DOI: https://doi.org/10.1016/S0278-4254(96)00055-5

[8] Hanum, H. R., and Zulaikha 2013. Pengaruh Karakteristik Corporate Governance Terhadap Effective Tax Rate. *Diponegoro Journal of Accounting, 2(2):* 1-10.

[9] Hite, P.A., & McGill, G.A. 1992. An Examination of Taxpayer Preference for Aggressive Tax Advice. *National Tax Journal*, *45*: 389-403. Available at: https://www.ntanet.org/NTJ/45/4/ntj-v45n04p389-403-examination-taxpayer-preference-for.pdf?v=%CE%B1

[10] Hsieh, Y. C. 2012. New evidence on determinants of corporate effective tax rates. *African Journal of Business Management*, *6*(3): 1177-1180. DOI: 10.5897/AJBM11.1522

[11] Khaoula, A. and Ali, Z. M. 2012. Demographic diversity in the board and corporate tax planning in American firms. *Business Management and Strategy*, *3*(1): 72-86. DOI:10.5296/bms.v3i1.1851

[12] Lanis, R., and Richardson, G. 2012. Corporate social responsibility and tax aggressiveness: An empirical analysis. *Journal of Accounting and Public Policy*, *31*(1): 86-108. Available at: https://doi.org/10.1016/j.jaccpubpol.2011.10.006

[13] Murphy, K. 2004. Aggressive tax planning: Differentiating those playing the game from those who don't. *Journal of Economic Psychology,* 25: 307-329. DOI: 10.1016/S0167-4870(03)00011-4

[14] Noor, R. M., Fadzillah, N. S. M. and Mastuki, N. 2010. Corporate tax planning: a study on corporate effective tax rates of Malaysian listed companies. *International Journal of Trade, Economics and Finance*, *1*(2): 189-193.

[15] Qureshi, A. and Qurashi, M. 2013. Islamic corporate Governance practices in Pakistan. *Journal of Research in Business and Management,* 1(3): 01-15.

[16] Rashid, N. M., Noor, R. M., Mastuki, N., Bardai, B., Hashim, J. H., and Harun, M. H. 2014. The Red Flags of Tax Reporting on the Market Value. *International Business Research, 7*(4): 142–150. DOI: 10.5539/ibr.v7n4p142

[17] Richardson, G., Taylor, G., and Lanis, R. 2013. The impact of board of director oversight characteristics on corporate tax aggressiveness: An empirical analysis. *Journal of Accounting and Public Policy*, *32*(3): 68-88. Available at: https://doi.org/10.1016/j.jaccpubpol.2013.02.004

[18] Sari, D. K., and Martani, D. 2010. Ownership Characteristics, Corporate Governance and Tax Aggressiveness. In *The 3rd International Accounting Conference & The 2nd Doctoral Colloquium. Bali.*

[19] Wang, Y., Campbell, M., and Johnson, D. 2014. Determinants of Effective Tax Rate of China Publicly Listed Companies. *International Management Review*, *10*(1): 10-20. Available at: http://scholarspress.us/journals/IMR/pdf/IMR-1-2014/v10n1-art-2.pdf

[20] Zemzem, A. and Ftouhi, K. 2013. The Effects of Board of Directors' Characteristics on Tax Aggressiveness. *Research Journal of Finance and Accounting, 4*(4): 140-147.

Formation of Competitive Cattle Breeding

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Abstract:

According to its role in the structure and in general in the reproduction process of the economy, the agricultural sector of Kazakhstan is basic. In accordance with the Development Strategy, the agro-industrial complex among the seven priority sectors should fully realize its sectoral advantages and large-scale potential. Kazakhstan needs to more effectively use its competitive advantages, especially in the production of environmentally friendly products.

The article discusses the main problems of livestock development, the conditions for implementing projects of public and private targeted programs, the main purpose of which is to create a solid basis for the continuous development of the meat industry of livestock. The main trends in the development of cattle breeding are identified and the conditions for ensuring food security and the possibility of increasing the volume of exports of domestic meat products on both existing and new world markets are defined.

