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Gains from Export – the Input Output Approach

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Abstract:

The differences between statistics of gross exports and value added in exports are already considerable and growing. Hence, export policy analysis based on gross trade allows will grossly overestimate the impact of exports. The Slovak Republic is mainly positioned in the downstream activities of GVCs. This contributes to the relatively limited domestic value added created by exports. The aim of this paper is to investigate the gains from export for the Slovak economy based on input-output analysis. The data covers period 2000 - 2014 and comes from World Input–Output Database (WIOD). The results show that Slovak exporting sectors generate lower product multiplication effects for Slovak economy and their effects on domestic value added is even weakening. The lowest value added across exporting sectors generates automotive industry and computer, electronic and optical products manufacturing. The automotive sector reduces the share of value added per unit of production during the period, although its total production significantly increases. However, the indicator of value added generated by export shows that in absolute value, the automotive industry generates in 2014 the most value added among all other sectors and its value even increases over time.

Keywords: export; global value chains; value added; input-output model; multipliers

JEL Classification: F14; F62; C67

Introduction

Increasing global production fragmentation has allowed exporting more to rely less on domestic inputs for production. The current research states that domestic content in exports has been declining in most countries. Understanding effects of exports for domestic production as well as value added creation and employment can provide important development policy insights.

Since the differences between gross exports and value added in exports are already considerable and growing, assessing the competitiveness of economies through traditional indicators based on gross export statistics is becoming increasingly less relevant. For example, the firms in China import materials or parts to be further assembled, processed and exported. Domestic value added in Chinese exports may be far less than actual gross exports. Input-output tables at the sector level enable to assess foreign content in exports, which simply equals the ratio of net exports to gross exports at the firm level. Domestic value added in Chinese processing exports was around 50% in 2000, and it gradually increases to 62% in 2006. Such increase is wide spread across industries as well as across destination countries. Firm level regressions confirm that export processing firms substitute imported materials with domestic materials which explains the rising domestic value added. This result suggests that China may be moving up the global production chain and is no longer only responsible for the final stage of productions. However, foreign content remains high. Chinese exports policy analysis based on gross trade allows will grossly overestimate the impact of Chinese exports (Kee and Heiwai 2016). For these reasons the aim of this paper is to investigate the gains from export for Slovak economy based on input-output analysis. We will analyse the production and value added multipliers as well as domestic value added generated by Slovak export using input-output approach. The data covers period 2000-2014 and come from World Input–Output Database (WIOD).

The paper is divided into four sections. Following the introduction, the relevant empirical literature is reviewed in Section 1. In Section 2 we provide an overview of input-output model that we employ to calculate the values of multipliers. Section 3 provides results of input-output analysis for selected industries. Finally, concluding remarks are made in Section 4.

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1. Literature review

The process of fragmentation is often analysed in literature under the names such as vertical specialization, outsourcing, offshoring or trade in task. Due to international fragmentation of production in world economy we may observe changes in understanding of international competitiveness. Intention of countries to participate in new international division of labour based on participation of country in the global value chains reveals lot of opened questions for industrial policy framework. Traditional measures of export performance provide biased information for policy decisions (Lábaj 2014, Habrman 2013). As a result, many authors focus on estimations of domestic value added shares in unit of exports that is used as a measure of vertical specialization in foreign trade. Examination of relative importance of individual sectors of the economy in the international production chains naturally corresponds with a requirement to use appropriate methodology (Lábaj 2014). In order to examine structural and intra-industrial linkages, empirical literature tend to implement input-output analysis that is based on the use of multiregional input-output tables that provide crucial information not only on value added within individual segments of production chains but also on quantitative and qualitative features of inputs (labour and capital) (Backer and Miroudot 2014). Empirical literature on input-output analysis concentrates on examination of equilibrium in the individual country. Such studies are based on the use of input-output tables due to their precise ability to monitor not only value added in export industries but also on the individual levels of a production chain.

Several empirical studies for the Slovak economy focused on analysing the position and importance of individual industries for the national economy (Kubala, Lábaj and Silanič 2015, Hečková and Chapčáková 2011). Lábaj, Luptáčík and Rumpelová (2008), Dujava, Lábaj and Workie (2011), Habrman, Kočišová and Lábaj (2013), Lábaj (2013) analysed complex cross-sectorial links in the economy of Slovakia, focusing on total production, value added, employment and imports. These studies bring important information on multiplier effects of final-use of individual commodities for Slovak economy and the importance of each final-use category for value added and employment creation. An approach that explores key sector based on the analysis of comparative advantages, has been investigated, for example by Balog *et al.* (2013). Habrman (2013) examined creation of value added in the Slovak economy and noted that exports generate lesser effects than domestic demand. Despite the great openness of the Slovak economy, most of the value added is still generated by domestic demand (58-63%) while exports generate the remaining part (37-42%). Production for the domestic market generates higher effects than output for export. A deeper look at the sectorial structure of the economy shows that the three most exporting sectors - Automotive, Electrical and Optical Equipment and basic metal and fabricated metal account for up to 50% of the economy's exports, but only 40% of the effects of all exporting sectors on value added and employment. This is mainly caused by the automotive industry, whose production is highly fragmented, and therefore domestic value added of the export generated in Slovakia represents only 26%. The OECD also states that Slovak Republic needs, to reconsideration of its position in GVCs. The involvement of the Slovak Republic in GVCs is highly concentrated, with strong involvement in a limited number of industries. With a relatively high share of intermediate inputs used for exports abroad, combined with a relatively low level of the share of domestically produced inputs in third countries' exports, the Slovak Republic is mainly positioned in the downstream activities of GVCs, often involving the assembly or manufacturing of components and parts.

This contributes to the relatively limited domestic value added created by exports. Half of the value of exports is value added from abroad embodied in intermediates, compared to one quarter on average in the OECD. There is a great potential for diversification of the economy, which, however, needs an appropriate supply response, driven by skills and innovation. The Slovak economy can make more out of its privileged position in by upgrading and diversifying its supply capacity. This could contribute to increasing the domestic value added created by exports. Competitiveness in GVCs requires strengthening factors of production that are unlikely to cross national borders. This implies mainly investment in human capital and skills (OECD 2013).

Compared individual EU countries, there are large differences between countries (Johnson 2014). EU countries from Central and Eastern Europe (CEE) generate about 5% lower domestic value added compared to old EU (EU15) countries. Foreign value added represents a larger share of CEE exports than the EU-15. Although the CEE countries have become major suppliers of intermediates and components, semi-final products and final products, they are shown to have an increasing share of imports included in their exports. In the CEE, the share in global value chains (GVCs) is higher than the EU-15 average, so they can improve their positions in the long run and increase domestic value added in exports (Vrh 2015).

2. Methodology

Identification of the key sectors in the economy require structural models and input-output analysis, taking into account the complex links between sectors in the national economy. Backward linkages are the most advanced analyses built on the Leontief inverse matrix and intermediate input matrix. Forward linkages are a slightly less used model. According to Cardanet and Sancho (2006), no general consensus about optimal model has been adopted so far, because each of the methods has its advantages and disadvantages, although models based on the Leontief inverse matrix can be clearly interpreted and are well supported by the theory of production. The Leontief model is based on a symmetrical input-output table, presented for the first time in the 1930s by the so called Nobel Prize winner, Wassily Leontief. The model is based on the equilibrium of resources (supply) and use (demand). Leontief's input-output model allows analysis of cross-sector and interregional structural links in the world economy therefore represented an advantage compared to other macroeconomic models. While aggregated models consider total output in the economy as one product, the Leontief model assumes that outputs from the production process are different goods and services. The interest is focused on the volume of total output as well as on the structure of production. Standard input-output analysis is typically made for one country or region where foreign countries are represented by import and export. By deriving it is possible to obtain an input-output model for two regions or more regions of the world economy.

Leontief's input-output model for one region assumes the division of the economy into the n sectors, with the output of each sector being used to satisfy final demand (households, public administration, investment or exports) or used as an intermediate product for the manufacture of other products (in the same or other sectors). Country's gross output can be expressed as column vector:

$$x = \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} \quad (1)$$

Final use as the ultimate goal of production serves to satisfy the needs of various economic subjects. Under this notion, we understand the purchase and use of various goods and services by households, investment by firms, final government consumption and export, indicating the final consumption of products and services abroad (foreign demand for products and services). Final demand vector can be written as follows:

$$y = \begin{bmatrix} y_1 \\ \vdots \\ y_n \end{bmatrix} \quad (2)$$

The matrix Z representing the $n \times n$ input-output (I-O) matrix of coefficients that stand for intermediate use (specifying units of intermediate goods in the production of one unit of gross output). The matrix Z can be written as:

$$Z = \{z_{ij}\} = \begin{bmatrix} z_{11} & \cdots & z_{1n} \\ \vdots & \ddots & \vdots \\ z_{n1} & \cdots & z_{nn} \end{bmatrix} \quad (3)$$

So country 's gross output has to satisfy the following accounting relationship (Koopman *et al.* 2014):

$$\begin{aligned} x_1 &= z_{11} + z_{12} + \cdots + z_{1n} + y_1 \\ &\vdots \\ &\vdots \\ x_n &= z_{n1} + z_{n2} + \cdots + z_{nn} + y_n \end{aligned} \quad (4)$$

The country production system can be written as input-output model as follows:

$$\begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix} = \begin{bmatrix} z_{11} & \cdots & z_{1n} \\ \vdots & \ddots & \vdots \\ z_{n1} & \cdots & z_{nn} \end{bmatrix} \times \begin{bmatrix} 1 \\ \vdots \\ 1 \end{bmatrix} + \begin{bmatrix} y_1 \\ \vdots \\ y_n \end{bmatrix} \quad (5)$$

By reorganizing the equation (5), the gross output vector X can be expressed as (Vrh 2015):

$$x = Zi + y \quad (6)$$

where: i represents a unit column vector. From the intermediate input matrix Z it is possible to calculate the matrix of technical coefficients noted as A . From the matrix A we can read the structure and volume of direct inputs of different commodities to produce one unit of production in the sector j . For example, we can find an

answer to the question as how many agricultural products and minerals is used to produce one unit of production in manufacturing. The individual elements of the matrix A are noted as a_{ij} and are calculated as follows (Lábaj 2014):

$$a_{ij} = \frac{z_{ij}}{x_j} \quad (7)$$

Therefore, the enrolment of the technical coefficient matrix calculation is as follows:

$$A = Z(x) \quad (8)$$

Using equivalent adjustments, we calculate Leontief's inverse matrix L :

$$x = Ax + y \quad (9)$$

$$x = (I - A)^{-1}y = Ly \quad (10)$$

where: I stands for unit matrix ($n \times n$); $(I-A)^{-1}=L$ represents Leontief inverse matrix.

Leontief's inverse matrix links final demand and production. It represents the overall direct and indirect effects for each sector's production when the final demand increase. If the inverse matrix L is multiply by individual component of final consumption (for example export), the getting result will capture the part of the output generated by this component (export). The horizontal sum of the L matrix elements represents the production multiplier, which characterizes the need for both direct and indirect inputs if the final demand for one commodity increased by one. The vertical sum of the Leontief matrix captures the direct and indirect demand of the domestic sector inputs, thus how much domestic output will grow if demand for the sector is increased by an additional unit.

For measuring the domestic and foreign contents, the value-added coefficient vector v is defined as:

$$v' = [v'_1 \cdots v'_n], \quad (11)$$

where: v'_1 represents the total value added of industry 1 for whole economy.

Dividing the elements of the value added vector v' by the elements of the total production vector x , we obtain the vector of the direct value added coefficients v that give us the value added generated in a given sector per unit of production of the sector.

To find the matrix of value added cumulative coefficients it is necessary to multiply unit vector of direct value added coefficients V ($n \times n$) with Leontief inverse matrix that can be written as:

$$VL = \begin{bmatrix} v_1 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & v_n \end{bmatrix} \times \begin{bmatrix} l_{11} & \cdots & l_{n1} \\ \vdots & \ddots & \vdots \\ l_{1n} & \cdots & l_{nn} \end{bmatrix}. \quad (12)$$

The individual elements of the VL matrix represent directly and indirectly generated value added in a particular sector caused by one final-use unit of the commodity. The multiplier of the value added of the j -commodity is then calculated as the corresponding column sum of the matrix elements. The value added multiplier reflects the value added that generates one final consumption unit of the j -th commodity. Multiplying the matrix VL by final demand y , we obtain the direct and indirect value added generated by one sector of economy.

$$VA = VLy. \quad (13)$$

To determine value added generated by export or domestic demand, the value in the VA expression is replaced by its part, *i.e.* by export e ($n \times 1$), or domestic demand d ($n \times 1$) (Habrman 2013).

$$va = VLe; va = VLd. \quad (14)$$

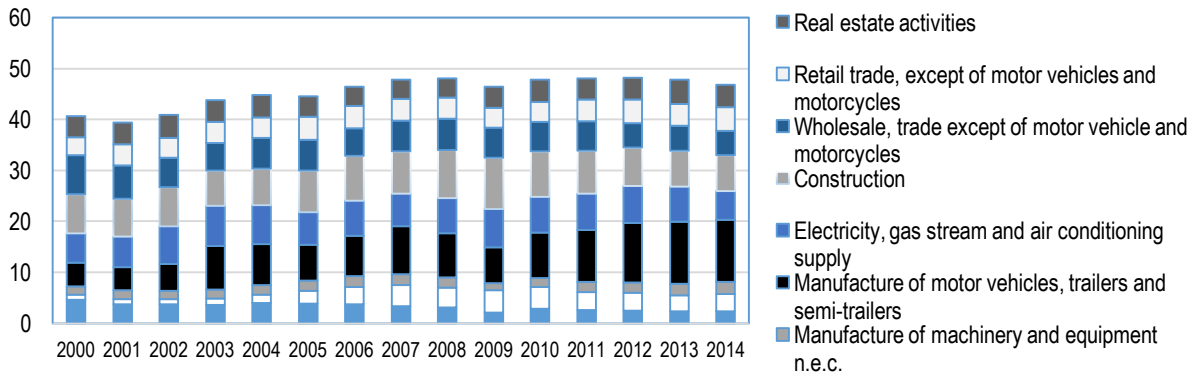
3. Results and discussion

In the next section the results of multipliers as well as domestic value added generated by exports for individual Slovak sectors during the period 2000-2014 will be presented. The attention is focused on the sectors with the higher share on Slovak output creation (such as Construction, Electricity, gas stream and air conditioning supply, Wholesale trade, Retail trade and Real estate activities) and the sectors with the higher export share (Manufacture of motor vehicle, Manufacture of computer product, Manufacture of basic metal and Manufacture of machinery *n.e.c.*) see Figure 1 and 2.

The aim of the next investigation is to discuss and compare the position of exporting sectors in term of domestic product and value added creation as well as share of domestic value created by export. Such analysis

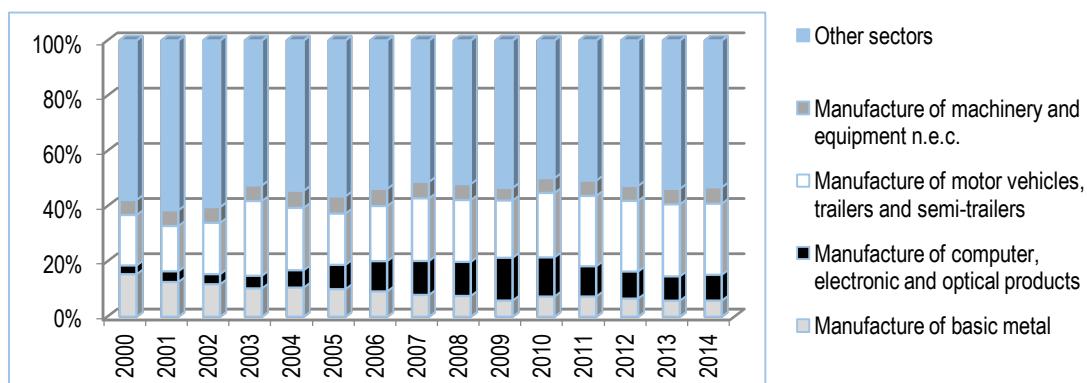
enables to estimate how the rising export affects the domestic value added creation. Understanding the development of domestic value added of export can provide important development policy insights. Whereby firms in Slovakia import materials or parts to be further assembled, processed and exported, domestic value added in Slovak exports may be far less than actual gross exports.

Figure 1. Slovak sectors with the higher share on output creation during the period 2000-2014



Source: data from WIO

Figure 2. Sectors with the higher share on Slovak export during the period 2000-2014



Source: data from WIOD

Multiplier of production express the production of all commodities in the economy necessary to satisfy one unit of final demand for one commodity. It can be calculating as the sum of individual column in the Leontief inverse matrix. It should be noted that the multipliers of production are bigger when the links with domestic production are stronger and weaker with foreign countries (import). These multipliers are greater than one, since increasing the final consumption of the commodity by one unit causes an increase in production at least by this unit. Based on the results in Table 1, it can be stated that the multiplication effect of all sectors decline, the most in Manufacture of computer, electronic and optical product and manufacture of basic metal sectors. The highest multiplication effect for Slovak economy generated the sectors as Electricity, gas stream and air conditioning supply, Construction, Retail and Wholesale trade. As expected, the exporting sectors generated lower multiplication effect. The fall of the multiplier may be due to an increasing dependence on imports.

Table 1. Results of production multiplier

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Manufacture of motor vehicles, trailers and semi-trailers														
1.72	1.67	1.72	1.83	1.66	1.58	1.55	1.49	1.48	1.47	1.54	1.48	1.55	1.55	1.55
Manufacture of computer, electronic and optical products														
1.33	1.29	1.29	1.27	1.19	1.18	1.17	1.19	1.19	1.22	1.20	1.19	1.12	1.11	1.11
Manufacture of basic metals														
1.96	1.73	1.79	1.74	1.55	1.50	1.46	1.46	1.52	1.59	1.54	1.49	1.46	1.43	1.41

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Manufacture of machinery and equipment n.e.c.														
1.68	1.59	1.62	1.62	1.49	1.46	1.46	1.47	1.47	1.47	1.44	1.44	1.49	1.47	1.46
Wholesale, trade except of motor vehicle and motorcycles														
1.98	1.93	1.96	1.84	1.68	1.65	1.63	1.66	1.65	1.57	1.60	1.71	1.76	1.63	1.69
Retail trade, except of motor vehicles and motorcycles														
1.82	1.77	1.68	1.62	1.57	1.55	1.51	1.55	1.56	1.56	1.58	1.68	1.54	1.56	1.53
Construction														
1.98	1.95	1.88	1.91	1.85	1.86	1.82	1.77	1.79	1.80	1.75	1.78	1.70	1.69	1.64
Electricity, gas stream and air conditioning supply														
2.09	2.16	2.23	2.12	1.90	1.81	1.70	1.74	1.87	1.89	1.93	2.03	2.04	2.03	1.87
Real estate activities														
1.43	1.39	1.45	1.45	1.42	1.47	1.42	1.40	1.40	1.45	1.54	1.54	1.52	1.37	1.51

Source: own calculation, data from WIOD

The value added multiplier examines the relationship between value added and final demand. This multiplier indicates the value added created by final demand one unit increase. The low values indicate that intermediate consumption is the dominant production input and thus the real value added creation diminish. Otherwise, as the value of multiplier grows, the effect for domestic value added increases. As expected, the sectors with dominant services share as Real estate activities, Retail and wholesale trade, and Construction multiply more value added by unit of production than manufacture exporting sectors (see Table 2). Moreover, the multiplier of value added for construction sector rise. However, the exporting sectors still lagged and their effect on domestic value added is even weakening. The results confirm the decreasing multiplication effects of automotive industry as well as others exporting sectors for value added creation in Slovakia during observed period.

Table 2. Results of value added multiplier

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Manufacture of motor vehicles, trailers and semi-trailers														
0.37	0.35	0.34	0.35	0.32	0.30	0.28	0.29	0.30	0.29	0.31	0.28	0.27	0.26	0.27
Manufacture of computer, electronic and optical products														
0.42	0.33	0.34	0.28	0.23	0.20	0.20	0.18	0.20	0.17	0.19	0.20	0.15	0.15	0.15
Manufacture of basic metals														
0.50	0.51	0.48	0.51	0.51	0.50	0.49	0.49	0.46	0.43	0.43	0.37	0.36	0.36	0.35
Manufacture of machinery and equipment n.e.c.														
0.59	0.56	0.54	0.54	0.53	0.51	0.47	0.47	0.49	0.50	0.50	0.46	0.46	0.45	0.47
Wholesale, trade except of motor vehicle and motorcycles														
0.80	0.79	0.78	0.81	0.82	0.81	0.80	0.80	0.81	0.84	0.83	0.82	0.77	0.79	0.78
Retail trade, except of motor vehicles and motorcycles														
0.83	0.83	0.85	0.86	0.86	0.85	0.85	0.85	0.86	0.87	0.86	0.84	0.85	0.83	0.84
Construction														
0.71	0.67	0.71	0.69	0.67	0.65	0.66	0.69	0.72	0.73	0.72	0.75	0.79	0.75	0.76
Electricity, gas stream and air conditioning supply														
0.53	0.43	0.46	0.54	0.57	0.55	0.62	0.59	0.56	0.57	0.52	0.50	0.50	0.46	0.47
Real estate activities														
0.91	0.91	0.90	0.90	0.90	0.88	0.89	0.90	0.91	0.91	0.89	0.88	0.89	0.91	0.88

Source: own calculation, data from WIOD

The conclusions made above, are even confirmed by comparing the indicator of value added creation across industries (see Table 3). Value added indicator specify the share of value added per unit of production. The sectors such as Real estate activities as well as Retail and Wholesale trade noted higher share of value added per unit of production. The lowest value added across exporting sectors generate automotive industry and computer,

electronic and optical products manufacturing. Unfortunately, the indicator even decreases during observed period. The automotive sector reduced the share of value added per unit of production during the period, although its total production significantly increased. The reason of this low value added may consist in the limited share of module and system manufacturers compared to the production of finished cars. Then the production of finished cars in Slovakia consists of assembly individual modules together.

The experiences from the world leader in export such as China confirmed the similar conclusions. Chen *et al.* (2012) stated that the production of processing exports sectors, which are highly dependent on imported inputs, would similarly generate less domestic value and employment than non-processing export sectors. Traditional manufacturing exports such as textile and garment products generated higher total domestic value added and employment than “high-technology” manufacturing exports such as electric equipment and machinery or telecommunication equipment, computer and other electronic products. Thus, promoting the high-technology industries at the expense of the traditional labour intensive industries may not necessarily lead to greater growth in domestic value added and employment, unless there is much greater room for export growth in the former than in the latter.

Table 3. Value added creation across industries

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Manufacture of motor vehicles, trailers and semi-trailers														
0.16	0.15	0.14	0.12	0.13	0.13	0.12	0.13	0.15	0.14	0.15	0.14	0.12	0.11	0.12
Manufacture of computer, electronic and optical products														
0.31	0.24	0.24	0.19	0.16	0.13	0.14	0.10	0.13	0.08	0.10	0.12	0.11	0.11	0.11
Manufacture of basic metals														
0.19	0.26	0.22	0.26	0.30	0.30	0.31	0.31	0.25	0.20	0.23	0.18	0.20	0.21	0.20
Manufacture of machinery and equipment n.e.c.														
0.36	0.35	0.33	0.32	0.33	0.32	0.28	0.27	0.30	0.31	0.32	0.29	0.27	0.27	0.29
Wholesale, trade except of motor vehicle and motorcycles														
0.41	0.41	0.39	0.44	0.49	0.50	0.50	0.49	0.51	0.56	0.54	0.49	0.42	0.50	0.46
Retail trade, except of motor vehicles and motorcycles														
0.49	0.50	0.56	0.59	0.59	0.59	0.60	0.58	0.59	0.59	0.58	0.52	0.60	0.56	0.59
Construction														
0.36	0.33	0.38	0.35	0.34	0.33	0.35	0.38	0.40	0.40	0.41	0.42	0.47	0.44	0.47
Electricity, gas stream and air conditioning supply														
0.21	0.13	0.15	0.21	0.27	0.28	0.35	0.32	0.27	0.27	0.23	0.22	0.21	0.19	0.22
Real estate activities														
0.74	0.75	0.71	0.71	0.71	0.68	0.70	0.71	0.73	0.70	0.63	0.64	0.62	0.72	0.62

Source: own calculation, data from WIOD

The next indicators of domestic value added generated by export can better clarify the position of individual sectors on export strength for Slovakia. The results from the Table 4 present the share of individual sectors on total domestic value added created by exports. The automotive industry as the top Slovak exporter, generated in 2014 the most value added created by export among all other sectors and its value even increase over time.

Interestingly, the other traditional Slovak exporting sectors are outclassed by the sector Wholesale trade. However, the share of this sector in total value added decline significantly after crisis period. Comparing the situation with China, Kee and Heiwai (2016) empirically showed that an increase in foreign direct investment raises firm domestic value added ratio by stimulating an increased supply of local input variety. The positive result suggests that China may be moving up the global production chain and is no longer only responsible for the final stage of productions. Unfortunately, the situation in Slovakia is rather different with growing share of imported intermediate inputs in manufacturing.

Table 4. The share of individual sectors on total value added generated by export (%)

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Manufacture of motor vehicles, trailers and semi-trailers														
6.30	5.68	5.97	7.98	7.06	5.92	6.08	7.37	7.97	6.78	8.76	9.59	8.14	7.95	8.62
Manufacture of computer, electronic and optical products														
2.04	1.82	1.77	1.78	1.95	2.28	3.22	2.64	3.30	2.67	3.17	3.09	2.38	2.06	2.27
Manufacture of basic metals														
7.41	7.68	6.30	6.70	7.55	7.22	7.07	6.17	4.56	2.98	4.09	3.27	3.14	2.91	2.75
Manufacture of machinery and equipment n.e.c..														
3.91	4.00	3.84	3.84	4.27	4.22	3.93	3.68	3.86	3.05	3.83	3.85	3.37	3.39	3.85
Wholesale, trade except of motor vehicle and motorcycles														
11.38	9.78	8.82	8.87	10.97	11.42	10.54	11.14	12.17	14.28	12.92	11.25	7.21	8.40	7.44
Retail trade, except of motor vehicles and motorcycles														
2.51	3.23	3.85	4.50	4.01	4.45	4.89	4.57	4.55	3.50	3.53	3.49	4.43	3.51	4.28
Construction														
2.03	1.63	1.97	1.70	1.63	1.66	2.09	2.10	2.91	3.54	2.98	3.41	3.61	2.99	3.32
Electricity, gas stream and air conditioning supply														
2.03	1.20	1.77	2.77	3.10	2.57	3.70	3.15	2.90	2.79	2.38	2.33	2.42	1.92	1.76
Real estate activities														
3.33	3.53	3.72	3.56	3.07	2.62	2.75	2.88	2.93	2.87	2.83	2.45	7.71	10.67	8.46

Source: own calculation, data from WIOD

Nevertheless, the study of Amador, Cappariello and Stehrer (2015) conclude that in the period 2000-2011, the export share of foreign value added sourced within the euro area was more stable than that sourced from other blocks, representing around 11% of total exports for the average euro area country. In other words, the growing relevance of external suppliers does not reflect a weakening of the production links within the euro area, being instead a substitution of domestic value added by extra euro area sourcing. They find evidence of an increasing trend in the share of foreign value added in exports for the euro area as a whole over the 11 years period, with a cyclical pattern evident during the trade collapse. The analysis also shows that the euro area is the main source of foreign value added in exports for most member countries and its share is more stable than that of other trade blocks. In other words, the growing relevance of external suppliers does not reflect a weakening of the production links within the euro area, being instead a substitution of domestic value added by extra euro area sourcing.

The value added indicator can be split in two categories - the domestic value added generated by domestic demand and value added generated by export. The weaknesses of Slovak exporting industries is their strong linking to foreign demand. Almost all value added of top Slovak export sectors is generated by export (see Table 5). This confirms the high risk of vulnerability for Slovak export sectors to external shocks. Moreover, there is an important network of domestic subcontractors connected to the production of cars. It is necessary for domestic intermediate suppliers to focus not only to subcontracting Slovak companies but to increase their importance as intermediary suppliers abroad.

Furthermore, the traditionally domestic sectors producing mainly for domestic demand such as construction sector, retail trade *etc.* observed the considerable growing share of value added created for export. As show this indicator for whole Slovak sectors the influence of foreign demand for Slovak value added creation is growing mainly after crisis period and compared to initial situation in 2000 the value is almost double. It can be dangerous as the sensitivity of Slovak economy to external shocks increases. Firms substitute domestic materials with imported materials which explains the decreasing domestic value added. Our results suggest that Slovakia may not be moving up the global production chain and is still only responsible for the final stage of productions. Slovak export policy analysis based on gross trade can grossly overestimate the impact of Slovak export for national economy. Moreover, as Lábaj (2017) concluded, the growth of trade with intermediate has been dominated in world trade development, indicating an increasing fragmentation of production chains across the world.

Table 5. The share of domestic value added generated by export on value added of individual sector (%)

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Manufacture of motor vehicles, trailers and semi-trailers														
77.4	78.5	82.7	93.1	95.4	92.9	97.7	93.6	93.7	94.3	97.6	95.3	95.4	95.5	95.2
Manufacture of computer, electronic and optical products														
61.7	73.8	74.0	87.4	98.8	98.9	99.1	99.2	99.3	99.2	99.3	100	100	100	100
Manufacture of basic metals														
74.8	77.0	77.8	84.9	86.9	87.5	90.4	90.4	88.0	92.2	90.2	97.0	100.4	99.6	99.5
Manufacture of machinery and equipment n.e.c.														
57.2	65.1	68.8	77.1	92.1	94.6	95.4	95.7	95.8	95.6	95.7	97.0	97.6	97.5	97.3
Wholesale, trade except of motor vehicle and motorcycles														
32.2	36.3	39.4	44.2	50.2	52.9	57.0	57.5	57.8	57.1	58.4	56.1	57.4	57.4	57.5
Retail trade, except of motor vehicles and motorcycles														
12.7	15.6	17.7	21.9	23.1	23.9	26.7	28.6	27.5	20.0	22.2	21.8	25.8	25.3	26.5
Construction														
6.5	6.5	6.9	8.2	8.9	8.8	10.1	10.3	11.5	11.6	11.8	13.8	16.4	16.3	16.9
Electricity, gas stream and air conditioning supply														
15.0	15.4	16.6	19.6	20.1	20.4	22.2	23.5	22.9	17.9	20.5	20.6	24.9	24.4	23.9
Real estate activities														
9.8	10.7	11.7	13.7	13.1	13.5	15.0	16.4	16.2	13.0	14.4	13.1	46.6	51.57	53.36
All sectors														
23.1	25.1	25.9	30.0	33.4	34.9	36.8	38.5	37.5	31.7	35.0	36.1	41.1	42.6	42.4

Source: own calculation, data from WIOD

Significant increases in value added have been recorded in particular by countries which have increased their participation in trade with intermediate products. Profits from intermediate trade more than offset losses in market shares in the final products trade. Countries that do not significantly engage in intermediate trade and achieve low labour productivity growth rates, have seen lower growth rates of value added. This development has negatively affected the economic growth of these countries in the next period.

Conclusion

In this paper we have studied the influence of Slovak exporting sectors on Slovak economy particularly on value added creation. We estimated the extent of total domestic value added generated by Slovak export during period 2000-2014. The attention was focused on multipliers of production and value added as well as domestic value added generated by export for Slovak sectors with the higher export share and for comparison for the sectors with the higher share on Slovak output creation.

The results confirmed that production multiplier over analysed period decreases, the most in exporting sectors. As expected, the exporting sectors generated lower product multiplication effect for Slovak economy. The sectors with dominant services share multiply more value added by unit of production compared to manufacturing exporting sectors. Moreover, the multiplier of value added for example for construction sector rises. However, the exporting sectors still lagged and their effect on domestic value added is even weakening. The lowest value added across exporting sectors generated automotive industry and computer, electronic and optical products manufacturing. The automotive sector reduced the share of value added per unit of production during the period although its total production significantly increased. The reason of this low value added is the limited share of module and system manufacturers compared to the production of finished cars. Then the production of finished cars in Slovakia consists of individual modules assembly hence the final stage of production process characterised by low value added. However, the indicator of value added generated by export showed that in absolute value, the

automotive industry generated in 2014 the most value added among all other sectors and its value even increased over time. The other weaknesses of Slovak exporting industries is their strong linking to foreign demand. Almost all value added of top Slovak exporting sectors is generated by foreign demand. This confirms the high risk of vulnerability to external shocks. Moreover, there is an important network of domestic subcontractors connected to the production of cars. It is necessary for domestic intermediate suppliers to focus not only to subcontracting Slovak companies but to increase their importance as intermediary suppliers abroad. Furthermore, as the growth of trade with intermediate has been dominated in world trade development, significant increases in value added have been recorded in particular by countries which have increased their participation in trade with intermediate products. Countries that do not significantly engage in intermediate trade and achieve low labour productivity growth rates, have seen lower growth rates of value added and in the next period lower economic growth.

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An Economic and Financial Turbulence Index: The Mexican Case 1996-2017

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Abstract:

This paper is aimed at providing an economic and financial turbulence index useful to determine the source factors and root causes of any type of crisis. The methodology is based on Minsky's (1974) Financial Instability Hypothesis and on Mahalanobis' distance. To do that, the dynamic correlations among Minsky's financial dimensions and principal component analysis are examined. The Mexican case is studied since in the last decades, it has undergone two financial crises that seem to have had different root causes and features.

JEL Classification: G01, C38, E12.

Keywords: economic and financial crises, principal components, multivariate analysis.

Introduction

Due to the magnitude of the United States real estate market crisis of 2008 and its consequences, criticism brought with it a shift in the established economic paradigm, which also happened in the decades following the Great Depression when the mainstream neoclassical approach that had prevailed over the years lost influence during the Keynesian revolution. Countless hypotheses and theories that attempt to explain the economic environment have been created from different economic visions. It would appear that accurately describing a crisis is an impossible task because the amount of literature and contrasting viewpoints about this topic are inexhaustible. However, not being able to comprehend the behavior, determining factors and dynamics of a financial crisis hinders the creation of both preventive and corrective policies.

Several isolated theories emerged trying to explain the source of a specific type of crisis, categorizing according to their origin, whether the banking sector, sudden stops, currency devaluation or debt issues. The puzzle is not attempting to join both approaches, but rather putting all of the theories that have been created into practice. Even the most sophisticated tools that synthesize both ideologies have failed to anticipate financial crises and explain their root causes, which makes finding a solution for this problem increasingly difficult.

From the perspective of models that seek to identify some sign of a possible financial crisis, there are the so-called Early Warning Systems (EWS), which have been widely developed and used mainly by the International Monetary Fund (IMF), specifically related to foreign exchange issues as in Kaminsky, Lizondo, and Reinhart (1998) and Kumar, Moorthy and Perraudin (2003). This tool is based on estimates made by LOGIT or PROBIT models in their different dimensions (binary or multiple responses) and its application has been extended to both developed and emerging countries. As an example, it can be mentioned the EWS based on multinomial LOGIT from Bussiere and Fratzscher (2006) to predict financial crises with the extraction of signals as in Kaminsky and Reinhart (1999). As it can be seen from the above, the problem is that the study of financial crises is carried out in many cases considering an isolated part of the financial system, as mentioned in Dattels, McCaughrin, Miyajima, and Puig (2010).

In this way, the next step was to incorporate variables that try to explain the instability of the entire financial system in EWS. Even though it is the preferred model for the forecast of financial crises, it has some disadvantages.

As mentioned in Sarlin and Peltonen (2013), the number of variables used to try to approximate the behavior of the financial system is large, which makes it difficult in visualizing the results. Another delimitation mentioned by the authors is the cross relation between the variables with the EWS estimations. Some other authors as Sarlin and Marghescu (2011) have pointed out that the relations between economic and financial variables do not have the characteristics of linearity nor normality, so the use of tools like EWS are not appropriate because of their assumptions. Thus, the use of multivariate data analysis tools has increased such as map models (SOM, MAP, SOFTM) and the concepts of distance and clustering (PCA, K-means). Among the latter is the model of Kritzman and Li (2010) which develops an index of financial turbulence for the United States stock market, Additionally it generates a measure of risk based on the analysis of main components called index of absorption which allows identifying which are the main variables that intervene in the variations of systemic risk.

The main objective of this research is to an economic and financial turbulence index that will be applied to the Mexican financial system to identify the periods of oscillation. Once these periods have been identified, we proceed to analyze the dynamic correlations among the Minsky's financial dimensions and the principal component analysis in order to identify the source factors of financial stress. This facilitates the task of policymakers to take actions to overcome faster a financial crisis. In order to achieve this it is proposed a dynamic model of principal components by sliding windows based on the model of Kritzman and Li (2010).

In order to achieve the above, the paper is organized as follows. First, we discuss on the relation between financial instability and financial fragility, and their individual and aggregate characteristics respectively. The next part consists of reviewing financial crises that have occurred in Mexico in the last two decades. On the basis of Tymoigne's (2011) financial fragility Index and Bussier and Fratzscher's (2006) EWS model, we expand an economic and financial turbulence index useful to determine the source factors and root causes of any type of crisis. Subsequently, a dynamic model of principal components is proposed with sliding windows based on the Kritzman and Li's (2010) model to examine the Mexican case to tried to show empirically that the dimensions proposed by Minsky are sufficient to explain the volatility of the financial instability in the Mexican financial system and its sources. Finally, conclusions are provided.

1. From financial fragility to financial instability: The Dynamics

In 1964, a theory that seemed capable of explaining the events brought about by the American real estate market crisis of 2008 was that proposed by Minsky's (2010) hypothesis. The financial fragility hypothesis is a theory that explains how financial crises happen as a result of the position of borrowers. This is closely related to the credit cycle and the inner workings of the financial sector, which in turn, determine investment dynamics and income. The position of every individual regarding the financial system is related to their ability to settle their liabilities. Minsky states that borrowers can be classified as hedgers when they are capable of settling their interests and liabilities, or speculators that delay the payment of their debt through loan refinancing and increase of liability costs. When individuals are no longer able to settle their debts, they resort to Ponzi financing. However, that proves to be troublesome because moneylenders can no longer collect loans and interests that decrease their income leading to more stringent credit policies, which, in turn, shrinks' investment. It is important to remember that the transition from one position to another is a consequence of economic factors such as inflation, interest rates, and exchange rates, coupled with the agents' financing decisions.

Financial fragility can lead to discouraging scenarios when an excessive number of borrowers rely on Ponzi financing. When this happens, the weakness of the economy brings instability and prevents the financial system from performing its financing role. According to Tymoigne (2011), two separate concepts can be identified: *"Moreover, the evolutionary nature of financial fragility clearly separates financial fragility from financial instability. The weaker the economy, the worse the financial instability will be. Financial fragility can be defined as a dependency of financial positions (balances, revenue accounts, cash flow accounts) on refinancing and settlements. Financial instability is related to the likelihood of damage caused by the weakness of the economy on the economic process. The latter expresses itself through a debt deflation process"*. Therefore, the questions are: what are the factors that cause instability? What extent can the characteristics of an economy's financial system worsen a recession to make it turn into an economic crisis?

The term financial fragility has gained popularity in the last few years. Minsky stated that financial panic is made possible due to changes in the economic structure that occurs during the market oscillations of a long expansion. In his pioneering paper, Minsky claims that there are three dimensions related to the loss of stability of the financial system: the rise of stock market prices and the rise in value of the housing sector, the increase of debt compared to income generated by the productive sectors and, finally, the decrease of international reserves. The latter is the economy's stabilizers because it is the liquid resource to be used in case of emergency.

In his work, Minsky points out that there are some relevant variables that might indicate a transition from stability to instability during the phases of economic growth when borrowers have positive expectations about their future income. This makes them believe that it is a suitable moment to meet their financial obligations and settle credits that were taken beforehand. A positive outlook of the economy can even be a motivation to apply for new loans or credit. According to Minsky, this is how debt starts to be perceived differently and the financial system starts becoming vulnerable, increasing the likelihood of an economic depression.

During an economic expansion, the market value of assets increases due to the positive expectations related to economic growth, which explains the rise in stock prices. However, prices might be rising because speculators are also observing favorable expectations about the market, but not about the asset itself. This makes the price of the asset rise even more than the equilibrium price, which already comprises positive expectations about expansion. Investment expansion happens through income leverage. This is a result of shifts in the payment types of the industrial sector. Minsky upholds that there are three types of payment and explains how they are related to increasing debt related to income. First, there are payments related to company balance sheets, *i.e.*, the payment obligation they have because they financed their own assets. External funding of a company can be done in one of two ways. One option is to issue shares, and the company will ask investors to provide funds. Investors will be granted a security, which represents a fraction of the company's capital. Companies may also resort to the second option, which allows them to apply for credits in banking institutions or issue debt.

According to the Pecking Order theory, external financing options can be categorized by hierarchy. Companies prefer debt financing over share issuance because entering the stock market might negatively affect the company's position and their market value expectations. Secondly, income payments signal changes in the income flow, which is based on the perceived scale production and amount of sales. Finally, there are also portfolio payments, which bundle all of the flows obtained from the sale of assets, be they tangible or intangible.

Minsky (1964) states that international reserves are made up of assets that are not subject to any type of private payment obligations. Therefore, when financial reserves decrease, the state will be able to measure the existing level of uncertainty regarding the financial system, which means they function as risk measurement. On the other hand, Minsky (1964) appears to understand that all financial crises follow the same spread mechanism: an external shock brings about a boom, followed by a burst. Other authors such as Detzer and Herr (2014) agree with Minsky's vision, taking into account Keynes' concept of marginal efficiency of capital. The aforementioned authors claim that what works as a trigger is the existence of nominal interest rates below marginal efficiency of capital caused by technological innovations or public policies that improve working conditions, which increases revenues for businesses. This drives investment and increases demand for credit applications. If bank money is generated, the nominal interest rate would be lower than the natural interest rate.

Due to the companies' investment plans, positive expectations about economic growth are created and the market value of the companies' assets increases, along with leverage. Prices rise due to speculation and, therefore, the nominal interest rate lowers to a point where it comes close to the natural rate of interest¹. When this happens, investments made because of a low nominal interest rate cannot be sustained due to the levels of the natural interest rate. This prompts agents to shift positions and the deleveraging cycle begins. On a different note, Fisher (1933) also stated that a financial system became unstable as a consequence of over indebtedness and price deflation, going on a downward spiral towards a financial crisis. On the basis of the foregoing, it can be concluded that if all financial crises follow the same dynamics and transition mechanisms (Minsky's instability dimensions), as well as expansion and shrinkage stages, it is possible to predict financial crises by analyzing the cycle's dynamics. These crises could turn into depressions if action is not taken immediately.

2. The impact of crises on the Mexican economy

Mexico has experienced disastrous consequences of several economic and financial crises. In this regard, Dornbusch, Werner and Fischer (1994) state that from 1950 to 1970 Mexico was a model economy because both the real and financial sectors were stable. However, the rise in oil prices in 1970 put an end to that trend. That year, leverage increased, currency was overvalued and there was a massive inflow of capital. These factors would later come to create instability and culminate in the 1982 crisis. This crisis main root cause was the country's inability to pay off its debt. These authors claim that the discovery of oil wells in Mexico led to a process of currency appreciation, which implied that export revenue had to decrease. At the same time, the Mexican government was

¹ Natural rate of interest is a concept developed by Knut Wicksell. In its seminal work, he defined this as the rate of interest determined by supply and demand if no use were made of money and all lending were effected in the form of real capital goods. The assumption is that money is a capital good. See Wicksell, K. (1936) for further information.

implementing an expansionist policy in an attempt to industrialize the country and build infrastructure to increase oil revenue. However, this policy relied on leverage; it was financed with debt. Additionally, rising interest rates in the USA further increased Mexico's external debt to almost half of its GDP. According to Cruz and Walters (2006), during the following years, Mexico received financial help in the form of foreign loans and credit, but had to give up its import substitution model and adopt trade openness in return. After overcoming several obstacles in 1986 y 1987, it was decided that a fixed exchange rate for the Mexican peso and the American dollar would be implemented.

According to Radonjic and Kokotovic (2014), stabilization policies were created to sell state-owned companies and privatize businesses and banks. On the other hand, the country opened its doors to financial liberalization and foreign investment. There was a decrease in the fiscal deficit and limitations for banking activities were eliminated. Another factor that increased attractiveness, as mentioned by Radonjic and Kokotovic (2014), were the Brady bonds, which transformed Mexican debt into discount bonds.

These above solutions attracted foreign investment in Mexico because the country now represented a big opportunity. Capital inflow increased significantly and Mexico's recovery seemed inevitable. So much so that from 1987 and 1989, according to Cruz and Walters (2006), a few goals were partially accomplished: 1) inflationary reduction from 159% to 19.7%, 2) fiscal deficit reduction of 14.1% with a GDP ratio of 4.5%, and 3) decreasing interest rates from 123% to 48.7%. However, it was not all good news. Due to financial liberalization, the removal of stringent banking restrictions, the inordinate increase in the amount of granted credits, the positive expectations about economic growth and the increased leverage caused an excessive level of indebtedness. Therefore, it is no surprise that as stated by Radonjic and Kokotovic (2014), the ratio for bank assets (credit and loans) and their market value was approximately 3.5, while private sector debt funding represented nearly 20% of the GDP.

Another determining factor that led to the crisis was the fixed exchange rate regime. The Mexican government economic policies drove currency devaluation in order to boost exports. Consequently, a crisis took place in 1994 and its root causes are seemingly capital outflow and over indebtedness. Moreover, in 2008 there was another crisis caused by the global economic downturn. But the question remains unanswered: what are the factors that cause instability? And, to what extent can the characteristics of an economy's financial system worsen a recession to make it turn into an economic and financial crisis? Finding that out is the main purpose of this research project.

3. Kritzman and Li's model

When attempting to determine a system's financial instability, it is necessary to identify a dependent variable as a proxy for the fragility of a country's financial system, as is the case in Tymoigne's (2011) Financial Fragility Index or Bussier and Fratzscher's (2006) EWS models. Most of times, an econometric analysis of simultaneous equations cannot be used to determine the nature of the crisis since the driving variables do not describe the transmission mechanism or the process following the exogenous shock. It seems to be that the main trigger is unknown, thus it is not possible to classify the crisis or to establish preventive or corrective policies.

However, a possible solution for this kind of problem is multivariate analysis, where a dependent variable is not defined as such. Rather, a variable is automatically generated by the joint variation of the independent variables. These joint variations are included through the deviations of the multivariate mean. Every point with coordinates in each exogenous variable indicates a measure of the distance between each observation and the population's center of gravity. Although using a large number of variables might be a problem for parametric or econometric theoretical models, multivariate analysis can be used for spotting redundancy *via* correlations between certain traits and for reducing the size of the data by using compound variables.

The turbulence indexes are specially aimed at spotting financial instability and are based on a multivariate approach. The default turbulence index developed by Kritzman and Li (2010) is based on the concept of distance and the use of multivariate tools such as Principal Components. Since no explanatory variable is included in this methodology, the measure of instability is given by the distance between each observation and its corresponding multivariate mean. The data sample must be representative of the population in order to obtain unbiased estimates. Furthermore, this methodology allows us not to establish an *ad hoc* theory or model for the analysis, and even allows us to include significant variables interchangeably. Therefore, it can be used as a starting point for corroborating the variables and as a tool for predicting a crisis regardless of its type, identifying the most volatile factor in the system as its cause.

On the other hand, Kritzman and Li (2010) use the Mahalanobis' distance in their research as a means to include a large number of variables and to explain data variance with just a few of them. They use Principal Component Analysis (PCA) for generating compound variables. PCA identifies the correlations with greater

variance and later determines a new orthogonal coordinate system that can explain the dynamics of the system. In their work, they developed a measure of instability called the absorption ratio. This is the ratio of the cumulative variance as explained by the chosen principal components over the total variance of all the components. Finally, it is worth mentioning that multivariate analysis can be used to find the proximity of the observations by using the concept of distance. The drawback of this methodology is that it is not scale invariant. That is, the characteristic variables may have different units of measurement. This can lead to a wrong interpretation of the similarity of two points relative to their mean.

The Mahalanobis' distance can be used to generate a variable in standard deviation units regardless of each variable's distribution (as long as the joint distribution is normal) and for detecting redundant variables. With the purpose of highlighting the benefits of the Mahalanobis distance. Consider a population Ω_i with n individuals and a set of random, characteristic variables $X_1, X_2, X_3, \dots, X_p$, where each individual can be understood as a vector with coordinates such that:

$$y_i = [x_{1i}, x_{2i}, \dots, x_{pi}], i = 1, \dots, n.$$

Consider a vector of means of the population where each individual is represented by coordinates x_i . Thus, the vector of means is represented by: $\mu = [\mu_1, \mu_2, \dots, \mu_p]$. The Euclidean distance from the mean is determined by $D^2 = (y - \mu)'(y - \mu)$ where y is the set of all individuals y_1, y_2, \dots, y_n . One of the drawbacks of the previous expression is that the characteristic variables can have different units of measurement. It is necessary to standardize the observations to have a common unit of measurement:

$$D^2_M = (y - \mu)' \Sigma^{-1} (y - \mu)$$

where: Σ^{-1} is the inverse of the population's variance-covariance matrix.

This is known as the Mahalanobis distance. In general, it can be used in a multivariate analysis for obtaining the distance to a centroid's mean. The purpose of the PCA is to find a new coordinate system for the observations. We need a matrix A that projects the original data reducing the distortion that results from the transformation.

The new variable is simply a linear combination of the sequence x_i and the vector a_j of matrix A, such that for an individual, $z_{ij} = a_j' x_i$. In general, for all observations and the first principal component, we have $z_1 = X a_1$. The method of least squares is similar to maximizing the component's variance, which is why the logical answer would entail an increase in the coefficients of the vector a_j of matrix A. However, this leads to an infinite increase and is therefore indeterminate, which is why we must impose the restriction of normalizing the a_j vector so that it is a unit vector $\|a_j\| = 1$. Therefore, the search for the first principal component leads us to:

$$\text{Maximize}_{z_1} \text{Var}(z_1) = \text{Maximize}_{a_1} \text{Var}(X a_1) \quad \text{subject to: } a_1' a_1 = 1$$

If we recall that the matrix X is a centering matrix and use the Lagrange multipliers, the previous problem can be simplified to the following expression:

$$\text{Maximize}_{a_j} \text{Var}(X a_1) = \frac{1}{n} z_1' z_1 = a_1' X' X a_1.$$

Hence, the purpose of this work is to determine whether these factors, as well as the principal components based on Minsky's financial fragility dimensions apply consistently to different structures of the financial system in a developed or an emerging economy. This enables a more enlightening analysis of the size of the impact in different countries.

In the next section, we use Kritzman and Li's (2010) methodology for analyzing the stability of the financial system for the Mexican case. In contrast to their work, which attempted to determine the instability of a certain specific sector (which could even be translated into a measure of fragility), we will include the variables most often used as indicators of financial fragility and instability.

4. Data used in the Economic and Financial Turbulence Index

As was previously mentioned, the Mahalanobis' methodology - unlike other measurements - standardizes the variables through the variance-covariance matrix so they are measured in units of standard deviation. In this way, we can avoid variables with different empirical distributions and adjustments to the parametric distributions. The variables used to verify Minsky's financial fragility hypothesis represent the three dimensions or factors that he

believes can reflect system instability. It is worth noting that all variables used in this research have a monthly periodicity that ranges from January 1996 to January 2017.

The Mexican Index of Prices and Quotations (IPC) will be used to track the behavior of stock market prices by taking the last price of each month. It is considered an approximation of the Mexican productive sector's market valuation, which is one of the main factors in determining the degree of fragility. The data of IPC and INPC was obtained from the web portal of National Institute of Statistics and Geography (INEGI). The Consumer Price Index (INPC) is used for the housing sector to track the increase in real estate market prices. The increase in prices is based on the increase in leasing costs. Leverage in the productive sectors is taken, generally, including financing granted by both commercial and development banks as well as the non-banking sector (FITNB)¹. We can use past-due portfolio (CV) as a way to recognize the part of the instability cycle that the economic system is currently in. Finally, the balances of the Net International Reserves (RIN) are used as a proxy variable for the last resort liquid assets. The data of IPC and INPC was obtained from the National Institute of Statistics and Geography (INEGI) and the rest of variables from the Central Bank of Mexico (BANXICO). For clarity, Table 1 includes the specific attributes of the aforementioned variables

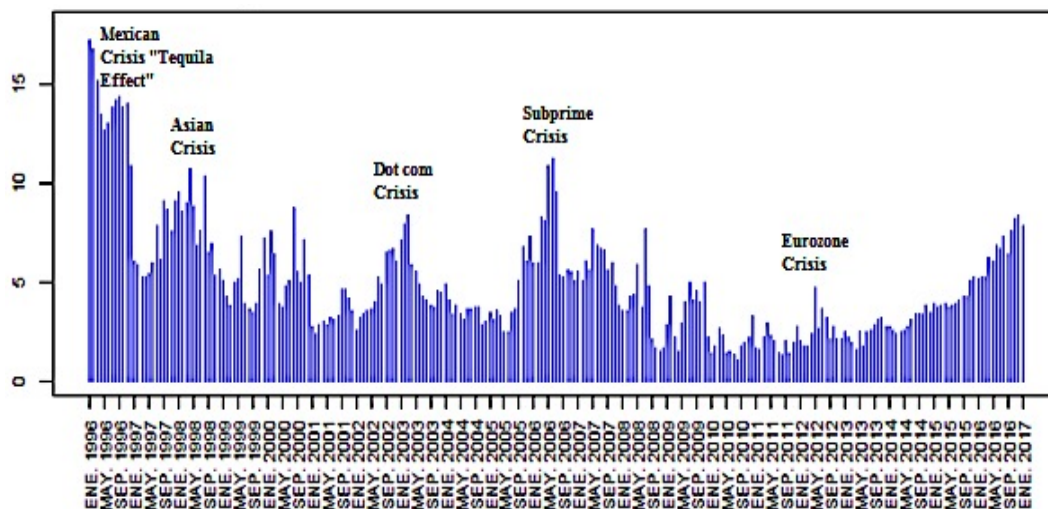
Table 1. Description of variables

Variable	Description
FITNB	Finance Granted by Commercial and Development banking to the Non-Banking sector (Nominal balances in thousands of pesos), logarithmic scale
IPC	Mexican Index of Prices and Quotations, last price of the month, logarithmic scale
INPC	Consumer Price Index for housing sector measured by the increase of rental, 2 nd half December 2010 baseline
RIN	Net International Reserve (Millions of dollars), logarithmic scale.
CV	Past due Portfolio Balance in Commercial and Development Banking, logarithmic scale.

Source: Authors' own elaboration with data from INEGI and BANXICO.

The Turbulence Index for Mexico is outlined in Figure 1 was generated using the Mahalanobis distance.

Figure 1. The Turbulence Index for Mexico



Source: Authors' own elaboration with data from INEGI and BANXICO.

As it is observed, the index seems to indicate clearly that during the points of greater instability in the financial system, relevant events have occurred that represent historical depressions or contractions of the real variables in the Mexican economy. An example of this is the index's high values for the period 1995-1996, which coincides with the December error and the monetary financial crisis known as the "Tequila Effect". Furthermore, the index seems to anticipate economic contractions such as the 2008 financial crisis and the 2000 dot com crisis. The index's trend is concerning, since it shows even greater financial instability than for the 2008-2009 financial crisis.

¹ FITNB represent the sum of historical series Financing granted by commercial banks and Financing granted by development banks for privates outside of the banking sector, according to BANXICO

4.1. Principal components analysis

In the previous section the turbulence index was applied for Mexico, which reveals a relationship between Minsky's fragility dimensions and the behavior of the Mexican economy's cycles of crisis for the relevant periods. Usually, the effect of each variable in the system is unknown, so it is necessary to use PCA. As was previously mentioned, PCA allows us to reduce the size of the data and break down the correlation matrix into eigenvalues that represent a part of the system variance. That is, it enables us to know the impact of each variable on the PCA. This is crucial, since though Minsky's dimensions react on different magnitudes depending on the type of crisis. One of the necessary conditions to use this statistical tool is that the variables need to be correlated, as it can be observed in Table 2.

Table 2. Variables correlation matrix

	FITNB	IPC	INPC	RIN	CV
FITNB	1	0.91015863	0.92538246	0.97397648	-0.4584904
IPC	0.91015863	1	0.95497548	0.94715559	-0.7435088
INPC	0.92538246	0.95497548	1	0.97790866	-0.6764255
RIN	0.97397648	0.94715559	0.97790866	1	-0.5858423
CV	-0.4584904	-0.7435088	-0.6764255	-0.5858423	1

Source: Authors' own elaboration with data from INEGI and BANXICO

Next, we use the correlation matrix to calculate the PCA. The method consists of finding the matrix's eigenvalues and eigenvectors as was mentioned previously. The standard deviation of the PCA can be observed in Table 3. We can square the standard deviation to find the matrix eigenvalues, which explains the amount of variance absorbed for it.

Table 3. Percentage of variance explained by component

	PCA1	PCA2	PCA3	PCA4	PCA5
Eigenvalue	4.30588605	0.61773056	0.04745158	0.02235997	0.00657214
Standard deviation	2.0750629	0.78595837	0.21783384	0.1495325	0.08106874
Proportion of variance	0.86118	0.12355	0.00949	0.00447	0.00131
Cumulative proportion	0.86118	0.98473	0.99422	0.99869	1

Source: Authors' own elaboration with data from INEGI and BANXICO

The first three principal components explain a cumulative variance of 99%. The first two alone explain 98% of the system volatility. The rule states that as many principal components as necessary to guarantee the results with at least 95% of confidence should be used, which is why the first three were chosen. Table 4 shows the eigenvalues with their corresponding vectors. In order to test Minsky's financial fragility hypothesis (1964), it is presented the weight of each variable in the first and second components.

Table 4: Correlation Matrix Eigenvalues and Eigenvectors

Eigenvalues	PCA1	PCA2	PCA3	PCA4	PCA5
	4.30588605	0.61773056	0.04745158	0.02235997	0.00657214
Eigenvectors	PCA1	PCA2	PCA3	PCA4	PCA5
FITNB	0.45126523	0.42056661	0.3631389	-0.5293625	-0.4553997
IPC	0.47527201	-0.0582157	0.57320904	0.65537069	0.11246378
INPC	0.47477477	0.06770019	-0.6939899	0.34002328	-0.4156535
RIN	0.47162106	0.23533343	-0.2400154	-0.2446349	0.7776491
CV	-0.3501981	0.87164758	-0.0182269	0.33882525	0.04956828

Source: Authors' own elaboration with data from INEGI and BANXICO

Figure 2: Weight of variables in PCAA1

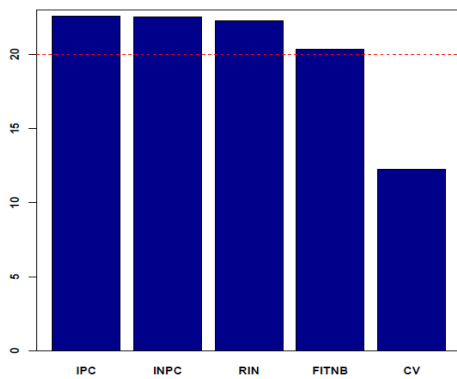
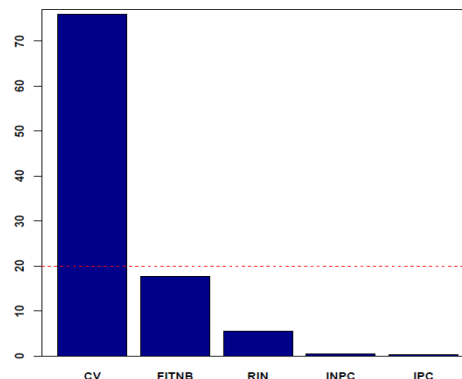


Figure 3: Weight of variables in PCAA2

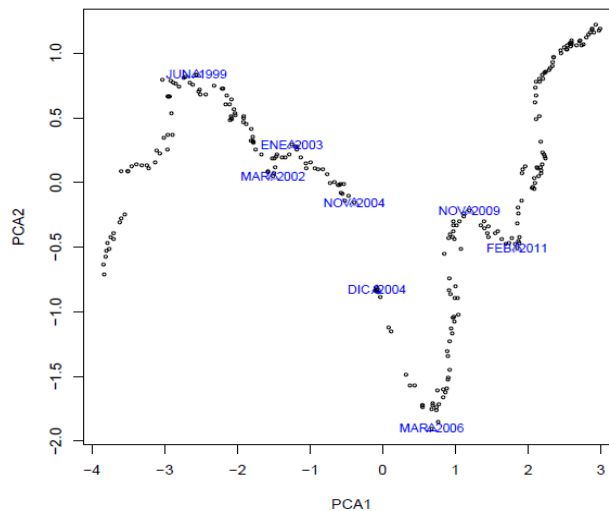


Source: Authors' own elaboration with data from INEGI and BANXICO

This might be enough to state that Mexico has been highly unstable during the studied period, on average, since Minsky's dimensions are highly significant: their weights contribute more than 20% to the first component.

The past-due portfolio commands almost 80% of the movement in component number two, while financing stays the same. In this case, the reserves have decreased a modest amount, while the IPC and the general price of the real-estate market have almost disappeared from volatility of the second component. Figure 4 shows the behavior of each variable and its corresponding projection on the dimension generated by components number one and; both are included in order to get a clearer visual representation. Each point represents an observation in time with coordinates in all variables.

Figure 4: Biplot PCAA1 vs PCAA2



Source: Authors' own elaboration with data from INEGI and BANXICO

In order to identify the points in time where financial instability increased as well as the causal factors, a variant of the Kritzman and Li model based on the absorption ratio will be used. This index will be created by generating subsamples for time windows in order to monitor the movements of the correlations. Once this is completed, the principal components are calculated using the variance-covariance matrix of each subsample. The absorption ratio shows the variance ratio explained by a component over the cumulative variance percentage of the components chosen for explaining the system.

Figure 5 shows the contribution of each component over the cumulative variance of the first three components. Only the first three components are included because the sum of the cumulative variance explains on average 95% of data oscillation at the multivariate level. It can be observed that there are periods where component one relinquishes participation to component number two. However, the periods with greater change in proportions seem to be related once again to the points of greater financial instability. The first of these appears generally during the 1997-1998 period, which coincides with the events of the Asian Financial Crisis. The second appears during the 2000-2003 period, which coincides with the end of the dot com bubble in March 2000, and its effects on the financial markets up until the beginning of 2003. Then it shows a significant increase in instability at

the end of 2006 and the start of 2007, which is when many authors believe the subprime mortgage bubble burst; Mexico felt its effects between 2009 and 2010.

Figure 5: Sliding window percentage of variance explained by component (Absorption rate)

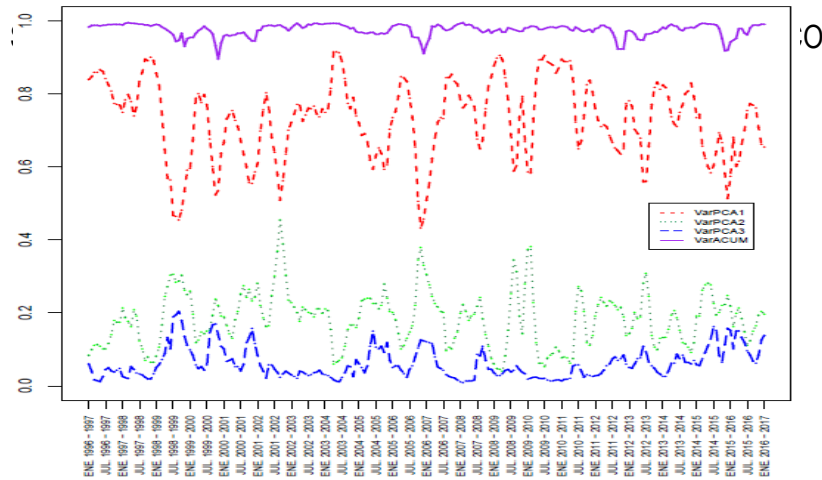
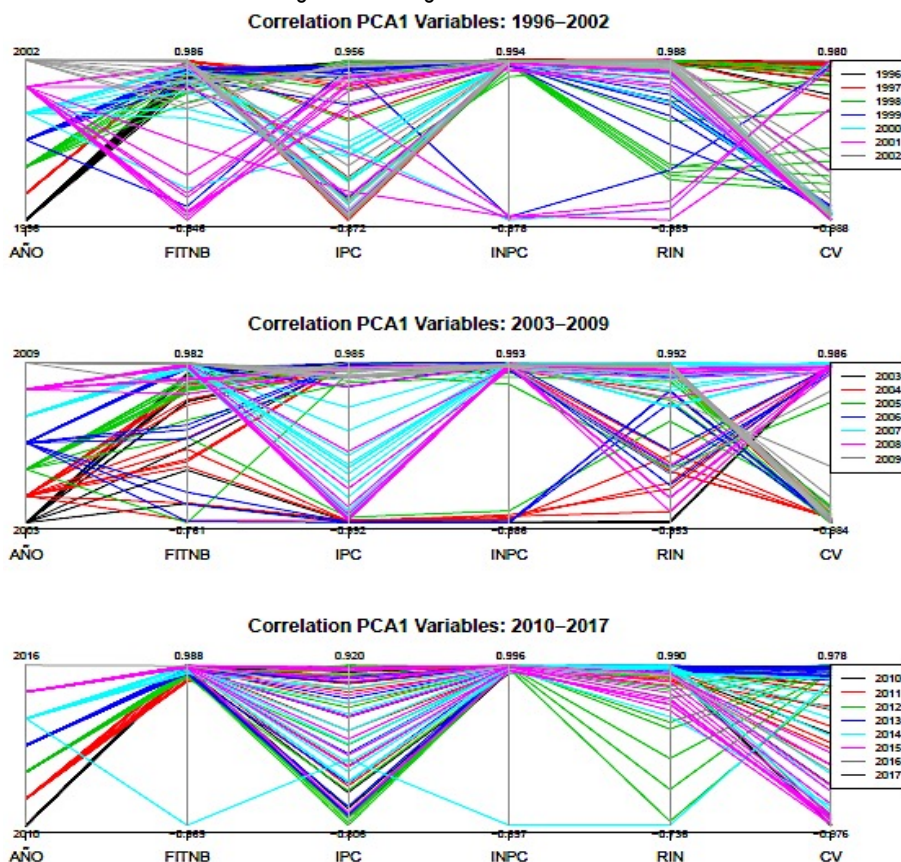


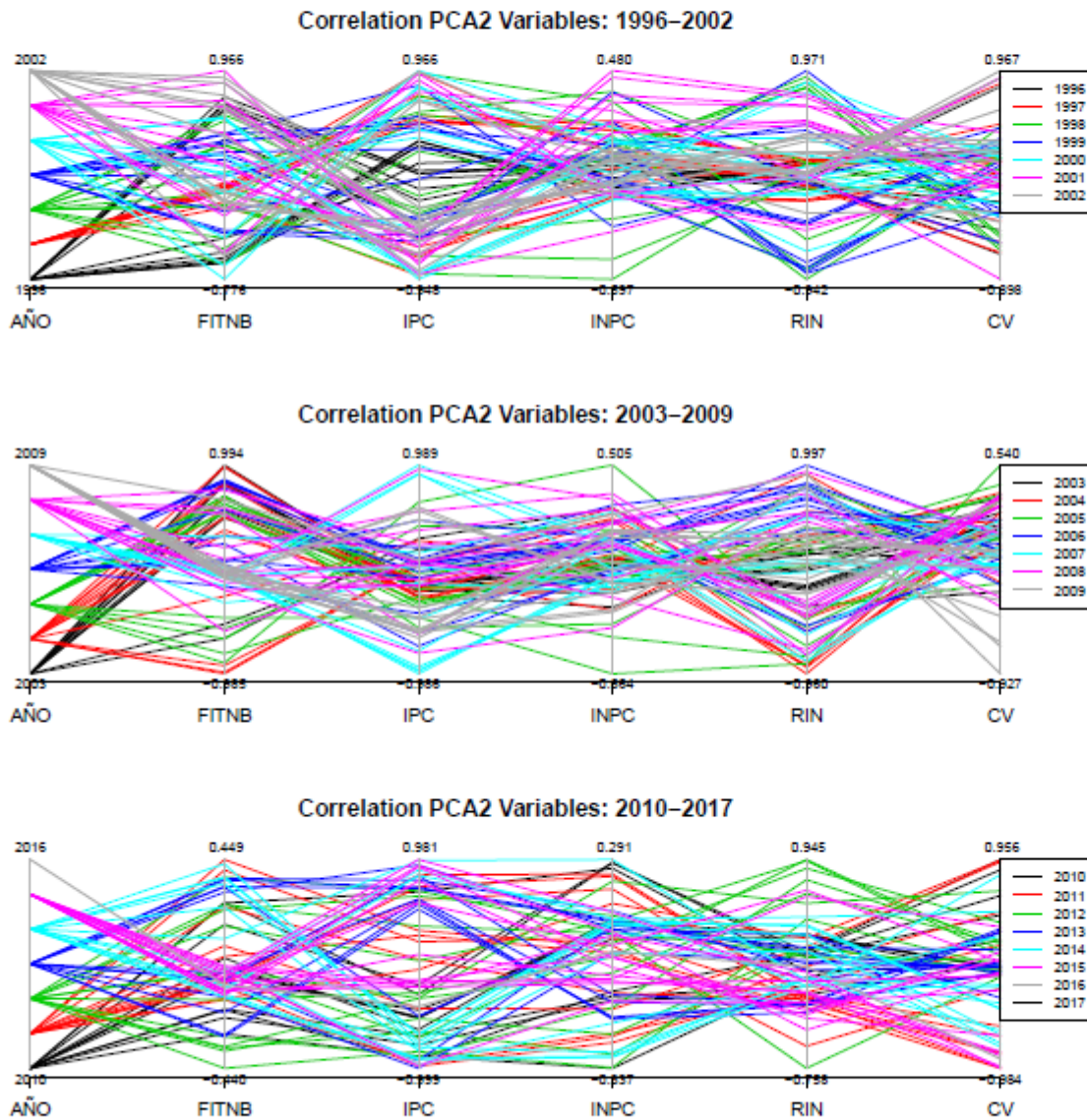
Figure 6 shows the correlations between variables and the first component related to short-term growth. When the lines are closer to the mean value, the correlation is smaller, the closer to the extremes, the stronger the relation to the component. Years 1996 and 1997 seem to follow a stable path with correlations greater than 0.90 for all variables. However, 1998 seems to indicate a drop in the correlation with the Index of Prices and Quotations (IPC), while the International Reserves (RIN) maintains a strong correlation with growth volatility but has a negative sign; something similar happens with past-due portfolio (CV). The Mexican economy declined in growth during this period due to changes in the value of the currency and the defaults on loans.

Figure 6: Sliding window correlations PCA1 - variables



Source: Authors' own elaboration with data from INEGI and BANXICO.

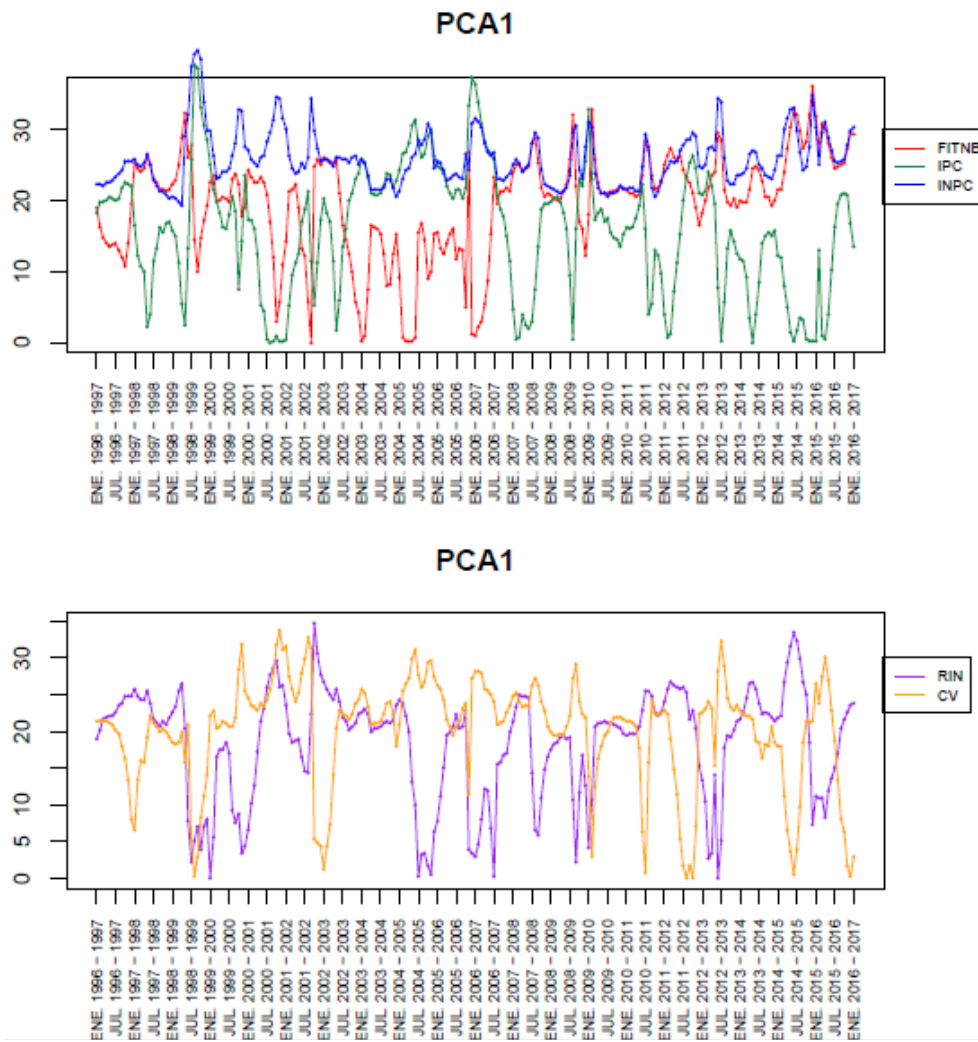
Figure 7: Sliding Window Correlations PCA2 - variables



While component number one shows the strength of the growth trend, component number two indicates the variables responsible for altering financial stability. Based on Figure 7, in 2007 the past-due portfolio was not responsible for instability, since its correlations for this period are close to the middle point of the graph, which indicates relations close to zero. However, IPC values are considerably high, which means that the stock market triggered the loss of stability. For explanatory purposes, it will be now analyzed the aforementioned points related with financial crises, in order to describe the evolution of these periods and the behavior of their variables.¹

¹ The individual correlations of the points presented on Figure 7 are available in the appendix.

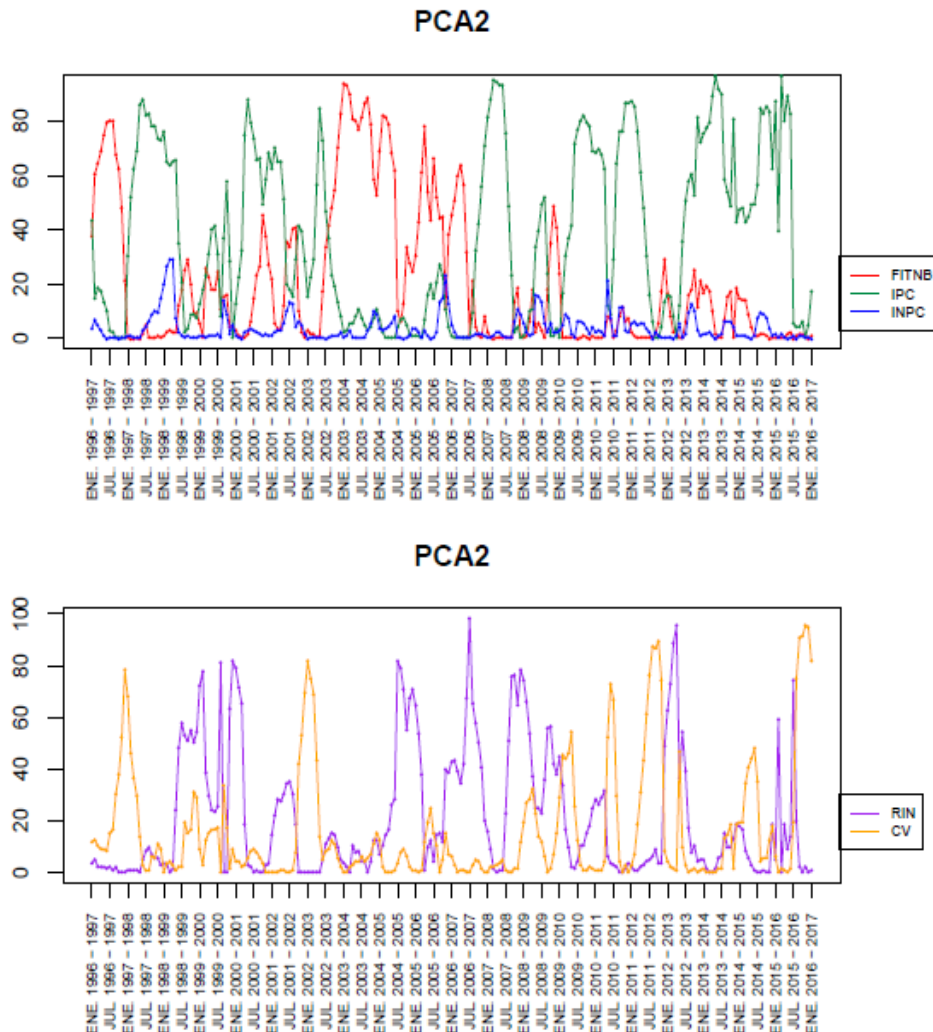
Figure 8: Weights of Variables in PCA1



As it can be seen in Figure 8, the economic trend in the period 1999-1999 has a very strong relation with decreases in the prices of the real estate sector (INPC) and in the shareholder (IPC). This is the reason why it is possible to indicate that moment in which probably the cycle of contraction began. The second component in the figure 9 indicates that the RIN has a greater weight in the instability component. This is the reason why it is possible to speak of depreciation of the exchange rate, propitiating even imbalances in the banking sector represented by FITNB.

For the period 2001-2002, the INPC showed an increase in the first principal component as well as in international reserves RIN, which indicates a new depreciation of the exchange rate and an increase in real estate prices as a consequence of the instability produced by the IPC and by the banking sector through FITNB. It is important to note that the rise in real estate prices in a period of crisis is presented as a rational response to what happened with the bubble dot com. The Mexican 2008-2009 crisis can be summarized as follows: the FITNB, INPC and CV contracted during this period in the first main component. The second component indicates that instability in this period is due to increases in the CPI and RIN, with the former having a greater participation in the instability, which indicates a contagion through the stock market. To conclude this section, is important to point out that this model allows to identify the type of crises that have affected the Mexican economy based on the individual correlations and the weights with each principal components

Figure 9 - Weights of variables in PCA2



Conclusions

The objective of this work was to determine whether financial fragility behaves in accordance with the three dimensions outlined by Minsky. First, the turbulence index that was used seems to accommodate all the periods of depression in Mexico since January 1996. It is worth noting that the financial fragility index reveals an increase in the financial system current instability. This could mean that the country is currently going through a phase of expansion that seems close to the phase of contraction when compared to the 2008 crisis; the current exchange rate of about 20 pesos per dollar is evidence of this. It is also worth noting that in March 2016 the National Institute of Statistics and Geography (INEGI) announced that the Mexican economy was entering a stage of economic recession.

From the PCA, it was concluded that Minsky's three dimensions seem to move at the same rate and even simultaneously. Principal component two explains the second largest source of variance in the system, and it is dominated by past-due portfolio. It is possible that the effect of the past-due portfolio in component two instead of component one is that, unlike the dimensions that change during the expansion phase according to Minsky, this one changes during the contraction phase. The model of time windows confirms the points in which there is greater financial instability, so that, it is possible to read first principal component as the one that determines the trend of the economy. This could even mean that the technique can be used as a substitute for time series analysis with the advantage of describing the long-term trend as well as the fluctuations and the amount of past-due portfolios in certain intervals, which represents the end of an expansion period and the beginning of a contraction phase. It is worth noting that Minsky's three dimensions are also essential variables to explain the different crisis models. On the one hand, Total Financing by the Commercial and Development Banks (FITN) is an answer to the banking

system's expectations of output and risk. This variable can easily describe the financial crisis as a consequence of credit restrictions or lack of liquidity.

On the other hand, a monetary crisis or a balance of payment crisis is closely linked to international reserves. In such a way that a speculative attack on the currency pushes the government to try to mitigate its effects by value auctioning, as is mentioned in the first and second generation crisis models, mainly as in the work of Krugman (1979) and Obstfeld (1986). A large reduction in the Net International Reserves (RIN) can be interpreted as an attempt to defend the local currency, which sooner or later leads to devaluation due to lack of funds.

Financial markets are the first indicators of the current state of the economy. However, they also show their correlation with other international markets. This is why the Index of Prices and Quotations (IPC) is capable of explaining how financial crises propagate from one economy to another, as long as a sustained increase in financial stability depends primarily on it. The variables that track real estate prices (INPC) and past-due portfolio (CV) are vulnerable to changes as a result of a financial crisis. This is based on the fact that both real estate prices and past-due portfolio are slow cyclic variables since they take more time to adjust compared to the other aforementioned variables.

Regarding to the sliding windows, as Figure 7 showed, the variance seems to indicate that during financial crises, a percentage of the variance explained by component number one is transferred to component two. This is the case for the corresponding periods of the 2001 dot com financial crisis and the 2008 financial crisis, whose worst effects were not felt in Mexico until November 2009 even though the graph indicates financial instability as early as 2006. Moreover, some signs indicate that this analysis even captures some events that are less harmful to the actual economy but do affect the financial system instability, such as the Eurozone situation in 2010. It is important to point out that PCA is carried out in accordance with the Mexican economy. For example, the dot com bubble bursts in March 1992. Additionally, there is a local maximum in May and June 1997 for component number two, which coincides with the beginning of the Asian crisis.

It is not surprising to see that in the long run the first component is dominated by the Index of Price and Quotations, the housing INPC, and the International Reserves. In fact, the positive sign of the vectors in component one shows a positive relationship to growth. This contrasts with the negative sign of the past-due portfolio, which clearly indicates that it is an obstacle. In fact, when the past-due portfolio is large, it is likely that the interest rate arises. If this happens, investment projects are halted due to the high cost of financing, which in turn triggers financial fragility and causes the economic agents to move from hedge and speculative positions to a Ponzi position, worsening the outlook of banking institutions. Therefore, the relevance and importance of this research lies in that it can identify financial instability regardless of the type of crisis. Once the principal components detect the points on which the growth tendency is declining, it is easy to observe which variable drives the system to a financial crisis. In the short run, the evidence shows the variable that generated the instability for different periods based on the weights and correlations with the second component. It is important to note that the objective of this work is to determine the dynamics of instability, not to curb it. In fact, Minsky himself pointed out that fragility and instability in a financial system are a natural part of the growth and development of a capitalist system. He also stated that even when financial instability is high it might not result in a financial crisis or, in the worst case, economic depression.

Even though results appear to be clear in terms of the actual economy, more empirical evidence is needed in order to evaluate its functionality and potential. This opens up a new line of research where this extension of the Krizman and Li model could be applied to different countries with the purpose of testing the efficiency of its indicators. It is important to point out that some authors question the use of principal components on time series since the variation explained by the first component reflects the economy growth trend. This complicates the analysis of the eigenvector coefficients. For this reason, the decision was made to include an analysis using moving time windows in order to suppress the long-term trend. Finally, it is possible for the time frame dimension to include biases, which is why the next research will include an analysis that solves these difficulties.

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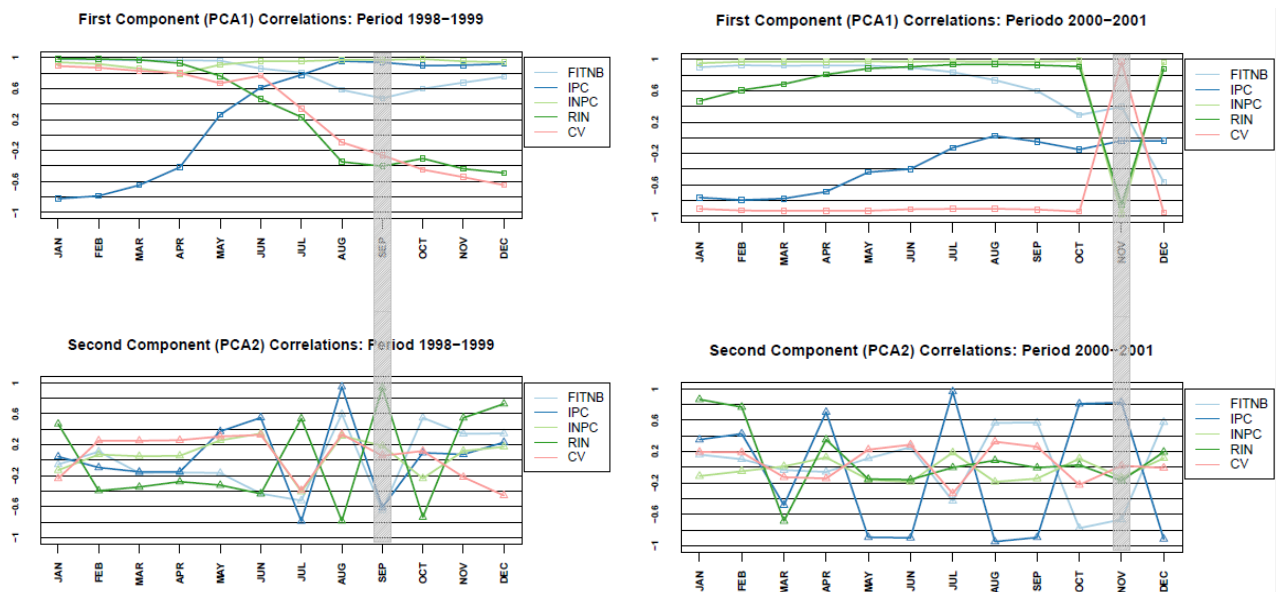
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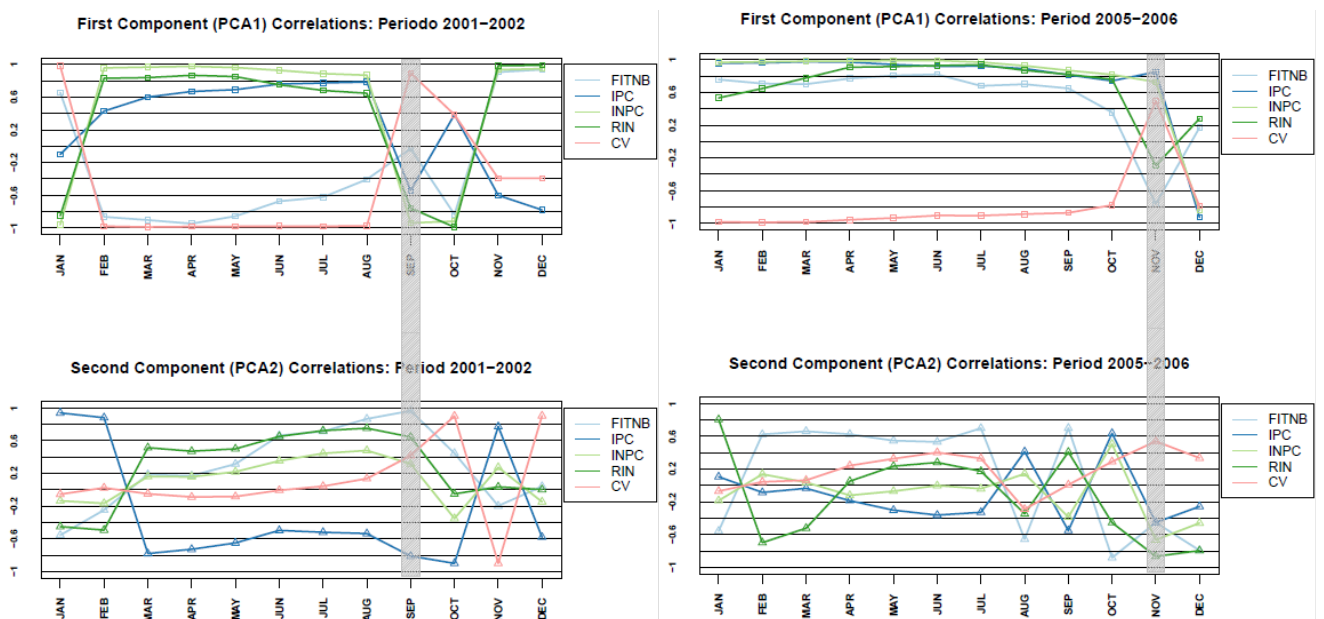
APPENDIX

Figure A1 - Sliding Window Correlations: Selected periods (I)



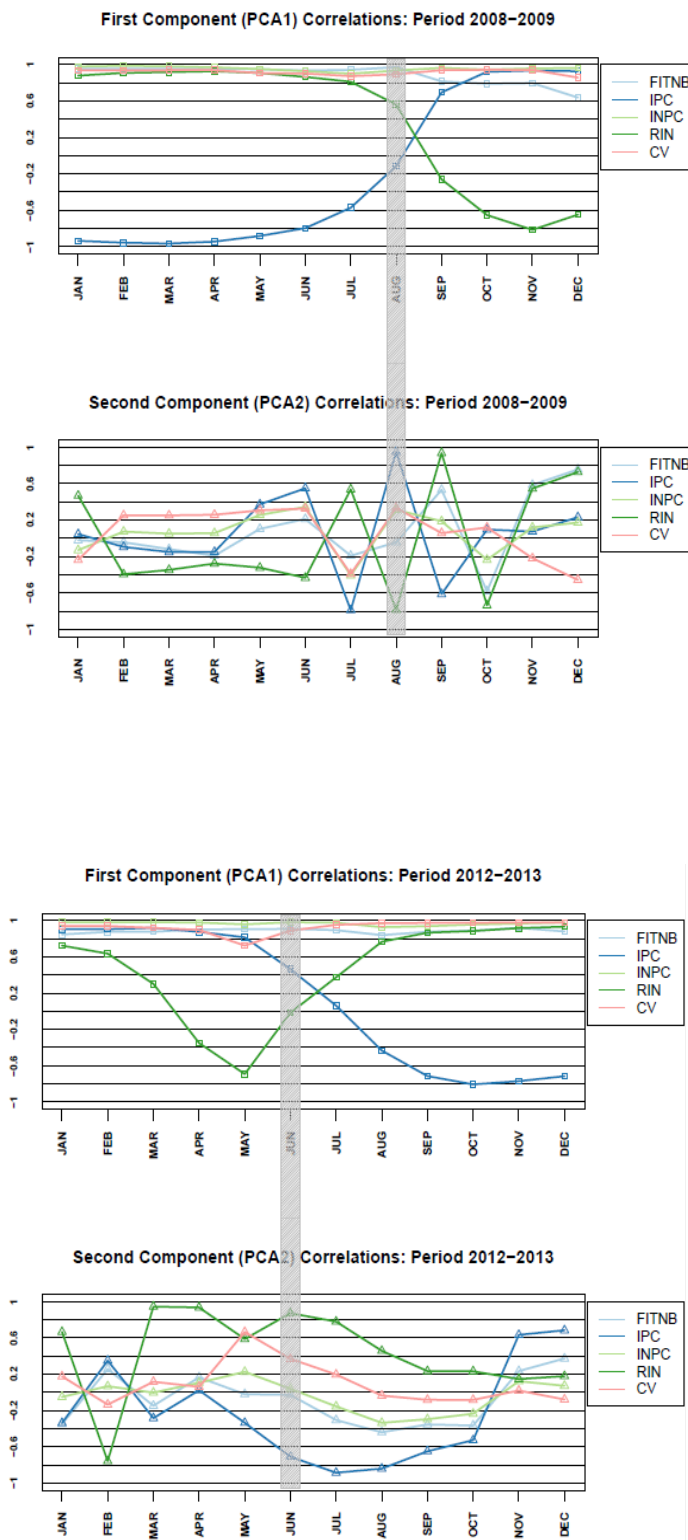
Source: Authors' own elaboration with data from INEGI and BANXICO.

