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Social Norms and Gender Discrimination in the Labor Market: An Agent-Based Exercise

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Abstract:

The incorporation of women into the labor market remains a challenge for most countries; likewise, gender gaps are observed in indicators such as employment, unemployment, and participation. In this paper, we study the role of social norms in labor market performance by gender, that is, how gender gaps arise from conservative gender roles. To this end, we construct an agent-based model where discrimination appears when information on job vacancies is transmitted within social networks with preference to a given gender. Networks are defined by size, closeness, and links per family. Our results show that social networks enhance the chance of securing a job. Discrimination deepens gender gaps. Discrimination does not favor the employment situation of households, since the share of non-income households (both members unemployed) is not reduced. Rather, discrimination reduces the number of 2-income households in favor of single-income households where only the man is employed.

Keywords: social networks; social norms; gender inequality; discrimination; labor markets; economic systems.

JEL Classification: C63; J71; D85.

Introduction

On December 18, 1979, the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) was adopted by the United Nations General Assembly. In its 30 articles, the CEDAW explicitly defined discrimination against women and settled an agenda for national action to end it; however, in spite of the agreements made in the CEDAW, the four world conferences on women convened so far (Mexico City 1975, Copenhagen 1980, Nairobi 1985, Beijing 1995), and the creation of the Entity for Gender Equality and the Empowerment of Women in 2010 (UN Women), there is still a long way to go to achieve full equality of rights and opportunities between men and women.

This matters not only because gender equality and women's empowerment are fundamental dimensions of human development but also because they are of paramount importance for economic growth, employment, and social cohesion. Accordingly, the United Nations (UN) established as goal number five of the Sustainable Development Goals in the 2030 Agenda for Sustainable Development a goal that seeks to "achieve gender equality and empower all women and girls" (UNDP 2016). Reaching this goal is therefore a major challenge embedded in all the main political and economic agendas of most governments, institutions, and organizations around the world. The European Commission (EC), for instance, recently devised strategies to achieve gender equality (EC 2015).

Gender discrimination is defined as "any distinction, exclusion or restriction made on the basis of sex which has the effect or purpose of impairing or nullifying the recognition, enjoyment or exercise by women, irrespective of their marital status, on the basis of equality of men and women, of human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field" (CEDAW 1979). Gender discrimination is thus a major source of inequality and one of the greatest barriers to progress in human development.

As a matter of illustration, in 2017 the average Human Development Index (HDI) worldwide value for women (0.705) was 4.4% lower than that for men; this gap was 5.9% in developing countries and 2.2% in Organization for

Economic Cooperation and Development (OECD) countries (UNDP 2018). A similar picture is given by the Gender Inequality Index (GII), which is a composite index that captures the inequalities women face in reproductive health, political representation, and the labor market (1 indicates absolute inequality, and 0 indicates perfect equality). The global GII value in 2017 was 0.441, whereas it was 0.186 for OECD countries. Women were the most disadvantaged in countries with low human development, where the GII value ranged from 0.270 for Europe and Central Asia to 0.531 for the Arab states and 0.569 in sub-Saharan Africa (UNDP 2018).

Likewise, the Global Gender Gap Index (GGGI) examines the gap between men and women in four fundamental categories (0 means imparity, and 1 means parity): economic participation and opportunity, educational attainment, health and survival, and political empowerment. In 2018, the overall Global Gender Gap score stood at 68%, meaning that there was still a 32% gap to close. Regarding each dimension, the scores were as follows: economic participation and opportunity, 59%; educational attainment, 95%; health and survival, 96%; and political empowerment, 22% (World Economic Forum 2018). In other words, global gender parity has almost been achieved in two dimensions, educational attainment (gap to be filled: 5%) and health and survival (gap to be filled: 4%); meanwhile, important gender gaps persist in the other two dimensions. The widest gap is observed in terms of political empowerment (78%), which reflects the lower representation of women in all political roles. The remaining gap in economic participation and opportunity is also large (41%); roughly, this means that women still encounter significant obstacles to entering and remaining in the labor market and, once in the workplace, to assuming managerial or senior official roles (World Economic Forum 2018).

In sum, wide inequalities persist, especially in the political and economic spheres. As previously stated, these inequalities are, to some extent, due to gender discrimination, which can stem from both law (*de jure*) and practice (*de facto*).¹ In the first case, legal and political institutions are used to perpetuate gender divisions so that women are denied access to the same legal rights as men. In the second case, culture and tradition play an important role in shaping gender roles and family relations through social norms that may affect the livelihood opportunities of women (Arendt 2005). Norms and traditions that distribute the bulk of unpaid work in the home to women limit women's participation in the labor market and can prevent girls from attending school (UNDP 2015).

To some extent, gender disparities are embedded in social norms and long-standing patterns of exclusion from household and community decision making that limit women's opportunities and choices. Given that the problem has several dimensions, this contribution focuses on the impact of social norms that discriminate against women with regard to unemployment, employment, and participation in the labor market. The remainder of this paper is organized as follows. Chapter 2 offers a deeper exploration of gender discrimination in the labor market. Chapter 3 contains current data on gender gaps. Chapter 4 presents the model of labor networks. Chapter 5 presents the simulations and results. Chapter 6 concludes.

1. Research background. Gender discrimination and social norms in the labor market

Gender differences in the labor market have been widely studied in recent decades² and the empirical evidence so far - based on studies with both national and international scopes, conducted over both short and long time periods - mostly points to the existence of gender gaps against women in terms of key labor market indicators, such as participation, employment, unemployment, and wages (Addabbo, Rodríguez-Modroño and Gálvez 2015, Blau and Kahn 1995, 1996, 2017; Jaba, Pârtrachi, Chistruga and Balan 2015, Ngai and Petrongolo 2017, Olivetti and Petrongolo 2016, Thévenon 2013, Peinado and Serrano 2018).

According to the scope of our contribution, next we present a brief review of the related literature, focusing on the role of culture, traditions, and social norms in explaining the observed gender differences. We establish in the next section some facts concerning the labor wedge gaps in the OECD countries.

1.1 The labor market gender gaps in wages, participation, and unemployment

The gender wage gap has been widely documented and studied since the work of Sanborn (1964), who documented the existence of this gap. Becker (1965) argues that women face a more complex time allocation problem than men; consequently, their labor market decisions also differ. Blinder (1973) and Oaxaca (1974) decomposed the wage gap to consider differences in education, experience, and other relevant variables, showing that most of the gap is purely due to discrimination. Similarly, Fernandez (2007) and Zaiceva and Zimmermann (2014) observe that an important part of the differences is attributable to cultural aspects. Duval-Hernández and

¹ The CEDAW Convention recognizes and addresses both forms of discrimination, whether contained in laws, policies, procedures, or practice

² See Peinado and Serrano (2018) for a recent literature review

Orraca Romano (2009) consider differences in human capital and demonstrate how female participation increases to compensate for the lower income when male income and labor possibilities decrease; this points to gender roles inside households, with men playing the role of provider so that female participation is perceived as secondary.

Blau and Khan (2017) surveyed recent literature to identify what has been learned about the explanations for the gender pay gap. They concluded that conventional human-capital factors are now relatively unimportant, whereas gender differences in occupations and industries, as well as differences in gender roles and the gender division of labor, remain important; moreover, research based on experimental evidence strongly suggests that discrimination cannot be discounted.

Women's generally greater nonmarket responsibilities could impact labor-market outcomes in several ways. The traditional division of labor by gender in the family may, on the one hand, affect the job-searching incentives of women, given their family responsibilities. This affects labor force participation, which is a crucial factor in understanding the development of women's wages because the receipt of wages is conditional on employment; additionally, women's labor force attachment is a key factor influencing the gender wage gap (Blau and Kahn 2017). On the other hand, once on the job, as women assume more nonmarket activities, they are less willing to invest in on-the-job training (and thus in human capital), and their expected earnings are thereby affected. In fact, Hersch and Stratton (2002) found that additional hours spent on housework are associated with lower wages.

Burda, Hamermesh, and Weil (2007) studied the use of non-labor time by gender under the social norm whereby it is more difficult for women to find a job because jobs must be offered first to men. Likewise, Bertrand, Kamenica, and Pan (2015) underline that, considering the wide-ranging effects of observance to traditional gender roles on the relative outcomes of men and women, the role of norms and identity must be deepened to explain gender differences in outcomes. In other words, identity, defined as a sense of belonging to a social category, combined with a view about how people belonging to the same category should behave, constitutes a social norm; departures from these norms are perceived as generating costs, hence people seek to avoid them (Akerlof and Kranton 2010).

1.2 The role of social networks

Social networks are another possible source of differences and even of discrimination. Their importance in labor markets is pervasive and well documented (Calvó-Armengol and Jackson 2004). For a variety of occupations, skill levels, and socioeconomic backgrounds, an important proportion of jobs are found through social contacts (Montgomery 1991), and this tendency has been fostered by the prevalence of the Internet and the importance of social media such as Facebook (Gee, Jones and Burke 2017)³. Finally, social networks have important implications for labor market outcomes (Myers and Shultz 1951, Rees and Shultz 1970). Loury (1977) argues that job opportunities might differ between individuals, either because they belong to different networks or because not everyone has the same position within the network.

Another channel for inequalities among groups is the transmission of information through the network (Montgomery 1991, 1992, 1994; Arrow and Borzekowski 2004, Topa 2001, Calvó - Armengol and Jackson 2004). Calvó-Armengol and Jackson (2004) were the first to study an explicit network model to explore the implications for employment of taking the role of social networks as a manner of obtaining information about job opportunities as a given; they show how the network model has important implications for inequality among agents and how that inequality can persist. Following their work, in this contribution, we analyze the effects of network discriminatory transmission of job vacancy information on several labor gender gaps.

1.3 The agent-based modeling approach

Given the sociocultural context of gender discrimination and the heterogeneity among agents resulting from it, in this contribution, we build a model under the perspective of agent-based modeling (ABM). The ABM approach is a form of computer simulation that allows for creating, analyzing, and experimenting with artificial worlds of heterogeneous agents; this enables investigation into how interactions between these agents - and between agents and other factors, such as time or space - add up to form the patterns seen in the real world (Hamill and Gilbert 2016). This modeling is increasingly being used in the social sciences because it allows for addressing real-world problems under a wide variety of possible circumstances, in a simplified representation of social reality (Wilensky and Rand 2015). The most significant advantage of ABM is that it enables the realization of social experiments

³ Indeed, the increasing use of digital social media has popularized the concept of networking, which refers to the ability (of an individual or enterprise) to create a network of contacts with the purpose of generating job or business opportunities.

while avoiding the difficulties and ethical problems that would arise from conducting them in the real world (Gilbert 2008).

Compared to classical representative-agent models, heterogeneity is a key and easily treatable feature in agent-based models: Each agent can have a unique set of characteristics and simple rules of behavior that tell them what they can do under different circumstances (Epstein 2006). The computer model can then be used to generate possible future scenarios and to study the effects of economic policies and test the validity of assumptions by determining whether they generate the expected patterns. Moreover, agent-based economic models can portray an economic system in which orderly behavior can emerge as a result of interactions between heterogeneous agents, none of whom has any understanding of how the overall system functions, and can be used to simulate, analyze and treat very different problems (Yachou and Aboulaich 2018, Yahyaoui and Tkiouat 2017). By contrast, to solve optimally challenging intertemporal planning problems in a very simple environment using full information, neoclassical economies assume that people understand how the overall system functions.

2. Gender gaps in the labor market

In this section, we document some facts related to the complications and limitations that women face in entering and remaining in the labor market. To this end, we analyze the gender gaps observed in 2018 for labor force participation, unemployment, employment and two categories of vulnerable employment; the data refer to aggregate regions grouped both by level of income and by location according to the International Labor Organization (ILO) classification. As in the recent World Employment and Social Outlook 2018, we find that “not only are women less likely than men to participate in the labor force, but when they do participate, they are also more likely to be unemployed and more likely to be in jobs that fall outside the scope of labor legislation, social security regulations and relevant collective agreements” (ILO 2018).

2.1. Labor force participation, unemployment, and employment

Table 1 presents the rates of, and gender gaps in, labor force participation, unemployment, and employment for 2018. All gaps are simply computed as the difference between the value for men and the value for women.