Keywords competitiveness; cattle breeding; export; import; meat consumption; cattle; small cattle

JEL Classification: M21; M29.

Introduction

The most important strategic task of the agro-industrial policy of the state in the economic sphere is the formation of efficient and competitive cattle breeding. In the Message "The Third Modernization of Kazakhstan: Global Competitiveness", the President of the Republic of Kazakhstan noted: "In many ways, we can be one of the world's largest producers of agricultural export products, especially in the production of organic food. The brand made in Kazakhstan should become the benchmark for such products" (Nazarbayev 2017).

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1. Research background

Authors such as Voyakin (2016), Legoshin (2015), Glazunov (2016), Surovtsev (2017), Buchinskaya (2017) in their works focus on new directions of development of the market of meat raw materials and products from it, which features rapidly changing trends, the formation of a profitable and sustainable livestock production industry and recognize the impact on these processes, the pace of innovation, the emerging sectoral regional cluster, the development of information support system for its participants.

Research and analysis of the Kazakhstani agro-industrial complex leads to the conclusion that the development of cattle breeding and, consequently, an increase in competitiveness in Kazakhstan are hampered by the following factors: *firstly*, small-scale production, concentration of livestock in small-scale ownership; *secondly*, low breed cattle; *thirdly*, insufficient food supply; *fourthly*, poor veterinary care. And only the implementation of a number of public and private targeted programs that are focused on the medium term will help to overcome the problems and increase the number of commercial cattle herds, and develop the export potential of cattle meat. An example of such programs are the current project "Development of the export potential of cattle meat" and the national program "Development of beef cattle for 2018-2027". The main goal of these projects is to create a solid basis for the continuous development of the meat industry of animal husbandry. Activities for the implementation of these projects are:

- expansion of the reproduction base in cattle breeding;
- improving the genetic potential of productivity;
- search and subsequent use of innovative technologies in this industry.

Livestock needs to increase productivity, reproduction of cattle and productive longevity of cows, as well as the application of new technologies and attracting qualified personnel, increasing investment attractiveness, the introduction of modern technologies that will increase the competitiveness and efficiency of the industry.

At present, the formation of a commercial contingent of cattle of meat breeds in the amount of 112 thousand heads has already been completed, and areas for fattening on an industrial scale with a capacity of 37 thousand places have been equipped. With the help of breeding bulls, improvement of beef cattle livestock breeds has begun, which in the future will improve its productivity to the most modern global standards.

Due to the credit resources of "KazAgro", up to 2019, it is planned to import 72 thousand units of cattle breeds from abroad, an increase in the livestock population in farms and peasant farms of Kazakhstan by 224 thousand heads, as well as the construction of areas for fattening animals by 150 thousands of places of simultaneous content. This will allow by 2019 to create all conditions in the country to ensure a solid basis for its food security, as well as to increase the volume of exports of domestic meat products to both existing and new global markets.

2. Methodology

Leading from the livestock industry is cattle breeding. The data from the Table 1 indicate that the population from 2013 to 2018 increased dynamically. The main regions of cattle breeding (cattle) are Almaty, South Kazakhstan, Karaganda and East Kazakhstan regions. An important factor is the development of crop production in these areas, as a pledge of forage.

Table 1. Indicators: the number of cattle (thousands of heads)

Region	2013	2014	2015	2016	2017	2018	2018 in % to 2017
Republic of Kazakhstan	5.690,0	5.851,2	6.032,7	6.183,9	6.413,2	6.764 212	105,5
Akmola	334,8	357,5	374,7	383,6	393,6	404.184	102,7
Aktobe	371,0	381,0	378,5	384,9	405,9	432.596	106,6
Almaty	832,4	852,5*	882,3*	899,7	928,4	963.888	103,8
Atyrau	149,2	145,8	148,6	150,4	152,5	157.218	103,1
West Kazakhstan	390,4	417,2	456,2	470,5	499,8	542.483	108,6
Zhambyl	300,0	300,1	306,0	315,5	329,9	359.290	108,9
Karaganda	416,1	443,3	467,1	472,5	480,2	506.240	105,4
Kostanay	394,4	402,5	415,5	420,7	427,0	440.720	103,2
Kyzylorda	243,3	248,9	257,8	269,0	288,6	309.635	107,3
Mangystau	14,6	14,1	15,0	13,6	15,0	17.769	118,7
South Kazakhstan	857,1	838,7	830,2	848,0	901,5	994.828	110,3
Pavlodar	364,0	375,0	379,5	385,5	388,8	392.868	101,1