Figure A2 - Sliding Window Correlations: Selected Periods (II)



Source: Authors' own elaboration with data from INEGI and BANXICO.

Figure A3: Sliding Window Correlations: Selected periods (III)



Source: Authors' own elaboration with data from INEGI and BANXICO.

Analysis of Transparency in the Field of Public Procurement through Mathematical Models - Competitive Procedure and Cartels Equilibrium

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Abstract:

This article concerns the analysis of transparency of public procurement using mathematical methods. With transparency in public procurement relates type of award procedures. Transparency in the use of restricted award procedure and open procedure is analyzed by ANOVA model. There are another aspects leading to less transparency in the field of public procurement. One of them is bid rigging cartels. This non-transparency aspect is evaluated through the Kuhn-Tucker model. In these two examples, the obvious benefit of mathematical modeling of the behavior of suppliers and authorities acting under public procurement law.

Keywords: Anova model; bid rigging cartel; Kuhn-Tucker model; mathematical models; public administration; public procurement regulation and law; business public contracts.

JEL Classification: H83; H77

Introduction

Transparency in the public procurement area (Public Procurement Law) is a principle of procurement procedure, observing of which contributes to the clarity of award procedure. Transparency allows obtaining on part of the public sector adequate information on public procedures, so that the risk of corruption in public tenders is reduced. For example, the situation is likely similar for the voluntary publication of information about small scale contracts on the websites of contracting authorities. On the basis of a study of the 110 largest municipalities in the Czech Republic in 2016 - 2018, an average of 43.7% of cities informed about the declaration of small scale contracts, 12.3% of cities informed about the course of the bidding, and 2.2% of cities informed about the conclusion of the bidding (own research, Pavel 2015, OECD 2017). It is clear that there is a direct relation between transparency and given opportunity for more suppliers to submit their bids (Bueren 2018).

1. Research background and methodology

The main added value of this article is that we take into account mathematical methods concerning selected aspects of transparency in the field of public procurement (Marek 2013). The article is prepared in the context of a comprehensive evaluation of transparency of public procurement procedure and to help possible improvement of future procurement policy (Audit Commission 2017).

The economic significance of public procurement in Europe is considerable, with yearly purchasing valued at 4,26 percent of the region's GDP. In the first part of the report, there is presented a definition of a transaction cost and are described circumstances of public procurement transaction costs. Furthermore, in the paper there would be recognized various procedures and techniques, that can influence on transparency and participation in selected tender procedures according to the European Union (EU) procurement legislation. Author is used Anova model for analyses of the type of procedures and Kuhn-Tucker model for the description and justification of the research methods used.

2. ANOVA model

Author is using ANOVA model for analyses of transparency concerning award procedure. There are exists other aspects. It is based on three main assumptions; first of all "bounded rationality", which means that imperfect contracts are due to the limited rationality of individuals, and these agreements suffer from necessity of additional costs (ex-ante and ex post). "Existence of opportunism" means that benefits extension may be carried out by using methods that are not entirely moral, and in some cases even not legal. Protection against the practice brings additional costs (ex-ante and ex post). The "existence of specific assets" is mentioned as the last one. Comparably,

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some author said (Blatter 2018), that the amount of transaction costs which is relevant when deciding on ways how to ensure certain activities is influenced by three factors: specific activities, measurability of output and input frequencies.

The above described assumptions have serious implications for the analysis of the relationship between government and market actors in the implementation of public procurement. The key assumption for the "rational" decision-making of public entities is the ability to realize the contracted goods and further quantify or at least estimate the size of the transaction costs associated with the implementation of the contract (Koten 2011). The methods used in this study may obviously be used after appropriate adjustments, even in the case of public procurement. However, this approach will not be useful for estimating the ex post transactional costs arising due to non-compliance with the concluded contracts, because there will not be periodic tasks (Budzinski 2018).

The largest positive economic work published until now focusing on transaction cost of public procurement in EU is a study prepared for the European Commission (Audit Commission 2017). Especially the second part of this paper introduces transaction cost analysis based on data from more than half a million of purchases published during Tender Electronic Daily (TED) for 30 countries in the years 2015 – 2017 (Hellwig 2018). Another source of data was a survey between 5500 and 1800 to the contracting authority suppliers.

The study shows that there are significant differences among EU countries. Transaction costs in the Czech Republic are below average (Ochrana 2017). The most important factor will be the labour cost, which is not still as high as in Western Europe. Total cost of public procurement in Europe is estimated at about 1,3% of purchasing volume. This equates to about 5.9 billion euro in 2017 term (OECD 2017). Although the unit costs for developing a request and managing the process are higher for authorities, the fact that several bids are prepared and submitted for each tender explains the higher total costs for suppliers. The average competition uses the equivalent of 131 person days of resources; in monetary terms this equates to 28.500 Euro (Ordonez 2018).

There is much difference in cost effectiveness between countries. For example, in Germany and Norway the process cost of procurement reaches above 4% of total procurement volume, while in the United Kingdom and Italy the share is less than 1% (Pavel 2015).

Immediately accessible information on the winner of the competition and their bidding price is necessary for comparison with the actual supplier with whom the contracting authority concludes a contract (see below). It is not an automatic rule that the offer with the best evaluation is selected, for example because of lack of cooperation from the applicant in concluding a contract. The effectiveness of public oversight is thus much higher than when this information remains "buried" in the documentation on the evaluation of offers (Ochrana 2017).

In order to be able to describe the possible dependency of selected parameters influencing the intensity of tenders, we have carried out a quantitative analysis of secondary data acquired from the Journal of procurement containing 203 procurement procedures. Individual data have been selected randomly and acquired from published Contract notices and Contract award notices, by selecting following tender conditions, Open procedure and restricted procedure.

The reason to narrow the selection to two types of procurement procedures was their high share of the total number and of the total financial value of public procedures in Czech Republic (Table 1). Data from negotiated procedures without publication have intentionally not been used, even though their share on the total number is higher than in the case of restricted procedures, because it is the character of such procedure to only have one offer.

Table 1. Structure of procurement procedure in Czech Republic

2017-6/2018	% from total procurement procedure	Spread (basis point) (Student copulas)
Open Procedures	43,6	65,6
Restricted Procedures	6,2	18,4

Source: MMR 2018, own calculation.

By using a regression function, the author has attempted to estimate the regression level coefficient expressed by a linear regression function (Marek *et al.* 2013):

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon,$$

where: Y is the explained value (dependent variable); X₁ is X_n are values explaining the variables; ε is an unsystematic (random) element

Because we are interested in the possible influence of explaining variables, specifically the type of procurement procedure (X₁ ... as open and restricted), number of offers in procurement procedure (X₂) and the

estimated value of the public procurement (X3), on the explained variable defined as the difference between the estimated value of the public procurement and the tendered price offered by the winning candidate (Y), we have included the before mentioned variables into the model (model no. 1, Hanclova 2011). We have calculated the following values:

Table 2. Regression statistics of model no. 1

Regression Statistics	
Multiple R	0,932354275
Reliability value R	0,869940786
Given reliability R	0,865305369
Standard error	11868574,78
Observation	273

Source: own calculation

Table 3. Regression of variance (Anova model) no. 1

	Difference	SS	MS	F	Importance
Regression	3	1,85876E+27	5,5892E+16	420,9111589	2,1614E-85
Residue	193	2,71871E+16	1,45966E+14		
Total	273	2,05063E+17			

Source: own calculation

The adjusted coefficient of determination $R^2 = 86,7$ implies that it is possible to explain 87% of the variability of values of the explained variable thanks to this regression model.

We used the F-test for a complex evaluation of the mode. The tested hypothesis contains a claim that all regression parameters β_j ($j = 1 \dots, k$) are, expect for the β_0 constant, equal to zero, *i.e.* the model does not contain any explaining X_j variable, which is statistically important.

$$H_0: \beta_0 = c; \beta_1 = \beta_2 = \dots \beta_k = 0$$

$$H_1: \text{non } H_0$$

It is obvious from Table 3 that the P-value of the F-test is $2,1614E-84 < \alpha = 0,05$, so we can dismiss the zero hypothesis about an improper model. We continued with partial t-tests, mainly the hypothesis test regarding the β_0 parameter and parameters β_1 , β_2 and β_3 . Based on the calculated reliability intervals, we reject the tested hypothesis for β_0 , β_1 and β_2 . However, the reliability interval for the partial β_3 t-test contains zero. We do not reject the zero hypothesis ($H_0: \beta_3 = 0$; $H_1: \beta_3 \neq 0$).

We will try to improve the described model in the next step and we will exclude the explaining X_2 variable. In this case we will receive the following parameters (model no. 2).

Table 4. Regression statistics of model no. 2.

Regression Statistics	
Multiple R	0,930829354
Reliability value R	0,866443287
Given reliability R	0,865066414
Standard error	11881626,37
Observation	273

Source: own calculation

Table 5. Anova model no. 2.

	Difference	SS	MS	F	Importance
Regression	2	1,77676E+17	8,87978E+16	629,2832227	1,5873E-86
Residue	194	2,73876E+16	1,41173E+14		
Total	203	2,05063E+17			

Source: own calculation

Thanks to the adjusted coefficient of determination $R^2 = 86,5$, we are able to see that it is possible to explain 86% of the variability of values of the explained variable thanks to this regression model. In comparison with model 1 this value has changed minimally, thus we can continue considering the use of such model.

As well as for the P-value of the F-test being $1,5473E-84 < \alpha = 0,05$, we can dismiss the zero hypothesis about an improper model.

After finishing partial t-tests (hypothesis test of parameter β_0 and parameters β_1 and β_2), it is possible to state that the constant as well as both explaining variables of the procurement procedure type (X_1) and the estimated value (X_2) contribute to explain the model.

The regression level has the following form: Price difference = $-9178287,082 + 8900448,76 \cdot \text{type of procedure} + 0,394208136 \cdot \text{estimated value}$. If the procedure is restricted then the equation implies that the price difference will decrease, meaning a higher achieved tendered price in comparison to its estimated value (in this case β_1 is equal to 0).

3. Application of Kuhn-Tucker model

For transparency is important that in the public contracts there are not exists cartels which are called in the field of public contracts "bid rigging cartel (Pepall 2008). A cartel is generally perceived as a specific market form of oligopoly where cartel subjects accede to a discreet agreement between formally legally independent economic subjects enter into a contract with an aim of reaching a more favourable position on relevant market and thus eliminate the mechanism of competition. Cartels, which based on the agreed market strategies, may follow common price strategy, set their production quotes or divide the market are forbidden in the EU countries as well as in many countries outside the EU (Pudil 2004).

A cartel is a specific case of oligopoly with an unspecified number of buyers but only a small number of sellers. The upper limit of the number of the sellers in the market structure for it to be defined as oligopoly is not explicitly defined. Some authors (Pepall 2008) show, that the key issue is not the number of the sellers but the way they communicate with each other, how to react to their individual intentions and how they jointly address the conditions and attributes of the oligopoly market equilibrium, that in how they resolve the question of market price of their products, how they set the total supply of the sector and how they agree on the individual contribution of the oligopoly subjects to the creation of total oligopoly supply in the relevant market. It should be noted that each action of a particular firm in an oligopoly affects the behaviour of other firms on the market.

Price lowering of one firm will likely decrease a market share of other firms on the production of a sector. In other words, responses of the competitors in oligopoly may a significant effect on a result of managerial decision making on an oligopoly market. It is therefore clear that a decision making about optimal price and supply in an oligopoly is far more complicated than in other market structures. In some situations, the subjects may simply ignore most of the actions of their competitors, in other cases however, a price war between the oligopoly subjects may strike as a reaction to seemingly innocent price change.

Multiple factors such as maturity of a sector, nature of production and also business methods can determine a way in which firms respond to competitors' behaviour. Methodological problems of formulating oligopoly models arise from the great diversity of ways in which firms can interact and conclude agreements on the distribution, market shares and market prices. Simply said, there is not general model of oligopoly. In the paper we present the result of microeconomic analysis of a cartel equilibrium model and show how a method of setting an optimal price and supply of a cartel limits the laws of competition. We study the properties of a cartel profit optimization problem considering various marginal costs of homogeneous production of the cartel subjects and point out some interesting, economically interpretable implications of Kuhn-Tucker optimality conditions in a cartel subject's optimal decision making problem in a context of its behaviour on the market of imperfect competition.

Let's study a situation in a sector where we assume the individual producers agree on a common course of action while setting a volume of their production, market shares and market price. So the producers will de facto act as a monopoly even though formally they remain independent firms. If the producers ignored specific behaviour of the other producers while making their decisions, every firm would independently have solved its own profit maximization problem based on classical optimality conditions.

Carlton (2005) shows, that if, however, the firms won't proceed independently but agree on common approach to production and sales, by which they violate the conditions of competition, their challenge will then be to find the answers to following questions:

- what will be the equilibrium market state with the cooperating producers in a sector?
- what volume of production will each producer supply?
- what will be a common market price of a product?
- what will be a common profit?
- how will this profit be divided?

So the firms agree on a common course of action. Pepall (6) shows, that the firms seek such a solution of equilibrium on a market that would maximize their common profit and adjust their individual production strategies

to this solution. They will therefore seek optimal volumes of supply of their production based considering common profit function maximization in a form:

$$\pi(Q) = \sum_{i=1}^n Q_i = \sum_{i=1}^n TR_i(Q_i) - TC_i(Q_i) \quad (1)$$

where: Q_1 – volume of supply of an i oligopoly producer, Q_i , R , $TC_i(Q_i)$ – real function of total costs of an i oligopoly producer, $TC_i: R \rightarrow R$, $\pi_i(Q_i)$ – real profit function an i the oligopoly producer, $\pi(Q): TC_i: R \rightarrow R$, $TR_i(Q_i)$ – real revenue function an i oligopoly producer, $TR_i(Q_i): R \rightarrow R$.

After expressing a price of cartel production using price-demand function $P(Q)$ in n variables we transform a common profit function maximization problem (1) of cartel subjects to a problem in a form where $P(Q)$ – real price-demand function, $P(Q): R \rightarrow R$ and after a modification we get:

$$\pi(Q_1, Q_2, \dots, Q_n) = \sum_{i=1}^n Q_i (P(Q_1, Q_2, \dots, Q_n)Q_i - TC_i(Q_i)) \rightarrow \max \quad (2)$$

Optimization problem (2) represents an unconstrained common profit function maximization in n variables and is realized in a stationary point of a concave function of a common cartel profit satisfying necessary optimality conditions in a form:

$$\frac{\delta \pi(Q_1, Q_2, \dots, Q_n)}{\delta Q_i} = \frac{\sum_{i=1}^n Q_i (P(Q_1, Q_2, \dots, Q_n)Q_i - TC_i(Q_i))}{\delta Q_i} = 0 \quad (3)$$

where: $i = 1, 2, \dots, n$

A degree of difficulty of a solution of necessary optimality conditions defined by a set of nonlinear equations (3) is a naturally, determined by a degree of difficulty of a price-demand function of a sector and cost functions of particular producers – cartel subjects. We can show that a market price and a volume of a total supply of a sector based on the conditions (3) are socially ineffective because they let the firms in a cartel reach higher profits while at the same time have a lower volume of supply and higher market price comparing to other forms of an oligopoly market structure. Regarding this statement let us study cartel profit maximization problem (2) as a mathematical programming problem in a following form:

$$\pi(Q_1, Q_2, \dots, Q_n) = \sum_{i=1}^n TR_i(Q_i) - TC_i(Q_i) = \sum_{i=1}^n (P(Q_1, Q_2, \dots, Q_n)Q_i - TC_i(Q_i)) \rightarrow \max$$

subject to: $i = 1, \dots, n$ (4)

Let us modify optimization problem (4) to a standard form, for example with an objective like this:

$$-\pi(Q_1, Q_2, \dots, Q_n) = \sum_{i=1}^n (-P(Q_1, Q_2, \dots, Q_n)Q_i + TC_i(Q_i)) \rightarrow \min \quad (5)$$

subject to: $i = 1, \dots, n$

In (Koten 2011) we can see that for problems (4), (5) we can formulate: generalized Lagrange function in a following form:

$$L(Q_1, Q_2, \dots, Q_n) = -\sum_{i=1}^n (P(Q_1, Q_2, \dots, Q_n)Q_i + TC_i(Q_i)) \quad (6)$$

Some authors (Walsh 2003, Budzinski 2018) shows, that Kuhn-Tucker optimality conditions for a Lagrange function (7) of an optimization problem (5), (6) are formulated as follows:

$$\frac{\delta L(Q_1, Q_2, \dots, Q_n)}{\delta Q_i} \geq 0 \quad i = 1, \dots, n \quad (7)$$

$$Q_i \frac{\delta L(Q_1, Q_2, \dots, Q_n)}{\delta Q_i} = 0 \quad i = 1, \dots, n \quad (8)$$

After substitution of a Lagrange function (7) to optimality conditions (8) and after another modification we can get the optimality conditions in a form:

$$\frac{-\delta(P(Q_i, Q_2, \dots, Q_n))}{\delta Q_i} Q_i - P(Q_i, Q_2, \dots, Q_n) + MC_i(Q_i) \geq 0 \quad \text{for } i = 1, \dots, n$$

$$Q_i \left(\frac{-\delta(P(Q_i, Q_2, \dots, Q_n))}{\delta Q_i} Q_i - P(Q_i, Q_2, \dots, Q_n) + MC_i(Q_i) \right) = 0 \quad \text{for } i = 1, \dots, n \quad (9)$$

If in the optimality conditions (9) we can use own price elasticity of a demand for oligopoly product based on a relation:

$$e(Q_i) = \frac{\Delta Q_i}{\Delta P} = \frac{\frac{\partial Q_i}{Q_i}}{\frac{\partial P(Q_i, Q_2, \dots, Q_n)}{P(Q_i, Q_2, \dots, Q_n)}} \quad \text{than in the optimality conditions we can use a following substitution:}$$

$$\frac{-\delta(P(Q_i, Q_2, \dots, Q_n))}{\delta Q_i} Q_i - P(Q_i, Q_2, \dots, Q_n) = -P(Q_i, Q_2, \dots, Q_n) \left(\frac{\partial(P(Q_i, Q_2, \dots, Q_n))}{\partial Q_i} \frac{\partial(P(Q_i, Q_2, \dots, Q_n))}{\partial(Q_i, Q_2, \dots, Q_n)} + 1 \right) =$$

$$-P(Q_i, Q_2, \dots, Q_n) \left(\frac{1}{e(Q_i)} + 1 \right) = -P(Q_i, Q_2, \dots, Q_n) \left(\frac{1+E(Q_i)}{e(Q_i)} \right) \quad \text{for } i = 1, 2, \dots, n \quad (10)$$

and we can finally formulate the optimality conditions in a final form:

$$-P(Q_i, Q_2, \dots, Q_n) \frac{1+e(Q_i)}{e(Q_i)} + MC_i(Q_i) \geq 0 \quad \text{for } i = 1, 2, \dots, n \quad (11.1)$$

$$Q_i \left(-P(Q_i, Q_2, \dots, Q_n) \frac{1+e(Q_i)}{e(Q_i)} + MC_i(Q_i) \right) = 0 \quad \text{for } i = 1, 2, \dots, n \quad (11.2)$$

$$Q_i \geq 0 \quad \text{for } i = 1, \dots, n \quad (11.3)$$

Some authors (Carlton 2015) show, that the scheme would be simpler for a homogenous production and undifferentiated cost functions or the functions of marginal costs of particular producers. Now let's study the properties of cartel profit optimization problem having various marginal costs of cartel participants' homogenous production.

So if the particular producers in a cartel decide on an optimal production Q_i for $i = 1, 2, \dots, n$, meaning, that a total cartel supply and a total demand on the market are in balance while maximum of cartel profit function $\pi(Q_1, Q_2, \dots, Q_n)$, then such variables must exist for the Kuhn-Tucker optimality conditions (14) are satisfied, therefore a vector of variables $(Q_1^*, Q_2^*, \dots, Q_n^*)$ is a solution of equations and inequations (11.1), (11.2), (11.3).

Let us now describe some interesting, economically interpretable consequences of Kuhn-Tucker optimality conditions in a profit maximization problem in the conditions of equilibrium on a cartel market:

- In the first case let us notice that validity of a condition (11.3) express that in a state of anticipated market equilibrium between aggregated demand and aggregated supply on a cartel market, an optimal value of supply of each cartel producer is either positive or zero. In other words, there may be producers on a market who don't get to supply their production and thus have a zero volume of supply. As we show later, this is related with a fact that an equilibrium market price of a cartel covers the marginal costs of a potential cartel participant.
- Assuming that a cartel participant supplies a positive volume of his production, then from a validity of the condition results a fact that he must supply such a volume of his production so that a following relation is valid between a cartel market price, his marginal costs and a demand elasticity corresponding to his market supply:

$$P(Q_i, Q_2, \dots, Q_n) = \frac{e(Q_i)}{1+e(Q_i)} MC_i(Q_i) \quad (12)$$

Let us study an economic interpretation of a relation (12) more closely. We will show that if a company in a cartel supplies a positive volume of production then a market price of a cartel is higher than marginal costs of a firm assuming that a demand for a firm's production is elastic for example. For an elastic demand for a value of a multiplier in Equation (12) stands,

$$e(Q_i) < -1 \rightarrow \frac{e(Q_i)+1}{e(Q_i)} > 1 \quad (13)$$

and therefore also,

$$P(Q_i, Q_2, \dots, Q_n) > MC_i(Q_i) \quad (14)$$

So we can see that if a firm in a cartel supplies a positive volume of its production, its marginal costs are always lower than an equilibrium market price of a cartel. It shows, that an optimal combination of a price and supply is under stated assumptions for a company in a cartel always more convenient than for a firm in an environment of a perfect competition which compared (14) must supply such a value of production to equal its marginal costs with a product price (Williams 2003, Blatter 2018).

- From (12) we can conclude that a bigger share on cartel production is gained by the firms with lower marginal costs because with a cartel common market price they can set bigger volumes of their supply having lower marginal costs. This positive trend of a firm's placement in a cartel is even more significant in a case of higher level of demand elasticity for a firm's production.
- In a context of above said notes let's discuss economical interpretation of the Kuhn-Tucker optimality condition (11.1). Two situations may occur:
 - a) In a case a firm in a point of cartel optimal equilibrium supplies a positive volume of production then from a validity of the condition (11.2) results that a cartel market price is on a level of marginal costs of a firm multiplier from (14) and the optimality condition (11.1) is realized as an equation and:
 - b) In other case, for example, if the optimality condition (11.1) is realized as a strict inequality and then from a validity of the condition (11.2) formally results that a company in a point of cartel optimal equilibrium is not producing, for example if production is authors (Wang 2003, Měříčková 2013, Bueren 2018) show that this situation occurs because the firm appears to be technologically ineffective as it has high marginal costs so these after being multiplied by the multiplier from (12) are not covered by cartel market price.

Kuhn-Tucker optimality conditions for cartel profit maximization problem confirmed a fact that the firms in a cartel, because of existing barriers to entry and using their agreement on joint course of action in setting an optimal combination of a price and a volume of product supply on a sector market, set the cartel product price above the level of marginal costs and therefore they reach a superior profit.

As an analysis of Kuhn-Tucker optimality conditions has clearly proven, such a situation is a result of a fact that the firms acting on a sector market in a cartel structure formally declare their relations being competitive but in fact they act as a monopoly while setting a combination of a market price and a cartel supply, with only one difference of a profit being divided by a scheme based on comparison of their marginal costs as it was shown by the description of (11.2) Kuhn-Tucker optimality conditions implications.

Conclusion

The author has pursued to determine the level of dependency of selected variables. Pearson's correlation coefficient (r) has been used to determine the relation's dependency intensity. A positive correlation of $r = 0,171582$ was measured from secondary data for the dependence of the number of submitted offers in a procurement procedure and the price difference (defined as the difference between the expected value of a public procurement and the winning bid of a candidate). Due to the positive value and the amount of r , we can talk about a weak dependency (r has an interval of $<-1,1>$ and, in this case, does not reach limit values). A possible interpretation could be: the increase of the number of offers has a weak positive influence on the price difference. The public procurement is the issue of professional economic debates; it is difficult to understand the prevailing neoclassical microeconomic apparatus, and therefore it is necessary to start supplementing economic instruments of transparency.

It is also clear that for transparency is a significant factor in the evaluation of bid rigging cartels. For current developed economies the different forms of imperfect competition are typical as a prevailing type of market structures. Among these a significant position belongs to an oligopoly which is characteristic for most sectors of national economies of developed countries. In an economic theory, a great attention is paid to the study of theoretical concepts of oligopolies behaviour also in a context of applying the principles and rules of economic competition on the markets of those sectors where a strong economic subject exists. That is because if the objective barriers to entry exist on a relevant market, the existence of economic subjects with a dominant market share is clearly connected with a high risk of a dominant position misuse. Legislation for guarantee of competition conditions and elimination of risks of anti-competition practices is created in the developed economies. In EU these tasks are performed by the European Commission, in the Czech Republic by the Office for the Protection of Competition. An oligopoly represents a market structure where a limited number of producers operate on a market of a sector. Firms in an oligopoly must respect an existence of their competitors and seek mutual agreement based on different assumptions and schemes of aligning the interests which will be determined by specific characteristics of a sector. In this competition scheme an existence of an oligopoly in accordance with the rules of economic competitions is socially effective and a presence of the competitive relations on a producer's side naturally effective as well.

A different situation occurs when the firms in an oligopoly which formally declare their independency and the existence of competitive relations in a sector agreement on joint process of fixing a volume of supply and price of a product in a sector, which is clearly against the principles of a competition protection. In this case we speak of

a cartel. An aim of this practice is an effort to reach an extra profit for cartel subjects. If the producers in a sector close the agreements based on cartel principles, they significantly limit a quality of a competition and it is an obligation of a state to regulate or eliminate this condition by legislation. In this paper we dealt with methodological tools of microeconomics analysis an optimal supply and price of a cartel and showed the ineffectiveness of such market structure. On the basis of results will be relevant to formulate economic policy recommendations for reform of formal and informal institutions. This should have a positive impact on the effectiveness of public procurement as well as for the overall efficiency. Also, the above stated findings gained from the information of the given issue and conducted analysis represents a fundamental platform for further scientific work. Measuring has discovered the dependence of the price difference on the type of procurement procedure, and the positive dependency between the number of submitted offers in a procurement procedure and the price difference. However, due to the fact that the analysis is based on a relatively small sample of data, the author of this article consider to verify and expand their conclusions through further and more extensive measuring. The transparency of public procurement is only meaningful if information about all key phases of the contract's procurement and realization are actively made public, i.e. from the defining of the request for tender through the realization of the subject and handover for use.

Based on mathematical methods, we can evaluate another of transparency public contracts. Generally, we can conclude and recommend that the existing legal treatment only requires the contracting authority to publish basic information about the declaration of the contract, the selection of the supplier and the price offered. The submitted amendment to the law significantly increases the standard for information in the public procurement system by adding a new responsibility for contracting authorities to publish information on tenders before the contract is announced, information about the contract concluded and subsequent changes to it, as well as information about the final price of the contract. The proposed amendment also counts on substantially reducing the limit for small-scale contracts, making the public procurement market more transparent, as it is in other EU states, and limiting the willfulness of contracting authorities in issuing public contracts. The fundamental instrument for public oversight – the public contract information system – is difficult for users to use and understand and can present a barrier to more effective public oversight. There is a significant number of contracting authorities in the Czech Republic and in the EU that voluntarily declare small-scale contracts via the official information system. This behavior proves that reducing the limits for small-scale contracts need not necessarily present a disproportionate additional administrative burden for contracting authorities. Conclusions must have wider perspective-implications for other broader areas and domains. Future Work and Outstanding Questions must arise from Conclusions.

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Labor Resources: Concept, Features and Modern Development Trends in the Context of the Paradigm of Sustainable Development

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Abstract:

The ability to form and develop the competitive advantage of organizations in a modern dynamic economy is based on innovation, quality and cost leadership. These are the three most important factors that determine the organization's competitive position in the market and depend on the organization's workforce. In conditions of openness of the economy of Kazakhstan and attraction of foreign investors to strategic industrial facilities, the issues of labor resources management and their quality are transformed under the influence of Western management, which implements its standards in this sphere. Large, export-oriented metallurgical corporations of Central Kazakhstan have been operating in the market economy of Kazakhstan for more than 10 years, and the lion's share of their products is sold on world markets. In the article the author studies the issues of improving the management of labor resources in the Republic of Kazakhstan. In the study, the author uses the experience of large corporations in Kazakhstan, and also considers the state regional policy of managing human resources (based on materials from the Karaganda region). The author developed the economic-mathematical model for forecasting the target indicators of the regional development program in the context of the paradigm of sustainable development and the quality of labor resources in the region.

Keywords: economy; labor resources; sustainable development; regulation; factors.

JEL Classification: J21; J24; J28.

Introduction

In large corporations, negative trends persist in the sphere of personnel management, which are manifested in issues of labor remuneration, working conditions, without which it is impossible to talk about the development of the company's human resources. Regulation of the use of domestic human resources in the liberal labor market, which has developed in Kazakhstan, by methods of social partnership, is only just beginning to take shape.

Regarding the state regulation, it is possible to talk about the necessary measures of state participation in such issues as the audit of working conditions, labor protection, since in these matters the most significant violations of the rules for using the labor of an employee had revealed.

The formation of human resources of a new quality, their management at the firm level, is the key to the country's future competitiveness in the global economy. Therefore, the relevance of the issues being developed for the economy of Kazakhstan is of high importance.

1. Literature review

Consideration of the specific features of the labor force factor had presented in the works of the classics, beginning with Petty (1940), Smith (2011), Marx (1974) and others. The category of "human capital" is introduced into economic science by Schultz (1972), Becker (2003), Porter (2003). The modern classic of firms' competitiveness M. Porter notes that the human factor should be highly specialized in relation to the specific needs of the industry and the company. In the development of this concept, Barney and Kelly (2016) made the most important additions,

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according to which the learning and effective application of the knowledge of the personnel gives the company more significant, unique advantages. Modern scientists and practicing managers who laid the foundations of approaches to the management of the firm's human resources in the world economy had recognized by Drucker (2014), Armstrong (2009), Meskon (2009), Atkinson (1980) and others.

In the post-Soviet space, the problems of personnel management, issues of development and management of labor resources are considered in the works of Satubaldin (2016), Meldakhanova (2010), Pritvorova (2016), Marcinkevich (2015), Soboleva (2015). Many scientists note that the attitude to labor resources as a source of economic development passes the stage of comprehension that the problems of ensuring extended reproduction of labor by domestic firms had not fully realized. However, the strategic task of forming the international competitiveness of Kazakhstan's economic entities requires the identification of positive experience of Western management in large corporations, and the elimination of negative practices of using domestic human resources.

Human resources have value if they are able to bring future income by providing their labor. Alternatively, you might say, the cost of personnel, like any other resources, is the present value of the expected future services and revenues. The cost of a person for an organization also depends on the period during which he can provide his services to the organization and generate income, that is, the period of work in the organization.

The expected return on investment in human capital includes a higher level of earnings, greater satisfaction from the chosen work during life, as well as a higher valuation of non-market activities.

The costs of producing human capital (to invest in human capital) include:

- direct costs, including tuition fees and other expenses for education, change of residence and work;
- lost earnings, which is an element of opportunity costs, since education, change of residence and work are related to loss of income;
- moral damage, since education is a difficult and often unpleasant occupation, job search tires and depletes the nervous system, and migration leads to the loss of old friends and acquaintances.

One of the conditions for the successful functioning of companies is human capital, since many industries, first of all, are not only labor-intensive industries, but also branches with highly qualified personnel. So, for example, in most types of banking activities, customer satisfaction depends on increasing the level of qualification of bank staff, *i.* quality of labor resources of the bank (Petty 1940). Human capital is understood as a person's knowledge, skills and abilities that contribute to the growth of his productive power. "Human capital - as most economists define it - consists of the acquired knowledge, skills, motivations and energy that human beings are endowed with and that can be used for a certain period of time for the production of goods and services" (Petty 1940). "He is a form of capital, because he is the source of future earnings, or future satisfaction, or both. He is a human being, because he is an integral part of man" (Porter 2003).

Smith (2011) clearly defined human beings as capital: "Instead of understanding capital as part of the output of industry, it seems there are no valid reasons why a person could not reckon with it". In addition, he notes the existence of a close analogy between conventional and human capital, believing that investing in human beings must have a rate of turnover that is consistent with the rate of turnover of other investments, plus the normal rate of turnover determined by the market interest rate during the individual's possible life (Smith 2011).

Nassay Senior (2014) suggested that human beings can be successfully treated as capital, with the costs of maintenance invested in a person with the expectation of obtaining benefits in the future.

McLeod (2011) considered the producing person as a fixed capital. From his point of view, if this person is not productive, then he is not subject to economic analysis. This view sharply contradicts the opinion of Leon Walras (2014), who included all human beings in capital. And the value, or price, of these human beings, said Walras, is defined like other capital goods (2014).

von Tünen (2015) also noted the reluctance of individual economists to evaluate human beings in money. But from this reluctance, he said, "there is a lack of clarity and confusion of concepts in one of the most important areas of political economy. Moreover, it may turn out that the freedom and dignity of people could be successfully secured if they were subjects of capital laws" (2015).

Capital, as Fisher (2017) argued, is a "useful intended material object," and therefore, since human beings have this characteristic, consistency in reasoning requires their inclusion in the concept of capital.

Human capital, according to Huebner (2014), can have the same scientific interpretation as ordinary capital has. Its operational definition can be obtained by "capitalizing the value of human life by means of bonds, giving them lifelong rent (for a given workforce) and circulation (as a source of credit), considering them on a collateral basis and using the depreciation funds method to ensure the implementation of the object in question, if only a person has the prospect of future business activity, and his family - the obligation to cover the existing risk of uncertainty in the duration of human life".

In the theory of general equilibrium with postulated short-term contracts, entrepreneurs are not interested in investing in labor. But recently, the factors of long-term growth are widely recognized as dominant in regulating business activity. As some Western economists have noted, entrepreneurs are increasingly aware of the importance of investment, which becomes an "integrated part of a person", and this awareness leads to the liberation of investment growth in human beings.

Woods and Metzger (2015) have shown that symmetry in treating both human and ordinary capital had achieved only if the categories of "depreciation", "conservation" and "disposal" are used. The conservation costs are taken into account when the consumption costs are deducted from the earnings and the depreciation with retirement is taken into account in the way in which the average earnings are estimated: "This factor (depreciation and retirement) is introduced into the calculation of the average annual salary of workers that includes the low wages of the old workers along with a high salary of more efficient producers. The former, naturally, receive lower salaries and wages than healthy and productive workers in the first half of their lives, but the earnings of the latter are diluted in the "average" by the lower wages of the first group and those very young workers who do not yet have qualifications".

Productive qualities and characteristics of the employee were recognized as a special form of capital on the grounds that their development requires considerable time and material resources and that they, like physical capital, provide their owner with a higher income: "In recent decades, the idea that capital consists of some physical assets, has been undermined. In its place, a more comprehensive view has gradually been established, according to which capital is any asset - physical or human, capable of generating a stream of future incomes" (Molloy and Barney 2015).

Many economists pointed to the need for and the possibility of an economic assessment of the workforce, and also talked about the use of these estimates for specific purposes.

Thus, it can be concluded that human capital is a set of investments in the training, ability and future of a person, embodied in a person's reserve of abilities, knowledge, skills, and motivations. This capital can be divided into special and general. Under the common human capital understand the whole body of knowledge and skills received by a person in the process of training and work and paid for at his own expense. They are of value to the person in his work in any company. Special capital is knowledge and skills received by a person in the process of work in a particular organization, paid for by the organization and representing value only for the organization (Armstrong 2009).

2. Methodology

The profitability of human capital had calculated by referring income from it to its value. This indicator had called the "rate of return". The rate of return, according to economists - neoclassicists, performs the same functions that, in relation to physical capital, fulfill the rate of profit, namely, it measures the degree of effectiveness of human investments and realizes their distribution. Also, human capital is determined by the totality of human qualities that affect the results of its activities and the corresponding revenues. In particular, the theory of human capital makes it possible to assess the appropriateness of the costs of training, depending on the anticipated increase in incomes and the duration of use of the acquired knowledge. Human capital is viewed as a set of qualities that determine productivity and can become sources of income for the individual, the family of the enterprise and society.

The issue, which is practically not paid attention in the domestic practice of human resources management, but is no less important in the learning process, is control over the effectiveness of training.

The following indicators can serve as general criteria for the effectiveness of the process of improving the qualification of human resources, from our point of view:

- densities and rates of growth in the number of human resources that do not have a basic profile education;
- dynamics of the number of human resources, having a higher profile education;
- the dynamics of the number of human resources (differentiated depending on the position held), during the last five years of continuing professional development in any form;
- dependence of material incentives on learning outcomes.

Intensification of management and improvement of the quality of labor of personnel are possible only as a result of applying fundamentally new approaches to working with human resources. Human resources management requires an integrated approach, which includes the development of the corporate culture of the organization, the use of different forms of planning and control, increasing the transparency of management decisions, and improving the professional skills of staff.

Table 1. Calculation of new variables

Year	Volume of GRP, mln. tenge	Volume of investments in fixed assets, mln. tenge	Z ₀	Z ₁	Z ₂
2001	200.649,8	22.080	-	-	-
2002	235.372,0	23.876	-	-	-
2003	299.947,3	33.192	-	-	-
2004	337.702,5	55.153	134.301	147.184	327.416
2005	370.493,6	62.584	174.805	193.165	402.805
2006	444.418,8	67.157	218.086	272.466	581.924
2007	508.970,6	96.650	281.544	357.784	813.870
2008	679.805,9	153.438	379.829	418.716	928.534
2009	922.634,5	134.157	451.402	548.209	1.144.451
2010	1.144.309,4	151.887	536.132	730.983	1.617.759
2011	1.463.026,7	210.247	649.729	880.515	2.069.457
2012	1.515.792,0	214.076	710.367	916.492	2.025.208
2013	1.872.842,3	211.085	787.295	1.090.231	2.422.047
2014	2.397.919,6	253.048	888.456	1.269.978	2.959.612
2015	2.458.966,9	323.816	1.002.025	1.317.446	3.024.072
2016	2.634.259,8	405.015	1.192.964	1.463.167	3.235.773
2017	2.968.537,7	411.852	1.393.731	1.811.791	3.977.711

Source: calculated by authors

Next, we estimated the parameters of the regression equation by the ordinary least squares method. The GRP volume is the dependent variable. Calculated by the formulas z_0 , z_1 , z_2 are independent variables. We obtained a three-factor linear regression model:

$$GDP_t = -24457,4 + 0,77904z_0 - 1,64355z_1 + 1,25231z_2 \quad (6)$$

Further, the coefficients of the original model were determined from the formulas:

$$\begin{aligned} \beta_0 &= a_0 = 0,779; \\ \beta_1 &= a_0 + a_1 + a_2 = 0,388; \\ \beta_2 &= a_0 + 2a_1 + 4a_2 = 2,501; \\ \beta_3 &= a_0 + 3a_1 + 9a_2 = 7,119. \end{aligned} \quad (7)$$

Thus, the initial model with a distributed lag is as follows:

$$GDP_t = -24457,4 + 0,779Inv_t + 0,388Inv_{t-1} + 2,501Inv_{t-2} + 7,119Inv_{t-3} \quad (8)$$

The analysis of the model shows that an increase in investments in fixed assets by KZT 1 million will lead to an average growth of GRP by 0.779 million tenge. In the current period. When investing in fixed assets in a year, one can expect an increase in GRP by KZT1,167 million, in two years by KZT 3,668 million. The growth of investments in the main capital by KZT 1 million in the current period will result in three years' growth in GRP volumes by KZT 10,787 million.

We calculate the contribution of each lag:

$$\begin{aligned} w_0 &= \frac{\beta_0}{\beta} = \frac{0,779}{10,787} = 0,072 \\ w_1 &= \frac{\beta_1}{\beta} = \frac{0,388}{10,787} = 0,035 \\ w_2 &= \frac{\beta_2}{\beta} = \frac{2,501}{10,787} = 0,232 \\ w_3 &= \frac{\beta_3}{\beta} = \frac{7,119}{10,787} = 0,661 \end{aligned} \quad (9)$$

Consequently, 7.2% of the total increase in GRP, caused by the growth of investment in fixed assets, occurs at the current time; 3,5% - in a year; 23.2% - in two years; 66,1% - in three years.

The average lag of the model is:

$$\bar{l} = 0 \cdot 0,072 + 1 \cdot 0,035 + 2 \cdot 0,232 + 3 \cdot 0,661 = 2,48 \text{ (years)} \quad (10)$$

The lag value of 2.48 years confirms that most of the GRP growth effect is manifested after three years.

Thus, we can argue that investments in fixed assets do have a long-term positive effect on the dynamics of the region's GRP as one of the main indicators of economic sustainability. Moreover, according to the constructed lag model, we can expect an increase in the gross regional product of the Karaganda region in the next three years. The forecast value of GRP will be: $GDP_{2018} = 3.751.296,71$ million tenge, $GDP_{2019} = 4.353.626,68$ million tenge, $GDP_{2020} = 4.356.004,64$ million tenge.

Social model. To predict the social stability of the Karaganda region, we built a multiple regression model. As a result, the total population of the region (Pop) was chosen. To select the factors that have the greatest impact on the result, we considered the variables: UP - unemployed population, thousand people; ANS - average monthly nominal wage, tenge; MG - migration increase, thousand people; PG - natural increase in population, people; NUS - number of students in universities, people; HB - number of hospital beds; CPO - the number of permanent preschool organizations.

The source was the statistical data of the Department of Statistics of the Karaganda region. Next, a correlation analysis is made and the correlation coefficients are calculated to select the factors that have the greatest correlation dependence with the resulting index-the total population. The results of estimating the correlation relationship are presented by the correlation matrix (Table 2).

Table 2. Results of correlation estimation

	Pop	UP	ANS	MG	PG	NUS	HB	CPO
Pop	1							
UP	-0,23	1						
ANS	-0,58	-0,28	1					
MG	-0,71	-0,29	0,63	1				
PG	0,39	-0,84	0,40	0,14	1			
NUS	-0,74	-0,18	0,25	0,70	-0,22	1		
HB	0,92	-0,37	-0,60	-0,60	0,40	-0,49	1	
CPO	0,78	-0,59	-0,02	-0,35	0,78	-0,56	0,76	1

Source: compiled by authors

Judging by the correlation coefficients, all the factors considered, except for the number of the unemployed population ($r = -0.23$), have a close correlation with the resulting sign. Based on the above, we did not include the mentioned factor in the model.

With the remaining factors, regression analysis was performed and the least-squares coefficients of the equation were estimated. As a result, a multiple regression equation was obtained:

$$Pop = 1536,8 - 0,00197ANS - 0,00015MG + 0,0066PG - 0,0033NUS + 0,0029HB + 0,148CPO, \quad R^2 = 0,99. \quad (11)$$

The regression equation is statistically significant, since the observed value of the Fisher criterion is significantly higher than its critical value at a significance level of 0.05 ($F_{abset} = 429.3 > F_{crit} = 2.69$), hence the model adequately describes the interrelation between the variables and can be used for further analysis and forecast.

To obtain predictive estimates of social sustainability in the future, we have identified trends in the development of indicators included in the model. Trends of the change and the forecast obtained by the trend models for the next three years are presented in Table 3.

Table 3. Forecast values of targeted indicators for sustainable development of the region

Factors of social sustainability	Trend model	Forecast of the target indicator		
		2018	2019	2020
Average monthly nominal wage, tenge	$ANS = 274,85t^2 - 2503,7t + 8971,1$ $R^2 = 0,99$	118.160	129.674	141.737
Migration growth, thousand people	$MG = 10868\ln(t) - 38578$ $R^2 = 0,39$	-3.595	-3.169	-2.759
Natural increase in population, people	$PG = 100,03t^2 - 2423,4t + 14993$ $R^2 = 0,84$	16.927	19.605	22.483
Number of students in universities, people	$NUS = -157,1t^2 + 4905,1t + 22054$ $R^2 = 0,56$	46.492	43.384	39.963
Number of hospital beds, units	$HB = 24690e^{-0,04t}$ $R^2 = 0,65$	9.083	8.727	8.385
Number of permanent preschool organizations, units	$CPO = 11,164\ln(t) + 487,63$ $R^2 = 0,97$	506	508	509

Source: compiled and calculated by authors

Using the obtained predictive estimates of social stability factors, we obtained a forecast of the total population of the Karaganda region in 2018-2020:

$Pop_{2018} = 1364,7$ thousand of people;

$Pop_{2019} = 1369,0$ thousand of people;

$Pop_{2020} = 1374,6$ thousand of people.

Compared to 2017, in 2018, we can expect a decrease in the total population of the Karaganda region, which is caused by a significant outflow of population from the region. In subsequent years, the trend again has a positive trend.

Ecological model. To predict the environmental sustainability of the Karaganda Oblast, we have built a multi-factor regression model in which the amount of pollutant emissions (Emis, thousand tons) will depend on variables such as GRP (GDP, KZT million), Population's total population (Pop, thousand people), the number of enterprises that have emissions of harmful substances into the atmosphere (Manuf, units) and vehicles (Avto, thousand units).

The relationship between the emissions of pollutants and the volume of GRP is described by a polynomial of the second degree. This type of connection between these indicators was described by Grossman and Krueger (2011), who suggested that the economic recovery leads first to an increase, and then to a decrease in emissions.

That is, with the growth of GNP in the beginning, the ecology worsens: the factories are smoky, the forests are cut down. But then there is a turning point, which many scientists explain: "With the increase in incomes, the demand for improving the environment rises and there are more resources that can be invested in it".

In other words, wealthy citizens, firstly, are keenly interested in living in an environmentally friendly environment, thereby preserving their health and thinking about future generations, and secondly, they can afford to invest free money in the environment.

Thus, in order to save the environment, it is necessary not to limit economic development, but, on the contrary, to develop it as intensively as possible, without being exchanged for ecology. However, in our opinion, the number of emissions into the atmosphere is affected by a number of other factors that we have included in the ecological model:

$$Emis = b_0 + b_1GDP^2 + b_2GDP + b_4Pop + b_5Manuf + b_6Avto + u_t \quad (12)$$

The coefficients of the regression equation were estimated by the method of least squares. As a result of approximation of statistical data for the Karaganda region for the period from 2001 to 2017, the following equation was obtained:

$$Emis = -711,7 + (-6,2E - 11)GDP^2 + 0,0009GDP + 2,075Pop + +0,029Manuf + 9,85Avto, \quad R^2 = 0,7 \quad (13)$$

Since the coefficient $b_1 = -6,2E - 11 < 0$, and the coefficient $b_2 = 0,0009 > 0$, we obtained a convex upward (\cap -shaped) curve that changes its direction with respect to the point of inflection from growth to fall.

Having differentiated the equality in terms of GDP, and equating the result to zero, we calculated the volume of the gross regional product in the average for the Karaganda region, for which the pollution reaches its maximum value. We received that the peak of pollution occurs at the level of $GDP = 7,258,064.5$ million tenge. A further increase in this indicator in the region leads to a reduction in air emissions of pollutants.

The forecast of the environmental situation, according to the constructed regression model, will be as follows for the next three years:

$Emis_{2018} = 750,6$ thousand tons;

$Emis_{2019} = 841,6$ thousand tons;

$Emis_{2020} = 627,6$ thousand tons.

This forecast was calculated based on the predicted values of the indicators participating in the model, which are indicated in the following Table 4.

Table 4. Forecast of target indicators of development of the Karaganda region for 2018-2020

Factors of social sustainability	Model	Indicator forecast		
		2018	2019	2020
Gross regional product, million tenge	Economic model	3.751.296,7	4.353.626,7	4.356.004,6
Total population, thousand people	Social model	1.364,7	1.369,0	1.374,6
Number of enterprises that have emissions of harmful substances into the atmosphere, units	Trend model $Manuf = 116,2t + 264,8$ $R^2 = 0,83$	1.078,2	1.194,4	1.310,6
Number of vehicles, thousand units	Trend model $Avto = 28,644t + 110,21$ $R^2 = 0,98$	425	454	483

Source: compiled and calculated by authors

Conclusion

Summing up the research, we would like to note that the transition to sustainable development and its management is a very long process, since it requires solving unprecedented social, economic and environmental tasks. In our opinion, it is necessary to pay special attention to the labor resources of the region and to improve the management strategy by increasing their quality.

As we move towards sustainable development, the very idea of it will change and be refined, people's needs will be rationalized in accordance with existing restrictions, and the means of meeting these needs will be improved. Therefore, the implementation of the principles of sustainable development should be considered in stages.

Nevertheless, the use of economic and mathematical models for forecasting the target indicators of sustainable development of the region in the context of the paradigm of its sustainable development will have a beneficial effect on the entire management process and will contribute to improving the quality of planning for the development of the region, developing regional development programs and their implementation. At the same time, a special role should be assigned to the labor resources of the region.

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Tax Capacity as a Financial Mechanism for Implementation of the Strategy for Municipal Formation

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Abstract:

The relevance of the research problem is explained by the fact that the concept of "tax capacity" is currently studied insufficiently. The purpose of the article is to develop a strategy or program for the development of the municipal formation, as well as to study ways to increase revenues to the local budget through certain activities. In this paper, the term "tax capacity" is used and suggestions are given on the methodology for determining it based on factor analysis, taking into account managerial influences. Thus, the research is conducted from the position of management, rather than financial accounting. The considered model of tax capacity has wide practical application. In the future, the model will allow to perform qualitatively scientific research work commissioned by federal and regional ministries, and especially municipal entities. The universality of the methodology of tax capacity is that it is in fact the mechanism for implementing the strategies for the development of the municipal formation. In addition, this approach can form the basis for the design of development strategies for the MF. This method is convenient for calculating scenarios and forecasts for the development of industries and territories. An important advantage of the model is that it allows you to evaluate the effect of managerial influences in creating conditions for the development of small business. Analytical formulas obtained in the study can be used as a basis for a computer program with subsequent registration of copyright.

Keywords: tax; tax capacity; tax potential; model of tax capacity; municipal formation.

JEL Classification: H20; H71; H21

Introduction

Studying municipalities, one can come to the conclusion that each of them has a certain potential that materializes in the form of taxes coming in or projected to enter the budget. The studies (Tatuev *et al.* 2016) relate this to typical characteristics of the territory, such as the population, the structure of production, as well as historical and cultural characteristics, conditioned by the propensity of the inhabitants to entrepreneurship. The latter is understood as an activity that the resident takes on oneself at one's own risk, not counting on the state (Zinchuk and Lukiyanova 2010).

Feeling the inadequacy of the studied topic, let us turn to the existing terminology. It is important to note that the task is to find a concept that would be applicable to the development of a strategy or program for the development of a municipal formation. At the same time, this would give an answer regarding ways to increase revenues to the local budget through certain activities. The closest in meaning was the "*tax potential*" of the territory (Baynova *et al.* 2016).

Thus, according to the official version submitted by the official authorities – the Federal Tax Service, "the tax potential of the municipal entity for the main types of taxes for the planned year can be calculated as the sum of the products of the forecasted tax base, the tax rate and the collection rate for each type of main taxes (Kuznetsova 2003). It also indicates that the tax potential for other taxes is calculated as the product of the expected tax charges for these taxes in the current year on the consumer price index. Also, the tax potential of a municipal formation is equal to the sum of tax potentials for basic and other types of taxes, which does not take into account the synergistic and multiplicative effect on the scale of the entire economy (Samsin 2013).

The importance of the tax potential for estimating the volumes of interbudgetary transfers is emphasized in one of the scientific studies (Naletov and Dorzhiyeva 2009). As in the previous case, it is suggested that it is to be calculated using an aggregated measure or by individual taxes by assessing the relevant tax bases assigned to municipalities (Hasanov 2017).

It can generally be said that the concept of "tax potential" and the methodology for calculating it reflects a fiscal, financial approach that is not suitable for the purposes of this study. If we consider the MF in terms of (strategic) management, according to which it is an independent subject of management, and not the third shopfloor level of the financial system of the Russian Federation, as it appears according to the logic of the Budget Code of the Russian Federation.

1. Materials and methods

In this section, we will give a definition of the *tax capacity*, or rather the methodology for calculating it in the context of taxes coming into the local budget.

The tax capacity includes three components – constituent local budgets:

- land tax;
- personal income tax (TIP);
- taxes on small businesses.

Tax capacity in respect of land tax. According to Art. 12 of the Tax Code of the Russian Federation, local taxes include land tax and personal property tax. In addition to this, municipalities receive deductions from regional and federal taxes in a certain proportion.

The land is one of the most important economic resources of the municipal formation, constitutes the physical basis of urban (rural) planning and is a necessary condition for the integrated development of the territory. Simultaneously, the land is immovable property, therefore, it has its value. In the world practice of local self-government (LSG), payment for land is the basis of local budgets. For example, in the revenue structure of the municipal budget of Flugerville, Texas, USA, property tax is more than 50% (Lukiyanova 2012). In Russia, the share of income from land use (land tax and rent) is relatively small and amounts to 5-20% of local budget revenues (Babun 2013).

Calculating the tax capacity in terms of land tax (Lukiyanova and Levchenko 2014), will help to reveal the huge potential for growth in the revenue base of municipalities in our country. Currently, the collection of land tax is regulated by the 31st chapter of the Tax Code of the Russian Federation (RF Tax Code), which was enacted by federal law No. 141-FZ of November 29, 2004. The principal difference from the previous taxation system is that the tax is calculated on the basis of the *cadastral value* of the land plot, the value of which is determined by the bodies of Rosnedvizhimost.

LSG bodies have two levers for regulating revenues from land tax – the tax rate and tax incentives (direct method). Another important factor in the model under consideration is the cadastral value of land plots located on

the territory of the given municipal formation (MF). However, from the point of view of management, it can only be affected by indirect methods. For example, the increase in value can be the result of a well-considered policy (strategy) of local authorities aimed at economic development of the territory, stimulating entrepreneurial activity, creating conditions for the development of small business, improving the investment appeal of the MF. Moreover, improving the characteristics of land (bringing communications, laying roads, planting trees, etc.) will contribute to the growth of their market value. Obviously, its magnitude will also be influenced by regional policy and macroeconomic factors regulated by federal authorities (inflation, GDP growth rate, ruble exchange rate to other currencies).

In practice, the amount of land tax T_L that is expected to enter the budget for a period is defined as the sum of the works of the cadastral value of land plots recognized as the object of taxation by the tax rate for each category of land (corresponding to 17 authorized uses). The share of deductions from this tax to the local budget is 100% (or 1), therefore it is not reflected in formula (1).

$$T_L = \sum_{t=1}^{17} V_t r_{Lt} - \sum_{t=1}^{17} E_t, \quad (1)$$

where: V_t - is the cadastral value of all land plots of the t -th type of permitted use; r_{Lt} - the land tax rate for land plots of the t -th type of permitted use; E_t - the amount of land tax benefits for land plots of the t -th type of permitted use.

Table 1. Calculation (forecast) of land tax amounts for 2010-2012

Land in the territory of the municipality	Square (ha)	Cadastral value (thous.rub.)	Tax rate %	Tax amount (thous. rub.)	Tax deduction	Tax amount except for deduction (thous. rub.)
Cadastral value of land plots recognized as an object of taxation						
a) housing stock	1.008,0	3.759.873	0,3	11.280		11.280
b) land under industrial objects	493,0	4.768.395	1,5	71.526	40% from rate	42.916
c) land of garages	16,3	232.996	1,5	3.495	1500 thous. rub.	1.995
d) land under the trade objects	12,8	194.488	1,5	2.917		2.917
e) land of public education institutions	46,3	655.136	1,5	9.827		9.827
f) lands under public objects	29,0	424.429	1,5	6.366		6.366
g) lands of summer and gardening associations			0,3			
TOTAL	1.430,0	10.035.317		105.411		75.301
Gathering%						77,3
Amount of tax in the budget						58.241

Table 1 gives an example that allows more clearly reflect the functioning of the model developed in the work to calculate the amount of tax capacity. Data are given from the appendix to the explanatory note to the 2010 budget for the urban district located in the Penza region (Zinchuk and Lukyanova 2010).

For the purposes of this article, it is necessary to identify factors affecting the calculation of the cadastral value of a land plot and to find a general formula for calculating it. A review of the legislation and a generalization of the practice of its application revealed the following. In each rural or urban settlement separate cadastral blocks are allocated. Let us recall that for each cadastral quarter, the cadastral value of land is determined (established) in accordance with the binding to each of the 17 types of permitted use (personal subsidiary farm, industrial premises, office, etc.). Consequently, the basis for estimating the cadastral value is the definition of the specific cadastral value of a land plot within a single cadastral block in the context of different types of permitted use of plots (The procedure for... 2014). To determine the cadastral value of the entire land plot, it is necessary to multiply the specific indicator of the cost per square meter by the number of square meters of the land area. Let us consider the calculation algorithm for the proposed model in a specific example. Tables 6 and 7 show the specific cadastral value U and area of land plots q . Let there be three land quarters and two types of permitted use of land plots (land under housing and office premises) in the selected municipal entity. Table 2 shows the values of model parameters in the base (expired) year, for example, in 2013; Table 7, in the forecast. Let us perform the calculations: for the 1st

type of permitted use $V_1 = 10 \cdot 5 + 1 \cdot 6 + 5 \cdot 1 = 61$ million rubles; for the second $V_2 = 6 \cdot 1 + 8 \cdot 2 + 5 \cdot 5 = 47$ million rubles respectively.

Table 2. Specific cadastral value and area of land plots in the base year

Type of permitted use of land, t	Specific cadastral value, U , mln. rub./ha			Area of land plots, q , ha			Cadastral value of land plots for each type, V_t , mln. rub.
	Number of cadastral quarter, i			Number of cadastral quarter, i			
	1	2	3	1	2	3	
1	10,0	1,0	5,0	5	6	1	61,0
2	6,0	8,0	5,0	1	2	5	47,0
TOTAL							108,0

Source: compiled by the authors

For example, in the forecast year, an increase in the cadastral value of land plots of two types of permitted use is expected, as well as additional involvement of two types of land in the first and second land area through the housing construction program and enterprise development (Table 3). Then V_1 will amount to 117 million rubles, V_2 to 68 million rubles.

Table 3. Specific cadastral value and area of land plots in the forecast year

Type of permitted use of land, t	Specific cadastral value, U'_t , mln. rub./ha			Area of land plots, q'_t , ha			Cadastral value of land plots for each type, V'_t , mln. rub.
	Number of cadastral quarter, i			Number of cadastral quarter, i			
	1	2	3	1	2	3	
1	10,0	2,0	5,0	10	6	1	117,0
2	9,0	8,0	5,0	3	2	5	68,0
Total							185,0

Source: compiled by the authors

In general, the formula for calculating the cadastral value of land plots V_t of a particular type of permitted use t can be presented as follows (2):

$$V_t = \sum_{i=1}^I U_{ti} q_{ti}, \quad (2)$$

where: U_{ti} - is the specific cadastral value of the land plot of the t -th type of permitted use of the i -th cadastral quarter; q_{ti} - the area of the land plot of the t -th type of permitted use of the i -th cadastral quarter; I - the number of cadastral blocks.

Then the *tax base for land tax*, which is equal to the cadastral value of all land plots within this MF, will be calculated as the sum V_t and denoted by TV .

For the purposes of management and implementation of the powers vested in local government bodies, we introduce the notion of *tax capacity in relation to land tax*. This concept is the potential (maximum) amount of income from land tax on the territory of this MF for a certain period (year), taking into account the restrictions (conditions) for tax rates and benefits provided for by federal legislation. Let us add that to achieve this value, certain managerial influences are necessary, for example, the implementation of activities within the framework of the MF development program. Also, let us introduce the notions of possible cadastral value, considering the potential of this local territory (MF), the area of land plots, rates and benefits for land tax.

Let us designate the actual tax capacity of the MF as T_L , and potentially possible in the implementation of the strategy and certain managerial influences as T'_L . Then, substituting equation (2) in (1), we obtain a formula for estimating the tax capacity T'_L :

$$T'_L = \sum_{t=1}^{17} V'_t r'_{Lt} - \sum_{t=1}^{17} E'_t \quad \text{or} \quad T'_L = \sum_{t=1}^{17} \left(\sum_{i=1}^I U'_{ti} q'_{ti} \right) r'_{Lt} - \sum_{t=1}^{17} E'_t, \quad (3)$$

where: $U'_{ti} = U_{ti} + \Delta U_{ti}$ and ΔU_{ti} - is the potential possible cadastral value and the change in the value of the land plot of the t -th type of permitted use of the i -th cadastral quarter; $q'_{ti} = q_{ti} + \Delta q_{ti}$; Δq_{ti} - the potential area and the change in the area of the land plot of the t -th type of permitted use of the i -th cadastral quarter; r'_{Lt} - the potential land tax rate for land plots of the t -th type of permitted use, established by local

self-government bodies; E_t' - potentially possible (optimized by reducing unjustified benefits for certain categories of taxpayers) the amount of land tax benefits for land plots of the t -th type of permitted use.

To save time in planning and forecasting, in practice it is convenient to calculate the difference between the tax capacity T_L and the actual size of the land tax collected in the given territory. This approach is especially relevant if the municipal entity plans to implement new development programs, open new investment projects and construction sites. To this end, we first calculate the *increase in the total cadastral value* of all land plots ΔTV .

$$\Delta TV = \sum_{t=1}^{17} V_t' - \sum_{t=1}^{17} V_t = \sum_{t=1}^{17} \sum_{i=1}^I U'_{ti} q'_{ti} - \sum_{t=1}^{17} \sum_{i=1}^I U_{ti} q_{ti} \quad (4)$$

or

$$\Delta TV = \sum_{t=1}^{17} \sum_{i=1}^I (\Delta U_{ti} q_{ti} + U'_{ti} \Delta q_{ti}) \quad (5)$$

Thus, it is clear that the increase in the tax base for land tax ΔTV (4) will consist of two components: an increase in the value of existing land plots and an increase in the area of new land at a new cost.

In practice, amounts of benefits and tax rates are often saved. In this case, the increase in the tax capacity will be equal to the sum of the products of the tax base increase for the t -th type of permitted use by the tax rate for the t -th type of permitted use:

$$\Delta T_L = T'_L - T_L = \sum_{t=1}^{17} V_t' r'_{Lt} - \sum_{t=1}^{17} V_t r_{Lt} \quad (6)$$

where: $r_{Lt} = \text{const}$, $E_t = \text{const}$.

Substituting (2) into (5), we obtain:

$$\Delta T_L = \sum_{t=1}^{17} \left(\sum_{i=1}^I U'_{ti} q'_{ti} - \sum_{i=1}^I U_{ti} q_{ti} \right) r_{Lt} \quad (7)$$

or

$$\Delta T_L = \sum_{t=1}^{17} \sum_{i=1}^I (\Delta U_{ti} q_{ti} + U'_{ti} \Delta q_{ti}) r_{Lt} \quad (8)$$

The proposed model of the tax capacity allows to develop and implement strategies aimed at developing the MF. As can be seen from formula (3), four factors (model parameters) will affect the amount of tax capacity:

- the area of land plots in circulation,
- the specific cadastral value of land,
- the land tax rate (within the limits established by the legislation),
- the amount of tax benefits (taking into account the limitations of federal legislation).

Let us consider two situations typical for Russian practice. First, the MF *strategy* can be aimed at increasing the revenues from land tax to the budget in the short term, which will increase the fiscal function of the land tax. For its implementation, based on the proposed formula (3), it will be expedient to implement measures primarily aimed at greatly increasing land tax rates, reducing or completely eliminating benefits, and increasing tax collection. Land inventory is also possible in the territory of the MF. However, such a policy will have a short-term effect and will have significant restrictions on growth, as it does not involve the remaining two factors – cadastral value and land area. Most likely, such a strategy can be implemented within the framework of a *conservative* (inertial) *scenario* for the development of a municipal formation (Zinchuk and Lukiyanova 2010).

In this regard, for the development of the territory in the medium and long term it is necessary to introduce an *integrated* (perspective) *strategy*. For these purposes, it is advisable to increase the investment attractiveness of the territory, stimulate entrepreneurial activity, and remove barriers to business development. This strategy does not reject activities of an organizational nature to reconcile payments, identify non-payers, inventory all lands on the territory of the MF, etc., that is, establish order as the implementation of one of the 14 principles of management according to A. Fayol.

So, the concept of "tax capacity" is convenient to use when creating scenarios for the development of municipal formations aimed at the development of local self-government in the whole region (Demenko *et al.* 2017). Also, the choice of strategy should be carried out taking into account the model of municipal management and the composition of the entities in the LSG system (Abramov 2013). Along with this, one should take into account the network nature of relationships in the local community, which determines the leading role of public communications in its design, which was discussed in detail in the work (Lukiyanova *et al.* 2017).

2. Results and discussion

2.1. The tax capacity in the TIPI part

We will continue to consider the tax capacity, but already in terms of the tax on personal income. In foreign countries, the local government has the property tax as the main source of their existence. While in our country a large share of income – up to 50% – is the personal income tax (hereinafter referred to as TIPI) (Lukiyanova 2012). In this regard, this work will consider the financial model of local budget revenues in terms of personal income tax and ways to optimize it.

The personal income tax is one of the main sources of tax revenues to the budget system of countries with advanced economies. Its drawbacks include the complexity of the process of calculating the tax and the procedure for filling out tax returns. In some countries, taxpayers resort to the help of specially created firms that provide paid services. The tax base is income received by an individual, received both in cash and in kind, which includes wages, dividends and interest, income from the leasing of property, income from the sale of property.

In Russia, as of January 1, 2001, a flat taxation scale of 13% was introduced in place of the progressive scale that existed earlier. With respect to dividends, the rate is 9%, prize winnings and lotteries 35%. Since 2002, this tax is received only in the consolidated budgets of the constituent entities of the Russian Federation, which establish the distribution standards between regional and local budgets. When determining the tax base, there are tax deductions: social, property, and so on. However, they are not considered in this paper.

According to Art. 225 of the Tax Code of the Russian Federation, the amount of tax as a percentage of the tax base corresponding to the tax rate. In other words, the amount of tax is defined as the product of the tax base for the corresponding tax rate.

Let us calculate the amount of personal income tax, which will go to the budget of the municipality for a year, for example, the city district (CD). It is possible to choose another time lag, for example, three or five years. This depends on the purpose for which the calculations are made: a three-year budget or a five-year program of social and economic development of the city. For the sake of simplicity, we will not include in the calculations (we will deduce beyond the scope of the study) incomes taxed at rates other than 13%. These include income from dividends, winnings from lotteries, and so on. Then the amount of the tax on personal income T_I collected for the year in the territory of the budget of this municipality will be equal to the product of the gross aggregate income of individuals B for the tax rate r and the standard of deductions to the local budget in question a :

$$T_I = a r B \quad (9)$$

In practice, the situation differs from the theoretical formula, which is confirmed in the study conducted by the author. In the study for the period from 2011 to 2013 entrepreneurs and representatives of commercial organizations of various fields were interviewed using the method of in-depth interviews. As a result, it was found that not all employees' salaries are reflected in tax returns, which leads to the payment of taxes not with the entire amount of income. Most likely, this is a consequence of the fact that Russia is a country with a developing economy that develops market relations comparatively recently. This is also evidenced by a large share of the "shadow" economy, characteristic of our country at this stage. In this article, the emphasis is on identifying a specific share of the "white" salary, with which TIPI is paid. The data obtained are summarized and presented in Table 4.

Table 4. The share of "white" wages by types of economic activity

Type of activity	Position of the interviewed	Factors affecting the amount of personal income tax	The share of "white" wages
Retail (trade, clothing shoes)	CEO	Income in kind is not taken into account (discounts on the purchase of own goods)	0,95
Construction and repair	Businessman	Salary "in the envelope"	0,50
Manufacture of household goods	Technical director	Salary "in an envelope"; Employees are not officially employed.	0,10

Type of activity	Position of the interviewed	Factors affecting the amount of personal income tax	The share of "white" wages
Trade in building materials	Manager	Salary "in envelope"; Income in kind is not taken into account.	0,70
Online store of animal goods	Manager	Salary "in the envelope"; Does not include the amount of penalties from employees.	0,50

Source: compiled by the authors according to the results of the study

This will make it possible to introduce into the formula (7) the parameter of the share of the "white" salary z . Obviously, it will differ depending on the region. However, for the purposes of this work, when the selected municipal entity is considered (for example, the urban district), the indicator values, as practice shows, are known to the employees of LSG bodies, therefore, can be determined by expert means.

Further, within the whole array of taxpayers, it is possible to single out groups or clusters, for which a certain proportion of the "white" salary is characteristic. The division into groups (clusterization) can be performed by the criterion of the share of "white" wages, by type of economic activity (retail trade, services, production, etc.) or other parameters. Then the formula for calculating TIPI will look like:

$$T_I = ar \sum_{j=1}^K N_j S_j z_j, \quad (10)$$

where: K – is the number of clusters in this MF; j – is the cluster number; N_j – the number of taxpayers in the j -th cluster; S_j – the average salary for the cluster actually accrued to the taxpayer (before deducting TIPI, "gross") in the j -th cluster; z_j – the share of "white" wage in the j -th cluster.

An example of such a calculation is more clearly presented in a tabular form (with a TIPI rate of 13% and a normative allocation to the city budget of 20%) in Table 5.

Table 5. Calculation of the TIPI amount collected in the municipality

Tax payers	Number of taxpayers in the cluster, thousand people N_j	Average salary (real), rub. S_j	The share of "white" wages, z_j	The aggregate taxable income (tax base), mln. rub.
Cluster 1	5	15.000	1	75
Cluster 2	3	20.000	0,5	30
Cluster 3	2	15.000	0	0
Cluster 4	1	- (unemployed)	-	0
Total	11	-	-	105

Note: $T_I' = 0,2 * 0,13 * 105 = 2,73$ mln. rub. (calculated for a period equal to a month).

Source: compiled by the authors

From the point of view of management, it is often important to find a formula for calculating not actually received amounts in the budget, but potentially available for collection in a given territory (for a certain period). These indicators should form the basis of scenarios and programs for socio-economic development of the MF. To do this, we consider a function represented analytically as (8). Here, the concept of tax capacity introduced earlier is applicable, which is the potential amount of tax revenues in the territory that is possible under certain conditions (it is discussed below in the part of TIPI). These factors include independent factors (macroeconomic indicators, such as inflation, the level of economic activity, availability of bank loans) and dependent factors (control actions, such as activities, strategies, programs, etc.).

Then the formula for calculating the tax capacity for TIPI T_I' will look like this:

$$T_I' = ar \sum_{j=1}^K N_j' S_j' z_j', \quad (11)$$

where: N_j' – is the potential number of taxpayers in the j -th cluster; S_j' – the average salary in the cluster, potentially possible to accrual to the taxpayer; z_j' – the potential share of the "white" salary in the j -th cluster.

In this case, the *purpose of the management system* of the municipal formation (city) will be the form of transferring it from the state T_I to T_I' . Often in practice, it is more convenient to calculate not the value of the tax capacity, but the amount of growth, *i.e.* tax potential ΔT_I . It will be equal to the difference between T_I' and T_I . As a result, calculating the difference between (8) and (9), we get:

$$\Delta T_I = ar \left(\sum_{j=1}^K N'_j S'_j z'_j - \sum_{j=1}^K N_j S_j z_j \right) \quad (12)$$

A number of measures can be proposed to reduce the costs of doing business, including the corruption component, which is described in detail in work (Mordovkin and Nesterova 2013). Another important factor is the competitiveness of products produced by enterprises. Total increase in tax collections for the year (tax potential) of this municipality may amount to 8.3 million rubles.

In practice, this model has its limitations in the application. For this, we investigate the function (9).

The function is linear, has no extremum (maximum), and will grow to infinity with increasing of its independent variables (Kuznetsov 2004). However, in practice this function will have extrema at the boundaries, due to the maximum possible values of its parameters.

As seen from equation (9), the value of the dependent variable T_I is affected by five factors (dependent variables). The tax rate r and the normative of deductions α to the local budget in question are unmanageable, since authorities in the municipality cannot influence them. Regions of the Russian Federation can transfer to the local budgets *additional norms of deductions* from personal income tax in excess of those stipulated by the Budget Code (in order to improve the budget provision of the MF and stimulate LSG bodies to develop). Due to the remaining three variables, the value of the function T_I can be increased by:

- growth in average wages,
- growth in the number of employed population,
- increasing the share of white wages and reducing the number of people officially unregistered with the employer.

Limiting values of the independent variables act as limitations for the function. So, the maximum value for $z'_j = 1$. For the amount of accrued wages S'_j , the upper limit can be determined by the method of expert assessments based on statistics on the average salary in a region or a particular MF (by economic activity type), taking into account annual growth rates. For the upper border N'_j , the value of the number of actually employed population in the economy of this MF is applicable, including unregistered entrepreneurs and employees who did not formalize labor agreements with employers in the manner prescribed by the legislator.

Thus, the developed model, including the three factors governed by the LSG, should form the basis for the development of strategies for managing the municipality. The end result will be an action plan or *socio-economic development program*, all elements of which, including goals, activities, indicators of their implementation (Zinchuk and Lukyanova 2010), will be scientifically substantiated. Thus, the entire process of calculations and assessments should not be aimed at calculating the MF's tax capacity as such, but linked with the development of further control impacts on the municipal formation, which acts as an object of management.

2.2. Tax capacity for taxes on small and medium-sized enterprises

Let us consider the tax capacity of the municipal formation in the part of taxes on small businesses. Currently, small and medium-sized enterprises are on special tax regimes, which include the following:

- taxation system for agricultural producers (unified agricultural tax, UAT),
- simplified tax system (STS),
- taxation system in the form of a unified tax on imputed income for certain types of activities (UTII),
- patent system of taxation (for individual entrepreneurs).

Organizations and individual entrepreneurs can voluntarily switch over from the general taxation system, which provides for the payment of VAT, income and property taxes, on the system of payment of taxes in the form of STS and UAT. At the same time, taxpayers must meet certain criteria. For example, for STS, the criteria are revenue that should be no more than 45 million rubles for 9 months preceding the year of transition to a simplified one, and the residual value of fixed assets should not exceed 100 million rubles and the average number of employees does not exceed 100 people.

In general, simplified regimes significantly simplify the accounting system at the enterprise, minimize the amount of tax reporting. As a consequence, the costs of maintaining accounting records are reduced, for example, in the form of wages.

With a simplified taxation system, the *object* of taxation is income or income reduced by the amount of expenditure. In the first case, the tax rate is 6%, in the second case 15%. The laws of the subjects of the Russian Federation may establish differentiated tax rates ranging from 5 to 15% depending on the taxpayer categories. A tax period is a calendar year, but the tax is paid quarterly in the form of advance payments.

If the taxpayer chose income reduced by the amount of expenses as a taxable object and received a loss or a very small profit, then he pays the *minimum tax* at a rate of 1% of the revenues received (revenue). It is important to note that if income is chosen as the object of taxation, the amount of the tax of the STS can be reduced by the amount of insurance premiums for compulsory pension insurance, mandatory social insurance in case of temporary incapacity for work and in connection with maternity, compulsory medical insurance, compulsory social insurance against accidents on production and occupational diseases. At present, they accounted for 30% of the labor compensation fund (LCF) and included at the salary of one employee from the beginning of the year 22% to the Pension Fund (in 2014, within 624 thousand rubles and 711 thousand rubles in 2015), 2.9% to the Social Insurance Fund (in 2015, within the limits of 670 thousand rubles, is not exempted above it), 5.1% to the Federal Compulsory Medical Insurance Fund (in 2014, within 624 thousand rubles, in 2015, without restrictions from the entire amount of labor payment).

Over the specified limit of labor remuneration, only a pension fund of 10% (2014) is accrued. In addition to the three funds, insurance contributions are calculated from accidents at a rate of 0.2% to 10% of the LCF, depending on the scope of the organization. At the same time, the amount of tax payable to the budget cannot be reduced by more than 50%.

When considering the model of the territory, let us take as an example the average municipal education with an urban district status. As an example, we choose an average city with a city district status. Let the number of SMEs transferred to the STS with the object of taxation "income" at a rate r_u equal to F , and applying "income reduced by the amount of expenses", taxed at a rate of $r_{ux} - C$. At the same time, the ratio (percentage) of the tax accounting to the local budget equals a_u . Then the revenues to the local budget in the given territory from the simplified taxation system T_{STS} can be determined in a general way as follows:

$$T_{STS} = a_u \left[\sum_{f=1}^F (I_f r_u - B_f r_{st}) + r_{ux} \sum_{c=1}^C (I_c - E_c) \right] \quad (13)$$

where: I_f – the income of a firm that uses "revenue" as an object of taxation; B_f – the fund of payment of the firm's work with the taxation of "income"; r_{st} – the rate of insurance contributions from the wage fund; I_c – the income of a firm that uses "income reduced by the amount of expenditure" as an object of taxation; E_c – the expenditures of such a firm. At the same time, the above-mentioned condition on the amounts of tax deductions must be observed $B_{f_{st}} \leq 0,5 I_{f_u}$.

Hereinafter, we will refer to the value of T_{STS} as the *tax capacity*. For the first time this concept was applied in work (Lukiyanova 2014), which is the potential amount of tax revenues in the territory that is possible under certain conditions (this work is considered in the part of the personal income tax). The basis for introducing this concept was the need to focus not on financial collection and filling the budget, but on the management system and the rationale for making decisions in the sphere of LSG.

Suppose, the purpose of the management system of the MF will be an increase in the fees from this tax. This situation arises when the MF head is looking for strategies to achieve an increase in revenue to the budget. It can be seen from formula (11) that this can be achieved either by an increase in the wage fund and the number of small and medium-sized enterprises operating in the territory, as well as by an increase in their incomes; or by reducing costs, including administrative costs, including the cost of commercial and municipal services.

Let us consider formula (11) more closely in order to forecast the potential amount of revenues to the local budget from small enterprises in this municipality. For this we take into account the following factors.

Earlier, when considering the tax capacity in terms of income tax, it was discovered that entrepreneurs often tend to hide part of the salary from taxation by paying out money "in envelopes" and showing only a certain share in the form of "white" wages in the accounts (Lukiyanova 2014).

The firm's margin (the difference between income and expenses) can be defined as the share of k in its revenues, then $I_c - E_c = K \times I_c$. In general, you can use its average indicator for this MF for the past period, obtained by expert means. For example, with a 20% revenue share, the marginal revenue will be $0,2 I_c$.

The "white" labor compensation fund B_f is linked to the company's income I_f , reflected in the official tax reporting. A similar phenomenon, described in the publication (Kuznetsov and Lukiyanova 2002), is as follows. The owner, trying to reduce the amount of taxes paid, shows only a part of the actual income received in the tax return. This value in practice is calculated by the "bottom-up" method, based on the size of the minimum "white" salary,

which is lower than the amount actually given to employees "in hands". Salaries in "envelopes" are one of the hallmarks of the shadow economy, which is of a large size now in Russia. Thus, the amount of tax revenue will depend not on the incomes of small enterprises, as is usually assumed in the compilation of budget forecasts. Then this income for a firm that uses the "income-expenditure" regime can be written in the form of the following correspondence:

$$I_f = gB_f \quad (14)$$

where: g - is a coefficient equal to the ratio of the company's income and labor compensation fund.

It is determined by the expert method, is taken on average by the MF and is accepted equal for all companies. For example, with an income of 100 rubles and the LCF of 10 rubles, the coefficient g will be 10.

Then formula (11) will have the form:

$$T_{STS} = a_u \sum_{f=1}^F (g \cdot B_f r_u - B_f r_{st}) + a_u \sum_{c=1}^C k \cdot g \cdot B_c r_{ux} \quad (15)$$

We will simplify the equation, opening the brackets and making the transformations, we will obtain the tax capacity of the MF in the part of enterprises that switched to the STS:

$$T_{STS} = a_u [(gr_u - r_{st}) \sum_{f=1}^F B_f + kgr_{ux} \sum_{c=1}^C B_c] \quad (16)$$

Note that for small values of g , the deduction for tax in the amount of $B_f r_{st}$ may exceed the amount of the tax itself. In expression (12) this leads to the appearance of a negative value in parentheses. In this case, you can replace this term with the maximum possible amount of 50% of the STS amount payable to the budget. If each firm will use this deduction to the maximum, then we will have a restriction in the form:

$$r_{st} \leq 0,5gr_u \quad (17)$$

For example, let us substitute the coefficients for one city district (CD) of the Penza region (Zinchuk and Lukiyanova 2010). The coefficients k and g were established expertly. At the same time, we take into account that 100% of the total amount of the tax from enterprises transferred to the STS comes to the MF budget. The coefficient g , which shows the ratio of LCF to the income of the firm, is assumed equal to 10 (in practice from 2 to 20). The coefficient k , showing the share of marginal income in the company's total income, is equal to 0.2 (in practice, from 0.1 to 0.5). Then,

$$\begin{aligned} T_{STS} &= I[(10 \cdot 0,06 - 0,3) \sum_{f=1}^F B_f + 0,2 \cdot 10 \cdot 0,15 \sum_{c=1}^C B_c] \\ &= 0,3 \left(\sum_{f=1}^F B_f + \sum_{c=1}^C B_c \right) \end{aligned} \quad (18)$$

Thus, for this MF, the amount of tax levied in connection with the application of the simplified taxation system is 30% of the total LCF of all small enterprises transferred to the STS. Also in this example, the constraint (13) is fulfilled, at which $0.3=0.3$, i.e. deduction is used by firms as much as possible. To calculate the UTII, we use the approximate calculation method. Formally, the tax does not depend on the LCF, it is proposed to calculate the amount from its revenues to the budget through a coefficient m that is a multiple of the amount of tax revenue from UTII in relation to payments from the STS for the past year. So, in the example considered, the share of STS tax revenues of the budget (Zinchuk and Lukiyanova 2010) of the urban district was 4%, the share of the UTII was 13%. Then $m = 0,13 / 0,04 = 3,25$. UTII fully in the amount of 100% is to be accounted to local budgets, meaning:

$$T_{UTII} = m \cdot T_{STS} \quad (19)$$

For our example and the results obtained above:

$$T_{UTII} = 0,975 \left(\sum_{f=1}^F B_f + \sum_{c=1}^C B_c \right). \quad (20)$$

Similarly, the UTIL is taken into account in the model for the calculation of UAT. Let h be the ratio of payments for a single agricultural tax to receipts from the STS, which in this example will be 4 and 0.3%, respectively. Then $h=0.3 \div 4=0.075$, and the general look of the formula will look like it is presented below.

$$T_{UAT} = hT_{STS} = 0,0255 \left(\sum_{f=1}^F B_f + \sum_{c=1}^C B_c \right) \quad (21)$$

The calculated value turned out to be small, less than 5%, so in this case it can be neglected. However, for municipal areas where the inhabitants are engaged in agriculture, this value can be significant.

Similarly, the tax capacity T_{patent} for enterprises transferred to a tax levied in the form of a *patent* value in connection with the application of a simplified taxation system may be introduced for a particular municipal entity. With a normative allocation to the local budget of 100% and the ratio of the sums coming to the local budget from the STS and from the patent equal to p , we will have:

$$T_{patent} = pT_{STS} = p \left(\sum_{f=1}^F B_f + \sum_{c=1}^C B_c \right) \quad (22)$$

When calculating for specific data, the component of the MF's tax capacity in terms of funds coming from the patent is not considered, because the system was introduced relatively recently, as a result of which there is a lack of information on the size of receipts. When conducting research in practice, calculations with its use on specific, "field" data are possible.