Table 1. Gender gaps in labor force participation, unemployment, and employment 2018 - rates in %

Region	Labor force participation rate and gender gap			Unemployment rate and gender gap			Employment rate and gender gap		
	Men	Women	Gap	Men	Women	Gap	Men	Women	Gap
World	74.9	48	26.9	4.7	5.4	-0.7	71.4	45.3	26.1
Developing countries	78.7	64.1	14.6	3.6	3.8	-0.2	75.9	61.7	14.2
Lower-middle-income countries	77.2	35.5	41.7	3.5	5.1	-1.6	74.5	33.7	40.8
Upper-middle-income countries	75	54.6	20.4	6	6	0	70.5	51.3	19.2
Developed countries	68.4	52.7	15.7	5	5.6	-0.6	65	49.8	15.2
Northern Africa	71.2	21.6	49.6	9.1	20.8	-11.7	64.8	17.1	47.7
Sub-Saharan Africa	73.1	63	10.1	5.6	6.2	-0.6	69	59.1	9.9
Latin America and the Caribbean	77	51.7	25.3	7	9.6	-2.6	71.7	46.7	25
North America	68.4	56.6	11.8	4.3	4	0.3	65.4	54.3	11.1
Arab states	77.2	18.4	58.8	5.8	15.6	-9.8	72.8	15.5	57.3
Eastern Asia	75.4	60.1	15.3	4.6	3.7	0.9	71.9	57.9	14
Southeastern Asia and the Pacific	78.8	55.8	23	3	2.8	0.2	76.4	54.2	22.2
Southern Asia	78.9	25.9	53	2.7	4.5	-1.8	76.8	24.8	52
Northern, Southern, and Western Europe	63.9	51.8	12.1	7.4	8	-0.6	59.2	47.7	11.5
Eastern Europe	67.3	51.7	15.6	5.5	4.9	0.6	63.6	49.2	14.4
Central and Western Asia	73.4	63	10.4	7.8	8.8	-1	67.7	41	26.7

Source: International Labor Office, Trends Econometric Models (ilo.org/wesodata)

Globally, the labor force participation gap in 2018 was 26.9%, but there were considerable differences between countries at different stages of development in terms of women’s access to the labor market. Emerging countries exhibited the largest gaps: 41.7% for lower-middle-income countries and 20.4% for upper-middle-income countries; on average, this equated to almost twice the gap exhibited by developed (15.7%) and developing (14.6%) countries. Gaps were particularly large in the Arab states, Northern Africa, and Southern Asia; this may reflect the fact that, owing to restrictive gender and cultural norms, women are more constrained in terms of their options for seeking paid employment in these emerging regions. Conversely, women in developed countries face less

restrictive social norms regarding paid work, and there exist public policies that play an important role in improving the work-life balance of women. The participation gap, however, remained wide in many developed countries in European and Asian regions, even in those countries where women and men have near equal educational achievements and working skills; in such cases, explanations must point to other sociocultural factors, such as discrimination. Finally, developing countries showed the smallest gender gap (14.6%) globally; this often mirrors the economic necessity to seek employment, given the prevailing poverty and lack of access to social protection.

Regarding unemployment (second block of columns in Table 1), we observe that globally, women are not only less likely than men to participate in the labor market, but they are also more likely to be unemployed: The unemployment rate for women was 0.7% larger than the unemployment rate for men. As for participation, the largest gap was in the lower-middle-income emerging economies (-1.6%) and was only slightly below the average in developed countries (-0.6%). Conversely, in developing and upper-middle-income emerging countries women seem close to parity in terms of unemployment rate. Nonetheless, this view can be misleading, since the unemployment rate is not a robust test of labor market performance as long as it fails to distinguish between types of jobs (formal, informal, part-time, *etc.*).

In certain regions, women even registered lower unemployment rates than men (North America, Eastern Asia, Southeastern Asia and the Pacific, and Eastern Europe). This invites several and even opposite explanations. For instance, a positive unemployment gap might mean that women find work easily because they have higher educational achievement or more skills than men; alternatively, it may mean that women are more pressed to take up any employment opportunity. To shed more light on the situation, we complement the analysis with several employment dimensions. The first is the employment rate; nonetheless, the employment gender gap (third block of columns in Table 1) does not provide new information, since its values closely approximate those of the labor force participation gap.

Table 2 presents the gaps in two other dimensions of employment, namely, the share of own-account workers in total employment and the share of contributing family workers in total employment. The first comprises workers who, on their own account or with one or more partners, hold the type of job defined as a self-employed job and have not engaged on a continuous basis any employees to work for them. The second comprises workers who are self-employed in a market-oriented establishment operated by a related person living in the same household but whose degree of involvement in its operation is too limited for them to be considered a partner (ILO 2018). These two categories are considered vulnerable employment because workers belonging to them are more likely than those in other categories of employment to be in informal employment and to have limited or no access to social protection systems.

Table 2. Gender gaps in shares in own-account and contributing family work, 2018 – in %

Region	Share of own-account workers in total employment and gender gap			Share of contributing family workers in total employment and gender gap		
	Men	Women	Gap	Men	Women	Gap
World	38	28	10	6	18	-12
Developing countries	56	44	12	17	43	-26
Lower-middle-income countries	53	42	11	8	25	-17
Upper-middle-income countries	31	24	7	5	15	-10
Developed countries	10	7	3	0	2	-2
Northern Africa	21	13	8	6	26	-20
Sub-Saharan Africa	53	49	4	15	33	-18
Latin America and the Caribbean	30	26	4	3	7	-4
North America	5	4	1	92	0	92
Arab states	14	8	6	2	5	-3
Eastern Asia	33	25	8	5	19	-14
Southeastern Asia and the Pacific	34	30	4	7	21	-14
Southern Asia	62	46	16	8	1	7
Northern, Southern, and Western Europe	12	8	4	1	1	0
Eastern Europe	11	7	4	1	2	-1
Central and Western Asia	26	20	6	5	15	-10

Source: International Labor Office, Trends Econometric Models (ilo.org/wesodata)

3. The model

In this section, we construct a model where the labor force is composed of men and women who are matched to create households formed by traditional man-woman families. Households are randomly grouped into large social networks. Networks are defined by the number of households or nodes in the network, the geographic homophily, and the average number of links per family. We consider a sociocultural source of discrimination that arises when information about job vacancies is transmitted within the network with preference to men. This social norm is congruent with a statement used in the World Value Survey to assess this form of discrimination: "If jobs are scarce, men should have more right to a job than women." Usually, this discrimination is related to the role of men as providers: Giving them preference to be employed is perceived as giving families insurance against the situation of not having any labor income in the family, that is, of being an impoverished family. Even today, 38.8% of respondents worldwide agree with this statement; moreover, countries exhibit strong differences, meaning that discrimination might be stronger in some countries than in others (World Value Survey 2014).

According to this, the model is simulated under three scenarios - total discrimination, partial discrimination, and gender equality - and the effects on the labor gender gaps are analyzed. To clearly assess the effects of discrimination, we assume that there is no other source of discrimination in the model; thus, firms will send job offers to both men and women and will pay the same wage rate to men and women.

3.1. Information rules

The two members of each family belong to the same network, and the only form of discrimination is the way in which information is transmitted through the network. Information about a vacancy is shared first within the family, therefore the own partners are the first informed. There is no job hunting while employed; consequently, when the two family members are both already employed and one of them receives a job offer, the information about the vacancy is directly transmitted to their social network's acquaintances. We allow for different levels of discrimination in this process, as follows:

- *Full discrimination*: The information regarding a vacancy is first sent to an unemployed male acquaintance. If no male acquaintances are unemployed, the information is sent to an unemployed female acquaintance;
- *Partial discrimination*: Unemployed male acquaintances have a higher probability of receiving the information than unemployed female acquaintances;
- *No discrimination (gender equality)*: When men and women have equal weight, there is no discrimination, and unemployed men and women receive the information regarding job vacancies within their network with the same probability.

3.2. Networks

Networks are formed by n households or nodes. The labor state of any family member is denoted by s_j^i , for $i = M$ (men), W (women); $j = 1, 2, \dots, n$ and takes a value of 0 if the individual is unemployed and 1 if the individual is employed. Let S^i be the vectors that contain the employment statuses of men and women in a network:

$$S^M = (s_j^M), S^F = (s_j^F) \quad (1)$$

The network is generated in a random way, wherein the households to be linked are randomly chosen from a binomial distribution. If the total number of family links within the network is k , each family knows on average $g = \frac{k}{2n}$ other households. As the number of households tends toward infinity, the binomial distribution tends at the limit toward a Poisson arrival rate, and the probability of forming a link is low and constant. A family will be linked to the closest family with which it is not yet linked with a probability of $0 \leq close \leq 1$. For high values of $close$, the model generates spatial clustering (friends of my friends are my friends) and a higher local density.

The network is expressed as a squared matrix, F , where each row and column identify a family. In other words,

$$F = (F_{i,j})_{n \times n}, i, j = 1, \dots, n \quad (2)$$

where: $F_{i,j} = 0$ if households i and j do not know each other; $F_{i,j} = 1$ if households i and j are linked. Since the knowledge is mutual and no family is linked to itself, the matrix is symmetric ($F_{i,j} = F_{j,i}$), and the elements on the diagonal are equal to zero ($F_{i,i} = 0$).

3.3. Probability of receiving a job offer within the family

Since firms do not discriminate, each family member may receive a direct job offer with probability a and an indirect offer from their partner with probability as_j^i . This probability will be zero if the partner is also unemployed ($s_j^i = 0$). The intra-family probability, p^f , that an unemployed member receives a job offer, then, is:

$$p^f = a + (1 - a)as_j^i \quad (3)$$

There is no job hunting while employed; consequently, if the two family members are both already employed and one or both receive a job offer, they pass the information to their network's acquaintances. The probability of having at least one remaining offer is as follows:

$$p_i^1 = (1 - (1 - a)^2)s_i^M s_i^F \quad (4a)$$

This also might happen if a family with one unemployed member received two offers.

$$p_i^2 = (a^2)Max\{s_i^M, s_i^F\} \quad (4b)$$

The probability p_i^o that family i has a remaining job offer is equal to $p_i^1 + p_i^2$:

$$p_i^o = (1 - (1 - a)^2)s_i^M s_i^F + (a^2)Max\{s_i^M, s_i^F\} \quad (5)$$

3.4. Probability of receiving a job offer within the network

An unemployed agent may also receive job vacancy information from his or her acquaintances. To compute this probability, we need several previous steps. First, the number of employed men (e^M) and women in each network are obtained, as follows:

$$e_{(nx1)}^M = FxS^M \quad (6)$$

Similarly, we obtain the vector with the number of employed women in each family network, as follows:

$$e_{(nx1)}^W = FxS^W \quad (7)$$

Let l be a $(nx1)$ vector containing the number of linked households in each network so that each entry of this vector corresponds to the sum of the elements in each column of matrix F . In other words,

$$l_{(nx1)} = (l_j) = (\sum_{i=1}^n F_{i,j}), j = 1, 2, \dots, n. \quad (8)$$

The vector with the number of male unemployed acquaintances of each family, then, is given by the difference between (8) and (6):

$$u_{(nx1)}^M = l_{(nx1)} - e_{(nx1)}^M \quad (9)$$

Similarly, the number of female unemployed acquaintances of each family is given by the following:

$$u_{(nx1)}^W = l_{(nx1)} - e_{(nx1)}^W \quad (10)$$

We consider three possible scenarios. If there is no gender discrimination, all unemployed male and female acquaintances of a family with a remaining job offer will receive the information regarding the vacancy with the same probability. Conversely, if there is total discrimination against women, the information will be transmitted only to the male acquaintances. Finally, if the gender discrimination is partial, the information will be transmitted in a weighted manner in favor of men.

3.4.1. Probability for an unemployed man of receiving at least one job offer

The outer-family probability, $p_j^{M,n}$, that an unemployed man of family j receives a remaining job offer from a family i in their network is as follows:

$$p_j^{M,n} = \begin{cases} \frac{1}{u_i^M}, & \text{if total discrimination} \\ \frac{1}{u_i^M + u_i^F}, & \text{if no discrimination} \\ \frac{w}{wu_i^M + u_i^F}, w > 1, & \text{if partial discrimination} \end{cases} \quad (11)$$

In the above expression, $w > 1$ represents the higher relative weight of men relative to women. For instance, $w = 2$ means that a man has double the weight of a woman.

In general terms, the probability that an unemployed man of family j will not receive any remaining job offer from a family i is equal to $F_{i,j}p_i^o p_j^n$; consequently, this probability becomes zero if households do not belong to the same network ($F_{i,j} = 0$).

The probability, $p_j^{M,any}$, then, that an unemployed man will not receive any information of job vacancies from any other family is as follows:

$$p_j^{M,any} = \prod_i (1 - F_{i,j} p_i^o p_j^n) \quad (12)$$

The probability, then, of receiving at least one job offer from other households in the network, $p_j^{M,one}$, is equal to the following:

$$p_j^{M,one} = 1 - p_j^{M,any} \quad (13)$$

Therefore, the total probability that an unemployed man in family j receives a direct or indirect job offer is given by the following:

$$p_j^{M,job} = p^f + (1 - p^f) p_j^{M,one} \quad (14)$$

3.4.2. Probability for an unemployed woman of receiving at least one job offer

In a similar way, the outer-family probability, $p_j^{W,n}$, that an unemployed woman of family j receives a remaining job offer from a family i in their network is as follows:

$$p_j^{W,n} = \begin{cases} \frac{1}{u_i^W} \Leftrightarrow u_i^M = 0 \text{ and } 0 \Leftrightarrow u_i^M > 0 & \text{if total discrimination} \\ \frac{1}{u_i^M + u_i^W}, & \text{if no discrimination} \\ \frac{1}{w u_i^M + u_i^W}, w > 1, & \text{if partial discrimination} \end{cases} \quad (15)$$

As shown above, the probability, $p_j^{W,any}$, then, for an unemployed woman in family j of not receiving any information from any other family is as follows:

$$p_j^{W,any} = \prod_i (1 - F_{i,j} p_i^o p_j^n) \quad (16)$$

The probability, then, of receiving at least one job offer from other households in the network, $p_j^{W,one}$, is equal to the following:

$$p_j^{W,one} = 1 - p_j^{W,any} \quad (17)$$

Therefore, the total probability that an unemployed woman in family j receives a direct or indirect job offer is given by the following:

$$p_j^{W,job} = p^f + (1 - p^f) p_j^{W,one} \quad (18)$$

4. Results from simulations

The model is simulated using the computer program NetLogo. The model is simulated for the different scenarios according to the baseline parameter values; the simulations are repeated 10 times for each set of values. This yields up to 57,600 observations, which are used first to evaluate the effects of discrimination on the job-finding probabilities, mean unemployment, and the employment statuses of households and are used subsequently to run several ordinary least squares (OLS) regressions to deepen the analysis.