Region	2013	2014	2015	2016	2017	2018	2018 in % to 2017
North Kazakhstan	280,7	297,6	315,0	327,3	330,4	343.498	104,0
East Kazakhstan	740,2	769,3	802,1	839,4	868,2	895.417	103,1
Astana city	1,1	1,1	0,7	0,6	0,5	487	98,4
Almaty city	0,7	6,6*	3,5*	2,7	2,9	3.091	105,5

Source: compiled by authors

Modern world practice, as well as domestic experience indicates that the progressive development of agriculture will be largely determined by the development of small and medium-sized businesses and the advantage of their cooperation.

The development of entrepreneurship and the system of agricultural cooperation is a matter of social, political and economic importance. The access of the agricultural sector to a higher level of development involves the widespread use of effective forms of entrepreneurship and models of cooperation between rural producers and enterprises of the system of storage, processing, marketing of products, *etc.*

One of the problematic issues of the agro-industrial complex of the Republic of Kazakhstan is the small-scale nature of production, as evidenced by the high proportion of small farms in the total gross output of agriculture, the total number of agricultural entities, and the tendency to reduce their land plots. The majority of small farms do not have government support measures in the form of subsidies, concessional lending due to the lack of collateral, *etc.* The low income level of small and medium-sized businesses does not allow for seed capital for rural business development.

The above problems of the agricultural sector justify the need to develop small and medium-sized businesses and integrate them into agricultural cooperatives in order to protect their interests, jointly organize production, market their products, process them for the first time, provide basic means of production (fuel, seeds, fertilizers, *etc.*) services of agricultural producers, *etc.*

Agricultural producers who are not linked by coordination relations with processing and trade and sales enterprises will not be able to effectively sell their products; they will be forced to contain all kinds of intermediaries. An analysis of the state of affairs in the agro-industrial complex of the republic shows that at this stage none of the spheres of the agro-industrial complex are able to go alone from the economic crisis. In this regard, the most important condition for the revitalization of the activities of agricultural enterprises can be the unification of their efforts on the basis of cooperation as the most important factor in stabilizing the economy.

The priority of this area is confirmed by the State Program for the Development of the AIC for 2017–2021 adopted in 2017, one of the main tasks of which is to "involve small and medium-sized farms in agricultural cooperation" (State program). In the President's Address to the People of Kazakhstan "Kazakhstan's Way - 2050: Common Goal, Common Interests, Common Future" dated January 17, 2014, Head of State N.A. Nazarbayev stressed the need to "remove all barriers to business development in agriculture and the cooperation process of farming ". In the Message of the President N. Nazarbayev to the people of Kazakhstan dated January 31, 2017, "The Third Modernization of Kazakhstan: Global Competitiveness", the head of state instructed the Government and head of the regions to create all conditions for the unification of more than 500 thousand households and small farmers in cooperatives.

The indicators of Table 2 indicate that the growth rate of the number of cattle in the private farms of the population is declining, and there is a steady growth in the agricultural formations and peasant farms. So, in the whole republic, the increase in the number of cattle in 2018 in% by 2017 it is: for agricultural enterprises -112%, for individual entrepreneurs and peasant or farm enterprises -109.3%, and for households only 102.3.