Let us denote the amount of revenues to the local budget from all taxes received from small enterprises in the territory of the MF (with the exception of those on a general taxation system) as the *aggregate tax capacity* T_{Agr} . To calculate the desired value, we represent its value in an analytical form, expressing it as the sum of four addends (12), (14), (15), and (16). Let us reflect the formula in a general form:

$$T_{Agr} = (m + h + p + 1) [a_u (gr_u - r_{st}) \sum_{f=1}^F B_f + a_u kgr_{ux} \sum_{c=1}^C B_c] \quad (23)$$

At the same time, the share of deductions to the local budget for all taxes, except for the STS, is not important, since they are taken into account in the coefficients contained in the first brackets of the formula (6.15). Now, let us calculate the value of the tax capacity for a specific example (the patent system is not considered).

$$T_{Agr} = (3,25 + 0,075 + 1) [0,3 \sum_{f=1}^F B_f + 0,3 \sum_{c=1}^C B_c] = 1,2975 \left(\sum_{f=1}^F B_f + \sum_{c=1}^C B_c \right) \quad (24)$$

Further, let the balance of the labor compensation fund of firms applying the simplified tax system in the "income" and "income minus expenses" mode, which is equal to q , be known. When

$\sum_{f=1}^F B_f = q \sum_{c=1}^C B_c$, we will obtain:

$$T_{Agr} = \sum_{c=1}^C B_c (m + h + p + 1) [a_u q (gr_u - r_{st}) + a_u kgr_{ux}] \quad (25)$$

The expression in square brackets is a constant value over a certain period of time for a given municipality. In this regard, it is advisable to introduce the concept of *tax multiplier* η , which shows how many times the revenues to the local budget will increase from taxes on small businesses from each ruble of increased wages or

$$T_{Agr} = \eta \sum_{c=1}^C B_c \quad (26)$$

For our example, with $q=1$, the value of the tax multiplier $\eta = 1,2975$. Thus, the growth of official "white" labor remuneration by 1000 rubles will lead to an increase in payments to the local budget from small businesses by 1297.5 rubles. So, the formula (18) was analyzed, which is essentially an analytical model of the activity of small enterprises in the territory of a municipal formation. These mathematical models are also used in calculating the budgetary efficiency of the region, in the management and controlling process both in commercial companies and in public authorities, the evaluation of banks on the basis of factor, agent-oriented models for stock markets, as well as in other institutional research of integrating innovative business, power and education structures (Abramov

et al. 2016, Berdnikov 2013, Gretchenko et al. 2017, Kolesnikov et al. 2013, Moiseev and Akhmadeev 2017, Moiseev et al. 2016).

For convenience, we will compile a table of symbols for using the model in LSG practice (Table 6). Note that B – a white salary, reflected by firms in the reporting, the employees are given a different amount in hands. So, the formula (18) was analyzed, which is a reflection of the small business model in the municipality. It includes the following parameters, as shown in the table above.

2.3. Peculiarities of the use of municipalities in strategic management

Let us create a factorial research model. To do this, we determine the factors that influence the result (see the analytical dependencies expressed in the formulas), and then note the dependent variables that can be changed through administrative influences on the system.

For clarity, we will depict a factorial model of the tax capacity. Also, we take into account the tax rates of the UTII, UAT, which dropped out of the tax multiplier model, because for the purposes of strategic management, all factors can be divided into unmanageable and manageable. Among the latter, we distinguish the factors of direct and indirect effects (Figure 1). It is important that unmanageable factors from the point of view of LSG bodies become manageable if you are at the level of a region and a federation. So, according to the Tax Code of the Russian Federation, the subject establishes a tax base for the patent system of taxation, to which individual entrepreneurs have been transferred, as *potentially possible* to receive an annual income depending on the type of activity.

Table 6. Model of tax capacity for small enterprises

Designation	Decipherment	Meaning
r_u	The tax rate for enterprises that switched to the simplified taxation system (STS) with the object of taxation "income"	0.06
F	The number of small enterprises that have transferred to the STS with the object of taxation "income minus expenditures"	-
r_{ux}	The tax rate for enterprises transferred to the STS with the object of taxation "income minus expenditures"	0.15
C	Using "income reduced by the amount of expenses", taxable at the rate	-
I_f	Income of a firm that uses "revenue" as an object of taxation	-
β_i	LCF of a firm with taxation "income"	-
I_{st}	Rate of insurance contributions from the LCF	-
I_c	Incomes of a firm using "income reduced by the amount of expenditure" as a taxable object	-
E_c	Expenses of a firm that uses "income reduced by the amount of expenditure" as the object of taxation	-
a_u	The norm (share) of the transfer of tax to the local budget for firms applying the simplified tax system	1
K	Share of the firm's margin (the difference between income and expenses) in its revenues or $I_c - E_c = k \cdot I_c$	0.2
g	Coefficient reflecting the ratio of income and firm's LCF, the average for MF	10
m	Coefficient equal to the ratio of the amount of tax revenue from UTII to the income from the STS per year	3.25
h	Ratio of the value (share in %) of payments on a single agricultural tax to the amount of income (share in %) from the STS to the local budget	0.075
p	The ratio of the amount coming to the local budget from the simplified tax system to the amount of tax revenue in the form of the value of a patent	-
q	The ratio of the firms' LCF that apply USN in the "income" and "income minus expenditures" regime	1
T_{Agr}	Aggregate tax capacity from small business in the selected MF	-
η	Tax multiplier	1.298

Source: compiled by the author

An imputed income for organizations that have switched to UTII is determined similarly. Thus, according to Figure above this is top-down, tax rates are regulated at the federal level (in the Tax Code), imputed income – at the level of the subject of the Russian Federation, in determining which takes into account the subsistence level and income level in a particular region. At the municipal level – such factors as the income of the firm. This view is important for the formation of a *unified state policy* in the field of SME taxation. At the same time, such factors as the number of SMEs and the firm's income are indirect and depend on the level of demand and economic activity

in a country influenced by economic crises, or rather big and small "waves." From this point of view, these two factors are unmanageable, and their regulation is rather indirect. At the MF level, it is possible to use organizational strategies to create conditions for the development of small businesses, provision of premises, consulting services and so on.

Business expenses, for example, in terms of costs for municipal services, such as utility payments, rent belong to *manageable factors* in this model. The share of the LCF is connected with the desire or, rather, the reluctance of owners to raise wages and continuing to work with the principle of "why pay more, if it works nonetheless". The next factor reflects the ability of local authorities to set the size of the correction coefficients of the base yield on UTII, taking into account the specifics of doing business. The coefficient K_2 is established by regulatory acts of municipal districts, city districts and cities of federal significance for a period of at least a year. Its size is set in the range from 0.005 to 1 according to the Tax Code of the Russian Federation. This is a good tool for implementing the policy of local authorities. There should be a policy in the sphere of SMEs, as well as a program to develop investment attractiveness.

Figure 1. Factor model of the tax capacity of the municipal formation (on the part of taxes from small enterprises)

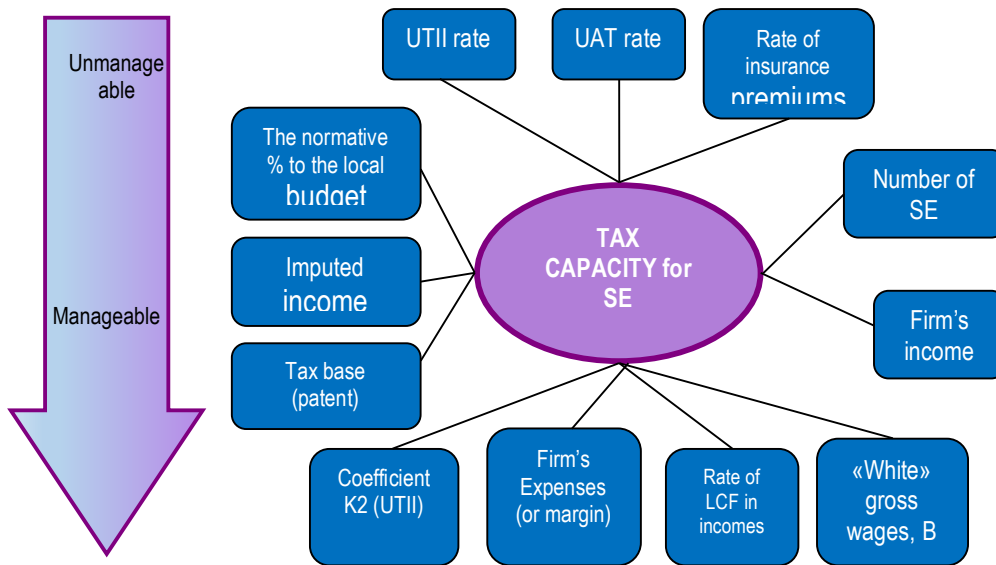
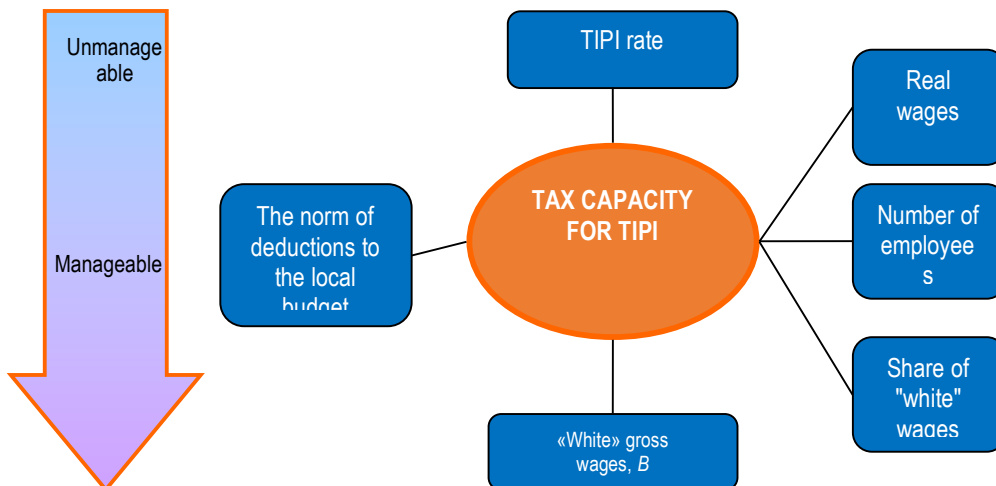


Figure 2. Factor model of the tax capacity of the municipal formation (on the part of TIPI)



The "white" salary indicator B , as described above in the section on the MF's tax capacity in terms of personal income tax, is a three-factor model and depends on the actual wage (real incomes of the population), the number of employees and the share of "white" wages (determined by the scale of the shadow economy) including the number of persons who are not officially registered with the employer. Schematically the model of the tax capacity for personal income tax will be reflected below. This growth is determined by three factors: the share of white wages, the number of jobs and real wages. In our opinion, there is no sharp boundary between manageable

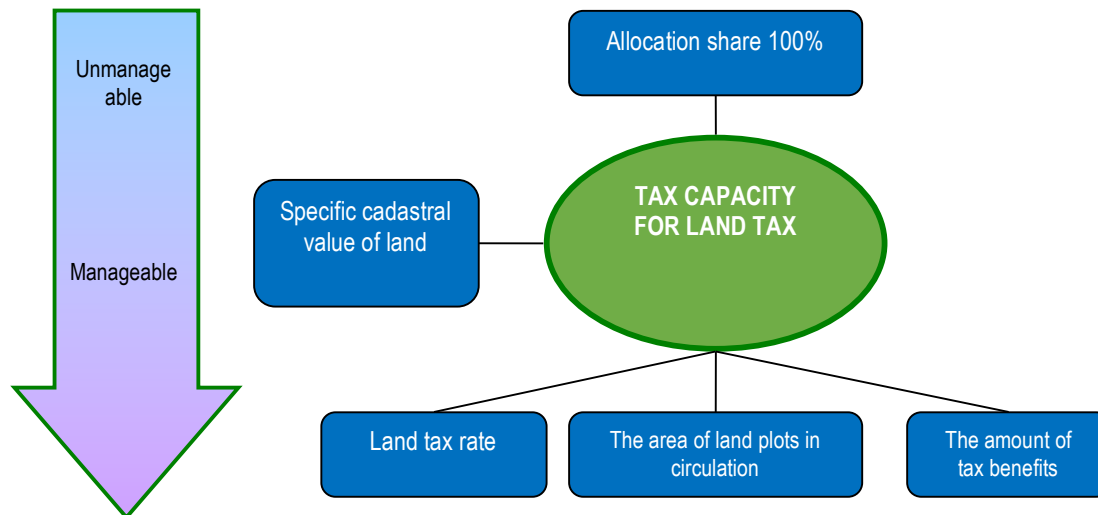
and unmanageable. Everything depends on how to set tasks, how to use the administrative resource, the possibility of involving regional authorities, associations of municipalities (Figure 2).

According to the above mentioned, tax capacity for land tax is determined by the following factors: the area of land plots in circulation, specific cadastral value of land, land tax rate (within the limits established by the legislation), the amount of tax benefits (taking into account the limitations of federal legislation).

Let us imagine a model of the tax capacity (Figure 3).

We gave an analytical and graphical (scheme) type of tax capacity above. We should not generalize the form for all taxes collected on the territory of the municipal formation, in the opinion of the author, because the general formula will be too cumbersome. It is also inductively possible to believe (put a hypothesis) about the emergence of a *synergistic* or multiplicative effect in calculating the total tax capacity of the territory.

Figure 3. Factor model of the tax capacity of the municipal formation (on the part of land tax)



Conclusions

This model has wide practical application. Firstly, it is necessary to create a computer program which can have copyrights registered to. At the same time, it is recommended to use it through MS Excel 07 and above, it works in the MS Office program and in the operating environment of Windows 2000 and higher. Secondly, in the future it is possible to obtain a certificate for the registration of the object – the result of intellectual activity (RIA). An ECM program (registration in Rospatent), as well as a simulator program, a software model, a software analytical system (branch scientific funds) can act as an object of RIA. Thirdly, the results of the research can become a theoretical basis for creating a *methodology for strategic management* for local self-governments. In the future, this will allow us to perform qualitatively scientific research work commissioned by federal and regional ministries, and especially municipal entities.

Factors identified in the course of the study should be reflected in the policy of the municipal formation, based on increasing the tax capacity. At the same time, it is necessary to take into account the different nature of the three main components of TC, for example, the fiscal nature of TIPI and against the incentive nature of land tax. Then the statement of the problem in calculating the tax capacity of the territory may look like: for TIPI and small business taxes - the maximization of the function (through the indicator of the tax multiplier); for land tax – optimization of incentive and fiscal functions. To implement the activities of the strategy, appropriate financial resources are needed. Often in practice, such policy documents remain as unfounded statements of political leaders. It is this problem that is a weak link in the strategic management of the territory. The proposed mechanism, which is the methodology for calculating the tax capacity, allows you to determine the amount of available financial resources.

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Economic Integration in the ASEAN and Its Effect on Empirical Economic Growth

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Abstract:

This paper empirically examines the impact of economic integration on economic growth within the Association of Southeast Asian Nations (ASEAN) from 1995–2015. A composite index was developed to measure the degree of ASEAN economic integration, based on the single market, economic homogeneity, and economic symmetry. According to the results, Singapore, Brunei Darussalam, Malaysia, and Laos have a high degree of economic integration. The Philippines is consistently below the average degree of economic integration in this region as are Thailand, Indonesia, Cambodia, Myanmar, and Vietnam. Our results are consistent with the literature where economic integration has a positive impact on economic growth especially for Indonesia, Malaysia, the Philippines, Singapore, and Thailand. The results also suggest that changes in the degree of ASEAN economic integration make a greater contribution to economic growth than that of ASEAN economic integration degree. Finally, the paper suggests that policymakers take into account the activities of continuous economic integration. Policy formulation should involve the continuation of the ASEAN economic integration agreement and the implementation of agreements must be adopted in accordance with the development level of member countries.

Keywords: ASEAN economic integration; economic integration index; economic growth; panel data.

JEL Classification: F15; F43; O47

Introduction

Economic integration has been growing in international importance (El-Agraa 1988, El-Agraa 1997) and is rapidly expanding in all regions. Economic integration remains the subject of global debate and affects the domestic economy in several ways such as trade creation, trade diversion, free movement of production factors, and economies of scale, all of which contribute to economic growth (Hosny 2013). The ASEAN established in 1967 is representative of developing regional economic integration within the structural changes of the worldwide economy (Shimizu 2010) and developed from a customs union into a common market, namely the ASEAN Economic Community (AEC) in 2015. It has four key characteristics: a single market and production base, a highly competitive economic region, a region of equitable economic development, and a region fully integrated into the global economy (Das 2012). However, there are few studies concerning the impact of ASEAN economic integration which might lead to inappropriate economic policy planning in this region.

This paper aims to elaborate on the degree of economic integration within the ASEAN framework and its impacts on the economic growth of each country. Section 2 provides an overview of economic growth in the ASEAN, section 3 presents an empirical literature review, section 4 outlines the methodology and data, and section 5 discusses the results. The conclusion and recommendations for policy implementation are presented in section 6.

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1. Overview of economic growth in the ASEAN

As a supranational organisation, the ASEAN has been in existence for almost 50 years. It has implemented intra-regional economic integration since 1967, the original founders being Indonesia, Malaysia, the Philippines, Singapore, and Thailand, with membership extended to Brunei Darussalam (1984), Vietnam (1995), Laos (1997), Myanmar (1997), and Cambodia (1997).

The main achievement of the ASEAN has been the maintenance of an uninterrupted period of peace and stability meaning that the individual member countries have been able to concentrate on promoting rapid and sustained economic growth and modernisation. The ASEAN developed from a customs union imposing a common tariff, reforming into a common market in 2015. The dynamism of the ASEAN economies is something many countries would like to imitate. For about 25 years (from 1991 to 2015), the ASEAN's GDP grew at an average annual rate of 5.73% (Table 1) and continued to record strong economic growth of 4.8% in 2016. Now with 10 member states, the ASEAN has a total market of about 635 million people and a combined GDP of more than US\$2.55 trillion in 2016, making it the world's sixth largest economy if it were a nation (ASEAN Secretariat 2017).

Table 1. GDP growth rate in ASEAN, 1991–2015

YEAR	Average GDP growth rate (%)										Average
	BRU	CAM	IND	LAO	MAL	MYA	PHI	SIN	THA	VIE	
1991–1995	3.17	7.77	7.87	6.19	9.47	5.9	2.19	8.65	8.20	8.21	6.76
1996–2000	1.35	7.34	0.99	6.17	4.99	8.53	3.59	5.72	0.86	6.96	4.65
2001–2005	2.08	9.36	4.73	6.24	4.76	12.87	4.60	4.95	5.45	6.90	6.19
2006–2010	0.69	6.75	5.74	8.01	4.56	11.1	4.96	6.88	3.78	6.32	5.88
2011–2015	(0.08)	7.18	5.51	7.88	5.29	7.33	5.91	3.96	2.88	5.91	5.18

Source: World Bank (2017)

2. Literature review

2.1 Measurement of economic integration

The measurement of economic integration for member countries of any bloc (free trade agreement, customs union, common market, etc.) in a comprehensive and adequate way is very difficult. There are several approaches to measuring the degree of economic integration including trade, foreign direct investment (FDI), capital flows, and the flow of people. Prakash and Hart (2000) suggest that Trade and FDI are the two main indicators for measuring economic integration. However, the most commonly used method is to measure the degree of trade openness.

Arribas, Pérez and Tortosa-Ausina, E. (2006) measured economic integration and globalisation by the degree of openness and connectedness. Similarly, Dreher (2006) developed an index for globalisation covering its three main dimensions: economic integration, social integration, and political integration using panel data. Rayp and Standaert (2012) introduced four measurements of actual economic integration: the flow of goods, services, FDI, and other financial flows. While König and Ohr (2013) investigated the degree of economic integration in Europe by developing a composite indicator for measuring the extent of economic integration within the European Union — the EU-Index takes into account 25 indicators grouping them into four key elements: a single market (for goods, services, capital, and labour), homogeneity (level of convergence), symmetry (of business cycle), and conformity (to EU law and institutional participation).

Based on the measurement of economic integration in the ASEAN, there are many single variables, *i.e.* degree of openness, FDI, and dummy variables but relatively little work has been done on developing a composite index for economic integration. Research measuring the degree of economic integration in the ASEAN includes the study by Dennis and Yusof (2003), who developed indicators of ASEAN integration: intra-ASEAN trade, investment and services, especially financial, to measure progress towards the goal of an ASEAN Economic Community (AEC) by 2020.

Chen and Woo (2008, 2010) constructed an index of economic integration to measure the degree of economic integration in the Asia-Pacific (AP), including some countries in Southeast Asia namely, Vietnam, Thailand, the Philippines, Indonesia, Singapore, and Malaysia. This economic integration index combines eight indicators: the absolute deviation of real GDP per capita, the non-agriculture sectoral share to GDP, the urban resident ratio, life expectancy, the education expense shares to GNI, the AP regional imports and exports share to GDP, the intra-AP FDI interflow share to gross capital formation, and the intra-AP tourist inflow. Nevertheless, Kahouli and Kadhraoui (2012) used the degree of trade openness, FDI, R&D, and dummy variables to measure the level of economic integration in the case of Japan, Singapore, Thailand, the Philippines, Indonesia and Korea.

2.2. Effect of economic integration on economic growth

The growth effect of economic integration is a matter for researchers and can be divided into two groups: temporary growth and permanent growth. Rivera-Batiz and Romer (1991) found that economic integration can contribute to permanent economic growth and closer integration can be achieved by increasing trade in goods or the flow of ideas, and increase the economic growth rate in the long term if it encourages worldwide exploitation of increasing returns to scale in the research and development (R&D) sector. However, Badinger (2005) found that economic growth resulting from economic integration was temporary. Moreover, Rafi and Lewis (2012) found that economic integration does not lead to meaningful positive spill-over effects on aggregate economic growth.

Bretschger and Steger (2004) suggest that economic integration affects economic growth mainly through two channels: the scale-effect and factor-reallocation. The scale-effect increases the long-run growth rate while factor-reallocation is ambiguous. Similarly, Henrekson, Torstensson J., and Torstensson, R. (1997) found that economic integration may affect resource allocation and the long-run growth rate in European integration.

However, the growth effect of economic integration may depend on the level of economic development. Economidou, Lei, and Netz (2006) found that economic integration can contribute to economic growth in developing countries and income diversion amongst member countries contributes positively and significantly to growth. Economic integration improves a country's economic growth in the following ways:

- by increasing production efficiency and competition due to specialisation;
- by enlarging its potential market and thus increasing the rate of return on R&D;
- by boosting the volume of trade and investment thereby diffusing technology between countries.

On the other hand, Dreher (2006) found that economic integration can promote growth only in developed countries. Dion (2004) found that economic integration can promote productivity depending on its own R&D efforts as well as those of its trading partners. These R&D spillovers can then spread across countries and sectors. Technology transfer by bilateral trade and investment through regional trade integration has a positive impact on long-term growth. Furthermore, Behrens *et al.* (2007) suggest that a decrease in trade and/or transportation costs has a direct impact on prices and wages, accounting for the impact on the economic geography and welfare of each country, depending on the degree of economic integration.

Interestingly, the results indicate that there is no significant empirical support for positive growth from ASEAN economic integration as yet, and not many researchers have investigated the effect of economic integration in this region. For example, Sharma and Chua (2000) used a gravity model to estimate the effect of intra-regional trade in Indonesia, Malaysia, the Philippines, Singapore, and Thailand, finding that trade in ASEAN countries increased with the size of the economy, the ASEAN economic integration did not increase intra-ASEAN, but an increase in trade occurred from members of the APEC group.

In contrast, Kien (2009) also used a gravity model and panel data to investigate the effect of the ASEAN Free Trade Area (AFTA). The results show that export flow increased proportionately with GDP, and the formation of AFTA has created significant trade amongst its members. In addition, Oncel and Lubis (2017) found that only FDI has a positive effect on output per capita in the ASEAN-5 countries of Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Trade and the dummy variable of free trade had no significant effect on output per capita before applying the zero tariff policy.

3. Methodology and data

3.1. The empirical model

To provide a simple model framework, a simple Cobb-Douglas production function was applied with constant returns to scale ($Y = AK^\alpha L^{1-\alpha}$, with technology (A), output (Y), capital (K), and labour (L)), which can be written in an intensive form as:

$$\Delta \ln y_t = \Delta \ln A_t + \alpha \Delta \ln k_t \quad (1)$$

where: y is an output per worker (Y/L); A is total factor productivity (technological progress); k is capital per worker; α denotes the elasticity of output with respect to capital.

Economic integration could generate growth via two main channels: technology (A) and physical capital (K) (Baldwin and Seghezza 1996, cited in Badinger 2005, 2008). Denoting the level of economic integration at time t with EI_t , one may distinguish the permanent technology-led growth effects of economic integration:

$$\Delta \ln A_t = \delta_{1A} + \varphi_{1A} EI_t \quad (2)$$

And the temporary investment-led growth effects of economic integration:

$$\Delta \ln k_t = \delta_{2K} + \varphi_{2K} \Delta EI_t \quad (3)$$

where: δ_{1A} is an exogenous component of technological progress and δ_{2K} refers to capital deepening, whereas the parameters φ_{1A} and φ_{2K} measure the effect of economic integration (EI) on technology and capital, respectively.

Inserting equation (2) and (3) into equation (1) yields the combined permanent technology-led growth and the temporary investment-led growth hypothesis as shown in the following equation (4).

$$\Delta \ln y_t = \delta_{1A} + \alpha \delta_{2K} + \varphi_{1A} EI_t + \alpha \varphi_{2K} \Delta EI_t + \varepsilon_t \quad (4)$$

$$\Delta \ln y_t = \text{intercept} + \varphi_{1A} EI_t + \alpha \varphi_{2K} \Delta EI_t + \varepsilon_t \quad (5)$$

where: y denotes income per capita; EI denotes the degree of economic integration; ΔEI denotes changes in the degree of economic integration.

Additionally, a proper measurement of economic integration is necessary for the estimation of its effect. Previous studies mainly use an economic integration index to identify the degree of economic integration.

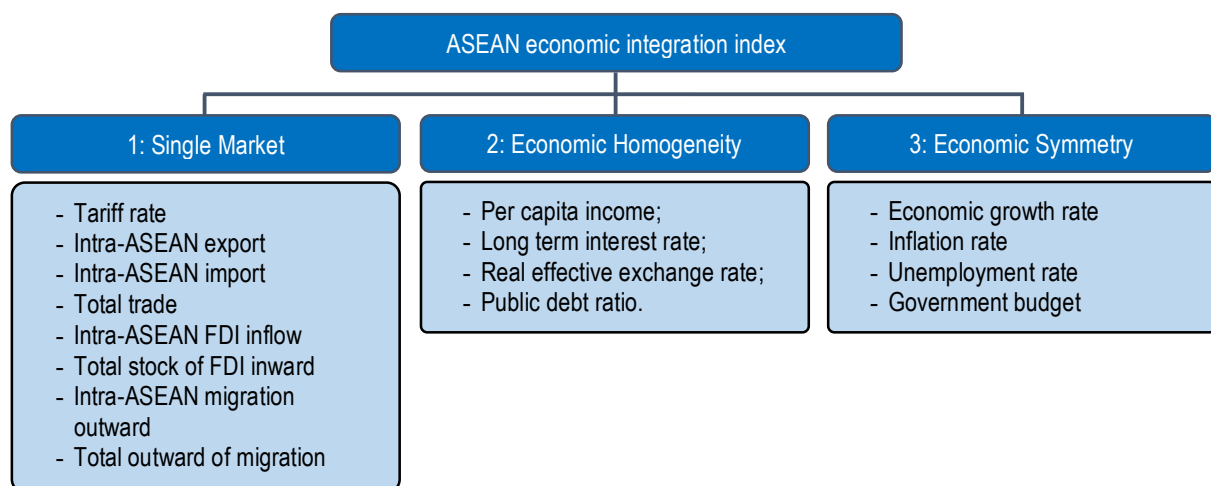
3.2 Measuring the degree of ASEAN Economic Integration

Before estimating the effects of economic integration, the measurement of integration itself must be obtained. Many studies simply used dummy variables or an openness index as a proxy for economic integration. However, these variables might be rather poor proxies for the complex process of economic integration in the ASEAN. A composite index is an alternative for determining the degree of economic integration, combining several indicators into one single measure to make it easier to interpret. This index also uses the necessary indicator for economic integration which has not been addressed in previous research.

The ASEAN economic integration index (AEII) is used to measure the degree of ASEAN economic integration. The AEII was adapted from König and Ohr (2013) and Chen and Woo (2010), comprising three dimensions:

- a single market (for goods, services, capital, and labour);
- economic homogeneity;
- economic symmetry (of the business cycle), using composite indexes constructed from 16 indicators, categorised into three dimensions.

Figure 1. Selected Indicators to measure the degree of ASEAN economic integration



Source: authors' conclusions.

Indicators for each dimension are presented in Figure 1. A single market and production base seeks to guarantee the free movement of goods, services, capital, and labour, and can be treated as a direct measurement of economic integration. Whereas the indicators for measuring economic homogeneity and the symmetry of business cycles reflect the indirect effects of economic integration (König and Ohr 2012).

The following procedure was used to develop this composite index:

- structural analysis of ASEAN economic integration;
- identification of sufficient indicators of economic integration;
- data normalisation;
- application of factor loading value to assign proper weights to the individual indicators;
- combining 16 indicators into a composite AEII index.

Missing data was approximated using linear interpolation techniques. Since the selected indicators have different measurement units, the data needs to be normalised. The max-min normalisation procedure converted the data into a scale ranging from 0 to 1, where 1 denotes the maximum level of each indicator per country in the year ($I_{i,t}$). In addition, the weights of the composite indexes were obtained from factor analysis.

3.3 Data

This study uses panel data from ASEAN countries, namely Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam from 1995 to 2015. The period is spread out from 1995 to 2015 depending on the availability of data. The data for dependent variables, percentage change in GDP per capita (as a measurement of economic growth), and the variables for constructing the AEII (or explanatory variables), level of ASEAN economic integration and changes in economic integration were obtained from various sources, including the World Development Indicators from the World Bank, Asian Development Bank (ADB), International Monetary Fund (IMF), United Nations (UN), ASEAN Secretariat and International Labour Organization (ILO).

4. Empirical results

4.1 Findings in relation to the degree of ASEAN economic integration

According to the literature review, a single indicator is used as the composite index (two or more sub-indicators) in most situations. Therefore, construction of the AEII was attempted using the principal component based on factor analysis. Factor analysis using the covariance matrix option was carried out on the transformed indicators in order to identify the underlying sub-indicators (factors) of the composite index. The indicators were scaled by max-min normalisation.

First, the results of factor analysis show that the Kaiser-Meyer-Olkin's measure of sampling adequacy (KMO: 0.58), and total explained variation (67.82) also support the overall suitability of the dataset. Factor analysis was performed on original indicators using the Varimax with Kaiser Normalisation rotation method option to identify the weight of the indicator. Then factor loading for each indicator was carried out to calculate the weight, and the scaled indicators were combined by the corresponding weight. The weights of 16 indicators are given in Table 2, consisting of three dimensions to construct the AEII. Based on the results, the single market was assigned the highest weight (0.49), followed by economic homogeneity (0.28), and economic symmetry (0.23), respectively.

Table 2. Factor analysis of weights of indicators and sub-indicators for measurement of the ASEAN economic integration index

Indicator	Rotated Factor Loading ^a	Weight (%)
1. Single Market Index	5.436	49.16
Tariff rate	-0.768	6.95
Intra-ASEAN export	0.725	6.56
Intra-ASEAN import	0.933	8.44
Total trade	0.586	5.30
Intra-ASEAN FDI inflow	-0.403	3.64
Total stock of FDI inward	0.637	5.76
Intra-ASEAN migration outward	0.537	4.86
Total outward migration	0.847	7.66
2. Economic Homogeneity Index	3.109	28.12
Per capita income	0.865	7.82
Long-term interest rate	-0.644	5.82
REER	0.797	7.21
Public debt ratio	0.803	7.26
3. Economic Symmetry Index	2.512	22.72
Economic growth rate	0.535	4.84
Inflation rate	-0.682	6.17

Indicator	Rotated Factor Loading ^a	Weight (%)
Unemployment rate	-0.596	5.39
Government budget	0.699	6.32
ASEAN Economic Integration Index	11.057	100.00
Kaiser-Meyer-Olkin	0.58	
Total variance explained (%)	67.82	

Note: ^a Rotation method: Varimax with Kaiser Normalisation

Using the weights, the AEII for each country can be computed in the sample from 1995–2015 as the base year of 2010 (Table 2). Due to data limitations, the AEII for Brunei Darussalam starts from 1997; Myanmar and Vietnam from 2000; and Laos and Cambodia from 2001. Movement in the AEII for ASEAN members is shown in Figure 2 indicating an upward trend (albeit with modest volatility). The fluctuations in the index are relatively slight. Indonesia, Laos, and Thailand are the most volatile countries. Indonesia’s economic integration degree fluctuates throughout the period but seems to have picked up since 2002.

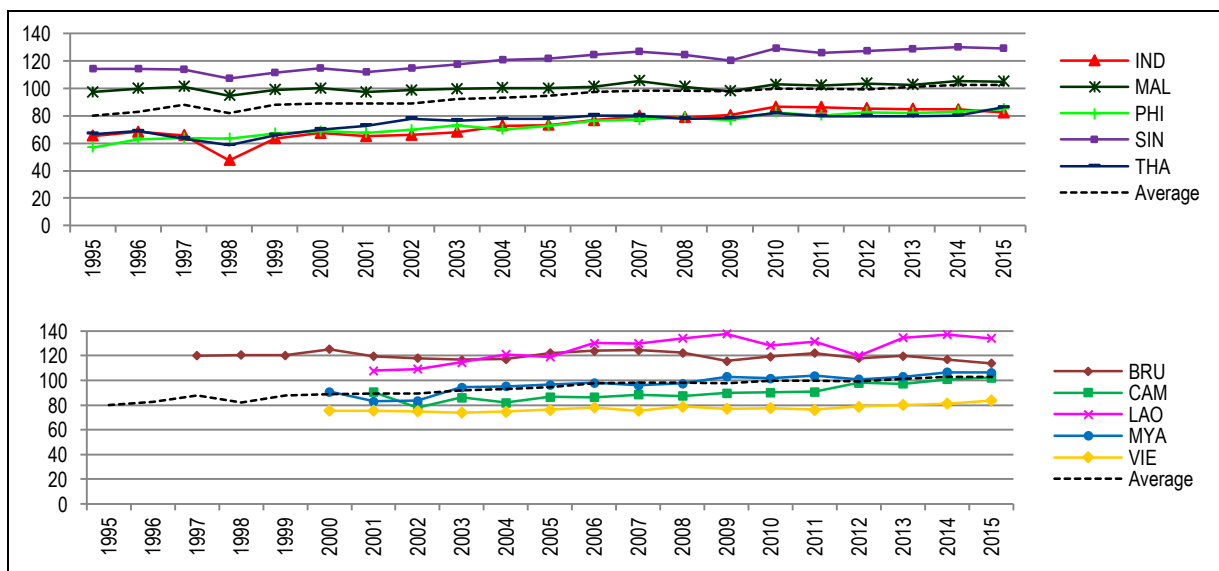
According to the AEII presented in Table 3 and Figure 2, Singapore has a significantly high degree of economic integration amongst the original founder countries throughout the period from 1995 to 2015.

Table 3. The developed ASEAN economic integration Index, 1995–2015

YEAR	1995		2005		2015		2001–2015		2001–2015	
	AEII	Ranking	AEII	Ranking	AEII	Ranking	Average AEII	Ranking	AEII improvement	Ranking
BRU	Na	na	122.19	1	113.86	3	119.41	3	-5.70	10
CAM	Na	na	86.72	6	102.27	6	90.38	6	11.59	7
IND	65.42	4	73.18	9	82.28	10	78.09	8	17.27	4
LAO	na	na	119.00	3	134.06	1	126.00	1	26.17	1
MAL	97.42	2	100.06	4	105.09	5	101.60	4	7.66	9
MYA	na	na	96.56	5	106.40	4	97.98	5	23.34	2
PHI	56.99	5	72.68	10	85.02	8	77.25	10	17.44	3
SIN	114.47	1	121.56	2	128.99	2	123.57	2	17.01	5
THA	66.86	3	78.07	7	86.22	7	79.15	7	13.38	6
VIE	na	na	76.40	8	83.85	9	77.53	9	8.33	8

Source: Authors’ calculations.

Figure 2. ASEAN Economic Integration Index, 1995–2015

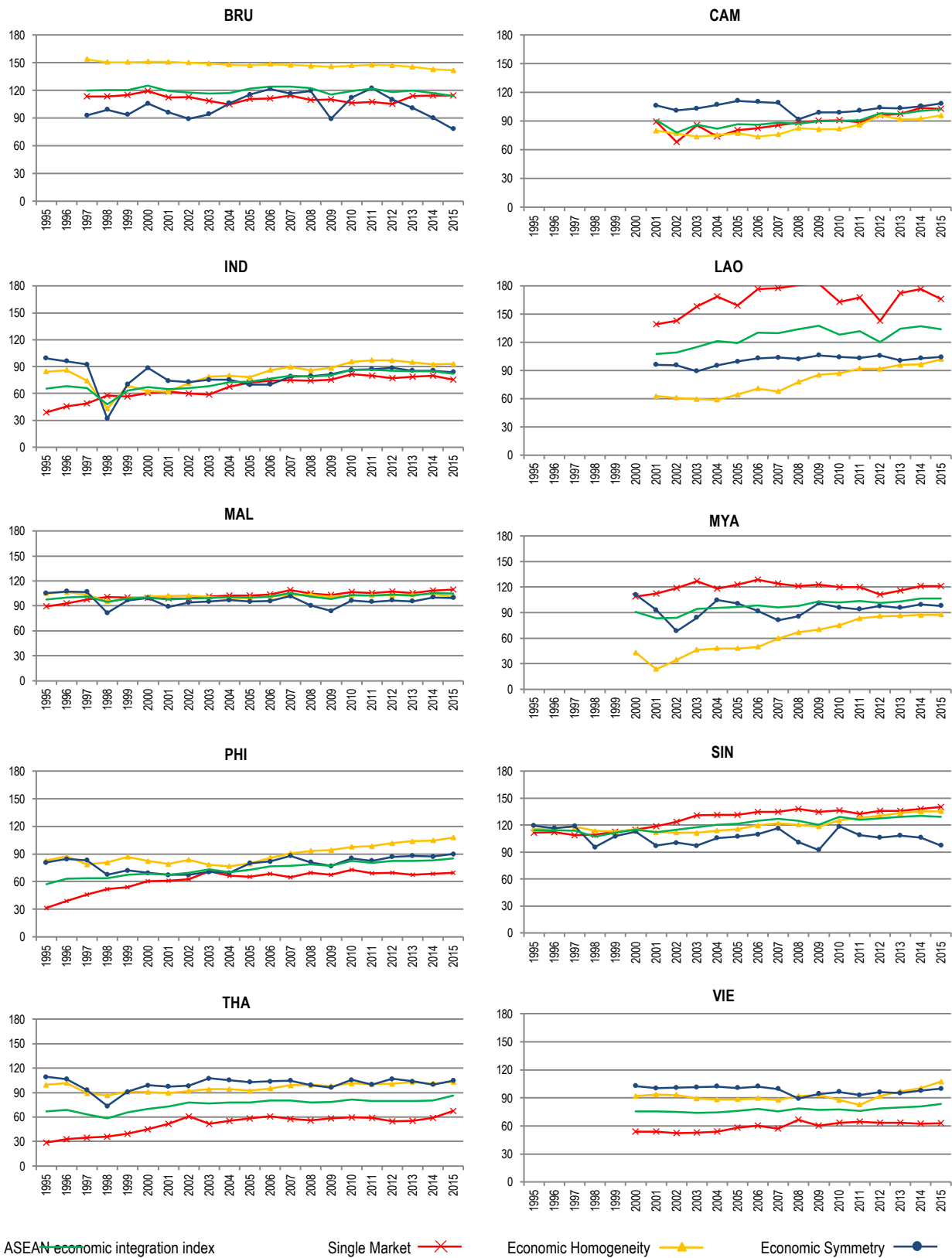


Source: Authors’ calculations.

Figure 3 reports the detailed sub-dimension of AEII for a single market, economic homogeneity, and economic symmetry. Laos, Singapore, and Myanmar show an intense degree of integration in the single market context due to the consequent free movement of goods, services, capital, and labour as a direct effect of economic integration. The average single market degree of integration intensity for those countries is 164.97, 126.87, and 119.54, respectively, while Singapore and Brunei Darussalam both have a high degree of economic homogeneity

and economic symmetry of business cycles, reflecting the indirect effects of economic integration. However, the main reasons for such variation in these countries and changes in the degree of ASEAN economic integration need further in-depth investigation.

Figure 3. ASEAN Economic Integration Index and sub indicator, 1995-2015



ASEAN economic integration index
 Source: Authors' calculations

Single Market

Economic Homogeneity

Economic Symmetry

Whereas Laos shows the highest degree of economic integration in BCLMV which later became a member. The Philippines is consistently below the average degree of economic integration for this region as a whole in similarity to Thailand, Indonesia, Cambodia, Myanmar, and Vietnam. On the other hand, the 10 ASEAN member countries can be divided into three groups consisting of a high degree of economic integration for Singapore, Brunei Darussalam, and Laos; a medium degree for Malaysia, Cambodia, and Myanmar; and a low degree for Indonesia, the Philippines, Thailand, and Vietnam.

Based on the data from 2015, Laos has the highest degree of ASEAN economic integration (134.06) due to its expansion in trade and foreign investment. Two countries with relatively high levels of economic integration are Singapore (128.99) and Brunei Darussalam (113.86). The lowest degree of economic integration is indicated by Indonesia (82.28). In terms of improvement in ASEAN economic integration, Laos shows the greatest, followed by Myanmar, the Philippines, Indonesia, and Singapore, respectively.

Interestingly, many ASEAN countries including the Philippines, Singapore, Thailand, Cambodia, Laos, Myanmar, and Vietnam have a high degree of economic integration in the period 2014–2015, coinciding with them becoming single common market ASEAN countries or joining the ASEAN Economic Community (AEC).

4.2 Effect of ASEAN economic integration on economic growth

The descriptive statistics for the main variables prior to empirical analysis are presented in Table 4. The table shows the mean and standard deviations, as well as the maximum and minimum levels of the variables and number of observations. The Hausman test is a common approach in choosing fixed effect or random effect models (Green 2008). The null hypothesis of the test indicates that there is no correlation between individual effects and explanatory variables. A fixed effect model is appropriate for estimating the 1-4 while the random effect model is the better choice for estimating the growth effect of economic integration in the case of CLMV (Table 5).

Table 5 presents an estimation of the growth effect of ASEAN economic integration based on panel data from 1995 to 2015. The empirical analysis shows a positive effect for the key variables of economic integration on economic growth in ASEAN member countries. The estimated coefficient for the degree of AEII and change in the degree of ASEAN economic integration (CAEII) are at the positive and significant level of 1% for all countries. In similarity to the studies by Economidou, Lei, and Netz (2006) economic integration was found to impact on economic growth in 17 developing countries, while Rivera-Batiz and Romer (1991), Bretschger and Steger (2004), Badinger (2005), and Kahouli and Kadhraoui (2012) found a positive impact from EU economic integration on economic growth.

For the five original founders (Case 3) and the five original founders plus Brunei Darussalam (Case 2), the coefficients are strongly positive for both AEII and CAEII at a significance level of 1%. Moreover, the coefficients in both cases are very similar. It can therefore be concluded that economic integration increases economic growth in Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Brunei Darussalam. In other words, the growth effect depends on the degree of economic integration and level of economic development in each country. However, ASEAN economic integration has no significant impact on economic growth for CLMV and CLMV plus Brunei Darussalam. In addition, changes in the degree of ASEAN economic integration have a greater impact than its related level, measured by the size of the coefficient of each variable (Table 5).

In January 2007, ASEAN countries agreed to accelerate the establishment of an ASEAN Economic Community (AEC) by 2015, and for this reason, this study uses an identical empirical model and techniques for analysis, divided into two periods: 1995–2006 and 2007–2015, respectively. Comparison of the results in Table 5 shows that AEII and CAEII have a positive effect on economic growth for all ASEAN countries and cases 2 and 3, for the period of 1995–2006 (Table 6). In the period from 2007–2015, the results indicate that only CEII has a positive effect on economic growth in case 1-3. Nevertheless, ASEAN economic integration continues to create a significant impact on economic growth in the cases of 4 and 5. Consistent with the ASEAN Secretariat (2015) who suggest that ASEAN should be provided with a new master plan for economic integration according to AEC Blueprint 2025, pushing forward the region's trajectory, strengthening institutional commitment and following through with implementation and the continual enhancement of monitoring and evaluation. These are the key drivers for both regional and international growth. Moreover, policymakers should take into account the real difficulties involved in linking economic integration to political will amongst a group of countries at various stages of economic development (Witkowska 2016).

Table 4. Summary of descriptive statistics

Variables	Mean	Maximum	Minimum	Std. Dev.	Obs.
Growth rate of GDP per capita (GGDP)					
10 Countries	0.0371	0.1241	-0.1549	0.0385	200
6 Countries ¹	0.0214	0.1241	-0.1549	0.0380	120
5 Countries ²	0.0274	0.1241	-0.1549	0.0378	100
BCLMV	0.0468	0.1202	-0.0387	0.0368	100
CLMV	0.0606	0.1202	-0.0141	0.0250	80
Degree of ASEAN economic integration (AEII)					
10 Countries	94.8437	137.8026	47.6803	21.0200	186
6 Countries ¹	93.5156	130.0759	47.6803	21.8647	124
5 Countries ²	88.7440	130.0759	47.6803	20.3404	105
BCLMV	102.7509	137.8026	74.0529	19.2812	81
CLMV	97.5000	137.8026	74.0529	19.1123	62
Change in degree of ASEAN economic integration (CAEII)					
10 Countries	0.8048	15.7187	-18.2293	4.0715	176
6 Countries	0.6796	15.7187	-18.2293	3.7284	118
5 Countries	0.8645	15.7187	-18.2293	3.7661	100
BCLMV	0.7263	14.5366	-12.5775	4.4662	76
CLMV	1.0596	14.5366	-12.5775	4.7183	58

Note: ¹ refers to Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand; ² refers to Indonesia, Malaysia, the Philippines, Singapore, and Thailand

Table 5. Results of the estimated fixed and random effects of the growth of economic integration in ASEAN from 1995–2015

Dependent variable: Growth rate of GDP per capita					
Independent variables	Case 1: 10 Countries	Case 2: 6 Countries	Case 3: 5 Countries	Case 4: BCLMV	Case 5: CLMV
	Fixed effect	Fixed effect	Fixed effect	Fixed effect	Random effect
Constant	-0.0715 (-2.2571)	-0.1649 (-4.6407)	-0.1559 (-4.5580)	0.1449 (1.9627)	0.1847 (2.4823)
AEII	0.0011*** (3.3121)	0.0020*** (5.1613)	0.0020*** (5.2097)	-0.0009 (-1.3253)	-0.0012 (-1.6282)
CAEII	0.0029*** (5.3228)	0.0050*** (7.2729)	0.0055*** (7.6165)	0.0007 (1.5282)	0.0007 (1.5087)
AR(1) test				0.5188*** (4.9010)	
Hausman Test	0.0211	0.0000	0.0000	0.0629	0.3317
R-squared	0.5326	0.5524	0.5492	0.8284	0.4706
Adjusted R-squared	0.5013	0.5239	0.5201	0.8093	0.4197
Obs.	176	118	100	71	54

Notes: t-statistics are reported in parentheses. ***, **, * indicates significance at 0.01, 0.05, and 0.10.

Table 6. Results of the estimated fixed and random effects of the growth of economic integration in ASEAN from 1995–2006 and 2007–2015

Dependent variable: Growth rate of GDP per capita										
Independent variables	Case 1: 10 Countries		Case 2: 6 Countries		Case 3: 5 Countries		Case 4: BCLMV		Case 5: CLMV	
	1995-2006	2007-2015	1995-2006	2007-2015	1995-2006	2007-2015	1995-2006	2007-2015	1995-2006	2007-2015
	Fixed effect	Fixed effect	Fixed effect	Random effect	Fixed effect	Random effect	Random effect	Fixed effect	Random effect	Random effect
Constant	-0.2912 (-4.7823)	-0.0587 (-0.6178)	-0.3660 (-5.3190)	0.0653 (2.4040)	-0.3461 (-5.3383)	0.0438 (2.1288)	0.0097 (0.1620)	0.0188 (0.2165)	-0.0097 (-0.1802)	0.0216 (0.2758)
AEII	0.0036*** (5.2777)	0.0009 (0.9743)	0.0043*** (5.5403)	-0.0005 (-1.6706)	0.0043*** (5.6016)	-0.0002 (-0.8546)	0.0005 (0.8567)	0.0002 (0.2493)	0.0009 (1.6563)	0.0003 (0.4295)
CAEII	0.0023*** (2.9754)	0.0020** (2.2485)	0.0034*** (3.6540)	0.0064*** (5.7884)	0.0039*** (4.1916)	0.0067*** (5.2365)	0.0007 (1.0923)	0.0005 (0.6174)	0.0008 (1.4443)	-0.0001 (-0.0968)

Hausman Test	0.0001	0.0023	0.0000	0.1094	0.0000	0.1996	0.1072	0.0212	0.5180	0.9986
R-squared	0.6983	0.5827	0.6281	0.4305	0.6748	0.4227	0.1257	0.8023	0.3959	0.4282
Adjusted R-squared	0.6535	0.5152	0.5816	0.4051	0.6342	0.3915	0.0633	0.7664	0.3323	0.3183
Obs.	86	80	64	48	55	40	31	40	22	32

Notes: t-statistics are reported in parentheses. ***, **, * indicates significance at 0.01, 0.05, and 0.10.

5. Discussion and conclusion

Empirically, the aim of this study was to measure the degree of ASEAN economic integration and investigate its impact on economic growth using panel data from 10 ASEAN member countries during the period from 1995–2015. Firstly, a composite index was developed to measure the degree of ASEAN economic integration, which combines the main indicators of a single market, economic homogeneity, and economic symmetry. Secondly, panel analysis was used to investigate the growth effect of ASEAN economic integration.

The empirical results suggest that the degree of economic integration has increased amongst ASEAN members. According to the results, Singapore, Brunei Darussalam, Malaysia, and Laos have a significantly high degree of economic integration, while the Philippines is consistently below average in economic integration for this region in similarity to Thailand, Indonesia, Cambodia, Myanmar, and Vietnam. Regarding the growth effect, ASEAN economic integration was found to make a significant contribution towards economic growth, especially in Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

The results also suggest that changes in the degree of ASEAN economic integration make a greater contribution to economic growth than that of ASEAN economic integration degree. Based on these results, policymakers should not only focus on the degree of ASEAN economic integration but also take into account the activities of continuous economic integration. Policy formulation should concern the planning implications of the continuation of the ASEAN economic integration agreement, otherwise economic integration may not support the expected economic growth. In addition, the agreements should be implemented in accordance with the development level of member countries.

However, this study applies the data at aggregate level. Further related research should involve in-depth investigation using data at micro level. The specific effect of any agreement on a particular sector should also be analysed to truly visualise the impacts of ASEAN economic integration.

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APPENDIX 1

Description and sources of indicators for measuring the ASEAN Economic Integration Index (AEII)

Indicator	Description	Source
1. Tariff rate	Average tariff rate of all products	World Bank
2. Intra-ASEAN export	Intra-ASEAN export of goods and services as a percentage of the total	ASEAN stats
3. Intra-ASEAN import	Intra-ASEAN import of goods and services as a percentage of the total	ASEAN stats
4. Total trade	Total trade as a percentage of GDP	ASEAN stats
5. Intra-ASEAN FDI inflow	Intra-ASEAN inflow of foreign direct investments as a percentage of the total	United Nations Conference on Trade and Development
6. Total stock of FDI inward	Total stocks inward of foreign direct investments as a percentage of GDP	United Nations Conference on Trade and Development
7. Intra-ASEAN migration outward	Number of ASEAN employees as a % of the total number of foreign employees	International Labour Organization
8. Total outward migration	Number of ASEAN employees as a % of the total (foreign and national)	International Labour Organization
9. Per capita income	GNI per capita at constant 2010	World Bank
10. Long-term interest rate	Minimum lending rate	ASEAN stats
11. REER	Real effective exchange rate	World Bank
12. Public debt ratio	Gross government debt as a % of GDP	ASEAN stats
13. Economic growth rate	Percentage change of real GDP compared to the previous period	World Bank
14. Inflation rate	Percentage change of consumer prices index compared to the previous period	World Bank
15. Unemployment rate	Percentage change in number of unemployment persons compared to the previous period	World Bank
16. Government budget	Government budget as a percentage of GDP	ASEAN stats

The Effect of Foreign Debts on Economic Growth in Iran

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Abstract:

During the past half-century there have been important political and economic changes like revolution, war, and sanction in Iran; and it have led to serious structural changes. Like most oil countries the government budget also along with changes of oil price, has gone under changes; and in some cases it has resulted in foreign currency borrowing. In this article the effect of foreign debts on economic growth of Iran have been examined in a boom and bust regimes, and it's been determined that during bust the effect of foreign debts on growth have been positive and non- linear; whereas, during boom this effect have been negative.

Keywords: economic growth; external debt, Markov-switching vector auto-regression.

JEL Classification: H26; H21; C22

Introduction

The most important objective of any economy is to achieve stable and sustainable economic growth. To achieve this goal, the participation of public and private sector is of necessity. In developing countries, the public sector plays a more prominent role in economic domains than the private sector. The most important revenue source for government is tax, which this revenue in developing countries (e.g. Iran) is not too sufficient to compensate government expenditure. Accordingly, non-tax revenues such as the revenue obtained from oil sale are considered as a source of government revenue. However, due to limited volume of export and a price that is not controlled by the government, oil revenue is not too much reliable. Due to instability of oil revenues, budget deficit generally occurs in developing countries. One of the major sources to compensate budget deficit is foreign borrowing. If budget deficit is met by this method, current account deficit or consequently external debt crisis may be ensued. However, the usage of external debt in efficient use of foreign resources is important. This efficiency can be achieved in case of accomplishing two objectives: allocative efficiency and efficiency in accomplishing the goal, *i.e.* the extent to which the country is able to repay debts and to achieve its main objectives that are rapid and sustainable growth (Molaei and Golkhandan 2014, 83 - 84).

In general, there are three approaches for the use of external resources. The first approach includes the theories that accord great importance to external resources for economic development. According to the experts that have proposed such view, developing countries are well known as poor economies in terms of investment, low savings and low investment. While average gross investment in developed countries is 15% to 20% of GDP, the gross investment rate in developing countries is 5% to 6%. In fact, developing countries, due to low savings, cannot afford the financing costs relating to depreciation and replacement of capital goods. In addition to the above, because of scientific weakness in developing countries, there is little chance to take advantage of the resources available as well. As a result, in such countries, external resources play essential parts to achieve the ideal economic growth.

The second view encompasses the theories that believe foreign aids are not an integral part of growth and development. Professor Bauer writes: "In the developing countries, foreign aid is not necessary or sufficient factor to escape poverty, but if the necessary conditions are provided for development, and economic and social overhead projects are undertaken, economic growth and development without aid external would be possible. If these conditions are not met, despite utilizing the foreign aid, economic development would be impossible and external resources wasted.

The third group consists of those theories that do not consider foreign aid as a sufficient condition for economic growth, but believe that with proper management of external debt, the possibility of economic growth and development can be fostered. This management includes the allocation of loans receivable to the production of export goods, stop wasting donations, *etc.* (Gharabaghi 1993).

According to the International Monetary Fund (IMF), foreign borrowing received by developed countries is unsustainable, and according to the results obtained from a research conducted in this area, foreign borrowing can negatively impact the function of the developed and developing countries in medium and long term. The interest in identifying and finding a solution to this problem has been increased particularly among government officials and researchers. A multitude of research is based on linear methods, and the results obtained from such research show the negative relationship between economic growth and foreign debt. However, unlike most research, the estimation presented in the current research is nonlinear and built upon regime change. In this regard, the current research seeks to examine non-linear relationship between economic growth and government external debt during the period 1979-2013.

1. Literature review

1.1. Theoretical foundations

The empirical studies can divide into two categories. The first category includes the studies that their results suggest a positive relationship between external debt and economic growth. Theoretical discussions related to the impact of foreign aid on economic growth indicate that foreign financial flows can eradicate restrictions imposed on saving, currency, or budget deficit and lead to economic growth. The theoretical and empirical studies such as the research performed by Hassan and Bakar (2008), Emotlo *et al.* (2011), Cicek *et al.* (2010) and Cohen (1991) suggests that there is a positive relationship between low levels of debt and economic growth.

Using three-stage least squares (SLS3), Chaudhry (1994) performed a consistent and efficient parameter estimation in ten Asian and the Pacific countries during the time period from 1970 to 1988. The structural model results show that all the direct and indirect effects of foreign debt from the public and private sectors on GDP are positive. In addition, Enache (2009) in a study using ordinary least squares (OLS) examined the effects of fiscal policy and economic growth in Romania. The results indicate that fiscal policies have positive and significant effect on Romania's economic growth.

Aryamen and Lowe (2009) presented panel data obtained from six Pacific Ocean countries for performing empirical analysis during the time period from 1988 to 2004. The results show that external debt coefficients are positive and significant but the budget deficit is significantly negative. Patilo *et al.* (2002) presented an analysis of 93 developing countries in sub-Saharan Africa, Latin America, and Middle East during the time period from 1969 to 1998. This empirical study shows that appropriate debt levels have a positive impact on growth, but high debt can deter growth.

Empirical studies have always approved the relevant relationship. For this reason, many researchers seek to understand the causes of influence or non-influence of external debt on economic growth and impact of foreign debt on investment and saving, and if with increasing external debt, saving is not reduced, external debt has a positive impact on economic growth. The second group includes studies that underline a negative relationship between external debt and economic growth. The research performed by Thornley and Velasco (1992), Sachs (1989) Komar and Wu (2010) shows that foreign debt at a high debt level has a negative impact on economic activity.

In addition, the research performed by Clements and Krolzig (2003) strongly confirms the hypothesis of debt burden on empirical estimations. The authors allege that the large amount of foreign debt beyond a certain threshold can reduce the rate of growth of per capita income. Depending on the variables used in the estimation method, they obtained the threshold amount to be 30-37% of GDP and 115-120% of exports. All the important results obtained from the estimation are concerned with the impact of debt on growth in HIPC's (poor countries with high external debt). The results obtained from the recent research in developing countries indicate that there is a very strong relationship between foreign debt and growth rate. High debt rates will reduce economic growth in low income countries.

Ramon (2005) used data from seven periods, each of which consists of the five years during 1970-2002 (*i.e.* 1974-1970: 1975-1979) for 20 countries in Latin America and the Caribbean. The relationship between foreign debt and economic growth for Latin America and the Caribbean is significantly negative. Foreign debts include foreign debt from private sector and foreign debt from the public sector. There is a negative relationship between foreign debt and economic growth. In other words, while there is an insignificant relationship between economic growth and foreign debts of public sector, the association between the debts of private sector with economic growth is relatively high.

Apart from the above two types of research, some studies have shown that there is a linear relationship between debt and economic growth, and in others there is a nonlinear relationship. While Clarc (2004), Belivy (2006) and Ramon (2005) claim that they have a linear relationship, some other scholars like Adam and Bevan (2005), Smith and Hessian (1995) and Cohen (1997) argue that they are search for a non-linear pattern. Westphal and Roter (2012) examined the non-linear relationship between foreign debts on economic growth in Europe Union (EU) during the time period from 1970 to 2010. The results show that government debt at confidence interval 70% to 80% can negatively impact economic growth. Public investment and total productivity of production factors are also important. Dugan and

Bilgili (2014) examined the non-linear relationship between external debt and economic growth in Turkey during the period 1974-2009 using a Markov switching model. The results show that the public and private external debt has a negative effect on economic growth. In addition, the negative impact of public external debt is higher than the private.

1.2. Theoretical models of the relationship between growth and foreign aid

1.2.1. Two-gap model

Before presenting this model, most of growth models were proposed based on saving gap. Chenery and Bruno (1962) showed that only factor that can constrict growth is not saving gap. They stated that developing countries are faced with exchange restrictions on the entry of capital goods. Thus, the second gap is foreign exchange. The two-gap growth model underlines inability to replace saving with the foreign exchange gap. In other words, according to this model, if there are restrictions on foreign exchange, the increase in savings will have no effect on economic growth. Another assumption of this model was that the developing countries are initially faced with limited savings and then foreign exchange constraints.

Griffin theory -Intertemporal budget constraint

Using statistical surveys, Griffin (1970) found out that only 25% of the foreign loans were allocated to the issues relevant to growth. In other words, 75% of foreign loans were spent on consumer spending. He adds the fact that, in developing countries, the flow of foreign aid will act as a substitute rather than supplement to internal resources.

This trend can be seen in both private and public sectors. In public sector, by an increase in foreign aids, taxes are reduced, and in private sector this increase leads to reduced saving. As Griffin believed that by an increase in foreign aids, present and future consumption is increased, his discussion is known as intertemporal budget constraint.

In an article entitled "foreign aid and domestic savings in developing countries", Bowles (1978) states that "despite the issue of foreign aid, a revision on Harrod-Domar model should be done". Bowles believes that the equilibrium growth presented in Harrod-Domar model in the form of $g = \frac{s}{v}$ should be in the form of $\frac{s+a}{v}$, where a is the proportion of foreign aid to production. Thus, if by an increase in foreign aid, the saving is not reduced, foreign aid can have a positive effect on economic growth. "As a result, according to Bolz, if there is not a negative relationship between foreign aids and savings, foreign aid can positively impact economic growth.

After introducing Griffin's theory, so much criticism was leveled against it. Coleman and Nixon (1986), in their criticism of Griffin's theory stated that, Griffin in his discussions considers a function of income and foreign aid, while regards saving only a function of revenue. On the other hand, Griffin considers the condition of equality of saving and investment as $I=S+A$, while if the saving is a function of income and foreign aid, then the above requirement will be $I=S$.

In criticizing the theory of Griffin, Newlyn (1973) alleges that: "equality of saving and investment is not highly important in terms of accounting, whereas the mechanism governing the equality is of importance. In classical theory and Keynesian theory, interest rate and income and production are, respectively, the variables that come to scene to create adjustment and equality, yet Griffin's theory is not based on either of these two theories. Griffin theory only considers an accounting equality. Griffin regards saving decline as tantamount to investment decline, and does not introduce any function for investors. In fact, he did not consider the impact of foreign aid on investment. In this manner, there could be a positive relationship between savings and foreign aid, but there is no any robust explanation to affirm the positive impact of foreign aid on economic growth. This is because increased investment does not necessarily mean an increase in investment resources. Accordingly, it could be said that, in investable resources, the impact of foreign aid should be taken into account (Thranchyan 1997).

1.2.2. Three-gap model

After presenting two-gap growth model, lots of criticism was leveled against it. One of the criticisms was that domestic resources have the ability to invest on the production of export goods. As a result, assuming the lack of substitution of savings and foreign exchange restrictions is unrealistic. On the other hand, one of the main criticisms was that receiving foreign loans separate from two gaps including foreign currency and saving gap may be due to the eradication of the government's fiscal gap and budget deficit.

Therefore, the third limitation introduced for the development was limitation of the government's fiscal gap. Bacha (1990) proposed a model in which three gaps including savings gap, the foreign exchange and the foreign exchange deficit are taken into account. According to Bacha, using the development of foreign resources, the economy can fill three mentioned sources and find its way on the path to growth.

1.2.3. Debt overhang hypothesis

One of the most important channels through which external debt affects economic growth is Debt Overhang (Krugman 1988, Sachs 1989). Debt overhang refers to the time that the growth of external debt is too much, and this can reduce economic growth. Sometimes huge debts become a barrier to investment because investors expect their return on investment to be reduced due to foreign creditors.

Fatima Ahmed and Rehman (2012) in their research examined the relationship between Pakistan's budget deficit and economic growth during the period 1978-2009. In this study, to identify long-term relationship between budget deficit and economic growth, the ordinary least squares (OLS) is used. The results obtained from the study indicate that the impact of budget deficit on Pakistan's economic growth in the long-term is negative and significant.

Abdol Rahman (2012) in an article examined the relationship between budget deficit and Malaysian economy during the period 2000-2012. In this article, Regressive Distributed Lag (ARDL) was used to analyze the impacts of short-term and long-term budget deficit and economic growth. The results show that short term deficit can have a negative and significant effect on the growth of the Malaysian economy.

Hamsi and Asbia (2013) examined the relationship between oil revenues, government's debt and economic growth in 1960 to 2012 in Bahrain using vector error correction model and integration method. The results indicate that oil revenues had a positive effect on economic growth and considered to be the main source of supply of government debt for Bahrain government.

Spioiti and Vam Vocas (2015) examined the impact of government debts on economic growth in Greece during 1970-2010 using time series method. The research results indicated that external debts have a positive and significant impact on Greece's economic growth.

2. Methodology and data

2.1. Markov-switching vector autoregressive models (MS-VAR)

In empirical macroeconomics, Vector Autoregressive models (VAR) are an important research method, while the MS-VAR has a more general class of nonlinear models which is able to specify the production process of linear data through constricting of linearity process at any regime in the form of a linear process, where the regime is conditional and invisible. These models are different in the hypotheses relevant to random process that can create the regime. MS-VAR class provides the tools to be able to estimate VAR models with the changes in the regime.

Utilizing dynamic structures, MS-VAR models are utilized to analyze non-linear relations underlying time series. The dynamism of these models is dependent upon the mode (invisible) variable s_t . From a theoretical perspective, it is assumed that in MS-VAR, s_t follows the first order of Markov chain, and by the probability of transition between state N, it is defined as below:

$$P\{s_t = i | s_{t-1} = j, s_{t-2} = k, \dots\} = P\{s_t = i | s_{t-1} = j\} = p_{ij} \quad (1)$$

According to the above implications, the probability of transition from state j to the state i in the next period merely depends on the prior period. After establishing the statistical foundations of the unobserved variable s_t , it would be possible to discuss the functional form of switching Markov process. The functional form of MS-VAR function is often defined as follows:

$$y_t = v(s_t) + A_1(s_t)y_{t-1} + \dots + A_p(s_t)y_{t-p} + \varepsilon_t \quad (2)$$

where: y_t is n-dimensional time series vector; v is intercept vector; A_1 to A_p are the matrices that can encompass self-explanatory parameters; ε_t is the vector of the error sentences, where $\varepsilon_t | s_t \sim \text{NID}(0, \Sigma(s_t))$.

In the above equation, the intercept along with other parameters are changed with the change in the regime. It is worth noting that Krolzig (1997) introduced several circular patterns (including Markov-Switching Mean, Markov-Switching intercept term, Markov-Switching Autoregressive Parameter, and Markov-Switching heteroskedasticity).

In these models, to show the rotational intercept (or dynamic regression), the mean rotation, and self-explanatory parameters, the symbols namely I, A, MS-H are used, respectively. More general form of the specification of MS-VAR models, in which all model parameters change as conditions change, is shown as follows:

$$y_t = \begin{cases} v_1 + A_{11}y_{t-1} + \dots + A_{p1}y_{t-p} + \sum_1^{1/2} u_t & \text{if } s_t = 1 \\ \vdots & \\ v_M + A_{1M}y_{t-1} + \dots + A_{pM}y_{t-p} + \sum_M^{1/2} u_t & \text{if } s_t = M \end{cases} \quad (3)$$

Depending on the fact whether intercept, the mean and variance in the above models are dependent upon the regime or not, MS-VAR models are converted into the four-fold states mentioned above or a linear VAR model, which Krozlig presents a summary of it as follows:

Table 1. Different modes of MS-VAR models

MSI Specification			MSM		
Intercept of constant	Intercept of variable (v)	Mean of Constant	Mean of variable (μ)		
linear VAR	MSI-VAR	linear MVAR	MSM-VAR	Σ Constant	Constant
MSH-VAR	MSIH-VAR	MSH-MVAR	MSMH-VAR	Σ	A _j
MSA-VAR	MSIA-VAR	MSA-MVAR	MSMA-VAR	Σ Constant	Variable
MSAH-VAR	MSIAH-VAR	MSAH-MVAR	MSMAH-VAR	Σ	A _j

Source: Author

When this system is placed in the arrangement of change in directions, VAR process parameters are changed with time. However, this process may be time-invariant and conditional, and may be observed on an unobservable variable regime S_t , which indicates that this regime occurs at time t . M represents the number of possible regimes. Then the conditional probability density of the observed time series vector y is as below:

$$P(y_t|y_{t-1}, s_t) = \begin{cases} f(y_t|y_{t-1}, \theta_1) & \text{if } s_t = 1 \\ f(y_t|y_{t-1}, \theta_m) & \text{if } s_t = M \end{cases} \quad (4)$$

where: θ_m is VAR vector in the regime $M=1, \dots, m$; Y_{t-1} are the observations $\{y_{t-j}\}_j^\infty = 1$

Thus, in a specified regime S_t , the time series vectors y_t are constructed using by a vector auto-regressive process with the order P (VAR(p) model), so that:

$$E(y_t|y_{t-1}, s_t) = U(s_t) + \sum_{j=1}^P A_j(s_t)y_{t-j} \quad (5)$$

where: $u_t = y_t - E[y_t|Y_{t-1}, S_t]$ is an innovation process with a covariance-variance matrix $\Sigma(s_t)$ which sometime it is assumed that:

$$u_t \sim NID(0, \Sigma(s_t)) \quad (6)$$

If VAR process is defined and the above conditions are defined in an unobserved regime such as Equation (4), the description of the production mechanism should be completed by assuming general regime process. In MS-VAR, it is assumed that S_t Regime is generated using homogeneous chain of Markov discrete state:

$$Pr(s_t | \{s_{t-j}\}_j^\infty = 0) = Pr(s_t | s_{t-j}, P) \quad (7)$$

where: p shows the regime production process parameters vector.

2.2. Statistical database

The data used in the current research were extracted from the Central Bank of the Islamic Republic of Iran, Iran's Statistical Center and the World Bank. The data were covered by annual data relevant to the time period from 1979 to 2013. 'L' in some of the variables used in the analysis represents the natural logarithm of the relevant variables, where gdp represents GDP, $lexd$ represents natural logarithm of foreign debt volume and $lgcf$ is the natural logarithm of gross capital.

The current research is driven from the article authored by Dugan and Biligy, which using Markov regime-switching method, the two authors analyzed the data related to Turkey since 1974-2009.

3. Model estimation

Before estimating the relevant model, it is highly important to examine the variables' reliability, because if the variables have unit root, the integration between the variables should be integrated. This is because this test specifies the appropriate form that the variable must have from the first rank in terms of level or differential of order i^{th} . Thus if a variable is integrated from the first order and other variables are not integrated, the differential of its first order should be used, while if I is (1) and integrated, then the variable levels can be used for estimating the long term relations (Gary Koob 2009, Giles and Garagata 1998).

Thus, to be more ensured of this research, more conventional unit root tests such as ADF and Akaike criteria, Bayesian and Henan Queen Criteria are used for stationary and non-stationary situation of the variables. As all the variables used in the study are integrated GDP and Lexd and LgcF from the first order, the variables are used on the level (despite their non-viability).

Clarify and estimate the MS-VAR non-linear models includes two major phases. In the first stage, using criteria such as LR and AIC (Akaike) and Schwarz Bayesian (SC) and Hannan Quinn (HQ), VAR degree is specified (Gary Cope 2009). It is noteworthy that the number of observations to get access to more accurate results is of special importance. Regarding the values of the above criteria as presented in the table below, the optimal lag of the research model is 2.

Table 2. The values of different statistics for choosing the optimal lag

Lags	LR	AIC	SC	HQ
0	-	23.994	24.132	24.039
1	191.683	17.475	18.030	17.656
2	21.806	17.147	18.118	17.463
3	111.654	6,192.149	18.560	17.625

Source: Author

External borrowing are done based on economic conditions and policies, but Iranian economy due to various conditions such as revolution, imposed war and economic sanctions always has had a high level of external borrowing. Thus, the current research examines the effects of external debt on economic growth in two regimes of recession and boom. In the model studied, given the characteristics of the research sample, with the selection of the two regimes, the model whose autoregressive parameters are dependent upon regime have presented the best estimation. In other words, among the models presented in Table (1), MSA-VAR (1, 2) is better than other models, because the results obtained from other model either did not present a non-linear relation or the coefficients did not take advantage of the reliability.

The values of LR (the test related to the presence of non-linear relations between variables) for the research model shows the presence of a non-linear relation between the research models, and confirms the selected MSA-VAR for the research.

Which has χ^2 distribution and using a comparison of $\chi_{4,5\%}^2$ with the Table, the non-linear relation is confirmed.

After specifying the non-linear relationship between the model's variables and the number of optimal lags, it is necessary to write the research's eccentric model based on the relevant variables and then do estimation. Thus, the research model is written as follows:

$$gdp_t = \begin{cases} v_1 + A_{1i} \sum_{i=1}^2 gdp_{t-i} + B_{1j} \sum_{j=1}^2 lexd_{t-j} + C_{1k} \sum_{k=1}^2 lgcf_{t-k} + \sum_1^{1/2} u_t & \text{if } s_t = 1 \\ \vdots \\ v_2 + A_{2i} \sum_{i=1}^2 gdp_{t-i} + B_{2j} \sum_{j=1}^2 lexd_{t-j} + C_{2k} \sum_{k=1}^2 lgcf_{t-k} + \sum_2^{1/2} u_t & \text{if } s_t = 2 \end{cases} \quad (8)$$

where: $s_t = 1$ is related to the first regime; $s_t = 2$ is related to the second regime. After selecting the model and estimating the model's parameters using maximum verification, the results are presented in Table 3.

Table 3. Results from the model estimation using MSA-VAR method

Variable	Coefficient	Statistics Value (prob)
First Lag of Lexd (Foreign Debt Volume) in Regime 1	1.21	(0.00)
First Lag of LGCF (Gross Capital Volume) on Regime 1	-1329.77	(0.00)
Second Lag of Lexd in Regime 1	-0.16	(0.00)
Second Lag of LGCF in Regime 1	1407.04	(0.00)
First Lag of Lexd in Regime 2	-1.21	(0.00)
First Lag of LGCF in Regime 2	1329.77	(0.00)
Second Lag of Lexd in Regime 2	-0.16	(0.00)
Second Lag of LGCF in Regime 2	-1407.04	(0.00)

Source: Author

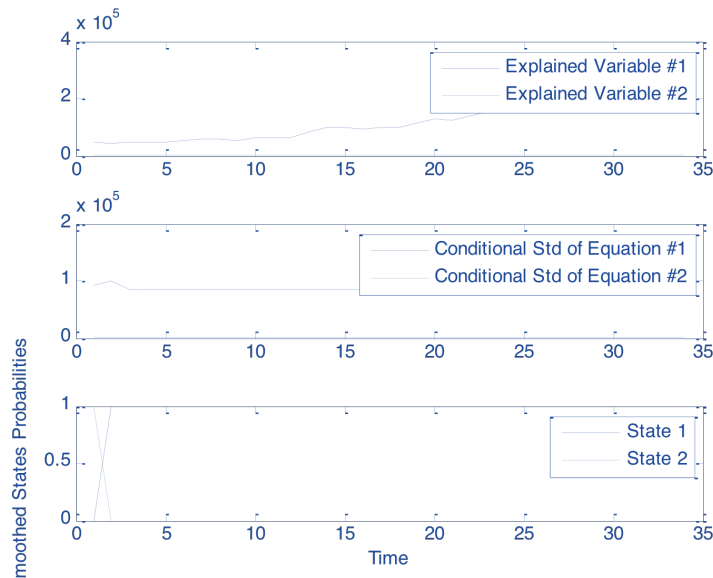
Given the theories presented, since the model chose GDP variable as the major dependent variable, the definition has been built upon the basis of estimates, the results obtained from the estimations done in Table 2 show that both in the first and second regime, the lag of the variables has significant impacts on GDP level. This means that the variable Lexd (external debt volume) in the first regime by a factor of 1.2 and in the second regime with 1.21 can significantly impact GDP. Accordingly, during the recession, based on the theoretical bases of macroeconomics (Laffer Curve), due to the lack of adequate government investment, external borrowing can increase aggregate demand and economic

growth through increasing public sector investment. Thus, through foreign debt and increasing external debt, GDP may increase.

However, in the time of boom, any external borrowing can cause a reduction in economic growth due to rising interest rates and the impact of replacement in investment spending. Thus, in the boom period, with increasing external borrowing, GDP will be reduced, and the coefficients of LGCF (gross capital) indicate that this variable has a negative effect on GDP and the economy in the first regime, and a positive effect in the second regime.

The results obtained from transition matrix show that the probability of staying in the first regime is 90%, and the probability of remaining in the second regime is 90% as well. However, the transition probability of the first regime into the second one and vice versa is 10%.

Diagram 1. Change in the regime



$$\text{Transition Matrix} = \begin{bmatrix} 0.90 & 0.10 \\ 0.10 & 0.90 \end{bmatrix} \begin{matrix} (0.00, 0.00) \\ (0.00, 0.00) \end{matrix}$$

The third figure in the diagram represents a change in the regime and placement in the new regime. The second figure shows the conditional variance at each regime.

Conclusion and policy recommendations

To examine the nonlinear relationship between economic growth and external debt volume and Iran's gross capital, Markov Switching Vector Auto Regressive Method (MS-VAR) is used. For this purpose, the statistical data relevant to the gross domestic product and foreign debt volume and gross capital during the time period 1979 to 2013 were utilized. Dickey Fuller unit root test results for the model's variables indicate that all of the variables of the integrated model are related to the order (I (1)), and after one time differentiation, they become viable. In addition, given the test's statistics value LR=79.75 that has distribution χ^2 , the non-linear relationship between the variables is confirmed. Considering the results obtained from MSA-VAR model, it was found that in the two regimens (recession and boom), the foreign debt volume and gross capital have equal significant effects on GDP in terms of absolute value effects, but the symbol of the coefficients in two relevant regimes is different from each other. In this case, foreign debt volume in the boom period by a factor of 1.21 has a positive and significant impact, and gross capital by a factor of -1329.77 has a significantly negative impact on economic growth. However, during the recession, the volume of external debt by a factor of -1.21 has a significantly negative impact, and gross capital with the coefficient 1329.77 has a positive and significant impact on economic growth.

According to the results, it is suggested to policymakers that:

- given the fact that one of the major problems in the country is unemployment of educated work force, the government can utilize external borrowing in line with public and private job creation to enable this debt to have positive effects on economic growth;
- given that the government's external borrowing are mostly short term, and the investment projects are carried out in a long-term form, the return on investment is practically not possible. It is suggested that policymakers do investment in higher-yielding construction projects rather than current ones.

With regard to the negative effects of external borrowing on economic growth during the boom, it is suggested that policymakers apply an appropriate tax system to compensate the state budget deficit through tax, instead of financing through external or domestic borrowing that can significantly contribute to high inflation. For this purpose, the need for education and culture is of significance.

Due to the positive effects of external borrowing on economic growth during a recession, it is recommended that policy makers with higher financial discipline to allocate funds to their budgets.

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Towards the Realisation of Vision 2030 and Beyond in Saudi Arabia: A Causality Analysis between Education and Economic Growth

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Abstract:

Education is *sine qua non* to economic growth and development of any nation. This paper investigates the short- and long-run relationship between economic growth, government spending on education and tertiary student enrolment in the Kingdom of Saudi Arabia. Examining this relationship is crucial towards the realisation of Saudi Arabia's economic development Vision 2030. This study used cointegration and error correction model to examine the short- and long-run relation between the period 1981 and 2016 in Saudi Arabia. The results revealed that education and economic growth in Saudi Arabia have long run relationship. There is bidirectional causality between GDP and tertiary student enrolment in the long-run, unidirectional causality from government spending on education to both GDP and tertiary student enrolment. In the short run, unidirectional causality was found from tertiary student enrolment to GDP, and also from government spending on education to tertiary student enrolment. This implies that government should intensify her efforts to increase tertiary student enrolment and spending on education as these would play great role towards the realisation of Saudi Arabia's vision 2030. Encouraging more youths (both males and females) to go for higher education in tertiary institutions by offering different supports which include increasing government spending on education would improve the Citizens' human capital and skills required to meet the industrial needs. It is believed that this would bring about a sustainable economic development in Saudi Arabia and facilitate the realisation of Vision 2030.

Keywords: government spending; education; tertiary student enrolment; economic growth; Error correction model; vision 2030; Saudi Arabia

JEL Classification: C01; E12; E22; H52; I25; O15

Introduction

Education has been recognised as a cornerstone to economic growth of the developed and emerging economies (Akinwale and Grobler, in press, Hanushek and Woessmann 2010). The role played by education in all sectors of economy – such as agriculture, service, manufacturing, oil and gas, tourism and mining among others – cannot be overemphasised. Achieving sustainable economic development without substantial investment in human capital is not possible in any nation (Ozturk 2001). Education expands people's understanding of themselves and the world in general because it improves the quality of lives and leads to broad social benefits to individuals and society. Higher learning education indicates that an individual is well prepared with information and better interpretation of information in engaging human capital to improve productivity in a firm or country (Knack and Keefer 1997, Akinwale *et al.* 2018). Any economic developmental agenda without a sound and robust educational system for the citizens is likened to pumping water into a profusely leaking tank (Ogbimi 2007). Education is therefore seen as the provision of qualitative and quantitative efforts required in the development process which encourage countries to develop modern manufacturing technologies and transfer them to the production process (Mercan and Sezer 2014). This is expected to engender human capital asset that fosters competitive advantage. There are empirical studies that have established the short – and long – run relationship between education and economic growth in different countries which justifies co-existence of the two variables (Pradhan 2011, Afzan *et al.* 2012, Hussin *et al.* 2012). While there are other studies that could not establish any relationship between the two variables (Nketiah-Amponsah 2009), few others could only justify either short-run or long-run and not the two (Pradhan 2009, Akinwale and Grobler, in press). Moreso, some studies established causality from education to economic growth and vice versa, few others could not establish any causality between the two variables (Danacica *et al.* 2010, Hussin *et al.* 2012, Ageli 2013). This could be as a result of the nature of data used as proxy variables for the two variables, the kind of methodology adopted and/or the peculiarities of the system in a country. Each of these results has implications on the nation's economic development.

Kingdom of Saudi Arabia is presently undergoing a developmental change with the national transformation program and vision 2030 of the government. Few of the objectives of the vision are: to increase the global

competitiveness index of the nation from the current 25 to top 10 in the world, to move from the current position as the 19th largest economy in the world into the top 15, to increase SME contribution to GDP, to have three Saudi cities be recognized in the top-ranked 100 cities in the world, and to increase the contribution of non-oil sector to GDP and total revenue among others (Vision 2030 document 2017). It is clear that all these goals and objectives would remain mere desires if the education capabilities of the citizens are not developed. This is because a sound economic development could only be possible if the country's relevant production skills are adequate in both quality and quantity, and this could be achieved through appropriate education base. Saudi Arabia has relied on crude oil for a long period of time as oil industry accounted for over 42% of the GDP, contributing 87% to the government revenue and generating over 90% of the foreign exchange earnings (CIA World Factbook 2017). As a result of the easier economic rent from oil revenue, government has not strongly developed other sectors of the economy as it ought to be. However, the current vision of the government is to turn around the entire sectors of the economy towards growth especially the private and non-oil sectors without jettisoning the effectiveness of the oil sector. The proportion of government spending on education as a percentage of total government expenditure was 23.98% in 1998 which was the highest considering the period between 1981 and 2010. Also, government spending on education as a percentage of GDP accounted for 8.34% in 1998 which was the highest between the period 1981 and 2010 (Index Mundi 2017, World Bank Development Indicators 2017). This shows that the extent of government spending on education in the past years was relatively unsteady which might have affected its impact on the economy. The proportion of Saudi Citizens relative to non-Saudis (saudization ratio) working in the private sector was 22.1% while this ratio was 94% in the public sector as at 2014 (Saudi Arabia General Authority for Statistics 2016). This shows that non-Saudis dominate the private sector especially the labour-intensive sectors, and this can be partly attributed to the disconnection between these sector needs and education/training outputs of the Saudi labour force (Saudi Arabia General Investment Authority 2016). Since the main objective of the private sector is to make profit, then the firms would only employ those that have requisite education qualification and skills which would effectively improve their profits.

In 2017, Saudi Arabia budget shifted towards the realization of the goals of the National Transformation Program and Vision 2030 (U.S - Saudi Arabian Business Council 2017). Government has adjusted its budget accordingly despite the reduction of oil prices in the previous year which led to lower government spending in 2016. Unlike the previous years, Saudi government has allotted the largest budget of approximately \$53.3 billion (SR200 billion) to education sector in year 2017 (U.S - Saudi Arabian Business Council 2017, General Authority for Statistics 2017), which further shows the commitment of government towards vision 2030.

Following the recent efforts of government on national transformation program and vision 2030, it therefore becomes necessary to examine the causality and the long-run relationship between education and economic growth in Saudi Arabia. This is to provide evidence-based suggestions to the policy makers on what needs to be done to promote economic growth through education. This study is different from other studies which examine government spending on education only, as this study also considers enrolment into higher education as a key proxy in addition to government expenditure on education.

1. Literature review

Hanushek and Woessmann (2010) opined that theoretical growth literature underlines at least three mechanisms through which education may impact economic growth. Firstly, education can improve the human capital inherent in the labour force which increases labour productivity and raise equilibrium level of output as stated by Mankiw *et al.* (1992) which is an augmented neoclassical theory. Secondly, education can increase the innovative capacity of the economy which promotes economic growth as stated by Lucas (1988), Romer (1990), Aghion and Howitt (1998) in theories of endogenous growth. Thirdly, education can expedite the diffusion and transmission of knowledge required to understand and process new information and successfully absorb new technologies developed by others which also promote economic growth (Nelson and Phelps 1966, Benhabib and Spiegel 1994, Akinwale 2018).

Ageli (2013) investigated the Keynesian relations and education expenditure in Saudi Arabia between 1970 and 2012. The results showed that real GDP and GDP per capital have long run relationship with education expenditure while unidirectional causality ran from GDP to education. Pradhan (2009) examined the causality between economic growth and government spending on education in India during 1951 to 2001. The results showed that there is unidirectional causality between education and economic growth in India, and the direction of causality is from economic growth to education spending and not viceversa. However, Pradhan (2011) examined the relationship between education, trade openness and economic growth using the data for the period 1951-2009, and the result found a feedback effect between education and economic growth. Chandra (2010) also tested a

causal relationship between education investments and economic growth for India for the time period 1951-2009 using linear and non-linear Granger causality methods, and found a bi-directional causality between education spending and GDP for India. In the study conducted by Hussin *et al.* (2012) in Malaysia for the period 1970-2010 using vector auto regression (VAR) method, it was found that government spending on education and economic growth have long run relationship and that education granger causes economic growth in the short- and long-run periods. Mercan and Sezer (2014) used auto regressive distributed lag (ARDL) method to examine the effect of education expenditure on economic growth in Turkey for the period 1970-2012, and they found short- and long-run relationship between the two variables. The result also revealed a positive and significant impact of education spending on economic growth. In the study of Akinwale and Grobler (in press) where relationship between education, trade openness and economic growth was examined for South Africa for the period 1984-2015, it was found that there is a long run bidirectional causal relationship between education and economic growth and no causality in the short-run between the two variables. Afzal *et al.* (2012) utilized ARDL model to examine the relationship between education, poverty, physical capital and economic growth for the span of 1971 to 2010 in Pakistan. The results revealed that education has positive and significant impact on economic growth only in the long-run, and Toda-Yamamoto Augmented Granger Causality (TYAGC) test confirmed bidirectional causality between education and economic growth. AlShahrani and Alsadiq (2014) investigated the effects of government's spending on economic growth in Saudi Arabia using the data for the period 1960-2010. Their results revealed that government spending on education and economic growth have long run relationship. However, while the spending on education has a positive effect on economic growth in the short run, it has a negative effect in the long run. They attributed the negative effect in the long run to the lack of emphasis on education in the earlier sample period, rather than a negative effect of education on growth in the long-run. They opined that the main reforms in education by the government were initiated in early 2005, and it is expected that long-run impact on growth would surface only after foreign educated talent returns to Saudi Arabia and are employed at full capacity.