4.1. Baseline parameter values

We assume that the time period taken to receive and accept offers is a day. To ensure the convergence of the mean values, we considered a total span of the simulation of 2,500 days (roughly 10 years). The simulations are dynamic, such that unemployment and the family employment status are computed each period. There are $n = 100, 500, \text{ or } 1,000$ households, and the initial unemployment rate is 5%. The probability of losing a job ($loss, b$) or receiving an offer (job, a) both take the same values: 1%, 4%, 7%, and 10%. The average number of links per

family (g) takes values 3, 5, 8, and 10. The geographic homophily, ($close, c$), is the share of links to close neighbors and takes values of 0, 0.25, 0.5, 0.75, and 1. The scenarios are total discrimination, partial discrimination (the relative weight of men, w , is higher than that of women, namely, 1.5, 2, 5, and 10), or no discrimination (gender equality, $w = 1$).

4.2. The effects of discrimination

4.2.1. The effects of discrimination on the job-finding probabilities

The mean values of the job-finding probabilities for unemployed men and women under different levels of discrimination (with 9,600 observations in each case) are presented in Table 3.

Table 3. Mean job-finding probabilities

Variable	Weight					
	1	1.5	2	5	10	∞
$p_j^{M,job}$	0.263	0.270	0.275	0.288	0.295	0.304
$p_j^{W,job}$	0.263	0.256	0.251	0.238	0.232	0.224

Source: Simulations from the model. Weight of 1 means gender equality. Weight of ∞ means total discrimination. $p_j^{M,job}$: total probability that an unemployed man in household j receives a direct or indirect job offer. $p_j^{W,job}$: total probability that an unemployed woman in household j receives a direct or indirect job offer.

When there is no discrimination, both genders have the same probability of finding a job, but a gender gap emerges and widens as discrimination increases.

4.2.2. The effects of discrimination on unemployment

The gap in the job-finding probabilities also affects the gender gap in unemployment (Table 4)⁴. As discrimination grows, men's unemployment decreases, since they have better labor opportunities (higher probability of finding a job). Conversely, women's unemployment increases by slightly more as discrimination increases; thus, when discrimination is high enough, mean unemployment increases.

Table 4. Mean unemployment for men, women, and general unemployment

Variable	Weight					
	1	1.5	2	5	10	∞
\bar{U}^M	0.303	0.298	0.295	0.287	0.283	0.278
\bar{U}^W	0.303	0.308	0.311	0.321	0.326	0.334
\bar{U}	0.303	0.303	0.303	0.304	0.3045	0.306

Source: Simulations from the model. Weight of 1 means gender equality. Weight of ∞ means total discrimination. \bar{U}^M : mean value of unemployment for men. \bar{U}^W : mean value of unemployment for women. \bar{U} : general mean unemployment.

4.2.3. The effects of discrimination on the family employment status

The larger unemployment gap and the increase in the mean unemployment undermine the labor status of the household (Table 5). Discrimination reduces the number of two-income households, increases the number of single-income households, and has little effect on the number of households with both members unemployed (as can be seen below, this effect is negligible).

Table 5. Households' employment statuses

Variable	Weight					
	1	1.5	2	5	10	∞
H^{2e}	0.593	0.592	0.592	0.590	0.589	0.585
H^{1e}	0.209	0.209	0.209	0.212	0.214	0.218
H^{2u}	0.199	0.199	0.198	0.198	0.198	0.197
$H^{1e,M}$	0.104	0.109	0.113	0.123	0.129	0.137
$H^{1e,W}$	0.104	0.0997	0.0966	0.0890	0.0854	0.0807

Source: Simulations from the model. Weight of 1 means gender equality. Weight of ∞ means total discrimination. H^{2e} : households with both members employed. H^{1e} : households with one member employed. H^{2u} : households with

⁴ Unemployment values are high in mean because the gap between the probability of losing a job and receiving a job offer might have great differences, as between the probability of 10% of losing a job and 1% of receiving a job offer.

both members unemployed. H_M^{1e} : households where the man is the provider. H_W^{1e} : households where the woman is the provider.

4.3. Least square regressions

To better disentangle the effects that other variables might have, we run several ordinary least square regressions. All regressions include a constant term (z). The explanative variables are the network size (n), the geographic homophily (c), the average links per family (g), the relative weight of men when discrimination is not total (W), a dummy variable to compare between total discrimination and gender equality (D), the probability of receiving a direct job offer (a), and the probability of job destruction (b).

4.3.1. The effects of the main variables on the probability of receiving a job offer

In the following regressions, we explore the impact of the explanative variables on the gender probabilities of receiving a job offer ($p_j^{M,job}$ and $p_j^{W,job}$). This is done under partial (weighted) and total discrimination. Results are reported in Table 6. In all four regressions, the determination coefficients are high (86% – 90%). Except for the network size (n), all variables are significant at the 1% level.⁵

Table 6. Probability that an unemployed man or woman receives a job offer

Partial Discrimination (W)			Total Discrimination (D)		
Variable	Coefficient $p_j^{M,job}$ (p-value)	Coefficient $p_j^{W,job}$ (p-value)	Variable	Coefficient $p_j^{M,job}$ (p-value)	Coefficient $p_j^{W,job}$ (p-value)
z	0.009021 (<0.0001)	0.0652824 (<0.0001)	z	0.0801065 (<0.0001)	0.0801065 (<0.0001)
c	-4.561e-05 (<0.0001)	-4.657e-05 (<0.0001)	c	-4.9203e-05 (0.0050)	-4.9203e-05 (0.0050)
g	0.0188273 (<0.0001)	0.0149957 (<0.0001)	g	0.0142017 (<0.0001)	0.0142017 (<0.0001)
b	-0.0323890 (<0.0001)	-0.0333022 (<0.0001)	b	-0.0335114 (<0.0001)	-0.0335114 (<0.0001)
a	0.0569952 (<0.0001)	0.0512664 (<0.0001)	a	0.0502200 (<0.0001)	0.0502200 (<0.0001)
W	0.00325080 (<0.0001)	-0.00306207 (<0.0001)	D	-0.0387422 (<0.0001)	-0.0387422 (<0.0001)
n	1.20669e-06 (0.2166)	1.20214e-06 (0.2447)	n	1.35220e-06 (0.4306)	1.32643e-06 (0.4306)
R^2	0.891609	0.863040	R^2	0.891606	0.863036
$adj.R^2$	0.891595	0.863023	$adj.R^2$	0.891594	0.891594

Source: Simulations from the model.

Note: $p_j^{M,job}$: total probability that an unemployed man in household j receives a direct or indirect job offer. $p_j^{W,job}$: total probability that an unemployed woman in household j receives a direct or indirect job offer. z : constant term. c : geographic homophily. g : average links per family. b : job destruction probability. a : probability of receiving a direct job offer. W : relative weight of men. D : dummy variable for total discrimination. n : network size.

A higher degree of discrimination (measured by the relative weight of men, W) increases the probability that an unemployed man receives a job offer. Conversely, discrimination decreases the probability that an unemployed woman receives a job offer. In both cases, however, we observe that total discrimination has a much greater effect than partial discrimination (more than 12 times greater). The probability of securing a job (a) has a positive effect: Larger values of a imply that more people are employed, therefore the probability of having remaining job offers increases for the unemployed (men or women). The job destruction probability (b), meanwhile, has the opposite effect. The network structure affects the probability that an unemployed man or woman receives a job offer through two channels: the geographic homophily (measured by c) and the average links per family (g). The first has a slight negative effect: As the density increases, the probability of finding a job through the network decreases. Conversely, as more households are linked, finding a job becomes easier.

⁵ We drop n from the regressions, and the results do not change

4.3.2. The effects of the main variables on average unemployment

Now we explore the impact of the explanative variables on the average unemployment by gender (\bar{U}^M and \bar{U}^W). Results are displayed in Table 7.

Table 7. Average unemployment of men (\bar{U}^M) and women (\bar{U}^W)

Partial Discrimination (W)			Total Discrimination (D)		
Variable	Coefficient \bar{U}^M (p-value)	Coefficient \bar{U}^W (p-value)	Variable	Coefficient \bar{U}^M (p-value)	Coefficient \bar{U}^W (p-value)
z	0.420515 (<0.0001)	0.395995 (<0.0001)	z	0.425876 (<0.0001)	0.384393 (<0.0001)
c	7.96210e-06 (0.6420)	8.20412e-06 (0.6036)	c	8.98294e-06 (0.7438)	9.83594e-06 (0.6899)
g	-0.00594122 (<0.0001)	-0.00450794 (<0.0001)	g	-0.00613600 (<0.0001)	-0.00388501 (<0.0001)
b	0.0493858 (<0.0001)	0.0519812 (<0.0001)	b	0.0490175 (<0.0001)	0.0526540 (<0.0001)
a	-0.0640778 (<0.0001)	-0.0632730 (<0.0001)	a	-0.0641139 (<0.0001)	-0.0628769 (<0.0001)
W	-0.00202484 (<0.0001)	0.00235946 (<0.0001)	D	-0.0254597 (<0.0001)	0.0308206 (<0.0001)
n	-4.56675e-07 (0.7813)	-4.66857e-07 (0.7583)	n	-5.15651e-07 (0.8451)	-5.25330e-07 (0.8244)
R^2	0.807753	0.834751	R^2	0.802684	0.839079
$adj. R^2$	0.807729	0.834731	$adj. R^2$	0.802622	0.839029

Note: \bar{U}^M : mean value of unemployment for men. \bar{U}^W : mean value of unemployment for women. \bar{U} : general mean unemployment. z : constant term. c : geographic homophily. g : average links per family. b : job destruction probability. a : probability of receiving a direct job offer. W : relative weight of men. D : dummy variable for total discrimination. n : network size.

Source: Simulations from the model.

In all cases, the determination coefficients are high (80%–83%). Except for the network size (n) and the geographic homophily (c), all the variables are significant at the 1% level⁶. A higher degree of discrimination reduces the mean unemployment for men but increases the mean unemployment for women by slightly more than the reduction in the mean unemployment for men; this has a slight positive effect on general unemployment. Finally, total discrimination still has a positive effect more than 12 times larger than partial discrimination. This effect on unemployment will influence the employment statuses of households.

4.3.3. The effects of the main variables on the employment statuses of households

Now we explore the impact of the explanative variables on the labor situations of households: two employed members (H^{2e}), two unemployed members (H^{2u}), and only the man ($H^{1e,M}$) or the woman ($H^{1e,W}$) is employed. The coefficient of determination is over 87% for the two-income households and around 70% for the no-income households (both members unemployed); however, in all three cases of single-income households, only around 50% of the variation in the dependent variable is explained by the model. In all cases, both the geographic homophily (c) and the network size (n) are non-significant. The relative weight of men (W) has a negative and significant impact on the proportion of households with two or one income(s); in the case of no-income households, this impact is non-significant. Thus, as discrimination increases, the number of two-income households decreases in favor of the number of single-income households. It is worth noting that, given that the number of woman-headed households also decreases with discrimination, this increase is biased toward the households headed by men. Thus, discrimination changes the wealth distribution among households; it also changes household composition, as it leads to more single-income man-headed households.

Similar results are obtained in the extreme scenarios of gender equity (see Table 8) and total discrimination (see Table 9), respectively.

⁶ We drop n and c from the regressions, and the results do not change.