Table 2. Indicators of livestock and poultry (data for the 1st of February 2017,2018)

Region	All categories of farms			Including								
				Agricultural enterprises			Individual entrepreneurs and peasant or farm enterprises			Households		
	2017	2018	2018-2017, %	2017	2018	2018-2017, %	2017	2018	2018-2017, %	2017	2018	2018-2017, %
Republic of Kazakhstan	6.838,1	6487,3	105,4	673,5	601,5	112,0	2246,1	2055,9	109,3	3.918,5	3829,9	102,3
Akmola	421,5	410,8	102,6	122,3	120,9	101,2	67,0	61068	109,7	232,2	228,9	101,5
Aktobe	424,6	399,1	106,4	41,8	33,1	126,2	167,5	151,9	110,2	215,4	214,1	100,6
Almaty	965,7	928,2	104,1	78,8	65,0	121,3	383,1	369,3	103,7	503,8	493,9	102,0
Atyrau	153,9	149,2	103,1	2,6	2,2	117,0	54,9	51,7	106,1	96,4	95,3	101,2
West Kazakhstan	543,7	500,8	108,6	42,3	28,4	149,1	306,4	264,5	115,8	195,1	207,9	93,8
Zhambyl	361,1	333,0	108,4	20,3	13,0	156,4	135,4	116,8	115,9	205,3	203,2	101,0
Karaganda	520,8	488,9	106,5	16,5	10,6	156,1	260,8	244,9	106,5	243,5	233,5	104,3
Kostanay	444,8	432,1	102,9	114,1	119,2	95,7	80,4	73,1	110,0	250,3	239,8	104,4
Kyzylorda	310,1	288,9	107,3	5,3	2,9	178,6	93,6	80,8	115,9	211,1	205,1	102,9
Mangystau	17,7	14,8	119,6	0,3	-	36,1	6,4	5,2	122,4	11,1	9,6	115,1
South Kazakhstan	993,3	905	109,8	40,1	37,7	106,2	86,8	70,8	122,7	866,4	796,5	108,8
Pavlodar	404,6	400,0	101,2	44,8	44,1	101,7	140,5	130,7	107,5	219,3	22,5	97,4
North Kazakhstan	361,0	347,8	103,8	89,6	87,3	102,7	61,3	56,8	107,8	210,2	203,6	103,2
East Kazakhstan	911,9	885,5	103,0	54,5	37,0	147,5	401,9	378,2	106,3	455,5	470,3	96,8
Astana city	0,58	0,5	99,0	0,1	0,06	187,7	0,05	0,01	52,2	0,3	0,3	94,6
Almaty city	2,7	2,6	102,1	0,06	-	-	0,08	0,07	122,7	2.583,0	2.548,0	101,4

Source: compiled by authors

Thus, the main advantages of combining small forms of business in agricultural cooperatives are:
- members of the cooperative retain their legal and economic independence when entering the agricultural service cooperative (sales, processing, procurement, *etc*.), that is, they remain owners of land, equipment and other property;
- warranty of stable sales of products produced by agricultural producers (without intermediaries directly to the processing plant or the market);
- reducing the cost of agricultural producers for transportation, delivery of raw materials to processing or finished products to the market;
- reducing the cost of farms for mechanized services through the use of domestic tariffs for members of the cooperative, which is lower than the cost of third-party (intermediary) organizations;
- protection of interests of members of a cooperative and having a right to vote at a general meeting of the founders of a cooperative when discussing and making decisions on production, organizational and economic tasks;
- the possibility of obtaining information and consulting assistance free of charge from specialists of the cooperative;
- provision of stable employment (permanent and additional work) (Law 2015).

The increase in the number of livestock has led to an increase in the production of meat by-products. For example, in 2017, almost a million (960 thousand) tons of meat of all kinds were produced in the Republic. The lion's share in this volume is occupied by beef (45%) and lamb (18%). Pork production dropped sharply from 192 thousand tons in 2013 to 93 thousand tons per year. Continuous growth has been observed in recent years in horsemeat and in camel meat (Table 3).