Education enrolments at different levels such as primary, secondary and tertiary educational institutions have also been used as proxy for education in some other studies. Abdullah (2013) using education enrolment in both secondary and tertiary education as proxy for education in Malaysia found that education and economic growth have negative relationship. Jalil and Idrees (2013) in their study for the period 1960-2010 found a positive effect of different levels of education on the economic growth of Pakistan through a non-linear two stage least square instrumental variable (NLTSL-IV) estimators used for estimating the error correction model for the data. Mariana (2015) established long run relationship and positive effect of higher education enrolments on economic growth in Romania using VECM but could not establish same for public expenditures on education. Meanwhile, Bose *et al.* (2007) found a positive growth impact of government total education expenditure and education investment in 30 LDCs during 1970–90, while school enrollments inhibit growth. Baldacci *et al.* (2008) found that primary and secondary enrollments are positively related to growth in 118 less developed countries (LDCs) for the period 1971–2000. Costantini and Monni (2008) found a negative secondary enrollments–growth relationship for the period 1970–2003 in 95 countries. Gyimah-Brempong *et al.* (2006) using the data for the period 1960–2000 found a stronger association between growth and tertiary schooling than primary and secondary schooling years in 34 African countries. Danacica *et al.* (2010) explored the causal nexus between higher education and economic growth in case of Romania for the period 1980-2008, and the results of their study confirmed that there is long run relationship between higher education and economic growth but there is unidirectional causality running from economic growth to higher education. Also differing results have also been found on the impact of years of schooling on economic growth (Hanushek and Woessmann 2011, Pritchett 2001).

It could be seen that despite the theoretical predictions for long-run and causality from education to economic growth, the empirical evidence on the impact of education on economic growth has long been mixed. Diverse results have emerged for different countries, and even sometimes results for the same country might differ which might be as a result of the variables used as proxy for education, years of data, the methodology adopted and the peculiarities of a Country. Since the research in this field is inconclusive and there are limited (or no) studies in Saudi Arabia that have combined government spending on education with the students enrolment at various levels to proxy education, hence this study seeks to contribute to fill such gap in the literature.

2. Econometric procedures and method

Annual time series data covering the period 1981–2016 on GDP per capita (GDP), total government spending on education (as percentage of GDP) (GSE) and total tertiary student enrolment (as percentage of the population of the age group that officially corresponds to the level of education) (TSE) are collected from the 2017 update of

World Bank's World Development Indicator (WDI). The choice of the starting period was constrained by the availability of data on government spending on education.

The econometrics method use in this study is presented in this section by investigating the relationship between government spending on education (GSE), tertiary student enrolment (TSE) and economic growth (GDP) in Saudi Arabia. Equation 1 shows the linear model could be written as:

$$GDP_t = \beta_0 + \beta_1 GSE_t + \beta_2 TSE_t + \varepsilon_t \quad (1)$$

where: β_0 is the constant; β_1 and β_2 are the coefficient of government spending on education and tertiary student enrolment respectively; ε is the stochastic error term and t is the time period in the equation 1.

Unit root test

Conducting empirical analysis on causality and error correction model, the series of variables are required to be stationary. It is well documented that using non-stationary data in causality tests can yield spurious results (Granger and Newbold 1974). This paper employs Augmented Dickey-Fuller and Phillips-Perron tests for stationarity of the series so as to determine the order of the integration of the variables being examined.

$$\Delta Z_t = \theta_0 + \gamma_0 t + \gamma_1 Z_{t-1} + \sum_{i=0}^p \theta_i \Delta Z_{t-1} + \varepsilon_t \quad (2)$$

where: Z_t is the variable in period t which could be GDP, GSE and TSE; $\Delta Z_{t-1} = Z_{t-1} - Z_{t-2}$; ε_t is the error term.

Hypothesis testing is conducted that $\gamma_1 = 0$ in equation 2 and if γ_1 is significantly less than zero, the null hypothesis of a unit root is rejected indicating the stationarity of the variable. Once the series of the variables are of the same order of integration, then Johansen cointegration could be conducted (Johansen and Juselius 1990, Akinwale *et al.* 2013).

Co-integration test

The existence of co-integration between variables signifies their common long-run relationship which can be used to predict their future values (Granger 1988). Johansen cointegration test is adopted to determine the long run relationship between economic growth, government spending on education and tertiary student enrolment (Johansen 1991, Johansen and Juselius 1990). The investigation of number of cointegrating vector involves the estimation of unrestricted vector auto-regression (VAR) model by writing Z_t as a vector autoregressive process of order k (i.e., VAR(k)) in equation 3 below using Johansen cointegration:

$$\Delta Z_t = \theta_0 + \Pi Z_{t-1} + \sum_{i=1}^k \Gamma_i Z_{t-i} + \varepsilon_t \quad (3)$$

where: Z_t is a (3 X 1) vector containing economic growth (GDP), government spending on education (GSE) and tertiary student enrolment (TSE) with time period t and they follow $I(1)$ process. Any long-run relationship(s) are captured by the (3 x 3) matrix Π shown in Equation (3) (Akinwale and Grobler, in press).

In equation (3), Π is a rank r matrix that can be decomposed as:

$$\Pi = \alpha \beta' \quad (4)$$

where: α is a 3 x r loading matrix; β is a 3 x r matrix of co-integrating vectors, r being the number of co-integrating vectors.

If $0 < r < n$, then there exists r cointegrating vectors. The cointegrating rank, r , are tested with two statistics known as trace test and maximum eigen-value test to ascertain the presence and number of cointegration equation(s).

Granger causality test

Granger (1988) proposed that the VECM is more suitable to investigate the causality between series that are integrated at $I(1)$. This states that the dependent variable is explained by the past values of the independent variables and the past values of the dependent variable (Brooks 2008, Solarin and Ozturk 2015). The three equations for the three series could be stated thus:

$$\Delta GDP_t = \theta_1 + \sum_{i=1}^p [\alpha_{1i} \Delta GDP_{t-i} + \beta_{1i} \Delta GSE_{t-i} + \psi_{1i} \Delta TSE_{t-i}] + \mu_1 EC_{t-1} + \varepsilon_{1t} \quad (5)$$

$$\Delta GSE_t = \theta_2 + \sum_{i=1}^p [\alpha_{2i} \Delta GDP_{t-i} + \beta_{2i} \Delta GSE_{t-i} + \psi_{2i} \Delta TSE_{t-i}] + \mu_2 EC_{t-1} + \varepsilon_{2t} \quad (6)$$

$$\Delta TSE_t = \theta_3 + \sum_{i=1}^p [\alpha_{3i} \Delta GDP_{t-i} + \beta_{3i} \Delta GSE_{t-i} + \psi_{3i} \Delta TSE_{t-i}] + \mu_3 EC_{t-1} + \varepsilon_{3t} \quad (7)$$

From equation 5-7, θ is a constant term, α , β and ψ are the coefficients of the lagged regressors. These parameters indicate the short term impacts of the explanatory series on the dependent series. The short-run Granger causality is denoted by the joint significance of F-test of these lagged terms. For instance, if the entire coefficients ψ in Equation (5) are jointly significant, then there is causality running from tertiary student enrolment to economic growth in the short run. μ is the coefficient associated with the error correction term EC which represents the adjustment speed towards the long run equilibrium. If the coefficient μ is significant in Equation (5), then GSE and TSE Granger cause GDP in the long term. Pairwise Granger causality is also used to corroborate the direction of causality between the variables in the short run.

3. Results analysis

3.1. Unit roots and co-integration tests results

The results of both Augmented Dickey-Fuller and Phillips-Perron test statistics showed that the three series contain unit root at levels as their p -values exceed 5% level of significance in Table 1. The p -values of ADF and PP tests became significance at 5% after first differences of the three series which make the series stationary at first difference.

Table 1. Results of unit root test

Variable	ADF		PP		Order of integration
	Levels	First Difference	Levels	First Difference	
LGDP	-0.5211	-5.1821*	-0.3142	-3.9939*	I(1)
GSE	-0.8413	-4.4621*	-2.1232	-4.3233*	I(1)
TSE	-0.2356	-4.7473*	-1.2743	-4.8653*	I(1)

Note: (*) indicates 5% level of significance

Table 1 revealed that the series GDP, GSE and TSE have integration of order one, *i.e.* I(1). Thus, co-integration test was conducted to examine the existence of long run relationship among the variables for the period 1981 – 2016 using Johansen's cointegration test. While the trace statistic and maximum eigenvalue test showed that the null hypothesis of absence of co-integrating relation ($R=0$) can be rejected at 5% level of significance, the null hypothesis of existence of at most one co-integrating relation ($R\leq 1$) cannot be rejected at 5% level of significance as shown in Table 2. This shows that there is one co-integrating equation, specifying a long run relationship between GDP, government spending on education (GSE) and tertiary student enrolment (TSE) for Saudi Arabia at 5% level of significance.

Table 2. Results of cointegration test

Hypothesis			Test Statistics			
Null	Alternative	Eigenvalue	Trace	p -values	Max. eigenvalue	p -values
$R = 0$	$R > 0$	0.5103	38.48370	0.0039	23.56310	0.0223
$R \leq 1$	$R > 1$	0.3372	14.92060	0.0609	13.57190	0.0641
$R \leq 2$	$R > 2$	0.0400	1.34880	0.2455	1.34880	0.2455

3.2. Vector Error Correction Model (VECM) and Granger Causality tests results

Error correction model is used to investigate the direction of causality in both long run and short run between the series. Table 3 revealed that there is long run causality from GSE and TSE to LGDP in GDP equation and also from LGDP and GSE to TSE in TSE equation, but there is no long run causality from LGDP and TSE to GSE in GSE equation. The error correction term for each of the equations is negative as expected and only significant at 1 percent in LGDP and TSE equations but not significant in GSE equation. This implies that GDP and TSE have long run bidirectional causality between themselves but GSE has unidirectional causality to each of GDP and TSE with no feedback effects. The percentages of the disequilibrium in the short run that is corrected in the long run are 57.9%, 94.9% and 78.03% for GDP, GSE and TSE equations respectively. Both government spending on education and tertiary student enrolment are expected to bring about the economic growth in the long run in Saudi Arabia. Also, the growth of economic activities and government spending on education would also contribute to a higher level of enrolment of students in tertiary institutions. This means that continuous government spending and encouragement of student enrolment would facilitate the realisation of Saudi Arabia's Vision 2030 and beyond. This is in line with few studies such as Danacica *et al.* (2010), Hanushek and Woessmann (2011) and Mariana (2015) among others.

Table 3 also showed the outcome of the short run causality using Wald statistic. In the short run, government spending on education could not granger cause economic growth but tertiary student enrolment could; economic

growth and tertiary student enrolment could not granger cause government spending on education; and economic growth could not granger cause tertiary student enrolment but government spending on education could granger cause tertiary student enrolment. This means that, there is unidirectional causality from tertiary student enrolment to economic growth and from government spending on education to tertiary student enrolment in Saudi Arabia in the short run, as all other variables could not show any causality between them. The results using Wald statistic signified that government spending on education could not granger cause economic growth in the short run but could granger cause economic growth in the long run; meanwhile, tertiary student enrolment could granger cause economic growth in both short run and long run with no feedback effect. It could be inferred from the results that government spending on education could not immediately cause economic growth in the short run, as it takes a longer period before the effect of government spending generates economic growth which could only happen in the long run. However, government spending on education enables more Citizens to enrol in tertiary institutions, and this tertiary student enrolment would result into economic growth in both short run and long run periods as revealed from Table 3.

Table 3. Results of Granger causality test within Error Correction mechanism

Causality	Long run	Short run
	Error correction term	Chi-square
Δ LGDP equation	-0.5788***	
Δ GSE		3.24
Δ TSE		19.62***
Δ GSE equation	-0.9493	
Δ LGDP		2.33
Δ TSE		1.28
Δ TSE equation	-0.7803***	
Δ LGDP		2.12
Δ GSE		15.24**

Note: *** Significant at 1% level; ** Significant at 5% level

The results of pairwise granger causality in Table 4 also corroborate the short run results obtained from Table 3 for granger causality within ECM. Table 4 showed that there is unidirectional causality running tertiary student enrolment to economic growth, and also from government spending on education to tertiary student enrolment. There is no other form of causality between the variables. It can also be deduced from this result that enrolment of student in tertiary institutions has a significant impact on economic growth in both short run and long run. Though government spending on education does not granger cause economic growth directly in the short run, but it granger causes tertiary student enrolment which then granger causes economic growth. The results from Tables 3 and 4 indicated that student enrolment in tertiary institutions and government spending on education would possibly develop the human capital required in the growing population of Saudi Citizens which would bring about economic growth in the short run and long run periods. These results are in line with few studies such as Benhabib and Spiegel (1994) across countries; De Meulemeester and Rochat (1995) in Sweden, Japan, and France; Hussin *et al.* (2012) in Malaysia; Mercan *et al.* (2014) in Turkey; Jalil and Idrees (2013) in Pakistan, and Mariana (2015) in Romania among others. The result of the short run causality is against the studies of Pradhan (2009) and Ageli (2013) which found unidirectional causality from GDP to education; Chandra (2010) and Pradhan (2011) which found a feedback effect between education and economic growth; and Akinwale and Grobler (in press) which found no causality effect between education and economic growth in the short run.

Table 4. Results of Pairwise Granger causality test

Null Hypothesis:	F-Statistic	Prob.
D(LGDP) does not Granger Cause D(GSE)	0.3084	0.7373
D(GSE) does not Granger Cause D(LGDP)	0.6491	0.5303
D(TSE) does not Granger Cause D(GSE)	0.0750	0.9279
D(GSE) does not Granger Cause D(TSE)	4.6061	0.0172**
D(TSE) does not Granger Cause D(LGDP)	4.8580	0.0104***
D(LGDP) does not Granger Cause D(TSE)	0.0421	0.9588

Note: *** Significant at 1% level; ** Significant at 5% level

3.3 Results of diagnostic tests

Residual diagnostic tests were also conducted to test if the estimated VECM model met the econometric assumptions. The results shown in Table 5 revealed that the null hypotheses for no presence of autocorrelation and heteroscedasticity could not be rejected as their p-values are greater than 5% level of significance. Moreover, the residuals of the model were found to be normally distributed as the p-value is also greater than 5% level of significance. This means that the model is valid as it passed all the diagnostic tests conducted.

Table 5. Diagnostic tests results

Test	Null hypothesis (H ₀)	P-values	Decision
Breusch-Godfrey Serial Correlation LM Test	No serial correlation	0.5280	Do not reject H ₀
Jarque-Bera (JB)	There is normality	0.6930	Do not reject H ₀
Heteroscedasticity	No heteroscedasticity	0.2466	Do not reject H ₀

Conclusion

Education has become an important factor when it comes to economic growth and development. Education is well recognised as a significant factor in human capital which leads to economic growth. Examining government spending on education might not fully capture the qualitative aspect of education on human capital; hence investigating student enrolment in tertiary institution becomes a good indicator of education. This study investigated the short- and long-run relationship between government spending on education, tertiary student enrolment and economic growth in Saudi Arabia. Cointegration analysis was conducted to establish the existence of long run relationship, and the error correction model was used to examine the short run and long run causality. Granger causality analysis was also used to validate the results obtained from ECM.

The results of the trace statistic and maximum eigenvalue tests showed the presence of one cointegration equation which signified the existence of long run relationship among the variables. While bidirectional causality was found between GDP and tertiary student enrolment in the long run, unidirectional causality was found from government spending on education to both GDP and tertiary student enrolment. In the short run, unidirectional causality was found from tertiary student enrolment to GDP, and also from government spending on education to tertiary student enrolment. The result of pairwise granger causality also revealed that causality ran from tertiary student enrolment to GDP and from government spending on education to tertiary student enrolment without any feedback effects validating the results obtained within ECM causality.

The results of this study imply that tertiary student enrolment and government spending on education are important to Saudi Arabia's economic growth in the long run. Even in the short run, while tertiary student enrolment has a significant impact on economic growth, government spending on education has a significant influence on tertiary student enrolment. This indicates that increasing tertiary student enrolment and intensifying government spending on education would play great role in realising the Kingdom of Saudi Arabia's vision 2030. More youths should be encouraged to go for higher education in tertiary institutions as this would develop the Citizens' human capital and skills required to meet the needs of the industries. Also, government should provide a strong support to the tertiary institutions and the students through her increased investment on education as this would generate high skill development and knowledge needed by various sectors of the economy to increase their productivity. Hence, this would generate employment and sustainable economic growth towards achieving the targets of Vision 2030 of the Kingdom of Saudi Arabia.

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An Econometric Analysis of the Effect of Government Expenditure and Money Supply on the Interest Rate in Indonesia

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Abstract:

This study aims to examine the effect of government expenditure and money supply on the interest rate in Indonesia. The results of the test using an autoregressive distributed lag (ARDL) bounds test approach for quarterly data for the period 2005Q4-2017Q1 revealed the existence of a long-run effect of government expenditure and money supply on the interest rate. Every 1% rise in government expenditure led to a decrease in the interest rate by 1.48%, whereas every 1% rise in money supply led to an increase in the interest rate by 1.16%. The results also revealed a short-run effect of government expenditure and money supply on the interest rate.

Keywords: government expenditure; money supply; interest rate; ARDL bounds test.

JEL Classification: C20; E510; E580; H500

Introduction

Government expenditure, money supply, and the interest rate constitute the policy instruments of a state to stabilize its economy. The government expenditure is a fiscal policy instrument, while money supply and the interest rate are monetary policy instruments. In policy implementation, governments usually make changes to the government expenditure, money supply, or interest rate to influence other macroeconomic variables such as economic growth. Brady and Magazzino (2017) stated that government expenditure or public sector spending can stimulate economic growth.

Theoretically, the effect of government expenditure on the interest rate can be explained through the monetary model of Chang and Tsai (1998) and the standard infinite-horizon neo-classical model of Mankiw (1987). In the monetary model, Chang and Tsai (1998) assumed that there is no mobility of capital. The model simulation result shows that an increase in government expenditure lowers the interest rate. Furthermore, in the simulation results of the standard infinite-horizon neoclassical growth model, Mankiw (1987) also concluded that a permanent increase in government expenditure results in the interest rate fall.

Other theories that explain the relationship between money supply and the interest rate are proposed by Gibson (1970) as well as Caporale and Mc-Kiernan (1999) in which money supply is viewed as an instrument of

monetary policy. According to the theories, an addition of money supply that exceeds the demand for money will cause the interest rate to fall. Furthermore, several studies have investigated how government expenditures and/or money supply affect the interest rate, and most of which done in developed countries, for instance, Izak (2004), and Choi and Devereux (2006). However, the studies looking particularly into the effect of government expenditure on the interest rate are still very few. In fact, from the literature search, it is known that no studies have examined the effect of government expenditure and money supply on the interest rate in Indonesia except research on the effect of government expenditure on investment by Fitrianti *et al.* (2015).

The present study aims to examine the effect of government expenditure and money supply on the interest rate in Indonesia. For the analysis purpose, it applied ARDL bounds test approach of Pesaran and Shin (1999) and Pesaran *et al.* (2001). The data used was quarterly time series data from the fourth quarter of the year 2005 to the first quarter of the year 2017.

1. Literature review

Studies concerning the relationship between government expenditure, money supply and the interest rate have been a concern of previous researchers. The section earlier has theoretically discussed the relationship among them. This section will particularly provide a review of several empirical research. Based on the literature search, there are four groups of empirical research regarding the relationship between government expenditure, money supply, and the interest rate. The four research groups are:

- research on the relationship between government expenditure and interest rate;
- research on the relationship between government expenditure, the interest rate, and other macroeconomic variables;
- research on the relationship between money supply and the interest rate;
- research on the relationship between money supply, the interest rate, and other macroeconomic variables.

Devereux (1991) examined the relationship between government expenditure and the interest rate. The results of this study showed that a rise in government expenditure decreased the interest rate and raised the investment. Du (2015) used a distributed lag model to analyze the relationship between government expenditure and the interest rate for the case of the US and China. From the analysis of the annual data spanning from 1959 to 2002 for the US and from 1989 to 2004 for China, he revealed the positive relationship between government expenditure and the interest rate in both countries. In this respect, a temporary increase in government expenditure led to an increase in the interest rate.

Choi and Devereux (2006) studied the relationship between government expenditure, gross domestic product (GDP), personal consumption spending, real fixed private domestic investment, nominal federal government debt, GDP deflator (inflation), and the interest rate in the United States. They used a vector of autoregressive (VAR) model to analyze quarterly data covering the period 1959:1-2001:4. The VAR test results showed that the increase in government expenditures had asymmetric effects on the interest rates and inflation.

Hardouvelis (1987) examined the relationship between money supply and the interest rate in the United States. He used a multiple regression model to test the relationship. Based on the analysis of monthly data spanning from February 1960 to March 1985, he found that money supply negatively affected the interest rate in the period of October 1979 to October 1982. Reichenstein (1987) also revealed the existence of negative relationship between money supply and the interest rate using the multivariate model for monthly data case covering the period January 1965 to March 1983.

Kasumovich (1996) looked into the effect of money supply surprises on the interest rate, output, price levels, and exchange rates in Canada using the VAR model. The VAR test results showed that a permanent increase in money supply decreased the interest rate temporarily, raised both the real output and the price level, and weakened the exchange rate of Canada currency. By contrast, a temporary rise in the interest rates lowered both the money supply and the output but raised the price level. Using the VAR model, Giani *et al.* (2014) investigated the relationship between the growth of money supply, the interest rates, and the unemployment rate for the case of the US annual data from 1960 to 2012. The study showed that the growth of money supply and the unemployment was a determinant of the interest rates. Similarly, by means of the VAR model, Kaplan and Gungor (2017) also revealed the existence of a positive relationship between money supply, interest rates, and inflation in Turkey using monthly data from January 2008 to December 2015.

2. Methodology

Data

This study made use of the data of government expenditure, money supply, and the interest rate. The money supply used the M2 data, and the interest rate used the interbank interest rate of Indonesia that was the 30-month rate. All the data was quarterly data spanning from 2005Q4 through 2017Q1. These three types of data were obtained from the Federal Reserve Bank of St. Louis. For the purpose of analysis, all the data was converted into the form of the natural logarithm.

Unit root test

Since the data analysis of the effect of government expenditure and money supply on the interest rate used the ARDL model, the first step was to test stationary data or integration order. This is due to the explanatory variables in the ARDL model can be either all I(0), or all I(1) or a combination of I(0) and I(1). In addition, the variables involved in the model should not be integrated with the stochastic trend I(2). Although the ARDL co-integration technique does not require unit root testing, it is necessary however to test the order of integration to ensure there is no variable I(2) in the model (Nkoro and Uko 2016)

The unit root test used was Augmented Dickey-Fuller (ADF) test developed by Dickey and Fuller (1981) as well as Phillips-Perron (PP) test developed by Phillips and Perron (1988). The ADF equation associated with the unit root test for variable y is

$$d(y_t) = a_0 + a_1 t + \Phi y_{t-1} + \sum_{i=1}^n \theta_i d(y_{t-i}) + \varepsilon_t \quad (1)$$

where: $d(y_t) = y_t - y_{t-1} = y - y(-1)$ is the first difference of y_t ; Notation α , β , Φ and θ_i ($i = 1, 2, \dots, n$) are parameters; t is a trend, ε_t is white noise.

The parameter test Φ in the equation (1) used statistic that is usually called τ_τ -statistic (Mills 2015). Meanwhile, unit root test of PP used the equation:

$$d(y_t) = b_0 + b_1 t + \theta y_{t-1} + v_t \quad (2)$$

where: v_t is white noise.

The parameter test θ in the equation (2) used t-statistic following PP-statistics distribution. In the unit root test, p-value criterion of the statistic test was used. If the p-value of the statistic test is smaller than the significance level of 1%, 5%, or 10%, then a time series is said to be stationary or integrated of order d , I(d), $d \geq 0$.

Analysis of Cointegration Relation

After testing the integration order or stationary of all variables, the following step was to test the cointegration between government expenditure (GE), money supply (MS) and the interest rate (IR) using the ARDL bounds test for cointegration of Pesaran and Shin (1999) and Pesaran *et al.* (2001). The ARDL cointegration equation is as follows:

$$D(IR_t) = \alpha_1 + \sum_{i=1}^{p-1} \vartheta_{1i} D(IR_{t-i}) + \sum_{j=0}^{q-1} \varphi_{1j} D(GE_{t-j}) + \sum_{k=0}^{r-1} \psi_{1k} D(MS_{t-k}) + \delta_1 IR_{t-1} + \delta_2 GE_{t-1} + \delta_3 MS_{t-1} + \varepsilon_{1t} \quad (3)$$

where: α_1, ϑ_{1i} ($i = 1, 2, \dots, p - 1$), φ_{1j} ($j = 0, 1, \dots, q - 1$), ψ_{1k} ($k = 0, 1, \dots, r - 1$), and δ_l ($l = 1, 2, 3$) are the regression parameters; ε_{1t} is white noise.

The hypothesis formula for cointegration testing was $H_0: \delta_l = 0 \forall l$ (there is no cointegration) versus hypothesis, $H_1: \delta_l \neq 0, l = 1, 2, 3$ (there is cointegration). The hypothesis testing used Wald-statistic or F-statistic. The test conclusions were obtained by comparing the statistic test values with the critical value of lower bound I(0) or upper bound I(1). If the statistic test is smaller than the lower critical bound I(0), then the hypothesis H_0 is accepted, meaning there is no cointegration between government expenditure, money supply and the interest rate. On the contrary, if the statistic test is larger than the upper critical bound I(1), then H_1 is accepted, meaning there is cointegration between government spending, money supply, and the interest rate. If the statistic test is between the lower critical bound I(0) and the upper critical bound I(1), then the test does not provide any certainty. Narayan (2005) has provided a set of the lower critical bound I(0) and the upper critical bound I(1) at a significant level of 1%, 5%, and 10% for the research sample between 30-80 observations. Since this study consisted of 44

observations, then the testing of hypothesis related to cointegration made use of critical values from Narayan (2005).

The ultimate step was to estimate the long-run relationship by applying the ARDL model with the following equation:

$$IR_t = \alpha_2 + \sum_{i=1}^p \vartheta_{2i} IR_{t-i} + \sum_{j=0}^q \varphi_{2j} GE_{t-j} + \sum_{k=0}^r \psi_{2k} MS_{t-k} + \varepsilon_{2t} \quad (4)$$

where: α_2 , ϑ_{2i} ($i = 1, 2, \dots, p$), φ_{2j} ($j = 0, 1, \dots, q$), ψ_{2k} ($k = 0, 1, \dots, r$), ε_{2t} is white noise that is normally distributed and independent with $E(\varepsilon_{2t}) = 0$, variance σ^2 is constant.

The model (4) is called ARDL(p, q, r) model where p, q , and r are called length of the time lag. The long-run coefficient of government expenditure variable (GE) and money supply (MS) is expressed by the following equation:

$$\gamma = \frac{\sum_{j=0}^q \varphi_{2j}}{1 - \sum_{i=1}^p \vartheta_{2i}} \text{ and } \delta = \frac{\sum_{k=0}^r \psi_{2k}}{1 - \sum_{i=1}^p \vartheta_{2i}} \quad (5)$$

The further step, we estimated the error correction model as follows:

$$D(IR_t) = \alpha_3 + \sum_{i=1}^{p-1} \vartheta_{3i} D(IR_{t-i}) + \sum_{j=0}^{q-1} \varphi_{3j} D(GE_{t-j}) + \sum_{k=0}^{r-1} \psi_{3k} D(MS_{t-k}) + \beta EC_{t-1} + \varepsilon_{3t} \quad (6)$$

where: α_3 , ϑ_{3i} ($i = 1, 2, \dots, p - 1$), φ_{3j} ($j = 0, 1, \dots, q - 1$), ψ_{3k} ($k = 0, 1, \dots, r - 1$), and β are the variable coefficients in regression; EC_{t-1} is the error correction variable; ε_{3t} is white noise.

The model (6) is also usually called the short-run model (Ozturk and Acaravci 2016), where ϑ_{3i} ($i = 1, 2, \dots, p - 1$), φ_{3j} ($j = 0, 1, \dots, q - 1$), and ψ_{3k} ($k = 0, 1, \dots, r - 1$) are called the short-run coefficient from interest rate, government expenditure and money supply variables. Time series EC_t was obtained from the regression equation $EC_t = IR_t - C - \gamma GE_t - \delta MS_t$ where $C = \frac{\alpha_2}{1 - \sum_{i=1}^p \vartheta_{2i}}$, γ and δ have been stated in (5). Such coefficients as C, γ and δ were assumed to be stabilized. To test the stability of these coefficients, recursive CUSUM test and recursive CUSUM square test were applied (Brown *et al.* 1975).

The long-run coefficients (5) are called the multiplier effects of the independent variables of GE and MS against the dependent variable IR (Koop 2006). If the coefficients are statistically significant, then there is an effect of GE and MS on IR. The same thing also applies to the short-run coefficients (Murthy and Okumande 2016). Thus, it is sufficient to determine the effect of government expenditure and money supply on the interest rate by testing the significance of the coefficients of the regression equation. For this reason, the Granger test of causality was not performed in this study.

3. Results and discussion

Unit root test

The result of the test statistic estimation of the ADF test and its p-values is summarized in Table 1. If we compare the p-values of the t-statistics listed in Table 1 with their significance level (1%, 5% and 10%), it is found that GE and IR were stationary at the level or integrated of order 0, I(0). Whereas the MS variable was not stationary at the level, but stationary at the first difference, or integrated of order one, I(1). Thus, the regressors of the equation of ARDL (p, q, r) in (5) were the combinations of I(0) and I(1).

Table 1. ADF Test and Phillip-Perron Test

Variable	Augmented Dickey-Fuller Test Statistic		Phillips-Perron Test Statistic	
	Constant	Constant & Trend	Constant	Constant & Trend
GE	-2.254742	-3.264514***	-1.712703	-3.105825
D(GE)	-8.096039*	-8.714703*	-11.02820*	-20.10136*
MS	-1.443651	-0.658303	-1.888478	-0.529546
D(MS)	-6.507617*	-6.832246*	-6.507121*	-7.506803*
IR	-3.516469**	-3.671064**	-2.422987	-2.298492
D(IR)	-3.944036*	-3.993858**	-3.028821**	-3.050307

Note: *, **, *** significance 1%, 5%, 10%.

Source: Own processing.

Analysis of Cointegration

The length of the lag for the equation (2) was set using the Schwarz Criterion and as a result, the ARDL(2, 0, 2) model obtained. The F-statistical estimation from the ARDL(2, 0, 2) model, the values of the lower critical bound $I(0)$, and of the upper critical bound $I(1)$ are summarized in Table 2. If we compare the F-statistics value (5.347954) with the upper critical bound value $I(1)$ at the significance level of 5% (4.26), then the F-statistic value is larger than the upper critical bound $I(1)$ value at the significance level of 5%. Thus the null hypothesis stating that no cointegration rejected. In the other words, there was cointegration between government expenditure, money supply and the interest rates.

Table 2. Bounds Test for Cointegration

Sample (T)	Number of Explanatory Variable (k)	F-Statistics	Critical Value			
			I(0)		I(1)	
			1%	5%	1%	5%
44	2	5.347954	4.770	3.435	5.855	4.260

Note: Critical values are extracted from Table in Appendix of Narayan (2005); Source: Own processing.

The estimation results of the long-run coefficients of the equation (4) represented by the formula (5) as well as the short-run coefficients of the equation (6) are summarized in Table 3. It appears in Panel B of Table 3 that the long-run coefficient of GE is significant 5%, and the long-run coefficient of MS is significant 10%. This means that there is a long-run influence of government expenditure and money supply on the interest rates.

Meanwhile, it appears in Table 3 in Panel B that the coefficient $D(GE)$, the coefficient $D(MS(-1))$, the error correction coefficient $EC(-1)$, and the coefficient $D(IR(-1))$ are significant 5%, 5%, 1% and 1% respectively. This indicates that there is a short-run effect of government expenditure and money supply on the interest rate. The $EC(-1)$ coefficient is -0.1988 indicating that the long-run equilibrium deviation between government spending, money supply, and the interest rate is corrected roughly 19.88% in the next quarter.

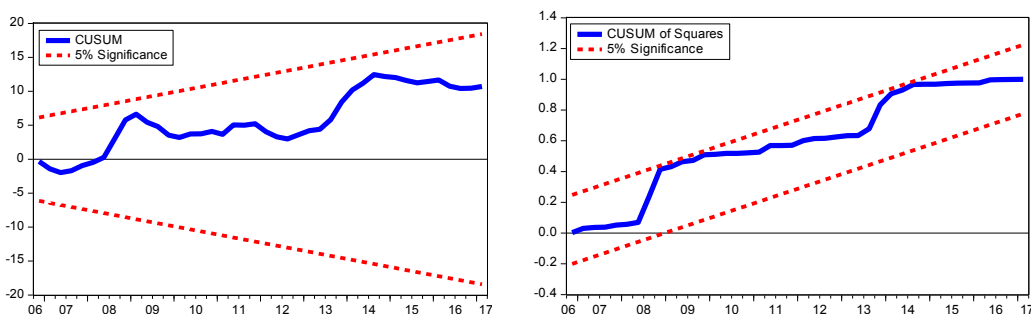
Table 3. Estimation of The Long-Run and Short-Run Coefficients

Constant and Independent Variables	Coefficient	t-Statistics	P-value
Panel A : Long-run Estimation Dependent Variable: IR			
GE	-1.483591**	-2.091246	0.0434
MS	1.158836***	1.736735	0.0908
C	-20.974858	-1.376229	0.1770
Panel B: Short-Run Estimation Dependent Variable : D(IR)			
$D(IR(-1))$	0.826058*	7.601979	0.0000
$D(GE)$	-0.294971**	-2.168128	0.0367
$D(MS)$	0.110350	0.229689	0.8196
$D(MS(-1))$	-1.133043**	-2.410424	0.0210
$EC(-1)$	-0.198823*	-4.512759	0.0001

Note: *, **, *** are significance 1%, 5%, 10%. Source: Own processing.

Furthermore, the results of parameter stability test using the CUSUM test and CUSUM Square test are shown in Figure 1. It appears in Figure 1 that the residual recursive is within the line limit of 5% significance. The p-values of the statistical tests: Jarque-Berra test, Breusch-Godfrey Serial Correlation LM test, and White test are 0.447, 0.689, and 0.183 respectively. These p-values are larger than the significance level of 5%, leading to a conclusion that the residual of ARDL (2, 0, 2) model distributes normally with the constant variance (homoscedastic) and does not have any autocorrelation.

Figure 1. CUSUM plot (left) and CUSUM square plot (right) of Regression Equation coefficient



Source: Own processing.

Discussion

If we notice the long-run coefficients, then it can be said that every 1% increase in the government expenditure, the interest rates fall by 1.48%. This conclusion but corresponds with the theories put forward by Chang and Tsai (1998) as well as Mankiw (1987). Empirically, the finding of this study is also in line with that of Devereux (1991) but is in contrast to that of Du (2015).

Meanwhile, the increase in money supply is followed by the interest rates increase although it is relatively small, that is in every 1% increase in money supply, the interest rates rise by 1.16%. The finding of this study disagrees with the theory of Gibson (1970), as well as Caporale and McKiernan (1999). Empirically, it is inconsistent with the findings of Gibson (1970), Caporale and McKiernan (1999), and Kasumovich (1996), but in line with that of Kaplan and Gungor (2017). The existence of the positive relationship between money supply and the interest rates found in this present study can be caused by the money demand changes that are greater than those of money supply within the times of sampling. Such changes can be due to the set of the interest rates by the Central Bank of the Republic of Indonesia is at a certain level at which investment decision at that level considered very profitable by investors.

Conclusion

This study aims to examine the effect of government expenditure and money supply on the interest rates. The research samples are quarterly data covering the period 2005Q4 to 2017Q1. The model used to analyze the effect is the ARDL bound test approach.

The analysis using the ARDL (2, 0, 2) model indicates that there is a long run effect of government expenditure and money supply on the interest rates. Besides, there is also a short-run effect. The long-run effects of government expenditure on the interest rates are negative, in which for each 1% increase in government spending, the interest rates decrease by 1.48%. Meanwhile, the long-term effect of money supply on interest rates is positive, in which every 1% increase in money supply, the interest rate rises by 1.16%.

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Fiscal Decentralization and Routine Conflict in Indonesia

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Abstract:

This study attempts to investigate whether fiscal decentralization is more effective to reduce routine conflict in provinces with good institutional quality. Our quantitative findings show that institutional quality does matter in explaining the fiscal decentralization – routine conflict nexus. In addition, both fiscal dependence and fiscal discretion are negatively and significantly correlated with the incidence of routine conflict and the deaths resulted from routine conflict. However, the qualitative results indicate that the phenomenon of elite capture occurs in every level of government.

Keywords: fiscal decentralization; routine conflict; Indonesia

JEL Classification: H110; H770; H830

Introduction

The conceptual basis of decentralization in the world has become a major debate amongst scholars. In this context, Oates (1972) assumes that there is no spillover effect between jurisdictions associated with public goods because the benefits of consuming these items are limited to individuals within the jurisdiction. Thus, larger and heterogeneous countries will benefit. However, the uniform level of public goods provision tends to be inefficient because each region has different social and economic characteristics. The argument shows that fiscal centralization can cause social unrest, which in turn, increases the risk of internal conflict and secession (Hechter 2000). This is due to the fact that the treatment of the central government over a particular region is considered unfair or discriminatory by the local population. On the other hand, by giving local governments greater control over economic affairs, as well as policies to design and implement policies taking into account the preferences of their citizens, fiscal decentralization can reduce the potential risks of internal conflict and secession (Tranchant 2010).

Turning to the fiscal decentralization – conflict nexus, Tranchant (2010) argues that fiscal decentralization is more effective when the ethnic distance between the largest group and population is the largest. Moreover, fiscal decentralization works better in rich countries as well as in poorer groups than in other populations, depending on the capacity of strong local governance. While Ezcurra (2015) finds that fiscal decentralization correlated negatively and significantly with the incidence of civil conflict. In Indonesia, Murshed and Tadjoeidin (2008) state that fiscal decentralization can reduce routine conflict in Java. While Rusyiana and Sujarwoto (2017) find that there is no significant relationship between fiscal decentralization and communal conflict in all districts and villages in Indonesia.

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Concerned with the lack of cross-province studies in Indonesia and the limited dimension of fiscal decentralization indicators as presented by Murshed and Tadjoeeddin (2008) as well as Rusyiana and Sujarwoto (2017), our study attempts to fill these gaps. In addition, the role of institutional quality in explaining the fiscal decentralization – conflict nexus will be elaborated in our study. Specifically, we want to investigate whether fiscal decentralization is more effective to abate routine conflict in provinces with good institutional quality.

1. Literature review

According to Rondinelli (1981), decentralization consists of three different but interdependent dimensions: the political, administrative, and fiscal dimensions. Political decentralization consists of the transfer of decision-making authority to elected local officials, who are accountable to their own constituencies. Administrative decentralization refers to the transfer of decision-making power in the management of public service functions such as recruitment decisions and salary fixing. Fiscal decentralization refers to the transfer of decision-making power to income and the assignment of expenditures to local governments. In practice, it is difficult to think of meaningful levels of fiscal decentralization without an effective level of political and administrative decentralization.

Over the past few decades, many central governments in some countries have essentially handed over political, administrative, and fiscal powers to local governments. According to data collected by Garman *et al.* (2001), over 80% of the 75 developing countries analyzed have undergone decentralization at the start of the millennium. Since then, the trend has only increased, including rich and poor countries, large and small populations, with different colonial origins.

Based on the conditions of a large number of countries that have implemented decentralization, Faguet (2014) provides some explanation of the reasons behind this phenomenon. Policymakers in other countries such as Peru, Cambodia, Mexico, India and Tanzania emphasize on reducing inequality in access as a goal of decentralization, in addition to increasing community participation and democracy, and to strengthening public accountability and government effectiveness in society. On the other hand, the provision of public services and goods in some countries such as Colombia, South Africa, and Ethiopia is designed to reduce ethnic conflict, and/or separatist movements.

From the above explanation, we can see that country size, population diversity, and expectations for achieving better institutional quality play a major role in decentralization. However, some empirical studies also show that the economic crisis can have an important role (Bahl and Linn 1992). The crisis has motivated many developing countries such as Indonesia to start a decentralization strategy. Before the Asian financial crisis of 1997, Indonesia was regarded as an "Asian Tiger", along with South Korea, Hong Kong, Taiwan and Singapore. However, the economic crisis that hit Indonesia in 1997, followed by the political crisis in 1998 and the fall of the Soeharto regime seems to expedite the decentralization process (Silver *et al.* 2001).

Some scholars try to investigate the relationship between fiscal decentralization and conflict, without providing conclusive results. Tranchant (2010) investigates the relationship between fiscal decentralization, as measured by the share of sub-national government spending over total government spending, institutional quality, and ethnic conflict in the period 1985 - 2001. It uses the Minority at Risk (MAR) dataset and the estimated Generalized Method of Moments (GMM) system. He finds that institutional quality is important to correctly estimate the impact of fiscal decentralization. In addition, fiscal decentralization is more effective when the ethnic distance between groups and other populations is greatest and it works better in rich countries. Also, groups that are poorer than the rest of the citizens are those who benefit the most from fiscal decentralization, which must be accompanied by strong local state capacities.

Based on the Tranchant study, the fiscal decentralization indicator can be viewed solely on the expenditure side. To address this issue, Ezcurra (2015) uses the UCDP / PRIO dataset to investigate fiscal decentralization, as measured by the share of sub-national governments spending over total government spending, and the share of sub-national government revenue over total government revenue, and conflicts, as measured by all conflicts with 25 or more war-related deaths in a year, in 77 countries during the period 1972 – 2000. To minimize the issue of reverse causality due to the fact that in the face of internal conflict, countries can change the level of decentralization, he uses a two-year lagged value of fiscal decentralization indicators. Using the Instrumental Variable (IV) probit techniques, he finds that fiscal decentralization reduces the incidence of civil conflict.

While most cross-country studies are dominated by other forms of violent conflict such as revolutionary warfare and ethnic separation, several case studies of one country try to investigate the phenomenon of conflict, beyond civil war. Murshed and Tadjoeeddin (2008) broadly categorize violent conflict or group/collective violence into episodic and routine. The former constitutes an ethno-communal war together with separatist violence and regional separation. It has a major economic impact and internally displaces many people. The latter consists of

ordinary violence along with group fights and vigilante violence. It is less likely to supersede inhabitants and relatively causes minor damage. In their research, they use the newly built UNSFIR dataset on social violence in Indonesia and the negative binomial estimation techniques to examine the relationship between routine violence and fiscal decentralization in 98 districts on the island of Java over the period 1990 – 2003. They find that routine violence is negatively and significantly correlated with the impact of fiscal decentralization and the size of local government. Also, there is a bell-shaped relationship between income and violence where initially, growing prosperity induces violence before it actually decreases after the increase in average incomes.

Quantitative studies conducted by Murshed and Tadjoeeddin (2008) only cover the districts of Java and therefore, these findings can only be generalized in inter-district communal conflicts within the Island. Recently, Rusyiana and Sujarwoto (2017) use SUSENAS dataset to examine the relationship between decentralization and conflict in all districts and village levels in Indonesia from 2008 to 2014. Using multi-level logit regression, they find that administrative decentralization was negatively and significantly correlated with communal conflicts, while both fiscal and political decentralization are not. However, there are several weaknesses in their study, as follows.

First, their decision to link simultaneously the three dimensions of decentralization with conflict is methodologically flawed since the extent to which local governments receive authority in terms of administrative, political and fiscal is difficult to measure. Therefore, separate regression is needed. Second, this study has several measurement errors related to fiscal decentralization indicators and proxy variables of institutional quality. In the former, they use the logarithmic function of the district's general allocation fund (*Dana Alokasi Umum – DAU*) that is transferred by the central government. However, the indicators of local fiscal dependence and fiscal discretion are neglected in this study. Finally, their decision to use accessibility on television broadcasting as a means of measuring institutional quality can be considered inadequate methodologically.

2. Methodology

In this research, we use a sequential explanatory strategy where it is characterized by the collection and analysis of quantitative data in the first phase of the study, followed by the collection and analysis of qualitative data in the second phase built on the results from quantitative analysis (Creswell 2009). We assume that institutional quality can play an important role in explaining the relationship between fiscal decentralization and routine conflict in Indonesia. Quantitatively, the crime rates can be a proxy variable on the quality of government, reflecting the quality of law enforcement and the capacity of law enforcement in preventing and punishing criminals (Buonanno and Vargas 2017). Meanwhile, qualitatively, we argue that institutional quality can be illustrated by looking at the determination of intergovernmental fiscal transfer policies and their implementation at the local government level.

In the case of Indonesia, Murshed and Tadjoeeddin (2008) categorize violent or group / collective violence into episodic and routine. In this study, the dependent variable used is routine conflict measured in terms of incidence and death. Such data can be obtained from the National Violence Monitoring System (*Sistem Nasional Pemantauan Kekerasan – SNPK*). The following panel data models will be used in cross-province level estimation:

$$C_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 Ins_{it} + \beta_3 (FD_{it} \times Ins_{it}) + \beta_4 X_{it} + \epsilon_{it} \quad (1)$$

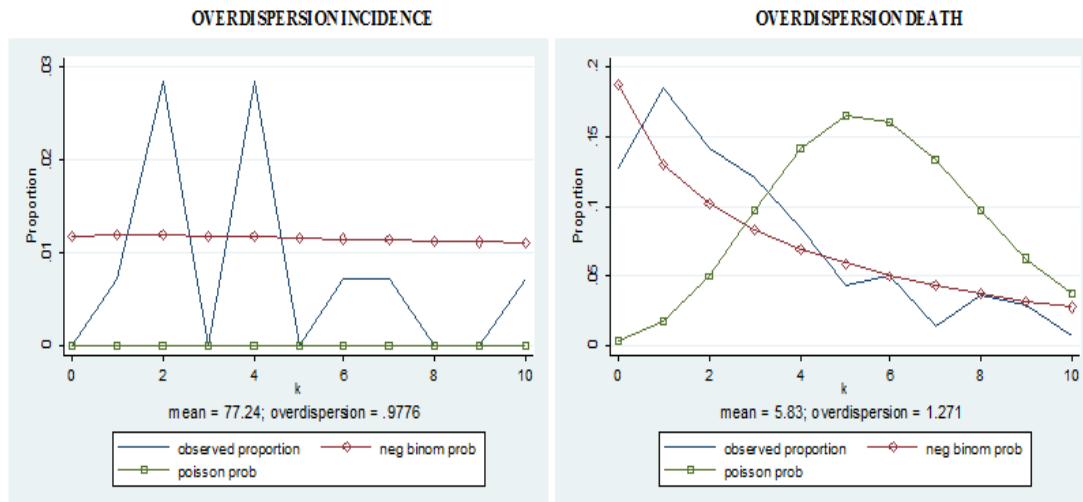
Where subscript *i* denotes 32 provinces, *t* denotes the year of observation, 2005 – 2014. *X_{it}* is a control variable vector assumed to have an influence on conflict, and ϵ is an appropriate interruption term. According to the economic theory of conflict and civil war, the level of development plays a key role in this context (Newman, 1991). We use the Gross Regional Domestic Product (GRDP) per capita taken from the Central Bureau of Statistics (*Badan Pusat Statistik – BPS*) to capture the differences that exist in development across the sample provinces. Thus, provinces with higher GRDP per capita tend to have stronger regional capacity (Fearon and Laitin 2003). We also include the average years of schooling, as low levels of education are associated with lower opportunity costs to engage in violence (Østby and Urdal 2010, cited in Tadjoeeddin *et al.* 2016). In addition, we include the Headcount Poverty Rate and the horizontal inequality indicators (Group Gini) as they are the driving forces in the conflict (Tadjoeeddin and Murshed 2007 and Tadjoeeddin *et al.* 2016). Some demographic variables such as ethnic fractionalization, distance, and population size also serve as control variables because they have been used by many authors in investigating conflicts (Tranchant 2010, Ezcurra 2015, Tadjoeeddin *et al.* 2016). Another control variable included in the equation is the criminal rate as a proxy variable of institutional quality because it can reduce the risk of conflict through interplay with fiscal decentralization (Tranchant 2010). All of these data can be obtained from BPS.

Our main variable of interest lies in the β_1 coefficient, which measures the effect of fiscal decentralization level on the routine conflict. Here, fiscal decentralization in Indonesia is measured by the share of intergovernmental fiscal transfers to total local government revenues. This indicator can indicate the ratio of fiscal dependence of local

governments on intergovernmental fiscal transfers from the central government. In this study, we also used the ratio of fiscal discretion calculated from the total amount of unconditional intergovernmental transfers to total local government revenues. This indicator shows how far local governments have discretion in optimizing block grants. The data on both indicators is based on the realization of Local Revenue and Expenditure Budget (*Anggaran Pendapatan dan Belanja Daerah – APBD*) issued by the Ministry of Finance on a regular basis.

As we mentioned earlier, routine conflict is measured in terms of incidence and deaths. Such variables are clearly in the form of count data that may take on any non-negative integer value, including zero. Our dependent variable is discrete but there is evidence of overdispersion in the data in which variance is greater than mean. Thus, negative binomial model might be the popular alternative (Cameron and Trivedi 2005). We conducted preliminary test showed a sign of overdispersion and hence, negative binomial in a panel model is appropriate (see Figure 1).

Figure 1. Overdispersion on Incidence and Death from Routine Conflict



The datasets we obtained were relatively unbalanced (see Table 1). We inspected that most of variations were within variation rather than between variation. Thus, we suspect that the fixed effect in the form of negative binomial regression would be appropriate to illustrate the relationship between fiscal decentralization and routine conflict. Related to the dependent variable, the incidence of routine conflict and the magnitude of death rate due to routine conflict is at a relatively moderate level. Meanwhile, the indicators of fiscal decentralization, the ratio of fiscal dependence and local fiscal discretion are relatively high at 76% and 70%. From the perspective of institutional quality, crime rates on average are relatively moderate. On the other hand, indicators of horizontal inequality are relatively high in Indonesia, while poverty indicators are at a relatively moderate level.

Table 1. Summary of statistics

	Observation	Mean	Std. Deviation	Min	Max
Incidence	141	77.24	110.51	1	775
Death	141	5.83	8.79	0	63
Fiscal Dependency	319	76.43	10.13	42.65	95.82
Fiscal Discretion	319	70.06	8.82	40.14	87.10
Crime	256	18.03	10.11	1.30	55.7
Fiscal Dep x Crime	256	1,382.90	832.11	83.51	4,548.22
Fiscal Dis x Crime	256	1,258.50	747.18	78.75	3,809.12
Group Gini	320	0.35	0.04	0.26	0.46
Poverty	320	15.40	8.16	3.95	42.12
GRDP per capita (log)	320	9.46	0.90	7.68	11.80
Distance (log)	320	7.96	0.84	6.41	9.65
Population (log)	320	15.16	1	13.44	17.65

Since fiscal decentralization is one of the political responses of episodic violence, we ignore the phenomenon of reverse causality in the relationship between fiscal decentralization and conflict. An econometric analysis was conducted on February 2018, preceded by a literature review phase on January 2018 and data collection phase on March 2018.

The results of the econometrics analysis will then be followed by qualitative fieldwork around May 2018. In this context, the initial design validation of the optimal model of fiscal decentralization based on government quality is conducted in two ways:

- Expert Judgment. According to Moleong (2007), expert judgment is a form of triangulation in a qualitative approach. Expert judgment is done by way of utilizing researchers or other observers for the purpose of re-checking the results of research. In this way researchers can compare the results of the research with studies or other research results. There are two (2) experts involved in this research, as follows:
 - expert on fiscal decentralization;
 - expert on public policy.
- Focus Group Discussions (FGDs). This method is very common in social research to collect general information from different perspectives (Creswell 2013). Because it emphasizes perceptions among people with similar backgrounds, FGDs can be useful for exploring general information about the planning and implementation of fiscal transfers. Such general information could be the basis for capturing more detailed and specific information when researchers conduct semi-structured interviews. In our research, we have conducted six (6) FGDs. Two FGDs are focussed on stakeholders at the national level, ranging from the central government bureaucrats level (e.g. Ministry of Finance, Ministry of Home Affairs, and Ministry of Planning and Development) to the members at House of Representative (*Dewan Perwakilan Rakyat – DPR*). Other four FGDs are emphasized on stakeholders at the provincial and districts / cities level, ranging from government apparatus level (Local Secretary, Local Development and Planning Agency, and Local Government Unit Agencies) to the member of Local Parliament (*Dewan Perwakilan Rakyat Daerah – DPRD*).

With regard to the scope of the fieldwork, we will use a case study approach in West Java province. Yin (2009) argues that case studies are empirical investigations that examine contemporary phenomena in the context of real life. This is particularly useful when the boundary between phenomena and context is unclear.

West Java was chosen as a case study based on several arguments. First, the growth rate of West Java increased from 5.6% in 2005 to 6.33% in 2013 (BPS 2005 - 2013). A recent study from Miranty *et al.* (2013) shows that from 2001 to 2010, there was an increase in vertical inequality in West Java. They also revealed that although West Java experienced a slight decrease in poverty between 2001 and 2010, the poverty rate in West Java was categorized as moderate in 2001 and 2010. Second, West Java consists of 27 regencies and cities, which is the fifth largest after East Java, Central Java, North Sumatra, and Papua in terms of number of local governments. Under these conditions, West Java province can be a perfect case study to investigate the “intermediary” role of the provincial government's in bridging the expectations of the central government and the aspirations of district/city governments in their working areas. Third, among other provinces in the Java corridor, the fiscal dependency ratio in West Java accounted for 50 percent of total revenues. However, when compared with other provinces, this number is relatively small, which is the fourth lowest after DKI Jakarta, Banten, and Bali. In this case, West Java can be a good example to test the adequacy of intergovernmental fiscal transfers.

Since the province of West Java consists of 27 districts/cities, researchers will not collect qualitative information from all districts because it is limited by time and cost. Instead, we will focus on the stakeholders in city of Depok and regency of Bekasi because they are categorized by the Ministry of Finance as high and low fiscal capacity, respectively (Ministry of Finance 2016). In addition, these two regions have different profile in terms of natural resources where regency of Bekasi is associated with resource-rich region while city of Depok is closely related to the growth in manufacture and services sector.

3. Results

In Table 2, we try to investigate whether the effects of fiscal decentralization on routine conflicts are straightforward as set forth in models (1), (2), (5), and (6) or they can be explained by the predictive value of the fiscal decentralization indicator originating from the regression of the institutional quality indicators and their interaction with fiscal decentralization indicators, as set out in models (3), (4), (7), and (8). Using the hausman test, a negative binomial regression with a fixed effect that constitutes province and year will be applied across the model.

In relation to the direct effects, fiscal dependency and fiscal flexibility have no significant effect on the incidence of routine conflicts and deaths from routine conflicts in Indonesia. Meanwhile, the crime rates which serve as a proxy variable of institutional quality is able to correlate positively and significantly to the incidence of routine conflict where an one standard deviation increase in crime rate will increase the incidence of routine conflict by 1.72 and 2, respectively when fiscal discretion and fiscal dependence are included in the calculation. Also, the

interactive terms between fiscal dependence and crime rates as well as between fiscal discretion and crime rates are negatively and significantly correlated with the incidence of routine conflict. This indicates that fiscal decentralization can reduce the incidence of routine conflict in Indonesia at the provincial level by improving the quality of law enforcement and by enhancing the capacity of law enforcers in preventing and punishing criminals. Specifically, an increase in the interaction terms between local fiscal dependence and the criminal rate, as well as between the local fiscal discretion and the crime rate of one standard deviation will decrease the incidence of routine conflict by 2.5 and 1.5, respectively. In addition, horizontal inequality and poverty rate are negatively and significantly correlated with the incidence of routine conflict in Indonesia.

In models (3), (4), (7), and (8), the fiscal decentralization indicators are the predictive value from the regression of the institutional quality indicator and their interaction with the fiscal decentralization indicators. We also added predictive value of horizontal inequality stemming from the regression of the gross regional domestic product (GRDP) per capita to test the Kuznet's hypothesis (1955). We can see that both fiscal dependence and fiscal discretion are negatively and significantly correlated with the incidence of routine conflicts and deaths from routine conflicts. Specifically, a one standard deviation increase in fiscal dependence and fiscal flexibility will decrease the incidence of routine conflict and death due to conflict routine by 0.41 and 0.35, respectively. In addition, when fiscal dependence and fiscal margin are taking into account, poverty rates are negatively and significantly correlated with routine conflict events. Specifically, an increase in the poverty rates of one standard deviation will decrease the incidence of routine conflicts by 0.65 and 0.8, respectively. Tadjoeidin *et al.* (2016) also find similar results and hence, this phenomenon contradicts to our expectations.

Table 2. Negative Binomial Regression between Fiscal Decentralization and Routine Conflict

	Incidence (1)	Death (2)	Incidence (3)	Death (4)	Incidence (5)	Death (6)	Incidence (7)	Death (8)
Fiscal Decentralization Indicators								
Fiscal Dependency	0.007 (0.013)	-0.03 (0.04)	-0.04*** (0.01)	- 0.04*** (0.02)				
Fiscal Discretion					0.009 (0.014)	-0.02 (0.04)	-0.04*** (0.01)	-0.04** (0.02)
Institutional Quality Indicator								
Crime Rates	0.20*** (0.075)	0.06 (0.20)			0.17** (0.08)	0.03 (0.2)		
The Interactive Terms								
Fiscal Dep x Crime	-0.003*** (0.001)	-0.001 (0.003)						
Fiscal Dis x Crime					-0.002** (0.001)	-0.0004 (0.003)		
Horizontal Inequality and Poverty Measurement								
Group Gini	-7.13*** (2.39)	1.94 (5.74)	-1.1 (2.02)	5.14 (3.76)	-6.1** (2.96)	2.89 (5.81)	-1.75 (2.04)	5.01 (3.76)
Headcount Poverty	-0.09* (0.05)	0.11 (0.09)	-0.08*** (0.03)	-0.02 (0.05)	-0.07 (0.06)	0.13 (0.09)	-0.1*** (0.03)	-0.03 (0.05)
Province Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	60	60	80	80	60	60	80	80
Groups	10	10	10	10	10	10	10	10

Notes: Number of parentheses are robust standard error where *** = significant at 1% level, ** = significant at 5% level, and * = significant at 10% level. Other control variables constitute natural logarithm of GRDP per capita, population, and distance, as well as average years of schooling, and ethnic fractionalization. Full results are available upon request.

The fieldwork results in West Java, Bekasi, and Depok indicate weak planning in fiscal decentralization. The majority of respondents said that the central government is not transparent in the allocation process. Therefore, some local governments try to influence the central government to gain or even increase allocations in their regions. In addition to the "direct intervention" of the Mayor and Bupati, heads of local government units (SKPD), DPRD and DPR members, or even private companies that regularly win "open tenders" in their regions can also influence allocations.

This condition is exacerbated by the weak role of the provincial government in addressing the lack of transparency and elite capture issues at the districts/cities level. According to Law no. 23/2014 on Local Government, the provincial government should bridge the aspirations of the district/city governments and the central government's expectation of fiscal decentralization, particularly with regard to intergovernmental transfers. In fact, respondents at the district/city level consider that the provincial government has worsened the elite capture phenomenon in the process of determining the location and size of the allocation of the intergovernmental fiscal transfers.

At the implementation level, the majority of respondents stated that the current fiscal decentralization policy provides "fear factor" for local governments to spend their budgets. This is based on the fact that central government is often too late to issue regulations. In addition, such regulations are very rigid to be implemented by local governments. Under these conditions, SKPD officials are afraid of making mistakes and breaking the rules that they can personally account for. Thus, they prefer not to do anything when in doubt (e.g. to limit spending).

Finally, majority of respondents stated that some local governments, regardless of their local fiscal capacity, feel that the amount of intergovernmental fiscal transfers they receive is insufficient to carry out their affairs. Others think that they often received an allocation that exceeds their capacity to carry out the affairs. In this situation, despite the lack of capacity, we suspect there are two motives behind this paradox. One of them refers to the political-economic motives in which some parties can make a profit, in order to maintain or even increase their strength and influence from elite capture behavior (e.g. accept a "certain percentage" of the amount of intergovernmental fiscal transfers received by the region, the incumbent Mayor and Regent was re-elected in the next period, SKPD officials got promotion, and etc.). Another motive relates to the fairness that truly reflects the need for intergovernmental fiscal transfers in the region. Therefore, two opposing arguments essentially derived from the planning aspect of fiscal decentralization in which there are various "interventions" from multiple parties to alter the location and the allocation of intergovernmental fiscal transfers.

Conclusion

In this study, we provide a novelty in the relationship between fiscal decentralization and routine conflict in Indonesia. These relationships can be explained through their interaction with indicator of institutional quality. We use two (2) different but interrelated dependent variables of routine conflict, namely: the incidence of routine conflict and the magnitude of death resulted from routine conflict.

The main result of the empirical examination is that the relationship between fiscal decentralization and routine conflict can be well described through institutional quality. In this context, fiscal dependence and fiscal discretion are negatively and significantly correlated with the incidence of routine conflict and deaths from routine conflicts. However, fieldwork results in West Java, Bekasi, and Depok provinces show poor quality of apparatus in planning fiscal decentralization policy. The elite capture phenomenon in the process of determining the location and size of the allocation does not only take place at the district/city level, but also at the provincial and central levels.

Our findings are consistent with empirical results from Tadjoeidin and Murshed (2007) as well as Murshed and Tadjoeidin (2008). In principle, there are two phenomena to explain violent internal conflict: greed and grievance (Murshed and Tadjoeidin, 2009). Accordingly, greed is simply about economic opportunity faced by rebel group to fight (loot-seeking motive). The source of rebel finance mostly centers around expropriation of natural resources. Meanwhile, grievance is sometimes described as justice-seeking motivation in the literature of civil war or rebellion. It is related to relative deprivation, that is the discrepancy between aspirations and achievements. This might motivate routine conflict in Indonesia.

In this study, some unexpected results were found in which horizontal inequality and poverty showed the opposite sign. Therefore, the need to solve irregular, rare and low-quality data is very important. Although such findings provide an interesting examination and discussion, it is beyond the scope of the study and leaves further investigation. Research limitations also require future research to explore different types of decentralization with different types of conflict.

To sum up, the findings that fiscal decentralization can reduce routine conflict in Indonesia cannot be interpreted solely as giving more intergovernmental fiscal transfers to the sub-national government in Indonesia. Instead, the central government of Indonesia should concern on improving managerial and administrative capacity of bureaucrats in every level of governments to design and implement fiscal decentralization policy. Besides bureaucratic quality, strong law and order in fiscal decentralization policy is needed to limit rent-seeking and elite capture.

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Rail Network Development and Economic Growth in Thailand

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Abstract:

This paper aims to analyze the impact of railway development on economic growth in the case of Thailand by measuring the total factor productivity (TFP) levels during 1993–2015 among seven sectors contributing to the country's gross domestic product (GDP). The findings indicate that investment in railway development increases capital stock growth, whereas, the opposite is true for the subsequent period. The standard approach is applied to analyze the effect of railway capital stock measurement on Thailand's economy. The empirical results suggest directional causality between railway capital stock and the economic growth of Thailand. As such, the growth of railway capital stock and stock per capita aims to achieve long-run economic growth. Improving the railway network creates railway capital stock accumulation.

Keywords: economic growth; railway; development; transportation; total factor productivity; Thailand.

JEL Classification: H41; H54; O18; O49; R42; R53

Introduction

Infrastructure plays an important role in regional and global economic development. It can help to promote production in the industrial sector and contributes to improving social welfare (Demurger 2000). Transportation is part of the infrastructure sustaining manufacturing industries and consumer services, and therefore needs to develop to support social needs. Transportation infrastructure development contributes to better long-run economic growth and income distribution (Benerjee 2012).

Aschauer (1988) studied the relationship between transportation infrastructure development and economic development in the United States of America during the 1970s to explain the country's lower productivity. He found that the drop in productivity had been caused by a decrease in transportation infrastructure investment, and concluded that transportation infrastructure had an important role to play in economic activity. Furthermore, public investment in transportation improvement (such as the maintenance or upgrading of roads, railways, inland waterways, maritime ports, and airports) creates employment, accessibility, and social benefit while promoting labor mobility and connecting communities.

1. Literature review

Previous literature has emphasized the important and positive effect of railway transportation on economic development. Bollinger *et al.* (1997) found that transportation infrastructure development in the Metropolitan Atlanta Rapid Transit Authority (MARTA) had a positive effect on commerce and employment in the station area. MARTA has altered the composition of employment in favor of the public sector, but this only directly affects areas with high levels of commercial activity. The results show that MARTA has promoted productivity growth in firms and labor migration efficiency from rural to urban areas. Nevertheless, the system can be useful in areas of high population density and economic activity such as Silicon Valley. However, it is not clear if this applies to the areas without a large economic zone.

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Moreover, Nerlove (1996) showed that investment in rail network development encourages economic growth. In the case of the United States of America, the railway made a significant contribution to the country's economic growth. Railway construction and maintenance were promoted to the industrial and financial sectors in the American economy. The railway not only directly promotes the industrial sectors, but creates innovation in financial enterprise. For that reason, Nerlove summarized that the railway network in the United States contributes directly to the generation of national income through the transportation service.

Alternatively, Loizides and Tsionas (2003) studied the dynamic distribution of productivity growth in European Railways using TFP to measure productivity in the rail network and found that the effect of transportation contributed to productivity growth. For example, the Belgian railway is a top performer. On the other hand, the productivity of the Danish railways improves if they use a coefficient of variation to compare ratings in terms of TFP because it has a smaller variation than the Belgian example. It only shows a "shift effect" on prices and output on productivity growth.

In addition, Tae Hoon Oum *et al.* (1999) also apply the survey as an alternative methodology for measurement and comparison of railway productivity and efficiency. They use productivity measured by TFP. The TFP index is the ratio of total output quality to total input quantity by aggregate. TFP growth is the difference between the growth of output and input quantity indices. Although productivity measured by TFP is a simple method, there are certain limitations, such as the issue concerning the selection of the type of productivity factor. The measurement result may be biased as the operation of industries differs according to technological changes.

According to previous literature, especially that concerning endogenous and neoclassical growth models, the long-run economic growth of a country depends on its productivity or technological progress. This study aims to estimate the total factor productivity growth (TFPG) levels of the railway in Thailand and its comparative progress during 1993–2015 on overall GDP and in selected economic sectors. Furthermore, the paper also investigates the relationship of TFP levels and growth on GDP to establish the effect of the railway on Thailand's economy. The respective findings are presented below.

2. Methodology

To analyze the effect of the railway on Thailand's economy, this paper uses secondary data to create a model for analyzing the impact of railway development on the national economy. The data was collected from the Office of the National Economic and Social Development Board (NESDB) and State Railway of Thailand. The model used in this study is TFP.

TFP or multi-factor productivity is a variable accounting for the influence in total output growth relative to the growth in the measured input of capital and labor. TFP can explain economic expansion not only caused by additional inputs (capital and labor) but from other parts, so the remainder is Solow residual. Diego Comin of New York University explained that TFP is the proportion of output not explained by the amount of input used in production. As such, its level is determined by how efficiently and intensely the inputs are utilized in production. TFP is calculated by dividing output by the weighted average of capital and labor input. TFP can be taken as a measure of an economy's long-term technological change or technological dynamism. From the literature review, the researcher attempts to explain evolution in the economic growth model following the book entitled "Economic Growth" by Barro and Sala-i-Martin (1997). Starting from the basic economic growth theory pioneered by Robert Solow (1956), the exogenous growth model is considered in neoclassical growth theory by assuming savings, population growth, and technological progress are constant. Subsequently, Mankiw, Romer, and Weil (1992) applied economic growth theory by adding human capital in the Solow model to improve its performance. However, the function of the exogenous growth model depends on non-increasing returns to scale, whereas former economists have studied the speed of adjustment for growth in small countries by assuming they have greater accelerated growth than larger countries. Finally, economic levels in small countries tend to converge with larger countries, because the latter have very slow growth inasmuch as the economic systems of big countries approach a steady state as a result of the diminishing (non-increasing) returns to scale. However, in reality, small countries never catch up with larger countries, and therefore, the new endogenous growth model is used to explain long-run sustainable economic growth by the assumption of non-decreasing returns to scale and accepts imperfect competition. Some economists define technological and innovation (Romer 1990) as proof that the economy cannot provide a perfect competitive market because excess normal profit is used to improve technology, innovation, and research and development (R&D) which create economic growth. Romer suggests that capital is not only defined by buildings, machines, and equipment, but also the result of investment in R&D, such as innovation or knowledge for creating new products. Progress from investment in innovation contributes to a new type of capital in knowledge

accumulation so capital accumulation includes knowledge as an externality to benefit economic development. This study follows the economic growth theory and applies an appropriate growth model using variables.

The researcher applies the Solow model (Solow 1990) by adding railway stock accumulation to represent human capital, and the renew production function is set out below:

$$Y_t = A_t f(K_t, L_t, R_t) \quad (1)$$

Assuming the Cobb-Douglas production function and Harrod's model of neutral technological change used to define A is caused by railway stock to find the railway development rate:

$$Y_t = (K)^{\alpha} (L)^{\beta} (AR)^{\theta} \quad (2)$$

When the production function exhibits constant returns to scale, taking the logarithm:

$$\ln Y = \alpha \ln K + \beta \ln L + \theta \ln R + \theta \ln A \quad (3)$$

From equation (3), the TFP levels of the railway sector can be found following equation (4):

$$(\theta) \ln A = \ln Y - \alpha \ln K - \beta \ln L - \theta \ln R \quad (4)$$

where: Y is real output of the transportation sector; A is TFP level of the railway sector; K is physical capital stock of transportation; L is labor input of the transportation sector; R is rail stock; α is capital share of the output; β is labor share of the output; θ is rail stock share of the output.

Assuming physical capital is constant in calculating the TFP levels of railways only and define γ represented by (θ) , the new equation can be rewritten as:

$$TFP = \ln Y - \gamma \ln R - \beta \ln L \quad (5)$$

To find the growth rate of TFP using econometrics to estimate:

$$GTFP = \alpha_0 + \alpha_1 \ln(Y/L) + \alpha_2 \ln(R/L) \quad (6)$$

This research uses rail stock from equation (2) and puts rail stock in equation (7) to establish productivity. In equation (7), the researcher defines the real output of the transportation sector by using GDP data from the National Accounts of Thailand and physical capital stock of transportation from the Office of the National Economic and Social Development Board. Parameters α and γ can then be found by using the linear regression model and ordinary least squares (OLS) to estimate α and γ and define TFP to represent railway productivity growth and provide the answer to the first objective. The researcher simulates the model again by using the TFP derived from the calculation inserted into the applied model as follows:

From the Mankiw, Romer, and Weil (1992) production function:

$$Y = AK^{\alpha} H^{\beta} L^{\gamma} \quad (7)$$

The researcher applied the Mankiw, Romer, and Weil (1992) production function to define railway stock:

$$Y = AK^{\alpha} H^{\beta} L^{\gamma} R^{\theta} \quad (8)$$

where: R^{θ} railway is the transport infrastructure defined in the production function by Canning and Fay (1993).

Taking the log-linear model in equation (8):

$$\ln Y = \ln A + \alpha \ln K + \beta \ln H + \gamma \ln L + \theta \ln R \quad (9)$$

Taking the log differences in equation (9), the equation can be solved to find the growth rate of output GY :

$$GY = GA + \alpha GK + \beta GH + \gamma GL + \theta GR \quad (10)$$

where: GA is the growth rate of TFP, combining equations (6) and (10):

$$GY = \alpha_0 + \alpha_1 \ln(Y/L) + \alpha_2 \ln(R/L) + \alpha GK + \beta GH + \gamma GL + \theta GR \quad (11)$$

TFP levels can explain the railway transport infrastructure as a possible source of technological progress, whereby the new technology is embodied in new capital according to the endogenous growth theory by Romer (1990). The growth of capital depends on output growth (GY) and savings:

$$K_{t+1}/K_t = 1 + s[Y_{t+1}/Y_t - 1] \quad (12)$$

Taking the log difference in equation (12):

$$GK=f(GY,s,) \quad (13)$$

The rate of investment or savings depends on the marginal product of capital in the golden rule, and income per capita:

$$S=f(Y/L,dY/dK) \quad (14)$$

The log marginal product of capital is given by:

$$\ln(dY/dK) = \ln(a)+\alpha\ln(K/L)+\beta\ln(H/L)+\theta\ln(R/L) \quad (15)$$

Combining equations (13), (14), and (15) and imposing a linear equation form:

$$GK=b_0+b_1GY+b_2\ln K/L+b_3\ln H/L+b_4\ln R/L+b_5\ln Y/L \quad (16)$$

The researcher assumes that the growth rate of labor depends on population growth (*GPOP*) and the difference between output growth and the growth rate of labor. Following the linear model for the growth rate of labor (*GL*):

$$GL=c_0+c_1GPOP+c_2(GY-GL) \quad (17)$$

Combining equation (11), (16), and taking *GL* as the exogenous variable can have the following reduced form output growth per capita:

$$GY=d_0+d_1\ln(Y/L)+d_2\ln(R/L)+d_3\ln(K/L)+d_4\ln(H/L)+d_5GH+d_6GL+d_7GR \quad (18)$$

where: *H* is the human capital defined by the Human Capital Index using Thailand's indicator from the World Bank; *GY* is the GDP growth rate of Thailand using data from the Bank of Thailand; *L* is labor supply by taking the unemployment rate in Thailand from the Bank of Thailand; *K* is the capital stock accumulation of Thailand by applying data from the Office of the National Economic and Social Development Board.

The parameters d_0, d_1, \dots, d_9 of the model are used to find regression between endogenous and exogenous variables while OLS is the estimator applied to find the parameters.

The parameters of railway productivity growth (d_9) answer the effect of railway development on Thailand's economic growth in macroeconomics.

3. Empirical results

Table 1 shows the results of the log-linear estimation of the Cobb-Douglas production function in Thailand for overall sectors of the economy and for the subsectors of transportation, non-agricultural, industrial, business activity, construction, the private sector, and agricultural sector, but agriculture is not significant in the estimation. The estimations presented correspond to equation 5 for the aggregate railway transportation. The estimation covers the period 1993–2015.

The results for the total capital stock of the railway and the aggregate of real GDP sector, transportation, non-agricultural, industrial, business activity, construction, and private sectors of the economy, estimation of the Cobb-Douglas production function in real GDP shows elasticities in railway stock and labor of 0.730562 and 0.901738, respectively. The results show a significant positive effect on railway stock and labor. In the transportation sector, the production function shows elasticity for railway stock and labor of 0.670580 and 0.987417, respectively. Furthermore, in the non-agricultural, industrial, business activity, construction, and private sectors show elasticity in railway stock of 0.588390, 0.782352, 0.441827, 0.291216, and 0.750420, respectively; whereas the elasticity of railway labor is 0.098323, 0.890372, 0.293499, 0.530724, and 0.515543, respectively. The results indicate that railway stock has a positive effect on the economy in each sector. This is because the railway infrastructure is necessary for the Thai economy. In addition, railway labor has a positive effect on the Thai economy since it impacts on the performance of the railway.

Table 1. Production function estimation in the case of railways in Thailand, 1993–2015

Variables	Real GDP	Transportation GDP	Non-agricultural GDP	Industrial GDP	Business activity GDP	Construction GDP	Private sector GDP
Railway Labor	0.901738**	0.987417***	0.098323*	0.890372***	0.293499***	0.530724***	0.515543***
Railway Stock	0.730564***	0.670580***	0.588390***	0.782352***	0.441827***	0.291216***	0.750420***
R ²	0.97	0.96	0.94	0.96	0.96	0.98	0.88
Adjusted R ²	0.97	0.97	0.93	0.96	0.96	0.97	0.86
Durbin-Watson statistic	1.81	2.17	1.73	1.67	1.67	2.01	1.96

Note: * significant at the 90% level of confidence; ** significant at the 95% level of confidence; *** significant at the 99% level of confidence.

Source: Authors' estimates

In Table 1, The Total Factor Productivity Growth (TFPG) is estimated using the elasticity from the results. The TFPG results by major sectors of activity show different results for railway transportation. Comparison of the seven sectors shows that the TFPG in each sector varies. The TFPG in the real GDP sector shows negative growth for 1994, 1996–2002, 2009, 2011–2012, and 2014, and positive growth for 1995, 2003–2008, 2010, 2013, and 2015. The TFPG in the transportation sector shows negative growth in 1994–1996, 1998, 2000–2003, 2009, and 2011–2013, and positive growth for 1997, 1999, 2004–2008, 2010, and 2014–2015. The TFPG in the non-agricultural sector shows negative growth in 1994–2002, 2009, and 2011–2012, and positive growth for 2003–2008, 2010, and 2013–2015. The results for other sectors is not much different from that of real GDP, transportation, and non-agricultural sectors, but the TFPG results for construction and the private sector indicate that TFP growth is mostly negative. This clarifies that the railway is not really a necessity for the construction and private sectors. The results of TFPG are shown in Table 2.

Table 2. Total factor productivity growth

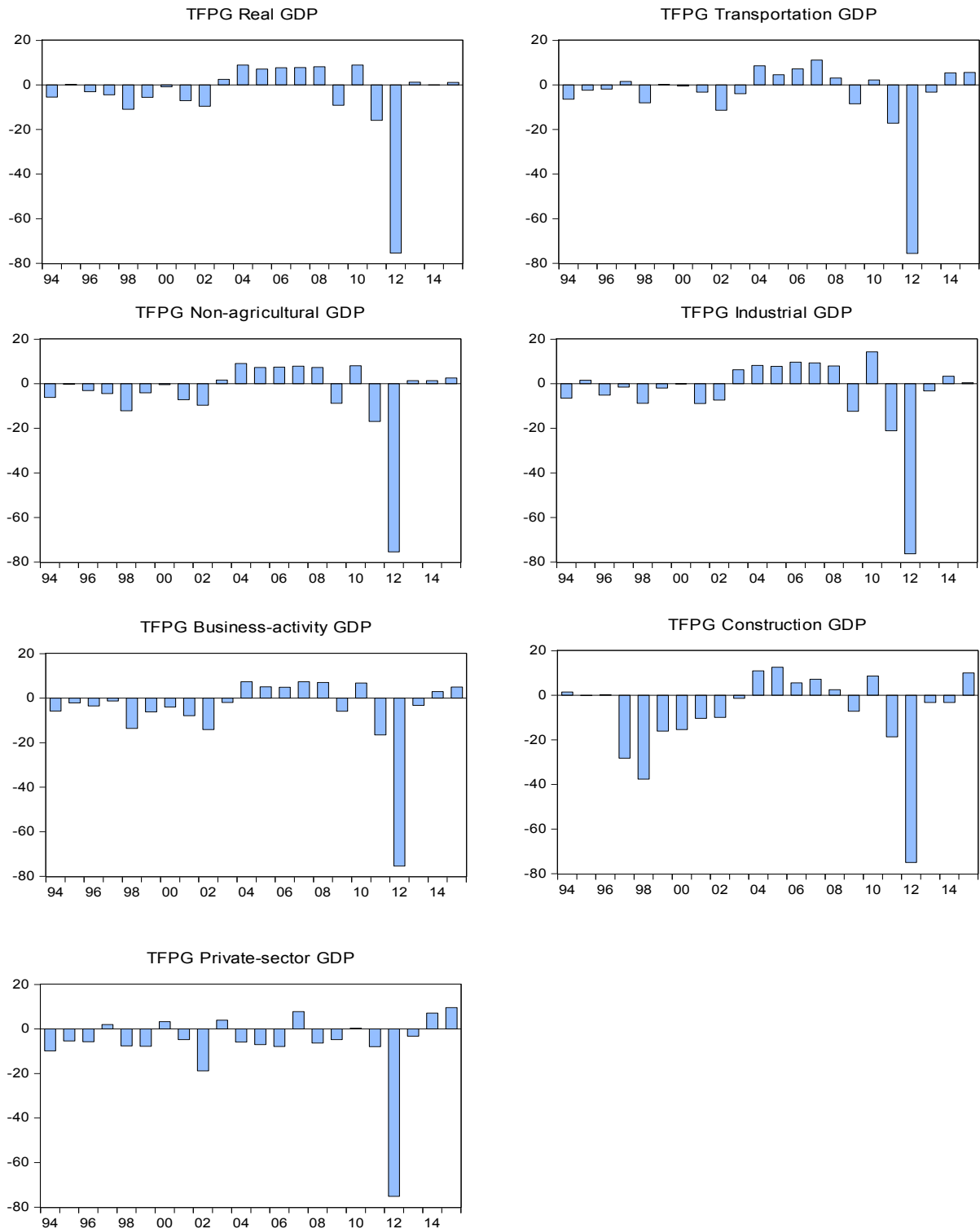
Years	TFPG Real GDP	TFPG Transportation GDP	TFPG Non-Agriculture GDP	TFPG Industrial GDP	TFPG Business activity GDP	TFPG Construction GDP	TFPG Private sector GDP
1994	-5.475630	-6.408580	-6.093490	-6.439070	-5.797920	1.479558	-9.868010
1995	0.298139	-2.407750	-0.199940	1.553053	-2.137230	-0.131210	-5.405540
1996	-3.084140	-1.846460	-3.065390	-5.069030	-3.527230	0.303957	-5.753620
1997	-4.434830	1.603977	-4.436600	-1.540270	-1.244580	-28.166400	1.988177
1998	-10.96550	-8.034980	-12.136200	-8.795100	-13.64470	-37.651700	-7.637700
1999	-5.496040	0.194225	-4.056790	-1.948400	-6.134780	-16.041500	-7.805000
2000	-0.815940	-0.503600	-0.388140	-0.101060	-4.014150	-15.364400	3.304552
2001	-7.068360	-3.223150	-7.149220	-8.881240	-7.867210	-10.287100	-4.820290
2002	-9.516870	-11.374100	-9.629320	-7.316790	-14.08320	-9.855080	-18.799500
2003	2.524070	-3.866840	1.683604	6.296685	-1.986110	-1.382670	3.989329
2004	8.893200	8.568939	9.074033	8.274303	7.379038	10.98851	-5.906840
2005	7.149457	4.586328	7.262946	7.836263	5.102609	12.583170	-7.048770
2006	7.712510	7.219357	7.465663	9.676226	4.861707	5.626836	-7.861760
2007	7.850330	11.118980	7.916447	9.311291	7.339144	7.218808	7.790582
2008	8.139070	3.085367	7.274450	8.004954	7.066004	2.478848	-6.361420
2009	-9.094250	-8.437030	-8.805990	-12.341900	-5.897990	-7.163840	-4.815230
2010	8.921824	2.263674	8.033998	14.287780	6.770391	8.653034	0.340538
2011	-15.893700	-17.193900	-16.898700	-21.134000	-16.516500	-18.586300	-7.952530
2012	-75.405500	-75.563700	-75.381100	-76.270200	-75.452300	-74.976400	-75.169300
2013	1.208548	-3.207560	1.421345	-3.207560	-3.207560	-3.207560	-3.207560
2014	-0.038800	5.445141	1.366988	3.385897	2.953873	-3.244530	7.132520
2015	1.108804	5.623100	2.627447	0.457093	5.005711	10.058690	9.600191

Source: Authors' estimates

The reason for differentiation in TFPG magnitude depends on the investment in railway transportation infrastructure. For example, during 2003–2008, there was investment in the maintenance and purchase of new

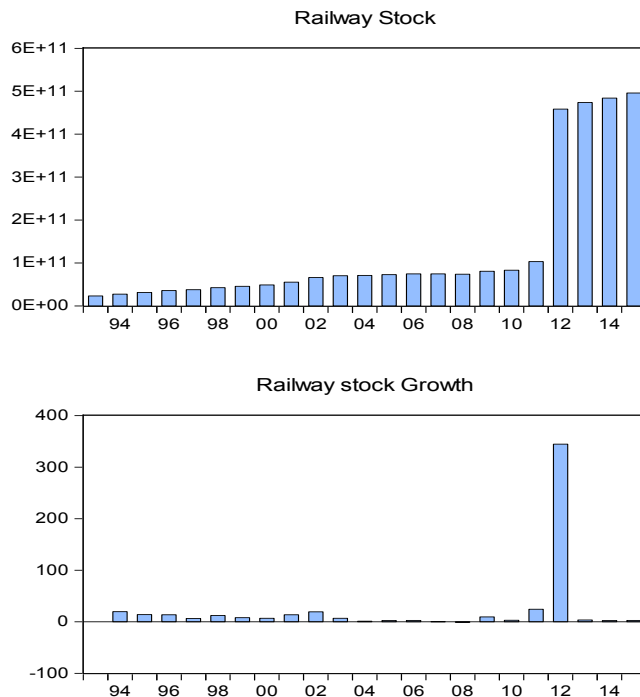
equipment in the Thai railway system. However, in 2012 a substantial investment was made to upgrade the double track railway system nationwide and new locomotives were purchased. Investment in railway network development increased railway stock growth but resulted in a decrease in TFP growth for the general sectors as shown in Graph 1 and 2. On the other hand, following little or no investment the subsequent year, railway stock growth decreased but the TFPG showed a return to positive growth. The results of TFPG and railway stock growth can be explained by the fact that investment in the development of the railway network impacted on the country's productivity but did not have any effect during this period, but affected the subsequent period.

Graph 1. Total factor productivity growth



Source: Authors' estimates

Graph 2. Railway stock and railway stock growth in Thailand



Years	Railway Stock Growth
1994	19.591386930
1995	13.986742810
1996	13.481910490
1997	6.257870100
1998	12.107640740
1999	7.802100285
2000	6.716478702
2001	13.446841380
2002	19.296611370
2003	6.797595987
2004	1.092582419
2005	2.186786782
2006	2.426187871
2007	0.178480090
2008	-1.101443999
2009	9.457023585
2010	2.735749259
2011	24.383146060
2012	344.371365200
2013	3.313851199
2014	2.225994992
2015	2.417935119

Source: Authors' estimates

Table 2 shows the results of the estimation from the log-linear analysis of the Cobb-Douglas production function for Thailand in the overall sectors of the economy in equation 18. The results prove the effects from railway capital stock on economic growth, showing the coefficients of independent variables such as growth in railway capital stock of 0.057094. This demonstrates that railway stock growth has a significantly positive effect on the nation's economic growth. The growth in railway capital stock is caused by investment accumulation in upgrading or developing the railway system over the years. The coefficients for growth in human capital (educational expenditure) and GDP per capita are 0.057326 and 0.000765, respectively. The results for the two coefficients indicate the positive effects from growth in human capital stock and GDP per capita on economic growth. In addition, the coefficients for growth in railway labor, human capital per capita, and railway stock per capita are 0.351488, 0.001752, and 0.002088, respectively. However, the coefficient for private capital per capita is negative at only -0.000045. This is due to the private capital stock per capita having hardly any effect on economic growth. The results show that investment in the development of the railway network increases railway capital stock and creating GDP growth. Investment in railway development results in railway capital formation. This research uses railway labor growth and railway capital stock per capita for representation. Table 3 shows the relationship between the growth in railway capital stock, railway stock per capita, and GDP. The results indicate that growth in railway capital stock creates GDP growth of about 5.7%.

Table 3. Regression results when GDP growth is the dependent variable and the others are dependent variables

Variables	GDP Growth
Growth of railway capital stock	0.057094***
Growth of railway labor	0.351488***
Growth in human capital (educational expenditure)	0.057326***
Human capital per capita	0.001752***
Private capital stock per capita	-4.50e-05***
Railway stock per capita	0.002088***
GDP per capita	0.000765***
R ²	0.97
Adjusted R ²	0.96
Durbin-Watson statistic	1.70

For notes, see Table 1.

Source: Authors' estimates

Conclusion

This paper examines the relative growth of TFP growth and railway stock. The results show the TFP growth in seven sectors, namely real GDP, transportation GDP, non-agriculture GDP, industrial GDP, business activity GDP, construction GDP, and private sector GDP. Five of these sectors are not very different. The relationship between TFP growth and railway stock growth can be explained by the fact that when railway stock growth increases more than 6%, TFP growth in five sectors decreases. On the other hand, when railway stock growth decreases by less than 6%, TFP growth in five sectors increases. From empirical exploration, high railway stock growth due to intensive investment in railway development has a negative effect on productivity growth in the period after one with railway stock growth. However, two sectors show mainly negative TFP growth, and therefore, railway development does not necessarily result in productivity growth in construction private sector GDP.