Table 8. Households' labor statuses under partial discrimination

Variable	Coefficient H^{2e} (p-value)	Coefficient H^{2u} (p-value)	Coefficient H^{1e} (p-value)	Coefficient $H^{1e,M}$ (p-value)	Coefficient $H^{1e,W}$ (p-value)
z	0.501905 (<0.0001)	0.318089 (<0.0001)	0.180005 (<0.0001)	0.0777477 (<0.0001)	0.102258 (<0.0001)
c	-1.15562e-05 (0.4658)	4.60360e-06 (0.8068)	6.95256e-06 (0.5489)	3.59724e-06 (0.5930)	3.35532e-06 (0.5115)
g	0.0076669 (<0.0001)	-0.00277811 (<0.0001)	-0.00488876 (<0.0001)	-0.00172802 (<0.0001)	-0.00316 (<0.0001)
b	-0.0634006 (<0.0001)	0.0379258 (<0.0001)	0.0254748 (<0.0001)	0.0140346 (<0.0001)	0.0114403 (<0.0001)
a	0.0709325 (<0.0001)	-0.0563674 (<0.0001)	-0.0145651 (<0.0001)	-0.00688030 (<0.0001)	-0.0076848 (<0.0001)
W	-0.0004575 (0.0062)	-0.000123 (0.5356)	0.000580494 (<0.0001)	0.00248152 (<0.0001)	-0.00190102 (<0.0001)
n	6.59703e-07 (0.6646)	-2.63460e-07 (0.8841)	-3.9624e-07 (0.7220)	-2.0321e-07 (0.7532)	-1.93e-07 (0.6941)
R^2	0.871598	0.709664	0.550014	0.510928	0.589391
$adj. R^2$	0.871582	0.709628	0.549958	0.510866	0.589340

Note: H^{2e} : households with both members employed. H^{1e} : households with one member employed. H^{2u} : households with both members unemployed. H_M^{1e} : households where the man is the provider. H_W^{1e} : households where the woman is the provider. z : constant term. c : geographic homophily. g : average links per family. b : job destruction probability. a : probability of receiving a direct job offer. W : relative weight of men. n : network size.

Source: Simulations from the model.

Table 9. Households' labor statuses under total discrimination

Variable	Coefficient H^{2e} (p-value)	Coefficient H^{2u} (p-value)	Coefficient H^{1e} (p-value)	Coefficient $H^{1e,M}$ (p-value)	Coefficient $H^{1e,W}$ (p-value)
z	0.508445 (<0.0001)	0.318389 (<0.0001)	0.173166 (<0.0001)	0.06585 (<0.0001)	0.107316 (<0.0001)
c	-1.35305e-05 (0.5868)	5.28091e-06 (0.8596)	8.2496e-06 (0.5868)	4.5511e-06 (0.6949)	3.69845e-06 (0.6428)
g	0.00721521 (<0.0001)	-0.00280178 (<0.0001)	-0.004413 (<0.0001)	-0.001082 (<0.0001)	-0.003332 (<0.0001)
b	-0.0637604 (<0.0001)	0.0378704 (<0.0001)	0.0258900 (<0.0001)	0.0147625 (<0.0001)	0.011127 (<0.0001)
a	0.0705848 (<0.0001)	-0.0563551 (<0.0001)	-0.01423 (<0.0001)	-0.006497 (<0.0001)	-0.007733 (<0.0001)
W	-0.00714367 (<0.0001)	-0.00178492 (0.3977)	0.008929 (<0.0001)	0.032593 (<0.0001)	-0.023665 (<0.0001)
n	7.43054e-07 (0.7559)	-2.97512e-07 (0.9173)	-4.45543e-07 (0.7559)	-2.27609e-07 (0.8382)	-2.179e-07 (0.7759)
R^2	0.872987	0.708385	0.545206	0.497626	0.599797
$adj. R^2$	0.872947	0.708294	0.545064	0.497469	0.599672

Note: H^{2e} : households with both members employed. H^{1e} : households with one member employed. H^{2u} : households with both members unemployed. H_M^{1e} : households where the man is the provider. H_W^{1e} : households where the woman is the provider. z : constant term. c : geographic homophily. g : average links per family. b : job destruction probability. a : probability of receiving a direct job offer. D : dummy variable for total discrimination. n : network size. n : network size.

Source: Simulations from the model.

Conclusions

The results from our simulations show that gender roles, expressed as the way in which the information on job vacancies is transmitted through a social network, negatively affect the gender gaps in the labor market. When there is a social bias toward male employment, such that the information on job vacancies is more likely transferred to men, the job-finding probabilities of men and women are altered. As a consequence, the income and labor statuses of household members are also altered. On the one hand, the employment of men increases, but this is offset by a larger decrease in the employment of women; consequently, general unemployment increases. This

pervasive effect on employment becomes more important as discrimination increases, thus reducing the total income generated in the economy.

On the other hand, discrimination reduces the number of two-income households; however, this does not imply a lower risk of having both family members unemployed, that is, no-income households. Instead, the number of single-income households headed by men grows, thereby increasing the economic dependence of women.

Regarding the social network effects, we find that network size does not affect the results when the number of nodes is larger than 100. The geographic homophily (measured by c) seems to be a short-term effect that reduces the probability that an unemployed man or woman receives a job offer, but it does not exert a significant impact on unemployment, nor does it exert a significant impact on households' employment status. For both genders, a higher number of average links per family (g) increases the job-finding probability and decreases the mean unemployment, such that employment and the number of two-income households increase. Therefore, provided there are no discriminatory rules in the transmission of information within them, social networks can lead to better job opportunities.

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Low Sample Size and Regression: A Monte Carlo Approach

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Abstract:

This article performs simulations with different small samples considering the regression techniques of OLS, Jackknife, Bootstrap, Lasso and Robust Regression in order to establish the best approach in terms of lower bias and statistical significance with a pre-specified data generating process (DGP). The methodology consists of a DGP with 5 variables and 1 constant parameter which was regressed among the simulations with a set of random normally distributed variables considering sample sizes of 6, 10, 20 and 500. Using the expected values discriminated by each sample size, the accuracy of the estimators was calculated in terms of the relative bias for each technique. The results indicate that Jackknife approach is more suitable for lower sample sizes while the Bootstrap approach reported to be sensitive for the lower sample sizes indicating that it might not be suitable for establishing statistically significant relationships in the regressions. The Monte Carlo simulations also reflected that when a significant relationship is found in small samples, this relationship will also tend to remain significant when the sample size is increased.

Keywords: small sample size; statistical significance; regression; simulations; bias.

JEL Classification: C15; C19; C63.

Introduction

One situation that might happen while we're trying to analyze different types of data and make empirical inferences over a phenomenon is that we may have a low (or reduced) number of observations. This is usually associated with the lack of confidence in the estimations, especially when we're opting for the regression analysis in the multivariate framework. A possible answer to avoid this problem is to perform descriptive statistics and proceed with the deduction patterns, however, it could be asked: Are we really sure that our estimations are unreliable? Do they really lack of confidence? These are usual questions in the context of quantitative analysis when we're regressing a model in the presence of low observations. Naturally, the literature supports this idea from different perspectives, as an example Bujang, Sa'at, and Tg Abu Bakar Sidik (2017) studies state that in order to obtain coefficients closer to the population parameters we need around 300 observations to be sure they're reliable.

But if our phenomenon has not been studied (or documented) properly in order to obtain a significant number of observations, should we discard immediately the multiple regression technique to analyze it? The aim of this paper is to provide evidence that regression can have consistent estimates of the coefficients even when we're dealing with a low number of observations. The methodology consists mainly of the use of Monte Carlo simulations derived from a linear data generating process (DGP) to perform conclusions about the bias of the estimated coefficients in the regression framework with a different number of observations. The estimation techniques involve ordinary least squares (OLS), Jackknife, Bootstrap, Robust Regression, and Lasso approaches.

1. Research background

The sample size can be classified in general terms depending on the number of observations, as it can be found in the study of Mason and Perreault (1991), a sample size of 30 observations or lesser is considerate small, samples around 150 observations can be considered as moderate and finally, samples bigger than 250 or 300 are tagged as large. One interesting problem that arises in small samples is relative to the statistical inferences, in fact, "using a sample smaller than the ideal increases the chance of assuming as true a false premise" (Faber and Fonseca 2014). This implies considering the two types of errors in statistical hypothesis testing, the type I and II errors. In simple words, the first type of error refers that our null hypothesis H_0 (relative to a specific proposition) is true but we reject it, while the second type of error refers when our H_0 is false but we don't reject it.

Small sample size and incorrect inferences in the parameters' significance tests are studied by Colquhoun (2014) indicating that a p-value lesser than 5% might not be statistically significant since the results are derived from "underpowered statistical inferences". From this, the risk of using a small size would be the possible type I error in the regression framework.

More from this idea can be found in another study of Forstmeier, Wagenmakers, and Parker (2017) where the problem of false-positive findings can be derived from a decreased sample size and incorrect p-values. Also, the problem of statistical inferences is correlated with the replication procedure, in other words, the last two types of errors seem to be sensitive to the number of replications in a way that the results derived from one inference might not match the result of a similar exercise concerning a similar set of data. This is a fair point in the analysis, the number of replications might affect the statistical inference and the overall converge rate to the population parameters of the estimations, therefore it should be taken into account. This idea leads to a basic statement: as we increase the number of replications of an experiment, we're getting closer and closer to the expected behavior of the population parameters in the inference. These authors also make a valid point regarding some underlying assumptions of the estimations, for example, autocorrelation, correct specifications, no omitted variables in general. In this case, small sample size inferences can be harmful where also the ordinary least squares assumptions are not satisfied.

A remarkable study performed by Holmes Finch and Hernandez Finch (2017) starts by analyzing tools like Lasso, Elastic net, Ridge regression and the Bayesian approach regarding the situation when we got high dimensional multivariate data relative to an even bigger number of variables. In this case, the number of independent variables may be close or equal to the sample size, yielding in unstable coefficients and standard errors (these ones are needed to the formulation of the hypothesis testing procedure) (Bühlmann, Van De Geer 2011). The result of these experiments tends to demonstrate that the regularization methods, in particular, the Ridge regression approach were more accurate in terms to control bias and type I errors produced in the estimations with low sample data for multiple regression analysis. Speed (1994) establishes a contribution to the solution of the problem of low sample size in the regression framework, considering sample reuse validation techniques. These techniques refer to the Jackknife and Bootstrap approaches related to the multiple regression estimation.

An important statement of this author is: *Researchers should note that the overwhelming case is that reduction in sample size is far more likely to reduce the likelihood of finding any significant relationships than to increase it. This is due to the way that sample size affects test power. The researcher sets the level of type I error (the probability of accepting a hypothesis when false in reality) in any test, normally at 0-05, and critical values calculated for the given size of sample. Small sample sizes are no more likely to result in wrongfully claiming a relationship exists than is the case for larger samples.* (Speed 1994, 91)

This interpretation is indeed useful since it states that low sample relationships are more likely to be found when the sample size increases over the experiments. In fact, there is some literature that also critiques the role of large samples in the estimations, arguing that anything becomes significant. Within this idea, we can find the study of Lin, Lucas Jr. and Shmueli (2013) where they affirm that as the sample size is increasing, the p-value starts to decrease drastically to 0, which could lead to statistically significant results which are not sensitive over the regression analysis. Meanwhile, a low sample size is more sensitive to the correlation between the variables (this implies sensibilization to the changes too) leading to think that large sample sizes might find significant results when it's just an overwhelming product of the power of the sample without accurately indicating real (or strong) relationships among the variables. In fact, Faber and Fonseca (2014) appoints that samples cannot be either too big or too small in order to perform statistical inferences.

Up to this point, we're facing problems on both sides of the sample size, too much can be misleading and insensitive to true relationships among the variables (which can be especially the case of the regression analysis) and on the opposite when we got a little sample size, we might have results that are inconsistent across replications driving to errors of type 1.

2. Methodology

The main idea of the methodology is to perform Monte Carlo approximations across different types of estimations which involves OLS, Jackknife, Bootstrap, Lasso and Robust Regression, assuming a multivariate data generating process in a linear form as it follows:

$$y_i = \alpha + \gamma x_{1,i} + \delta x_{2,i} + \theta x_{3,i} + \vartheta x_{4,i} + \varphi x_{5,i} + u_i \quad (1)$$

Equation (1) is calibrated setting the population parameters $\alpha, \gamma, \delta, \theta, \vartheta, \varphi$ as all equal to 10 for the i observations. The independent variables are x_j with $j = \{1,2,3,4,5\}$ and the residuals are expressed in u_i . The objective is to identify which of the estimation types suits better in terms of accuracy of the estimators. In this case, across the simulations it is assumed that:

$$x_j \sim N(0,1) \quad (1)$$

$$u_i \sim N(0,1)$$

From (1) we're setting the number of replications to 10, 100 and 500 while the number of observations would be set at first to 6 in order to induce on purpose the micronumerosity phenomenon and see how the estimators react to this problem, the next size of observations across replications are set to 10, 20 and 500. There's no need to test for a higher number of observations since empirical literature has established that the overall significance and unbiasedness are influenced by a large sample size. The relative bias of the estimators among the coefficients would be expressed as a relative difference from the population parameter, following a general idea that:

$$Bias = \left| \frac{\beta_j - \bar{\beta}_j}{\beta_j} \right| \quad (3)$$

where: β_j represents the true parameter associated to the x_j variable contained in equation (1) and $\bar{\beta}_j$ represents the estimated parameters in the regressions.

The overall bias $O.B.$ can be expressed in terms of expected values as it follows:

$$O.B. = \left| \frac{k - E(\bar{\beta}_j)}{k} \right| \quad (4)$$

where: the mean value of the estimated parameters would be our expected value $E(\bar{\beta}_j)$ of the coefficients by each type of regression; k represents the expected value of the true parameters considering that all of the population parameters in the DGP are set to 10 therefore $k = 10$.