Table 3. Meat production in the Republic of Kazakhstan

Indicator	2013	2014	2015	2016	2017
Slaughtered on the farm or sold for slaughter (slaughter weight), tons	934.067,0	871.012,0	900.224,0	931.003,7	960.686,8
Cattle	373.524,0	383.468,0	405.475,0	416.822,7	430.599,8
Small cattle	153.791,0	156.379,0	161.937,0	165.101,0	169.178,0
Swine	192.665,0	99.906,0	99.817,0	95.264,0	93.867,0
Horse	85.133,0	89.387,0	92.352,0	101.440,0	107.773,0
Bird	123.057,0	135.796,0	134.201,0	146.128,0	152.715,0
Other	5.897,0	6.076,0	6.442,0	6.248,0	6.554,0

Source: compiled by authors

According to the trademap.com website, beef exports are growing at a slow pace from year to year. The largest export volume of beef was recorded in 2016. and amounted to 1.980 tons. The import of this meat is also changing at a slow pace, but in a smaller direction. In 2017, the Republic imported 9.470 tons of cattle meat. The trade balance for this type of product is negative and amounts to 7.870 tons (Table 4).

Table 4. Dynamics of production, export, import and consumption of meat

Indicator	2013	2014	2015	2016	2017
Production, thousand tons	374	383	405	417	431
Export, thousand tons	0	0,29	1,96	1,98	1,6
Import, thousand tons	20,64	23,94	16,9	15,58	9,47
Market capacity, thousand tons	394,64	406,65	419,94	430,6	438,87
Import share (by capacity market),%	5,23	5,89	4,02	3,62	2,16
Per capita consumption population, kg/year	23,7	24,0	24,5	24,7	24,8
The need for beef according to the minimum consumption standards, thousand tons	250,095	253,65	257,415	261,27	265,05
Theoretical export - Potential, thousand tons	123,905	129,35	147,585	155,73	165,95

Source: compiled by authors

The bulk of beef exports are exports of fresh and chilled meat to the Russian Federation. In 2017, out of total exports, which amounts to 1,646 tons, 1,276 tons of beef were exported to Russia. The rest of the meat was exported to the neighboring Kyrgyz Republic. The import geography is wide, with such remote countries as Paraguay, Brazil, Argentina. Most of the imports are frozen meat from these countries. Along with these countries, a huge amount of beef is imported from Ukraine (4,870 tons).

The share of mutton exports in the total production of this type of food is very small (0.2%). In recent years, there has been a good growth in the export of mutton compared with previous periods. So, for example, according to trademap.org, in 2016, exports amounted to 306 tons of fresh and chilled meat from Mrs. However, this volume was shipped only in one direction to the Russian Federation. This fact indicates the need to diversify the supply of mutton. Mutton meat is traditionally in demand in the Muslim world, including in the Middle East region.

In addition to these markets, the newly opened Iranian market has recently attracted the attention of mutton exporters. Due to the fact that for a long time economic sanctions of the world powers were acting against this state, importing mutton to the Islamic Republic was not possible. However, with the relaxation of these sanctions in 2015, the Iranian market opened for meat producers from around the world. The state program of this country to raise the standard of living of citizens led to an increase in meat imports to Iran, one of the indicators of which was annual meat consumption per capita. The average annual consumption of meat by Iranians per capita is 12kg. The above program assumes an increase in this socio-economic indicator to 30 kg per year (Sultangaliyeva 2013).

3. Study case

Accelerated development of beef cattle as a priority for ensuring food security in Kazakhstan should be supported by a scientific analysis of the current situation and possible prospects for the development of beef cattle in Kazakhstan, in particular, an increase in the number of cattle and identification of the main problems and causes characterizing the dynamics of livestock production (Espolov 2015).

Kazakhstan has great potential in the export of livestock products, especially in the supply of meat. The presence in the country of vast natural pastures gives an excellent opportunity to produce competitive and, importantly, environmentally friendly livestock products. Therefore, the outlook for the development of the domestic

meat market is necessary for choosing a strategic vector for the development of the meat livestock industry in Kazakhstan.

In domestic practice are reflected a variety of methods for predicting the dynamics of livestock production. In the study, the development of a predictive model for the development of the dynamics of meat production and the formation of the domestic meat market was carried out on the basis of a trend model based on the exponential smoothing method (calculated on the basis of actual data on the functioning of livestock industries for the period 2013-2017 given in Table 4.