Moreover, this study also found that a relationship exists between railway capital stock accumulation and long-run economic growth, namely railway capital stock growth and railway stock per capita (at the beginning of the study period: 1993). This result is in line with the theory and prior studies. The evidence supports a positive relationship between railway capital stock, railway stock per capita, and long-run economic growth. Moreover, the other independent variables also show a positive relationship with long-run economic growth. However, there is no strong evidence to support the negative effect of private capital per capita on long-run economic growth, and the negative effect of private capital is very small, at only about -0.0045%.

The results of this study give a broad picture of government investment in public transportation, in that railway system improvement has an impact on the promotion of productivity in the country. Moreover, expanding and upgrading the network of railway transportation would be particularly useful in the diffusion of long-run economic growth.

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Impact of Lease Accounting According to International Financial Reporting Standards on the Indicators of Financial Statements in Kazakhstan

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Abstract:

The IASB (International Accounting Standards Board) published IFRS 16 "Lease" in January 2016 with the effective date on January 01, 2019. This work gives the summary of the main aspects of the standard. The objective of this work is to study the degree of impact of the new standard on the key financial indicators of companies, applying international accounting standards, and cover some of the most important issues that shall be taken into account during preparation for the adoption of IFRS 16. The results obtained during the research have allowed concluding that the new standard obliges to take into account and recognize in the balance sheet the operating lease together with the financial lease and this, in its turn, will make a significant impact on the financial indicators of enterprises of the Republic of Kazakhstan. The most noticeable change of the financial indicators such as debt load, capital leverage, and EBITDA will take place in retail enterprises and air companies. At the same time, the new standard of lease accounting will increase the compatibility of the data in financial statements and it can also influence the special terms of loan contracts, credit ratings, costs for loans and perception of a company by the interested parties.

Keywords: IFRS; IAS; statements; international standards; financial indicators; operating and financial lease; leasing.

JEL Classification: H80; H83

Introduction

For many companies of the Republic of Kazakhstan, leasing plays a critically important role in their business operations; it is an important and widely used financial solution. This is the flexible solution allowing companies to get access and use the property and equipment without large cash outflows and allowing lessors to solve the problem of moral depreciation and the residual cost risk. Actually, sometimes leasing is the only way to get the physical asset that is unavailable for purchase.

As it is known, for a long time there exists a special standard – IAS 17 "Lease". In January 2016, the IASB published a new standard of lease accounting. IFRS 16 "Lease" comes into force for the periods beginning from January 01, 2019 or later. However, it can be applied in advance if the enterprise applies IAS 15 "Revenue from Contracts with Customers". The new document cancels IAS 17 and its three related interpretations – IFRIC 4 "Determining Whether an Arrangement Contains a Lease", SIC 15 "Operating Leases — Incentives" and SIC 27 "Evaluating the Substance of Transactions in the Legal Form of a Lease".

The new standard requires that the lessees accept almost all leasing contracts on the balance sheet that will recognize their right for use of the asset during a particular period of time and obligation for payments related to it. It is expected that the new standard will influence lessees significantly. Its implementation can lead to changes of the policy, processes, control and IT systems that support lease accounting and, possibly, lease procurements, lease administration and tax. According to the new requirements, almost all off-balance lease accounting is excluded from lessees (leaseholders) and many widely used financial indicators are determined in a new way such as the ratio of equity capital and loan capital and EBITDA. This will increase the compatibility of data in financial

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statements and also can influence the special terms of loan contracts, credit ratings, costs for loans and perception of a company by the interested parties.

The accounting of lessees will remain mainly unchanged. However, the introduction of IFRS 16 can influence their business model due to the changes of the needs and behavior of their clients (*i.e.* lessees). To let enterprises of the Republic of Kazakhstan to prepare better to the problems and decrease the costs for introduction and risks related to the breach of the regulatory and statutory requirements, it is necessary to perform the qualitative and quantitative estimation of the minimal impact of the new lease standard on the financial coefficients and indicators of the lease efficiency.

1. Literature review

The results of research of IAS introduction problems at the national level are represented in the works of Gláserová, and Otavová (2010), Nurunnabi (2017), Beckman (2016), Ali *et al.* (2009), etc. The peculiarities of lease accounting in various industries are studied by Chatfield *et al.* (2017), Durocher, and Fortin (2009), De Martino (2011), etc.

The necessity of changes in the current accounting lease legislation in the internationally recognized formats of financial statements is mentioned in the works of Kovalev and Kovalev (2016), Svoboda (2010), etc. The analysts notice that the current regulation of accounting according to IAS does not require the capitalization of the operating lease. However, it can be changed after publication of the new offer of IASB (Àngels *et al.* 2013).

The analysis of the impact of the new accounting model on the key financial indicators shows that IASB 16 will lead to the capitalization of the current operating lease of the most of lessees (Morales-Díaz and Zamora-Ramírez 2018). The results of research show the negative impact of capitalization of the operating lease on the financial statements and financial indicators of the company (Bohušová 2015).

At the same time, some researchers notice that the impact of lease accounting in IFRS seems less serious that it was expected (Baltussen *et al.* 2014). Despite this fact, it can become a serious obstacle for the departments of corporate real estate management (CREM) that do not work at the strategic level. Thus, the changes in the accounting according to IASB can become a catalyst for the professionalization of CREM departments.

Bohušová and Svoboda (2013) specified that the development of the methodological approaches to lease accounting on the part of the lessee and lessor shall become the result of the activity convergence in the field of lease accounting; they can eliminate the main disadvantages of the current accounting system, based upon the classification of lease contracts due to the validity of lease and transfer of risks and benefits related to the lease to the lessee.

The research of Collins, Pasewark, and Riley became the first archive research dedicated to the study of the connections between the solutions according to the lease classification and use of standards of lease accounting; the authors considered the problem of impact of the availability or absence of the "bright lines" in IASB 16 on the lease contracts classifications (Svoboda 2010).

2. Methods

The research is based upon the secondary analysis of the research results of the effects of introduction of the International Accounting Standards of lease accounting performed in 2016 by the IASB.

The estimation of costs and benefits has mainly a qualitative but not quantitative character. It is explained by the fact that the qualitative estimation of costs and, in particular, benefits is a rather complicated problem. Currently, there are no sufficiently grounded and reliable methods of qualitative estimation of costs and benefits.

Within the frameworks of this work, the estimation of the potential consequences of the new requirements to lease accounting has been performed because the actual consequences will be known only after application of the new requirements. The growth of debt is determined using the calculated lease liabilities of the off-balance operating lease and their relative impact on the debt already being on the balance.

The credit leverage is determined as a ratio of net debt to the value of EBITDA. The designed increase in the lease liabilities was used to determine the increase in the credit leverage presented together with the design increase in EBITDA. The increase in EBITDA was determined by adding the open annual lease expenses.

3. Impact of International Financial Reporting Standards 16 on the financial indicators of companies

The results of the international studies of the impact of the new standard on the companies were analyzed to eliminate the possible problems and to decrease the costs for the introduction of the new accounting standards in the Republic of Kazakhstan.

In January 2016, the IASB published the results of the analysis of effects of introduction of IAS 17 "Lease".

IFRS 16 requires the company to report the lease assets and lease liabilities for all the lease contracts (except the short-term lease and low cost assets lease). For the companies with an off-balance lease, the International Standard on Related Services (ISRS) expects that the most significant effect of IFRS 16 will be an increase in the lease assets and lease liabilities.

The newly recognized lease asset, *i.e.* the right of use of the asset, is the off-balance non-financial asset; the lease liability is a part of the current and off-balance financial liabilities depending upon the terms of lease payments. Consequently, the ISRS expects that the key financial coefficients obtained from the assets and liabilities of the company will change.

For off-balance lease contracts, when applying IAS 17 the equity capital is usually reduced every period for the sum of the lease payments; the ISRS expects that IFRS 16 will influence the reported capital.

Applying IFRS 16 to individual leasing, the balance sheet lease asset, as a rule, would decrease much faster than the balance sheet lease liabilities. It is related to the fact that in every lease period the lease asset is usually depreciated by the linear method and the lease liability:

- decreases for the sum of the paid lease payments;
- increases due to the decrease in the interest rates during the lease term.

Consequently, though the sums of lease assets and lease liabilities, as a rule, are the same in the beginning and at the end of the lease, the lease asset will be smaller than the sum of liability during the whole lease term. As this effect is expected for every separate lease, it is also expected when considering the "portfolio effect" of the companies having the mixed lease with various remaining lease terms.

Accordingly, if we presuppose that all other factors that can influence the equity capital are constant, for the companies with the significant off-balance lease the application of IFRS 16 usually will decrease a share of stockholders' equity in comparison with IAS 17. It is expected that when the company applies IFRS 16 for the first time, the deferred capital will decrease and after this the reported capital will remain unchanged to the extent to which the lease portfolio of the company will remain unchanged. However, the terms of reduction of the equity capital depend upon the solutions taken by the companies during the first introduction of IFRS 16.

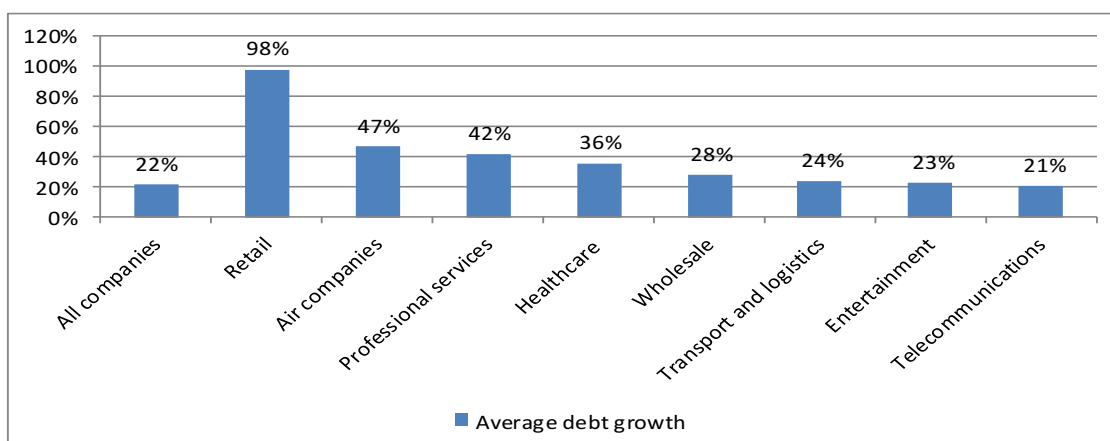
The actual impact on the share capital of the company will depend upon the financial leverage of the company, the terms of its lease and the ratio of lease liabilities to the equity capital. This, in its turn, depends upon the share of assets the company possesses, a share of leased assets and how the company finances its activity.

The IASB does not expect that the impact on the stock capital will be significant for most companies (International Accounting Standards Board 2016).

In 2016, PwC in cooperation with the Scotland School of Management in Rotterdam performed the international research of estimation of the impact of the new lease standard on the debt values, the ratio of the own and borrowed funds, financial solvency and EBITDA. The research determined the minimal impact of the new lease standards on the financial indicators of efficiency that the companies reported in the IFRS accounting around the world.

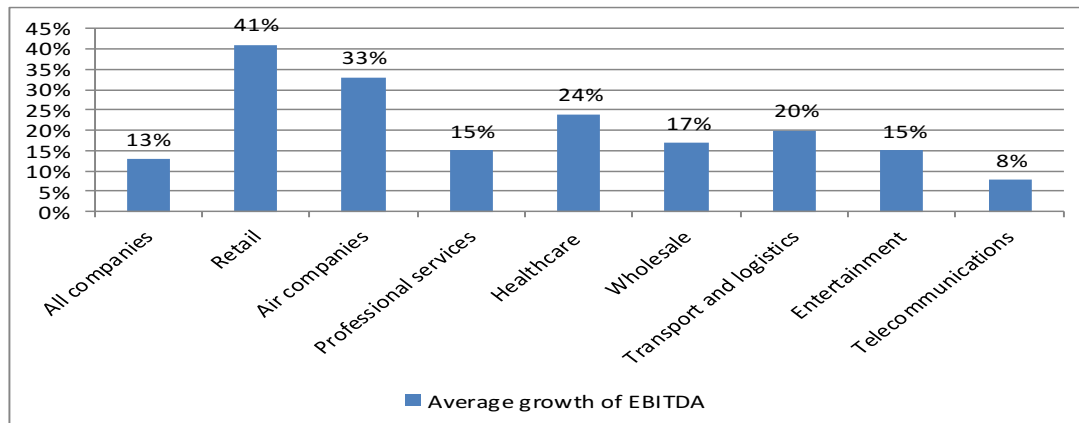
Basing upon the disclosure of liabilities of the operating lease for 2014 in the financial statements, the obtained results certify that the average increase in the debt loads of the legal entities will be about 22%. Following the results of the research, the new standard IFRS 16 "Lease" will make the most remarkable impact on retail enterprises and air companies (Figure 1).

Figure 1. Average growth of debt liabilities of the enterprises of various industries during introduction of IFRS 16



The average profit increase before payment of interest, taxes, confiscations and depreciation ("EBITDA") could be approximately 13%.

Figure 2. Average growth of EBITDA of enterprises of various industries during introduction of IFRS 16



For retailers, the average growth of debt will be 98% and the average value of EBITDA will be 41%. The essential part of the business model of retailers is the lease of commercial premises. The significant part of such lease contracts has a form of long-term lease contracts (as a rule from 3-5 to 9 years) for premises in the premium places (flagship stores) and also for ordinary malls or retail outlets.

Such lease contracts usually provide the variants of prolongation and often include variable lease payments. The variable character of terms is usually determined by the corrections of inflation and concession lease in some places where the landowner has a direct interest in the business efficiency (for example, in airports, "shop in shop").

Historically, such lease contracts were considered operating lease contracts and, therefore, they did not influence the balance sheet. The sum reported in the income statement, as a rule, is calculated using the linear method and is included into the operating expenses completely. The new standard of lease accounting will influence not only the balance sheet but also the operating expenses with the expenses division into operating and financial expenses.

The results of the performed research showed that according to the accounting of IFRS 16, almost 80% of the own aircraft fleet were on the balance sheet (*i.e.* approximately 80% of the aircraft fleet of the air company belonged to it or were leased according to the financial lease contracts). Within the frameworks of the off-balance, air companies lease about 20% of the own aircraft fleet and various buildings.

The results of the IASB research certify that the introduction of IFRS 16 will lead to the increase in the leased assets and lease liabilities (Effects Analysis International Financial Reporting Standard, 2016) (Table 1).

Table 1. Estimation of the change of leased assets and lease liabilities of retail enterprises and air companies during introduction of IFRS 16 in comparison with IAS 17

Balance item	Air companies			Retail		
	IAS 17	IFRS 16	+/-	IAS 17	IFRS 16	+/-
Capital assets	27,886	27,886	0	44,521	44,521	0
Leased assets	12,030	25,430	13,400	958	187,57	17,799
Other	9,114	8,952	-162	26,703	26,703	0
Total non-current assets	49,030	62,268	13,238	72,182	89,981	17,799
Total current assets	21,152	21,152	0	38,086	8,086	-30,000
Total assets	70,182	83,420	13,238	110,268	98,067	-12,201
Raising funds	9,430	9,430	0	22,533	22,533	0
Lease liabilities	10,516	25,277	14,761	697	21,233	20,536
Other liabilities	34,818	34,818	0	57,714	57,264	-450
Joint liabilities	54,764	69,525	14,761	80,944	101,030	20,086
Equity capital	15,418	13,895	-1,523	29,324	27,037	-2,287
Total liabilities and capital	70,182	83,420	13,238	110,268	128,067	17,799

Operating profit, EBITDA and other earning yield will be higher when using IFRS 16 in comparison with IAS 17 (Table 2). It is explained by the fact that using IFRS 16 the companies report a part of lease payments of off-

balance lease as a part of financial expenses. By the contrast, in case of using IAS 17 all expenses related to the off-balance lease were included into the operating costs.

Table 2. Estimation of the change of earning yields during introduction of IFRS 16 in comparison with IAS 17

Balance item	Air companies			Retail		
	IAS 17	IFRS 16	+/-	IAS 17	IFRS 16	+/-
Revenues and other revenues	67,272	67,272	0	164,181	164,181	0
Operating expenses (with no regard to depository and depreciations)	60,893	58,340	-2,553	141,937	140,764	-1,173
EBITDA	6,379	8,932	2,553	22,244	23,417	1,173
Wear and depreciation	3,908	5,674	1,766	16,222	16,222	0
Operating revenue	2,471	3,258	787	6,022	7,195	1,173
Net financial expenses	865	1,656	791	1,293	2,393	1,100
Income before tax	1,606	1,602	-4	4,729	4,802	73
Income tax	285	285	0	1,161	1,161	0
Profit for year	1,321	1,317	-4	3,568	3,641	73

The size of increase in the operating profit and financial expenses depends upon the significance of leasing for the company, term of lease and applied discount rates.

The average leverage (ratio of debt/EBITDA) for the whole group of enterprises will increase from 2.03 to 2.14 including the financial leverage of retail enterprises that will increase from 2.4 to 3.5, for air companies – from 3.1 to 3.9 (Table 3).

Table 3. General financial coefficients of retail enterprises and air companies during introduction of IFRS 16 in comparison with IAS 17

Index	Air companies			Retail		
	IAS 17	IFRS 16	+/-	IAS 17	IFRS 16	+/-
Financial leverage	3.1	3.9	0.8	2.4	3.5	1.1
Percent (EBITDA to net financial expenses)	7.4	5.4	-2	7.4	5.2	-2.2
ROCE (revenue on capital employed)	7.0%	6.7%	-0.3%	11.5%	10.2%	-1.3%

Thus, for companies having the material off-balance lease IFRS 16, it will lead to the expected increase in leased assets and financial liabilities.

4. Discussion

The IASB has come to conclusion that the provision of the information about the undiscounted liabilities of the company of the off-balance lease only in the notes to the financial statement is not enough (according to the requirements of IAS 17). This is because this information is:

- insufficient for some investors and analysts that often estimate the assets and lease liabilities of the company basing upon the limited information available by the methods making it possible to get the evaluations that can vary in wide limits and can be inaccurate;
- is not evident for other investors and analysts who rely upon the balance sheet of the company, income statement and cash flow statement to provide the information of the financial leverage and base of assets of the company without regard to the information provided in the notes.

Although the new standard IFRS 16 will not come into force till 2019, for many Kazakhstan companies applying IFRS the preparation for its introduction shall start right now.

Professor Li Singh and his assistant Dereck Carmichael mention that IFRS 16 will introduce significant changes into the accounting of lessees (Singh and Carmichael 2017). Every company leasing the capital assets shall perform a deep analysis of the presupposed changes and estimate the impact on the indicators of financial statement, business processes and special terms of credit loans, etc. Besides, the enterprises shall consider all main contracts they concluded. At the same time, lessees shall also take into account the changes in the accounting of lessees that can make a particular impact on them.

The partner of PwC in the Middle East in the field of capital markets and consultation services Blaise Jenner expresses his opinion that for better understanding of the impact of the new standards it is necessary to focus the efforts on the following areas of research (Blaise 2017):

- quantitative estimation of the financial impact of IFRS 16 on the financial statements and key indexes of the company;

- determination of the interested parties that will be influenced by the revised financial coefficients and indexes. This will allow the organization to reconsider their mechanisms actively, and if necessary, to attract the interested parties;
- the check of impact of IFRS 16 for the existing and future mechanisms of financing to avoid the emergencies and complicated negotiations with creditors;
- estimation of how the existing systems and processes correspond to the high requirements of IFRS 16;
- the classification of the existing lease contracts and revealing of gaps in the lease data. In cases when the company has a huge volume of lease contracts, it can be one of the most labour-consuming actions of preparation for IFRS 16.

To transfer to IFRS, Kazakhstan enterprises shall thoroughly study the impact on the financial indicators and perform some actions of the organizational and legal character. The company shall consider the consequences for the financial statements and indicators when concluding contracts that are or can contain lease contracts. This activity requires the participation of various subdivisions of the company.

One of the high priority measures is the identification of lease contracts. According to the definition of IFRS 16, a lease contract is an agreement between two or several parties that create the legally enforceable rights and liabilities or part of the contract according to which the right to control the use of the identified asset is transferred in exchange for the reimbursement during a certain period.

The fundamental requirement for the definition of lease is the availability of the identified asset that can be directly or indirectly specified in the contract. At the date of conclusion of the contract by the companies, the analysis of the right essence of the supplier for the replacement of the asset shall be performed.

The specified terms of IFRS 16 allow distinguishing the rights for replacement that lead to the situation when the supplier begins to control the use of asset and rights that do not change the content or the character of the contract. The contract establishes the right to control the use of the identified asset during a certain period in exchange for the reimbursement.

According to the new standard, the lessee shall disclose the significant volume of information about the assets and liabilities and it includes certain specific requirements. The information subjected to disclosure shall include:

- incomings, depreciation expenses and balance sheet assets in the form of the right of use as of end of period depending upon the class of assets;
- analysis of maturity dates of lease liabilities;
- interest expenses of lease liabilities;
- expenses of variable lease payments not included into the lease liabilities;
- expenses related to the short-term lease and lease of low value assets;
- total sum of cash outflow of lease and
- profits or losses from the sale operations with the leaseback.

When transferring to the new standard, at the initial stage Kazakhstan companies shall perform the inventory of the existing contracts and agreements and also develop the strategy of information interaction allowing controlling the interested parties. The set of measures includes the extraction, collection and check of data of lease, estimation of impact and preparation to restructuring of the internal IT systems and processes.

To minimize the negative impact of the new lease standard, the company may require reconsidering of the terms of the existing lease contracts. Exclusion of off-balance accounting and an increase in the administrative load due to lease accounting can lead to a decrease in the lease attractiveness.

The increase in data transparency can become a stimulus for the economically profitable lease solutions providing the potential saving of resources and optimization of the lease portfolio.

The transfer of enterprises of the Republic of Kazakhstan to the lease accounting standard IFRS 16 will require the introduction of new and reliable IT systems and control means. Now many enterprises account the lease funds using electronic tables. Under conditions of the accounting complication when all leases will be reported in the balance sheet the application of this labor-consuming form of accounting can lead to the errors in the financial statements.

To make lease calculation according to the requirements of IFRS 16, lessees may need to integrate the modules of contracts control regarding the data and lease mechanisms into their accounting systems. Currently, in the market of the Republic of Kazakhstan there are few software solutions of the separate accounting of the financial and operating lease that are based upon the model of "risks and profits" that can take into account the new requirements. They shall be modified according to the requirements of IFRS 16. The timely estimation of the weak

points on the existing IT systems and also of commercial and IT requirements will allow decreasing the risks related to the accounting submission.

In general, most analysts come to the conclusion that the recognition of the assets and liabilities essentially for all the lease contracts provides the more acute representation of the financial state of the company and brings more transparency regarding the financial leverage and used capital of the company. It is expected that this will allow the investors and analysts to estimate better the financial state and financial indicators of the company.

The experts expect that IFRS 16 will improve the information available for all the investors when taking investment decisions. This is due to the fact that when the companies applied the previous requirements to lease accounting, some investors corrected the balance lease (using various methods) but others did not do it.

The specialists mention that the investors analyzing the financial information without correction of the balance lease will be among those who gain the biggest profit from IFRS 16. The new represented information is expected to provide the best base for decision-making.

Conclusion

The performed research has allowed making the following conclusions:

- the increase in the lease assets and financial liabilities will become the most significant result of the new requirements. Consequently, for the companies with the significant off-balance lease, the key financial indicators obtained from the assets and liabilities of the company (for example, the coefficients of the credit leverage) will change;
- the new standard will require from the company to do more than just to convert its existing accounting regarding the lease operations to report the assets and liabilities of the lease assets. Its implementation can lead to the change in policy, processes, control and IT systems that support lease accounting and possibly lease procurements, lease management and tax;
- the changes will affect the biggest part of the existing agreements and many interested parties. The companies applying IFRS shall estimate the transfer to the new standard more thoroughly at the initial stage, to draw up an inventory of the corresponding contracts.

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Reexamining the Economic Growth – Education Inequality – Income Distribution Nexus in Indonesia

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Abstract:

This paper examines the determinants of economic growth, income inequality, and their relationship in the context of education inequality. The results indicate that the relative dispersion of human capital has a disequalizing relationship with income distribution while the absolute dispersion has the opposite effect. This study also shows that economic growth has a significantly disequalizing effect on the income distribution and there is a quadratic relationship between income per capita and inequality (Kuznets' curve). Finally, human capital investment is positively related to the growth of the economy. Therefore, economic policies should be targeted on equal access to education.

Keywords: education; growth; inequality; Indonesia

JEL Classification: C3; I24; O47

Introduction

The goal of development is to reduce poverty, which can be achieved by economic growth, income redistribution and other development aspects such as health and education equality (Bigstein and Levin 2001). A pro-poor growth strategy not only focused on economic growth but could also be combined with an active policy of income redistribution. However, distributional policies take on greater priority if more rapid reduction in poverty can be achieved through reduction in inequalities. On the other hand, if greater levels of inequality appear to secure rapid growth that leads to faster poverty reduction, then there may be greater tolerance of distributional inequalities. Therefore, the relationship between economic growth and inequality has been highly controversial since 1950s (Bigsten and Levin 2001).

In recent years, the debates have focused on one channel which examines the impacts of economic growth on income inequality (see Ravallion 2001 and Quah 2001). However, some studies investigate the role of education in relation between economic growth and income inequality (see Checchi 2000 and Park 1996). They basically use either enrollment ratio or average years of schooling, which indicate the improvement in education level. But such indicators cannot clearly reflect the dispersion of human capital in terms of absolute and relative, respectively. Standard deviations of schooling have recently been used to measure such dispersion in absolute terms. However, to measure the dispersion of schooling distribution in relative terms, education Gini seems to be an appropriate measure.

In this paper, I use the framework of Thomas *et al.* (2000) to investigate if there is a significant relationship of changes in the education Gini and standard deviation of schooling on income inequality. Then, I establish hypothesis that economic growth is associated with income inequality and its distribution, and that there is a link of education variables on economic growth. I also disentangle whether income inequality and its distribution are correlated with economic growth.

1. Literature review

In the case of growth – inequality nexus, Kuznets (1955) postulates an inverted-U pattern where inequality first increases and then falls, as per capita income rises. The driving force was assumed to be structural change in a dual-economy setting, in which labor was shifted from a less productive (low wage) and undifferentiated traditional sector in relatively equal (rural) area, to a more productive (high wage) and differentiated modern sector in relatively unequal (urban) area.

Many researchers have doubted the Kuznets' inverted-U relationship. Fields (1989) finds that, even with more rapid growth, inequality is less likely to increase and there is no tendency for inequality to increase more in

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early stages of economic development (traditional society) than in latter stages (high mass consumption). In line with this argument, Bruno *et al.* (1996) believe that the effect of growth on inequality can go either way and depends on number of factors, but the evidence that growth changes distribution in a systematic way is very doubtful.

Deininger and Squire (1998) reveal that it was impossible to find any significant change in income distribution during recent decades and they did not find any robust evidence of an association between growth and inequality. Neither Ravallion and Chen (1997) nor Rehme (2007) find any sturdy relationship between the rate of growth and inequality. Goudie and Ladd (1999) conclude that the effect can go either way, contingent on a number of factors, and that there is little convincing evidence that growth alters distribution in a systematic way.

While the Harrod-Domar model predicts that greater inequality would create higher growth rates, there is a shift in focus from inequality to growth (Goudie and Ladd 1999). On the one side, this model proposes a strong argument that a positive link between inequality and economic growth could arise because a larger share of income is on the hand of the rich who mostly use for saving and investment purpose, instead of the poor who have high interest in consumption. On the other side, empirical evidence from both industrialized and less-developed countries has tended to confirm the negative relationship between inequality and growth.

Overall, there are five mechanisms that explain the link between inequality and growth, as follows:

First, political-economy models by Persson and Tabellini (1994). As the median voter's distance from the average capital endowment in the economy increases, reflecting a rise in income inequality, the median voter will push for high taxes, which discourage investments, and finally lower growth. In contrary, Aghion and Bolton (1990) believe that higher income inequality will produce higher rates of taxation, which increase expenditure on public education programs, leading to higher public investment in human capital, which boosts economic growth.

Second, the relationship can be explained through investments in physical and human capital. Kaldor (1956) proposes an argument that higher income inequality spurs physical capital (material resources) accumulation because rich agents have a higher marginal propensity to save than the poor. In contrary, Galor and Moav (2004) insist that during the early stages of economic development, accumulation in physical capital drives economic growth. At initial level, high income inequality stimulates aggregate saving that in turn, increases physical capital accumulation, which engineers the process of economic development. During this process, the increased physical capital stimulates return on human capital (education) investment. Thus, in the later stages of economic development, human capital accumulation wholly substitutes physical capital accumulation as an activator of economic growth, because of capital-skill complementarity.

A third channel between inequality and growth is via social-political conflicts. Alesina and Perotti (1996) argue that inequality creates social-political unrest, which tends to reduce efficiency and investment levels, and then growth. It has also been argued that if income is distributed unequally, it will bring instability to society which lessens the ability of governments to respond to external shocks, leading to a high frequency of government changes (Rodrik 1997).

Fourth, economic incentives can determine the growth – inequality nexus. Voitchovsky (2005) confirms that in a high income inequality country where skill is fully rewarded, productivity increases due to a strong incentive to invest either in physical or in human capital, which generates higher growth rates. Moreover, Champenowe and Cowell (1998) endorse the minimal role of government in open economy where income inequality is fundamentally good for incentives, which then increase growth.

Last, De La Croix and Doepke (2003) argue that a higher fertility rate will lower the relative income for the poor, which in turn enlarges the income inequality. The poor tend to have more children and thus invest less in education. In addition, there is tendency that children of poor people will likely still be poor in the future due to poverty trap. A larger proportion of population will come from the poor if fertility rate increases. As a result, a rise in inequality lowers average education and therefore, growth.

Moving to the relationship between education inequality and economic growth, such nexus can be explained by three mechanisms as follows. First, in a life expectancy model by De La Croix and Licandro (1999), investment in human capital is assumed to depend on the parental level of human capital, the number of children born by their parents, and the individual's life expectancy, which then depends on the environment where individuals grow up. An individual's level of human capital is a positive function of life expectancy and hence, the positive effect of a longer life on growth can be offset by decreasing the participation rate.

A second possible channel can be explained through technological progress. The growth process may increase the rate of adoption of new technologies. More specifically, as the investment in human capital of the highly-educated people increases, the accumulated knowledge trickles down to the less-educated people via a technological progress in production, known as the global production externality (Galor and Tsiddon 1997).

Last, this relationship can be determined by incentives that should be taken into account as growth-enhancing (Aghion *et al.* 1998). Educational inequality could be good for incentives, meaning that the greater the educational inequality, the greater the incentive for an individual to attain a higher educational level and training.

Most empirical studies use the international data on education attainment to explain this relationship. Barro (2001) reveals that growth is positively related to the initial level of average years of school attainment of adult males at the secondary and higher levels, and it is insignificantly correlated to years of school attainment of females at the secondary and higher levels and male at the primary level. Moreover, the quantity of schooling is positively associated to the economic growth. However, the effect of school quality is found more important for economic growth.

In contrast, Birdsall and Londono (1997) explore the impact of the distribution of assets on growth by emphasis on human capital accumulation via basic education and health. The results indicate a significant negative correlation between education dispersion and economic growth. Lopez *et al.* (1998) prove that the distribution of education is very important to describe income levels and economic growth, and if it is distributed unequally, it would lower income levels and economic growth. The impact of education on growth is also affected by good macroeconomic policy such that policy reforms can rise the average years of schooling and enhance the productivity of human capital in growth models.

Meanwhile, Lin (2007) investigates on how income inequality responds to changes in the average level of schooling and educational inequality in Taiwan. In addition, two control variables, fertility rate and the ratio of high-tech products on total exports, were used in OLS regressions. The finding suggests that average years of schooling are negatively associated with income inequality, and education inequality is positively correlated with income inequality. However, the estimated coefficients of the log of per capita GDP and its square are opposing with the Kuznets inverted U-shaped hypothesis. Moreover, the model can lead to reverse causation in a sense that income inequality also has an impact on economic growth and thus, OLS regression has a problem in simultaneity.

In attempt to re-establish the effects of education variables on income distribution, Park (1996) examines cross-section data in 59 countries with careful choice of the schooling variables. In a significant result, average years of schooling have an equalizing outcome on the income distribution while the standard deviation of schooling has a disequalizing yield on the income distribution. Nevertheless, as Park explicitly recognizes, a multicollinearity problem arises because the variable chosen as a proxy for educational inequality contains the average level of schooling. In addition, this study does not solve the simultaneity problem between economic growth and distribution and hence OLS regression results will be biased.

In a late study, Park (1998) presents an endogenous growth model to examine the determinants of economic growth and income distribution and their relationship. By using a simultaneous equation model, a higher level of educational attainment of the labor force has an equalizing outcome on the income distribution, while a larger dispersion of schooling among the labor force adds to income inequality. Moreover, both human and physical capital investments are significant factors in boosting economic growth, and income inequality negatively related with economic growth. However, this model only provides a partial explanation of changes in economic growth and the income distribution, given other factors such as technology and learning by doing.

2. Methodology

I take Core SUSENAS by using 1996, 1999, 2002, 2005, 2008, 2011, and 2014 as its series with section of 23 provinces in Indonesia. Five provinces such as Banten, Gorontalo, Bangka Belitung, Riau Islands, and North Maluku are a newly-autonomous-region from the previous provinces such as West Java in 2000, North Celebes in 2000, South Sumatra in 2000, Riau in 2004, and Maluku in 1999, respectively, and thus I do not include from the analysis. I also exclude the other provinces such as Maluku, Nangroe Aceh Darussalam, and Papua due to various factors (*e.g.* political turbulence and natural disaster) which make the data cannot be obtained sequentially in the period of 1999 – 2002 and 2005 – 2014.

Instead of using average consumption per capita taken from household survey, economic growth data used in this paper are real income per capita based on 2000 and 2010 constant market prices in terms of Rupiah. Bhalla (cited in Adams 2004) proves that the use of the former will underestimate income inequality and elasticity of poverty on economic growth. To measure inequality on income distribution I use the BPS Gini index based on expenditure data. As a note, a Gini index based on expenditure data tends to be lower than one resulted from income data as it only describes income shares of the bottom and the middle.

In estimating education inequality in Indonesia, I use education Gini coefficient, average years of schooling, and standard deviations of schooling. Thomas *et al.* (2000) develop education Gini formula, which is shown in equation (1).

$$E_L = \left(\frac{1}{\mu}\right) \sum_{i=2}^n \sum_{j=1}^{i-1} p_i |y_i - y_j| p_j \quad (1)$$

where: E_L is the education Gini that takes into account the distribution of educational attainment; μ is the average years of schooling for the targeted population; p_i and p_j is the proportions of population with certain levels of schooling; y_i and y_j are the years of schooling at different educational attainment levels; n is the number of levels in attainment data.

Meanwhile, on measuring average years of schooling and its standard of deviation, Barro (1991) categorize the population that include no schooling or illiterate, partial primary, complete primary, partial secondary, complete secondary, partial tertiary, and complete tertiary. However, BPS shares the population into six categories attainment include never been to school, not complete primary school, complete primary school, complete junior secondary school, complete senior secondary school, complete tertiary school or university. Thus, those measurements can be estimated in formula 2 and 3 respectively.

$$\mu = AYS = \sum_{i=1}^n p_i y_i \quad (2)$$

$$\sigma = SDS = \sqrt{\sum_{i=1}^n p_i (y_i - \mu)^2} \quad (3)$$

Since this study's focus is the effects of education variables on economic growth and income inequality as well as its distribution, I specify the following simultaneous equation model, given other variables that may effect on economic growth, income inequality as well as its distribution.

$$LYINEQ = \alpha_0 + \alpha_1 SDS + \alpha_2 LEG + \alpha_3 LY + \alpha_4 LY^2 + \alpha_5 TFR + \alpha_6 LYINEQ_{-1} + \mu_1 \quad (4)$$

$$LY = \beta_0 + \beta_1 SDS + \beta_2 LEG + \beta_3 LYINEQ + \beta_4 LPopGR + \beta_5 LiExp + \beta_6 LY_{-1} + \mu_2 \quad (5)$$

where: LYINEQ is is the natural logarithm of income inequality and is proxied by the income share of bottom 40%, middle 40%, top 20% of population, and the income Gini; SDS is standard deviation of schooling based on the dispersion of education attainment; LY is the natural logarithm of real per capita GDP; LY^2 is the squared of natural logarithm of real per capita GDP; TFR is total fertility rate; PopGR is natural logarithm of population growth rate; LiExp is life expectancy; μ is error term.

In addition, the first-period-lag of LY and LYINEQ are added into economic growth and income inequality equation respectively as these variables are one of the main determinants. Overall, Table 1 provides summary of statistic of variable that its are used in this paper.

Table 1. Summary of statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
-----+					
lowest	161	21.547550	2.001988	15.355	26.200
middle	161	37.625930	2.515397	32.605	48.091
highest	161	40.872450	3.727162	31.440	51.935
ays	161	6.878882	.9651651	4.430	9.820
hdi	161	69.834660	4.555598	54.200	78.590
-----+					
PopGR	161	.1691787	.0889946	-.050404	.400101
ig	161	.3248571	.04623	.241	.44
eg	161	.31	.0515752	.19	.47
sde	161	3.923665	.2858555	3.38	4.66
growth	161	55195.57	72453.24	31.44	35.3723
-----+					
LiExp	161	69.34534	4.176915	57.8	79.7
TFR	161	2.711056	.4697707	1.8	4.2
Year	161	2005	6.018721	1996	2014

Variable	Obs	Mean	Std. Dev.	Min	Max
LY	161	10.31626	1.036457	8.053251	12.77627
-----+-----					
LY2	161	107.4928	22.08791	64.85486	163.233
lowest_lag	138	21.70681	2.015718	15.355	26.2
middle_lag	138	37.64275	2.40378	32.605	48.091
highest_lag	138	40.67797	3.636964	31.44	51.93
LY_lag	138	10.31648	1.095641	8.053251	12.77627
-----+-----					
lg_lag	138	.3161014	.0421376	.241	.44
lPopGR	159	-1.907262	.6009101	-4.169852	-.9160383

In addition, the expected sign of independent variables in each equation can be summarized in Table 2. In equation (4), a higher level of educational attainment is expected to contribute to a decrease in income inequality and thus, α_1 will be negative. In addition, the coefficient of α_2 will be positive as there is a direct relationship between educational inequality and income inequality in essence of human capital theory. Also, an association between growth and income inequality is expected to test Kuznets' hypothesis so α_3 is positive and α_4 is negative. Moreover, since income inequality will rise as the fertility rate goes up, α_5 will be positive. Lastly, the coefficient of α_6 will be positive since level of previous inequality determines that of current inequality.

Table 2. The expected sign

Income Inequality (LYINEQ) equation	α_1 SDS	α_2 LEG	α_3 LY	α_4 LY ²	α_5 TFR	α_6 LYINEQ ₋₁
	(-)	(+)	(+)	(-)	(+)	(+)
Economic Growth (LY) equation	β_1 SDS	β_2 LEG	β_3 LYINEQ	β_4 LPopGR	β_5 LiExp	β_6 LY ₋₁
	(+)	(-)	(-)	(-)	(+)	(+)

The theoretical framework explains that greater inequality in income and education distribution is detrimental factor to economic growth. Therefore, in equation (5), the coefficient of β_1 will be positive while β_2 , β_3 and β_4 will be negative. Also, the coefficient of β_5 will be positive since a rise of economic growth will increase life expectancy. Finally, the coefficient of β_6 will be positive as the current growth is determined by the previous growth.

3. Results

Preliminary estimations are done separately for each equation, (4) and (5), by using the ordinary least squares (OLS) method. The model is then re-estimated using two-stage least squares (2SLS) method.

Table 3 presents the OLS estimation results of equation (4). The standard deviation of schooling (SDS) serve as an absolute dispersion of human capital while education Gini (LEG) measures the relative dispersion of human capital. Both variables show a significant relationship with income distribution, except for the income share of the middle population (Middle40) for SDS and top population (Top20) for LEG. In addition, SDS shows a considerable disequalizing link with income inequality, reflected by a positive sign on income Gini and the Top20 as well as a negative sign on the income share of the bottom population (Bottom40). On the other hand, EG shows equalizing on income distribution, reflected by a negative sign on income Gini and positive sign on Bottom40.

Table 3. OLS regressions of income inequality

	LBottom40	LMiddle40	LTop20	Log Income Gini
SDS	-0.13* (0.03)	-0.02 (0.01)	2.67* (0.92)	0.18* (0.04)
LEG	0.12* (0.03)	-0.05** (0.02)	0.69 (1.34)	-0.24* (0.06)
LY	0.05 (0.12)	-0.09 (0.09)	3.51 (5.41)	0.31*** (0.18)
LY ²	-0.002 (0.006)	0.004 (0.004)	-0.18 (0.25)	-0.01*** (0.008)
TFR	-0.02 (0.01)	-0.005 (0.007)	0.63 (0.52)	0.003 (0.02)
LBottom40 ₋₁	0.56* (0.09)			

	LBottom40	LMiddle40	LOp20	Log Income Gini
LMiddle40 ₋₁		0.83* (0.05)		
LOp20 ₋₁			0.74* (0.06)	
LogIG ₋₁				0.49* (0.07)
R ²	0.63	0.76	0.67	0.54

Note: N= 138; The first entry for each predictor is the coefficient estimate and the second in parentheses is the robust standard error of the coefficient. *Significant at the 0.01 level, **Significant at the 0.05 level, and ***Significant at the 0.10 level.

As expected, total fertility rate (TFR) also exerts a equalizing yield with income inequality, but the coefficient is not statistically significant. Moreover, there is a quadratic relationship between income per capita and inequality (Kuznets' curve) where the estimated coefficient is about 0.31 on the linear term and -0.01 on the squared term. Finally, adding lag variables of income inequality and its distribution (LYINEQ) into this equation provides a positive and significant association. The explanatory power of the model measured by the R² is relatively good though the possibility of some important explanatory variables missing from the model specification.

Table 4 reports the OLS estimation results of equation 5. First, in the long-term, there is a negative association between income inequality and economic growth. In contrast, SDS is positively associated with economic growth while higher education Gini (LEG) index has adverse relationship with economic growth and the coefficient of LEG in all models is statistically significant. Also, in insignificant and unexpected results, life expectancy (LiExp) and population growth (LPopGr) is a decreasing function of economic growth. As predicted, the lag variable of growth is positively and significantly related to economic growth, indicating that current growth links to the previous growth.

Table 4. OLS regressions of economic growth

	Model 1	Model 2	Model 3	Model 4
SDS	0.20 (0.17)	0.22 (0.16)	0.22 (0.17)	0.32*** (0.18)
LEG	-0.72*** (0.39)	-0.70*** (0.37)	-0.72** (0.38)	-0.71** (0.37)
LiExp	-0.02 (0.02)	-0.02 (0.01)	-0.02 (0.01)	-0.004 (0.01)
LPopGr	-0.05 (0.06)	-0.05 (0.06)	-0.05 (0.06)	-0.06 (0.06)
LY ₋₁	0.82* (0.06)	0.82* (0.06)	0.82* (0.06)	0.82* (0.05)
LBottom 40	-0.14 (0.49)			
LMiddle 40		-0.07 (0.65)		
LOp 20			-0.004 (0.51)	
Log income Gini				-0.75*** (0.45)
R ²	0.84	0.84	0.84	0.84

Note: N= 136; The first entry for each predictor is the coefficient estimate and the second in parentheses is the robust standard error of the coefficient. *Significant at the 0.01 level, **Significant at the 0.05 level, and ***Significant at the 0.10 level.

Table 5 describes the 2SLS regression results of income inequality equation. The finding confirms the OLS results that the absolute dispersion of human capital (SDS) have a disequalizing link with income distribution in which a positive sign on income Gini and Top20, and a negative sign on Bottom40 occur. Meanwhile, the relative dispersion of human capital (LEG) have a equalizing effect on income inequality, reflected by a negative sign on income Gini, and a positive sign on Bottom 40. Moreover, economic growth (LY) has a significantly disequalizing effect on income inequality, reflected by a positive sign on Top20 and Income Gini, and a negative sign on Bottom40.

Also, like OLS result, there is a quadratic relationship between income per capita and inequality (Kuznets' curve) where the estimated coefficient is about 2.64 on the linear term and -0.12 on the squared term. Finally, all lag variables of inequality are positively correlated with current inequality and total fertility rate has negative and insignificant relationship with Bottom40 and Middle, except for Top20 and income Gini. Overall, under null hypothesis that LY are exogenous, Hausman test result suggests that we should reject the null hypothesis, meaning that my OLS result are significantly different from instrumental variable approach and thus, LY are endogenous because μ_1 in equation 4 are correlated with μ_2 in equation 5. In addition, under null hypothesis that all instruments are uncorrelated with error term, overidentifying test result suggests that overidentification restrictions are valid and we should not cast a doubt on the suitability of instruments set.

Table 5. 2SLS regressions of income inequality and its distribution

	LBottom40	LMiddle40	LTop20	Log Income Gini
SDS	-0.11* (0.03)	-0.01 (0.01)	0.05** (0.02)	0.16** (0.07)
LEG	0.07 (0.05)	-0.07* (0.03)	0.06 (0.04)	-0.14 (0.12)
TFR	-0.02 (0.01)	-0.005 (0.008)	0.02 (0.01)	0.009 (0.04)
LY	-0.64** (0.29)	-0.39** (0.18)	0.71* (0.29)	2.64* (0.77)
LY2	0.03** (0.01)	0.02** (0.008)	-0.03* (0.01)	-0.12* (0.04)
LBottom40 ₋₁	0.57* (0.10)			
LMiddle40 ₋₁		0.79* (0.06)		
LTop20 ₋₁			0.69* (0.07)	
Log IG ₋₁				0.35* (0.13)
R ²	0.50	0.71	0.54	0.14
Hausman Test	0.004*	0.03**	0.004*	0.000*
Overidentification test	0.11	0.04**	0.06***	0.69

Note: N= 136; The first entry for each predictor is the coefficient estimate and the second in parentheses is the robust standard error of the coefficient. *Significant at the 0.01 level, **Significant at the 0.05 level, and ***Significant at the 0.10 level.

Table 6 expresses the 2SLS regression results of growth equation. SDS is statistically insignificant in all models, except for model 4 where one additional unit of SDS will increase economic growth by 0.73%, holding other variables fixed. Similar with OLS result, the relative dispersion of human capital (LEG) have adverse impact on growth in all models and the coefficients are statistically significant. In addition, LiExp are a positive function of economic growth and the coefficients are statistically significant in model 4, except for LiExp in Model 1, 2 and 3.

Also, the coefficient of income Gini is statistically significant and negatively correlated with growth where one percent increase in income Gini will decrease growth by 3.79%, holding other variables fixed. Overall, under null hypothesis that LYINEQ are exogenous, Hausman test result suggests that we should reject the null hypothesis, meaning that my OLS result are significantly different from instrumental variable approach and thus, LYINEQ especially income Gini is endogenous because μ_2 in equation 5 are correlated with μ_1 in eq. (4). In addition, under null hypothesis that all instruments are uncorrelated with error term, overidentifying test result suggests that overidentification restrictions are not valid and we should cast a doubt on the suitability of instruments set.

Table 6. 2SLS regressions of economic growth

	Model 1	Model 2	Model 3	Model 4
SDS	0.12 (0.17)	0.21 (0.16)	0.22 (0.16)	0.73* (0.29)
LEG	-0.72*** (0.38)	-0.66*** (0.39)	-0.70*** (0.40)	-0.67*** (0.41)
LiExp	-0.03 (0.02)	-0.02 (0.01)	-0.02 (0.02)	0.06** (0.03)
LPopGr	-0.06	-0.05	-0.05	-0.10

	Model 1	Model 2	Model 3	Model 4
	(0.05)	(0.06)	(0.06)	(0.07)
LY-1	0.83* (0.05)	0.82* (0.05)	0.82* (0.06)	0.81* (0.05)
LBottom 40	-0.70 (0.75)			
LMiddle 40		0.20 (0.80)		
LTop 20			-0.05 (0.67)	
LIncome Gini				-3.79* (1.27)
R ²	0.84	0.84	0.84	0.75
Hausman Test	0.28	0.74	0.88	0.001*
Overidentification Test	0.000	0.000	0.000	0.000

Note: N= 136; The first entry for each predictor is the coefficient estimate and the second in parentheses is the robust standard error of the coefficient. *Significant at the 0.01 level, **Significant at the 0.05 level, and ***Significant at the 0.10 level

Conclusion

There are many comprehensive studies investigating the relationship between economic growth, education inequality, income inequality, and income distribution. A relationship between economic growth and income inequality and vice versa is still major issue among the economist and researchers. In addition, there is an indication of systematic relationship between economic growth and education inequality, between education inequality and income inequality as well as income distribution. One major shortcoming of the literature on the link among these variables is that the simultaneous and the direction of causal relationship have often been neglected. Thus, an establishment of linkage and direction of causality will have major impacts on the relevance of results.

The econometric results from a cross-section analysis of 23 provinces in the period of 1996-2014 indicate that the absolute dispersion of human capital has an equalizing effect on the income distribution while the relative dispersion of human capital has the opposite effect. This study also indicates that economic growth has a significantly disequalizing effect on the income distribution and there is a quadratic relationship between income per capita and inequality (Kuznets' curve). In addition, the current level of inequality and growth is positively associated with the previous level of inequality and growth. Moreover, standard deviation of schooling and life expectancy is positively related with the growth of economy while both income and education Gini are negatively correlated with growth. However, there is little convincing evidence that changes in population have a link with economic growth and that alteration in total fertility rate has a relationship with income distribution.

The initial OLS regressions provide only limited support for other explanatory variables such as total fertility rate in a sense that such variables fail to make impact on 2SLS estimations. Furthermore, instrumental variables estimation allows to interpret the results as causal but the need of good and valid instrument is crucial. When the instrument is only weakly correlated with the explanatory variable, the variance of the IV estimator can be high, that is the standard errors will be high and so coefficients may be insignificant. For instance, during first stage regression, the instrument of population growth rate in equation 4 as well as TFR and LY2 in equation 5 tend to be insignificant. In addition, misspecification of the equation tends to be a problem in this paper. For example, for model I – IV in equation 5, overidentifying test suggested that instruments are correlated with error term, which means we should put all instrument to the equation as exogenous.

With intrinsic limitations, the need to disentangle the growth – income distribution nexus with other aspects of inequality, such as health and land is considered to be very important in future research. Another item on research agenda is how to take into account the interaction effects between education and income distribution. Finally, this research shows the necessity for more dynamic models in panel dataset.

There are some development policy considerations that can be drawn from this study in a bid to increase the level of human capital. If developing countries such as Indonesia want to achieve an egalitarian society with a more equitable distribution of income, economic policies should be more targeted at educational expansion and equal access to education sector. This can either be accomplished by altering the scholarship scheme to reach children who cannot continue to school after completing primary school. Such action can give positive effect on the demand for education. Or the government can raise the supply for education by building some affordable schools that are closer to the community.

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First Order Analysis of Organisational Knowledge, Organisational Orientation and Performance

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Abstract:

The focus of this paper was to examine the first order moderating effect of organisational orientation on the relationship between organisational knowledge and performance of telecommunication firms. Data was gathered from 230 managers and other administrative and technical employees of the four major telecommunication firm in Nigeria, through the use of structured questionnaire. The hierarchical multiple regression was used to show this moderating effect. According to the results of this research, strong emphasis and attention should be placed on an organisation-wide culture of learning orientation, such as shared vision and open mindedness; entrepreneurial orientation, such as proactiveness, competitive aggressiveness and autonomy as influencers of organizational effectiveness; and market orientation, such as customer and competitors' orientation. The influence of these orientations on organizational knowledge and performance demands that managers instill behaviour in organisational members towards reflecting these orientations in their dealing with customers and across organisational functions.

Keywords: tacit knowledge; explicit knowledge; organisational knowledge; strategic orientation; firm performance

JEL Classification: M10; M20

Introduction

The concept of organisational knowledge was popularised by Drucker (1993), and there has been increased research interest in its understanding and application. The assertions of Jackson, Hitt and Denison (2003) and Kai, Wei and Meng-Lin, (2014) suggest that the greatest transformations in the twenty-first century business environment largely depend on the creation, exploitation and management of knowledge. Therefore, organisational knowledge creates a platform for business managers to re-engineer their business processes to become knowledge driven. An advantage of knowledge driven processes in organisations is that it places the organisation in a vantage point where values are delivered and competitors find it difficult to adopt/imitate the organisation's initiatives. According to Sbaffoni (2010) competitive advantage is a function of the organisation's ability to be innovative in its business processes; and innovation is driven by organisational knowledge (David and Foray 2003). Indeed, knowledge determines organisations' efficient utilization of every other resources (Omezere and Gulez 2011).

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These view notwithstanding, the present state of the global business environment which is characterised by high levels of volatility, dynamism and turbulence requires managers to not only know- what and how, but to be versatile as to the application of existing organisational knowledge in driving firm performance. Such argument has not been sufficiently addressed in existing research. Consequently, managers are still in doubt about specific strategic organisational orientations that organisational knowledge should be aligned with, in a bid to enhance the firm's performance. Indeed, strategic organisational orientations portray the areas of deepest concern which firms perceive to enhance their operational processes and achieve effective and optimal performance. Therefore, strategic orientations shape firms' behaviour and determine their pattern of responsiveness of the changing business environments in which they operate. Based on this understanding managers are required to build up firms that are entrepreneurial, or innovative in their thinking about the creations of business models that are immersed in the knowledge, orientation and performance relationships. Consequently, this research is focused on contributing to existing knowledge in the fields of strategic and knowledge management about the relationships between organisational knowledge, organisational orientation and performance of firms.

1. Literature review

1.1. Organisational orientation and performance

Organisational orientation effectively relates with organisational performance because it determines the strategic directions of the organization (Iederan, Curşeu, Vermeulen and Geurts 2013). Several empirical evidences on the study of strategic orientation and performance have shown mixed results. Liu and Fu (2011) studied strategic orientation in a holistic pattern across the entrepreneurial orientation, marketing orientation and learning orientation. Their studies aimed at explaining the inconsistencies in the results of strategic orientations under different circumstances. Therefore, the main line for their research examined the 'direct, moderating and mediating effect that occur among the constructs. Based on a list of selected criteria seven articles out of one hundred and one samples were selected for their study. The results showed that the relationship between strategic orientation and organisational performance in born global organisations showed either direct relationship or indirect relationship intervened by moderator and mediator.

The opinion of Choy and Mula (2008) was not too different from that of Liu and Fu (2011) as to the mixed evidences gathered from empirical studies on strategic orientation dimensions and performance. The work carried out by Choy and Mula (2008) utilised the Venkatraman (1989) typology of business level strategic orientation dimension over the performance of different geographical subsidiaries of a single multinational firm. The result of the study showed that some of these dimensions are dominant and that certain patterns of these dimensions associate closely with strong business performance. Abiodun and Ibidunni (2014) also supported variations in the results of strategic orientation dimensions when they tested the significant relationship between technology and strategic orientation dimensions. After engaging the Venkatraman (1989) dimensionality upon their hypothesis they found that differentiation and futurity strategy dimensions were marginally dominant in the managerial practices of the two banks studied. Futurity orientation was found not to be significantly related with most of the technology policy dimensions investigated. In addition, their results showed that technology could be used to foster defensive behaviours rather than enforcing a competitive edge.

As a means of viewing strategy design and implementation from the organisational and the business or market level, existing literature have discussed the relationship between strategic orientation and performance (Liao and Wu 2010). As such managers can better understand, adapt and strategize according to their organisational peculiarities and operating environments. Consequently, most strategy based authors describe strategic orientation based on entrepreneurial, market, learning, technological, innovation orientations and so on (Liu and Fu 2011). Therefore, this present research adopts this broader perspective by discussing three multidimensional organisational orientations, namely: entrepreneurial, learning and market orientations.

The propensity for organisations in transition economies to practice entrepreneurial orientation very often proves to be high. This is because of changes that demand them to become more competitive in their industry, the need to design proactive strategies, take risks and enhance their learning about contemporary business processes (Zhou, Yim and Tse 2005, Zhao, Li, Lee and Chen 2009). More so, in industries where change is happening fast and dynamism characterizes most business operations, organisations survive and stay competitive by exploring and exploiting opportunities and creating novelty. Thus entrepreneurial orientation serve as a viable part of their strategy process. According to Rauch, Wiklund, Lumpkin and Frese (2004), a meta analysis carried out to show the magnitude of relationship between entrepreneurial orientation and performance showed that the correlation

between them is moderately large, and internal and external organizational factors exist to moderate that relationship.

Although, innovation of organisations is valuable to staying competitive in the competitive and dynamic global business economy, yet there is the need for both small, medium and large organisations to continuously leverage on learning orientation to remain competitive in their industry (Eshlaghy and Maatofi 2011). Learning orientation can create enhanced performance in organisations through the expansion of knowledge which gives the organization and its members' awareness above that of competitors, creation of new ideas and processes for new product development. Thus strategic flexibility and prompt responsiveness are important characteristics of organisations which are given to learning orientation (Jiménez-Jiménez and Sanz-Valle 2011). With learning orientation, organisations are more sensitive to changing trends and opportunities in the market, than competitors. Evidences abound about the relationship between learning orientation and organizational performance. For example, Liao and Wu (2010) found that learning orientation stimulates organisations to be more innovative, thus enhancing their ability to create new products and identify better ways of carrying out business operations. Also, Calantone, Cavusgil and Zhao (2002) suggest the second order relationship between learning orientation and organisational performance.

More so, market orientation is an important part of organisational orientation that describes the extent to which organisations respond to customers' needs, competitors' strategic moves in the industry and how functional units of the organisation collectively function to achieve organisational objectives and higher performance. As part of its marketing orientation practices, organisations engage in continuous environmental scanning so that they can be proactive and design strategies that enhance their market-based competitiveness (Uchebulam, Akinyele and Ibidunni 2015, Balasundaram 2009). Hussain, Ismail and Akhtar (2015) showed a significant relationship between first and second order market orientation and organizational performance of small and medium enterprises. Besides, the relationship between market orientation and business performance was found significant among knowledge-intensive organisations (Protcko and Dornberger 2014).

1.2. Linking organisational knowledge, orientation and performance

Proponents of the Resource Based View of the firm identify that organisational intangible resources offer unique competitive advantages when they are differentiated and difficult to imitate (Barney 1991). Strategic management scholars identify an extension of the Resource Based View of strategy: the Knowledge Based View (Grant 1996). The Knowledge Based View suggests that within the scope of the knowledge economy, knowledge is considered as the most significant resource for firm competitiveness (Curado 2006, Hellebrandt, Heine, Schmitt 2018). Denicolai, Zucchella and Strange (2014) also identified the possibility of achieving firm competitiveness from knowledge applications on organisational physical assets. Abrahamson and Goodman-Delahunty (2014) asserted that effective knowledge utilization in organisation largely depends on specific support systems such as policies on information, strategies, structures and technology. Knowledge engage humans in a dynamic social process that shapes/creates a desirable future (Takeuchi 2013). Strategy is about creating a future, it may therefore, be implied that knowledge should be an issues of strategic choice in contemporary competitive business environment.

Knowledge engagement in business processes is considered a key variable in generating value and achieving enhanced performance (Martín-de-Castro, Delgado-Verde, López-Sáez and Navas-López 2011, Shujahat, Sousa, Hussain, Nawaz, Wang, Umer 2017). Linking organisational knowledge to performance requires business managers to identify their tacit and explicit forms of knowledge resources and strategically leveraging on them in business operations. Evidence from successful firms indicate that knowledge is a strategic resource for achieving enhanced performance in complex business environment (Sharma and Mishra 2007, Fang, Wade, Delios and Beamish 2007). Meaning that, organisations perform excellently depending on the embodiment of what the organisational members know and what they do with what they know.

The importance of knowledge to organisational existence has been established. But organisations have a duty to tie-up knowledge resources and capabilities to their organisational strategy in order to achieve results that align with their business objectives (Ibidunni, Ogunnaike, Abiodun 2017). Competitive orientation plays a potentially influential role in connecting organisational knowledge with performance (Kim, Im and Slater 2013). Through competitive orientations, firms significantly create platforms that link their knowledge strategy to their external environment (Zhou and Li 2010). Competitive orientations represent the firm's strategic decisions over alternative means of achieving superior positions over its competitors. This is informed by pressures from the firm's competitors, technology, customers and overall environmental context (Iederan, Curşeu, Vermeulen and Geurts 2013).

By implication, a firm's internal strategic knowledge capabilities and resources can successfully interact with its external environmental context given the intervention of the firm's competitive orientation. An example is the leverage of technological depth that firm's gain as they interact with their competitive environment and external technological and innovative environments. This means that, for example, have observed that knowledge about competitive areas of the firm and its environment can result in improved performance (Wiklund and Shepherd 2003). Lyles and Schwenk (1992) affirmed that business strategy is inseparable from organisational knowledge.

2. Methodology

The research study is descriptive in nature. The use of descriptive research design is validated by the fact that the population for the study is already established, and the research study attempts to describe the relationships among the variables included in the research (Jong and van der Voordt 2002) as a way of contributing to existing knowledge in the fields of strategic and knowledge management.

Therefore, the research question that relates to this design seeks to investigate a first order interacting effect of organisational orientation as a moderator of the relationship between organisational knowledge and performance of telecommunication firms in low technology economies, like Nigeria. Central to the theme of organisational knowledge and orientation in developing economies, such as Nigeria, is the telecommunications industry. This is because the telecommunication industry is knowledge driven and contributes significantly to the nation's economy, especially in terms of Gross Domestic Product (GDP) (National Bureau of Statistics 2016, Ogbo, Okechukwu and Ukpere 2012, Osabuohien and Efobi 2012). Survey method was adopted for the study because it gave the researcher the opportunity for gathering large number of sample respondents from the given population (Taylor, Sinha and Ghoshal 2014). More specifically, copies of well-structured questionnaires were used to collect data from the sampled respondents.

Measures

Questions about organisational knowledge of the firms were developed based on a typological scaling of knowledge: individual-tacit, group-tacit, individual-explicit, and group-explicit knowledge dimensions (Chilton and Bloodgood 2007, Fei, Chen and Chen 2009, Huang 2014). Items of organisational orientation of the firms included market orientation (Chao-Hung 2015); entrepreneurial orientation (Lumpkin and Dess 2001, Li, Huang and Tsai 2008); and learning orientation (Sinkula, Baker and Noordewier 1997, Calantone, Cavusgil and Zhao 2002).

This research work argued that a multidimensional approach to measuring organisational orientation is important in helping managers to have a more robust view of interactions between variables and arrive at more qualitative judgments in guiding the firm's strategic engagements. Items on organisational effectiveness as designed by Gold *et al.* (2001), Rehman, Asghar and Ahmad (2015) and Shiaw-Tong, May-Chiun, and Yin-Chai (2016) were used. Customers' satisfaction item was captured based on the firm employees' feedback from customers about their level of satisfaction with the organisations' products and services (Almossawi 2012).

Sampling

Managerial, technical and administrative employees of organisations in the Nigeria telecommunications industry form the population for this study. Specifically, four organisations in the GSM sub-market of the industry were included in this study. The GSM sub-sector is pivotal to the Telecommunication industry because it has the highest number of subscribers (98.07 per cent), thus serving as the major driver of growth in Nigeria's telecommunication industry. A total sample size of five hundred and four (504) managerial and other technical and administrative employees was determined for this research work.

Reliability and validity of the scale items

The reliability of the research items was ensured using the internal consistency method while the validity of scale items was carried out using construct validity. The Coefficient Alpha (α) is the most popularly used to measure internal consistency (Pallant 2005). The closer the value of α to 1, the more accepted the reliability of the data.

From the Table below, Pallant's (2005) bench mark of 0.7 scale reliability is fulfilled by most of the constructs. Therefore, the scale items were found to be reliable for the constructs of this research study. The combine reliability of all items in the research instrument gave a reliability statistic of 0.889, which also surpasses the benchmark. This study determined construct validity of the research items using the extent of convergence and discriminant validity among the items in each construct of the research study (Brown 2000). Whereas some literature identifies construct validity by using factor analysis to observe clustering of items, another way of determining this validity is to explore the degree of correlation among items of a construct (Weiner 2007, Pae 2012).

Table 1. Inter-Item Correlations of Scale Items

Variables	Mean	Std. Dev.	α	ITK	GTK	IEK	GEK	LO	EO	MO	CS	OE
ITK	2.2278	1.12968	0.878	1								
GTK	4.2438	.50805	0.738	.002	1							
IEK	3.9524	.65277	0.547	.078	.306**	1						
GEK	4.0019	.66113	0.785	.084	.664**	.234*	1					
LO	4.0263	.75189	0.870	-.013	.520**	.309**	.578**	1				
EO	4.0925	.49471	0.852	.069	.545**	.375**	.477**	.524**	1			
MO	4.2107	.49454	0.852	-.125	.590**	.174	.526**	.629**	.639**	1		
CS	4.1978	.57193	0.770	-.265*	.311**	.229*	.172	.348**	.222*	.342**	1	
OE	4.0402	.64008	0.873	-.049	.469**	.377**	.651**	.622**	.553**	.558**	.229*	1

Note: * Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed).

The results showed in Table 1 reflect sufficient level of convergent among items of the same construct, thus validating convergence among the items. More so, the divergence conditions among the items of different constructs was also ensure by the uncorrelated results among items of different constructs.

3. Analysis and results

A total of two hundred and thirty (230) copies of questionnaire was retrieved from the organisational employees. The firms' employee base is largely dominated by female staff (31 respondents, or 68.9%) than their male counterpart (14 respondents, or 31.1%) out of which a total of 16 respondents (35.6%) are single while 27 respondents (60%) are married.

Most of the staff working with the firm have working experience ranging from six to ten years (33 respondents or 73.3%). A minute number of 11 respondents (24.4%) have spent five years and below working with the firm, while only 1 respondent (2.2%) has spent between eleven to fifteen years with the firm. This may imply that the firm has a weak employee retention strategy, and hence the organisational knowledge, especially tacit knowledge might not be sustainable over time since the carriers of such knowledge are not retained in the firm. Alternatively, the firm would be able to sustain its knowledge and establish a strong and competitive culture if it has mechanisms that capture knowledge of employees.

Results of Hierarchical Multiple Regression

Tables 2 consist of eight models that include the results of hierarchical multiple regression showing the interactions of first order organisational knowledge with first order Organisational Orientation and their linkages with organisational performance.

Table 2. Result of Hierarchical Multiple Regression (First Order Organisational Knowledge with First Order Organisational Orientation)

	Customer Satisfaction				Organisational Effectiveness			
	M1	M2	M3	M4	M5	M6	M7	M8
Individuals' Demographic Variables								
Sex	.085	.104	.105	.373***	.002	.035	.008	-.594***
Marital status	.096	.143	.170	-.019	-.085	-.035	-.031	.327***
Work experience	-.125	-.103	-.019	.250**	-.048	-.029	.105	-.520***
Age	.000	-.006	-.088	-.210*	-.087	-.032	-.090	.142**
Position	.287**	.309***	.238**	.451***	.141	.170	.129	-.599***
Education	.114	.112	.006	-.086	.054	.050	-.061	.235***
Personal Income	-.057	-.007	-.010	-.005	-.076	.019	-.013	.024
Organisational Demographic Variables								
Nature of employment		.092	.012	-.253**		.286***	.071	.682***
Firm size		-.131**	-.088	-.425***		-.129**	-.034	.680***
Functional units		.082	.042	.143**		-.012	-.088	-.215***
Individual-tacit Knowledge								
Explaining job steps			-.028	-.034			-.109***	.503***
Writing down the procedures			-.062	-.270*			.045	.915***
Individual-explicit Knowledge								

	Customer Satisfaction				Organisational Effectiveness			
	M1	M2	M3	M4	M5	M6	M7	M8
Personal trainings			-.007	.578*			.096**	-1.467***
Knowledge gained from journal and magazines			.156***	.874***			.058	-1.811***
Educational background			.038	.662***			-.083*	-1.572***
Group-tacit Knowledge								
Organizational culture			.091	-.029			.098	-.238***
Staff share experiences			.040	-.529***			.111	.462***
Shared experiences			.024	-.714***			-.006	.934***
Staff share stories of work			.055	-.293***			.061	.215***
Explain difficult work processes			.006	-.140			.080	-.063
Group-explicit Knowledge								
Firm's knowledge base			.104	.635***			.170**	-.973***
Document personal experiences			.015	.583***			.152***	-.917***
Interacting Effects								
ITKnRiskTaking				-.295				.073
ITKnAutonomy				2.699***				-6.667***
ITKnInterFunctionCoord				-2.156***				4.181***
IEKnCommitToLearning				.363*				-.100
IEKnOpenMindedness				-10.984***				23.334***
IEKnSharedVision				.395***				-.515***
IEKnInnovativeness				-.869***				2.307***
IEKnCustomerOrient				-.400				2.024***
IEKnInterFunctCoord				6.939***				-16.143***
GTKnOpenMindedness				11.004***				-23.369***
GTKnInterOrgKnowSharing				-.510**				1.539***
GTKnRiskTaking				-.294				.801***
GTKnProactiveness				-.187				.290***
GTKnCompetitiveness				.989***				-1.015***
GTKnAutonomy				-2.892***				7.009***
GTKnInterFunctCoord				-4.797***				12.258***
GEKnSharedVision				-.451***				.770***
GEKnInnovativeness				.342**				-1.137***
GEKnComptOrient				-.184**				.531***
R ²	.085	.123	.292	.500	.058	.160	.488	.866
ΔR ²		.038	.169	.207		.102	.328	.378
F	1.979*	2.061**	2.535***	2.824***	1.316	2.804***	5.853***	18.257***
Df	7	10	22	41	7	10	22	41

Note: * $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$; M1 = Model 1, M2 = Model 2, M3 = Model 3, M4 = Model 4, M5 = Model 5, M6 = Model 6, M7 = Model 7, M8 = Model 8

Model 1 examined the influence of individuals' demographic factors on customer satisfaction. Only position in the organisation was found to influence customer satisfaction ($\beta = 0.287$, $p \leq 0.05$). In model 2, organisational demographic variables were included into the block. At this levels, position in the organisation was found to influence customer satisfaction ($\beta = 0.309$, $p \leq 0.01$); firm size was also found to influence customer satisfaction ($\beta = -0.131$, $p \leq 0.05$). In model 3, individual-explicit knowledge was found to have significant influence on customer satisfaction. Statistically, the knowledge that employees gain from journals and magazines significantly impacts on their responsiveness towards customer satisfaction ($\beta = 0.156$, $p \leq 0.01$).

Model 4, shows the moderating effect of organisational orientation on organisational knowledge and customer satisfaction. Individual-tacit knowledge, specifically employees' ability to write down procedures involved with their work, were found to significantly predict customer satisfaction ($\beta = -0.270$, $p \leq 0.1$). However, the negative influence implies that losing employees with this tacit knowledge could result in declined customer satisfaction. All three items of individual explicit knowledge also have significant influence on customer satisfaction at this level. Employees' engagement in personal training ($\beta = 0.578$, $p \leq 0.1$), knowledge they gain from journals and magazines

($\beta = 0.874, p \leq 0.01$), and their educational background ($\beta = 0.662, p \leq 0.01$). These are indicators of the importance of employees' personal development for the organizational good.

Three specific items of group tacit knowledge have significant relationship with customer satisfaction. Employees' shared experiences ($\beta = -0.529, p \leq 0.01$), Shared experiences result in most successes ($\beta = -0.714, p \leq 0.01$) and employees often share stories of their work ($\beta = -0.293, p \leq 0.01$). Likewise, group explicit knowledge statistically had significant relationship with customer satisfaction. Organizational knowledge base ($\beta = 0.635, p \leq 0.01$) and the organizational culture that mandates employees to document their personal experiences during work ($\beta = 0.538, p \leq 0.01$) were revealed to influence customer satisfaction. Still in model 4, the moderating role of first order organisational orientation variables on first order organisational knowledge variables and customer satisfaction was also found to be significant. The four dimensions of organizational knowledge were individually tested on individual constructs of the three dimensions of organisational orientation that were included in this research study. They are: learning orientation, entrepreneurial orientation and market orientation. The relationship between individual tacit knowledge and customer satisfaction was moderated by constructs of entrepreneurial orientation, such as autonomy ($\beta = 2.699, p \leq 0.01$) and interfunctional coordination ($\beta = -2.156, p \leq 0.01$).

Similarly, the relationship between individual explicit knowledge and customer satisfaction was moderated by learning orientation's: commitment to learning ($\beta = 0.363, p \leq 0.01$), open mindedness ($\beta = -10.984, p \leq 0.01$) and shared vision ($\beta = 0.395, p \leq 0.01$), entrepreneurial orientation's: innovativeness ($\beta = -0.869, p \leq 0.01$); and market orientation's: inter-functional coordination ($\beta = 6.939, p \leq 0.01$). The influence of group tacit knowledge and customer satisfaction was moderated by organizational orientation. Statistically, learning orientation's: open mindedness ($\beta = 11.004, p \leq 0.01$) and inter organizational knowledge sharing ($\beta = -0.510, p \leq 0.05$); entrepreneurial orientation's: competitive aggressiveness ($\beta = 0.989, p \leq 0.01$) and autonomy ($\beta = -2.892, p \leq 0.01$); market orientation's: inter-functional coordination ($\beta = -4.797, p \leq 0.01$). Lastly, statistical result showed that first order constructs of organizational orientation moderate the relationship between group explicit knowledge and customer satisfaction. These moderating factors include, learning orientation's: shared vision ($\beta = -0.451, p \leq 0.01$); and entrepreneurial orientation's innovativeness ($\beta = 0.342, p \leq 0.05$) and market orientation's: competitor orientation ($\beta = -0.184, p \leq 0.05$).

Model 5 examined the influence of individuals' demographic factors on organizational effectiveness. None of the individual demographic factors included in this study was found to have any statistical influence on organisational effectiveness. In model 6, organisational demographic variables were included into the block. Nature of employees' employment with the organisation ($\beta = 0.286, p \leq 0.01$) and firm size ($\beta = -0.129, p \leq 0.05$) were also found to influence organisational effectiveness. In model 7, organizational knowledge was introduced into the block. Individual-tacit knowledge, specifically the fact that employees with this tacit knowledge find it difficult to explain the steps involved with their work, has statistical influence on organisational effectiveness ($\beta = -0.109, p \leq 0.01$). Individual-explicit knowledge was found to have significant influence on organisational effectiveness. Statistically, the knowledge that employees gain from personal training ($\beta = 0.096, p \leq 0.05$) and their educational background ($\beta = -0.083, p \leq 0.1$) significantly impacts on their responsiveness to the extent of ensuring higher organisational effectiveness. Group-explicit knowledge, such as the organisation's knowledge base ($\beta = 0.170, p \leq 0.05$) and documentation of employees' personal experiences relating to their work ($\beta = 0.152, p \leq 0.01$), has statistical influence on organisational effectiveness.

Model 8, shows the moderating effect of organisational orientation on organisational knowledge and organisational effectiveness. Individual-tacit knowledge, specifically the fact that employees find it difficult to explain the steps involved with their work ($\beta = 0.503, p \leq 0.01$) and the difficulty with writing down the procedures for carrying out their work ($\beta = 0.915, p \leq 0.01$) were found to significantly predict organisational effectiveness. Individual-explicit knowledge such as the knowledge that employees gain from personal training ($\beta = -1.467, p \leq 0.01$), knowledge gained from journals and magazines ($\beta = -1.811, p \leq 0.01$) and their educational background ($\beta = -1.572, p \leq 0.01$) significantly impacts on their responsiveness to the extent of ensuring higher organisational effectiveness.

Group-tacit knowledge, such as organizational culture ($\beta = -0.238, p \leq 0.01$), Employees' shared experiences ($\beta = 0.462, p \leq 0.01$), Shared experiences result in most successes ($\beta = 0.934, p \leq 0.01$) and employees often share stories of their work ($\beta = 0.215, p \leq 0.01$) influence organizational effectiveness. Likewise, group explicit knowledge statistically had significant relationship with organizational effectiveness. Specifically, organisational knowledge base ($\beta = -0.973, p \leq 0.01$) and the organisational practice that mandates employees to document their personal experiences during work ($\beta = -0.917, p \leq 0.01$) were revealed to influence organizational effectiveness.

The moderating role of first order organisational orientation variables on first order organisational knowledge variables and organizational effectiveness was also found to be significant. The four dimensions of organizational knowledge were individually tested on individual constructs of the three dimensions of organisational orientation that were included in this research study. They are: learning orientation, entrepreneurial orientation and market orientation. The relationship between individual tacit knowledge and organizational effectiveness was moderated by constructs of entrepreneurial orientation, such as autonomy ($\beta = -6.667$, $p \leq 0.01$) and market orientation's interfunctional coordination ($\beta = 4.181$, $p \leq 0.01$). Similarly, the relationship between individual explicit knowledge and organisational effectiveness was moderated by learning orientation's: open mindedness ($\beta = 23.334$, $p \leq 0.01$) and shared vision ($\beta = -0.515$, $p \leq 0.01$); entrepreneurial orientation's: innovativeness ($\beta = 2.307$, $p \leq 0.01$); and market orientation's: customer orientation ($\beta = 2.024$, $p \leq 0.01$) and inter-functional coordination ($\beta = -16.143$, $p \leq 0.01$). The influence of group tacit knowledge and organizational effectiveness was also moderated by organisational orientation. Statistically, learning orientation's: open mindedness ($\beta = -23.369$, $p \leq 0.01$) and inter organizational knowledge sharing ($\beta = 1.59$, $p \leq 0.05$); entrepreneurial orientation's: risk-taking ($\beta = 0.801$, $p \leq 0.01$), proactiveness ($\beta = 0.290$, $p \leq 0.01$), competitive aggressiveness ($\beta = -1.015$, $p \leq 0.01$) and autonomy ($\beta = 7.009$, $p \leq 0.01$); and market orientation's: inter-functional coordination ($\beta = 12.258$, $p \leq 0.01$). Lastly, statistical result showed that first order constructs of organizational orientation moderate the relationship between group explicit knowledge and organizational effectiveness. These moderating factors include, learning orientation's: shared vision ($\beta = 0.770$, $p \leq 0.01$); and entrepreneurial orientation's: innovativeness ($\beta = -1.137$, $p \leq 0.05$) and market orientation's: competitor orientation ($\beta = 0.531$, $p \leq 0.05$).

Individuals' demographic factors had up to eight (8) percent influence on customer satisfaction ($r^2 = 0.433$), $F(7, 150) = 1.979$, $p \leq 0.1$. In model 2, with the influence of organisational demographic factors, the combine effect on customer satisfaction shifted upward by over three (3) percent ($r^2 = 0.433$; $\Delta r^2 = 0.038$), $F(10, 147) = 2.061$, $p \leq 0.05$. with the introduction of organisational knowledge variables in model 3, the effect of the predictor variables had an overall higher influence on customer satisfaction of over sixteen (16) percent ($r^2 = 0.292$; $\Delta r^2 = 0.169$), $F(22, 135) = 2.535$, $p \leq 0.01$. In model 4, with the moderating role of organisational orientation the influence of organisational knowledge on customer satisfaction further strengthened by up to twenty (20) percent ($r^2 = 0.500$; $\Delta r^2 = 0.207$), $F(41, 116) = 2.824$, $p \leq 0.01$ when viewed from the first-order relationships.

In model 5, individuals' demographic factors had up to five (5) percent influence on organisational effectiveness ($r^2 = 0.058$), $F(7, 150) = 1.316$. In model 6, with the influence of organisational demographic factors, the combine effect on organisational effectiveness shifted upward by over ten (10) percent ($r^2 = 0.160$, $\Delta r^2 = 0.102$), $F(10, 147) = 2.804$, $p \leq 0.01$. With the introduction of organisational knowledge variables in model 7, the effect of the predictor variables had an overall higher influence on organizational effectiveness of over thirty-two (32) percent ($r^2 = 0.488$; $\Delta r^2 = 0.328$), $F(22, 135) = 50853$, $p \leq 0.01$. In model 8, with the moderating role of organisational orientation the influence of organisational knowledge on organisational effectiveness further strengthened by up to thirty-seven (37) percent ($r^2 = 0.866$, $\Delta r^2 = 0.378$), $F(41, 116) = 18.257$, $p \leq 0.01$.

4. Discussion

The focus of this study was to examine the first order moderating effects of organisational orientation on the relationship between organisational knowledge and performance of the firm. The hierarchical multiple regression was used to show this relationship. The moderating effect of organisational orientation on the relationship between organisational knowledge and orientation was also evident from the statistical analysis. This research supports the existing endeavour of Wiklund and Shepherd (2003) who found that entrepreneurial orientation is significant to the utilization of knowledge based resources in enhancing organisational performance.

Based on statistical results, risk-taking attitude and autonomy (that is, entrepreneurial orientation), and inter-functional coordination (that is market orientation) moderated individual-tacit knowledge and both customer satisfaction and organisational effectiveness. Thus implying that employees with tacit knowledge in the organisation should be encouraged to come up with innovations that create radical industry changes, such that their strategic implementation can make the organisation a leader in that regard (Santoro, Vrontis, Thrassou, Dezi, 2017; Ibidunni, Ibidunni, Oke, Ayeni, Olokundun 2018). However, these individuals should be made to think in autonomy. The reason is explained by the fact that rather than having a strong bureaucratic culture, organisations that are dynamic and innovative have a more flexible culture that emphasise employee participation and idea sharing (Ferreira and Pilatti 2011). Also noticeable is that individuals with tacit knowledge should work together, especially across departments and units of the organisation. This is essential for monitoring purposes, especially since it is expected that all efforts in the organisation, whether by individuals or as a group must be towards the actualisation of the common objectives of the organisation.

Also, individual-explicit knowledge and organisational performance was moderated by commitment to learning, open mindedness and shared vision (that is learning orientation); innovativeness (that is, entrepreneurial orientation) and customer orientation and inter-functional coordination (that is, market orientation). Again the evidences reveal that individual explicit knowledge must be synchronized into a collective form that achieve organisational objectives. The attention of managers should be called to awareness that despite the gains achievable from group or collective endeavours in the organisation, acting individual, employees still have many positive ideas and impact that they could make on the organisation. Therefore, there should also be systematically designed tasks that keep employees individually engaged but at the same time, their knowledge and experiences should be gathered, documented and stored as references to guide future similar endeavours (Gberevbie 2010). Both individuals and organizational managers should follow the pattern of continuous learning. As indicated in the absorptive learning literature (Kotabe, Jiang and Murray 2011), organizational members should continue to create new knowledge from existing ones. Thus, internal and external knowledge gathering should be emphasized (Denicolai, Zucchella and Strange 2014, Hwang, Lin, Shin 2018). As they continue with this attitude individual should be willing to subject organizational processes to change, where there is a need and a collective effort on knowledge sharing should be an important theme among organizational members.

As expected, the emphasis on group knowledge was more pronounced. However, result showed that moderation effect on group-tacit knowledge was more pronounced than on group-explicit knowledge. Group-tacit knowledge and organisational performance was moderated by opening mindedness and inter-organisational knowledge sharing (that is learning orientation); risk-taking, proactiveness and competitive aggressiveness (that is, entrepreneurial orientation); and autonomy and inter-functional coordination (that is, market orientation). Similarly, the three organisational orientations, though with slightly different and fewer number of items, influence the group-explicit and organisational performance relationship. The attention of managers is therefore called to specific areas of designing strategies for the organisations' market competitiveness, designing human resource strategies and setting operational strategies that guide organisational activities.

Conclusion

This research study focused on determining the moderating effect of organisational orientation on the relationship between organisational knowledge and performance. The hierarchical multiple regression was used to show this moderating effect. It was revealed that the three dimensions of organisational orientation, namely, learning, market and entrepreneurial orientations moderated the relationship between organisational knowledge and performance.

This research gives direction to the strategic and knowledge management literature by highlighting important and specific areas of organisational orientation, upon which organisational knowledge must align to influence strategic behaviours and achieve higher levels of organisational performance. Consequently, this research concludes that market, learning and entrepreneurial dimensions of organisational orientation are important aspects of organisational tacit and explicit knowledge gathering that can enhance organisational performance.

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The Role of Top Management Support in the Quality of Financial Accounting Information Systems

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Abstract:

Researchers previously conducted research on management support and information systems. The aims of this study to investigation the role of top management support in the quality of financial accounting information system in ministries and institutions of Republic of Indonesia. Survey conducted on 270 respondents *i.e.*, users of financial accounting information systems in 76 ministries and institutions. Data is collected using questionnaires. The variance base SEM used to data analysis. The results shown that top management support have significant effect on the quality of financial accounting information systems. The results can be interpreted that top management support plays an important role to realize the quality of financial accounting information system.

Keywords: top management support; quality; financial accounting information system.

JEL Classification: C02; C12; C83; M41

Introduction

The quality of information systems is a desirable characteristic of information systems in generating information (DeLone and McLean 1992). The quality of good information systems has several characteristics, among others: reliability, integration and accessibility (Bocij, Greasley and Hickie 2015, Heidmann 2008). In fact, the accounting information systems of various organizations in Indonesia do not have good quality (Susanto 2017a) such as: higher education (Susanto 2016, Puspitawati 2016, Fitrios 2017, Susanto 2017b), financial institutions (Mulyani, Darma, Sukmadilaga 2016, Darma 2017), state-owned enterprises (Ladewi *et al.* 2017), zakat institutions (Nurhayati and Susanto 2017).

The government wants to have a good quality financial accounting information system: reliable, integrated, and accessible. Reliability associated with the ability of information systems to function properly and produce accurate information (Baltzan 2014). Integration related to subsystem integration, system integration and data integration (Valacich and Schneider 2016). Accessibility is related to the ability of information systems to be accessed anywhere and anytime (Avison and Fitzgerald 2006). However, in reality, many ministries and state agencies do not have good quality financial accounting information systems (Widodo 2017, Main 2016, Haryanto 2015).

Management support is a key component of the success of information systems (Langer 2008). Top management support to assure needed resources were provided (Olson 2004). An information system depends on the resources of people, hardware, software, data and network (Marakas and O'Brien 2014). Implementing enterprise information systems requires a lot of resources and management support (Stair and Reynolds 2016).

Based on above phenomena, we investigate the role of top management support in quality of financial accounting information systems in context of ministries and institutions of Republic of Indonesia.

1. Literatur review

1.1. Top management support

Top management support refers to the willingness of top manager in providing the resources needed to operate the information system successfully (Fortune and Peters 2005). Top management support refers to the extent to which top managers provide all information systems resources (Iftinedo 2008). Executive management support is the necessary assistance for projects from the executive level (Langer 2011). Top management support to assure needed resources were provided (Olson 2004). Based on those definitions, we define top management support as the support of top management to provide all resources that needed to operate financial accounting information systems properly.

The information systems require five resources: human, hardware, software, network communication and data (Bocij, Greasley and Hickie 2015). The management backing also ensures that a systems project receives sufficient funds and resources to be successful (Laudon and Laudon 2016). Top management support for information systems is to provide the main resources of financial and human resources (Palvia and Palvia 2003). Top management support: top management provides adequate financial, material and human resources for effective system implementation (Boonstra 2013). Top management support related to resources is the provision of necessary funds for hardware, software and others (Dong, Neufeld and Higgins 2009). Top management refers to the extent to which top managers provide assistance and orders in the selection of equipment, hardware, software (Compean and Higgins 1995). Top management support dimensions used in this research namely: providing human resource, providing hardware, providing software, and providing fund as needed for operate of financial accounting information systems. An explanation of each of top management support dimensions as follows:

- 1 Providing human resources as needed. The human resources include users, developers, maintainers and operators of information systems (Bocij, Greasley and Hickie 2015). The human resources of information systems are planner, organizers, acquirer, implementer, communicator, supporter, monitors, and evaluator of information systems (Gelinis and Dull 2008). The human resources information systems include technical personnel and managers (Palvia and Palvia 2003). The human resources in information systems, such as managers, data input officers and technical support personnel (Bocij, Greasley and Hickie 2015). Providing human resources as needed in this study means top management provides the human resources as needed to operate the financial accounting information system. The indicator providing of human resource as needed *i.e.*, the suitability of the data entry personnel and technical support personnel to needs;
- 2 Providing hardware as needed. The hardware is a computer hardware and communications network hardware (Considine *et al.* 2010). The hardware is a physical component of a computer that performs input, processing, storage, and output of computer activities (Susanto 2013). The communication networks are required to transfer data / information (Stair and Reynolds 2016). Providing hardware as needed in this study means top management provides software as needed to operate the financial accounting information system. The indicator providing of hardware as needed *i.e.*, the suitability of computer hardware and network communications network to needs;
- 3 Providing software as needed. The software is an accumulation of instructions for running a computer (Susanto 2013). The software is a computer program written in a programming language or code that instructs the operation of the computer (Considine *et al.* 2010). The software refers to a program or set of instructions that command the computer to perform certain tasks (Bocij, Greasley, Hickie 2014). The software is a computer program that regulates the operation of the computer (Valacich and Schneider 2016). The software is a generic term for various programs used to operate a computer to perform certain tasks (Marakas and O'Brien 2014). Software is instructions for hardware to do certain tasks (Haag, Cummings and McCubbrey 2005). Group computer software into application software and operating system software. Application software can be divided into two types: general purpose application program and special purpose application program. While the operating system software can be differentiated into: system management programs and system development programs (Marakas and O'Brien 2014). Providing software as needed in this study means top management provides software as needed to operate the financial accounting information system. The indicator providing of software as needed *i.e.*, suitability of operating systems software and application software to needs;
- 4 Providing funds as needed. The top management is expected to provide support in the form of budget allocations or funds that meet the needs of the information systems department (Palvia and Palvia 2003).