In equation (4), the bias would be expressed in terms of percentage comparing the true parameters with the mean of the estimated parameters by the regressions as a relative difference, indicating that 0 would be closer to a perfect match with the absence of bias.

In order to see the changes in the statistical significance of the coefficients, single Monte Carlo simulations would be presented in the usual regression output for each type of estimation (OLS, Jackknife, Bootstrap, Lasso and Robust Regression) with the different sizes in the observations as mentioned before, then the bias results are presented for each type of estimation discriminated by the size of the sample and the number of replications. For the overall calculus, simulations and results, the statistical software Stata 16 was used (StataCorp, 2019).

3. Results

3.1. Statistical significance

The OLS simulation practiced, establish that the pattern of statistical significance for all estimators will remain as long as the sample size is increasing, the special case of micronumerosity tend to disrupt the statistical significance as expected, but the yielding estimators seems to be closer to the DGP.

Table 1. OLS Monte Carlo simulation with different sizes

VARIABLES	(1)	(2)	(3)	(4)
	Y	Y	Y	Y
x1	9.549	9.288***	9.915***	9.991***
	(0)	(0.440)	(0.208)	(0.0468)
x2	10.36	9.915***	10.01***	9.961***
	(0)	(0.491)	(0.200)	(0.0499)
x3	8.952	9.709***	10.27***	9.979***
	(0)	(0.362)	(0.211)	(0.0457)
x4	10.66	10.44***	9.977***	10.04***
	(0)	(0.295)	(0.207)	(0.0453)
x5	10.70	9.233***	10.59***	10.02***
	(0)	(0.530)	(0.289)	(0.0506)
Constant	8.902	9.979***	10.10***	9.997***

VARIABLES	(1)	(2)	(3)	(4)
	Y	Y	Y	Y
	(0)	(0.394)	(0.225)	(0.0463)
Observations	6	10	20	500
R-squared	1.000	0.999	0.999	0.998
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Source: Own construction

As an interesting thing to consider, the R^2 values changes when we estimate the DGP with 20 observations, to a lower accuracy (but still closer to 1) in the context of 500 observations, this is proof that the property of consistency among the OLS estimator is achievable (and of course all classical assumptions of the linear regression model are also satisfied). This tends to indicate that the affirmation of Speed (1994) regarding to the relationships found in small sample sizes tend to remain as the size of the sample increases.

Going further with the jackknife estimation, it can be observed that it cannot be computed in the presence of perfect micronumerosity, leading to the impossibility to even approach to get a result from observed coefficients, among the statistical significance it also remains across the different sample sizes, suggesting the same result from OLS.

Table 2 Jackknife estimation with different sample size

VARIABLES	(1)	(2)	(3)	(4)
	Y	Y	Y	Y
x1	-	9.733***	10.25***	10.00***
	-	(0.470)	(0.358)	(0.0445)
x2	-	9.892***	9.891***	9.926***
	-	(0.296)	(0.380)	(0.0454)
x3	-	10.42***	10.33***	10.02***
	-	(0.667)	(0.296)	(0.0445)
x4	-	11.04***	10.09***	9.977***
	-	(0.523)	(0.403)	(0.0476)
x5	-	10.29***	9.627***	10.03***
	-	(0.784)	(0.401)	(0.0434)
Constant	-	9.454***	9.830***	10.04***
	-	(0.433)	(0.282)	(0.0462)
Observations	6	10	20	500
R-squared	-	0.999	0.998	0.998
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Source: Own construction

The goodness of fit of the model tends to be reduced as the sample size is increased considering this type of estimation, we can also see that the coefficients vary from the ones estimated via OLS. The bootstrap estimation is presented in the Table 3 and display results a little bit different from the OLS and the jackknife, in the induced model with micronumerosity the coefficients can be computed, however, standard errors cannot be estimated.

Table 3. Bootstrap estimation with different sizes

VARIABLES	(1)	(2)	(3)	(4)
	Y	Y	Y	Y
x1	10.06	10.26**	9.651***	10.01***
	(0)	(4.026)	(0.214)	(0.0512)
x2	9.375	10.67**	10.23***	9.958***
	(0)	(4.408)	(0.264)	(0.0359)
x3	10.85	9.744***	10.40***	10.02***
	(0)	(2.750)	(0.200)	(0.0379)
x4	10.24	10.27	9.718***	10.05***
	(0)	(8.483)	(0.177)	(0.0422)
x5	10.68	10.15***	9.959***	10.01***
	(0)	(3.871)	(0.238)	(0.0479)
Constant	11.34	10.50***	10.04***	9.993***

VARIABLES	(1)	(2)	(3)	(4)
	Y	Y	Y	Y
	(0)	(2.564)	(0.286)	(0.0396)
Observations	6	10	20	500
R-squared	1.000	0.993	0.999	0.998
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Source: Own construction

According to the Monte Carlo experiment with the bootstrap technique, it can be seen that as the sample size is increasing, the statistical significance will also be increased. The variables x_1 , x_2 and x_4 demonstrate this situation, where for example with $n = 10$, for x_4 there wasn't a statistically significant relationship with y in the regression model. Then as soon as we increased the sample size to $n = 20$ the variable turned to be significant, the similar case can be observed with x_1 and x_2 where they only were significant at a 5% with $n = 10$. Then with $n = 20$ they become significant at 1%, indicating that the bootstrap approach is sensitive to the number of observations regarding the coefficient hypothesis testing. This might suggest is not a good idea to perform this technique with a low sample size since it might discard a real relationship among the variables. Following with the Lasso regression, micronumerosity doesn't allow the estimation of the coefficients. And the overall statistical significance remains equal across regressions with different sample sizes. This result indicates that estimations are consistent across models using the right variables with the specific function formal equally to the DGP.

Table 4. Lasso estimations with different sizes

VARIABLES	(1)	(2)	(3)	(4)
	Y	Y	Y	Y
x1	-	11.18***	10.09***	10.03***
	-	(0.832)	(0.242)	(0.0453)
x2	-	9.605***	9.785***	9.913***
	-	(0.376)	(0.272)	(0.0452)
x3	-	10.70***	9.866***	10.07***
	-	(0.551)	(0.264)	(0.0442)
x4	-	9.441***	9.585***	9.873***
	-	(0.355)	(0.235)	(0.0421)
x5	-	10.17***	9.861***	9.984***
	-	(0.397)	(0.336)	(0.0433)
Observations	6	10	20	500
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Source: Own construction

It can be noted that Lasso regression omits the constant parameter in this single exercise, but the highest possible goodness of fit has been selected according to the variables. Thus, the statistical significance of the estimators prevails across the models with different sample sizes. However, it is necessary to appoint that Lasso regression doesn't look directly at the p-values or the standard errors since its sole objective is to isolate a model where the predictions become more suitable according to the data (StataCorp, 2019).

The robust regression estimates are similar to the ones done with Lasso and jackknife in terms that the model cannot be estimated when micronumerosity is present. The other results related to the statistical significance of the estimators indicate that when we're in the context of short samples, the relationships remain significant as the number of observations increase.

Table 5 Robust regression with different sizes

VARIABLES	(1)	(2)	(3)	(4)
	Y	Y	Y	Y
x1	-	9.866***	9.883***	10.02***
	-	(0.443)	(0.282)	(0.0442)
x2	-	11.04***	9.560***	9.978***
	-	(0.618)	(0.255)	(0.0460)
x3	-	10.15***	10.35***	10.02***
	-	(0.611)	(0.290)	(0.0415)
x4	-	9.315***	10.16***	9.972***
	-	(1.361)	(0.333)	(0.0441)
x5	-	10.88***	10.25***	9.963***
	-	(0.649)	(0.215)	(0.0430)
Constant	-	10.58***	9.949***	10.02***
	-	(0.935)	(0.226)	(0.0444)
Observations	6	9	20	500
R-squared	-	1.000	0.999	0.998
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Source: Own construction

An interesting thing to appoint is that as long as we're having a large sample regarding our regressions, the goodness of fit tends to be somewhat reduced across estimations. This led to confirm the conclusion that R^2 is sensitive to the number of observations among the sample.

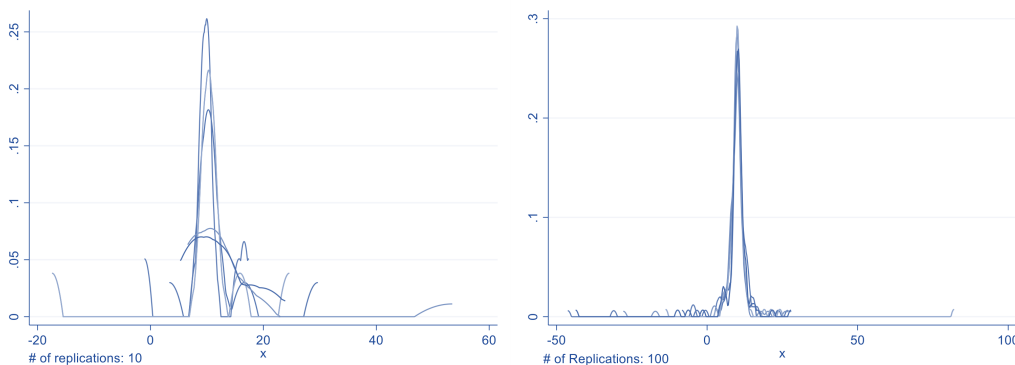
3.2. Bias behavior of the parameters

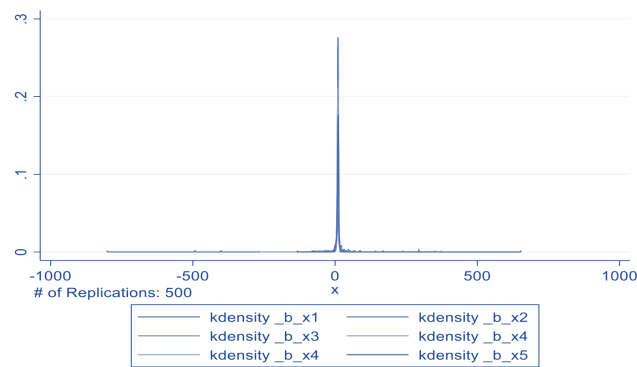
This section consists of the results for each type of estimation (OLS, jackknife, bootstrap, lasso and robust regression) referring to the distributions across replications for the coefficients, kernel densities were used for each coefficient of the different x variables in order to provide analysis regarding the importance of the number of replications.

3.2.1. Ordinary Least Squares

Considering a number of 6 observations, the coefficients for each variable tend to be somewhat unstable when the number of replications is low, meaning that in the presence of micronumerosity, the estimators are less likely to be trustable. As replications are increased to 100 and 500, the estimators seem to converge to their true value of 10, the situation clearly implies that across regressions with normally distributed data, as long as we replicate enough times the experiments, the expected value seems to be close to our DGP, it should be noted that OLS estimators stills covers some extreme values which could be affecting the consistency across replications, as we can see it in the graphical pattern in Figure1.

Figure 1. OLS - Distributions of the coefficients with n=6





Source: Own construction

These results prove evidence that under micronumerosity, OLS estimates are unstable so it should be avoided at all cost. Considering the 500 replications for the 6 observations regression with OLS, the descriptive statistics for each coefficient reflects an undeniable reality. The minimum and maximum values are out of scale regarding to our DPG where each coefficient is equal to 10, even when the mean value is somewhat closer, the results yield unstable.

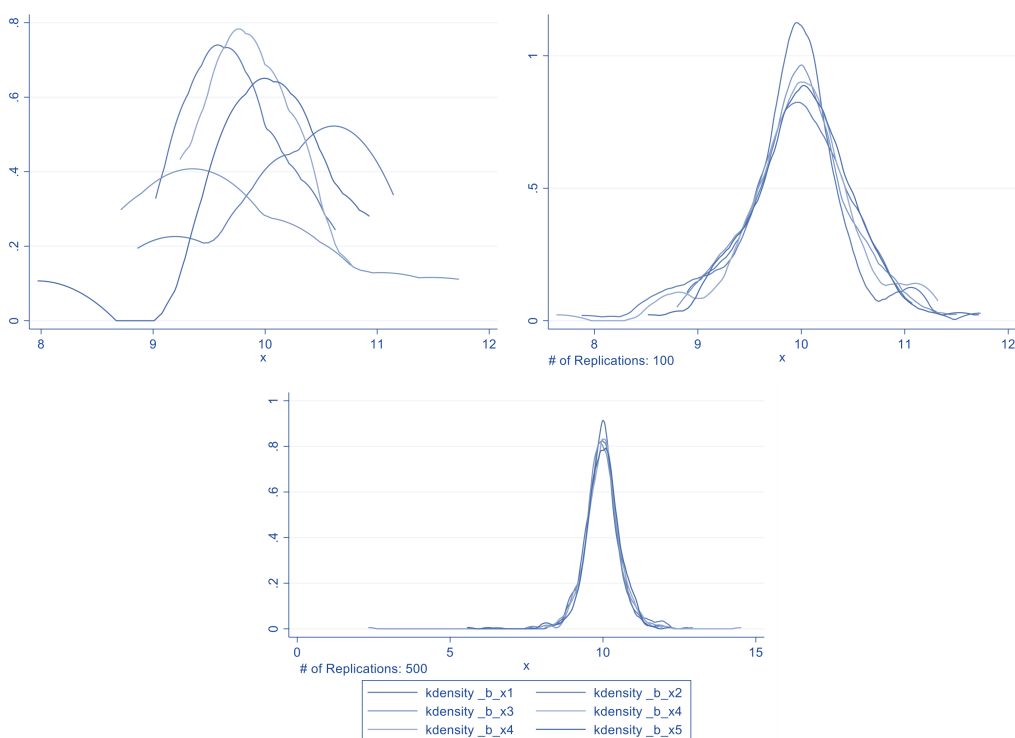
Table 6. OLS Descriptive Statistics with n=6

Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.78	13.529	-86.594	243.693
_b_x2	500	13.807	102.362	-588.518	2199.746
_b_x3	500	7.444	49.54	-1044.307	199.705
_b_x4	500	10.553	28.372	-306.405	526.281
_b_x5	500	4.668	62.136	-1043.826	62.116
_b_cons	500	5.83	92.71	-2015.365	188.439

Source: Own construction.