The exponential smoothing method is described in the works of Boxing (1974), Jenkins (1974), Lukashin (2016), Svetunkova (2010), Chetyrkin (2017), Bann and Farmer (2017) and others. In works it is noted that this method of forecasting is considered to be very effective and reliable. The method of exponential smoothing makes it possible to obtain an estimate of trend parameters, which characterize not the average level of the process, but the trend that has developed by the time of the last observation. The method has found the greatest application for the implementation of medium-term forecasts. For the exponential smoothing method, the main point is the choice of the smoothing parameter (smoothing constant) and initial conditions.

All levels of observation need to be analyzed, but earlier weights are given lower weights compared to later ones. The exponential smoothing method, developed by Brown (2013), corresponds to precisely such principles. The time series prediction scheme using the exponential smoothing method thus consists of the following steps:
- select the type of model of exponential smoothing;
- determine the parameter α by the formula:

$$\alpha = \frac{2}{m+1} \tag{1}$$

or given by the researcher.
- calculate the initial conditions ad after that calculate exponential averages:
- stimates of the prediction model coefficients are determined;
- predicted one point ahead;
- the deviation of the actual value of the time series from the predicted is found. According to the recurrence formula:

$$S_t^{[k]}(y) = \alpha S_t^{[k-1]}(y) + (1-\alpha) S_{t-1}^{[k]}(y) \tag{2}$$

- new exponential averages are calculated, and according to them, the estimated coefficients of the forecast model are determined accordingly;
- the forecast is carried out on two points ahead, *etc*.

Table 5. Equation parameters by least squares method

T	Y	t²	y²	t y
1	374	1	139.876	374
2	383	4	146.689	766
3	405	9	164.025	1.215
4	417	16	173.889	1.668
5	431	25	185.761	2.155
15	2.010	55	810.240	6.178
average value	402	11	162.048	1.235,6

Source: compiled and calculated by authors

For our data, the system of equations is:

$$\begin{cases} 5a + 15a = 2010 \\ 15a + 55b = 6178 \end{cases}$$

From the first equation we express a and substitute into the second equation with $\text{Get } a = 357{,}6; b = 14{,}8$. Trend equation is: $Y = 14{,}8\,t + 357{,}6$. The empirical trend coefficients a and b are only estimates of theoretical coefficients β_i, and the equation itself reflects only a general tendency in the behavior of the variables in question. The trend coefficient $b = 14{,}8$ shows the average change in the effective indicator (in units of measurement of y) with a change in the period of time t per unit of measurement. To determine the size of the error or accuracy of the forecast indicator *Y* we calculate standard deviation, as follows:

$$\sigma(t) = \sqrt{D(t)} = \sqrt{2} = 1,4142$$

$$\sigma(y) = \sqrt{D(y)} = \sqrt{444} = 21,0713$$

To assess the quality of the parameters of the equation, we construct a calculation table as in Table 6.

Table 6. Equation parameters by least squares method

t	y	y(t)	$(y_i-y_{cp})^2$	$(y_i-y(t))^2$	$(t-t_p)^2$	$(y_i-y(t)): y_i$
1	374	372.4	784	2.56	4	0.00428
2	383	387.2	361	17.64	1	0.01100
3	405	402.0	9	9.00	0	0.00741
4	417	416.8	225	0.04	1	0.00048
5	431	431.6	841	0.36	4	0.00139
		2010.0	2220	29.6	10	0.02450

Source: compiled and calculated by authors

Analyze the accuracy of determining the estimates of the parameters of the trend equation, standard equation error is determined:

$$S_y = \sqrt{S_y^2} = \sqrt{9,8667} = 3,1411$$

The hypothesis was tested against the coefficients of the linear trend equation:
1) t-statistics. Student criterion, according to the student's table was found Ttabl:

$$\text{Ttabl} \, (n - m - 1; \alpha/2) = (3; 0,025) = 3,182$$

$$t_a = \frac{a}{S_a}; \qquad\qquad t_a = \frac{14,8}{0,993} = 14,8997 > 3,182$$

The statistical significance of the coefficient *a* is confirmed. The estimation of the parameter *a* is significant and the trend in the time series exists.