Top management is expected to commit to provide sufficient funds for the financing of hardware, software, and training of information systems operators (Dong, Neufeld and Higgins 2009). Providing fund as needed in this study means top management provides budget as needed to operate the financial accounting information system. The indicators providing of fund as needed *i.e.*, suitability of budget amount for maintenance and replacement hardware and software, and for training of entry data staff.

1.2. Quality of Financial Accounting Information System

Accounting information system refers to a collection of resources to process financial and nonfinancial data into financial information (Bodnar and Hopwood 2014). Accounting information system as a set of interdependent components harmoniously to process data into information and distribute that information to support decision making and control in an organization (Susanto 2015). Accounting information system is a type of information system that functions to process data into information for decision makers (Romney and Steinbaart 2015). Accounting information system refers to a system that processes financial transactions into financial information to make decisions (Richardson, Chang and Smith 2014). An accounting information system is a set processing procedures data into information for its users (Bagrahoff, Simkin and Norman 2010). The system of collecting and processing transaction data is known as the accounting information system (Kimmel, Weygandt and Kieso 2011). Based on those definitions, we define the accounting information system as a collection of resources that work in harmony to process of financial data into financial information and distribute it to users.

Three types of accounting information systems are: financial accounting information systems, cost accounting information systems and management accounting information systems (Gupta 2011). The financial accounting information system is a system that aims to record, process and report past transactions in the financial statements in accordance with generally accepted principles (Boockholdt 1999). Financial accounting information system is an information system that provides information for the interests of external parties (McLeary 2000). Based on those definitions, we define a financial accounting information system as a collection of resources that work in harmony to process of financial data into financial information in the financial statements based on accepted accounting principles and is intended for the benefit of external parties.

Quality in the context of information systems describes the extent to which the product or service of the information system meets certain requirements (Mandl 2008). Quality means the ability of a product (including service) to meet or exceed customer expectation (Stair and Reynolds 2010). Quality of information system refers to a desirable of characteristics of information system in produce (DeLone and McLean 1992). Information system quality which is related to the quality of IS products (Pham Thi and Helfer 2009). Based on above definition, in this study we define the quality of financial accounting information system is a characteristic that describes ability of financial accounting information system in generating financial accounting information that meets user expectations.

Characteristics of a good quality information system easy to use, data functioning correctly, quickly in processing and presenting data in different screen display; reliable; secure; integrated with other systems (Bocij Greasley and Hickie 2015). The components of quality of information systems include: availability, integration and reliability (Avison and Fitzgerald 2006). Characteristics of quality of business intelligence system include: reliability, integration and accessibility (Mulyani, Darma and Sukmadilaga 2016, Darma 2017). System quality dimensions include: integration, flexibility, accessibility, formalization, and media richness (Heidmann 2008). System quality dimensions: reliability, flexibility, integration, accessibility, and timeliness (Shyong Ong, Yuh Day and Lian Hsu 2009).

The quality of financial accounting information system dimensions in this study namely reliability, integration and accessibility of financial accounting information system.

- 1 Reliability of financial accounting information system. Reliability is the system can provide the information needed (Bocij, Greasley and Hickie 2015). Reliability: the system functions correctly and produce accurate information (Baltzan 2014). Reliability refers to information systems able to function properly and provide accurate information (Haag, Cummings and McCubbrey 2005). Reliability measures the dependability of the system's operation (Shyong Ong, Yuh Day and Lian Hsu 2009). The indicators of reliability of financial accounting information system in this study *i.e.*, ability to functioning properly and produce accurate information.
- 2 Integration of financial accounting information system. Systems integration includes both linking the different modules of a new system together and linking the new system with existing systems (Bocij, Greasley and Hickie 2015). System integration: connectivity, compatibility, integrating subsystems and systems. System integration-connecting separate information systems and data (Bocij, Greasley, Hickie

2014). Integration allow separate systems to communicate with each other (Valacich and Schneider 2016). The indicator of integration of financial accounting information systems in this study *i.e.*, integration subsystem, integration system with other systems and integration of data.

- 3 Accessibility of financial accounting information system. System accessibility is a user accessible information system (Bocij, Greasley and Hickie 2015). Accessibility refers to information systems accessible, viewable, or user-initiated when needed by the user (Baltzan 2014). Availability: whether it is accessible, when and where required (Avison and Fitzgerald). The indicators of accessibility of financial accounting information system in this study *i.e.*, ability of financial accounting information systems to be accessed whenever and wherever required.

1.3. Theoretical framework and hypothesis

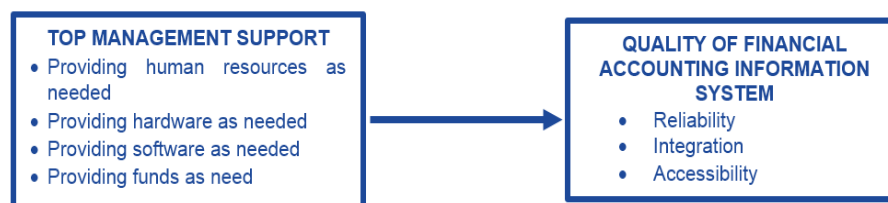
Management support will lead to increase system quality (Zaied 2012). The successful implementation of information systems requires a lot of support from top management (Laudon and Laudon 2016). Successful maximization of information systems requires support from top management (Bocij, Greasley and Hickie 2015). Support from top management is a key factor that is often proven for successful implementation of information systems (Olson 2015).

Resources needed in the implementation of accounting information systems include: human resources, hardware, software and funds. Management support ensures that the information system receives sufficient funds and resources for its success (Laudon and Laudon 2016). Top management support for resources is the provision of funds necessary for the procurement of hardware, software and others (Dong 2008). Top management support is top management providing adequate financial, material and human resources for effective implementation of information systems (Boonstra 2013)

Several previous research results show the effect of top management support on information systems. Support from top management is essential for effective implementation of information systems (Thong, Sing Yap and Raman 1996). Top management support is positively related to the effectiveness of information systems (Seliem *et al.* 2003). Top management support relates directly or indirectly to the performance of information systems (Ragu Nathan *et al.* 2004). Top management support is significantly related to the quality of information systems (Husein *et al.* 2007). Top management support influences the use of management accounting information systems (Gil and Hartman 2007). The level of management support is related to the level of quality of information systems (Medina and Chaparro). Top management support has the most powerful influence on information systems (Rouibah *et al.* 2009). Management support very helpful to improve the quality of information systems (Zaied 2012). Top management support is a key factor for the success of information systems (Chen, Zhao and Wang 2012). One of the factors consistently found to influence the success of information systems is top management support (Petter, DeLone and McLean 2013). Top management support has a strong effect on the operation of information systems (Khan, Lederer and Mirchandani 2013). Top management support has an effect on information systems (Al-Mamary, Shamsudin and Aziati 2014). Support from top management is an important point for the success of corporate information systems (Shao, Feng and Hu 2015).

Based on explanation and results of previous research above, so can be concluded that top management support affects the quality of financial accounting information system. The model of this research can be seen in Figure 1.

Figure 1. The research model



Based on the theoretical framework above, the hypothesis to be tested in this study is top management support have significant effect on the quality of financial accounting information systems.

2. Methodology

This study uses explanatory survey method. The population in this study is 86 units of Reporting & Accounting in Ministries and Institutions of the Republic of Indonesia. The sampling technique used is simple random sampling so that obtained 76 units. Respondents in this study are users of financial accounting information systems consists

chief of financial bureau, chief of financial officer, head of accounting and reporting, and staff of data entry. The instrument that is used for the collection data is a questionnaire. Three hundred and four questionnaires are distributed to 76 ministries and institutions, 270 questionnaires are returned and it is used in the statistical analysis. The questionnaires using Likert scale on five choices of responses ranging from “does not/never” to “very/always”. The questionnaire includes two variable namely: top management support (TMS) and quality of financial accounting information system (QFAIS). Top management support consists of four dimensions namely providing of human resources (TMS1), hardware (TMS2), software (TMS3), and fund (TMS4) as needed. The dimensions of providing of human resources as needed consists two indicators ie the suitability of the data entry personnel (TMS11) and technical (TMS12) to needs.

Further, the dimensions of providing of hardware as needed consists two indicators *i.e.*, the suitability of computer hardware (TMS21) and communications network hardware (TMS22) to needs. Furthermore, the dimensions of providing of software as needed consists two indicators ie the suitability of the operation systems software (TMS31) and application software (TMS32) to needs. While the providing of fund as needed consists three indicators ie suitability of the budget amount for: maintenance and replacement hardware (TMS41), software (TMS42), and training of data entry personnel (TMS43) to needs. The quality of financial accounting information system consists of three dimensions namely reliability of system (QFAIS1), integration of system (QFAIS2) and accessibility of system (QFAIS3). The dimensions of reliability of system consists two indicators *i.e.* the ability of systems to: function properly (QFAIS11) and produce accurate information (QFAIS12). Further, the dimensions of integration of system consists three indicators *i.e.*, the integration of subsystem (QFAIS21), integration system with other systems (QFAIS22), and integration of data (QFAIS23). While the dimensions of accessibility of system consists two indicators *i.e.*, the ability to access systems: anytime (QFAIS31) and anywhere (QFAIS32). All causal relationships between indicators and constructs in this study use a reflective measurement model. The method of analysis used structural equation modeling with variance based approach by using SMART-PLS, while hypothesis testing used t-test.

3. Finding and discussion

3.1. Demography of respondents

Based on the answers of the respondents on questions relating to gender, age, education level, and educational background, so the demographics of respondents can be seen in Table 1 below:

Tabel 1. Demographics of respondents

	Frequency	Percentage
Gender:		
Male	154	57,04%
Female	111	41,11%
Not Identified	5	1,85%
Amount	270	100,00%
Age:		
20-29	32	11,85%
30-39	118	43,70%
40-49	42	15,56%
50-59	33	12,22%
Not Identified	45	16,67%
Amount	270	100,00%
Education Level:		
Diploma	20	7,41%
Bachelor:	155	57,41%
Master	85	31,48%
Doctorate	4	1,48%
Not Identified	6	2,22%
Amount	270	100,00%
Educational Background:		
Accounting	158	58,52%
Economic But Not Accounting	52	19,26%
Not Economy	48	17,78%
Not Identified	12	4,44%
Amount	270	100,00%

Table 1 above shows that based on gender of male dominated respondents as much as 154 respondents or 57.04%, based on age of respondents dominated age between 30-39 years that is as much as 118 respondents or 43.70%, based on education level most respondents are bachelor that is as much as 155 respondents or 57.41%, and based on the educational background of most respondents background accounting that is as much as 158 respondents or 58.52%.

3.2. Descriptive of variable

Two hundred seventy questionnaires from user of financial accounting information systems at 76 Ministries and Institutions of Republic of Indonesia (78.49%) were returned and completed. A summary of respondents' responses on each dimension and indicators of top management support (TMS) and quality of financial accounting information systems (QFAIS) is presented at Table 2 Summary of respondents' responses on variable below.

Table 2 Summary of respondent responses on variable

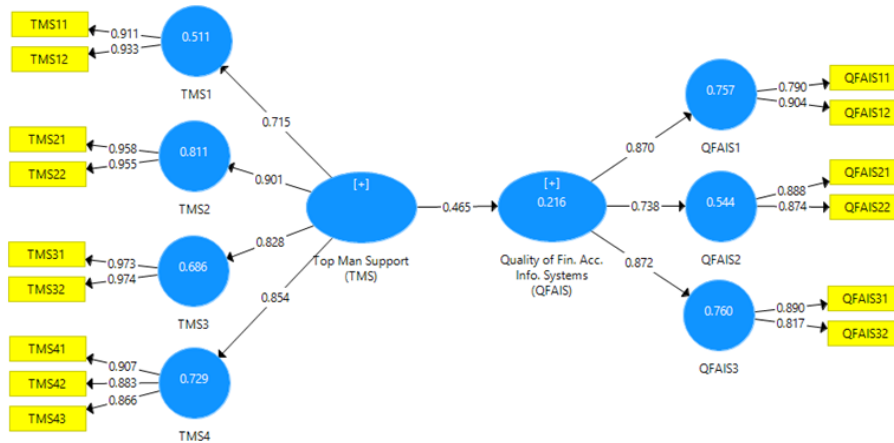
No	Dimensions and indicators of TMS	Mean Score	Category	Dimensions and indicators of QFAIS	Mean Score	Category
1.	Providing human resources as needed	3,21	Sufficient	Reliability	3,67	Sufficient
	Suitability of entry data personnel	3,27	Sufficient	Ability to functioning properly	3,74	Sufficient
	Suitability of technical personnel	3,14	Sufficient	Ability to produce accurate information	3,59	Sufficient
2.	Providing hardware as needed	3,79	Sufficient	Integration	3,46	Sufficient
	Suitability of computer hardware	3,77	Sufficient	Integration subsystems	3,70	Sufficient
	Suitability of communication network hardware	3,81	Sufficient	Integration systems with other systems	3,13	Sufficient
3.	Providing software as needed	3,81	Sufficient	Integration of Data	3,56	Sufficient
	Suitability operating system software	3,81	Sufficient	Accessibility	3,54	Sufficient
	Suitability of application software	3,81	Sufficient	Ability to access anytime	3,69	Sufficient
4.	Providing fund as needed	3,27	Sufficient	Ability to access from anywhere	3,38	Sufficient
	Suitability of budget amount for maintenance and replacement of hard	3,36	Sufficient			
	Suitability of budget amount for maintenance and replacement of soft	3,20	Sufficient			
	Suitability of budget amount for training of entry data personnel	3,23	Sufficient			
Mean score (Actual)		3,52	Sufficient	Mean score (Actual)	3,56	Sufficient
Mean score (Ideal)		5,00		Mean score (Ideal)	5,00	
Gap		1,48		Gap	1,44	

Inter-quartile range (IQR) was used to categorize the respondents' responses (Susanto 2015). The category of respondents' responses is: mean score: 1,00-1,99 (poor), 2,00-2,99 (less), 3,00-3,99 (sufficient) and 4.00-5,00 (good).

3.3. Evaluation of measurement model

The reflective measurement model is considered to meet validity if the extracted average variance (AVE) is higher than 0.5 and the outer load indicator on the construct must be higher than all the cross loads with the other constructs. The reflective measurement model is considered reliable if the composite reliability and outer load indicator is higher than 0.708 (Susanto 2016). The first stage of evaluation of first order on outer model, the outer loading of QFAIS23 indicator is below 0.7 so it must be eliminated from the model. The second stage of evaluation first order on outer model, we found that the outer loading of all items used to measure each dimension of the top management support and quality of financial accounting information systems is above 0.7 as shown Figure 2.

Figure 2. Path diagram



Further, the summary of composite reliability (CR) and average variance extracted (AVE) as shown in Table 3.

Table 3. The summary of composite reliability and average variance extracted

Dimensions	Items	CR	AVE
Providing of Human Resources as needed (TMS1)	TMS11	0,919	0,850
	TMS12		
Providing of Hardware as needed (TMS2)	TMS21	0,955	0,914
	TMS22		
Providing of Software as needed (TMS3)	TMS31	0,973	0,948
	TMS32		
Providing of Fund as needed (TMS4)	TMS41	0,916	0,784
	TMS42		
	TMS43		
Reliability (QFAIS1)	QFAIS11	0,837	0,715
	QFAIS12		
Integration (QFAIS2)	QFAIS21	0,874	0,776
	QFAIS22		
Accessibility (QFAIS3)	QFAIS31	0,844	0,730
	QFAIS32		

The results of outer loading and cross loading can be seen in Table 4 below:

Table 4. Outer loading and cross loading

	QFAIS1	QFAIS2	QFAIS3	QFAIS	TMS1	TMS2	TMS3	TMS4	Top Man Support (TMS)
QFAIS11	0,790			0,593					
QFAIS12	0,904			0,852					
QFAIS21		0,888		0,667					
QFAIS22		0,874		0,632					
QFAIS31			0,890	0,825					
QFAIS32			0,817	0,651					
TMS11					0,911				0,611
TMS12					0,933				0,702
TMS21						0,958			0,876
TMS22						0,955			0,846
TMS31							0,973		0,801
TMS32							0,974		0,811
TMS41								0,907	0,768
TMS42								0,883	0,772
TMS43								0,866	0,727

Note: QFAIS - Quality of Fin. Acc. Info. Systems

Based on the data in Table 3 and Table 4 average variance extracted above 0.5 and an indicators outer loadings on a construct higher than all its cross loadings with other constructs, it's concluded that the reflective measurement model is valid. Likewise, based on data in Table 3 and Figure 2, composite reliability and all indicator outer loading higher than 0.708, it's concluded that the reflective measurement model is reliable.

3.4. Testing of hypothesis

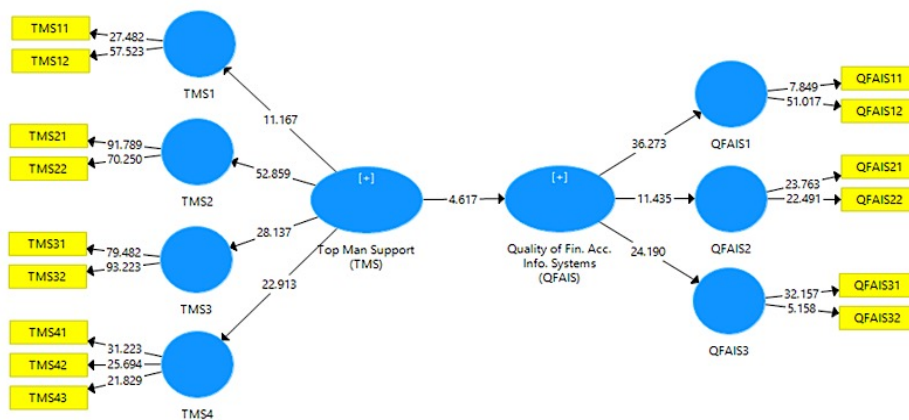
The hypothesis to be tested in this study are:

H_0 : The top management support has not significant effect on the quality of financial accounting information systems.

H_a : The top management support has significant effect on the quality of financial accounting information systems.

H_0 is accepted if t -Statistics is smaller than t -Table in significance level 5% (1.96). The Path diagram (PLS Bootstrapping) can be seen at Figure 3 below:

Figure 3. Parth diagram (PLS-bootstrapping)



Based on data in Figure 3, we found that t -Statistics is greater than t -Table ($4,617 > 1,96$). This means that H_0 is rejected or in other words the top management support have significant effect on quality of financial accounting information system. The path coefficient between top management support and quality of financial accounting information systems is 0.465, coefficient determination (R^2) is 0.216. this means that top management support able to explain the quality of financial accounting information system equal to 21.6%, while the remaining 78.4% explained other factors not included in this research model.

4. Discussion

Based on the result of hypothesis testing, we found the empirical evidence in the context of ministries and institutions of Republic of Indonesian that top management support has a significant effect on the quality of financial accounting information systems.

These empirical evidence confirms the theoretical framework that to maximize quality of information systems required top management support (Avison, Fitzgerald 2006, Gil, Hartmann 2007). This empirical evidence also supports the results of previous studies which suggest a significant positive effect of top management support with information systems (Olson 2015, Palvia 2003, Petter, DeLone, McLean 2013, Pham Thi, Helfert 2009, Puspitawati 2016, Ragnathan, Apigian, Qiang Tu 2004, Richardson, Chang, Smith 2013, Romney, Steinbart 2015, Rouibah, Hamdy, Al-Enezi 2009, Sekaran, Bougie 2016, Seliem, Ashour, Khalil, Millar 2003, Shao, Feng, Hu 2016, Shyong, Yuh, Wen-Lian 2009, Stair, Reynolds 2015).

This evidence indicates that the lack of quality of financial accounting information system is caused by the ineffectiveness of top management support. The result of this study can be explained below.

As shown in left side of Table 2, the mean score of the respondents' responses to the top management support is 3.52 (70.4%) or sufficient category. When compared with the ideal score top management support (5.00), there is a gap of 1.48 or 29.6% equivalent. This gap indicates that top management in ministries and institutions of the Republic of Indonesia has not been able to provide resources as much as 29.6% required financial accounting information systems. The highest response was given to the providing software as needed is 3.81 or sufficient category; providing hardware as needed is 3.79 or sufficient category; providing fund as needed is 3.27 or sufficient

category, and the lowest response was given to providing human resources as needed is 3.21 or sufficient category too. Further, we analyze there are three indicators that contribute most to the gap *i.e.*, unsuitable of technical personnel is 1.86 or 36.80%; unsuitable budget amount for maintenance and replacement for software is 1.8 or 36%, and unsuitable of budget amount for training of data entry personnel is 1.77 or 35.4%.

Problems (gaps) that occur in the top management support has implications on the quality of financial accounting information systems. The right side of Table 2 shows the respondents' responses to the quality of financial accounting information system. The mean score of the respondents' responses to the quality of financial accounting information systems is 3.56 (71.20%) or sufficient category. When compared with the ideal score (5.00), there is a gap of 1.44 or 28.80% equivalent. This gap indicates that financial accounting information systems in the ministries and institutions of republic of Indonesia as much as 28.8% has been not: reliable, integration and accessible. The highest response was given to the reliability is 3.67 or sufficient category; the accessibility is 3.54 or sufficient category and the lowest response was given to the integration is 3.46 or sufficient category too. Furthermore, we analyze there are three indicators that most contribute to the gap *i.e.*, integration system with other system is 1.87 or 37.40%; ability to access anywhere is 1.62 or 32.4% and integration of data is 1.46 or 29.2%.

Problems related to top management support are technical personnel unsuitable, budget amount for maintenance and replacement of software and training for entry data personnel unsuitable. This problem can be solved by:

- increase the number of technical personnel according to system maintenance needs;
- increase the budget amount for maintenance and replacement of software;
- increase the amount of budget for training data input officers.

Further, problems related to the quality of financial accounting information systems are the systems has been not well integrated with other systems, un-accessible anywhere, and data not integration. This problem can be solved by:

- evaluation of financial accounting information system resources: human resources, hardware, software, and funds currently used to determine the level of conformity to current needs taking into account future needs;
- based on the evaluation results, management must improve all types of resources in accordance with the need for financial accounting information system can operate with better quality.

Conclusion

This study aims to examine the role of top management support on the quality of financial accounting information system. Results of hypothesis testing shown the top management support have significant effect on the quality of financial accounting information system. This results can be interpreted that top management support plays an important role to realize the quality of financial accounting information system.

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How Does Internet Usage in Entrepreneurial Process Affect Owner Characteristics?

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Abstract:

In this study, we examine the impact of internet usage in entrepreneurial process on the characteristics of entrepreneurs. We find that there are more “experienced” entrepreneurs (*i.e.* three or four previous startups) in the states that have a better internet startup and internet tax payment process. Our results also show that there are more “experienced” entrepreneurs (*i.e.* previous startup experience) in the states that have a better internet licensing process. Our results also show that there are more young and middle-aged entrepreneurs in the states with low internet scores when compared to the high-score states.

Keywords: entrepreneur; entrepreneurship; small business; internet; entrepreneurial activity; owner characteristics.

JEL Classification: G38; L25; L26

Introduction

In this study, we examine the relation between internet usage in entrepreneurial process and owner characteristics. What type of entrepreneurs are more concentrated in the US states that have a better internet startup, internet tax payment, and internet licensing process?

To achieve our objective, we use the “United States Small Business Friendliness Survey” done by Kauffman Foundation and Thumtack.com in 2013. This survey asks small business owners questions about their state’s online startup, tax payment, and licensing systems. Using the responses in each state, we first compute each state’s scores on internet startup, internet tax payment and internet licensing. Then, we compare owner characteristics across high- and low- score states. We compare high- and low-internet startup score states first. Then, we compare high- and low-internet tax payment score states. Finally, we compare high- and low-internet licensing score states.

The owner characteristics that we examine are the respondent’s position in the firm, the owner’s experience, and the owner’s age.

We believe that the results here will be helpful to the US states’ officials. If certain processes affect certain groups/firms more, then the officials can make adjustments to their online systems accordingly. If a state wants to attract a certain group of entrepreneurs into their states, by looking at the results here, they can invest in specific processes rather than trying to improve everything at once.

The paper proceeds as follows: Section 1 goes over the previous literature. Section 2 explains the data and the methodology. Section 3 shows the empirical results. Section 4 concludes.

1. Literature review

Technology use during the initial startup phase as well as later during a small firm’s life is very important for entrepreneurs. We know from the previous literature that rules and regulations, in general, deter entrepreneurial activity. However, the use of technology makes the whole process less cumbersome for the entrepreneur. He/she will spend less time and effort when setting up the firm, when getting the necessary licenses, and when later making the tax payments. Since technology use relieves the entrepreneur, at least partially, from the cumbersome tasks that he/she needs to deal with, one would expect to see certain entrepreneurs or prospective firms to be more attracted to the states with better systems in place. One would also expect to see a positive relation between a state’s technology use in its systems and entrepreneurial activity in that state.

Since technology use directly affects the burden of rules and regulations on entrepreneurs, in this section, we focus on papers that examine how rules and regulations affect entrepreneurial activity in a region, country, or city. In all of these papers explained below, we are seeing that there is a negative relation between the degree of

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rules and regulations in a country and the entrepreneurial activity in that country. In other words, rules and regulations tend to have a negative impact on entrepreneurship.

Some of the previous papers focus on the direct role of the institutional framework on entrepreneurship. Wennekers and Thurik (1999) argue that both culture and institutional framework affect the amount of entrepreneurial activity in an economy. They also show that, besides these two factors, demographic, technological, and economic forces are also important for entrepreneurial activity. Similarly, Welter (2004) argues that there are shortcomings in the institutional environment that restrict women's interest in entrepreneurship. Therefore, we know that the institutional framework in a country is important for entrepreneurs. Parker (2007) finds that legal structures shape organizational forms in entrepreneurship. The author also shows that legal rules and institutions impact entrepreneurship in three areas: regulation, bankruptcy legislation, and the broad area of property rights, corruption, and the efficiency of courts. Aidis *et al.* (2008) argue that Russia's relatively low levels of entrepreneurial activity can be explained by its institutional environment. Manolova *et al.* (2008), on the other hand, argue that the overall institutional framework in each country is important but it should only serve as a first approximation only and interpreted with great care. Stephan and Uhlaner (2010) show that two factors, namely opportunity existence and the quality of formal institutions, support entrepreneurship.

Other papers look into the impact of other factors including the direct role of government on entrepreneurship. Zahra and Garvis (2000) focus on the impact of technological changes, aggressive government intervention, and fierce local rivalries on US firms' activities in other countries. The authors show that, when the international environment is hostile, firms tend to struggle. Gartner and Shane (1995) explain that changes in technology, attitudes, values, and government regulations have a significant impact on changes in entrepreneurship over time. They also argue that the economic and social changes in the world also affect entrepreneurial activity. Ovaska and Sobel (2005) examine entrepreneurial activities in post-socialist economies. They explain that certain factors (contract enforcement, credit availability, sound monetary policy, low government corruption, high foreign direct investment, low-level of regulations, and low tax rates) give citizens a high degree of freedom, and that these factors therefore are important for entrepreneurial activity.

Klapper *et al.* (2006) look into the relation between market entry regulations and the number of new limited-liability firms, the average size of firms, and the growth of incumbent firms. They show that costly regulations restrict the creation of new firms. Bitzenis and Nito (2005) focus on entrepreneurial activities in Albania. They show that unfair competition, lack of financial resources, changes in taxation procedures, and problems related to public order are the most important obstacles faced by entrepreneurs in that country.

Acs and Szerb (2007) explain that, to increase entrepreneurial activity, middle-income countries should focus on increasing human capital, improving technology availability, and promoting enterprise development. The authors show that, in developed countries, reducing entry regulations, in most cases, will not result in more high-potential startups. The authors contend that, these countries may try other things like labor market reform and deregulation of financial markets. Aidis *et al.* (2007) focus on the impact of rules and regulations as well as gendered norms and values on female business development. The authors show that rules and regulations may permit women to start their own businesses, but gendered norms and values may restrict women's activities and their access to resources.

Van Stel *et al.* (2007) argue that two factors especially lower entrepreneurship rates across countries. These factors are labor market regulations and the minimum capital requirement required to start a business. Nyström (2008) explains that a smaller government sector, less regulations, better legal structure and security of property rights are important determinants of entrepreneurial activity in a country.

In a more recent paper, Acs *et al.* (2009) examine factors such as taxes, legal restrictions, risk aversion, bureaucratic constraints, labor market rigidities, and lack of social acceptance on entrepreneurs and show that entrepreneurial activities tend to decrease under greater regulation, administrative burden and market intervention by government. Smallbone *et al.* (2010) contend that, especially in transition countries, governments play a particularly important role for entrepreneurship development. In these countries, the government's in creating the institutional framework that enables and/or constrains entrepreneurship is important.

Valdez and Richardson (2013) explain that a society's values, beliefs, and abilities may play a greater role than purely economic considerations of opportunity and transaction costs in entrepreneurship. According to Nawaser *et al.* (2011), laws, regulations, and motivational factors are important factors for entrepreneurship development. Dreher and Gassebner (2013), on the other hand, find that the existence of a larger number of procedures required to start a business, as well as a larger minimum capital requirement are detrimental to entrepreneurship.

Ghani *et al.* (2014) show that physical infrastructure quality and local education levels in India play the most important roles in promoting entry. They also contend that while strict labor regulations discourage entrepreneurship, better household banking environments promote entry in the unorganized sector. Branstetter *et al.* (2014) explains that Portugal's deregulations to promote entrepreneurship resulted in increased firm formation and employment, but mostly among "marginal firms" (*i.e.* firms that are deterred by existing heavy entry regulations). García-Posada and Mora-Sanguinetti (2015) explains that higher judicial efficacy increases the entry rate of firms, while it has no effect on the exit rate.

Sobel *et al.* (2007) looks into a different issue and examine entrepreneurs' impact on the process. The authors explain that, once they become successful, entrepreneurs tend to lobby for government entry restrictions. According to Sobel *et al.* (2007), bad political institutions yield to these demands and they place barriers on domestic and international competition.

2. Data

In this study, we use a 2013 survey done by Kaufman Foundation and Thumtack.com. The survey's name is "United States Small Business Friendliness Survey". This survey asks small business owners questions on their internet use for their business. The following are these questions:

- "Did you use the internet to form/start your business?";
- "Have you used the internet to pay taxes on your business earnings?";
- "Have you used the internet to get a license or permit to do business?"

For these questions, the respondents chose either "Yes" or "No". Then, we compute the percentage of owners who said "Yes" to these questions in each state. This way, we assign an "Internetstartscore", an "Internettaxscore", and an "Internetlicensingscore" for each state. Therefore, our first three variables are the "Internetstartscore", "Internettaxscore", and "Internetlicensingscore" variables. There are 41 states with adequate data, therefore we made our calculations for these 41 states.

The survey also asks business owners questions about their role in the company, their age, and their previous entrepreneurship experience. These variables are explained below:

- "Managerbutnotowner": the percentage of respondents who are the manager but not the owner;
- "Nonmanageremployee": the percentage of respondents who are an employee but not the manager;
- "Ownerandmanager": the percentage of respondents who are the owner and the manager;
- "Ownerbutnotmanager": the percentage of respondents who are the owner but not the manager;
- "Previousentre": The percentage of owners who has previous entrepreneurship experience;
- "Previousstartups1": The percentage of owners who started one previous business;
- "Previousstartups2": The percentage of owners who started two previous businesses;
- "Previousstartups3": The percentage of owners who started three previous businesses;
- "Previousstartups4": The percentage of owners who started four previous businesses;
- "Previousstartups>4": The percentage of owners who started more than four previous businesses.

The age variables Age<25, Age25-34, Age35-44, Age45-54, Age55-64, and Age>64 are self-explanatory. For each of the above variables, we compute the percentage values for each state. For example, in Oklahoma, what percentage of owners are younger than 25 years of age? If five percent of the small business owners are younger than 25 years of age, Oklahoma's "Age<25" score is 5 (percent). Therefore, each state in the survey has a percentage value for each of these variables.

Table 1 shows the summary statistics for our variables. All of the variables are in percentages.

In order to do the analyses, we run nonparametric tests (*i.e.* Mann Whitney Wilcoxon tests) that compare states with high and low scores in terms of "Internetstartscore". Then, we compare states with high and low scores in terms of "Internettaxscore". Finally, we compare states with high and low scores in terms of "Internetlicensingscore".

We use the mean values to assign each state into the high-score or the low-score category with respect to "Internetstartscore", "Internettaxscore", and "Internetlicensingscore". The states with scores higher than the mean are classified as high-score states, and the states with scores lower than the mean are classified as low-score states.

Table 1. Summary Statistics (All Variables in %)

Variable	Mean	Median	Stdev	Min	Max
Panel A. Internet Score					
Internetstartscore	58.21	58.62	6.39	37.50	69.11
Internettaxscore	34.54	34.78	6.71	20.83	54.51
Internetlicensingscore	32.94	32.93	10.07	18.30	64.09
Panel B. Position, Experience, Age					
Managerbutnotowner	3.39	3.25	1.87	0.00	8.33
Nonmanageremployee	0.53	0.41	0.72	0.00	3.23
Ownerandmanager	94.02	94.59	2.80	86.11	100.00
Ownerbutnotmanager	2.05	2.01	1.80	0.00	8.33
Previousentre	43.84	43.33	6.78	29.49	57.14
Previousstartups1	44.74	44.64	12.08	16.67	100.00
Previousstartups2	30.53	31.51	8.03	0.00	41.67
Previousstartups3	15.10	14.68	7.42	0.00	33.33
Previousstartups4	4.18	4.42	3.63	0.00	14.29
Previousstartups>4	5.45	4.76	4.54	0.00	21.43
Age<25	2.09	2.18	1.67	0.00	8.70
Age25-34	18.72	19.21	5.14	5.26	35.48
Age35-44	24.27	25.32	3.98	14.29	31.82
Age45-54	28.18	28.46	5.88	10.00	46.67
Age55-64	21.38	20.45	6.32	8.70	42.11
Age>64	5.36	5.71	2.61	0.00	11.43

In the "Results" section, we first show the results of our comparisons between high-Internetstartscore states and low-Internetstartscore states. Then, we show the results of our comparisons between high-Internettaxscore states and low-Internettaxscore states. Finally, we show the results of our comparisons between high-Internetlicensingscore states and low-Internetlicensingscore states.

3. Results

Table 2 compares certain owner characteristics across the high- and low- internet start score states. The table looks at the separation of ownership and management in the firm, the previous experience of the owner, and the age of the owner. The last column shows the results of the Mann-Whitney Wilcoxon tests that compare the high- and low-score scores.

As we can see from the table, there is no statistically significant difference in the respondents' position in the firm across high- and low-score states. However, we are seeing that the two groups of states differ in terms of the owner's experience level. While 41.64% of the owners have one previous startup experience in the high-score states, the corresponding percentage is 49.58% in the low-score states. The difference is significant ($p=0.0115$). This shows that there are more entrepreneurs with one previous experience in the low-score states.

On the other hand, when comparing the two groups of states in terms of the percentage of owners with three or four previous startup experience, we are seeing the opposite. While 15.51% of the owners have three previous experience in the high-score states, only 14.47% have three previous experience in the low-score states. This difference is statistically significant ($p=0.0906$). Similarly, while 5.23% of the owners have four previous experience in the high-score states, only 2.54% have similar experience level in the low-score states. This difference is also statistically significant ($p=0.0147$).

The high-score states have more owners with three or more previous experience when compared to the low-score states. In other words, while less experienced entrepreneurs are concentrated in the low-internet startup score states, more experienced ones are concentrated in the high-score states.

Table 2. High- versus Low-Internetstart score states

Variable	High-Score		Low-Score		Mann-W.
	Mean	Med.	Mean	Med.	p-value
Managerbutnotowner	3.16	2.97	3.76	3.57	0.1747
Nonmanageremployee	0.60	0.41	0.43	0.22	0.3364
Ownerandmanager	94.16	94.59	93.82	94.46	0.3492
Ownerbutnotmanager	2.08	1.87	2.00	2.20	0.3889
Previousentre	43.67	43.80	44.11	42.34	0.4840

Variable	High-Score		Low-Score		Mann-W.
	Mean	Med.	Mean	Med.	p-value
Previousstartups1	41.64	42.42	49.58	49.42	0.0115**
Previousstartups2	31.99	32.91	28.24	31.18	0.1713
Previousstartups3	15.51	15.22	14.47	13.21	0.0906*
Previousstartups4	5.23	4.96	2.54	1.27	0.0147**
Previousstartups>4	5.63	5.06	5.17	3.75	0.2870
Age<25	2.10	2.29	2.09	2.10	0.1735
Age25-34	18.89	18.48	18.46	19.43	0.2694
Age35-44	24.67	25.32	23.64	25.08	0.1119
Age45-54	28.03	28.50	28.42	28.14	0.4258
Age55-64	21.16	20.25	21.71	20.51	0.4947
Age>64	5.15	5.45	5.68	5.94	0.2782

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

The table shows that there is no statistically significant difference in the owners' age across high- and low-score states. We compare the two groups of states in terms of the percentage of entrepreneurs in different age groups, and we find no significant difference with respect to any age group.

Table 3 compares owner characteristics across the high- and low- internet tax score states. The table shows that the position of the respondent in the firm is generally not different across the two groups of states. Only "ownerbutmanager" is significantly different across the two groups of states. More of the respondents are owner but not the manager of the firm in the low-score states. This may indicate that the separation of ownership and management is more prominent in the low-score states.

The table shows that the two groups of states differ in terms of the owner's experience level. While 29.48% of the owners have two previous startup experience in the high-score states, the corresponding percentage is 31.86% in the low-score states. The difference is significant ($p=0.0476$). This shows that there are more entrepreneurs with two previous experience in the low-score states. On the other hand, when comparing the two groups of states in terms of the percentage of owners with three previous startup experience, we are seeing the opposite. While 17.50% of the owners have three previous experience in the high-score states, only 12.04% have three previous experience in the low-score states. This difference is statistically significant ($p=0.0243$).

Table 3. High- versus Low-Internettax Score States

Variable	High-Score		Low-Score		Mann-W.
	Mean	Med.	Mean	Med.	p-value
Managerbutnotowner	3.43	3.28	3.35	3.00	0.3565
Nonmanageremployee	0.45	0.39	0.64	0.50	0.1595
Ownerandmanager	94.52	94.69	93.40	94.24	0.1528
Ownerbutnotmanager	1.60	1.61	2.62	2.28	0.0269**
Previousentre	44.55	44.90	42.94	42.33	0.1755
Previousstartups1	43.47	45.74	46.36	43.35	0.4895
Previousstartups2	29.48	30.95	31.86	33.64	0.0476**
Previousstartups3	17.50	16.67	12.04	14.00	0.0243**
Previousstartups4	4.47	4.76	3.80	2.21	0.2530
Previousstartups>4	5.07	4.00	5.93	5.47	0.3179
Age<25	1.86	2.16	2.40	2.25	0.3607
Age25-34	18.85	19.29	18.56	18.56	0.4582
Age35-44	23.32	24.62	25.47	25.74	0.0688*
Age45-54	29.80	28.57	26.12	26.22	0.0531*
Age55-64	20.49	19.66	22.51	21.67	0.1013
Age>64	5.67	5.45	4.95	5.80	0.3275

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

Table 3 shows that there are more middle-aged entrepreneurs (*i.e.* age35-44) in the low-score states, while there are more old entrepreneurs (*i.e.* age45-54) in the high-score states. 23.32% of the owners in the high-score states are in the age35-44 group, while the corresponding percentage is 25.47% in the low-score states. The difference is statistically significant ($p=0.0688$). On the other hand, 29.80% of the owners in the high-score states are in the age 45-54 group, while the corresponding percentage is 26.12% in the low-score states.

Table 4 compares owner characteristics across the high- and low- internet licensing score states. The table shows that the position of the respondent in the firm is generally not different across the two groups of states. Only “ownerbutmanager” is significantly different across the two groups of states. More of the respondents are owner but not the manager of the firm in the low-score states. This may indicate that the separation of ownership and management is more prominent in the low-licensing score states.

The table shows that the two groups of states differ in terms of the owner’s experience level. While 45.29% of the owners have previous startup experience in the high-score states, the corresponding percentage is 42.46% in the low-score states. The difference is statistically significant ($p=0.0855$). This shows that there are more entrepreneurs with previous startup experience in the high-score states. Also, there are more entrepreneurs with previous two startup experience in the high-score states. While 32.45% of the owners have two previous experience in the high-score states, only 28.70% have two previous experience in the low-score states. This difference is statistically significant ($p=0.0775$).

Table 4. High- versus Low-Internetlicensing Score States

Variable	High-Score		Low-Score		Mann-W.
	Mean	Med.	Mean	Med.	p-value
Managerbutnotowner	3.72	3.71	3.09	2.97	0.1125
Nonmanageremployee	0.57	0.23	0.49	0.41	0.4562
Ownerandmanager	94.23	94.31	93.83	94.67	0.3971
Ownerbutnotmanager	1.48	1.77	2.59	2.24	0.0728*
Previousentre	45.29	45.40	42.46	42.55	0.0855*
Previousstartups1	42.13	44.07	47.23	44.64	0.1875
Previousstartups2	32.45	32.37	28.70	30.95	0.0775*
Previousstartups3	15.73	15.98	14.51	14.29	0.2130
Previousstartups4	4.74	5.41	3.64	3.05	0.1173
Previousstartups>4	4.96	3.79	5.92	5.41	0.2444
Age<25	1.74	1.79	2.43	2.27	0.0784*
Age25-34	19.28	18.68	18.19	19.51	0.4224
Age35-44	23.18	24.14	25.30	26.32	0.0068***
Age45-54	28.37	29.26	28.00	27.16	0.1514
Age55-64	21.99	20.13	20.79	20.47	0.4123
Age>64	5.44	5.54	5.28	5.71	0.4948

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

Table 4 shows that there are more young entrepreneurs (*i.e.* age<25) and middle-aged entrepreneurs (*i.e.* age35-44) in the low-score states. While only 1.74% of the owners in the high-score states are in the age<25 group, the corresponding percentage is 2.43% in the low-score states. Similarly, while only 23.18% of the owners in the high-score states are in the age35-44 group, the corresponding percentage is 25.30% in the low-score states.

Conclusion

In this study, we examine the relation between internet usage in entrepreneurial process and owner characteristics. We use the “United States Small Business Friendliness Survey” done by Kauffman Foundation and Thumtack.com in 2013. This survey asks small business owners questions about their state’s online startup, tax payment, and licensing systems. Using the responses in each state, we first compute each state’s scores on internet startup, internet tax payment and internet licensing.

When we compare the owner characteristics in the states with a high internet startup score versus in the states with a low internet startup score, we find significant differences in terms of owners’ experience level. On the other hand, we do not find a significant difference in owners’ age. Similarly, when we compare the owner characteristics in the states with a high internet tax payment score versus in the states with a low internet tax payment score, we find significant differences in terms of owners’ experience level. We also find a significant difference in owners’ age.

Finally, when we compare the owner characteristics in the states with a high internet licensing score versus in the states with a low internet licensing score, we find significant differences in terms of owners’ experience level. We also find a significant difference in owners’ age. Our results indicate that certain types of entrepreneurs are more concentrated in the high-internet score states. Therefore, if a state wants to attract a certain group of entrepreneurs into their states, by looking at the results here, they can invest in only one or two specific processes

(i.e. the startup, the tax payment, or the licensing process online) rather than trying to improve all processes at once.

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Support for Youth (Start-Up) Entrepreneurship through the Development of Coworking Spaces: Accumulated Experience and Perspectives

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Abstract:

The experience of creation and development of coworking centers in the city of Moscow shows premises should be chosen with the lowest lease rate, but one should include an advertising budget and running of public events for the target audience. Given the social component of the project, it is necessary to form the "core" of residents of coworking. The "evangelists" of a new place are useful, these ones are formed in the already operating coworking center in another district of the city. It is advisable for the authorities to provide various support to coworking centers, including orders for profile activities and trainings, subsidizing of part of the costs of start-up entrepreneurs for the lease of workplaces, ensuring the exchange of best practices for successful projects. The article presents a scheme for initiating the creation of coworking centers by government bodies engaged in supporting small business development at the municipal level. The development of coworking centers is a unique direction that is advantageous for both state and municipal government bodies, as well as for owners of old industrial enterprises that require redevelopment, as well as for start-up entrepreneurs to create their own business from a "zero" level.

Keywords: co-working spaces (CWS); small and medium sized enterprises (SME's); state entrepreneurship policies and programs; reorganization of production territories; urbanistics.

JEL Classification: L53; O18; O38

Introduction

The main goal of the article is to analyze the development of coworking centers in Moscow, including the analysis of the coworking center organization in a large business center on the basis of an industrial enterprise that went bankrupt in the 1990s. The article presents a scheme for initiating coworking centers in the regions, as a social infrastructure for supporting entrepreneurship among young people. Here is given an example of the analysis of the possibility of locating a coworking center in a small town, in the historical building of a vodka distillery dating back to Tsarist Russia.

1. Literature review

In Russian practice, the organization of coworking centers is often considered in the context of the reorganization of production areas. It should be mentioned that the development of coworking to revive business activity in the urban environment is considered, particularly in the UK (Brown 2017), but the author cautions against the use of coworkings as a tool for a "quick fix" of city renovation problems. At the same time, the advantages of coworking spaces go beyond the immediate members of these communities and allow connection between local colleagues and remote business communities. For creating ideal coworking space, the concept of coworking space must be recognized as a community space for interaction and creativity between people and space. (Han 2013) Coworkings are part of the ecosystem of Israel's start-ups, which is one of the advanced countries in regard to innovative technologies. Israel, called the start-up nation, has more start-ups per capita than any other country in the world, with its high-tech industry consisting of a dense ecosystem of conferences, accelerators, business lunches, social networks and coworkings (Fraiberg 2017).

One of the fundamental studies on this issue was the study in 2005 of a group of Moscow scientists in the field of regional economic policy: "Reorganization of industrial areas of the city of Moscow: economical, organizational and city-planning aspects" (Burak, Rostanec, Bekker, Gazetov 2005). This fundamental work was the basis for the state program for the reorganization of production areas, developed and adopted by the Government of Moscow.

After its approval, the reprofiling of Moscow enterprises, relocation, changes in the functional purposes of the territories, occupied by these enterprises, resumed its legislative and organizational courses.

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Currently, the work of the Government of Moscow is carried on, as follows: large-scale investment programs are being implemented on the former territories of the industrial zones "Nagatino-Zil", of the metallurgical plant "Serp i Molot". In 2006, a total amount of 66 industrial zones occupying 15% of the city's territory were allocated in the megalopolis (Burak *et al.* 2005). However, in many cases, the reorganization of the industrial zone should be accompanied only by multistoried residential development or extensive trade and office spaces.

It is necessary at the state and municipal levels to support the organization of coworking centers capable of creating new jobs for start-up entrepreneurs in the promising sectors of a new economy.

The results of the studies of 14 coworking spaces located in six Asian countries show that people appreciate the possibilities of four dimensions of coworking: creation of opportunities for knowledge exchange, expansion of the creative sphere, expansion of individual actions in the team and support of collective actions for its effective implementation (Castilho, Quandt 2017). Similarly, researchers identify four types of coworking spaces formed in the EU: corporate coworking space, open corporate coworking space, consulting coworking space and independent coworking space (Bouncken, Laudien 2018).

Coworking centers are not just equipped workplaces with an hourly/daily/weekly/monthly payment. In the first place, a successful coworking center is a business environment, a place for communications of professionals and trainings of venerable experts for the creation of collaborations and start-ups. So, in 2014, one of the largest investment companies in the world, Goldman Sachs, which co-finances new businesses, has invested in the network of coworkings "WeWork". (Konrad 2014). And only the second most important task of the coworking center organization, which is self-explanatory, is the provision of a workplace to a start-up entrepreneur on terms of an hourly payment, as well as a short-term lease: day, week or month. Thus, coworking centers reduce barriers to business development by helping to create new jobs in the field of digital economy, design, consulting and various other services. The main priorities of the state policy in the field of supporting entrepreneurship in Russia are the construction of technology parks and business incubators (state companies), the allocation of public funds for consulting assistance, the provision of subsidies for payments on loans and leases to small businesses, the development of microlenders and guarantee funds that, in case of a reduction in interest rates in Russia, are losing its relevance. However, the state system for supporting entrepreneurship somewhat does not "notice" the rapidly developing direction of the small business infrastructure of coworking centers in large cities (with the exception of Moscow and St. Petersburg). Thus, we believe that the priorities of state policy shall be shifted towards supporting the development of private infrastructure for small businesses as opposed to the state one (industrial parks, business development centers, *etc.*), primarily in small Russian cities. We also believe this methodical approach to the entrepreneurship support is relevant for any country.

2. Methodology

In this article, we use empirical and theoretical research methods. Empirical methods include stages of accumulating information and collecting data from interviews, publications on the Internet, thematic databases, and generalization of price information. Theoretical methods consist in abstracting and formalizing the received heterogeneous information on the phenomenon being investigated – the organization of coworking centers in Russia and abroad. The obtained data were subjected to simulation and a formula was proposed that allows estimating possible revenues from coworking, suggesting steps to improve the efficiency of the organization of coworking centers with the participation of state and municipal authorities.

3. Case studies and experiments

City-planning solutions creating in many ways unique city spaces, on the basis of reorganized industrial zones, have developed in recent decades in Moscow and other regions of Russia. In particular, on the territory of the factory "Hrustalny" named after Kalinin, located on the Bolshaya Novodmitrovskaya street in Moscow, with a total area of factory buildings of 21 thousand square meters, Design-factory "Flakon" was opened in 2009 – the first creative cluster in Moscow, aimed at the development of a wide range of projects in the field of actual forms of creativity, education and civic activities.

The name of this development project was picked for a reason. The factory was built in the 50s of the XX century for a large-scale production of perfume bottles. However, historically in this place there was the Glass factory of Friedrich Franzevich Dufloy from 1865 to 1918. There was a wide range of products: oil lamps, construction, pharmacy, industrial glass, crystal tableware (Toptigki livejournal 2014)

Characteristically, the width of the Bolshaya Novodmitrovskaya street for the last 150 years has not changed, and now it is impossible to park there during business hours. However, the parking directly on the territory

of the Design-factory "Flakon" costs about 1 euro per hour, thus the owners of this popular place in Moscow receive incomes not only from numerous lessees, but also from visitors of this place.

If before the start of the reorganization project of the industrial zone the factory was dilapidated, now this place looks like well-kept European capitals, a place where it is not only pleasant to work, but one can also go to have a snack or visit a cultural and entertainment event.

A coworking center START HUB is well presented in the space of the Design-Factory "Flakon".

In total, in the first quarter of 2018, 409 coworking centers operated in Russia in 100 large, medium and small Russian cities located in 57 regions. There are 152 establishments in Moscow, 30 establishments in the Moscow Region, 35 centers in St. Petersburg, the people being allowed to call their establishment "coworking" or otherwise, for example, "anti-cafe" (kovorkingi.ru 2018), however, it is the owners and their visitors who do identify or do not identify themselves with the format of the "coworking" office space (Figure 1). In our opinion, such a situation is the most preferable form of self-organization of this field of activity. And in general, the very spirit of coworkings can be described as "we do what we want and as we want, except, of course, violation of the law."

The average price level in the coworking centers in Moscow is as follows: the lease of the workplace is on the average 4000 rubles/week, 12000 rubles is the lease price per month. Average weighted price is 5600 (223 euro) per month. For comparison, in Texas, Austin, the monthly rate is \$ 250 (Spinuzzi 2012). Thus, the level of rates is comparable. Meeting zones (show-rooms) cost 600 rubles/hour, which is about 9 euro. If we consider these projects as a whole, then the coworking center is an office center focused on providing services in the format of leasing a workplace and business infrastructure on flexible terms.

Coworking centers are equipped with a shared access office equipment (network printers, scanners, projectors, Wi-Fi, etc.), and also with a stable and high-speed Internet connection. Coworking centers have meeting rooms and conference rooms that are leased by center users, as needed. Calculation of the average monthly revenue of the coworking center, with a total area of 500 square meters, is 13294 euro per month (or 27 euro per square meter) (Table 1). The cost of visiting cultural, educational and leisure activities is about 1.5–5 euro, and the cost of training for 2 academic hours is from 15 to 50 euro.

To assess the technical and economic effect of the project implementation for creating the coworking center, we propose to calculate the expected revenue by the following formula:

$$Rev = P * T * Z * D * Trf, \text{ где} \quad (1)$$

where: Rev – revenue per month from coworking (euro); P – number of workplaces (an average of 6 square meters per person); T – duration of coworking (hours); Z – average occupancy (in %); D – working days of coworking per month (days); Trf – tariff rate (euro/hour for meeting rooms, euro/month for workplaces).

Calculations show that with 80% occupancy rate of workplaces (60% – with weekly payment, 40% – with monthly payment), as well as leasing of meeting rooms at 30% occupancy rate, the revenue from the coworking center, with an area of 500 square meters will be 13.2 thousand euro. It shall be mentioned that 500 square meters is the optimal area for establishments of this type.

What is the alternative profitability of the premises in the same district of the city? According to analytical agencies, the cost of such a lease is about 25 euro per month per square meter in large and high-profile office centers.

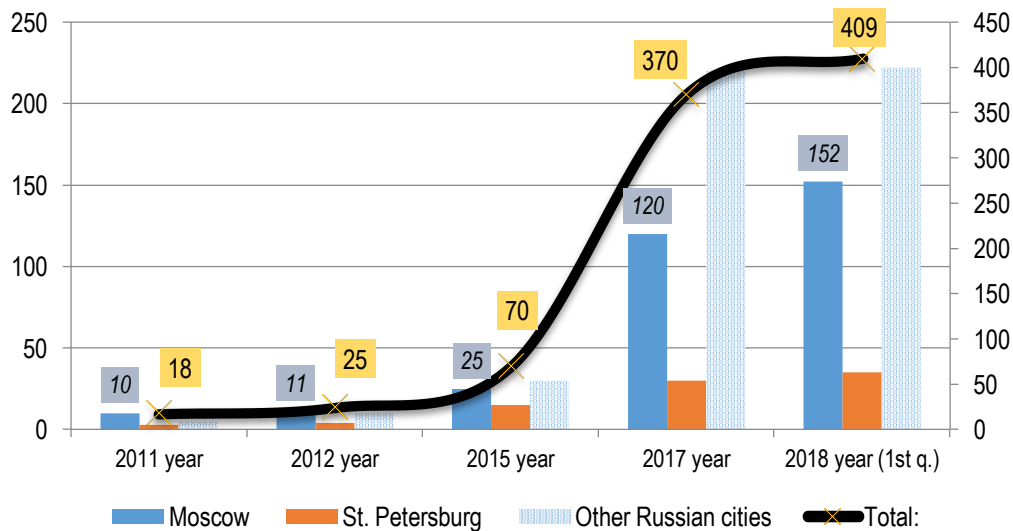
However, for an objective assessment, a decreasing factor should be applied to this cost, because the premises for the coworking center should not be selected from the most visited and marketable places, since visitors of the coworking centers are attracted through targeted activities and PR campaigns. Thus, we take the quality factor of the premises in the amount of 80% of the average cost of lease.

Table 1. Initial data and calculation results for the average monthly revenue of the center's coworking

Zoning	S	P	T	Z	D	Trf	Rev
	Total area (sq. m.)	Number of workplaces	Duration of coworking (h)	Average occupancy (%)	No of work days	Rate	Revenue (euro)
Zone for Workplaces	300	50	-	80%	-	223	8,920
Zone for meeting rooms (show-rooms)	200	3	18	30%	30	9	4,374
TOTAL:	500			TOTAL revenue:			13,294
				Specific revenue per square meter:			27

Source: Start Hub, Vse kovorkingi Rossii 2018

Figure 1. The dynamics of the opening and operation of coworking centers, anti-cafe and other similar institutions with a short-term lease of equipped workplaces in Russia



Source: kovorkingi.ru, Serebro Lab, by author.

Calculation of alternative use of premises for the coworking center (Table 2) shows that the difference between the income of the coworking center and the lease revenue is 3.4 thousand euro.

Table 2. Calculation of alternative use of premises for the coworking center

Indicator	Indicator value
Area of premises, sq. meters	500
Lease rate, euro per sq. meter per month (premises with finishing)	25
Revenue, euro per month for 500 sq. meters	12,357
Revenue, euro per month for 500 sq. meters with reduction quality factor for premises (80%)	9,885
The difference between the coworking center revenue and the lease revenue	3,409

Source: RBK Nedvizhimost. (2018) (The analysis of rates for leasing premises in the district, where the Design-factory "Flakon" is situated)

Thus, we can estimate the revenue from the premises equipped with coworking centers being 1.2–1.5 times higher than the lease revenue from a "classical" office. It should be mentioned that "non-marketable" premises are also leased as coworking centers: "on the roof" – in the attic part of the building, or deep inside the building, not on the first line of the office complex, as in the case with the coworking center START HUB. Thus, the lessee can bargain more favorable lease terms from the owner, if compared with the mid-market ones.

Suggested cost estimates of additional repair work and equipment for 500 sq. meters is about 57 thousand euro or 114 euro per 1 sq. meter.

Works in general do not involve the use of expensive materials, but the development of a "creative" design is welcome. Often, the future residents of the coworking center are directly involved in repair works and premises design, equipment adjustment, these residents further use the premises free of charge for some time and constitute the "core" of lessees, involving more and more new users in their activity. Often such groups of young people are called "evangelists" of the coworking center by analogy with the fans of some new electronic device or solution in the field of information technology.

In general, revenues and expenses of the coworking center are formed depending on whether the premises are owned by the director of the coworking center, or are subject to leasehold rights. Are the premises are destroyed, or only require cosmetic repairs, and, finally, what is the cost of raised funding and the level of taxation of this activity?

In any case, it is obvious that the explosive dynamics of the development of such establishments in Russia shows both the availability of demand and the financial soundness of such a business, but on the other hand, it is also obvious the need to diversify cashflows by providing services to government bodies and companies conducting profile events.

The following specialists are the main and most experienced ones in the field of organizing co-working centers in Russia (Serebro Lab 2013): Sergej Fesenko, founder and manager of MatrixOffice (Moscow), Anastasiya Kuznecova, PR-director of Cabinet Lounge (Moscow), Aleksandr Fuzeev, founder and manager of StartHub (Moscow), Dmitriy Bryzhahin, founder and manager of OpenSpace (St. Petersburg), Aleksej Vasil'ev, PR-director of "Office-M" (St. Petersburg).

Table 3. Expenses and revenues of the coworking center

Expenses per month	euro	Revenues per month	euro
Remuneration of labor (including taxes, 2 specialists, 2 trainees)	2500	Revenue from core business – a short-term lease	13,294
PR events	500		
Direct material expenses, including paid activities	1800	Paid events (forums, round tables, etc.) by order of government bodies, private companies	3,000
Amortization (at the rate of 10% per year)	476		
Turnover taxes (revenues minus expenses 15% for limited liability companies) (depend on taxation in the country)	166	Additional services: lease of cells, call center services, postal address services, fast food sales and so on.	500
Lease (may be even lower, if the premises were unfinished)	9,885		
TOTAL:	15,327	TOTAL:	16,794
		<i>Profit per month</i>	<i>1,467</i>

Source: calculation by author

Projects for the organization of coworking centers without the participation of experienced specialists can begin with learning the hard way, primarily in financial terms. In addition, many researchers mention that to create an ideal coworking space, the concept of coworking space shall be recognized as a community space for interaction and creativity between people and space: the appropriate zoning is needed to ensure the circulation of visitors to the coworking center (Han 2013)

For example, coworking as a social organization of entrepreneurship begins operating with the participation of the team already formed in the fulfilled coworking. This team from the previous coworking begins to act as "evangelists" of the formed coworking, however, if the organizer of a new place has a bad reputation in the community, then it will not be easy to recruit "evangelists". This will lead to the fact that the team of creative designers, volunteers will not meet, and as a result, coworking will be repaired and equipped on the basis of the opinion of the designer and a third-party executor, which means, by definition, that it cannot fully match the tastes and needs of the main core of the coworking center. This situation will result in the fact that the first months of its existence, coworking will be half-empty, and may even be unwanted by the local business community of start-up entrepreneurs.

The researchers warn about another danger connected with the fact that opportunism, often as a leak of knowledge, will directly and indirectly spoil the processes of training and doing business, as this reduces the trust in the development of business communities. (Bouncken, Reuschl 2018)

The importance of PR support for the organization of a coworking center is also mentioned by Alexander Fuzeev, the founder of the coworking center START HUB. Coworking center conducts such public events as the START2DAY business forum, a two-day program that officially opens the World Entrepreneurship Week in Moscow, aimed at the interaction of start-up projects and young entrepreneurs with experts, investors and top managers of large international companies. Such events allow young people to start their own business, to reach their entrepreneurial initiative. We all understand that the progress from idea to project, from project to business activity creating jobs, shall go through the "valley of death".

Actually the coworking center allows to walk through this "valley of death" in many aspects. Therefore, its organization is the missing element of the regional entrepreneurship support infrastructure that helps people start their own business. (Gazetov 2013)

If we consider things at the regional level, including at the level of municipalities, it is advisable to use the scheme of organization of this work, shown in Figure 2.

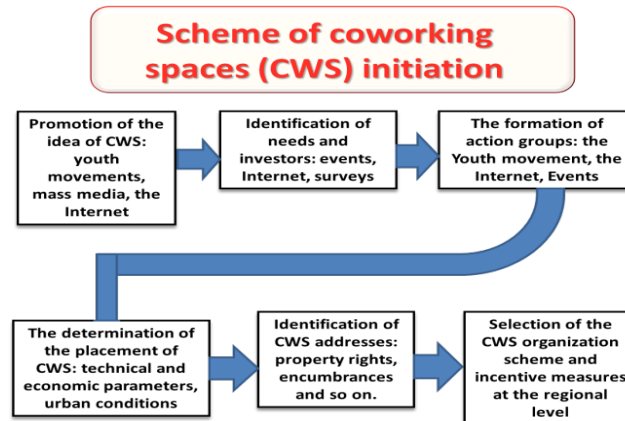
The Figure 2 shows the main stages of the initiation and creation of coworking centers with a comprehensive approach at the level of the subjects of the Russian Federation or large municipal formations:

- Popularization of the idea of coworking centers (CC): youth movements, mass media, Internet. In the regions, such an initiative can be supported by significant social and political movements.
- Identification of needs and investors: Events, Internet, Surveys. Alexander Fuzeev mentions that the work on identifying needs is a key component of his survey in the region before the start of the project to create

coworking centers. For the success of the coworking center in addition to the PR company, it is necessary to understand the audience of the center and its specialization: industrial art, Internet technologies or others. The results of the survey will help to properly distribute efforts for further work on the creation of coworking centers in the region.

- Formation of initiative groups: in youth movements, online communities, social events. Support "from below" can be the basis for practical steps made by the authorities to implement coworking centers as a public and significant for the regional economy movement to support entrepreneurship and innovative activity.

Figure 2. Scheme for initiation of coworking spaces (centers) in the regions



Source: author

- Determination of the location of CC: technical and economic parameters, city planning conditions. On the basis of public initiatives, including appeals of the business community, the main priorities in the distribution of CC at municipal levels shall be developed.
- Determination of the CC address: property rights, encumbrances and so on. For the implementation of the program, including the one with an investment component, it is important to determine the locations for coworking centers, to understand the situation with the title documentation for real estate assets used for the accommodation of coworking centers.
- Selecting the scheme of organization of CC and measures of stimulation and creation.

However, the above measures will result in final success only if the types of services provided by coworking centers are taken into account in state programs for supporting entrepreneurship, youth policy, culture and others. (Gazetov 2013). For example, events in the coworking centers START HUB are supported by the Moscow Government, but not only by it. The main source is the funds of residents of coworking centers, as well as of sponsors, who promote their financial, consulting, as well as informational and engineering solutions.

That is, entrepreneurs who want to develop this direction shall understand that their business will be in demand both by society and the state. If we talk about regional support, in our opinion, the region benefits from the development of coworking centers in the following way:

- Reducing the barriers to the development of entrepreneurial initiative* – starting business is easier and coworking organically complements the current infrastructure for supporting entrepreneurship and innovation: technological parks and business incubators in the regions.
- Formation of business and creative environment* – in the region, in the city (recommended for a city with a population of 100 thousand people), there is a center of business activity, where current trainings, workshops and other formats of business activity.
- Providing a platform for cultural and at the same time business communication for startups, incl. young entrepreneurs.*
- Enhancing the status of city communities* – reducing motivation for migration to large cities.
- A significant contribution to the implementation of state priorities to support entrepreneurship in Russia, which provides for an increase of 12% in the number of small and medium-sized businesses (per 10 thousand people), and an increase of 1.5% in the headcount part of employees in small and medium-sized businesses in the headcount of employees (without external part-time workers) of all enterprises and organizations.*
- Coworking centers for developers and property owners also have significant benefits.

As we have already mentioned, the use of premises as coworking centers brings about 1.5 times more income, compared to the usual leasing of the office with a comparable area and location. However, it requires additional costs for administrative staff, which ensures:

- Uninterrupted functioning of the infrastructure;
- Additional services: buffet functioning, cleaning of premises, as well as the maintenance of shower cabins and bathrooms, long working hours of the coworking center;
- Organization of educational and public cultural events;
- Advertising and socially significant actions, in order to form new visitors and residents of the coworking center;
- Profits from increased revenues from the coworking center are somewhat reduced by such additional costs.

Thus, as Alexander Fuzeev mentions, coworking is more profitable than leasing an area for offices only by 1.2 - 1.5 times. Summarizing the above, the positive effect for property owners and developers on the territory of which the coworking center is located is as follows:

- The revenue is increased due to minimization of space losses when using "open space" technology and due to the introduction of additional monetization schemes for the coworking center and the surrounding community (for example, the profit from the promotion of third-party goods/works/services among visitors of the coworking center);
- The capitalization of the real estate asset is increasing due to the development of creative spaces and due to the increase of brand recognition as a result of interesting and socially significant events;
- The demand for premises is growing, which forms a competitive environment among lessees who gained ground in coworking, and also provides a flow of new lessees through activities carried out by coworking.

Thus, the coworking center is a point of attraction and increase of liquidity, and therefore of the cost of the premises related to coworking. In this context, the organization of the coworking center is an important component of the development project of office real estate. If one considers the organization of the coworking center at the regional level, then, as shown in the diagram in Figure 2, one needs to select a pilot project.

For example, in the Rostov region, a former distillery in the city of Kamensk-Shakhtinsky may become such a project. It is located at the following address: Vinnaya street, bld. 4a. The city population is about 95 thousand people, but still there are several suburbs and the total number in the agglomeration of the city of Kamensk-Shakhtinsky is more than 100 thousand people. Thus, the creation of a coworking center is possible. In addition, educational institutions are located in the city, among the students and graduates it is possible to identify youth teams of start-up entrepreneurs to be accommodated in the coworking center in order to nurture the business community. Such educational institutions are the following:

- Institute of the city of Kamensk (branch) of the South-Russian State Technical University (Novocherkassk Polytechnic Institute) (KI (f) of the SRSTU (NPI));
- Branch of the Russian State Social University in the city of Kamensk-Shakhtinsky;
- Chemical and Mechanical College of Kamensk;
- Technical school of construction and car service of Kamensk.

Also, it seems useful to organize the work with the Station of young technicians in Kamensk-Shakhtinsky, which will increase the social significance of the project. Despite the seemingly difficult position (the railway crossings are at a long distance from the building), the former distillery in the city of Kamensk-Shakhtinsky is of equal distance from the stated educational institution. Thus, one can count on residents of the coworking center from all these educational institutions, and thus ensure the availability of different specialties, creative aspirations and form balanced groups of active youth.

The architectural appearance of the building of the former distillery as a whole promotes the formation of a creative and cultural atmosphere. At the turn of the 20th century, in 1894-1902, the Prime Minister S. Yu. Witte initiated the introduction in Russia of the fourth state monopoly on the production of vodka. At the time, 350 state-owned wineries called wine warehouses, were put into operation in Russia. The distillery, being the oldest example of the industrial architecture of the city of Kamensk, is also a typical project of the turn of the 20th century.

In general, the above economic assessments are approximate and based on the projects of similar buildings in Moscow and the Moscow region. A more accurate calculation can be made based on the results of a preliminary survey of the location of the object, the city agglomeration, the identification of groups of youth entrepreneurial initiative.

Conclusion

In our opinion, the development of coworking centers even in Russia towns has its own prospects, as well as in the whole world. At the same time, it shall be mentioned that it was during the crisis in the economy that this format of development projects developed, and as mentioned in the research of Serebro Lab company, the main condition for the introduction of coworking centers was the development of high technologies, which made it possible for a large number of specialists mainly involved in intellectual work and in service sector to work remotely. Thus, this stimulated many people to leave the offices and set them free, such people becoming freelancers and entrepreneurs. Therefore, the propagation of the idea of shared leasing by independent specialists was quite natural and could be a successful project in Russian towns and abroad.

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Financial Liberalisation and Economic Growth in the Southern African Development Community

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Abstract:

Attaining high levels of economic growth and development has been one of the goals of the Southern African Development Community (SADC). This paper investigates the relationship between financial liberalisation and economic growth in SADC countries. Annual data for the 15 SADC countries for the period 1985-2011 is used to develop a fixed effect model, system generalised method of moments (GMM). The results reveal that there is a positive relationship between financial liberalisation and economic growth in SADC. However, in the long-run financial liberalisation has a positive but insignificant impact on economic growth. It is thus recommended that the SADC adopt measures to increase the level of financial openness in the region in order to increase economic growth. Prior to the increase in the level of financial openness, well-defined property rights and a sound regulatory framework should be in place to monitor the financial liberalisation process in order to avoid financial crises and ensure that the benefits are long-term.

Keywords: financial liberalisation; financial openness; economic growth; SADC; system GMM

JEL Classification: F21; C33; C36; O47; G15.

Introduction

Economic theories of competitive and efficient markets suggest that financial liberalisation is positively related to economic growth and development and thus over the most recent decades, there has been increasing calls for developing countries to liberalise their financial sectors. The finance and growth nexus was discussed extensively by Schumpeter (1912) and Levine (1997) who argued that financial sector development has a positive impact on economic growth through savings mobilisation and capital accumulation, risk management and reducing transaction costs. However, instability in the financial sector may result in financial crises thus impacting negatively on economic growth.

The objective of this paper² is to investigate the relationship between financial liberalisation³ and economic growth in the SADC countries as well as to examine whether a long-run relationship exists between the two variables. The major priorities of the SADC include trade, economic liberalisation, poverty eradication and infrastructure development to support regional integration (SADC 2011). The accomplishment of these goals requires higher levels of economic growth and development.

SADC have set a number of policies or targets to foster regional and economic integration amongst member countries. These targets include having a SADC free trade area, customs union, common market and the establishment of a monetary union (Bank of Botswana 2013). In order to achieve these targets SADC have proposed greater co-ordination between its member countries with regards to macroeconomic variables such as inflation rates, current account deficits as percentage of GDP, fiscal deficits as a percentage of GDP and public debt as a % of GDP (SADC 2011). Macroeconomic targets for the period 2008 to 2018 have been set, such as achieving economic growth rates of 7%, increasing domestic savings as a % of GDP to about 35% and domestic investment as a percentage of GDP to 30% by 2018 (Bank of Botswana 2013). Other targets set by the region include reducing the public debt to GDP ratio to less than 60% and reducing the inflation rate to less than 3% by

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³ The component of financial liberalisation relevant for this study is financial openness or capital account liberalization.

2018 (Bank of Botswana 2013). Meeting these targets continues to be a huge challenge for most of the SADC countries. According to the World Bank (2014) domestic savings and investment levels in the SADC region are well below the targets set. Financial liberalisation through its impact on financial development could enhance domestic savings and investment levels thus promoting economic growth.

The level of financial openness in the SADC region as a whole is low, although there are a few financially open countries such as Zambia, Seychelles and Mauritius. The descriptive statistics indicate that the level of financial openness based on the Chinn-Ito-Index in the SADC is -0.63 against a maximum of 2.44 (Chinn and Ito 2008). Based on a study by (Gorlach and Le Roux 2013), Mauritius attained the highest recorded GDP per capita in the SADC region for the period 2000 to 2009 suggesting the presence of a link between financial liberalisation and economic growth.

A number of empirical studies examining the impact of financial liberalisation on economic growth in African countries such as Fowowe (2008), Misati and Nyamongo (2012) and Ahmed (2013), focus on Sub-Saharan Africa by grouping countries from different regions. However, due to the differences in economic indicators across different regions, region specific studies are crucial. Such studies are also vital for policy decision regarding regional economic integration. Empirical studies assessing the role of financial liberalisation in promoting economic growth in SADC countries such as Odhiambo (2011) as well as Tswamuno, Pardee and Wunnava (2007) utilise time series techniques which are plagued by issues such as multicollinearity and heteroscedasticity. This study improves on the above studies by utilising panel data techniques which permit more degrees of freedom, less collinearity, more variability and efficiency (Baltagi 2005). Panel data techniques also minimise the problems of multicollinearity and omitted variable bias that are common in time series techniques. The study also seeks to determine whether financial liberalisation has a long-term or short-term impact on economic growth.

The estimation techniques utilised in this study are the fixed effects estimator and the Arellano and Bover (1995) and Blundell and Bond (1998) system generalised methods of moments (GMM) estimator, and the fully-modified OLS (FMOLS) cointegration test. The model is estimated as a dynamic panel data model which includes a one period lag of the dependent variable. The results suggest that financial liberalisation and economic growth are positively related in SADC countries, indicating that increasing the level of financial liberalisation could lead to higher economic growth. The long-run relationship between the variables is examined using fully-modified OLS (FMOLS) cointegration test. The result suggests that in long-run financial liberalisation has a positive but insignificant impact on economic growth implying that the relationship is short-term.

The rest of the paper is organised as follows: section two reviews the literature on financial liberalisation including the related empirical literature; section three describes the data and the methodology used in the study; section four discusses the empirical results and lastly section five concludes the paper and discusses policy recommendations.

1. Literature review

The research on financial liberalisation was initiated by McKinnon (1973) and Shaw (1973) who argued that financial repression policies involving state control of interest rates was responsible for retarding economic growth in the world economy by discouraging savings and investments. The concept of financial repression has since been extended to other economic variables. Williamson and Mahar (1998) suggest that financial repression includes six elements namely, the state control of the interest rates, credit programmes and banking operations, barriers to entry in the financial sector and restrictions in international capital flows.

Financial liberalisation is therefore defined as a process which involves the removal of controls by the government in the financial sector, the removal of entry barriers for foreign financial institutions and restrictions on foreign financial transactions (Spratt 2009) and (Guha-Khasnobis and Mavrotas 2008). The different forms of financial liberalisation include capital account liberalisation, stock market liberalisation and financial sector liberalisation. Capital account liberalisation which is the main focus of the study, involves the removal of restrictions on capital inflows and outflows in a country (Tswamuno, Pardee and Wunnava 2007). This would offset low savings and therefore increase the amount of investment, employment and economic growth.

Despite its benefits, financial liberalisation should be undertaken with caution in developing countries because it increases the risk of financial crises (Spratt 2009). Opponents of financial liberalisation argue that it increases a country's exposure to international shocks and results in an increase in capital flight (Tswamuno *et al.*, 2007). Capital inflows in a country with an underdeveloped financial system can cause a rapid increase in bank lending which can in turn result in financial crisis if the lending is to unworthy candidates (McLean and Shrestha 2002). These concerns of financial liberalisation have been intensified due to the Asian and 2008/2009 global financial crises.

Empirical evidence of the impact of financial liberalisation on economic growth yields conflicting conclusions. While some studies suggest a positive relationship between financial liberalisation and economic growth, other studies present evidence of a negative association. Levine (2001) found that liberalisation of international portfolio flows impacts positively on economic growth through stock market development and productivity growth in 15 emerging economies. Using a panel data framework, McLean and Shrestha (2002) concluded that foreign direct investments and portfolio flows have a positive impact on economic growth in 40 developed and developing countries. However, bank inflows are negatively associated with economic growth. Fratzscher and Bussiere (2004) examined the impact of capital account liberalisation in 45 industrial and emerging countries using the GMM estimation technique. The authors established that capital account liberalisation has a positive but short-term impact on economic growth with temporary growth reversals experienced in the medium to long-term.

Bonfiglioli (2005) concluded that financial openness captured by capital account and equity market liberalisation has a positive impact on productivity growth through financial development in 93 countries. Furthermore, financial openness does not increase the likelihood of financial crises. Bekaert, Harvey and Lundblad (2005) concur with the findings of Bonfiglioli (2005) and argued that equity market liberalisation leads to a 1% increase in real economic growth in a set of developed and developing countries, however, the channel is through higher investment levels.

Romero-Ávila (2009) examined the effect of capital account and interest rate liberalisation in EU-15 countries for the period of 1960 to 2007. Using the GMM estimation technique and ANOVA analysis, the researcher concluded that lifting capital controls as well as liberalising interest rates has a positive impact on economic growth. Using the system GMM estimation technique, Fowowe (2008) suggested that financial liberalisation has a positive impact on economic growth in 19 Sub-Saharan African countries.

Egbuna *et al* (2013) investigated the impact of capital account liberalisation on economic growth in the Western African Monetary Zone (WAMZ) for the period 1980 to 2012 using the ARDL approach. The results suggested that capital account liberalisation has a positive effect on growth in Ghana and Sierra Leone in the long-run, while in The Gambia, Guinea, Liberia and Nigeria there is long-run relationship between the variables.

Lopes and de Jesus (2015) analysed the relationship between capital account liberalisation and growth in a sample of 77 countries for the period 1990 to 2010 and found that capital account liberalisation has a positive effect on growth in highly democratic countries. Khumalo and Kapingura (2014) examined the impact of capital account liberalisation on growth in South Africa using the Johansen cointegration test and found a positive long-run relationship between the variables.

Estranda, Park and Ramayadi (2015) investigated the effect of financial development and financial openness on economic growth in 108 countries made up of developed and developing countries for the period 1977 to 2011. The authors used the GMM technique and concluded that financial openness has a positive impact on growth when it boosts actual inflows. Furthermore, for developing countries the impact is less robust possibly due to less developed financial systems.

Critics of financial liberalisation argue that it increases the risk of financial crises. One such study is Misati and Nyamongo (2012) who investigated the effect of financial liberalisation on growth using a bank crisis model and growth model in 34 Sub-Saharan African countries. The authors concluded that there is a positive relationship between financial liberalisation and banking crises. Furthermore, the growth retarding effects of financial liberalisation are greater than the growth enhancing effects.

Other critics of capital account liberalisation suggest that it negatively impacts on economic growth due to capital flight and increased exposure to international shocks. Tswamuno *et al.* (2007) suggested that liberalisation of bond and equity markets has impacted negatively on economic growth in South Africa. Furthermore, the results suggest that capital markets had a positive impact on economic growth during the period of capital controls. Ahmed (2013) reported that financial market liberalisation decreased annual economic growth in 21 Sub-Saharan African countries by 0.09%.

Gamra (2009) concluded that financial liberalisation differs by sector in the East Asian region. Domestic financial liberalisation has a positive impact on economic growth while capital account and stock market liberalisation are negatively related to economic growth. Furthermore, full financial liberalisation of the financial sector has been associated with slower economic growth as compared to partial liberalisation which positively affects growth. Van der Laan, Cunha and Alves (2011) construct an index of capital account openness and report that economic growth is negatively related to capital account liberalisation in emerging countries of Latin America and East Asia.

Zenasni and Benhabib (2013) examined the link between capital account liberalisation and growth in three Maghreb countries namely Algeria, Morocco and Tunisia for the period 1970 to 2009 using the GMM estimation

technique. The authors concluded that capital account liberalisation boosts economic growth in Morocco while in the Algeria and Tunisia the variables are negatively related.

Lee (2016) analysed the relationship between capital account liberalisation and growth in panel of countries for the period 1976 to 2004 using the fixed effects model. The author concluded that capital account liberalisation is not growth enhancing in the long-run. In the short-run there is a positive relationship between the variables and furthermore, the effect of capita account liberalisation is greater in countries with lower levels of government consumption.

The review of the literature suggests that the relationship between financial liberalisation and economic growth is inconclusive. Furthermore, a limited number of empirical studies examine the relationship between the two variables in SADC countries and those that do so utilise time series techniques. This study uses panel data techniques which minimise some of the shortcomings of time series techniques.

2. Data and methodology

Table 1 presents the description of the variables used in the study. Due to the unavailability of data for some countries, the dataset consists of the 15 SADC countries¹ for the period from 1985 to 2011. The data on the Chinn-Ito-Index is taken from the Chinn-Ito website and the data on government spending and investment for Seychelles is taken from the International Monetary Fund (IMF) (2017). All other data is sourced from the World Bank (2017).

Table 1. Definition of variables

Variable	Description
GDP	Annual growth rate of GDP divided by midyear population
CHINN	Measure of the degree of financial openness for a country ranges from a low of -1.86 to a high of 2.44
INV	Gross fixed capital formation as a percentage of GDP
TRD	Sum of imports and exports of goods and services as a share of GDP
CRT	Domestic credit to the private sector as a percentage of GDP
DEBT	Total external debt stocks as a percentage of Gross National Income
GOV	Government current expenditures on goods and services as well as compensation for government employees

Source: World Bank (2017) and IMF (2017)

2.1. Descriptive statistics

Table 2 outlines the descriptive statistics for the variables used in the study. The average or mean value for the Chinn-Ito index for SADC countries is -0.63. This indicates relatively low levels of financial openness in SADC countries even though a number of the countries embarked on financial liberalisation in the 1980s to 1990s. A few countries are financially open such as Mauritius, Zambia and Seychelles but the majority have low levels of financial openness as indicated by the negative scores (Chinn and Ito 2008). The low level of financial openness suggests that SADC countries have not exploited the benefits of financial liberalisation.

The mean level of GDP per capita growth is 1.49%, indicating that low levels of economic growth have been achieved in SADC despite the improvements experienced in the last decade. The GDP growth rates are below the target of 7%. The mean level of investment or gross fixed capital formation as a % of GDP is 20.1% which is lower than the target level of 30%. Investment as a % of GDP can be increased by liberalising the financial sectors. The average level of trade as a % of GDP is 89% which suggests that SADC countries are relatively open with regards to trade. The trade agreements formed within the region have a gone a long way in fostering trade among member countries and with other countries around the world. Public debt as a percentage of gross national income has a mean value of almost 81% in SADC countries. These levels of public debt could be an impediment to investment and economic growth. However most of the countries have been able to reduce public debt over the last decade.

Table 2. Descriptive statistics

Variable	Mean	Max	Min	Std. Dev.	Jarque-Bera
GDP	1.49	18.51	-27.15	5.08	343.04
CHINN	-0.63	2.44	-1.86	1.27	147.17
CRT	20.07	91.38	0.28	19.52	257.73
GOV	20.60	63.92	2.05	11.45	196.00
DEBT	80.97	581.21	4.12	78.48	690.69

¹ Angola, Botswana, the Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

Variable	Mean	Max	Min	Std. Dev.	Jarque-Bera
INV	20.98	74.82	1.43	10.48	967.98
TRD	89.13	209.87	14.33	40.46	33.22

Source: Researcher's own computations

2.2. Correlation analysis

Covariance analysis is used to measure the strength of correlations between the variables. The most popular methods of testing for correlations are the Spearman's rank order and the Pearson correlation coefficient. Spearman's rank order test is selected for this study because it does not make assumptions with regards to the distribution of the variables (Hauke and Kossowski 2011). It is more preferable to the Pearson coefficient due to the fact that it can be used without making the assumption that the relationship between the variables is linear.

Table 3 shows the results of correlation analysis. The results indicate that there are positive correlations between GDP and the Chinn-Ito index significant at the 1% level of significance. This suggests that financial liberalisation and GDP have a positive relationship. Investment is also positively correlated with GDP and significant at the 1% level of significance which is in line with *a priori* expectations. Public debt to GDP ratio is negatively correlated with GDP and significant at 1% level of significance and this confirms *a priori* expectations that as public debt increases economic growth decreases. Trade is positively correlated with GDP and significant at the 1% level of significance which confirms *a priori* expectations.

Table 3. Spearman Rank Correlation Test

Variable	GDP	CHINN	GOV	CRT	DEBT	INV	TRD
GDP	1						
CHINN	0.24***	1					
GOV	0.07	0.04	1				
CRT	0.10*	0.11**	0.19***	1			
DEBT	-0.22***	-0.17***	-0.28***	-0.63***	1		
INV	0.37***	0.38***	0.38***	0.26***	-0.29***	1	
TRD	0.28***	0.21***	0.39***	0.27***	-0.39***	0.42***	1

Note: (*), (**) and (***) indicates 10%, 5% and 1% significance level

Source: Researcher's own computations.

Table 4. Panel Granger Causality Test

Null Hypothesis	F-statistic
GDP does not Granger cause CHINN	3.07*
CHINN does not Granger cause GDP	10.34***
GDP does not Granger cause CRT	4.31**
CRT does not Granger cause GDP	42.36***
GDP does not Granger cause TRD	5.04**
GDP does not Granger cause DEBT	21.17***
DEBT does not Granger cause GDP	71.78***
GOV does not Granger cause GDP	9.37***

Note: (*), (**) and (***) indicate 10%, 5% and 1% significance level, respectively

Source: Researcher's own computations.

Panel Granger causality tests were conducted to ascertain the direction of causality between GDP and the other variables in the study. Table 4 shows the results of the Panel Granger causality test with only significant results are presented. There is bi-directional causality between GDP and financial liberalisation, GDP and public debt as well as GDP and credit. GDP Granger causes trade while government spending Granger causes GDP.

2.3. Model specification

Testing for unit roots in econometric studies is important in order to determine the order of integration of the variables (Gujarati and Porter 2009). The most popular unit root testing methods for panel data are the Im, Pesaran and Shin (IPS) (2003) and the Levin, Li and Chu (LLC) (2002) tests. The LLC test assumes homogenous first-order autoregressive parameters which is a major limitation. Maddala and Wu (1999) argued that the assumption of the alternative hypothesis of the LLC test requiring every cross-sectional unit to converge at the same rate rarely holds in empirical analysis. The test also assumes independence across cross-sectional units which makes it

inappropriate if cross-sectional correlation is present (Barbieri 2006). The IPS test allows for heterogeneous first-order autoregressive coefficients. The test is more flexible and can be used in the presence of residual serial correlation across cross-sectional units (Baltagi 2005). The IPS test is thus the chosen unit root testing method for the study. Table 5 presents the unit root test results and these indicate that government spending is the only variable stationary in levels while the rest of the variables are stationary at first difference. Government spending would thus be excluded from the cointegration tests.