Now considering the number of observations as 10, the following pattern of distributions can be found in Figure 2.

Figure 2. OLS - Distributions of the coefficients with n = 10



Source: Own construction.

There is a quick and stable rate of convergence relative to the distributions of the estimators for each variable which is depicted across replications. The distributions tend to be normal as the simulation number increase, leading to the true value of the estimators for all x variables and the constant term. The descriptive statistics are shown ahead in Table 7 considering 500 hundred replications of the Monte Carlo simulations with $n=10$ observations.

Table 7. OLS Descriptive Statistics $n=10$

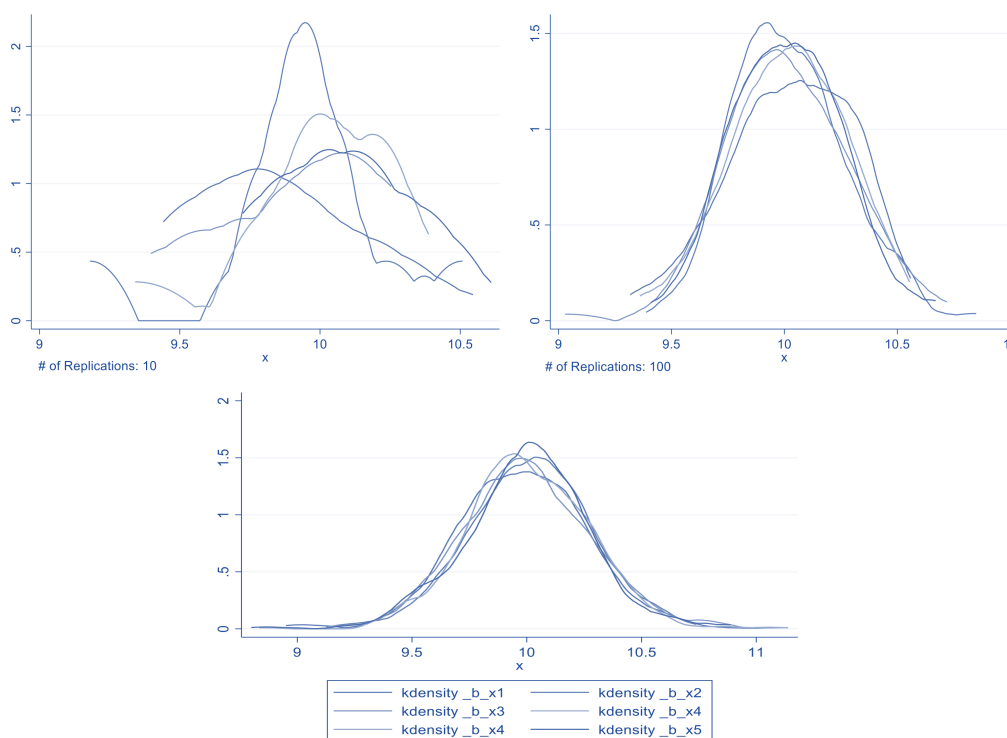
Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.937	.575	5.552	11.942
_b_x2	500	9.994	.599	7.56	12.789
_b_x3	500	9.957	.688	2.325	12.944
_b_x4	500	10.007	.583	8.089	14.52
_b_x5	500	9.999	.582	5.572	12.208
_b_cons	500	10.002	.535	7.253	12.053

Source: Own construction.

We can see that the minimum and maximum values for the 500 hundred replications with $n = 10$ tends to be more stable than when $n = 6$ which is the micronumerosity simulation. In this case the mean values are also more accurate in terms to approach to the data generating process of equation (1).

Now considering the number of observations to 20, the pattern of the distributions for each parameter is shown ahead in Figure 3, indicating a possibly significant difference from the $n = 10$ exercise because the shape of the curves for each distribution are different.

Figure 3. OLS - Distributions of the coefficients with $n = 20$



Source: Own construction

The range of the distribution is more accurate (from 9 to 11 in the x axis) for all replications with 20 observations, this tends to indicate that the precision of the estimates is increasing as expected. However, the shape of the curve is somewhat different but still relies over 10. Which is a sign of the consistency and unbiasedness property of the estimator. The descriptive statistics in Table 8 from the 500-replication exercise within this number of observations reflects a good precision of the estimators.

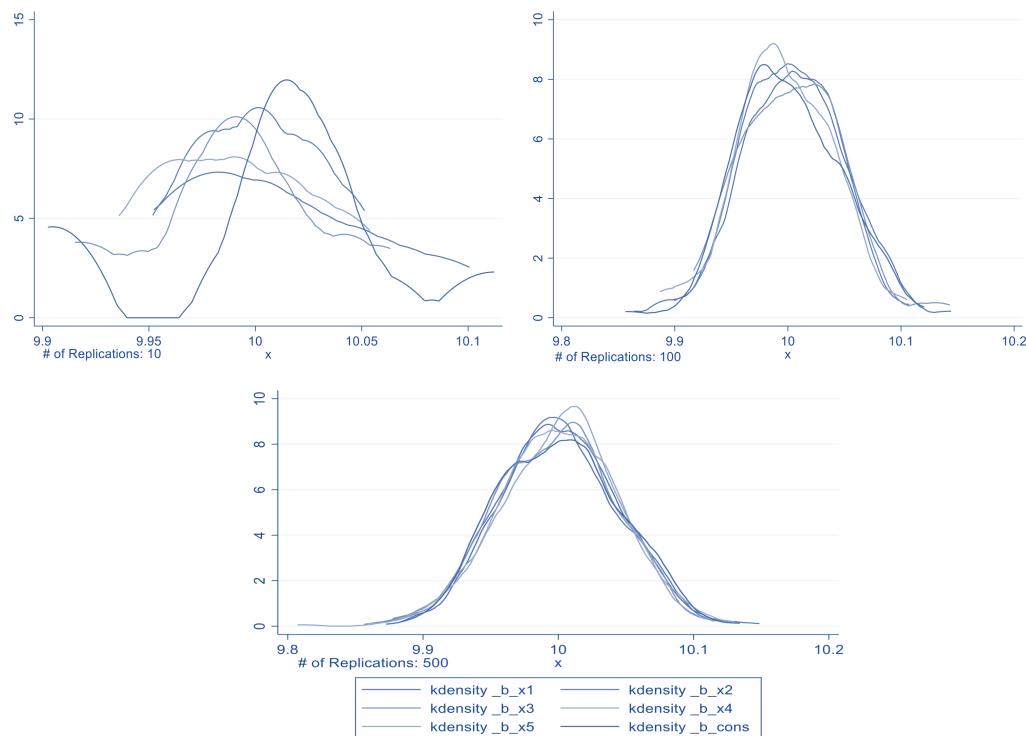
Table 8. OLS Descriptive statistics with n = 20

Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.979	.274	8.95	10.736
_b_x2	500	10.018	.269	9.145	11.104
_b_x3	500	10.003	.284	9.126	11.082
_b_x4	500	10.007	.268	8.834	11.139
_b_x5	500	10.002	.275	8.8	10.889
_b_cons	500	9.998	.271	9.262	10.837

Source: Own construction

Finally, as a comparing exercise, we're setting the number of observations to 500 in order to understand the behavior of the coefficients' distribution as it is shown in Figure 4.

Figure 4. OLS - Distributions of the coefficients with n = 500



Source: Own construction

As expected, the higher number of observations tend to have a faster converging rate to the true value of the parameters than the other simulations with lesser observations, the accuracy of the regressions are shown in the descriptive statistics ahead in Table 9.

Table 9 OLS Descriptive Statistics n= 500

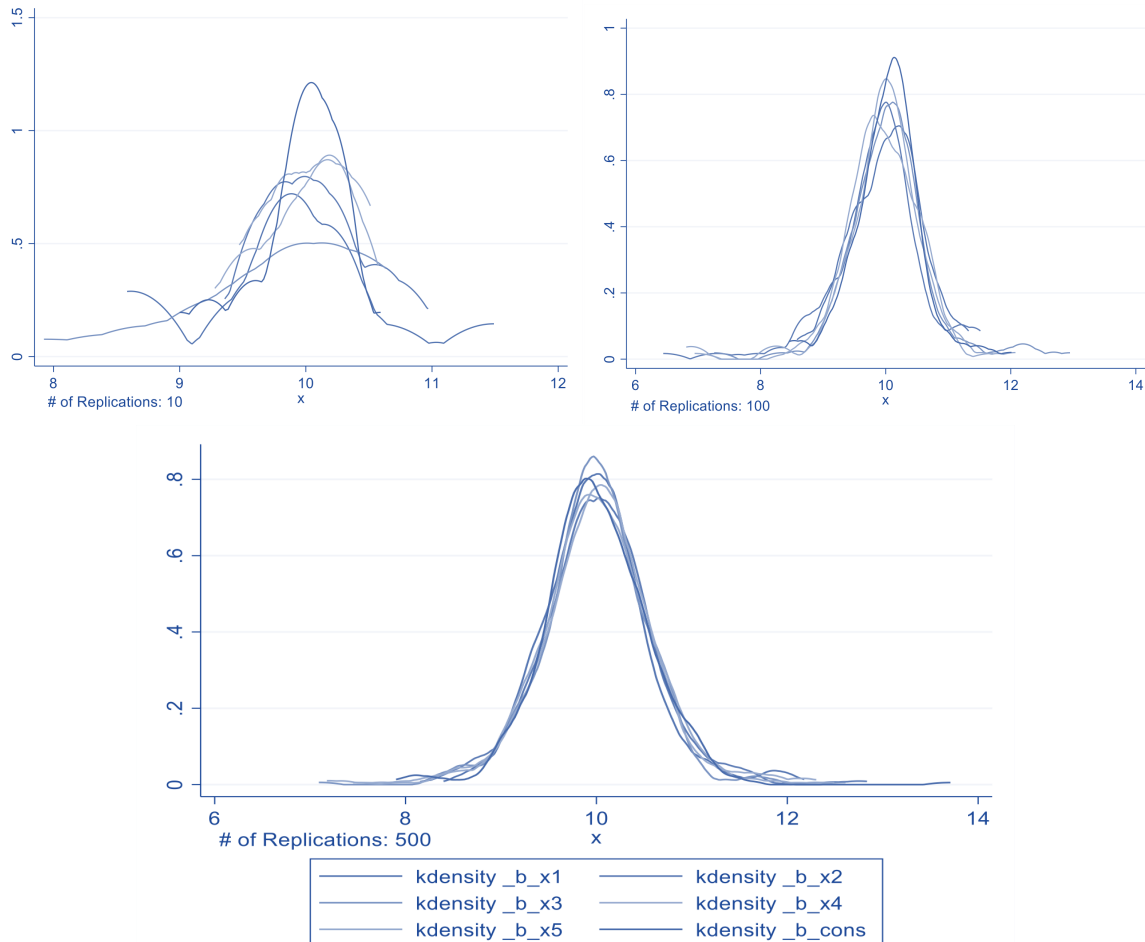
Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	10.002	.043	9.883	10.149
_b_x2	500	9.999	.044	9.857	10.112
_b_x3	500	9.998	.043	9.878	10.115
_b_x4	500	10.001	.044	9.86	10.13
_b_x5	500	10.001	.044	9.807	10.132
_b_cons	500	10.001	.044	9.873	10.134

Source: Own construction.

3.2.2. Jackknife

This type of estimation cannot be performed in the presence of perfect micronumerosity, so distribution analysis cannot be done with the case of 6 observations. Moving ahead with 10 observations, the behavior of the distributions of the parameters according to different replications are shown in Figure 5.

Figure 5. Jackknife - Distributions of the coefficients with n = 10



Source: Own construction.

It appears that the range of the different parameters' distributions in the case of 100 replications is higher than the rest of the simulations considering 10 observations, something particular but yet over the long-run not important since the mean value of all replications stills converge to the true value. The shape of the distributions cannot be established as better from the OLS, since the range varies widely. From this, descriptive statistics in Table 10 would be useful.