$$t_b = \frac{b}{S_b}; \qquad\qquad t_b = \frac{357,6}{3,294} = 108,5465 > 3,182$$

The statistical significance of the coefficient *b* is confirmed.
2) F-statistics and Fisher Criteria. Coefficient of determination:

$$R^2 = 1 - \frac{\sum(y_i-y_t)^2}{\sum(y_i-\bar{y})^2} = 1 - \frac{29,6}{2220} = 0,9867;$$

$$F = \frac{R^2}{1-R^2}\frac{n-m-1}{m} = \frac{0,9867}{1-0,9867}\frac{5-1-1}{1} = 222,0001$$

Find from the table Fcr (1; 3; 0,05) = 10,1
where *m* is the number of factors in the trend equation ($m = 1$).
Since $F > F_{cr}$, the coefficient of determination (and, in general, the trend equation) is statistically significant.

Table 7. Predicted values of the estimated indicator and parameters of the equation of the predictive model

Indicators	2013	2014	2015	2016	2017	Forecast		
						2018	2019	2020
Production, thousand tons	374	383	405	417	431	446.4	461.2	476
Model equation:	Y = 14,8 t + 357,6							
R²	0,9867							
Standard equation error	3,1411							
t-statistic	12,706							
F-statistic	222,0001							

Source: compiled and calculated by authors

The time dependence of *Y* on time *t* was studied. At the specification stage, a linear trend was chosen. Its parameters are estimated by the method of least squares. The statistical significance of the equation is verified using the coefficient of determination and the Fisher criterion. It is established that in the situation under study,

98.67% of the total variability of *Y* is explained by the change in the time parameter. It was also established that the parameters of the model are statistically significant. Economic interpretation of the model parameters is possible - with each time period *t*, the value of *Y* increases by an average of 14.8 units.

Based on the constructed trend model and the conducted forecast calculations, it is possible to plan the dynamics of the production of cattle meat in the Republic of Kazakhstan for the future.

Conclusion

The implementation of a number of public and private targeted programs, which are focused on the medium term, will help to overcome problems and increase the number of commercial cattle herds, and develop the export potential of cattle meat. An example of such programs are the current project "Development of the export potential of cattle meat" and the national program "Development of beef cattle for 2018-2027".

Problems impeding the development of competitiveness of the industry:
- *Firstly*, these are problems of a sectoral nature: the high cost of raw materials, a high proportion of morally and physically obsolete equipment, and the use of outdated technologies in production, which does not allow producing competitive finished products.
- *Secondly*, these are general problems related to the lack of control over the observance of technical regulations, insufficient information propaganda, orienting consumers to domestic products, and difficulties in accessing trade objects.

As a result of the analysis of the meat market of the Republic of Kazakhstan on the subject of export potential, the following points can be highlighted:
- To date, the domestic market of cattle is not sufficiently saturated. In addition, up to 10 thousand tons of beef are imported annually from foreign markets. Beef producers of the republic in many cases do not maintain price competition with traditional meat exporters. It is necessary to continue work on further reducing the cost of production and increase the number of cattle.
- The cattle breeding market has sufficient potential for the development of export of quality meat to the markets of the Middle East and China. The qualitative characteristics and ecological purity of domestic mutton makes it competitive, despite the huge transport component in the cost of this meat. Today in the countries of the Middle East and North Africa there is an increase in the demand for mutton. Moreover, these regions intend to rely on the quality of imported meat. Despite the fact that the markets of the UAE, Saudi Arabia, Qatar, Israel and other importing countries are filled with cheap lamb from Australia, New Zealand and other traditional export-oriented countries, Kazakhstan has every chance to conquer its niche in the world market for quality lamb. With further work to reduce the cost of meat, while optimizing the cost of transporting finished products, as well as with marketing work to familiarize domestic mutton in the above markets, Kazakhstan can become a world exporter of mutton along with Australia, New Zealand, Pakistan and India.