Table 5. Panel Unit Root Test

Variable	In levels	In First Difference	IPS test statistic
GDP	I(1)	I(0)	-7.68
Public debt	I(1)	I(0)	-10.32
Gov. Spending	I(0)		-2.55
Chinn-Ito Index	I(1)	I(0)	-10.41
Investment	I(1)	I(0)	-9.44
Trade	I(1)	I(0)	-10.87
Credit	I(1)	I(0)	-10.11

Source: Researcher's own computations

The model is specified as a dynamic panel model due to the strong persistent nature of GDP per capita. The dynamic panel data model uses a lag of the dependent as one of the regressors (Baltagi 2005). Using a lagged dependent variable as one of the explanatory variables improves the fit of equations and can be used to pick up partial adjustment effects (Fair 2014).

The model is specified as follows:

$$Y_{it} = \beta_1 + \beta_2 Y_{it-1} + \beta_3 F_{it} + \beta_4 X_{it} + \beta_5 Z_{it} + \varepsilon_{it} \quad (1)$$

where: Y_{it} = GDP per capita growth rate; F_{it} = Chinn-Ito index; X_{it} = Set of control variables; ε_{it} = Disturbance term.

The Chinn-Ito index (CHINN) is used as a proxy for financial liberalisation. The index measures the degree of financial or capital openness for a country at a certain period of time and is constructed using binary variables based upon the IMF's Report on Exchange Arrangements and Exchange Restrictions (AREAER) (Chinn and Ito 2006). The expected sign of the variable is ambiguous as evidence of the impact of financial openness remains inconclusive. The control variables are government spending (GOV), trade openness (TRD), investments (INV) public debt (DEBT) and domestic credit to the private sector (CRT).

Government spending includes all government current expenditures for purchases of goods and services including compensation to employees as a percentage of GDP. Government expenditures may crowd out private investments by increasing the interest rate (Bonfiglioli 2005). However, government expenditures on public goods and services can complement private investment thus impacting positively on economic growth (Misati and Nyamongo 2012). The variable is expected to have either a positive or negative relationship with GDP.

Public debt is represented by total external debt stocks (public and publicly guaranteed) as a ratio of gross national income. The variable captures the impact of macroeconomic instability on economic growth (Ocampo 2005). The researchers would have liked to use inflation as a proxy of macroeconomic instability; however, the presence of outliers makes it a less than ideal candidate. Public debt is financed by increasing taxes which reduce disposable incomes and economic growth (Gorlach and Le Roux 2013). High levels of public debt limit the available funds for public investment expenditures which negatively impacts on economic growth (Ismihan, Metin-Ozcan and Tansel 2005). Investment is captured by gross fixed capital formation as a percentage of GDP which includes land improvements, plant, and machinery and equipment purchases (World Bank 2014). According to the growth theories such as Solow-Swan as well as Harrod-Domar, higher investment levels enhance the productive capacity of an economy and thus impact positively on economic growth (Romer 2012). The coefficient is thus expected to be positive.

Trade openness is the sum of imports and exports of goods and services measured as a share of GDP. Trade openness may improve efficiency in an economy by promoting product specialisation as specified by the theory of comparative advantage (Bonfiglioli 2005). Trade also provides a larger market for domestic output, increases competition and provides producers with access to a variety of capital goods which may enhance productivity (Misati and Nyamongo 2012). However, as postulated by Ahmed and Suardi (2009), trade liberalisation impacts positively on economic growth if an economy's export structure is diversified. The impact of trade openness on economic growth is therefore ambiguous. Credit is captured by domestic credit to the private sector as a share

of GDP and indicates the impact of financial development on economic growth Ahmed (2013). According to Bonfiglioli (2005), financial development spurs economic growth by increasing the availability of funds for investment purposes and enhancing productivity levels. However, credit channelled to non-productive consumption activities may have an insignificant or negative impact on GDP.

As argued by Bond (2002), Baltagi (2005) and Roodman (2009), the OLS estimator performs poorly when estimating a dynamic panel data model due to the dynamic panel bias caused by the correlation between the disturbance term and the lagged dependent variable. This violates the assumption required for the consistency of the OLS method. The model is thus estimated using the fixed effects (also known as the within-group) estimator as well as the system GMM estimator proposed by Arellano and Bover (1995) and Blundell and Bond (1998).

The Hausman test is used to select the appropriate model to use between the fixed effects and the random effects model, by testing the consistency of the random effects model (Gujarati and Porter 2009). The results are presented on table 6 and suggest that the null hypothesis that the random effects estimates are consistent is rejected at 1% level of significance implying that the random effects model errors are correlated with the explanatory variables. This indicates that the fixed effects estimator is the most preferred model. The fixed effects estimator takes into account the unobservable country specific effects and corrects for omitted variable bias (Wooldridge 2002). The fixed effects estimator attempts to correct the dynamic panel bias by eliminating individual effects. The transformed equations are estimated using OLS. Panels with small time periods, the transformed lagged dependent variable and the transformed error term are negatively correlated (Bond 2002) and (Roodman 2009).

Table 6. Hausman test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob
Cross-section random	41.71	7	0.000

Source: Researcher's own computations

However, in panels with large time periods the correlation in the transformed equations is eliminated thus rendering the fixed effect estimator consistent. In this study the number of time periods is large (26) and therefore the fixed effects estimator is relevant.

The GMM estimator is an instrumental variables technique popularised by Hansen (1982) and Holtz-Eakin, Newey and Rosen (1988). The GMM estimator is popular because it can be used in the presence of heteroscedasticity by making use of the orthogonality conditions (Baum, Schaffer and Stillman 2003). Arellano and Bond (1991) proposed the two-step difference GMM that uses lags of the independent variables as instruments at each period for a first difference model. However, the difference GMM estimator suffers from finite sample bias when the correlation between the instruments and the endogenous first differences is weak (Blundell and Bond 1998). The system GMM combines equations in levels and in first difference, and thus improves efficiency by using a larger set of instruments (Baltagi 2005). The system GMM also produces more precise estimates and has a smaller sample bias compared to the difference GMM.

Diagnostic tests are performed to examine the accuracy of the system GMM estimator. The validity of the instruments is tested using the Sargan (1958) and the Hansen (1982) tests of overidentifying restrictions where the null hypothesis states that the instruments are valid. The study also reports the Arellano and Bond (1991) test of second-order serial autocorrelation and the Difference-in-Hansen test for exogeneity of instruments. According to Anderson and Sørensen (1996) and Roodman (2009), instrument proliferation weakens the power of the Hansen (1982) to a point where it produces p-values equal to 1.000. The instrument count should be small to minimise the error in the Sargan (1985) test. As such, the results are presented with a collapsed instrument matrix therefore reducing the instrument count to 15 a number equal to the number of cross-sectional units as suggested by Roodman (2009). The panel fully modified OLS (FMOLS) test is employed to determine whether there is a long-run relationship between financial liberalisation and economic growth. This method takes into account heterogeneity across the member countries included in the panel, and asymptotically normal and unbiased estimators (Pedroni 2000).

3. Empirical results

Table 7 presents the results of the pooled OLS, fixed effects and the system GMM estimations. The results indicate that the coefficient of the lagged GDP per capita is positive and statistically significant suggesting that past GDP per capita values have an influence on current values. The result squares well with the findings of Misati and Nyamongo (2012) and Gorchach and Le Roux (2013). According to Roodman (2009) the coefficient of the lagged dependent variable is upward biased in when utilising the OLS estimator and downward biased when using the fixed effects estimator. Good estimates of true parameter should lie between the upward and downward biased

figures. The coefficients of the OLS and fixed effects estimators are 0.30 and 0.18 respectively. The system GMM estimate is 0.25 which lies between range (0.30 – 0.18). Financial liberalisation is positively related to GDP and statistically significant at the 5% level. After controlling for the potential endogeneity of the explanatory variables, it can be concluded that financial liberalisation has a positive impact on economic growth in SADC countries. The result is in line with the findings of Fowowe (2008).

Table 7. Fixed Effects and system GMM Results (GDP per capita growth as the dependent variable)

Variables	OLS	Fixed Effects	System-GMM
GDP (-1)	0.30*** (5.96)	0.18*** (3.56)	0.25* (1.91)
CHINN	0.44** (2.28)	0.62** (2.05)	0.45** (2.43)
GOV	-0.04* (-1.72)	-0.16*** (-3.31)	-0.04* (-1.79)
DEBT	-0.01** (-2.55)	-0.01*** (-3.37)	-0.01*** (-2.87)
INV	0.06** (2.20)	0.07** (1.98)	0.06 (1.39)
TRD	0.14** (2.18)	0.03*** (2.91)	0.02* (1.79)
CRT	-0.20 (-1.47)	-0.09*** (-3.25)	-0.02 (-1.45)
C	0.78 (0.84)	3.44*** (2.17)	
R-Squared	0.23	0.19	
Redundant Fixed Effects		[0.00]	
Sargan test of overidentification			[0.38]
Hansen test of overidentification			[0.20]
Arellano and Bond second-order serial correlation test			[0.34]
Difference-in-Hansen test for exogeneity of instruments			[0.13]

Note: (**), (***) indicate 5% and 1% significance level, respectively. Figure in parenthesis () are T-statistics and figures in parenthesis [] are p-values

Source: Researcher's own computations.

The Government spending variable is negative and statistically significant. This is in line with *a priori* expectations as government spending directed at non-productive expenditures could have a negative effect on economic growth (Gorlach and Le Roux 2013). The government spending would require an increase in taxation which can result in a decrease in income, savings and investments which in turn reduces economic growth (Barro 1991). These results square well with those of Ahmed (2013), Van de Laan *et al.* (2011) and Misati and Nyamongo (2012). Increased government expenditure could also reduce economic growth by raising interest rates which in turn crowds out investment and reduces the amount of credit flowing in the economy (Snowdon and Vane 2005).

Public debt is also negatively related to the level of GDP and statistically significant at the 1% level which confirms *a priori* expectations and is in line with the results by Fowowe (2008) who argued that a high debt service shifts resources away from economically productive areas in an economy. The results are also in line with those of Gorlach and Le Roux (2013) who found that public-sector debt is funded by a rise in taxes which could reduce disposable income, consumption spending and in turn economic growth. Investment is positively related to GDP and statistically significant in the fixed effects model. This result confirms *a priori* expectations as investment is one of the key drivers of economic growth and squares well with the results found by Van de Laan *et al.*, (2011) and Ahmed (2013).

Trade and GDP are positively related which supports the view that increased openness to trade can lead to higher economic growth. The removal of barriers to trade can foster entrepreneurship and increase competition which in turn would improve economic growth levels (Romer 2012). This result is in line with those of Misati and Nyamongo (2012). Financial development captured by credit to the private sector is negatively related to GDP and significant at the 1% level in the fixed effects model. This is consistent with the findings of Phakedi (2014) who argued that SADC region is not integrated and thus financial sector development has not led to economic growth. Another possible reason for the negative relationship between credit and economic growth could be the existence of non-performing loans in some parts of the region (Cojocar, Hoffman and Miller 2013). Non-performing loans

also have a negative effect of discouraging financial institutions from lending which in turn would impact negatively on economic growth (Romer 2012).

The system GMM model satisfies all the diagnostic tests. The Sargan (1958) and Hansen (1982) tests of overidentifying restrictions fail to reject the null hypothesis that restrictions are valid while the Difference-in-Hansen test fails to reject the null that the instruments are exogenous. The Arellano and Bond (1991) test for second order serial correlation rejects the presence of second order serial correlation.

Table 9 shows the results of the FMOLS estimation. The results indicate that the Chinn-Ito index is positively related to GDP but not statistically significant. This result suggests that there is no long-run relationship between financial liberalisation and economic growth in SADC countries. The relationship between the two variables is therefore short-term which squares well with the findings of Fratzscher and Bussiere (2004) as well as Lee (2016). A surge in capital inflows may exert an insignificant or negative impact on economic growth in the long-term if channelled to consumption activities. Furthermore, capital inflows in an environment without a sound regulatory or institutional framework may result in excessive lending thus causing financial crises in the long-run. The other estimates of the FMOLS model are in line with those of the fixed effects and System GMM estimation with public debt and credit negatively related to GDP and significant at the 1% level. These variables have a negative long-run relationship with economic growth. Investment and trade have a positive long-run relationship with GDP and significant at the 1% and 5% level respectively, which confirms *a priori* expectations.

Table 9. FMOLS results (GDP as the dependent variable)

Variables	FMOLS
CHINN_ITO_INDEX	0.28 (0.81)
PUBLIC DEBT	-0.02*** (-4.15)
INVESTMENT	0.09*** (2.44)
TRADE	0.03** (2.40)
CREDIT	-0.09*** (-2.69)
R-Squared	0.26

Note: (**), (***) indicate 5% and 1% significance level, respectively. T-statistics in parenthesis
Source: Researcher's own computations.

Conclusion

McKinnon (1973) and Shaw (1973) advocated that the removal of controls on an economy can impact positively on economic growth. However, critics argue that financial liberalisation has a negative impact on an economy and increases the likelihood of financial crises. This paper sought to examine the relationship between financial liberalisation and economic growth in SADC countries for the period 1985 to 2011. The Chinn-Ito index of financial openness was used as a measure of financial liberalisation while the estimation techniques employed are the fixed effects estimator and the system GMM.

The results suggest that financial liberalisation has a positive impact on economic growth in SADC countries thus providing support for the McKinnon and Shaw hypothesis. However, the relationship is a short-run phenomenon. In the long-term financial liberalisation has a positive but insignificant effect on economic growth. The study further finds that trade and investment have a positive impact on economic growth while public debt, government spending and credit to the private sector are negatively correlated with economic growth. With regards to policy recommendations, SADC countries should enact policies that are conducive to the progress of the financial liberalisation process. Increasing the level of financial liberalisation would be beneficial but without a sound regulatory framework to monitor the financial system, financial crises would prevail. As such, the establishment of a sound regulatory framework should precede any attempts to increase the level of financial openness. SADC countries should also establish well-defined and secure property rights in order to attract long-term investments.

Investments are a key driver of economic growth and hence measures have to be taken to ensure that the conditions are conducive for savings and capital inflows which can supplement low levels of savings. Removal of controls on interest rates and restrictions on capital flows could have a positive effect on savings and investments. These policies could enable SADC countries to meet the target investment and GDP growth levels. Further removal of trade barriers would be beneficial to SADC countries in terms of increased economic growth. Government

spending should be directed at productive areas in the economy such as infrastructure development including transport facilities, telecommunications and electricity generation which can positively impact on economic growth. Government expenditure for consumption purposes should be at a minimal as these expenditures do not exert a positive influence on economic growth. The level of public debt should be reduced in SADC countries as debt service shifts resources from productive areas in the economy and may result in macroeconomic instability. Public borrowing should be used to fund investment projects while borrowing for consumption purposes should be kept to a minimum.

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Influence of Offshore Business on the Russian Economy

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Abstract:

This article explores controversial opinions on the operation of offshore business, problems caused by redistribution of entrepreneurial resources, as well as the flight of capital from the national economy. The latter determined the authors' interest in this economic phenomenon. Substantiating the relevance of the topic, the following should be considered. To develop market relations, to transform the structure of the ownership and to change the management system, it is necessary to devise and apply new methods and approaches to offshore business. This manuscript aims to identify the specifics of the business functioning in the offshore zone regarding the Russian economy. The methodology includes general scientific and special research methods, in particular, the correlation method. The authors applied system analysis to ensure the integrity of the study. Theoretical, comparative and statistical analyses are the main methods used in the article. The authors built an econometric model and proved the influence of offshore business on the Russian economy. The relevance, theoretical and practical significance are determined by its focus on solving an important scientific and practical problem that has empirical significance for offshore business in the framework of the national investment regime which uses limited investments and aims to optimize their sources.

Keywords: offshore business; tax incentives; jurisdictions; international trade; transnational companies

JEL Classification: F23; H29; H73; P33; P45

Introduction

Active international trade of Russian companies has eventually led to the situation when new generally accepted rules began to be created in the economy, and a company would not be able to function in the market without observing them. First and foremost, this was due to the fact that it is much easier for all global companies to comply with unified rules, that is, the same standards operating all over the world. Problems arising in offshore business are examined in scientific articles by Dufey and Giddy (1984), Hampton (1999), as well as in the works of such modern authors as Morris-Cotterill (1999), David, Gamer, McKee and others.

However, despite the integration of economic processes in the world economy, the tax systems of states have significant differences. Each country has its own specific system of taxation and currency regulation. A country where tax rates are lower (along with a stable exchange rate) is more attractive for large businesses and multinational companies since non-residents can receive additional income from doing business in such states. A lower corporate tax or its absence allows entrepreneurs to avoid taxation in their country, which contributes to the company's net profit. It is these circumstances that create competition between the markets of different countries as the company chooses the country not regarding its location, but the conditions of doing business in it.

In this regard, the goal of this article is to analyze the functioning of offshore business in the modern world and its impact on the Russian economy. The subject of the study is the offshore business of different countries.

The scope of the study is the economic relations arising in offshore business. The methods of scientific research include the methods of theoretical and empirical analysis in the field of offshore business.

1. Literature review

Issues related to offshore business were considered in the works by Suglobov (2014), Galata (2011), Chaschin (2013), Bauer, Vorozhikhina, Milogolov and Tserenova (2016), Roberts (2009), Kern, Verhees, Raven and Smith (2015), Brock and Hydle (2018), Omar and Zolk (2015).

However, it should be noted that the concept of "offshore" is defined in different ways. Many researchers have been actively studying this phenomenon since the moment this term emerged. Having considered economic publications, we could identify several basic definitions of the offshore which are presented in Table 1 (Errico and Musalem 1999, Hampton and Abbott 1999, Zorome 2007).

Table 1. Basic definitions of "Offshore zones"

Author	Year	Definition
Dufey G., Giddy I.	1978	Offshore banking implies the provision of a financial intermediary between a non-resident borrower and a non-resident investor. It's advantageous as there is no expensive official regulation which includes taxation and control over the decisions of bank intermediaries.
McCarthy	1979	An offshore zone is cities, regions or countries that have achieved notable success in attracting offshore business, i.e. giving foreign corporations relatively free entry through a flexible system of taxation, payments, and government regulation.
Park, Y. S.	1994	Offshores are international financial centers that differ from national ones regarding the following characteristics: - Transactions in foreign currency (not in the currency of the country in which the offshore is located); - Exemption from taxes and lack of currency control; - They work mainly for customers who are not residents.
Johnston, R. B.	1982	An offshore center is a small territory (in most cases), with international business conducted on its territory and whose activities are regulated by relatively flexible taxes, currency controls and banking laws.

Tax havens, preferential jurisdictions and offshore zones receive additional financial benefits from residents of other countries, and thus, obtain their income. Borderless global trading activities provide opportunities for multinational companies (MNCs) to practice tax avoidance and tax evasion. Therefore, this study highlights on the need to further investigate on this issue to mitigate profit shifting (Omar and Zolk 2015). Offshore structures finance their activities from foreign sources, and business is conducted abroad. However, they accumulate their capital in offshore jurisdictions, pay necessary, albeit insignificant, taxes, develop its internal infrastructure, provide additional employment for the population, *etc.* In accordance with this, one usually considers three groups of strategic objectives pursued by the state creating an offshore zone, which are presented in Table 2.

When applied, these objectives can be adjusted depending on the specific situation and type of offshore jurisdiction. For example, the targeted tax policy of such preferential holding jurisdictions as the Netherlands and Luxembourg has not only attracted huge additional funds to their economies, but these countries themselves became the world's largest investors. In order to take advantage of offshore business, small and economically underdeveloped countries tend to turn the whole country into an offshore zone and organize the structure of the national economy according to this (Morris-Cotterill 2001).

Table 2. The main objectives of creating Offshore Zones for the economy of the country

Economic objectives	Social objectives	Scientific and technical objectives
<ul style="list-style-type: none"> ▪ Attracting foreign investments; ▪ Increasing foreign exchange earnings in the economy of the whole country or its separate region due to registration fees. 	<ul style="list-style-type: none"> ▪ Facilitating the development of the country as a whole or its specific territory; ▪ Increasing employment and income levels of the population; ▪ Creating a layer of highly skilled workforce. 	<ul style="list-style-type: none"> ▪ Introducing advanced foreign technologies, primarily IT, in the field of modern means of communication and banking.

Let us consider France and the Kingdom of Monaco. Since "one can already talk about the general trend of changes in tax policy in different countries, *i.e.* unification of tax systems, the transfer of the tax burden on individuals", one can conclude that the role of Monaco, being a tax haven for individuals, is gradually increasing in offshore business. Here, it is worth mentioning the relationship between Monaco and France – its patron. A prominent expert in offshore business, E. Shambost noted in this regard: "The movement of money through Monaco

is carried out through the accounts of the zone administered by the Bank of France. In such circumstances, France is interested in preserving the Principality as a tax haven; we can assume that France, on whose territory Monaco is located, is its patronage". Thus, it can be concluded that there are favorable prospects for the future of this offshore jurisdiction.

The experience of Italy in regulating relations with its own offshore zone can be considered on the example of Campione d'Italia. Tax exemptions in Campione apply only to locals or immigrants who need to become homeowners in order to obtain a residence permit. The area of this Italian enclave on Swiss land is very small, and the population is approximately 3,500 people, of which 1,500 are so-called tax refugees. That is why the potential of this offshore zone is severely limited and cannot have a significant impact on the tax situation in Italy. On the other hand, the fact that the town is used by foreign citizens as a tax haven contributes to additional, albeit modest by the standards of offshore business, foreign exchange earnings to the treasury of Italy. In this case, the country is mainly focused on preventing a negative impact on its economy from the internal offshore zone (IMF 2000).

The People's Republic of China gives a good example of using an offshore zone for the benefit of the state. It refers to Hong Kong which in the recent past was joined China along with its offshore status. Having proclaimed the principle of "one state – two systems", the PRC government preserved Hong Kong's original economic system. Moreover, the Chinese authorities are interested in its effective functioning and intend to expand Hong Kong's potential as a financial and economic window to the outside world. Considering the Chinese determination and taking into account the experience they have gained regarding the operation of special economic zones, it is not surprising that "the transfer of sovereignty over Hong Kong to the authorities of the PRC did not cause a general flight of capital, as some analysts had predicted". In this case, the role of the state is reduced to preserving the existing status quo of Hong Kong and maximizing the use of its offshore potential for the development of the economy of the whole country (Dufey and Giddy 1984).

Currently, Hong Kong is actively used by the Chinese authorities as the main economic gateway of the country and a source of foreign exchange earnings. It can even be said that the economic space of Hong Kong has been extended to the adjacent free economic zone of Shenzhen. Thus, the tax haven and the free economic zone function in collaboration.

Regarding the theoretical aspect, the authors of the article share the view of international scientists who define an offshore zone as "the center that receives financial assets that are separated from the main regulatory subjects (states) territorially or legitimately. This zone may be located on a separate island or be a financial center situated within the territory of a city" (Hampton 1996). Or, "offshore centers are jurisdictions in which offshore banks are exempt from a number of regulatory measures that are commonly applied in states" (Errico and Musalem 1999).

A devised econometric model that shows the impact of direct foreign investment in offshore on the overall economic situation in the country determines the originality of this research. In the analytical part of the scientific research, the authors used the methods of correlation and regression involving such indicators as gross regional product, direct foreign outgoing investments and investments in the regions of the country.

Competitive tax system, currency regulation and the development of information technologies promoted the development of an offshore business, which has advantages in all these indicators. This is the main reason for a wider use of offshore in the modern world. However, in many cases, offshore business can negatively affect the national economy since low-taxation zones are often associated with tax evasion, as well as accumulation of financial resources that can later be used to finance the "black market" in the economy. There is a striking imbalance between the widespread acceptance of Bartlett and Ghoshal's (1988, 1989) transnational concept and the paucity of empirical research studies to verify and extend this construct (Meyer and Su 2015). This void has resulted in international management scholars assuming that these complex organizations may indeed achieve some balance of structural integration and differentiation (or responsiveness), but remaining vague as to what this balancing act entails (Brock and Hydle 2018).

2. Methodology

Offshore wind has been positioned as a promising technology that could play a major role in moving towards more sustainable energy systems, but deployment varies significantly across countries (Kern *et al.* 2015). The research methodology includes general scientific and special research methods. Using these methods, the authors could obtain a more accurate idea of the essence of the problems analyzed, reveal the existing relationship between the aspects under consideration. A systematic analysis conducted in this paper ensured the integrity of the research. The main methods used in the study are theoretical, comparative and statistical analysis.

The study is based on the statistical information and empirical data presented by the Central Bank of the Russian Federation, the International Monetary Fund, the Organization for Economic Cooperation and Development, the International Financial Center, the website of the US Internal Revenue Service and others.

Currently, there are about 60,000 Russian companies out of the 1.7-3.2 million offshore companies registered in the world. Every year, 2 or 3 thousand Russian offshore companies are registered abroad (usually in the Seychelles, the Virgin Islands, Hong Kong), which is why, Russia is the world leader according to this indicator. Russian economy actively uses offshore zones, such as Cyprus, the Virgin Islands, Turkey, Finland, and the Bahamas (Table 2). The conducted econometric modeling is to test the thesis that was put forward previously and claimed the negative impact of foreign direct investments (FDI) in offshores on the economic success of the country. When carrying out econometric modeling, the authors used the data for 85 regions of Russia from 2007 to 2017. The indicators included:

- gross regional product (grp) (million rubles) as a dependent variable reflecting the economic success of the region;
- FDI outgoing to "offshore" countries (fdi_off1) (million rubles): synthetic indicator calculated on the basis of country's indicators of outgoing FDI and relative contribution of regions into the economy of the country;
- control variables: a number of variables at the regional level that affect the GRP of the region and used to find errors in calculating the coefficients. This group includes such indicators as: the share of employed population (share_of_emp) (%), labor productivity index, investment in fixed capital (inv_cap) (million rubles), and industrial production index (prod_in).

In turn, Russia is considering and devising necessary deoffshorization measures, *i.e.* reduction of the impact offshores have on Russian business. This is confirmed by decreasing foreign direct investment in Russian economy from Cyprus and Luxembourg in 2015. When determining the directions and objectives of deoffshorization, first of all, it is necessary to identify the reasons for the Russian business transition to offshore zones. Then eliminate and minimize the impact of these factors and create conditions stimulating Russian business to return from offshore zones.

Offshore finance is a major component of the international financial system. Contemporary offshore finance developed as capital globalized during the last half of the twentieth century (Roberts 2009). In modern economics, there are several factors explaining the emergence of offshore zones in the economy of the country:

- emergence of authorities regulating capital flows to restore the balance deficit that was observed in America in the 1950s and later in the 1960s in the countries belonging to the Organization for Economic Cooperation and Development;
- introduction of high taxes with simultaneous restriction of monetary policy (imposing restrictions on the movement of national capital) as an attempt to stabilize the deficit balance of payments occurring due to fiscal imbalances, for instance, in some OECD countries;
- abolition of restrictions on international currency exchange on income of non-residents in Western Europe;
- the increased interest of US banks to managing currency transactions and attempts to expand their influence over new territories, which followed signing the Glass-Steagall Act in 1933 that prohibited investment activities for commercial banks, which significantly limited the banks' transactions in securities. Upon signing of the Act, the government also introduced compulsory insurance of bank deposits (Scharf 2001).

Currently, there is a growing need for a qualitative study of how offshore zones function. This is due to the fact that the activities of offshore territories are steadily increasing their share in the world financial flows. Offshore centers began to develop actively in the middle of the 20th century. However, their impact on world finance became significant in 1970.

The concept of "an offshore center" emerged as early as in the 1950s. An article in one of the American newspapers described a financial organization that was able to avoid increased state regulation by transferring its activities to another place. A US company which the US government wanted to control, moved its operation to the territory with a more favorable tax regime. Thus, the term "offshore" means not only a zone with a specific taxation system, but also an economic and geographical location (Zorome 2007).

It can be claimed that offshore zones originate from Europe. In 1868, Monaco, abolished personal taxation. Since then, Monaco has been developing in the status of a tax haven. Switzerland is another example of the first offshore centers, and it was this country that introduced the idea of bank secrecy. Thus, the Swiss banks

implemented the idea of creating anonymous bank accounts which have been successfully functioning up to the present day. In the modern world, the confidentiality of information in banks is a traditional feature of all offshore zones. It should be noted that Switzerland takes the leading position regarding bank secrecy exactly due to developing standards that are now applied in other financial offshore centers (Sikka 2003).

It is believed that the emergence of offshore financial centers is a natural phenomenon representing an effective response of international banks to the attempt of sovereign states to fully control financial flows through state regulation norms. Thus, all measures aimed at increasing the restrictions along with new business opportunities abroad stimulated many financial institutions and transnational corporations to transfer their assets outside the country and increase offshore activity and business.

In the early 1970s, offshore zones began their active expansion moving beyond Western Europe and gradually spreading throughout the world. Banks, and later insurance companies, began to create offshores in some areas of the Caribbean islands, in Latin America and South Asia. These jurisdictions are now known as major offshore centers (Levi 2002).

Geographical location of an offshore often plays a key role in its success. Offshore centers can use their location to be independent from the main regulatory bodies. Thus, remoteness from direct control of major developed economies is the most important factor for offshores. At the same time, it is most beneficial for an offshore to be located in close proximity to the developed countries. For example, the Caribbean Islands for a long time prospered as the main offshore center, and one of the reasons behind this is that these islands are located near the USA and Latin American countries. It takes only a short flight to reach the Caribbean islands from the main financial and economic centers of the United States and Latin America. At the same time, they are located outside of the regulation of these countries. Combined with the advantages of the legal and tax system, the Caribbean islands continue to enjoy certain advantages right due to being an offshore zone.

Like the Caribbean islands, it is similar for Hong Kong in Asia, Switzerland in Europe, while in the Middle East Dubai enjoys all these advantages in the United Arab Emirates.

3. Results

The tables below represent descriptive statistics and the correlation matrix.

Table 3. Descriptive statistics

Variable	Observed	Avg.	STD	Min.	Max.
Grp	249	711,326.800000	1,461,240.000000	33,313.5	1.35e+07
fdi_off1	249	-13,462.720000	31,532.580000	-407,608.6	-430.8911
prod_in	249	102.969500	7.4721010	73.1	154
Productivity	249	101.981900	3.5269980	83.6	118.6
inv_cap	249	171,940.300000	230,660.200000	8,386.266	1543601
share_of_emp	249	.0122391	.0131963	.0004278	.0976094

Table 4. Correlation matrix

	grp	fdi_off1	prod_in	productivity	inv_cap	share_of_emp
Grp	1.0000					
fdi_off1	-0.8493	1.0000				
prod_in	-0.1042	0.0853	1.0000			
Productivity	-0.1252	0.0710	0.3379	1.0000		
inv_cap	0.8471	-0.7314	-0.0518	-0.0999	1.0000	
share_of_emp	0.8753	-0.7700	-0.0489	-0.1049	0.7909	1.0000

Regression coefficients are calculated using the panel least square method. The constructed model is represented below.

$$grp = \beta_0 + \beta_1 * fdi_{off1} + \beta_2 * prod_{in} + \beta_3 * productivity + \beta_4 * inv_{cap} + \beta_5 * share_{of_emp} \quad (1)$$

Modeling was carried out in statistical package Stata 14. The results are presented below.

Table 5. Stata 14 Package

Random-effects GLS regression				Number of observations		249
Group variable: iid				Number of groups		83
R-sq:				Observations per group:		
within = 0.7259				min =		3
between = 0.9222				avg =		3.0
overall = 0.8746				max =		3
				Wald chi2(5) =		1695.39
				Prob > chi2 =		0.0000
grp	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
fdi_off1	-15.59743	1.743.911	-8.94	0.000	-19.01543	-12.17942
prod_in	-6807.023	4737.49	-1.44	0.151	-16092.33	2478.288
inv_cap	1.907.918	.2478003	7.70	0.000	1.422239	2.393598
share_of_emp	4.14e+07	4635575	8.94	0.000	3.23e+07	5.05e+07
productivity	-8351.486	10059.04	-0.83	0.406	-28066.84	11363.87
_cons	1218842	980685.9	1.24	0.214	-703266.5	3140951
sigma_u	0					
sigma_e	51089.329					
rho	0	(fraction of variance due to u_i)				

4. Discussion

According to chi-square statistics, the obtained regression equation is generally significant. At the same time, the determination coefficient indicates that the model describes 87.4% of the variation of the dependent variable, which implies the high explanatory power of the model. Control variables (with the exception of the productivity factor and the index of industrial production) are significant and have the expected positive signs. The two remaining control variables mentioned above are considered insignificant in the course of modeling, which may be caused by a small variation of these characteristics during the periods and regions studied in Russia.

The main variable studied – FDI in offshore, has the expected negative value and is significant for more than 99% confidence interval. This result confirms our thesis about the negative impact of outgoing direct foreign investments on the economy of the regions and, accordingly, Russia as a whole. Moreover, according to the received model, each million rubles, withdrawn to offshore countries, causes an average damage to GRP in the amount of 15.6 million rubles.

The findings on the corporate social policy of offshore companies are summed up and presented in Table 5 (Savin 2011).

Table 6. Positive and negative impact of offshore companies within corporate social policy

Positive influence	Negative influence
Creating new jobs in a foreign economy	Losing potential jobs in the national economy
Reducing unemployment in a foreign economy	Remaining unemployment in the national economy
Investing in a foreign economy	Decrease in tax revenues to the federal budget
Spending the proceeds on the implementation of corporate social policy programs both in the offshore zone and in the national economy	
Ability to invest in the development of the region's infrastructure	
Implementing programs that aim to protect the environment and local people in the offshore zone	

Conclusion

Difference in views on the functioning of offshore zones in the international financial system led to the fact that many researchers began to actively study this topic. The International Monetary Fund, the World Bank, as well as other organizations that deal with the regulation and control of monetary, credit and financial transactions in the international economy are greatly interested in offshore zones. This is due to the fact that apart from providing favorable conditions for doing business to various legal entities, offshore zones can cause many problems in the global economy, as well as provoke instability in the financial market.

First, offshore companies provide tax benefits mainly to non-residents. Implementing appropriate financial and economic policies, national economies are interested in studying the impact caused by their residents' doing business in offshore zones.

Second, countries that are offshore zones, that is, states with preferential tax conditions, are characterized by a specific volatility of the financial system. This problem associated with offshores is due to the restriction of the activities of regulatory bodies and arbitration, the anonymity of persons owning companies in offshore organizations, a significant share of shadow financial transactions in these zones, and a decrease in the level of legal security.

Third, offshore zones rely heavily on their ability to attract international financial business. This strengthens global competition, which is also accompanied by the fact that offshore zones do not seek to comply with international standards, which differs greatly from the aspirations of many national economies. Therefore, there is a greater risk that high incomes will be followed by a lack of global regulatory standards (Zorome 2007).

It is worth noting that the offshore area benefits most from offshoring, both financially and in terms of solving corporate social responsibility problems. For the national economy, this means great losses; however, as the examples of a British company or the Ural Mining and Metallurgical Company in the Urals region show, investment income can be used to implement social programs, as well as to develop the region's infrastructure.

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Territorial and Branch Differences in the Investment Attraction of Industry of the West Kazakhstan Region of the Republic of Kazakhstan

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Abstract:

The scientific work presents the analysis' results of the main factors and their influence on the degree of territorial differentiation of the enterprises and industries' investment attractiveness of the West Kazakhstan region of the Republic of Kazakhstan. The territorial features of the distribution of investments into the fixed capital of the industry of the West Kazakhstan region at the level of administrative regions are revealed. Priority directions of attracting investments into the industrial sector of the economy of the West Kazakhstan region are determined taking into account the priorities of the State Program for Industrial and Innovative Development of the Republic of Kazakhstan for 2015-2019 and the Program for the Development of the Territory of the West Kazakhstan Region for 2016-2020.

Keywords: investment attractiveness; territorial differences; industrial development; territorial industrial clusters; regional economic policy.

JEL Classification: L52; O10; P33

Introduction

At present, the priority direction of the state economic policy of Kazakhstan is the industrial and innovative development of the country's regions on the basis of diversification, transformation and modernization of the territorial organization of industry, effective use of natural, industrial and labor resources, increasing productive forces and competitiveness of industrial enterprises. At the same time, the vector aimed at "stimulating diversification and improving the competitiveness of the manufacturing industry" is clearly defined in the State Program for Industrial and Innovative Development of the Republic of Kazakhstan for 2015-2019 (Decree of the President... 2017).

In accordance with the tasks set, an indispensable condition for industrial and innovative development of the regions of Kazakhstan is to increase the investment attractiveness of industrial enterprises and industries. One of the main factors in diversifying industrial production and increasing the competitiveness of the economy's industrial sector is the investment attractiveness of industrial enterprises and industries. Investments allow increasing production volumes and directly influencing the implementation of competitive advantages of industries and industrial enterprises, which in turn justify investment costs and allow receiving economic benefits in the medium and long term.

Within the framework of the state economic policy in Kazakhstan, a large and systematic work is under way to create the necessary conditions for attracting investments for the development of industrial enterprises and industries. But under the influence of natural and resource, social and demographic, economic and environmental factors, the industry of the regions and administrative districts of Kazakhstan have varying degrees of investment attractiveness. In this regard, it is important and urgent to identify territorial differences in the investment attractiveness of the industry in the regions of Kazakhstan. This will determine the priority areas and industries, which contributes to the implementation of an effective regional policy in the field of industrial and innovative development of the country's regions.

Allocation of previously unresolved parts of a common problem. During the implementation of the second five-year period of industrial and innovative development of Kazakhstan, an important territorial and branch

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assessment of the investment attractiveness of industry in each region of the country is an important component in the conduct of an effective regional policy.

Solving the problems of industrial diversification and increasing the competitiveness of industries of the West Kazakhstan region (WKR) is directly dependent on the territory's investment potential. Analysis of the current state of the territorial and sectoral investment attractiveness of industry will help to identify problems and priority areas for spatial industrial development of the WKR.

Analysis of recent research and publications. Features of investment attractiveness of enterprises and industries of the WKR are poorly studied. This is the evidence of the recent research and publications' analysis.

Problems of investment attractiveness of industries and enterprises of the WKR industry are reflected in the works of Erniyazov (2006), Kartmambetova (2006), Ibyzhanova (2007), Dzhubatyrova and Gabdualieva (2010), Musagalieva and Baigalieva (2016), Kryukova *et al.* (2016), Adamenko *et al.* (2017), Kryukova (2016) and other scientists.

The purpose of the article: to reveal territorial differences in the industry's investment attractiveness, and also to identify priority areas and industries for increasing the volume of investments in the industrial sector of the WKR economy on the basis of the territorial and sectoral analysis of the investment's potential development main factors.

1. Materials and methods

The research used methods of scientific abstraction, analysis and synthesis, induction and deduction, analogy and comparison, systemic and logical approaches. We used comparative and geographic, mathematical, statistical, descriptive, cartographic, geoinformational and other methods of investigation.

The statistical data of the Department of Statistics of the West Kazakhstan region, the Department of Passenger Transport and Highways of the West Kazakhstan region, the West Kazakhstan RSE branch for the REM Kazakhavtodor, KazTransOil JSC, the Western branch of the Ural Oil Pipeline Administration, Intergas Central Asia JSC, Uralsk Branch of Intergas Central Asia, JSC, West Kazakhstan Distribution Network Company JSC for 2009-2015, cartographic materials and analytical information on the Internet was the information base of the study.

The estimation of the main factors of the development of the investment potential of the industry of the WKR's administrative districts was carried out on the basis of using the indices of the territory's area, the number and density of the population, the book value (net of depreciation) of the fixed assets' value, the length of the transport network (main railways, highways, pipelines, internal waterways, power lines), the volume of industrial products' production (goods and services). Using the above mentioned indicators, integrated indicators were calculated: the territorial density of infrastructure facilities by the balance (net of depreciation) of the fixed assets' value; territorial development of transport infrastructure (E. Engel-Yudzuru Kato coefficient); level of industrial development (index of industrial development of the territory).

An evaluation using the Engel-Yudzuru Kato coefficient determination method was carried out to assess the level of spatial development of the entire WKR transport system. The E. Engel-Yudzuru Kato coefficient is calculated as follows:

$$d = \frac{L}{\sqrt{SP}} \quad (1)$$

where: d is E. Engel-Yuzuru Kato coefficient; L is the length of transport network (km); S is the area of the territory (km²); P is the number of population (person) (Dmitrevsky 1991).

Using the calculation of the index of industrial development of the territory (I_i) was determined the level of industry's development in each administrative district of the WKR, which is determined by the formula:

$$I_i = \frac{V}{\sqrt{N \times S}} \quad (2)$$

This integral indicator correlates the following indicators: V – the volume of industrial products' production (goods and services) (\$ million); N – population size (thousand people); S – area of the territory (thousand km²) (Lopatnikov and Esterov 1997).

To carry out the typology of the WKR's administrative districts in terms of the favorable conditions for attracting investments in the industry, was chosen the method of grading and scoring the social and economic development of the region, developed by the Ministry of Economic Development of the Russian Federation (Ibragimova 2006). This method allows you to combine different indicators and obtain an integral value on the basis

of which it is possible to conduct a typology and to reveal territorial differentiation or similarities at the level of different territorial administrative units.

We propose a system of basic indicators for determining the degree of favorable conditions for attracting investments in the industry, including the following indicators:

- population density (per km²);
- territorial density of infrastructure facilities on the balance sheet value (net of depreciation) of fixed assets (\$ million per 1,000 km²);
- territorial development of transport infrastructure (E. Engel-Yudzuru Kato coefficient);
- level of industrial development (index of industrial development of the territory);
- the number of functioning industries.

In accordance with the methodology of the rank-and-score assessment, the integral indicator is calculated step-by-step (Ibragimova 2016). At the first stage, for each of the 5 basic indicators, the rank of each specific administrative region is determined, starting with the best (first place) and ending with the worst value (last place); the rank of the average regional index value is also determined. At the second stage, a score is calculated for each of the indicators of each administrative district ($Ball (Ind)_1^i$). The formula has the following form:

$$Ball (Ind)_1^i = Range (Ind)_1^R - Range (Ind)_1^i \quad (3)$$

where: $Range (Ind)_1^R$ is the rank of the average regional value in the general ranking series;

$Range (Ind)_1^i$ is the rank of the i -th administrative district in the general ranking series.

At the final, third stage, for each administrative district of the region, the scores given are summarized by the aggregate of all 5 accountable basic indicators, followed by dividing by 5:

$$ComplexBall (Ind)_1^i = \frac{\sum_{i=1}^5 Ball (Ind)_1^i}{5} \quad (4)$$

Thus, it is possible to identify the influence of the main factors that determine the degree of favorable conditions for attracting investments in the industry of the WKR administrative districts.

The territorial differences in the investment attractiveness of the WKR industry were determined using the following indicators: the volume of investment in fixed assets by types of economic activity of industry; the volume of investment in the fixed capital of industry per capita; index of the investment attractiveness of the territory's industry. The index of investment attractiveness of the territory's industry was determined by us on the basis of the following formula:

$$I_i = \frac{I}{\sqrt{N \times S}} \quad (5)$$

where: I is the volume of investments in the fixed capital of industry (\$ thousand); N is the population number (thousand people); S is the area of the territory (thousand km²).

The use of the above research methods and indicators allowed us to identify territorial differences in the investment attractiveness of the WKR industry.

2. Results and discussion

WKR is located in the north-west of Kazakhstan and covers an area of 151.3 thousand km² (5.5% of the country's territory), home to 629.9 thousand people. The share of the urban population is 49.6% (2015). According to the territorial and administrative division, the WKR is divided into 12 administrative districts and the territory of the Uralsk city administration, which unite 148 rural districts, 2 cities (Uralsk and Aksai) and 446 rural settlements (Aidapkelov 2016). For 2009-2015 the volume of industrial production of the WKR increased by 36.6% and amounted to \$ 7.3 billion (Official Internet resource..., The official...). The presence of natural resources' reserves and social and economic preconditions in the WKR contributed to the development of 13 industries. To further develop the industrial complex of the region and increase its competitiveness, it is necessary to realize the investment potential of the territory.

As of 2015, the volume of investments in the fixed capital of the industry of Kazakhstan amounted to \$ 17.4 billion, where the share of the industrial sector of the WKR was 7.4% (Aidapkelov 2016, The official...). In terms of investment attractiveness, the WKR industry was inferior to Atyrau, Pavlodar, Mangistau, East Kazakhstan regions.

For 2009-2015 the volume of investments in fixed capital of the WKR industry grew by 35.3% and amounted to \$ 1.3 billion (Information on investments: statistical bulletin 2009, On investment... 2015). There is an increase

in investments in fixed assets in all types of industry's economic activity. In terms of volume, the fixed assets are dominated by a group of mining industries, whose share in the structure of the region's industrial sector investment attractiveness has dropped to 86.6%. During the period under review, the share of the manufacturing industries' group in the total volume of investment in the industry's fixed capital increased from 2.2% to 7.2%. There is an increase in the share of electricity, gas, steam and air conditioning, as well as water supply, sewerage, control over waste discharge and distribution (Table 1).

Table 1. Dynamics and structure of investment attractiveness of the WKR industry by types of economic activity (2009-2015)

Types of economic activity	Investments in fixed assets (\$ million)			
	2009		2015	
	Volume of investments (\$ million)	Relative share (%)	Volume of investments (\$ million)	Relative share (%)
Industry	840.1	100.0	1,297.6	100.0
Mining industry and quarry development	794.5	94.6	1,123.8	86.6
Manufacturing industry	18.8	2.2	93.0	7.2
Power, gas and steam supply, air conditioning	16.0	1.9	58.1	4.5
Water supply, sewerage system, control over waste discharge and distribution	10.8	1.3	22.7	1.7

Source: Compiled by the authors on: (Information on investments: statistical bulletin, 2009; On investment activity..., 2015).

The territorial differentiation of the industry's investment attractiveness is a consequence of the influence of many factors, among which one can single out the population density, the territorial development of the production and transport infrastructure, and the level of the territory's industrial development.

In 2015, the average density of the WKR population was 4.2 people per 1 km². In the WKR, the territory of the Uralsk city administration has the highest population density, where the city of Uralsk – the regional center – is located. Burlinsky, Zelenovsky and Terektinsky districts had a population density above the average regional rate. In the remaining 9 administrative districts of the WKR, the population density varied from 0.8 to 1.2 people per 1 km² (Official Internet resource...) (Table 2).

Table 2. Quantitative indicators of the main factors of development of the WKR administrative districts' industry's investment potential as of 2015

Name of administrative district	Density of population (person/km ²)	Territorial density of infrastructure facilities on the balance sheet (net of depreciation) of fixed assets (\$ million/1,000 km ²)	Territorial development of transport infrastructure (E. Engel coefficient)	Level of industrial development (index of industrial development of territory)	Number of functioning industries
Akzhaiksky	1.6	119.5	0.12	15.3	5
Bokeyordinsky	0.8	42.6	0.10	15.7	5
Burlinsky	9.8	61,671.6	0.11	17,172.0	12
Zhangalinsky	1.2	38.6	0.09	2.4	3
Zhanibeksky	2.0	68.3	0.14	8.8	3
Zelenovsky	7.5	673.9	0.15	1,342.6	9
Kaztalovsky	1.6	58.8	0.18	5.5	4
Karatobinsky	1.6	86.6	0.10	19.4	2
Syrymsky	1.7	82.0	0.10	4.0	4
Taskalinsky	2.1	95.0	0.15	13.2	5
Terektinsky	4.7	395.8	0.16	48.4	6
Chingirlausky	2.1	120.3	0.11	26.4	6
Territory of Uralsk city administration	405.2	405,029.3	0.13	2,147.9	11
WKR	4.2	4275.1	0.09	1601.7	13

Source: Compiled by the authors on: (Official Internet resource..., Fixed assets..., 2016; Map of the West Kazakhstan region, 2003; Data of the Office of Passenger..., 2015; Data of the West..., 2015; Data of Intergas..., 2015; Export routes..., Data of JSC..., 2015; Kazakhstan completed...; "KazStroyService"..., Handbook of kilometer distance..., 2010; Data of JSC "West...", 2015).

Calculations of E. Engel-Yudzuru Kato coefficient (1) showed that the highest level of transport infrastructure development is in Kaztalovsky, Terektinsky, Zelenovsky and Taskalinsky districts. The average level of the

transport and infrastructure system's development is characteristic of the territory of the Uralsk city administration, Zhanibeksky, Akzhaiksky, Burlinsky and Chingirlausky districts. The territory of Syrymsky, Bokeyordinsky, Karatobinsky and Zhangalinsky districts have poorly developed transport infrastructure (Table 2).

As of 2015, the aggregate figure of the WKR territory's industrial development index (2) was 1601.7. Spatial analysis of the industrial development of the territory's index shows that on the territory of the WKR the Burlinsky district has the maximum level of the industrial development, the index of which is almost 11 times higher than the average regional index. On the territory of the Burlinsky district, high indices of industrial development are achieved due to large volumes of production of the oil and gas industry. Characterized by a large backlog from the Burlinsky district, the territory of the Uralsk city administration has a high level of industrial development, where the manufacturing industries have developed. The group with an aggregate figure of industrial development of the territory includes the territory of the Zelenovsky district, and the Terektinsky district has a low index. All the above mentioned administrative districts are located in the north of the WKR and have a developed specialization in industry. The only northern administrative district, which has a low level of industrial development and does not have specialization, is the Taskalinsky district. The same group includes the remaining 8 administrative districts located in the south, west and east of the WKR and having a low index of the industrial development index of the territory (Table 2).

The Burlinsky district and the territory of the Uralsk city administration have diversified industrial structure of industry in the WKR. Also, the Zelenovsky district stands out according to the industrial structure of the industry. In these three administrative units, all large and medium-sized industrial enterprises of the WKR are located. The least number of industrial branches were established in the territory of Karatobinsky, Zhangalinsky and Zhanibeksky districts (Table 2). In 10 administrative districts of the WKR, the industrial sector of the economy is represented only by small industrial enterprises.

The combination of quantitative indicators of the main factors in the development of the investment potential of industry on the basis of the methodology of rank-and-score assessment (3, 4) made it possible to conduct typology of the WKR administrative districts in terms of the favorable conditions for attracting investments in the industrial sector of the economy (Table 3).

As shown in Table 3 among the administrative units of the WKR favorable conditions for attracting investments in the industrial sector of the economy have: the territory of the Uralsk city administration, Burlinsky and Zelenovsky districts. In 2015, the above mentioned 3 administrative units accounted for 62.6% of the population and 99.3% of the volume of manufactured industrial WKR products. Less favorable conditions characterize the territories of Terektinsky, Chingirlausky, Taskalinsky and Akzhaiksky districts, the share of which in the production of industrial products was 0.5% of the total regional volume. The remaining 5 administrative districts located in the west, south-west, south and east of the WKR do not currently have favorable conditions for attracting investment in industry. In total, these administrative areas account for only 0.2% of industrial WKR products.

Table 3. Typology of the WKR administrative districts by the degree of favorable conditions for attracting investments in the industry as of 2015

Degree of favorable conditions	Name of administrative districts	Indices of rank-and-score assessment
Favorable	Territory of the Uralsk city administration, Burlinsky, Zelenovsky	from 0.6 to 1.8
Less favorable	Terektinsky, Chingirlausky, Taskalinsky, Akzhaiksky	from 0 to -3
Unfavorable	Kaztalovsky, Zhanibeksky, Karatobinsky, Syrymsky, Bokeyordinsky, Zhangalinsky	from -4 to -6.8

Spatial analysis of the investment attractiveness of the WKR industry shows territorial disproportions in the distribution of investments, which is directly related to the influence of various factors that determine the investment potential of the territory. In 2015, more than 65% of the investment in fixed assets of the WKR industry was located in the Burlinsky district. In the Burlinsky district, high investment attractiveness is characteristic of the oil-extracting and the gas industry, which is associated with the development of the Karachaganak oil and gas condensate field. Also, the Burlinsky district is the leader in attracting investments in the basic capital of the manufacturing industry of the WKR, in particular in the chemical and petrochemical industry, engineering is also allocated. Among the administrative districts of the WKR, Burlinsky district ranks 1st and 3rd in attracting capital to the hydromineral industry and heat and power engineering.

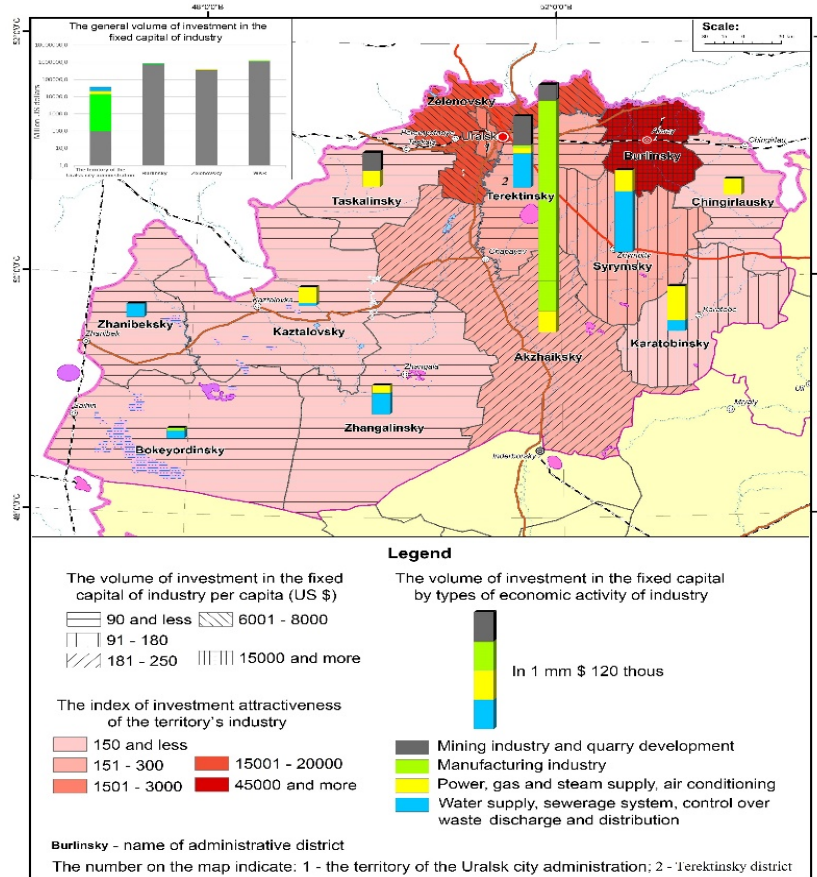
The industry of the Zelenovsky district accounted for 30.1% of the investment in the fixed capital of the industrial sector of the WKR economy. In the Zelenovsky district, the oil industry, the gas industry and heat and

power engineering are leading in investment attractiveness. In the Zelenovsky district, the hydromineral industry and the food industry also stand out in attracting investment.

With considerable lagging behind the Burlinsky and Zelenovsky districts, the investment appeal of industry is followed by the territory of the Uralsk city administration, with a relative share of 2.8%. In the territory of the Uralsk city administration, the woodworking and pulp and paper industry, the hydromineral industry, the food industry, the thermal power industry, ferrous metallurgy and metal processing, machine building, and the production of building materials are distinguished for their investment attractiveness.

The relative share of the territories of the remaining 10 administrative regions for attracting investments in the fixed capital of industry in 2015 was 1.6%. The features of the territorial differentiation of the investment attractiveness of the WKR industry are shown in Figure 1.

Figure 1. Territorial differentiation of the investment attractiveness of the WKR industry in 2015.



Note: Compiled by the authors on: (The official Internet..., 2015, Official Internet..., The official...).

On the territory of the WKR, as of 2015, the oil-extracting industry and the gas industry were characterized by the highest indices of investment attractiveness, with a relative share of 86.6%, which were developed in the Burlinsky and Zelenovsky districts. The share of the chemical and petrochemical industry in the total volume of investments in the fixed capital of the industrial sector of the WKR economy was 5.1%, while the thermal power industry accounted for 4.5%. The hydromineral industry is allocated further on the relative share. The food industry, woodworking and pulp and paper industry, construction materials industry (Buley 2016, Lukiyanova *et al.* 2017), machine building, ferrous metallurgy and metalworking have relatively low investment attractiveness. The printing industry, light industry and mining of construction materials have the smallest investments in the fixed assets (Table 4).

Table 4. The volume of investments in fixed assets by the WKR branches in 2015

Industry branches	Volume of investments in fixed assets (\$ million)	Relative share of total investment in fixed assets (%)
Oil-extracting industry	1,123.4	86.6
Gas industry		
Chemical and petrochemical industry	66.5	5.1

Industry branches	Volume of investments in fixed assets (\$ million)	Relative share of total investment in fixed assets (%)
Thermal power industry	58.0	4.5
Hydromineral industry	22.7	1.7
Food industry	10.1	0.8
Woodworking and pulp and paper industry	4.7	0.4
Construction materials industry	3.5	0.3
Machine building industry	2.0	0.1
Ferrous metallurgy and metalworking industry	1.4	0.1
Mining of construction materials industry	0.5	0.0
Light industry	0.1	0.0
Printing industry	0.0	0.0
Other industries	4.7	0.4

Source: Compiled by the authors on: (On investment..., 2015, The official Internet...).

In 2015, the structure of investments in the fixed capital of industry by source of financing was significantly dominated by the own funds of industrial enterprises (91.7%). The share of bank loans and other borrowed funds (including foreign investment), attracted as investments in industry, amounted to 3.2% and 2.7%. Less significant is the participation of the republican and local (regional) budget in investment activities aimed at the development of industries (1.9% and 0.5%) (Table 5).

A natural process is the contribution of the own funds of industrial enterprises to the development of their field of activity. Public funds went to the development of industrial enterprises that provide water, electricity, gas, steam and work related to their maintenance. Borrowed funds (including foreign investments) were attracted to the development of the fixed capital of industrial mining enterprises and the development of quarries, manufacturing, electricity, gas, steam supply and air conditioning (Table 5). The volume of foreign investment in fixed assets of the WKR industry in 2015 was \$ 7.3 million, which was invested in the oil industry and gas production industry (On investment... 2015, The official Internet...).

Table 5. Structure of investments in fixed capital of the WKR industry by types of economic activity in 2015

Types of economic activity	Sources of investments in fixed assets (\$ million)				
	Republican budget	Local budget	Enterprises' own means	Bank loans	Other borrowed funds
Industry	24.2	6.9	1190.3	41.0	35.2
Mining industry and quarry development	0.0	0.0	1098.0	0.6	25.2
Manufacturing industry	0.0	0.0	82.8	2.6	7.6
Power, gas and steam supply, air conditioning	6.5	4.0	7.4	37.8	2.4
Water supply, sewerage system, control over waste discharge and distribution	17.7	2.9	2.1	0.0	0.0

Source: Compiled by the authors on: (On investment..., 2015; The official Internet...).

Conclusions

Thus, under the influence of development factors, the investment attractiveness of the WKR industry is characterized by the features of territorial and sectoral differentiation. The index of investment attractiveness is dominated by the oil and gas industry, which is the main sector for the WKR and is concentrated in Burlinsky and Zelenovsky districts. The chemical and petrochemical industry is developing on the territory of the WKR on the basis of the two marked sectors. This industry is characterized by investment attractiveness in comparison with other branches of manufacturing industry and is localized in Burlinsky and Terektinsky districts, in the territory of the Uralsk city administration. In terms of investment in fixed assets, thermal power is also produced, which is located on the territory of the Uralsk city administration, Burlinsky and Zelenovsky districts. The four above mentioned industries account for 96.2% of all investments in fixed assets of the WKR industry.

Such industries as the hydromineral industry, the food industry, the woodworking and pulp and paper industries, the construction materials industry, the machine building industry, ferrous metallurgy and metalworking industry, the production of construction materials, the light industry, the printing industry are less attractive and significantly inferior to the investment attractiveness of the oil industry, gas industry, chemical and petrochemical industry, heat and power engineering.

The industry of 8 administrative districts located in the south, west and east, as well as the Taskalinsky and Terektinsky districts located in the north of the WKR have a low degree of investment attractiveness, which is primarily due to the level of industrial development of their territories.

Based on the results of the implementation of state industrialization programs in 2010-2014 (the first five-year plan), 34 projects were completed on the territory of the WKR for a total of \$ 1.77 billion (Imashev *et al.* 2015). However, the implementation of these projects has not allowed a significant increase in production in the manufacturing industry and the basic industries are the oil industry and the gas industry. Moreover, the low investment attractiveness of the manufacturing industries of the WKR remains.

In accordance with the State Program of Industrial and Innovative Development of the Republic of Kazakhstan for 2015-2019, regional economic policy is aimed at developing the manufacturing industry in the WKR, namely, the modernization of existing and the creation of new production capacities in the chemical and petrochemical industries, machine building, production of construction materials, food industry, heat and power engineering. One of the main goals of the West Kazakhstan Region Development Program for 2016-2020 is "to ensure the growth of diversification and competitiveness of the manufacturing industry" (Program for the development... 2016).

In the authors' opinion, in the generalized form, in the long term, the government bodies of the WKR management within the framework of the regional economic policy in attracting investments for the development of the manufacturing industry and enhancing its competitiveness, both at the national and international levels, need:

- to develop the transport and logistics, innovative and market infrastructure in cities and large rural settlements at a faster rate;
- to stimulate and develop competition between industrial enterprises and servicing institutions of the service sector;
- to create and develop related and supporting industries, deepening specialization in the manufacturing industry;
- to form and develop a regional innovation structure by means of creating and intensifying the activities of technology parks, business incubators, centers for commercialization and integration of higher education institutions, research institutes, industrial enterprises;
- to perform deconcentration of industrial production;
- to stimulate the development of small and medium-sized businesses;
- to modernize the agro-industrial complex with the transition from an extensive type of agriculture to an intensive one;
- to develop export-oriented industrial branches that do not have a commodity orientation;
- to create special industrial zones with the participation of foreign capital;
- to form territorial industrial clusters on the basis of the development of the most promising industries based on local mineral and raw materials resources.

In the medium and long term perspective, investment and attraction of investments (especially foreign ones) in such branches as chemical and petrochemical industry, machine building, production of construction materials, food industry, heat and power engineering, should become a priority. These industries are located in the northern administrative regions (the territory of the Uralsk city administration, Burlinsky, Zelenovsky and Terektinsky districts) of the WKR, which have the potential for the formation and development of territorial industrial clusters.

According to recent research (Imashev and Safiullin 2011, Imashev 2014a, Imashev 2014b, Imashev 2014c, Imashev and Safiullin 2015, Imashev 2016) the current level of industrial development is higher than the noted northern administrative units and their investment attractiveness with an effective regional economic policy makes it possible to create and develop the following territorial industrial clusters in the WKR:

- Aksai oil and gas chemical cluster (Aksai, Burlinsky district);
- Uralsk cluster of oil and gas engineering (Uralsk);
- Uralsk shipbuilding cluster (Uralsk);
- Regional agro-industrial cluster (the territory of the Uralsk city administration, Zelenovsky, Terektinsky, Taskalinsky districts);
- Uralsk cluster for the production of building materials (Uralsk).

Undoubtedly, the formation and development of territorial industrial clusters in the northern administrative units contributes to the implementation of investment potential, the inflow of foreign investment and, most importantly, the rapid development of processing industries of the WKR on the basis of its own natural resources, whose products will have a high added value.

In the administrative regions located in the south, south-west, east, west, north (Taskalinsky, Terektinsky) and east of the WKR, where there is a low level of industrial development, it is necessary to attract investments for the development of the food industry based on local agriculture with the introduction of new production technologies. Further development of the food industry in these administrative regions will increase the competitiveness of enterprises and will allow selling products not only in the WKR market, but also in the markets of the neighboring regions (Atyrau, Aktobe) and the border territories of Russia.

In its turn, local agriculture can produce raw materials not only for food, but also for the textile and clothing industries. Therefore, it is necessary to ensure the investment attractiveness of administrative areas, and local governments should facilitate the process of organizing and developing these industries. At the same time, industrial enterprises should be formed within the framework of development of small and medium-sized businesses.

At present, the administrative districts of the WKR, which have a low level of industrial development, have not exhausted their potential. It is necessary to accelerate the industrial development of administrative regions located in the south, south-west, west and east, with unrealized investment potential. This applies to the development of new small oil and gas fields, the development of food and light industries, which will allow for the policy of territorial deconcentration of industrial production.

Accounting for the above proposals on the territorial organization of industry in the future can help reduce the territorial and sectoral differences in the invasive industry attractiveness, the deconcentration of industrial production, territorial and structural transformation and modernization of the spatial social and economic development of the WKR.

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Statistical Analysis of Differentiation of Russian Regions in Terms of Ensuring Intensive Import Substitution in the Livestock Sector

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Abstract:

The purpose of the presented research is to assess the possibility of using cluster analysis as a popular method of object grouping in conditions of ensuring the efficiency of private and public investments aimed at intensive import substitution in the livestock sector industries in comparison with the proprietary methodology. The article deals with the changes in the elements of the resource potential of the livestock sector according to the data of agricultural censuses of 2006 and 2016, reveals the differences between the regions of Russia in conditions and efficiency of manufacturing the animal husbandry products and establishes the need to specify the method of their analysis. The scientific novelty of the research is in developing a methodology for the typification of regions by grouping on the basis of a multidimensional mean, including the system of statistical indicators of the region's characteristics under the conditions of the targeted approach, substantiation of the weight coefficients of the indicators, approaches to assessing the capabilities of a group of regions in ensuring the country's food security. The practical significance is in the possibility of applying the methodology by the agribusiness authorities at the level of the region and at the federal level.

Keywords: differentiation; resource potential; import substitution; animal husbandry; multidimensional mean; cluster analysis.

JEL Classification: Q13; Q18; Q28; R11

Introduction

Nowadays the concept of production efficiency not only reflects the relationship between the result obtained and the resources spent in the form of costs at the commodity producer level, but is also determined on the basis of the targeted approach as the degree of the goal achievement. The current activities of the producers of Russia's agribusiness are carried out in conditions determined not only by the market, but also by the State Program for

Agriculture Development for 2013-2020, the main objective of which is to ensure the food security of the Russian Federation, including the intensive import substitution of agricultural products with regard to economic and territorial accessibility of products. To ensure the effectiveness of the state support in the framework of the Programs, as well as private investments, it is necessary to develop a methodology for typification of objects as the basis for their application and distribution, i.e. identify groups of regions with different capabilities to achieve the goal, including a system of statistical indicators that characterize regions in this aspect and a method for identifying groups of elements based on this system.

1. Literature review

Food security today is one of the most acute problems in the world. Despite significant advances in recent decades, food insecurity remains a major concern for policy makers around the world. The growing population (as estimated by the group of scholars from Australia, Canada, Germany (King *et al.* 2017), it is expected to reach at least 9 billion people by 2050) and the limited land and water resources (Lanz *et al.* 2018), the vast territories of risky farming necessitate the improvement of principles and systems for managing food security at the international level and within countries (Pérez-Escamilla *et al.* 2017), including through the development of private and public investment mechanisms and evaluation of its efficiency (Bourgeois and Sette 2017, Trejo-Pech *et al.* 2018). The main role is assigned in this process to the state policy by the majority of researchers in economics (Boratyńska and Huseynov 2017, Van den Broeck and Maertens 2016, Hailu and Poon 2017); this role, according to British scholars, is not always effective, especially with the expansion of geopolitical and sectoral interdependencies (Moragues-Faus *et al.* 2017), the need to maintain own production in the conditions the openness of the agricultural products market and the development of international trade (Mohammed and Zheng 2017, OECD Agriculture Statistics 2018).

A group of major problems that determine the existence of mankind is associated with an excess of food for some and with malnutrition of others. William M. and Olga Liefert (2012) regard Russia as a major player in the world agricultural market, which is able to play a leading role in providing food not only to its own population, but also to other regions, given an effective model of transition agriculture is chosen, special attention is also paid to the opportunities of the south of Russia in intensive agricultural production on the basis of regional soil-climatic features.

There is an opinion that food security provision is a comprehensive task of agriculture and political will combined with logistics of product delivery (Prosekov and Ivanova 2018), especially in the dairy breeding sector as particularly vulnerable in a free market, but vital for the population of the country (region) (Cechura *et al.* 2017). The vast territory of Russia and the high variation in the conditions and forms of agricultural production and investment attractiveness (FAO 2009) require the development of certain approaches to differentiation of volumes, directions and methods of state support (Baum 2004). Russian and foreign scholars (Vincze and Mezei 2011) often consider the creation of territorial clusters as the basis for sustainable development of regions; in particular, economists of Novosibirsk proposed a methodology for statistical analysis of the possibility of creating economic clusters in the regions of the Russian Federation (Glinskiy *et al.* 2016) based on one of the most widespread methods – cluster analysis (Amelio and Tagarelli 2018).

However, regional clusters do not always prove sustainable under the conditions of an actively changing economic environment, as shown by scholars from major Russian universities (Vertakova *et al.* 2016), which requires to develop a system of indicators for singling out clusters in each individual aspect of state regulation (Baur and Schläpfer 2018), with regard to the risk reducing aspects of investing in agriculture considered by the Canadian scholars (Smyth *et al.* 2015) and meeting the demand for different types of products (Clements and Si 2018); this issues will be given special attention in the framework of the submitted work when developing approaches to the typification of Russian regions in terms of the possibility of ensuring food security and investment efficiency.

The selection of the basic form of production organization based on the size and level of marketability (Reddy 2015, Willis *et al.* 2016) is one of the issues of the agricultural production effectiveness in the context of implementing the targeted approach and multistructurality of agriculture, which will also be highlighted in this paper while determining the directions of state support for groups of regions. Modern forms of economic management in Russia include the population households, peasant (family-operated) farms, agricultural organizations, including agribusiness holding companies, which have already made it possible to meet the population's demand for pork and poultry meat products. Many economists believe that this is the only progressive form of modern production organization in agriculture (Hockmann *et al.* 2009, Rylko *et al.* 2008); however, the specifics of the Russian regions dictate the need to preserve multistructurality in this type of economic activity.

2. Materials and methods

The information base of the research is formed by the data of the All-Russian Agricultural Census of 2006 and the preliminary results of the All-Russian Agricultural Census of 2016 for the territorial entities of the Russian Federation, as well as the results of the State programs presented by the Ministry of Agriculture in open access.

The following statistical methods were used to comprehensively characterize the object under study based on general scientific methods of theoretical cognition: calculation and analysis of indicators of a time series, the multidimensional mean method, the method of statistical groupings, cluster analysis, tabular and graphical methods.

The calculation of time series indicators is used to analyze the intensity of the change over time, using indicators obtained as a result of comparing the levels: absolute growth and growth rate. Absolute growth characterizes the absolute change in the level of the indicator studied in the units of measurement presented and is calculated from formula:

$$\Delta y = y_i - y_0 \quad (1)$$

The growth rate characterizes the relative change in the indicator in percent and is calculated from formula:

$$T_p = \frac{y_i}{y_0} \times 100 \quad (2)$$

The method of multidimensional weighted mean is applied in the research to obtain an integral indicator that generalizes the levels of several qualitative characteristics of the units of the studied aggregate with a view to further ranking the elements or grouping them. It is calculated as follows:

$$U_i = \sum_{j=1}^n K_i^j \times g_i^j, \quad (3)$$

where: n is the number of characteristics of the territorial entity of the Russian Federation; K_i^j – the weight of the j -th characteristic of the i -th territorial entity; g_i^j – a standardized indicator of the j -th characteristic of the i -th territorial entity.

Statistical groupings method implies separating units of a mass phenomenon into essentially different groups with simultaneous combining qualitatively homogeneous elements of the aggregate into groups. Typological groupings were used in the presented study which made it possible to establish the main, fundamental differences in the phenomenon under study, in particular, the peculiarities of the regions of the Russian Federation from the standpoint of the conditions and results of the livestock sector production.

In this research the efficiency of applying the grouping method is compared with the capabilities and results of the most widespread method of multidimensional classification – cluster analysis, enabling to distinguish qualitatively homogeneous elements of a statistical aggregate on the basis of several characteristics (X) simultaneously. Cluster analysis is carried out using a software package STATISTICA application programs based on the normalized data through the algorithm

$$t_{ij} = \frac{x_{ij} - \bar{x}_i}{\sigma_{x_i}} \quad (4)$$

that is, the transition from the matrix X to the matrix T . Owing to the normalization it is possible to perform any mathematical operations with rows and columns of the matrix T . Euclidean distance was chosen as a measure of closeness:

$$\alpha_{kl} = \sqrt{\sum_{i=1}^b (t_{ik} - t_{il})^2} \quad (5)$$

where: α_{kl} is a distance between the object k and the object l ; t_{ik} – values of normalized deviations for each feature of the object k ; t_{il} – values of normalized deviations for each feature of the object l .

The clusterization of the elements was carried out on the basis of k-means, and the centers of gravity were chosen on the basis of the matrix of the proximity function between the objects.

Tabular and graphical methods made the basis for a visual analytical presentation of the results of the study, while simple analytical and group typological tables, linear graphs were used with combined development of the predicate.

3. Results

From 1990 to 2006 (the year when the National Agricultural Development Project was launched), the number of cattle declined by 35.4 million head, or 62.1%, including 11.1 million head, or 54.1% of cows; the agricultural area reduced by 1.78 million hectares (0.8%), including 4.22 million hectares of hayfields and pastures. During the implementation of targeted state programs, in 2016 only three regions (the Republics of Dagestan, Kalmykia and Altai) were able to restore the number of cattle in all types of households to the level of 1990 according to the data of the All-Russian Agricultural Census (FSSS 2016, 70). Thus, the development of approaches to the study of regional peculiarities in ensuring the growth of the livestock sector production volumes in the context of achieving the goals of state programs is relevant both at the micro and macro levels.

The available resource potential is the basis for achieving the objectives set in the country's agricultural development programs (Potrakhina 2015), which for the livestock sector industries includes agricultural land in general, as well as natural hayfields and pastures to provide feed for the animal husbandry subsector, the number of livestock and poultry, labor resources, buildings and agricultural machinery. It is possible to estimate the changes in the resource potential for the period of implementation of the National Project and the State programs for agriculture development on the basis of agricultural censuses conducted in the country in 2006 and 2016 (Table 1)

Table 1. Availability of resources in the livestock sector according to the All-Russian Agricultural Census

Indicator	2006	2016	2016 in % to 2006
Cattle stock, thous. Head			
all categories of the households, including	23,514.2	19,318.6	82.2
Agricultural organizations	11,225.5	8,595.5	76.6
Peasant (family-operated) farms and individual entrepreneurs	979.5	2,564.1	261.8
Cow population, thous. Head	9,569.3	7,983.7	83.4
Pig population	17,091.8	23,268.9	136.1
Sheep and goat population	22,460.8	27,216.9	121.2
Poultry	389,845.3	553,029.2	141.9
Tractors, thous. Units	1,102.7	1,043.6	94.6
Forage harvesters, thous. Units	33.8	18.7	55.3
Agricultural areas, thous. Ha	165,985.1	142,206.8	85.7
hayfields	13,930.2	10,299.0	73.9
Pastures	35,200.5	26,518.5	75.3
Forage acreage	19,467.7	16,060.9	82.5
Average annual staff headcount, thous. people:			
Agricultural organizations (ACOs)	2,613.9	1,323.1	50.6
Peasant (family-operated) farms (PFs)	553.5	300.9	54.4

The data of the table indicate the effectiveness of measures within the framework of the State Programs in poultry breeding (41.9%) and swine breeding (36.1%), while the most vulnerable branches of dairy and beef cattle breeding still did not overcome the crisis. There is also a transfer of production from large, high-value agricultural enterprises to the sector of peasant (family-operated) farms (PFs) (the livestock grew almost by 2.6 times, with a general reduction in all categories of households by 17.8%, including in agricultural organizations (ACOs) by 23.4%). In general, one can note a decline in the volume of the main types of resources of the industry: land by 14.3%, including reduction in natural hayfields by 26.1%, pastures – by 24.7%, forage acreage – by 17.5%; the labor force decreased by almost one half; tractors and forage harvesters – by 5.4 and 44.7%, respectively.

The noted changes in the volume of the resource potential for the restoration and development of the livestock sector production during the period of implementation of the State programs for the agribusiness development have the above mentioned differentiation by the territorial entities of the Russian Federation (Zinchenko 2017), which requires consideration in developing approaches to further regulate the processes of import substitution of food products. According to 2016 data, a high degree of the regional differences was noted in the livestock density and the livestock sector production per 100 hectares of agricultural land: the coefficient of variation was 70.5% and 92.5%, respectively. To establish differences in the conditions and results of the livestock sector production in the regions of Russia, statistical grouping of the territorial entities of the Russian Federation

was carried out in terms of the livestock sector production output at current sales prices for all categories of households per 100 hectares of agricultural land, the results of which are given in Table 2.

Table 2. Characteristics of conditions and results of the livestock sector production by regions of Russian Federation in 2016

Indicators	Groups of regions manufacturing the livestock sector products per 100 ha of agricultural lands, thous. RUB			Universal mean
	below 2000	2000 - 4000	above 4000	
Number of regions	32.0	29.0	17.0	78.0
Number of ACOs on average per region*	522.0	519.0	250.0	461.0
Number of PFs on average per region*	2,178.0	1,778.0	903.0	1,751.0
The livestock sector production in actual prices 100 ha of agricultural lands, thous. RUB	1,044.8	2,649.8	6,701.4	1,735.3
Gain in the livestock sector production in actual prices per 100 ha of agricultural lands as compared with 2015:				
absolute, thous. RUB	42.8	124.6	117.8	68.1
relative, %	4.27	4.94	1.79	4.08
Milk production per capita, kg	270.0	232.0	175.0	239.0
Meat production per capita, kg	68.0	68.0	126.0	77.0
Imports of food products per capita, USD	62.9	99.8	185.7	98.2
Balance (import-export) on average per region	-109.2	56.7	41.8	-14.6
Milk yield per 1 cow, htw	33.69	43.97	44.00	38.52
Calf crop per 100 cows, head	77.7	84.7	71.0	78.9
Cattle stock per 100 ha of agricultural lands, head*	10.4	19.1	28.7	13.6
Area of hayfields and pastures per 1 manufacturer (in the ACOs and PFs), ha*	326.1	113.4	55.8	213.3
ACO sales profits in the livestock sector per 100 ha of agricultural lands, thous. RUB	20.5	98.5	549.9	65.9
GRP per capita, thous. RUB	304.9	463.7	454.8	397.0
State support for agriculture per 100 ha of agricultural lands, thous. RUB	62.4	194.8	522.4	119.0

Source: Compiled by the authors

Note: *according to the data of the All-Russian Agricultural Census, 2016

The presented calculations are indicative of a high level of differentiation in the conditions, levels and efficiency of agricultural production in general and the livestock sector in particular. Thus, the main production of agricultural products is concentrated in the group of regions with the lowest level of production efficiency and sales of the livestock sector products, this group accounts for 46% of agricultural organizations and 51% of peasant (family-operated) farms, i.e. as calculated per 1 region by 13.2% and 24.4% more, respectively, over the national average. These are regions with a predominance of small-scale production, because there are 4.2 peasant farms per one organization, whereas in the second and third groups they account for 3.4 and 3.6, respectively. This group shows low indicators of animal productivity, however, milk production per capita is close to the consumption norms, which makes it possible to achieve the goal of import substitution at high rates of growth in output, as indicated by the lowest level of food imports per capita and excess volumes of food exports over imports, in contrast to other groups of regions with high rates of animal productivity, a high level of regional development, i.e. ensuring effective demand, but not providing for their own needs.

The state support in the framework of implementing the Agricultural Development Programs is distributed unevenly (Androsova *et al.* 2016). In the first group, its level is lower by 88% as compared to the third group (where the regions with intensively developing meat cattle breeding are concentrated, namely: Bryansk Region, Belgorod Region, Caucasus Regions) and by 48% than the national average. Thus, at present the state support for agricultural production in Russia is directed to the urbanized regions having no high prospects for the development of such sectors as dairy cattle breeding due to the limited availability of forage areas (the area of hayfields and pastures per 1 household is lower by 83% in the third region than in the first), which is confirmed by other researchers (Aliev *et al.* 2017). Thus, in the context of the goal of intensive import substitution for all types of the livestock sector products, an algorithm is needed for the systematization of the territorial entities of the Russian Federation from the viewpoint of the possibilities for the livestock sector development and the efficiency of the distribution of state support for agriculture, which is also confirmed by the Russian economists studying the problems of agricultural production location (Svetlov 2017).

3.1. The proposed methodology

In the process of analysis the indicators that form two aggregated groups characterizing the region in terms of the level of production activity in the livestock sector were chosen as criteria for classification ("The livestock sector production index", "Profits margin of the livestock sector", "The livestock sector production per 1 ruble of subsidies") and in terms of general development ("The ratio of the average monthly wages of workers employed in agriculture to the average wages for the region's economy", "Unemployment rate in the region", "Average weighted index of investment risk in the region", "Agricultural capital investment index", "The relative share of the region in the all-Russian investment potential").

This scoring system takes into account the main indicators of the State Program for agriculture development and regulation of markets for agricultural products, raw materials and food supplies for 2013-2020, the indicators of the public-private partnership development in the agrarian sector as one of the most promising and effective forms of interaction between the state and private business in the agriculture development, calculated by the Ministry of Economic Development in cooperation with the "Center for Public-Private Partnership Development" Non-commercial Partnership. And it is also proposed to take into account the indicators of rating agencies that provide a comprehensive assessment of the investment attractiveness of the regions. Also, with regard to the insufficient efficiency of the state support system, it is necessary to include the indicator of the output per 1 ruble of subsidies in the scoring system. The characteristic of the region in terms of social efficiency is reflected in the scoring system by the indicators of the unemployment rate in the region and the ratio of the average monthly wages of workers employed in agriculture to the average wages for the region's economy.

The elemental composition of the presented system can be changed, transforming it, for example, with regard to the changing requirements of the state, manufacturers of agricultural products or international organizations. Possessing sufficient information, it is possible to consider the characteristics of agribusiness holding companies operating in the regions, natural conditions, bioclimatic potential, etc.

The cluster analysis is the most popular method among economists today to typify statistical aggregates (Looijen and Heijman 2013). Based on the presented system of indicators, similar groups of regions (clusters) were identified using the cluster analysis method (K-means clustering) (Borovikov 2013), with the characteristics given in Table 5. At the same time, all the factors taken for analysis turned out to be significant with a probability higher than 0.93 (Table 4).

Table 3. Results of cluster analysis in the STATISTICA application software package (Summary: Euclidean distances)

Cluster Number	Euclidean Distance between Clusters - Distances below diagonal - Squared distances above diagonal		
	No. 1	No. 2	No. 3
No. 1	0.000000	1.512040	0.553171
No. 2	1.229650	0.000000	2.017970
No. 3	0.743755	1.420553	0.000000

Table 4. Results of cluster analysis in the STATISTICA application software package (Analysis of Variance)

Variable	Analysis of Variance (Cars)					
	Between SS	df	Within SS	df	F	signif. p
The livestock sector production index, %	15.42247	2	58.57753	72	9.47819	0.000222
The livestock sector profits margin, %	28.77376	2	45.22624	72	22.90386	0.000000
The livestock sector yield per 1 ruble of subsidies, RUB	5.20554	2	68.79446	72	2.72405	0.072374
The ratio of the average monthly wage of workers employed in agriculture to the average wages for the region's economy, unit fractions	40.08681	2	33.91319	72	42.55351	0.000000
Unemployment rate in the region, %	22.61133	2	51.38867	72	15.84022	0.000002
Level of PPP development in the region, %	26.45547	2	47.54453	72	20.03168	0.000000
Agricultural capital investment index, %	6.50895	2	67.49104	72	3.47190	0.036351
Investment risks in the region, unit fractions	49.15597	2	24.84403	72	71.22897	0.000000
Investment potential of the region, unit fractions	14.61000	2	59.39000	72	8.85603	0.000364

The data of the table indicate a high difference between all the clusters singled out, at the same scale, *i.e.* separation of the aggregate can be considered successful, and it makes sense to compare the objects in terms of the efficiency of the livestock industries development on the basis of the implementation of state programs and public-private partnership mechanisms.

Table 5. Characteristics for clusters of regions according to level of development and efficiency of livestock sector production

Indicator	Clusters for regions according to level of development, including subsectors of livestock sector			Universal mean
	I	II	III	
Number of regions	42	12	20	74
The livestock sector production index, %	98.6	103.0	106.8	101.6
The livestock sector profits margin, %	6.6	4.1	21.0	10.1
The livestock sector yield per 1 ruble of subsidies, RUB	45.7	58.4	83.6	58.0
The ratio of the average monthly wage of workers employed in agriculture to the average wages for the region's economy, unit fractions	0.66	0.62	0.84	0.70
Unemployment rate in the region, %	5.50	8.47	5.97	6.11
Level of PPP development in the region, %	39.2	29.5	34.9	36.5
Agricultural capital investment index, %	98.4	133.1	114.6	108.4
Investment risks in the region, unit fractions	0.261	0.349	0.256	0.274
Investment potential of the region, unit fractions	1.215	0.766	0.819	1.035

Source: Compiled by the authors

Thus, the singled out clusters have the following features: the 1st cluster, being the largest one, includes the regions with the low level of the livestock sector development, but having a high investment potential and the prevalence of public-private partnership mechanisms. These are urbanized regions (the Moscow, Murmansk, Novosibirsk, Sverdlovsk, Kurgan, Tyumen and other Regions, the Krasnodar and Stavropol Territories, the Republics of Tatarstan, Chuvashia, Mordovia, etc.), using an average level of state support (RUB 105.8 thous. per 100 hectares of farmland, which is 11.2% below the national average). While some of these of the territorial entities, in our opinion, are attributed to this cluster accidentally from the point of view of the return on investment in the livestock sector, because they have all the natural-climatic and economic conditions for achieving high livestock productivity and the performance of the sector as a whole (for example, the Republic of Tatarstan has a historically high level of development of dairy cattle breeding with a productivity level of 5,120 kg per head, the productivity level making 6,239 kg in the Stavropol Territory and 6,808 kg in the Krasnodar Territory (according to the Ministry of Agriculture of the Russian Federation). In terms of allocating funds of the state support for the development of the livestock sector, this cluster is a mixture of different types of regions (with high and low possibilities of their effective use from the viewpoint of availability of natural and economic conditions – the resource potential), i.e. there cannot be a single system of managerial decisions for this cluster.

The 2nd cluster, which includes mainly the territorial entities of the North Caucasus District and several representatives of the Far East (the Republic of Sakha (Yakutia), the Sakhalin Region and the Amur Region) and Siberia (the Republic of Buryatia, the Altai Territory), represents a group of regions with low investment potential and high investment risks, low level of agricultural development in general and the livestock sector, in particular. This requires a special approach to solving the issues of ensuring the supplies of the livestock sector products to the population in these regions. This can be the supplies from the neighboring regions with a higher level of resource potential while maintaining small forms of economic management (peasant (family-operated) farms, individual entrepreneurs and households of the population) in the region.

The 3rd cluster is represented mainly by the territorial entities of the Central Federal District with a high level of development relative to other territorial entities of the Russian Federation, as well as regions with highly efficient agriculture and livestock sector industries, in particular (the Leningrad Region, Republic of Bashkortostan, the Orenburg Region and others). The livestock sector profits margin is high enough in the regions of this cluster to provide extended reproduction in the sector; the average level of the investment potential indicators and risks leads to sustainable development of the public-private partnership mechanisms in agriculture with the purpose of providing food products while preserving its multistructurality. This cluster consisting of 12 regions uses 35.8% of all state support funds in the framework of the implementation of State programs in agriculture.

The results of cluster analysis have shown difficulties in its use with the aim of developing managerial decisions at the macro level regarding the distribution of the state support funds, including through the implementation of public-private partnership mechanisms to ensure import substitution in the livestock sector due to the mixing of various types of territorial entities of the Russian Federation in clusters in terms of the resource potential and the possibility of achieving the set up goal.

One of the approaches proposed by the analysts of the "Directorate of Scientific and Technical Programs" Federal State Funded Research Institution to the generalized assessment of the implementation of state programs is the use of an integral indicator (Mikhailets *et al.* 2013), which can also be applied in this research to objectively assess the regions' potential in developing the livestock sectors within the framework of state programs. On the basis of the considered scoring system characterizing the regions, a method for regions' grouping is proposed employing an integral indicator – multidimensional mean obtained from the standardized values/scores (the ratio of each value of the attribute to the universal mean of regions in percentage terms).