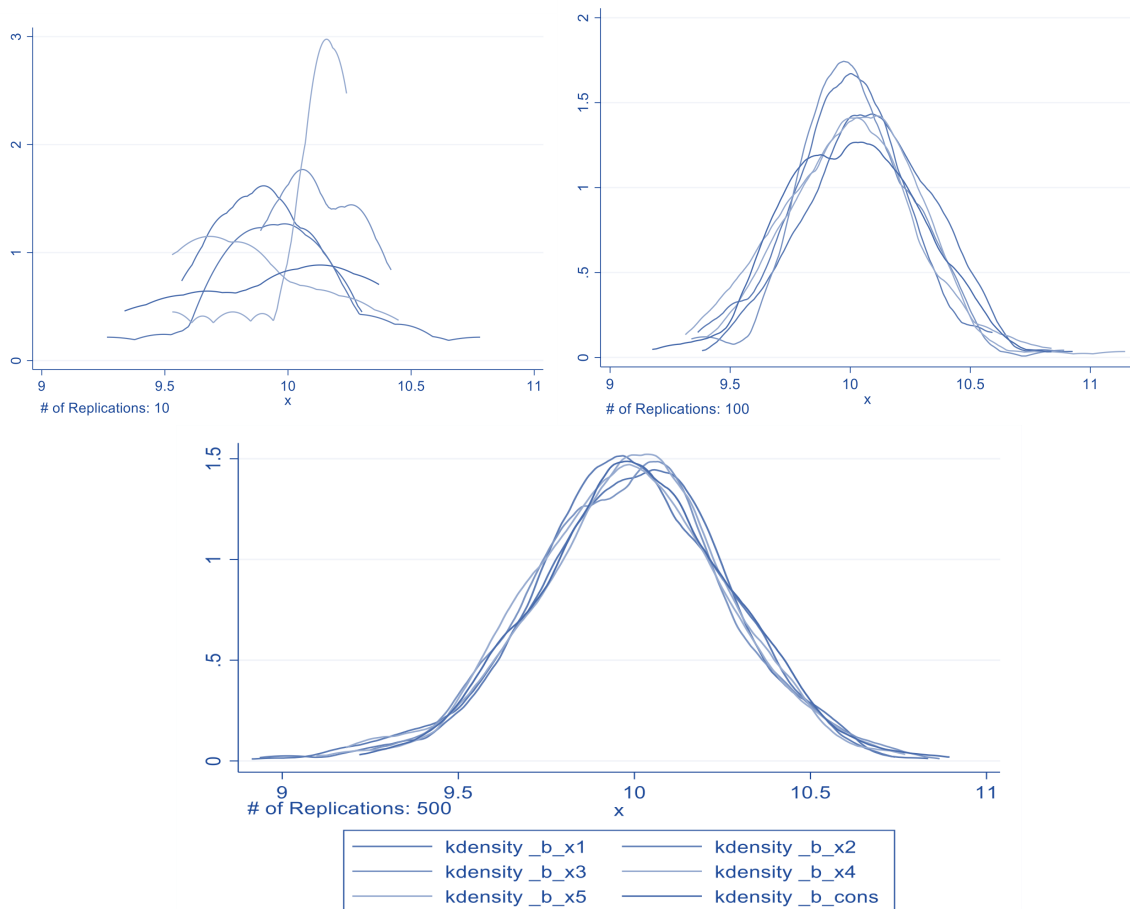
Table 10 Jackknife descriptive statistics n = 10

Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.999	.554	8.398	12.178
_b_x2	500	10.024	.594	8.152	12.835
_b_x3	500	9.987	.554	7.092	12.61
_b_x4	500	10.009	.63	7.176	12.303
_b_x5	500	10.001	.577	7.451	12.494
_b_cons	500	9.997	.565	7.9	13.709

Source: Own construction.

The expected value of the parameters is more accurate in the jackknife simulations than it is with the OLS, also the standard deviation tends to be lower for the jackknife approach. Considering now a sample size of 20 observations, the following pattern can be observed in Figure 6.

Figure 6. Jackknife - distributions of the coefficients with n = 20



Source: Own construction.

Jackknife estimation seems to be more unstable with a lower number of replications considering n=20, however we're not sure yet if it's more suitable than OLS by the graphic interpretation, looking at the descriptive statistics in Table 11 we can have a better approximation.

Table 11 Jackknife descriptive statistics n=20

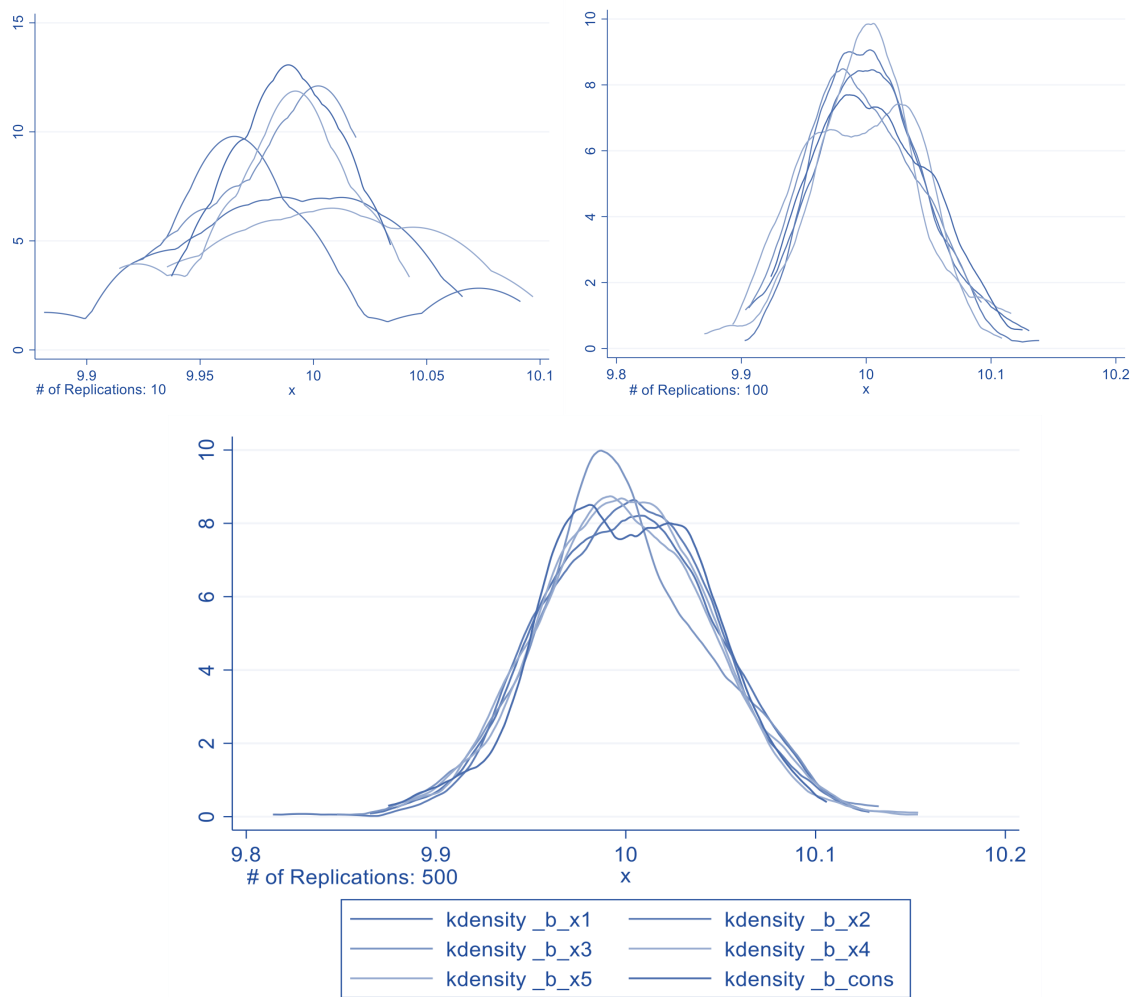
Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.985	.284	8.913	10.834
_b_x2	500	9.986	.272	8.936	10.74
_b_x3	500	9.988	.273	9.249	10.867
_b_x4	500	9.978	.274	9.097	10.769
_b_x5	500	9.99	.276	9.181	10.766
_b_cons	500	10.006	.274	9.219	10.895

Source: Own construction

The estimations with jackknife seem to be pretty close to the ones performed with OLS at this number of observations, however OLS seems to have the advantage to be more stable with lesser replications than Jackknife does and the expected value with n = 20 of the estimators is closer to the DGP for OLS than it is for jackknife.

Finally, with 500 observations the pattern is shown in Figure 7, it is noted that jackknife has the counterpart to require a higher and significant time of computing during the estimations.

Figure 7. Jackknife - distributions of the coefficients with n = 500



Source: Own construction.

The jackknife distribution with n=500 seems to converge somewhat equal to the OLS estimations. If we analyze the statistics relative to the OLS for the same number of observations, we'll find that the OLS performs better in terms of the standard deviation and minimum and maximum values closer to 10.

Table 12 Jackknife Descriptive Statistics n=500

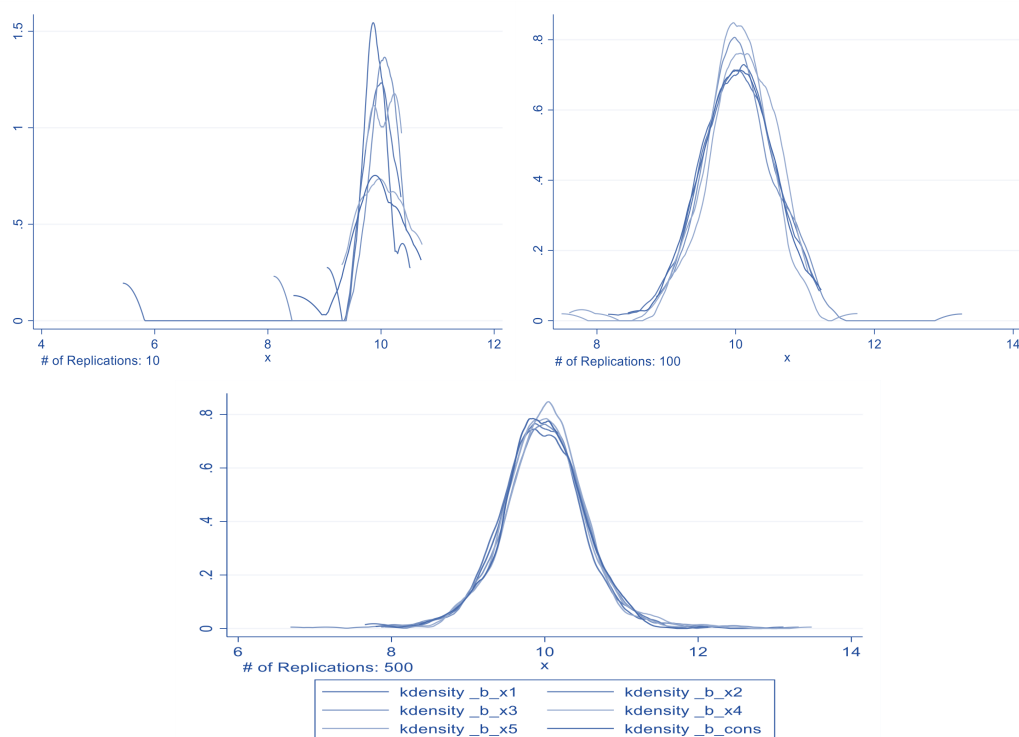
Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	10.002	.045	9.865	10.126
_b_x2	500	10.001	.044	9.814	10.128
_b_x3	500	9.999	.046	9.848	10.133
_b_x4	500	10	.043	9.879	10.154
_b_x5	500	10	.045	9.875	10.154
_b_cons	500	10	.043	9.875	10.106

Source: Own construction.

3.2.3. Bootstrap

Similar to the Jackknife approach, bootstrap estimation cannot be performed if the number of observations is 6, so it is not allowed perfect micronumerosity. Moving to the analysis with n = 10 we can observe the following patterns of the parameters via bootstrap in Figure 8.

Figure 8. Bootstrap - Distributions of the Coefficients with n = 10



Source: Own construction.

The pattern related to the lowest replications (10) tends to be unstable with the bootstrap technique with n=10, but as it gets more replications the parameters converge to their true value. The descriptive statistics are presented ahead in Table 13 indicating a similar behavior to the Jackknife technique.