At present new trends in the world agricultural economy and demography are emerging, integration processes in the regions have received real development, and global climate changes are taking place. Kazakhstan joined the world trade organization. In addition, the insufficient level of labor productivity in the industry the imperfection of the technologies used, small-scale production does not allow to conduct agricultural production on an intensive basis, thereby ensuring the most complete use of material, labor and other resources, to comply with environmental requirements (Aimurzina *et al.* 2018).

For the competitive functioning of the market of meat products in Kazakhstan, it is necessary, firstly, to create a sufficient and high-quality raw material base for meat processing enterprises; secondly, the planned development of the infrastructure of the market of meat products; thirdly, the intensification of the activity of meat processing enterprises for the production of meat and meat products, an increase in the utilization of production facilities by enterprises fourth, carrying out comprehensive marketing research by each meat processing enterprise and other economic entity of the meat products market; and, finally, fifthly, the constant carrying out by every business entity that is present in the meat products market an economic analysis of its business and competitive environment.

References

[1] Alsan, M., Bloom, D.E. and Canning, D. 2006. The effect of population health on foreign direct investment inflows to low- and middle-income countries. *World Development,* 34(4): 613-630.

[2] Boxing, J., Jenkins, G. 1974. *Analysis of time series. Forecast and management*. Moscow. 520.

[3] Bann, D.V., Farmer, E.D. 2017. *Comparative models of electrical load prediction*. Moscow. 200.

[4] Brown, R.G. 2013. *Smoothing, Forecasting and Prediction of Discrete Time Series*. N.Y. 135.

[5] Buchinskaya, A.G. 2017. Problems and Prospects for the Development of Meat Cattle Breeding in Russia. *Meat Technologies*, 7(9): 38-40.

[6] Chetyrkin, E.M. 2017. *Statistical forecasting methods*. Moscow. 199.

[7] Espolov T.I. 2015. AIC of Kazakhstan: Globalization and innovation. Almaty. 436.

[8] Glazunov, V. 2016. Formation of competitiveness of meat products. *AIC: Economics, Management*, 2(8): 43-47.

[9] Lukashin, Yu.G. 2016. Adaptive short-term forecasting methods. Moscow. 214.

[10] Logoshin, G. P. 2015. Beef production in Russia: Problems and development prospects. *Meat Technologies*, 1(4): 48-51.

[11] Nazarbayev N.A. 2014. Message from the President to the People of Kazakhstan. Kazakhstan's Way - 2050: Common Goal, Common Interests, Common Future.

[12] Nazarbayev, N.A. 2017. The third modernization of Kazakhstan: Global competitiveness. Message of the President of the Republic of Kazakhstan. Available at: www.akorda.kz

[13] Aimurzina, B., *et al.* 2018. Methods of sustainable regulation of agricultural enterprises at the present stage. *Journal of Environmental Management and Tourism,* Volume IX, Fall, 5(29): 1101- 1107.

[14] Sultangaliyeva, L.E. 2013. Development of the competitiveness of the livestock industry in the Republic of Kazakhstan. Vestnik KazNU, 2(9): 93-101.

[15] Surovtsev, V. 2017. Directions of increasing profits and profitability in dairy cattle breeding. AIC: Economics, Management, 12(9): 34-36.

[16] Svetunkov, S.G., Svetunkov, I.S. 2010. Methods of socio-economic forecasting: A textbook for universities. SPb. 103.

[17] Voyakin, M.P. 2016. Modern world tendencies of the meat industry/ M.P. Voyakin // Meat technologies. - 2009. - N 1. - p. 14-19

*** State program for the development of the agro-industrial complex of the Republic of Kazakhstan for 2017-2021. Decree of the President of the Republic of Kazakhstan. Available at: www.minagri.gov.kz

*** Law of the Republic of Kazakhstan. 2015. On Agricultural Cooperatives. www.minagri.gov.kz

*** Electronic resource www.trademap.com