The weights proposed for the calculations were developed on the basis of the expert group estimates (a survey was conducted among 25 respondents to obtain a representative sample; the respondents belonged to bank employees, teachers of agricultural higher education institutions and employees of agricultural organizations) and tested for stability by the Monte Carlo Simulation method (100 iterations showed stability of these weights), the results are given in Table 6.

Table 6. Weight coefficients

Indicator	Weight of the characteristic
The livestock sector production index in comparable prices, %	0.16
The livestock sector profits margin, %	0.16
The livestock sector yield per 1 ruble of subsidies, RUB	0.13
Groupwise total	0.45
The ratio of the average monthly wages of workers employed in agriculture to the average wages of those employed in economics	0.13
Unemployment rate, %	0.06
Level of PPP development, %	0.11
Agricultural capital investment index, %	0.07
Average weighted index of investment risk	0.07
The relative share of the region in the all-Russian investment potential, %	0.11
Groupwise total	0.55

Based on the calculated values of multidimensional mean, a ranked distribution series is constructed, and typical groups are singled out according to the nature of the grouping attribute variation (in our case, differences in the intensity of the change in the attribute were found at 90-100 and 116-122 (Figure 1). Thus, three groups were identified with the value of the grouping attribute: below 100 points, within the range of 100-122 and above 122 points, and characterized by a number of average and relative indicators.

Using the proposed methodology for regional typification to assess the possibility of providing import substitution in the livestock sector products and working out measures for the livestock sector development, attracting investments, including through the implementation of the public-private partnership mechanism, the following results were obtained (Table 7).

Figure 1. Ogive curve of the ranked distribution series

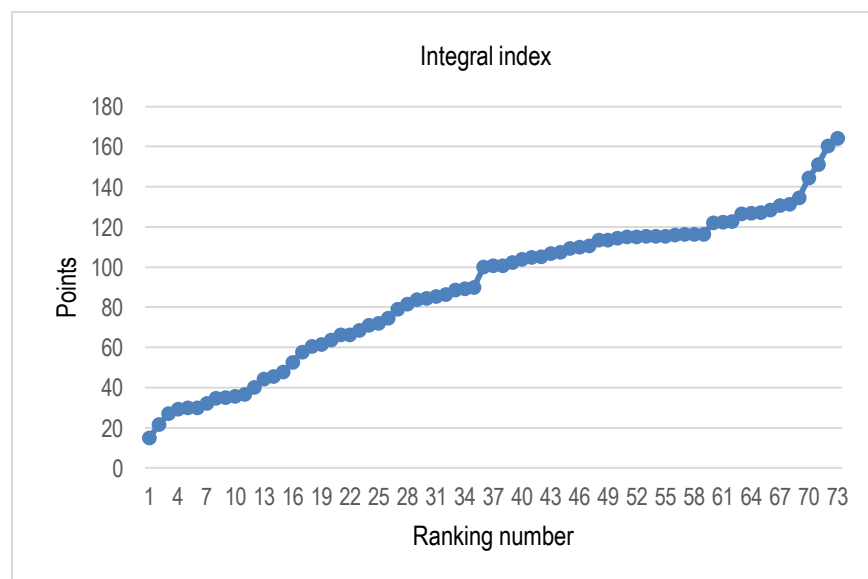


Table 7. Conditions and results of the livestock sector production by the groups of Russian regions in 2016

Indicator	Groups according to the integral indicator level			Universal mean
	I	II	III	
Number of regions	35	24	15	74
The livestock sector production index, %	98.54	102.02	107.93	101.57
The livestock sector profits margin, %	0.00	14.53	26.57	10.10
The livestock sector yield per 1 ruble of subsidies, RUB	45.27	53.49	94.97	58.01
The ratio of average monthly wage of workers employed in agriculture to average wages for the region's economy, unit fractions	0.62	0.76	0.83	0.70
Unemployment rate in the region, %	6.17	5.51	6.92	6.11
Level of PPP development in the region, %	34.43	41.75	32.79	36.47
Agricultural capital investment index, %	85.84	102.32	170.65	108.38
Investment risks of the region, unit fractions	0.30	0.24	0.26	0.27
Investment potential of the region, unit fractions	0.77	1.31	1.22	1.03
number of ACOs per a region	367	592	538	475
number of PFs per a region	1,147	2,320	2,498	1,801
Area of farmlands per a region, thous. ha	1,343.0	2,876.5	1,569.2	1,886.2
Cattle stock per 100 ha of the farmland, head	14.5	12.9	13.8	13.6
Percentage of arable area in the farmland	50.8	74.4	77.5	67.0
State support per 1 ha of the farmland, thous. RUB	864.9	1,166.2	1,916.3	1,191.2
GRP per capita, thous. RUB	501.9	352.3	348.9	402.4
Production per capita, kg				
milk production	209	279	214	241
slaughter cattle and poultry production	46	74	135	78
Imports per capita, USD	65.6	49.8	255.9	100.2

The territorial entities of the Russian Federation are distributed unevenly among the groups with predominance of the first group regions that are characterized by a low level of production efficiency in the livestock subsector and the intensity of its development (despite the implementation of the state subprogram for the livestock sector development, output of products decreased by 1.46% in 2016 compared to 2015). These are mainly industrial regions (representatives of the Far Eastern Federal District, the Central Federal District and Siberia), but having high-risk agriculture with low investment potential in agriculture and, accordingly, with high investment risks, import-dependent (production of milk, slaughter cattle and poultry is lower than the norms of consumption recommended by the Ministry of Health (325 kg and 73 kg) by 35.7 and 37%, respectively). Thus, the main goal for this group of regions is to maintain the non-commodity and small-scale output of the livestock sector products for own consumption (31) while maintaining the existing narrow specialization (for example, the Republic of Kalmykia specializes in meat cattle breeding).

Currently, the regions of the third group (the Moscow, Belgorod, Tambov, Lipetsk, Kaliningrad, Stavropol Regions, the Krasnodar Territory, and the republics of the North Caucasus) are the main users of the state support funds with a high level of return. However, this group also does not provide sufficient milk production to ensure import substitution in its territory due to the low productivity of cows (4,373 kg of milk per head). These regions are characterized by a high level of production intensity, especially in the meat cattle breeding industry, the possibilities of increasing its efficiency through the use of high technologies with limited land resources. The high level of production concentration allows developing cooperation in manufacturing, processing and sale of products, *i.e.* creation of agribusiness holdings with participation of both public and private investments. Already today the represented territorial entities are attractive to investors, have opportunities for expanded reproduction and, therefore, can rely more on private investments.

In our opinion, the regions of the second group are the most promising in terms of intensive import substitution; they have large areas of agricultural land as the basis for the forage resources to develop the dairy and meat cattle breeding, with their sufficiently intensive use (index of ploughness making 74.4%). These regions occupy an intermediate position between the first and third groups by the majority of indicators and constitute an economically stable core (having the highest investment potential and relatively low risks) to attract private investments, but in case of targeted state support aimed at improving the material and technical base, increasing quality of the main herd, the use of innovative technologies in the production cycle (livestock keeping, feeding and care).

The conducted analysis showed that under the conditions of the targeted approach to determining efficiency, the grouping method based on the multidimensional weighted mean is the most rational method of object typification, since it minimizes the mixture of types of the analyzed objects, gives the opportunity to vary weights taking into account changing objectives and allows determining priority directions in the development of managerial decisions at various levels.

4. Discussion

The key task of this research is to assess the regions of Russia from the perspective of the possibility of intensive import substitution of agricultural products, in particular dairy cattle breeding through the attraction of private and public investments. The high degree of variation in the soil and climatic conditions of the regions, as well as the different levels of social and economic development of the territorial entities of Russia, required the development of a system of indicators characterizing regions from the standpoint of the livestock sector development, the general economic level and investment attractiveness.

The system of indicators presented in the paper was subsequently tested during the typification of regions by cluster analysis in accordance with the methodologies used by domestic and foreign authors. However, this method showed an insufficiently stable result, since the selected groups included heterogeneous elements of the aggregate in terms of natural conditions, and there is also no possibility to typify the country's regions on the basis of a unified system of indicators in the face of changing goals dictated by the targeted approach to the development of the economy as a whole and agriculture, in particular, which is implemented by the government. Cluster analysis required expanding the system of indicators, but this complicates the methodology. In this connection, the authors propose a method for the typification of regions based on the weighted multidimensional mean value, which enables to obtain new results when changing the weight coefficients in accordance with the emerging goals and tasks of group identification.

Conclusion

Thus, the research enabled to identify negative changes in the level of resource potential from the standpoint of the possibility of expanding the production capacity of the livestock sector and improving its quality in general in the Russian Federation, during the inter-census period, there is a reduction in all major resources of agricultural production, despite the implementation of the National Project for agribusiness development and State Programs.

Based on the typological grouping, the regional differences were revealed in the conditions, the results of the livestock sector production, and the efficiency of using state support funds, which confirmed the need to develop a methodology for the typification of regions to increase its efficiency and successfully achieve the goal of ensuring the country's food security.

A system of statistical indicators has been developed that includes characteristics of the territorial entities in the Russian Federation in terms of the industrial activity level (livestock sector industries) in the region and the social and economic level of the region's development that has become the basis of the methodology for the typification of regions.

A methodology for identifying groups of regions with various possibilities of intensive import substitution has been proposed and approved, promising areas of application of public and private investments in the livestock sector and the development of various forms of economic management have been identified.

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Finding the Development Pathways of Local Food Markets in the Region in the Context of Intermunicipal Socio-Economic Differentiation: Matrix Tools

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Abstract:

It is shown that the balanced development of local food markets in the conditions of existing intermunicipal socio-economic differences is a condition for ensuring the physical and economic accessibility of food products for the population of the region. The concept of "spatial potential for the development of local food markets" is proposed and its characteristics are given. The possibility of using a matrix tool for the strategic analysis of the development of local food markets in the region is substantiated. A matrix of spatial differentiation and pathways of the strategic development of local food markets of the region has been developed. The pathways of the strategic development of the markets are defined as applied to the research area.

Keywords: local food market; pathways of strategic development; market development; matrix tools.

JEL Classification: O10; O15

Introduction

The polarized development of regions associated with the uneven distribution of economic sectors, the territorial division of labor, the concentration of population dispersal, generates a significant intermunicipal socio-economic differentiation. Intermunicipal differences in the density, the standard of living of the population, the territorial unevenness of reproduction and migration processes create some usual signs for the differentiated development of local markets. The situation is complicated by the fact that the level of development of markets often does not correspond to the level of social and economic development of the territory, resulting in an imbalance between the increasing demands of residents and the possibilities of their satisfaction.

Today, the regions focus on resolving some operational problems and current tasks. The role of strategic management in the development of local food markets in the region is underestimated; there are no sound strategic priorities and market development goals embedded in strategic guidelines for the development of the region and its municipalities, which restricts plans for activities of local producers and makes it difficult to ensure unhindered economic and physical access of people to food.

To date, there is no tool for strategic analysis that allows substantiating the pathways of the strategic development of local food markets, which makes it difficult to justify the guidelines for their development in the region. The shortcomings of the available developments in this field revealed the need to develop an author's matrix tool.

1. Methods

Growth of the requirements for conceptual and meaningful developments concerning the problems of making management decisions in the field of developing strategies at the macro, meso- and microlevels necessitates the widespread use of heuristic methods as methods for generating solutions to problems, searching for variants of goals and criteria on the basis of the inherent ability to creative activities. A positive result, in this case, is the combination of informal and quantitative methods of assessing the phenomena under study.

The methodology as a set of methods of conducting research on the claimed subject area, expressed in the justification of management decisions to choose the pathways of the strategic development of local food markets in the region, taking into account their spatial potential and intermunicipal socio-economic differentiation, is based

¹ 625000, Russia, Tyumen, Volodarskogo St., 38

on the combinatorial use and systemic application of both heuristic and local, specific ways of studying the phenomenon. These include the matrix methods of strategic analysis and planning.

Matrix tools used in management activities and especially in strategic management have not received a clear methodological justification. Without pretending to be universal, they make it possible to visually and conveniently, graphically represent the information necessary for strategic management and to investigate the factors of influence on the object of research.

The methodological approach in the study, represented by the matrix of spatial differentiation, is focused on allocating territories with balanced, lagging and advancing development of local food markets in the region and defining a set of actions to ensure the pathways of their strategic development, taking into account the spatiotemporal relationships and potential opportunities for the development of economic zones in the region.

2. Results

2.1 Conceptual characteristics of the spatial potential of the development of local food markets in the region

The development of local food markets in the region is largely due to the socio-economic situation of the territories within which they are localized. The uneven spatial development of the region manifested in intermunicipal socio-economic differentiation is the reason for the differentiated development of markets. Given the existing multipolarity of the intraregional area, it is not possible to talk about the smoothing of the differential development of local food markets, but it is necessary to ensure the realization of their development potential, which is a gap between the existing level of development of markets and the level that can be achieved taking into account the socio-economic situation of the territories of localization. "Differences in regional capacities should not negate one of the postulates of federalism dictated by the provision in the federal state of all citizens of equal access to basic goods and services regardless of their place of residence ..." (Seliverstov 2013).

There is the concept of "market potential" in the scientific literature, the essence of which is examined in two ways: as the maximum possible volume of deliveries of products by commodity producers to the market, provided that all their production capacities (production potential) are used, and the maximum possible amount of goods purchased by buyers in the market (consumer potential). The consumer potential is often called the "market capacity", and it can be real (actual consumption of goods) and potential (the maximum possible consumption).

In the case of food markets, the calculation of the production and consumer potentials should be made for individual food products. It should be noted that, relative to local markets, their definition is impossible for the following reasons: in view of the lack of data about the distribution channels of products by enterprises, in addition, even the goods of local producers are supplied practically to all areas of the region (the production potential of a separate local food market cannot be determined); due to the lack of municipal statistics on per capita consumption of individual food products (which makes it impossible to calculate the real capacity of the market to compare it with the potential one). Thus, the calculation of these parameters is possible only with respect to the regional food market.

In our study, we focus on determining the *spatial potential for the development of local food markets*. An uneven concentration of economic activity in the territory of the region leads to the polarization of space, which ultimately manifests itself in the significant socio-economic differentiation of municipalities. The existing intermunicipal differences can be explained by the heterogeneity of the spatial potential, which refers to the spatial characteristics of the territory, forming an idea of its possible filling with natural and artificial resources, the possibilities for the development of the territory and the environment. Similarly, local food markets develop unevenly: intermunicipal contrasts in food consumption, the state of the trade infrastructure, the physical availability of food for the population, etc., are increasing. The situation is complicated by the fact that the level of development of markets often does not correspond to the level of social and economic development of the territory; as a result, there is an imbalance between the increasing demands of residents and economic entities and the possibilities of their satisfaction.

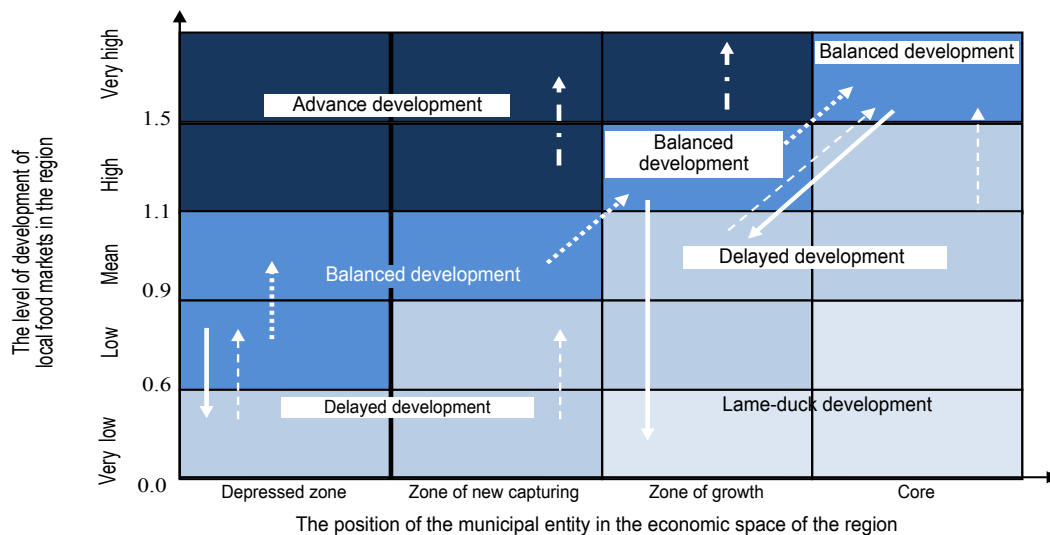
Thus, the *spatial potential of the development of local food markets* can be defined as existing opportunities to increase the physical and economic accessibility of food products for the population of the region through the development of consumer demand, commodity distribution network, commodity supply, competitive environment in accordance with the socio-economic situation of municipalities. The realization of this potential will ensure the complete satisfaction of the needs of residents in food products, taking into account intermunicipal socio-economic differentiation. In other words, the spatial potential for the development of local food markets is a gap between the level of their development achieved and the one that most closely corresponds to the socio-economic status of municipalities, the standard of living of their population and its needs.

2.2 The matrix of spatial differentiation and pathways of strategic development of local food markets

Often, when making strategic decisions, matrix tools are used. Their advantage is the ability to give a graphic (visual) representation of the position of the objects under study in the context of the chosen coordinate system, identify problems and the causes of their occurrence, and determine development priorities.

As an instrument of strategic analysis that allows determining the dynamic characteristics of the local food markets of the region, their spatial-temporal relationships and potential development opportunities, we propose to use the author's matrix of spatial differentiation and pathways of the strategic development of local food markets (Figure 1).

Figure 1. The matrix of spatial differentiation and development paths of local food markets in the region



Characteristics of economic zones: Core: the significant contribution of the Ministry of Defense to the GRP of the region, consistently high living standards of the population, high values of natural and migratory population growth, ...; "Zone of growth": significant growth rates of shipped products and investments, a high and growing standard of living of the population, positive population growth, ...; "Zone of new capturing": appearance of new industries in the structure of the economy and the growth of their share, a significant amount of investment in fixed assets, an increase in the standard of living of the population, a relatively low population density, ...; "Depressed zone": the decline in production, a minimum level of investment, growth in the structure of production of underdeveloped agriculture, low living standards of the population, ...

paths of strategic development of markets:

- > – catching-up development;
-> – proportional development;
- .-.-> – moderate development;
- > – regressive development

The distinctive features of the proposed matrix in the dynamic aspect as a tool for strategic analysis of the development of local food markets are:

- *Firstly*, an assessment of the spatial potential of market development, taking into account the existing gap between the level of development of markets achieved and one that most closely matches the socio-economic situation of the territory;
- *Secondly*, the choice of strategic market development pathways (based on the identified potential);
- *Thirdly*, the definition of the spatial organization of local food markets, which is most appropriate for the uneven spatial development of the region.

The localization of the municipal formation on the matrix is determined by its positioning in the axes "The level of development of local food markets in the region" – "The situation of the municipal entity in the economic space of the region".

The typology of municipalities in terms of the level of development of markets is based on the results of assessing the territorial features of their functioning. As private indicators of the level of development of markets, taking into account the limitations of municipal statistics, it is proposed to use the following: the turnover of retail trade in food products per capita and unit of shopping space; the purchasing power of the average monthly wage; the provision of the population with retail space for the sale of food products; the density of the trading network; the specific weight of settlements provided by trade objects; the share of locally produced goods in the total volume of trade. The values of the individual indicators are normalized by the average regional value. By finding the geometric mean, the values of integral indicators of the level of development of local food markets are determined. Based on

the values of integral indicators, the types of municipal formations (MF) with very high ($kint > 1.5$), high ($1.5 \geq kint > 1.1$), average ($1.1 \geq kint > 0.9$), low ($0.9 \geq kint > 0.6$) and very low ($0.6 \geq kint$) level of development of local food markets are identified.

The distribution of municipalities by economic zones ("new development zone", "growth zone", "core", "depressive zone") is carried out on the basis of refined criterial signs of the phases of the cycle of economic activity. Thus, the phase of the emergence of economic activity (the "core" zone) is characterized by the appearance in the structure of the economy of the municipality of new industries and high annual rates of growth of their production (105-115%); significant growth rates of investments in fixed assets (over 110%); a decrease in the level of unemployment; relatively low population density, which has a positive trend.

The spatial potential for the development of local food markets in the region should be determined not only on the basis of the actual state of markets and the socio-economic situation of the localization area, but also taking into account the factors of negative and positive influence, the emergence of "poles" and growth points in the economic and social sphere of municipalities. This can ensure a change in the position of the territory in the economic space of the region: its transition from the depressive zone to the zone of new development, from the zone of new development into the growth zone, *etc.*

Thus, there is a very high spatial potential for the development of local food markets in the event of a maximum gap between the actual and necessary level of market development, taking into account intermunicipal socio-economic differentiation and projected changes in the economic space of the territories. A very low potential is revealed if the actual and necessary level of development of the markets coincides or if the actual level already exceeds the required level, further development, in this case, will be more related to qualitative changes (in demand, commodity distribution network, supply) rather than quantitative ones.

Based on the identified potential, one of the four strategic paths proposed by the authors is determined, which makes it possible to implement it:

- the path of catching-up development presupposes the elimination of the existing negative gap between the achieved and the necessary level of development of markets taking into account the socio-economic status of municipalities through the implementation of strategic actions to develop consumer demand, commodity distribution network, the supply of goods, competitive environment. First of all, it is necessary to ensure minimal economic and physical accessibility of food products, especially when it comes to depressive areas. At the same time, the municipal entity is moved up the matrix of spatial differentiation of the development of local food markets from one quadrant to another (if there are no signs of changing the position of the municipal entity in the economic space of the region) or up and to the right (when moving the municipal entity from one economic zone to another, for example, from the depressive zone to the growth zone);
- the path of proportional development, taking into account the existing balance between the development of local food markets and the socio-economic situation of municipalities, should ensure the further harmonious development of markets. In this case, the transition from one matrix field to another (up and to the right) is possible in the event of the emergence of new and strong points of growth in the economy of the municipal formation that promotes the active development of local food markets. However, as a rule, the movement of the municipal entity through the matrix is carried out only within the framework of the current quadrant;
- the path of moderate development is chosen when there is a positive gap between the achieved and the necessary level of development of markets taking into account the socio-economic status of municipalities. It should be noted that in this case, we are not talking about the focus on reducing the level of development of local food markets, but about slowing the growth rates of this development. It is necessary to concentrate efforts on improving the qualitative rather than quantitative state of demand, commodity distribution network, supply and competitive environment. The municipal formation, in this case, moves up the matrix within the current quadrant at a slowing rate;
- the path of regressive development presupposes the implementation of targeted actions that ensure a reduction in the level of development of local food markets. It can be with economic "desertification" of the territory and its removal from economic circulation, which inevitably leads to a decrease in the standard of living of the population, its outflow to other territories, a drop in demand in commodity markets, *etc.*

2.3 Testing of matrix tools for determining the paths of the strategic development of local food markets in the region

The proposed matrix tools were used to substantiate the paths of the strategic development of the local food markets in the Tyumen Region. The region includes 319 municipalities: 5 urban districts, 21 municipal districts, and 293 rural settlements. Based on the results of the conducted analysis of the spatial development of the Tyumen Region, taking into account the criteria specified by the author, a grouping of municipal entities was carried out, with the allocation of four economic zones in the region's space. In order to systematize information about the processes taking place in local food markets, as well as to identify trends in their development common to certain groups of municipalities, areas with very high, high, medium and low levels of development of local food markets were identified on the basis of calculations. The comparison of the obtained typology with the grouping of municipalities in economic zones allowed the authors to identify areas with balanced, outstripping and lagging development of local food markets:

- the municipal entities with a balanced level of development of local food markets in the region are Tyumen, Zavodoukovsky, Ishim, Yalutorovsk, Abatsky, Armizonsky, Aromashevsky, Berdyuzhsky, Vagaysky, Vikulovsky, Kazansky, Sladkovsky, Sorokinsky, Yurginsky, Yalutorovsky Districts;
- the level of development of local food markets for the municipal entities of Tobolsk and the Uvatsky District is ahead of the development;
- among the municipalities with a lagging level of development of local food markets there are Golyshmanovsky, Isetsky, Ishimsky, Nizhnetavdinsky, Omutinsky, Tobolsky, Tyumensky, Uporovsky and Yarkovsky Districts;
- to assess the spatial potential of the development of local food markets in the Tyumen Region in the framework of strategic analysis, the authors identified factors that largely determined the development of markets (Table 1).

Table 1. Factors affecting the development of local food markets in the Tyumen Region

Territory	Factors contributing to the development of local food markets	Factors hindering the development of local food markets
Balanced development of markets		
Tyumen (the "core")	<ul style="list-style-type: none"> – increasing the level of social and economic development of the city; – growth of population, number of visitors; – growth of living standards of the population; 	<ul style="list-style-type: none"> – the existence of significant entry barriers to small local producers; – tougher competition from large foreign players (both food producers and retailers);
Ishim, Zavodoukovsky urban district, Yalutorovsk ("growth zone")	<ul style="list-style-type: none"> – significant domestic production potential of markets; – raising the standard of living of the population 	<ul style="list-style-type: none"> – insufficiently high level of trade infrastructure; – the degree of differentiation of food products is weak relative to the center districts.
Abatsky, Aromashevsky, Armizonsky, Vagaysky, Vikulovsky, Berdyuzhsky, Kazansky, Sladkovsky, Sorokinsky, Yurginsky, Yalutorovsky Districts ("depressive zone")	<ul style="list-style-type: none"> – the availability of domestic production capacity to fill the market with agricultural products 	<ul style="list-style-type: none"> – decrease in population, its outflow to cities and other regions; – low living standards of the population; – a significant imbalance in the distribution of trade infrastructure;
Leading development of markets		
Tobolsk ("growth zone")	<ul style="list-style-type: none"> – growth of the population of the city; – a significant increase in the standard of living of the population; – the influx of tourists into the city due to the positioning of the city as a "cultural capital"; 	<ul style="list-style-type: none"> – difficult access to the market for small forms of management; – low domestic production potential of the market;
Uvatsky District	<ul style="list-style-type: none"> – growth of living standards of the population; – the influx of people due to economic development of the territory 	<ul style="list-style-type: none"> – uneven development of the market in the territory of the district; – insufficient level of trade services; – low domestic production potential of the market;

Backward development of markets		
Golyshmanovsky, Isetsky, Ishimsky, Nizhnetavdinsky, Omutinsky and other Districts (the "growth zone")	<ul style="list-style-type: none"> – maintaining the previous sufficiently high level of social and economic development; – growth of domestic production potential of filling the markets with food products. 	<ul style="list-style-type: none"> – population decline; – insufficient development of trade infrastructure; – weak differentiation of the product offer.

Based on the data presented, the authors assessed the spatial potential and defined the paths of their strategic development, taking into account the socio-economic situation of the localization areas and the factors that contributed to and impeded the development of markets:

- path of proportional development (very low market development potential): Tyumen ("core" zone) Zavodoukovsky urban district, Ishim, Yalutorovsk ("growth zone"); Abatsky, Vikulovsky Districts, Armizonsky, Aromashevsky, Berdyuzhsky, Vagaysky, Kazansky, Sladkovsky, Sorokinsky, Yurginsky, Yalutorovsky Districts ("depressive zone");
- the path of slowing development (very low potential for the development of markets): Tobolsk ("growth zone"); Uvatsky District ("zone of new development");
- path of catch-up development: Golyshmanovsky, Ishimsky, Omutinsky, Tyumensky Districts ("growth zone", low potential for the development of markets); Isetsky, Nzhnetavdinsky, Tobolsky, Uporovsky, Yarkovsky Districts ("growth zone", average market development potential).

3. Discussion

A number of Russian scientists (Kuimov, Suslova and Shcherbenko 2015a, Kuimov, Suslova and Shcherbenko 2015b, Bonda and Pashina 2015, Granberg 2000, Dvoryadkina 2011, Marshalova 2001, Novikova 2012, Novoselov 2002, Satalkina 2007, Filimonenko 2012, Filimonenko 2013, Tsvetkova 2010) have studied the nature of local markets, including local food markets, the features of their functioning and the role in the economic development of the region with varying degrees of detail.

The matrix method is widely used in the implementation of strategic analysis and the rationale for enterprise development strategies at various levels: the BCG matrix (Boston Consulting Group 1972), the SWOT matrix (Thompson and Strickland 1984), the Ansoff matrix (Ansoff 1957), the ADL matrix (Efremov 1998), the Porter matrix (Porter 1980), and others. It should be noted that when implementing strategic planning at the level of regions and municipalities, the same set of matrix tools is used, which was originally developed for application at the enterprise level, with only some modifications.

An analysis of the results of studies by domestic and foreign authors on the issues of strategic planning for the development of markets also did not allow identifying specific instruments that made it possible to carry out a strategic analysis of their development. This necessitated the formation of a matrix tool that allowed determining the spatial potential and paths of the strategic development of food markets at the local level in the context of intermunicipal socio-economic differentiation.

Conclusion

Local food markets are an integral component of the regions of any specialization. They ensure the satisfaction of the population's needs for food, the sale of food products of local producers and interregional trade. In the context of increasing intermunicipal socio-economic imbalances, local food markets of regions are developing unevenly, resulting in an imbalance between the growing needs of the inhabitants and the possibilities for their satisfaction.

A spatial balance between the supply and demand of food products in the region can be achieved through the implementation of procedures for the strategic management of the development of local food markets. The formation of strategic benchmarks for the development of markets should be carried out taking into account the results of the strategic analysis, for which no specific instrument has been developed that allows taking into account intermunicipal socio-economic differences. As a tool for strategic analysis, the authors propose to use the matrix of spatial differentiation of the development of local food markets, which makes it possible to assess the potential of spatial development of markets, to choose the paths of their strategic development and to determine the spatial organization of local food markets that best corresponds to the uneven spatial development of the region.

The use of the proposed matrix tools allowed the authors to determine the paths of the strategic development of the local food markets in the Tyumen Region, taking into account the existing spatial potential for their development. This makes it possible to expand the set of generated strategic initiatives for the development of local food markets in the region, taking into account the features of intermunicipal socio-economic differentiation.

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Boosting Mini-Power Plant Business Performance by Implementing Supply Chain Management and Business Partnership - Case Study: Mini-Power Plant Business Units in West Java

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Abstract:

The mountainous topograph in Southern part of West Java, many small rivers and high rain fall is very potential for the development of environment-friendly hydroelectric technology, which is a runoff river power plant between 1-10 MWh called Mini Hydro Power Plant (Pembangkit Listrik Tenaga Mini Hidro). However, the business performance of mini hydro power plant (PLTM) relatively has still low. It was allegedly related to the aspects of supply chain management and business partnerships. So this study aims to examine the influence of supply chain management and business partnerships on business performance of mini hydro power plant business units in West Java to drive continuous support on grid electricity. The research used explanatory survey method. The type of research used is verification. The observation was conducted in a cross section, that is in 2017. Unit of analysis is of 33 companies of population of mini hydro power plant industry in West Java where observation unit is the company's management. Because of the small population size, the data collection method is conducted by census. The analytical approach used is Partial Least Square (PLS). The results show that supply chain management and business partnerships affect business performance on micro hydro power plant business units in West Java. Business Partnerships have a greater impact than supply chain management in improving business performance.

Keywords: supply chain management; business partnership; business performance; mini hydro power plant.

JEL Classification: M21; C3

Introduction

The mountainous topograph in Southern part of West Java, with many small rivers flowing throughout the year and high rain fall volume have springs flowing to the rivers is very potential for the development of environment-friendly hydroelectric technology, which is a runoff river power plant between 1-10 MWh called Mini Hydro Power Plant (Pembangkit Listrik Tenaga Mini Hidro). The equipment used is relatively simple and easy to find. The required land is not extensive, so there is no need to open the forest to build the large scale hydroelectric power supply with big water dam and huge power installation. Southern part of West Java has mountain topography spread all over the region. In general, mountain's texture is steep with relatively few inhabitants. The mountainous area has a large electrical energy in the form of water. The flow of water from the plateau to the lower one has potential energy that can be utilized as a source of electrical energy, especially in Sukabumi, Cianjur, Garut and Tasikmalaya that still have forests and stable water supply.

With the publication of ESDM Regulation no. 19 of 2015 on Micro Hydro Power Plants regarding the electricity tariff (Feed In Tariff) of Hydro Power Plants under 10 MW/h of 12 cent USD/KWh and the use of mini

hidro Potential of 500 MW, newly installed 86.1 MW, should increase the number of Mini Hydro Power Plants (PLTM) in West Java. Actually, the potential of Mini Hydro Power Plants for supporting to the main grid of electricity (Jawa Bali Network) and remote areas that have not reached the electricity network or areas that do not have other sources of fuel, so that the potential for the development of the Mini Hydro Power Plants is not optimal. However, the request for a Water Power Business Permit under 10 MW in Indonesia has only reached 33 Commercial Operation Date (COD) Permits from 266 Permits during 2015 to date.

Until now, the company's performance is only 65%-75% of 86.1 MW installed yet, due to the frequent down time. This problem is caused by lack of optimal partnership and also supply chain management in mini hydro power plants companies, especially in the technology to be used, expertise people and financial investor. The Previous study has not address on Supply Chain Management and Strategic Partnership during the operation phase of Mini Hydro Power Plant. The form of partners relationship proposed by Cravens (2013) that includes a vertical relationship consisting of relationships with suppliers and customers and the relationship horizontally consisting of lateral and internal partnerships. In the era of decentralization of the energy sector in Indonesia, the key to sustainability success is extensive coordination with private parties, local government offices, state electricity company, and communities. On the other hand, Clement, Clement, Joseph (2013) suggests that the performance of a company with partnership is better than a single-ownership company. In addition, Agus and Hassan (2012) demonstrate that the product quality performance and business performance dependence on practices of strategic suppliers partnerships.

Another factor that is alleged to have an impact on the optimum business performance of micro hydro power plant companies is regard to the aspects of the supply chain. Turban, Rainer and Porter (2004) mentions supply chain includes 3 components ie upstream supply chain, internal supply chain management, and downstream supply chain. Lia, Ragu-Nathan, Ragu-Nathan, Rao (2006) found that higher levels of SCM practice lead to increased competitive advantage and improved organizational performance.

Based on this background, this study aims to examine the effect of supply chain management and business partnership on the business performance of business units of micro hydro power plant in West Java. In this case, this study is expected to be used by the Government in their policies and private sectors to boosting mini hydro power plant performance to empowering rural social and economics sustainability by increase electrification ratio based on renewable energy resources. And may also provide benefits to the next Mini Hydro Power Plant Business studies writing academics.

1. Literature study

1.1 Supply Chain Management

According to Turban, Rainer and Porter (2004), supply chain includes 3 (three) kinds of components: Upstream Supply Chain, with main activity is procurement; Internal Supply Chain Management covers all the processes of goods imported into warehouses used in transforming upstream inputs, so it main concerns include production, manufacturing and inventory control; and downstream supply chain, encompassing all activities involving the delivery of goods to end customers, so that the main concern is directed to distribution, warehousing, transportation and service.

According to Kalakota (2000), supply chain management is a major process by which products are created and delivered to consumers from a structural angle. A supply chain refers to an intricate network of relationships that maintain an organization with its business associates to gain a source of production in delivering products to consumers. Currently, conventional supply chain management is starting to be abandoned and turning to green supply chain management.

Previous study on Green Supply Chain Management (Zhu and Sarkis 2004) point out that the success of copmanies in implementing GSCM practices and achieving the targeted performance. In this study, there is still a need to examine the influence of Green Supply Chain Management on the business performance of mini mydro power plant, since there is technology, people and water factors of supply chain management jointly impact the company performance were unexplored as an Upstream Supply Chain, Business and Technical Process as an internal Supply Chain and Electricity Out Put send to On Grid Distribution. In this study, supply chain management is measured on the dimensions and indicator of upstream supply chain, Internal Supply Chain Management, and downstream Supply Chain is shown on the Table 1 below.

Table 1. Dimension and indicator of supply chain variable

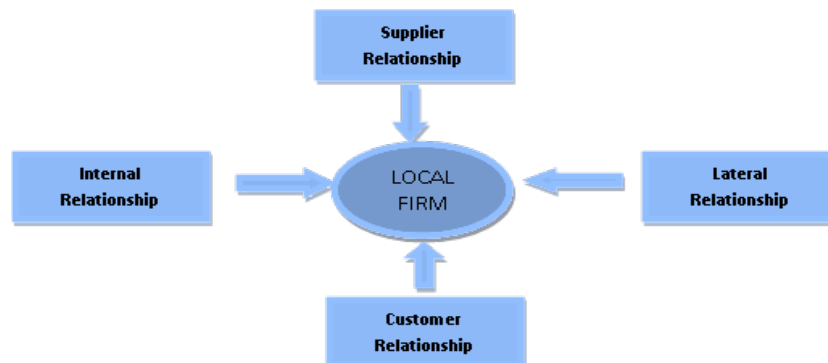
Dimensions	Indicator
Upstream Supply Chain	a. Catchment Area (ha) b. Water Volume Flow Rate at intake (m3/sec). c. Water Quality (Good, Normal, Poor). d. Civil Construction (Good, Enough, Bad).
Internal Supply Chain	a. Turbin Technology (Pelton/Keplan) b. Water Transport to Turbine (m3/sec) c. Breakdown Maintenance (week) d. Expertise Engineer (Task Performace, Specific Problem Solving) e. Log Book on Business Process
Down Stream Supply Chain	a. Power Produce/hour (MWh) b. Electricity Usage (KVAR) c. Connection Capacity at Local Grid (MWh) d. Connection & Network Services (Rp/Month)

1.2 Business partnership

According to Simo'es and Mason (2012) the company is part of a network of suppliers, customers and others involved in a relationship. Companies use collaborative business relationships with selected stakeholders to innovate and maintain market supply. There are several key factors in the success of business partnerships according to Ghzaïel and Akrouit (2012) which are grouped into three categories:

- factors related to partnership characteristics of both partners;
- factors related to partnership behavior;
- factors related to the characteristics of supply.

Figure 1. Types of Organizational Relationships Sumber: Cravens (2013, 196)



The concept of partnership in the opinion of Cravens (2013), includes a vertical relationship consisting of relationships with suppliers and customers and horizontal relationships consisting of lateral and internal partnerships. The types of companies partnerships according to Cravens (2013), shown as follows :

Vertical Relationship (Supplier Customer Relationship)

Suppliers and buyers of raw materials, substitutes and components, equipment, services and customer relationship are linked together in a vertical distribution channel. Vertical relationships can be transactional up to the business to business relationship. In the study on Mini Hydro Power Plant, water supplier from the small river is under control the regional government, it is necessary to permit the utilization of small river water by the regional irrigation services for long term usage (20 years). There are also civil works contractors and overseas technical turbine suppliers who have responsibility for construction and turbine maintenance during the operation of the plant. The only customer is PLN (Perusahaan Listrik Negara), Indonesia's Electric generation company which is marked by Price Purchase Agreement for 20 (twenty) years under Feed in Tariff Act as a Standardize Power Purchase (SPP) rates.

Horizontal Relationship (Internal and Lateral Relationship)

Internal relationship occurs between business units, departments and individuals to encourage optimal operational poses. A successful internal relations strategy requires strong leadership, team work, standardize business processes which can achieve the business performance target of the plant. Usually, there are more than

one mini hydro power plant in located alongside one river, mostly operated by different owner. To increase the overall power generating efficiency of all hydro power plants alongside one river, a good communication- and cooperating concept that is called lateral relationship. The dimension and indicator of Relationship such as follow:

Table 2. Dimension and Indicator of Relationship

Dimension	Indicator
Supplier Partnership	a. Partnership with Regional Water Agency b. Partnership with community c. Partnership with civil work contractor d. Partnership with technology agency
Customer Partnership	a. Price Purchase Agreement b. Interconnection Capacity (MWh)
Internal Partnership	a. Functional Team Work b. Internal Collaboration c. Individual Relationship
Lateral Relationship	a. Joint Operation b. Technical Service Assistance c. Outsourcing

1.3. Business performance

According to Hubbard and Beamish (2011), the type of organization affects the type of performance measurement. In private companies, performance measures are: market share, sales, net profit, growth, ROA, ROE, customer satisfaction, efficiency, and quality. Matic and Jukic (2012, 199) suggest "Business performances are indicator of how well does organization accomplish its goals (Ramanujam 1986 in: Lin and Kuo 2007, 1069).

Table 3. The business performance measurement model

Non- Financial Business performance measure	Financial Business performance measure
1. Customer satisfaction; 2. Quality of products and/or services; 3. Market share; 4. Growth of sales; 5. Reputation of organization; 6. Employees' satisfaction with their jobs; 7. Organizational innovativeness.	1. Return on assets (ROA); 2. Return on equity (ROE); 3. Operative profit.

Source : Matic (2012, 281)

David (2013) measured performance by: Return on Investment (ROI), Return on Equity (ROE), Profit Margin, Market Share, Debt to Equity, Earnings per share, Sales growth, Assets growth.

1.4 Previous research

Lia, Ragu-Nathan, Ragu-Nathan, Rao (2006) found that higher levels of SCM practice lead to increased competitive advantage and improved organizational performance.

Clement, Clement, Joseph (2013) suggests that the performance of a company with partnership is better than a single-ownership company. In addition, Agus and Hassan (2012) demonstrate that the practices of strategic suppliers' partnerships and their implementation have significant relationships with product quality performance and business performance.

2. Methodology

The method used in this study is explanatory survey. The type of research used is verification. Scope of observation time in this study is cross section, meaning that information or data obtained is the result of research conducted at one particular time that is in 2017.

The unit of analysis is the micro hydro power plant industry with Price Purchase Agreement (PPA) in West Java where the observation unit is the management of the company. The target population is all companies belonging to the micro hydro power plant industry group. Based on secondary data, there are 33 companies. Because of the small population size, the data collection method is done by census. The analytical approach used is Partial Least Square (PLS).

3. Result and discussion

3.1 PLS Result

Table 4. Test of outer and inner model

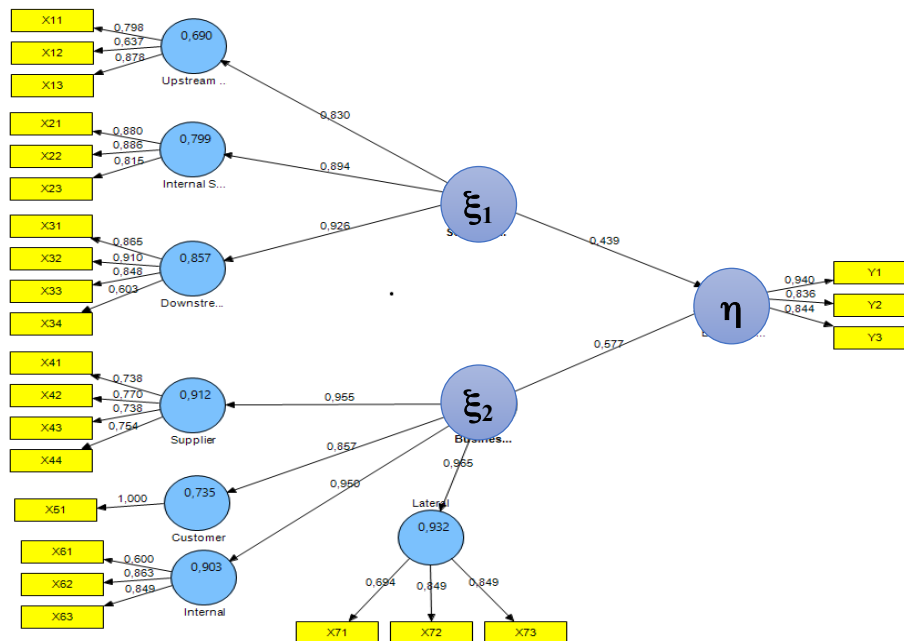
Variable	R Square	Cronbachs Alpha	Composite Reliability	AVE	Q square
Supply Chain Management		0.896	0.916	0.524	0.496
Business Partnership		0.921	0.933	0.560	0.551
Business Performance	0.861	0.845	0.907	0.765	0.508

Source: SmartPLS 2.0

The table show that the value of R² of business performance as endogenous variable in the strong/high criteria (>0.67), and the value of Q square is in the large criteria (>0.350), so it can be concluded that the research model is supported by the empirical condition or the model is fit.

The result of measurement model of dimensions by its indicators show that the indicators are valid which the value of t<2.04 (t table at α = 0.05). The result of measurement model of latent variables on their dimensions show to what extent the validity of dimensions in measuring latent variables. The next figure shows the complete path diagram.

Figure 2. Complete path diagram of research model



3.2 Structural model

Based on the research framework, then obtained a structural model as follow:

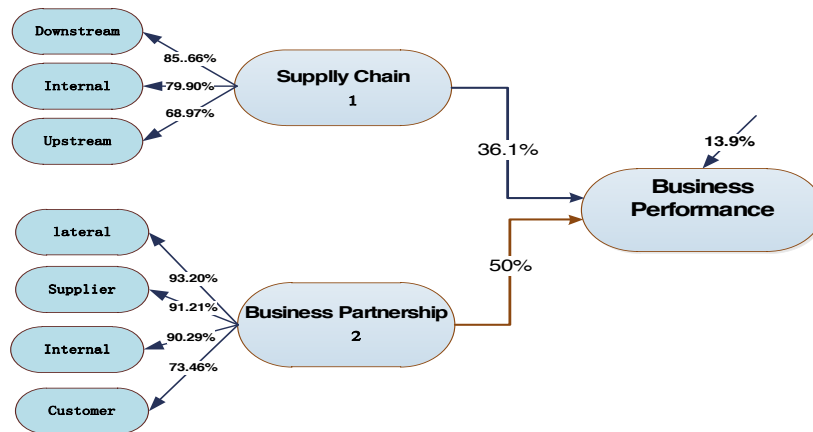
$$\eta = 0.439\xi_1 + 0.577\xi_2 + \zeta_1 \tag{1}$$

where: η = business performance; ξ_1 = supply chain management; ξ_2 = business partnership; ζ_i = residual.

The table show that partially, Supply Chain Management and Business Partnership affect significantly to Business Performance, which is Business Partnership has a greater influence (50%).

Based on hypothesis testing result, will describe the Research Model Finding as follow:

Figure 3. Research finding



3.3. Discussion

The research findings show that supply chain management and business partnership have the effect on business performance. Business partnership has greater influence than supply chain management in improving business performance in business units of micro hydro power plant in West Java.

Lateral partnership play a major role in encouraging business performance, then supported by supplier partnership, internal partnership and customer partnerships. Lateral partnerships can be done through joint operations, joint ventures, and outsourcing.

While on the aspect of supply chain management, it is known that Downstream Supply Chain is more dominant aspect in boosting business performance. Downstream Supply Chain covers all activities that involve the delivery of electricity to the PLN Interconnection station. In the downstream supply chain, the main concern is directed to water volume m³/second transporting to turbin and generator at powerhouse.

The findings of this study indicate that business partnership plays a dominant role in encouraging business performance, supporting Clement's Clement, Joseph (2013) which indicates that the performance of firms with partnership is better than single-ownership firms. In addition, Agus and Hassan (2012) demonstrate that strategic supplier partnership practices and their implementation have significant relationships with product quality performance and business performance.

Conclusion and recommendation

Conclusion

From the result of hypothesis testing, can be concluded that supply chain management and business partnership have an effect on business performance. Business partnership has a greater impact rather than supply chain management in improving business performance in business units of micro hydro power plant in West Java.

Recommendation

For the management of the business unit of micro hydro power plant, the findings of this study can be used as input to improve business performance through the improvement of business partnership implementation especially lateral partnership supported by better implementation of supply chain management.

For those who interested in researching the micro hydro power plant business unit, the findings of this research can be used as a framework for preparing the premise.

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The Current State of Affairs with Regard to the Effective Management of Human Capital in Agricultural Enterprises

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Abstract:

This paper explores the current state of affairs in terms of the effective management of human capital in agricultural enterprises in the Republic of Kazakhstan. Since human capital plays a major role in an enterprise's economic activity, it is how efficiently this capital is managed that the development level of agricultural enterprises will always largely depend on. The authors examine some of the key schools of thought related to human capital management theory. The paper shares the findings from computations of the coefficient of the efficiency of human capital management in Aktyk Agrofirma JSC, Rodina Agrofirma LLP, and Novokubanskoye LLP. The authors substantiate the significance of investment in human capital with the findings from their calculations in respect of Rodina Agrofirma LLP, which devotes a great deal of attention to investing in personnel. In the period 2015–2017, this agricultural enterprise invested as much as 313,300,000 tenge towards human capital development.

Keywords: human capital; management; agricultural enterprise; labor; schools of thought; efficiency; agrofirma; investment.

JEL Classification: O10; O13

Introduction

One of the key factors for the efficient operation and sustainable development of agriculture is human capital and its effective management. In Kazakhstan, the development of human capital is taking on special relevance at this time in a climate of the republic's shift to innovation-driven development.

Human capital in agriculture has a dual structure. On the one hand, it is a set of accumulated knowledge, competencies, skills, and experience which can be put to effective use to ensure boosts in the competitiveness of agricultural enterprises and their susceptibility to innovation. On the other hand, human capital may also be viewed as a set of capital assets that can be created through the use of certain elements of an individual's human capital, *i.e.* labor, intellect, *etc.*

The term 'human capital' came into wide scholarly use in the mid-1960s. Issues of assessing human capital have been explored extensively by both Russian and foreign scholars. Foreign best practices related to the development of human capital view human capital, alongside organizational capital and consumer capital, as a component of intellectual capital.

The operation of the human capital management system in many foreign countries is grounded in principles of quality control. Quality control, as a system of management, represents the logical continuation of the

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development of technology for managing diversified holdings. This circumstance makes it worthwhile to examine the phenomenon in greater detail (Tatulov 2010). Today, human capital management theory is characterized by a set of specific approaches, which are presented in Figure 1. An analysis of the conceptual tenets of various schools of management with respect to human capital (Figure 1) helps draw the conclusion that all these schools lay an emphasis on the development of subject-and-object relations (Zaitseva 2012).

Figure 1. Schools of thought associated with human capital management theory.

SCHOOLS OF THOUGHT CONCERNED WITH HUMAN CAPITAL MANAGEMENT THEORY	
School of scientific management	The focus is on investing a company's personnel with individual duties, employing stimulating methods of influence on one's work performance, time-tracking production processes to help save time and resources at each stage of the production process, and implementing work standardization, with effective human capital management believed to necessitate the use of authoritarian methods of management.
Classical school of management	The focus is on adopting universal principles of management with regard to planning the company's activity, organizing the company's management processes, issuing directives, coordinating these directives with company members, and administering control over the execution of planned activities. It is believed that personnel, who own the company's actual human capital, can and must take part in working out the job requirements to the company's management team.
School of bureaucratic management	The key tenet is that as part of the job requirement development process there takes place the identification of those who own human capital. This approach favors the following: hierarchical subordination of personnel; uniform methods of human capital management; methods of substitution; periodic personnel performance appraisals. It is believed that this helps facilitate the development of human capital, i.e. there are opportunities for career growth. The school is also in favor of documenting production processes to reduce production downtime.
School of human relations and behavioral science	The focus is on that people's intellectual efforts are natural costs, and are associated with a specific human capital carrier, with an emphasis on the development of the personal abilities of human capital subjects. Representatives of this school of thought have developed various ways of optimizing the structure of corporate relationships to facilitate future boosts in labor productivity and the work satisfaction of the company's personnel.
Social systems school	It is believed that human capital subjects perform their actual professional duties within the system of social relations. Their work activity has an effect on the structure of thinking and behavior of human capital carriers. The owner of human capital, in turn, is viewed by the school as the central link within the system of production relations. Representatives of this school of thought have insisted on the need to establish an interrelationship between the needs of human capital carriers and the preferences of corporate relations subjects.
Social approach to management school	The key tenet is that a company needs to streamline its methods of human capital management and correlate them with its resources and consumer demand.

The development of human resources incorporates ensuring the professional and social adaptation of newly hired personnel and training personnel, *i.e.* teaching personnel the skills facilitative of boosts in labor productivity (Sinyanskaya 2014, Storey 2001). While enhancing work organization and working conditions helps cultivate in personnel a sense of satisfaction, boost the quality of work, reduce absenteeism, and lower the attrition rate. Also, to ensure the effective management of human capital, it may help for a company's executives to combine in practice different theoretical postulates of human capital management and choose the more productive model of management (Nevretdinova 2015).

The present-day concept of human capital management is based on various management methods and principles, economic controls, and incentives. There is the concept of human capital management from the viewpoint of subsystem theories, where agricultural workers are a crucial subsystem, with a focus on two groups of systems: the economic one, which is represented by the process of production, exchange, and future distribution (redistribution) of material goods and in which agricultural personnel are perceived as labor resources, and which

implies organizing people; the social one, which is represented by relations among people, their cultural/moral and spiritual values, various social groups, and various aspects of personal development and in which employees are viewed as one of the most significant elements in the system, each with their unique personal qualities (Smirnov, Bondarev and Romanchin 2003, Armstrong 2008).

1. Methods

In the literature, to assess and conduct a more in-depth analysis of the efficiency of human capital management they use the method of comparing overall expenditure on human resources at agricultural enterprises, across a set of categories, and the average expenditure on personnel in the labor market. Thus, the coefficient of the efficiency of human capital management, across a set of categories, is calculated via the following formula:

$$HCMEC_c = \frac{PE_e}{PE_m} \quad (1)$$

where: $HCMEC_c$ is the coefficient of human capital management efficiency of a certain category of agricultural workers based on overall expenditure (payroll, social disbursements toward human resources, and additional disbursements) on human capital; PE_e is the average expenditure on a category of agricultural workers at the enterprise; PE_m is the average expenditure on a group in the market (e.g., the sectoral, regional, national, or international market).

The resulting indicator of the efficiency of human capital management is the average coefficient of the human capital management. The average coefficient of the efficiency of human capital management in an agricultural enterprise is the sum of the products of the size of the human capital of a certain group and the coefficient of the efficiency of managing the human capital of that category divided by the overall size of human capital in the agricultural enterprise:

$$HCMEC_e = \sum \frac{N_c * HCMEC_c}{N} \quad (2)$$

where: $HCMEC_e$ is the average coefficient of the efficiency of human capital management in an agricultural enterprise; N_c is the size of a personnel category; $HCMEC_c$ is the coefficient of the efficiency of managing the human capital of a certain category; N is the size of human capital in an agricultural enterprise.

If, as a result of an analysis, the average coefficient of the efficiency of human capital management in an agricultural enterprise is greater than 1, its qualitative level in the enterprise is above the market's average level and the labor market will not be able to provide quickly a substitution for required specialists. But if the coefficient is below or equals 1, the qualitative level of human capital is below the market's average level and the market can provide quite quickly the necessary workforce when the unemployment rate is high and more slowly when the unemployment rate is low (Garbuzyuk 2015).

2. Results

Assessing the efficiency of human capital management implies comparing the situation in the sector with what is going on in the market. This enables an agricultural enterprise to conduct comparative analysis of its expenditure on human resources and compare it with the average expenditure that exists in the labor market, i.e. expand the indicators of its competitiveness and social responsibility. Essentially, this kind of assessment makes it possible to conduct analysis of the degree to which an agri-enterprise's human capital management system matches the conditions in the market.

Below is an assessment of human capital management in a company based on calculations and comparisons of overall expenditure on human capital in Aktyk Agrofirma JSC, Rodina Agrofirma LLP, and Novokubanskoye LLP (Tables 1, 2, and 3).

Table 1. Indicators of the Efficiency of Human Capital Management in Aktyk Agrofirm JSC (2015–2017)

Personnel group (category)	Number, people	Total expenditure on human capital at the enterprise, thousand tenge	Total expenditure on human capital in agriculture in Akmola region, thousand tenge	HCMEC _c	$\frac{N_c * HCMEC_c}{N}$
Executives	16	9,207.656	313,257	0.0293	0.0023
Specialists	28	16,534.18	1,532,697	0.0107	0.0015
Workers	154	91,284.5	9,419,254	0.0096	0.0075

Note. Computed and compiled by the authors based on data from Aktyk Agrofirm JSC.

Thus, based on the authors' calculations in respect of Aktyk Agrofirm JSC, Rodina Agrofirm LLP, and Novokubanskoye LLP, the coefficient of the efficiency of human capital management across the categories of employees, computed via the above two formulas is as follows:

Aktyk Agrofirm JSC:	$HCMEC_e = 0.0023 + 0.0015 + 0.0075 = 0.0139$
Rodina Agrofirm LLP:	
- exclusive of the benefits package:	$HCMEC_e = 0.002 + 0.001 + 0.0039 = 0.042$
- inclusive of the benefits package:	$HCMEC_e = 0.5717 + 0.3234 + 8.8202 = 9.7154$
Novokubanskoye LLP:	$HCMEC_e = 0.0000001 + 0.0093 + 0.00666 = 0.00759$

Table 2. Indicators of the efficiency of human capital management in Rodina Agrofirm LLP (2015–2017)

Personnel group (category)	Number, people	Total expenditure on human capital at the enterprise, thousand tenge		Total expenditure on human capital in agriculture in Akmola Region, thousand tenge	HCMEC _c		$\frac{N_c * HCMEC_c}{N}$	
		Exclusive of the benefits package	Inclusive of the benefits package		Exclusive of the benefits package	Inclusive of the benefits package	Exclusive of the benefits package	Inclusive of the benefits package
Executives	20	19,372.72	4,334,500	313,257	0.0618	13.8368	0.002	0.571
Specialists	33	32,233.61	7,212,025	1,532,697	0.021	4.7054	0.001	0.32
Workers	427	417,246.2	93,355,661	9,419,254	0.044	9.9111	0.039	8.820

Note. Computed and compiled by the authors based on data from Rodina Agrofirm LLP.

As is evidenced by Tables 1–3, in Aktyk Agrofirm JSC, Novokubanskoye LLP, and Rodina Agrofirm LLP (exclusive of the benefits package) the average coefficient of the effectiveness of human capital management is below 1, which puts the overall qualitative level of human capital in relation to overall expenditure on human resources below the market's average level, serving as testimony to insufficiently effective human capital management in these agricultural enterprises.

In Rodina Agrofirm LLP (inclusive of the benefits package), the coefficient of the effectiveness of human capital management across the categories is above 1 with workers, which is testimony to these categories of human capital surpassing the market's average in qualitative level. The average coefficient is 9.17, which puts the overall qualitative level of human capital in relation to overall expenditure on human capital above the market's average one.

Table 3. Indicators of the Efficiency of Human Capital Management in Novokubanskoye LLP (2015–2017)

Personnel group (category)	Number, people	Total expenditure on human capital at the enterprise, thousand tenge	Total expenditure on human capital in agriculture in Akmola Region, thousand tenge	HCMEC	$\frac{N_c * HCMEC_c}{N}$
Executives	4	1,354.003	313,257	0.0043	0.0000001
Specialists	32	11,185.25	1,532,697	0.0073	0.0009300
Workers	210	74,175.84	9,419,254	0.0078	0.0075000

Note. Computed and compiled by the authors based on data from Novokubanskoye LLP.

3. Discussion

These indicators attest to an enterprise's current position in the labor market and reflect its overall expenditure on human capital. Similar computations by researcher I.V. Garbuzyuk have produced an average coefficient of the effectiveness of human capital management of 1, which puts the overall qualitative level of human capital above

the market's average one (Garbuzyuk 2015). That is, Aktyk Agrofirma JSC and Novokubanskoye LLP may need to improve their human capital management with a focus on the following: the benefits package, education, work organization, and optimizing the use of human capital factoring in seasonality in agriculture, which ultimately should help stimulate human capital productivity and result in greater revenue for the agricultural enterprise.

Investing in human capital (focusing on the benefits package) plays a significant role, clear testimony to which is a set of calculations carried out by the authors with respect to Rodina Agrofirma LLP, which is known for its major focus on investing in personnel. In the period 2015–2017, the company invested 313,300,000 tenge toward the development of its human capital. As an example, here is a breakdown of investing by Rodina Agrofirma LLP: student education – 12,000,000 tenge; building a children's playground and exercise machine complexes – 33,000,000 tenge; material assistance for funerals, medical treatment, weddings, childbirth, and veteran benefits – 20,000,000 tenge; gifts for kids on New Year's Eve – 1,000,000 tenge; free meals for kids at school and kindergarten – 16,000,000 tenge; trips to recreation camps – 3,000,000 tenge; food benefits for machinery operators – 5,000,000 tenge; sponsor assistance for organizations – 16,000,000 tenge; cofunding the construction of 8 residential homes via the 'Employment 2020' program – 32,000,000 tenge; beautifying the district and taking care of road maintenance – 100,000,000 tenge; occupational safety – 5,800,000 tenge; support for the development of culture and education – 23,500,000 tenge; support for the development of sports – 6,000,000 tenge; building a roofed hockey rink – 40,000,000 tenge.

A key benefit of investing in human capital is that there ensues a lasting economic/social effect both for agricultural enterprises and for society at large. The sooner one invests in personnel, the sooner that will start paying off through their improved performance, while it is also worth remembering that most robust long-term investments are known to result in greater revenue in the near future. Based on the above, the essence of investing in human capital implies the investor engaging in a purposeful activity. Investing in human capital cuts across the following areas: healthcare (fostering healthy lifestyles, cultivating stress resistance, helping develop a stable nervous system, etc.); education (helping get a diploma, fostering professional development, providing on-the-job training, etc.); research and development; cultural/moral investments; etc. The above types of investment may help boost personnel's human potential, and, as a consequence, help improve the volume and caliber of an agri-enterprise's labor potential. This makes robust investing in human capital all the more relevant for agricultural enterprises.

As for the rest of the agricultural enterprises under analysis, in the period 2010–2015 Aktyk Agrofirma JSC invested in (expended on) human capital an average of 117,026.33 thousand tenge, with the bulk of that being payroll (around 97%) and the rest going to: housing for personnel, social protection for personnel, personnel training and retraining, cultural/educational activities, fitness activities, etc. A similar situation was observed in Novokubanskoye LLP. The findings from the above calculations revealed poor management of human capital in these agricultural enterprises, which signaled the need for and added relevance to investing in enterprises' labor resources. For instance, by reference to the experience of Rodina Agrofirma LLP, with its average annual volume of investment in human capital registered at 200,833,333 thousand tenge, the authors computed an approximate annual volume of investment based on the overall volume of the enterprise's output, which led them to draw the following conclusions: a suggestion for Aktyk Agrofirma JSC is to invest 78,328,070 thousand tenge or 371,223 thousand tenge per worker, and for Novokubanskoye LLP – 38,096,684 thousand tenge or 170,837 thousand tenge per worker. However, these investments are just the minimum of what may need to be expended on human capital, and will pay off not straightaway but after the passage of a certain period of time. It is worth noting that the quality of human capital depends not only on investing in the development of the workforce as an essential production force. The caliber of the workforce is also governed by a variety of other factors, including systemic ones, motivational ones, proper work organization, etc.

Conclusion

Thus, one of the key characteristics of running agricultural production lies in that agriculture is distinguished by a complex, extremely inhomogeneous, and mobile organizational/production structure, which reflects on the actual way human capital is formed and managed. Human capital in agriculture is the capacity of employable residents involved with agriculture to turn out food products and agricultural raw materials.

The management of human capital in agriculture is a complex system of interrelationships and interdependencies among various factors influencing the outcomes of production/economic activity by agricultural enterprises.

A special factor for the positive economic performance of agricultural enterprises is continual investing in human capital. A key benefit of investing in human capital is that there ensues a lasting economic/social effect both

for agricultural enterprises and for society at large. The sooner one invests in personnel, the sooner that will start paying off through their improved performance. Investing in human capital may cut across the following areas: education and on-the-job training; healthcare; motivation; basic research and development; environmental protection and healthy lifestyles; culture and leisure. The above types of investment may help boost personnel's human potential, and, as a consequence, help improve the volume and caliber of an agri-enterprise's labor potential.

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Tax Amnesty Establishment, Abnormal Return and Trading Volume Activity in Indonesia Stock Exchange

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Abstract:

The aims of this study are to examine the impact of Tax Amnesty establishment in Indonesia year 2016-2017 on the average of abnormal return and the average of trading volume activities on Indonesia Stock Exchange (BEI) before and after its establishment. This study utilized event study method by doing paired sample t-test. The data used was secondary data and was obtained from Indonesia Stock Exchange. The population consisted of 45 companies listed on Indonesia Stock Exchange LQ-45 and the samples were selected by applying purposive sampling. The results of this study indicated that there was no significant different on abnormal return before tax amnesty establishment, while in contrast there was a significant different on abnormal return after tax amnesty establishment. Despite the facts from abnormal return results, trading volume activity results an absence of significant different before and after tax amnesty establishment. These results generally tell that tax amnesty establishment was a good news for investors before, but then the information content had been spreading very fast which lead investors were able to interpret the information and result all the possibilities already predicted. These facts showed the reason of investors reacted differently before and after tax amnesty establishment.

Keyword: tax amnesty; abnormal return; trading volume activity.

JEL Classification: E44; H21; H27

Introduction

As one of economic instrument, capital market cannot be separated from various environment effects which cover economic factors from internal or external of the company and non-economic factors such social, politic, and other factors which can disturb national stability in a country. As stated by Putri (2015, 1) that capital market benefits companies as a medium to get funds from investors and does an important role in the national economics system. It is connected to the two functions of stock market which are economic function and financial function. Economic function means that the stock market gives facilities that take two interested parties, such as investors and those who need funds. The stock market as a financial function means that the stock market gives possibilities and opportunities to get return for the owner of the funds, according to the characteristics of the selected investments.

Capital market will be affected if there is event content information to investors. Capital market is become sensitive to the event around when capital market role become more important to the growth of economy (Sanjiwani and Jati 2017, 1). Information is the primary needs by investors in capital market. Investors can assess how the performance prospects of an issuer so they can get an illustration regarding the risks as well as expected return due to funds or capital invested if the information content relevance value (Sanjiwani and Jati 2017, 2).

Information which relate to market conditions are such political news, policy related to capital market, and national economic policy for example tax amnesty policy. On June 28th 2016 there has been a national event, the

announcement of tax amnesty policy by the government through Law No. 11 Year 2016. This policy is a breakthrough in the field of taxation which aims to taxpayers who had difficulty in solving the problem of taxation. In addition, the purpose of tax amnesty is to repatriate or bring back the wealth of Indonesian citizens which have been kept overseas. This policy can also increase the number of domestic investors investing in capital markets and other investment instruments. This is because the citizens of Indonesia which is also a taxpayer and following the tax amnesty program will repatriate his property to Indonesia.

Director of Corporate Assessment of PT BEI SamsulHidayat (2016) said tax amnesty is expected to improve the macroeconomic condition of Indonesia. Tax amnesty also contributes positively to the company because the company's financial report looks better and this tax amnesty policy increases investor confidence in stock investing. In fact, the IDX (Indonesia Stock Exchange) Composite Index from the beginning of the news, its legalization, until the end of tax amnesty period III were experienced an upward trend. On the announcement date of tax amnesty June 28th 2016 IDX Composite Index has increased to 4,882.17 from the previous 4,834.57, and reached 5,568.31 point at the end of tax amnesty period III on 31 March 2016.

The increase of IDX Composite Index is estimated to cause capital market react to the event which lead to a significant changes in abnormal return and trading volume activity. As we can see in Table 1, abnormal return trend was fluctuated drastically on June 28th 2016 (D-0), it fell to -0.008715908 and jumped to 0.026354113 in next day (D+1). It is the same on trading volume activity which showed its significant changes from 0.002088195 in (D-4) to 0.040846432 in (D-3), while the other day the trading volume activity was statistically normal.

Table1. Average Abnormal Return and trading volume activity before and after tax amnesty announcement date

No.	Date	Event Period	Abnormal Return	Trading Volume Activity
1	June 21 st	D-5	0.006061792	0.002210468
2	June 22 nd	D-4	0.000145682	0.002088195
3	June 23 rd	D-3	-0.000465870	0.040846432
4	June 24 th	D-2	-0.000465870	0.002027683
5	June 27 th	D-1	0.003723307	0.001440676
6	June 28 th	D-0	-0.008715908	0.002161411
7	June 29 th	D+1	0.026354113	0.002122924
8	June 30 th	D+2	0.012915534	0.002108029
9	July 1 st	D+3	-0.009034245	0.001232170
10	July 11 th	D+4	0.013427467	0.002417586
11	July 12 th	D+5	0.016402819	0.002227162

Source: Data Processed 2017

Based on these situations, it can be concluded the presence of tax amnesty in the country was able to cause capital market to react. Therefore, eventstudy can be used to test whether an event occur within the country has information content that impacts the capital market. Market reaction is identify through the change of stock price (closing price) listed in IDX, by using abnormal return indicators (Lidya *et al.* 2017). Trading volume activity (TVA) can also be used as an indicator to estimate market reaction, by comparing the number of shares traded with the number of shares outstanding (Putri 2015, 3).

Research on tax amnesty in Indonesia is increasingly rise, since this event is successfully affected the market. Research done by Sanjiwani and Jati (2017) which conducted study about Market Reaction to Tax Amnesty Policy on Its Announcement and at the end of Tax Amnesty First Period. The Paired Sample T-Test and the Wilcoxon signed rank test showed that there were no differences in average abnormal return obtained by the investor during study period. Another event study research done by Lidya *et al.* (2017) about the Investor reaction to the announcement of tax amnesty policy on July 1st 2016. The research found that abnormal return and trading volume activity showed varying results but was not statistically significant. While test results a difference t-test showed that there is no significant difference during study period.

The difference result conducted in previous researches was leading an interest of the author to re-examine whether political event such Tax Amnesty has information content which affected investors decision in capital market to react. The purpose of this study is to examine:

- impact of tax amnesty establishment before and after tax amnesty announcement date on abnormal return;
- impact of tax amnesty establishment before and after the end of tax amnesty period iii on abnormal return;

- impact of tax amnesty establishment before and after tax amnesty announcement date on trading volume activity;
- impact of tax amnesty establishment before and after the end of tax amnesty period iii on trading volume activity.

Based on the explanation above, the researcher was interested to review further this study by using event study to see investor reaction through abnormal return and trading volume activity.

1. Literature review

Abnormal Return

Abnormal return is difference between realized return with expected return. Normal return is expected return or return hoped by the investors. Lasmanah and Bagjah (2014, 568) also state that in other word, abnormal return is excess of realized return to normal return. Abnormal return can occur due to certain events, such as national holidays, beginning of the month, beginning of the year, uncertain political condition, phenomenal events, stock split, initial shares public offering, *etc.* (Putri 2015, 11).

Trading Volume Activity

Trading volume activity is the ratio between the number of shares traded at a certain time against the number of shares outstanding at a particular time (Agustin, Santoso and Firmansyah 2017). The development of trading volume activity reflects the strength between supply and demand which is a manifestation of investor behavior. The increase of trading volume activity means there is an increase in trading activity by the investors.

Tax Amnesty

Government regulations on taxation which provide the abolition of taxes that should be owed by paying a ransom on a certain amount that aims to provide additional tax revenue as well as an opportunity for tax evaders to be honest taxpayers is called tax amnesty. This is expected to encourage the increased voluntary compliance of taxpayers in the future (Hutagaol 2007).

Indonesian parliament passed the tax amnesty bill into Law No. 11 2016 on June 28th 2016 with enactment on July 1st 2016. This tax amnesty is consisting into three periods, there are: Period I from July 1st 2016 - August 31st 2016; Period II September 1st 2016 - 31st December 2016; and Period III from January 1st 2017 - March 31st 2017. As written in Tax Amnesty Law, the objective of the program can be delivered into three points. First, to improve domestic liquidity, increasing the Indonesian Rupiah exchange rate, to minimizing the interest, and a booster in investment. Second, to improve tax reformation into a taxation system that has more fairness and has more taxation data that is valid, comprehensive and integrated. Third, to increase revenue from the tax, this in between many, it will be spending for expenses on infrastructure/contruction.

The relationship between Tax Amnesty and Abnormal Return

Relationship between before and after tax amnesty event with abnormally return is related to signaling theory which stated that signal from a good information from external company will directly affect the fluctuation of price stock. The existence of tax amnesty program has become a marker of IHSG rises over the past few weeks. The increased of investor trust in domestic economic conditions triggered a rise in stock index. The repatriation fund required to be in Indonesia for a minimum of three years with rates ranging from 4% to 10%.

Global Financial Integrity estimates that there are approximately US \$ 180 billion or around Rp 2,400 trillion which has flown from Indonesia since 2004. Bank Indonesia (BI) also estimates that around Rp 560 trillion of funds can be repatriated and about Rp 46 trillion additional tax revenue. In countries which have less than 0.2% of investor, most of the repatriation funds are likely to flow into the real estate sector. The other sectors banking, the increase of liquidity commercial banks will increase the stock performance if it successfully distributed to the program 1 million houses, infrastructure projects and agriculture and maritime sector. In contrast, if funds fail to be distributed to productive assets, then the cost of bank capital becomes expensive. The third sector is infrastructure; it is estimated that some repatriation funds flow for infrastructure projects. B (Atmaja 2016) by this fact, investors are able to estimate the prospect and lead them to trust more companies they will invest to.

The relationship between Tax Amnesty and Trading Volume Activity

Tax amnesty argued would improve company's share volume composition relationship between before and after tax amnesty event to trading volume (Lasmanah and Bagja 569, 2014). Trading range theory is a tool to recognize the share price at desired price range and the more possible for investor to buy in large number. Refers to research

conducted by Liana (2011), which shows that the change of Income Tax Law has a significant effect on stock trading volume. The decrease of income tax rate in accordance with the 2008 Income Tax Law had an effect on the company to conduct stock trading.

2. Methodology

Research design

Type of research used in this study is an event study method. The event study method used to investigate the market reaction to the information content as published announcement. Market reaction can be reflected by positive abnormal return as good news and negative abnormal return as bad news (Tandelin 2010, 565).

Population and sample

Population in this research is all the stock listed in LQ-45 during tax amnesty establishment and results of 42 samples using purposive sampling with criteria all stocks which consistently listed in LQ-45 index listed in Indonesia Stock Exchange during study period. Based on the criteria, it was obtained 41 stocks which consistently listed. The reason was because the change of LQ-45 index period February-July 2016 to August-January 2017 Elnusa Tbk. (ELSA) has been substitute by Tower Bersama Infrastructure. Then, from August-January 2017 to February-July 2017 followed by Global Mediacom Tbk. (BMTR), Matahari Putra Prima Tbk. (MPPA), and Siloam International Hospital Tbk. (SILO) who have been substituted by PT. Bumi Resources Tbk. (BUMI), PT. XL Axiata Tbk. (EXCL) and PT. PP Properti Tbk. (PPRO).

Resource and data collection technique

The resource of data used in this study was secondary data, which was obtained from IDX. The data required in this research was daily stock trading data of stocks listed as sample in this study which make transaction in Indonesia Stock Exchange within study period June 21st 2016 until April 5th 2017.

Event period

The length of period in this study is 11 days which consist of 5 days before the event, the day of the event, and 5 days of the event. This research is to examine tax amnesty on its announcement date also at the end of tax amnesty period III. So, the total days of this research are 22 days.

2.1. Variable operationalization

Dependent Variable (Y)

According to Sekaran and Bougie (2013, 69) "dependent variable is the variable of primary interest to the researcher". Dependent variables in this study are abnormal return and trading volume activity.

Abnormal Return (Y1) - is a gap number between real return with expected return. Generally, the abnormal returns discuss in the study were observed price reaction or market efficiency. Hence, abnormal return is excess of realized return to normal return (Lasmanah and Bagja 2014, 568) The following formulas will explain about the operationalization of variables (Y1) used in research:

$$AR_{i,t} = E[R_{i,t}] - R_{i,t} \quad (1)$$

where: $AR_{i,t}$ is abnormal return of i-securities on t-event period; $E[R_{i,t}]$ is expected return of i-securities at all events of t-period; $R_{i,t}$ is actual return of i-securities in t-estimation period.

- a. The actual return is the returns that occur in time-t which represents the difference between the relative current price and the price before (t-1).

$$R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}} \quad (2)$$

where: $R_{i,t}$ is daily stock returns of i-securities in t-period; $P_{i,t}$ is Stock price for current time; $P_{i,t-1}$ is Stock price for previous time.

- b. Expected return is the return expectation that will be acquired by investors in the future. In this research, expected return was calculated by using Market Adjusted-Model. It is because this model estimates returns of securities equal to the return market index. Therefore, it is not necessary to use the estimation period.

$$E[R_{i,t}] = R_{M,i,t} \quad (3)$$

where: $E[R_{i,t}]$ is expected return of i-securities at all events of Period-t; $R_{M,i,t}$ is market return i-securities in the estimation period-t

- c. This research used IDX Composite Index as market return. The formula to calculate market return is as follow (Haryanto 2009):

$$R_{M,i,t} = \frac{IDX\ Composite\ Index_{i,t} - IDX\ Composite\ Index_{i,t-1}}{IDX\ Composite\ Index_{i,t-1}} \quad (4)$$

where: $R_{M,i,t}$ is market return of i-securities in t-estimation period; $IDX\ Composite\ Index_{i,t}$ = $IDX\ Composite\ Index$ in the t-period; $IDX\ Composite\ Index_{i,t-1}$ = $IDX\ Composite\ Index$ in the t-1 period.

Trading Volume Activity (Y2)

According to Lasmanah and Bagja (2014, 568) TVA is measure the volume of particular stock traded, indicates the ease of stock trading. The amount of trading volume variable determined by observing stock trading activity that can be seen through indicator Trading Volume Activity (TVA).

$$TVA_{i,t} = \frac{\sum stock-i\ traded\ at\ time-t}{\sum outstanding\ of\ stock-i\ at\ time-t} \quad (5)$$

where: $TVA_{i,t}$ is trading volume activities of i-securities traded at time-t

2.2. Independent Variable (X)

"Independent variable is one that influences the dependent variable in either a positive or negative way. In other words, the variance in dependent variable is accounted for by the independent variable" (Sekaran and Bougie 2013, 70). The independent variable in this study is Tax Amnesty.

Tax Amnesty (X) - can be explaining as a limited-time opportunity given by the government for a specific group of tax payer to pay a defined amount, in exchange for forgiveness of tax liability relating to a previous tax period or periods and without fear of criminal prosecution (Tanmalando 2016, 32). According to Director General of Tax, Tax Amnesty program is addressed for those who are tax payers which obligated to submit SPT (*Letter of Notification*) on PPh (*Income Tax*) are deserved to get Tax Amnesty.

Tax amnesty issued by the government in 2016 and has been regulated in Law No. 11 Year 2016 on the tax amnesty. This law has been approved by the President of the Republic of Indonesia on July 1st 2016 and enacted on July 18th 2016 (Rahayu 2017, 32). Tax amnesty is granted on the assets declared in the *SPHPP (Statement of Property for Tax Amnesty)* which had not been declared in the latest annual income tax return. The amount of redemption money varies depending on the period of declaration and is computed on the net asset value which comprises the undeclared assets less liabilities associated with the undeclared assets, the formula shown as:

$$\text{Redemption Money} = \text{Rate of Redemption Money} \times \text{Net Assets Value} \quad (6)$$

However, the declaration on onshore and/or offshore assets and repatriation of offshore assets are called as rates of redemption money. While, for entrepreneurs (SME) with revenue not exceeding IDR 4.8 billion per annum, not including employees and professionals, they will have a lower redemption rate. The rate of redemption money will be shown in Table 2 (Tanmalano 2016, 6).

Table 2. Redemption rate

	TA - Period I	TA - Period II	TA - Period III
Onshore assets declaration - Assets are retained in Indonesia for at least 3 years	2%	3%	5%
Offshore assets declaration - Assets are repatriated and invested in Indonesia by Dec 31 st 2016 or March 31 st 2017 depending on the redemption rate used, for at least 3 years.	2%	3%	5%
Offshore assets declaration - Without repatriation to Indonesia	4%	6%	10%
SME with revenue of IDR 4.8 billion:			
Total assets <= 10 billion		0.5%	
Total assets > 10 billion		2%	

Source: Mazar Magazine July – September 2016

3. Result and discussion

Before we test the hypothesis, firstly we need to do normality test to know its normality data. If the data is normally distributed then paired sample t-test is used to test the hypothesis, but if the data is abnormally distributed then wilcoxon signed rank test will be used.

The first hypothesis in this study is "Tax Amnesty establishment in Indonesia year 2016-2017 affects the average of abnormal return on stocks in LQ-45 index listed on Indonesia Stock Exchange before and after tax amnesty announcement date".

Table 3. Abnormal return normality test on tax amnesty announcement date

Variable	Sample	Kolmogrov-Smirnov Z	Asymp. Sig (2-tailed)	Criteria	Explanation
Abnormal Return Before	41	0.466	0.982	0.05	Normal
Abnormal Return After	41	0.445	0.989	0.05	Normal

Table 4. Paired sample t-test on abnormal return on tax amnesty announcement date

Variable	Sample	t-test	Sig (2-tailed)	Criteria	Explanation
Abnormal Return Before	41	0.363	0.719	0.05	Not Significant
Abnormal Return After	41	-6.654	0	0.05	Significant

Paired sample t-test on the table 4 shows that Abnormal Return before announcement date results t-value 0.363 with significance 0.719. Because of significance $0.719 > 0.05$, then the result showed H_0 is accepted which means there is no difference on average abnormal return before tax amnesty announcement date. But paired sample t-test of abnormal return after tax amnesty announcement date shows t-value -6.654 with 0 significant. Because of $0 < 0.05$ the interference for abnormal return after tax amnesty announcement date has significant result or H_0 is rejected which means there is significant difference of average abnormal return.

This test shows that there is no difference on average abnormal return before tax amnesty announcement date which means the declining or incrementing were not applied to all stocks listed as sample at once, it must be declining stock price and incrementing stock prices under certain subsector which directly or indirectly affected by the phenomena. While the significant result of abnormal return after announcement date on these stocks were showed that these stocks price were incrementing due to phenomena. The fund collected from tax amnesty program was distributed through subsectors which lead them get to more fund in managing their production. By this additional fund, they will perform better such increasing the production and result more promising return to invest.

The second hypothesis in this study is "Tax Amnesty establishment in Indonesia year 2016-2017 affects the average of abnormal return on stocks in LQ-45 index listed on Indonesia Stock Exchange before and after the end of tax amnesty period III".

Table 5. Abnormal return normality test at the end of tax amnesty period III

Variable	Sample	Kolmogrov-Smirnov Z	Asymp. Sig (2-tailed)	Criteria	Explanation
Abnormal Return Before	41	0.512	0.956	0.05	Normal
Abnormal Return After	41	0.531	0.941	0.05	Normal

Table 6. Paired sample t-test of abnormal return at the end of tax amnesty period III

Variable	Sample	t-test	Sig (2-tailed)	Criteria	Explanation
Abnormal Return Before	41	-0.928	0.359	0.05	Not Significant
Abnormal Return After	41	-1.482	0.146	0.05	Not Significant

Paired sample t-test on the table 6 shows that abnormal return before the end of tax amnesty period III results t-value -0.928 with significance 0.359. Because of significance $0.359 > 0.05$, then the result showed H_0 is accepted which means there is no difference on AAR before the end of tax amnesty period III. The same result also showed on AR after the end of tax amnesty period III which result t-value -1.482 with significance 0.146. Because of $0.146 < 0.05$ the interference for abnormal return after the end of tax amnesty period III has no

significant result or H_0 is accepted. The negative value on t-value shows that AAR before and after the end of tax amnesty period III lower than the ARR before the even period.

These result means that the declining or incrementing on stock price were not applied to all stocks listed as sample. It might cause by the information was quickly receive by the investors, the information has been predicted by the market, and investors were able to interpret the information.

The third hypothesis in this study is "Tax Amnesty establishment year 2016-2017 affects the average of trading volume activities on stocks in LQ-45 index listed on Indonesia Stock Exchange before and after tax amnesty announcement date".

Table 7. Trading Volume Activity normality on tax amnesty announcement date

Variable	Sample	Kolmogrov-Smirnov Z	Asymp. Sig (2-tailed)	Criteria	Explanation
TVA Before	41	0.477	0.977	0.05	Normal
TVA After	41	0.785	0.569	0.05	Normal

Table 8. Paired sample t-test of trading volume activity on announcement date

Variable	Sample	t-test	Sig (2-tailed)	Criteria	Explanation
TVA Before	41	-1.221	0.229	0.05	Not Significance
TVA After	41	-1.612	0.115	0.05	Not Significance

Paired sample t-test on the table 8 shows that TVA before announcement date results t-value -1.221 with significance 0.229. Because of significance $0.229 > 0.05$, then the result showed H_0 is accepted which means there is no difference on ATVA before tax amnesty announcement date. It also the same with TVA after announcement date which shows t-value -1.612 with significance 0.115. Because of $0.115 > 0.05$ the interference for TVA after tax amnesty announcement date has no significant result or H_0 is accepted which means there is no significant difference of ATVA.

Tax amnesty program was aimed to repatriate some amount of Indonesian fund which have been kept overseas. This program become such a good news for capital market in Indonesia since the capital market is a gateway for investors to repatriate their fund, it can be seen through IDX Composite Index which have an upward trend since tax amnesty announcement date. In fact, before announcement date investor tend do make sell-buy activity which lead trading volume increase. But then, the activity dominated by taking profit activity, taking profit lead trading volume activity become negative. These result average trading volume activities have no significant effect due to tax amnesty establishment.

The fourth hypothesis in this study is "Tax Amnesty establishment year 2016-2017 affects the average of trading volume activities on stocks in LQ-45 index listed on Indonesia Stock Exchange before and after the end of tax amnesty period III".

Table 9. Trading volume activity normality test at the end of tax amnesty period III

Variable	Sample	Kolmogrov-Smirnov Z	Asymp. Sig (2-tailed)	Criteria	Explanation
TVA Before	41	0.975	0.297	0.05	Normal
TVA After	41	1.045	0.224	0.05	Normal

Table 10. Paired sample t-test of trading volume activity at the end of tax amnesty period III

Variable	Sample	t-test	Sig (2-tailed)	Criteria	Explanation
TVA Before	41	0.909	0.369	0.05	Not Significant
TVA After	41	-0.373	0.711	0.05	Not Significant

The test of paired sample t-test on the table 10 shows that TVA before the end of tax amnesty period III results t-value 0.909 with significance 0.369. Because of significance $0.369 > 0.05$, then the result showed H_0 is accepted which means there is no difference on ATVA before the end of tax amnesty period III. The same with TVA after the end of tax amnesty period III which shows t-value -0.373 with significance 0.711. Because of $0.711 > 0.05$ the interference for TVA after the end of tax amnesty period III has no significant result or H_0 is accepted which means there is no significant difference of ATVA.

According to Governor of Bank Indonesia, tax amnesty realization until the end of period III was the highest accomplishment. However, tax amnesty was ended successfully in fact it did not change the investor desire in trading activity. Tax amnesty was a big event for Indonesian; moreover, it was the last chance given for tax evaders before Indonesia implements the Automatic Exchange of Information (AEOI) framework. Based on that reason, investor have been predicted the successful of tax amnesty. As a result, the excitement of tax amnesty in Indonesia Capital Market no longer occurred. Consequently, investor desires in trading activity have become normal again.

Conclusions

Based on the data analysis and discussion in this study which aimed to examine the impact of tax amnesty establishment in Indonesia years 2016-2017 on abnormal return and trading volume activity, then the conclusion are as follow:

- the average of abnormal return based on the statistical test before tax amnesty announcement date showed there was no significant difference. Oppositely, the statistical test showed a significant difference on average abnormal return after tax amnesty announcement date. This different results happened due to some reason such tax amnesty information which already widely spread and easily received by the investors, the information have been predicted, the investors are able to interpret the information, and government offer another gateway to be investment room;
- the average of abnormal return based on statistical test before and after the end of tax amnesty period III showed that there was no significant difference. The absence of significant differences here was because the investors have predicted the information which leading them has interpret market condition earlier;
- the average of trading volume activity based on statistical test before and after tax amnesty announcement date showed that there was no significant difference. The absence of significant differences here was because the demand from investors only for taking profit activity. In this moment, tax amnesty announcement was consider as a big event but did not content information which affects investor desire to trade their stocks in the market;
- the average of trading volume activity based on statistical test before and after the end of tax amnesty period III showed there was no significant difference. The absence of significant differences here was because the demands from investor have become normal again. In short, however tax amnesty program was ended successfully but it did not change the investor desire to trade.

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