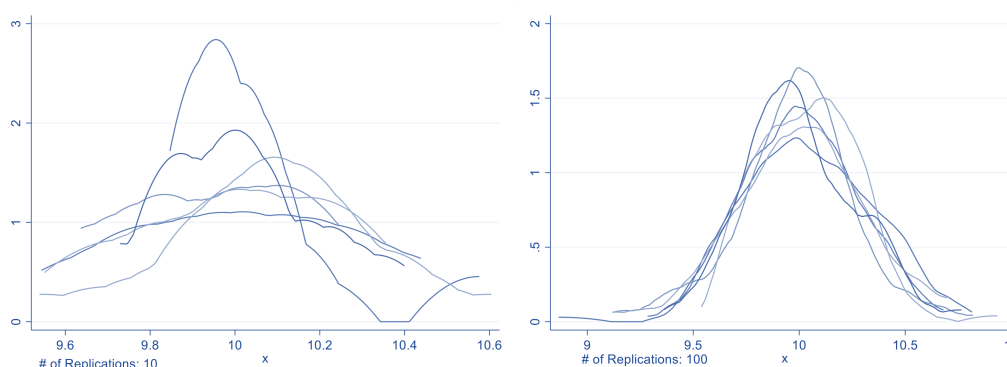
Table 13. Bootstrap Descriptive Statistics n=10

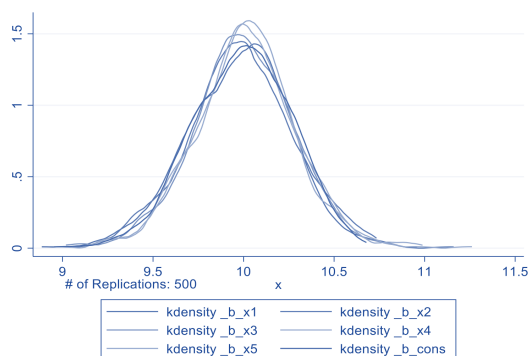
Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.955	.588	7.653	13.115
_b_x2	500	9.968	.552	7.915	12.409
_b_x3	500	9.995	.633	6.682	13.314
_b_x4	500	10.014	.558	7.865	12.28
_b_x5	500	10.015	.556	7.969	13.482
_b_cons	500	9.98	.532	7.794	12.132

Source: Own construction.

Moving to n=20, the patterns relative to the lesser replications tend to be more stable than with n=10, indicating a sensitive behavior of the bootstrap with lower samples, however stills yielding results similar to OLS and Jackknife.

Figure 9. Bootstrap - Distributions of the Coefficients with n=20





Source: Own construction.

As happens with the jackknife, the bootstrap in Figure 9 seems to have variations for each distribution of each variable when the replication number is set to 100, however the distributions converge as OLS and jackknife in the case of bootstrap when replications are set to 500.

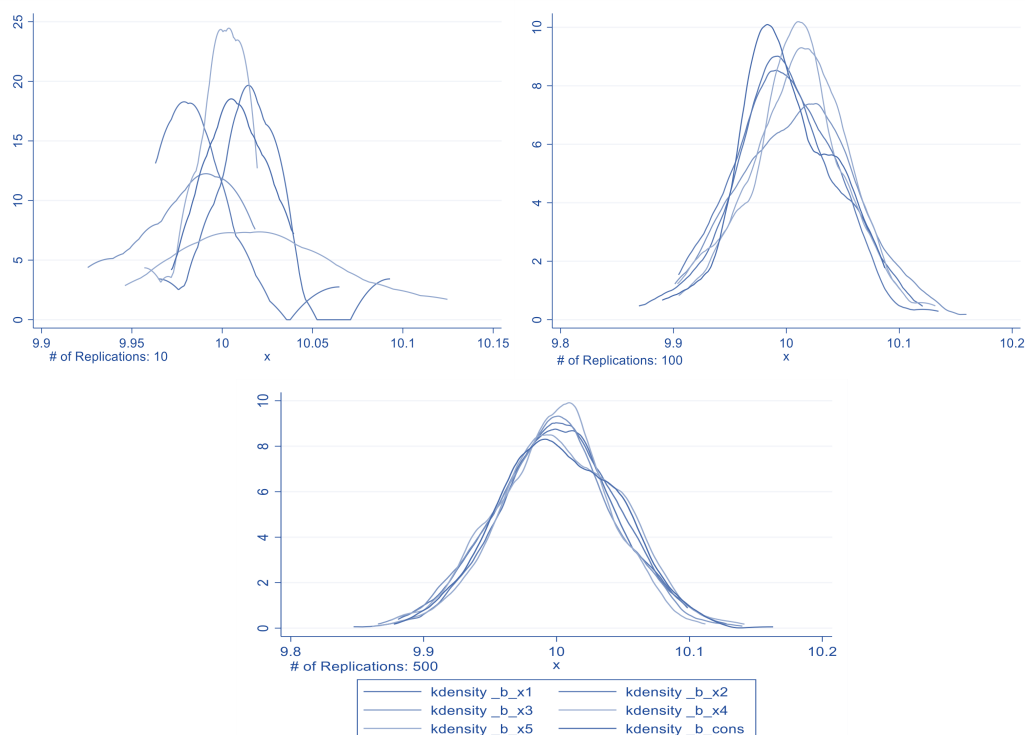
Table 14 Bootstrap Descriptive Statistics n=20

Estimated Parameter	Replications	Mean	Standard Deviation	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.977	.288	8.93	11.161
_b_x2	500	9.986	.288	9.015	10.734
_b_x3	500	9.998	.277	9.019	10.957
_b_x4	500	10.013	.279	9.185	11.261
_b_x5	500	10.009	.275	8.953	10.988
_b_cons	500	9.988	.273	8.885	10.678

Source: Own construction

Going further with the bootstrap technique and using n=500 observations, the graphical pattern in Figure 10 indicates some better adjustment regarding the lower replications compared to n=10 and n=20.

Figure 10. Bootstrap - Distributions of the Coefficients with n=500



Source: Own construction.

The pattern of the distributions among the coefficients when the number of replications is set to 500 tends to be more different from the OLS and the Jackknife estimations, which might suggest that bootstrap performs different distributions for each estimator even when the OLS and jackknife tend to converge the distribution for all estimators with the same number of $n=500$ observations. According to the descriptive statistics in Table 15, bootstraps seems to be as efficient as OLS and Jackknife specially because of the mean value of the coefficients, it's stills as accurate relative to the expected value of the estimators in comparison.

Table 15 Bootstrap Descriptive Statistics $n=500$

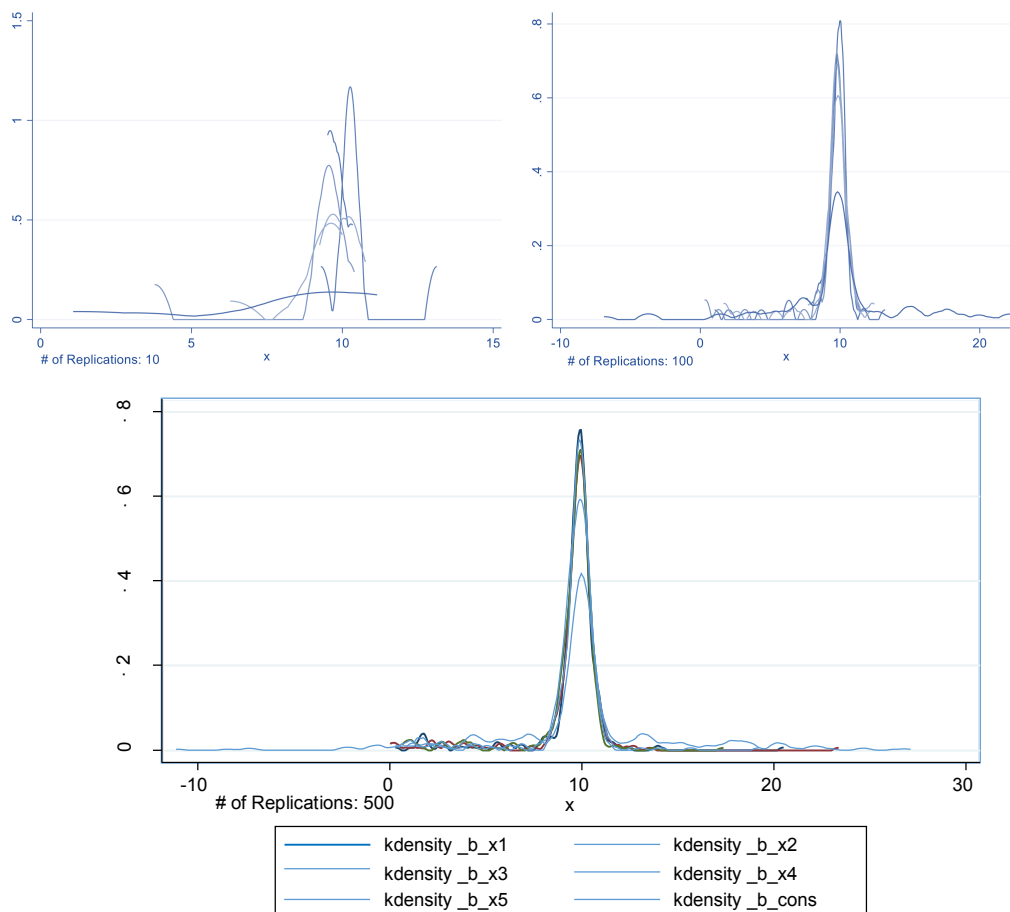
Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.998	.044	9.881	10.099
_b_x2	500	10.003	.044	9.847	10.128
_b_x3	500	9.997	.045	9.866	10.14
_b_x4	500	9.996	.042	9.875	10.112
_b_x5	500	10.005	.045	9.861	10.141
_b_cons	500	10.002	.045	9.878	10.163

Source: Own construction.

3.2.4. Lasso regression

As mentioned before, lasso cannot compute the model when the number of observations is equal to 6, so we're going straight to the analysis with 10 observations, the graphical pattern is shown ahead in Figure 11.

Figure 11. Lasso - Distributions of the Coefficients with $n=10$



Source: Own construction.

The figure suggest that the distributions are different for each variable across replications, in that case the constant coefficient remains with difference ranges when its converging to the true parameter. The descriptive statistics in Table 16 suggest that from the 500 simulations some of them failed and were just covering up to 307,

317, 318 replications, the constant term was the only one which remained across the simulations, however even when the mean value it's somewhat accurate, the minimum and maximum values are varying more in the coefficients associated with the x variables.

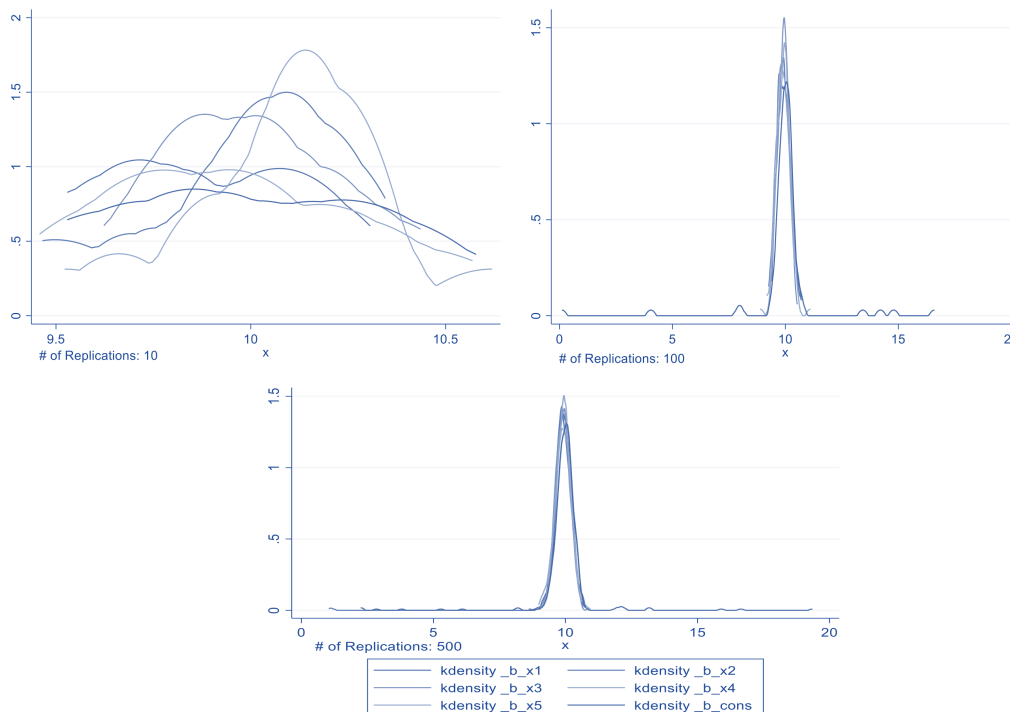
Table 16 Lasso Descriptive Statistics n=10

Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	317	9.484	1.963	.287	20.51
_b_x2	317	9.444	2.142	.014	23.37
_b_x3	314	9.371	1.921	.657	17.363
_b_x4	318	9.382	2.063	.29	19.233
_b_x5	307	9.457	1.841	.894	12.664
_b_cons	500	10.108	4.509	-11.102	27.153

Source: Own construction.

Proceeding with lasso estimations with n=20 we watch the graphical pattern associated to the distribution of the parameters as it follows in Figure 12.

Figure 12. Lasso - Distributions of the Coefficients with n=20



Source: Own construction

According to the distributions, the estimators associated to the different variables seem to behave over a wide range during the simulations with n=20 observations. Relying in the descriptive statistics in Table 17, we can find a significant range regarding the x_1 variable and the constant term in the regression. Also, some simulations failed to accomplish the main total of 500, which tends to indicate that lasso approach is sensitive to the number of replications and therefore, the overall range of the estimators differs across replications.

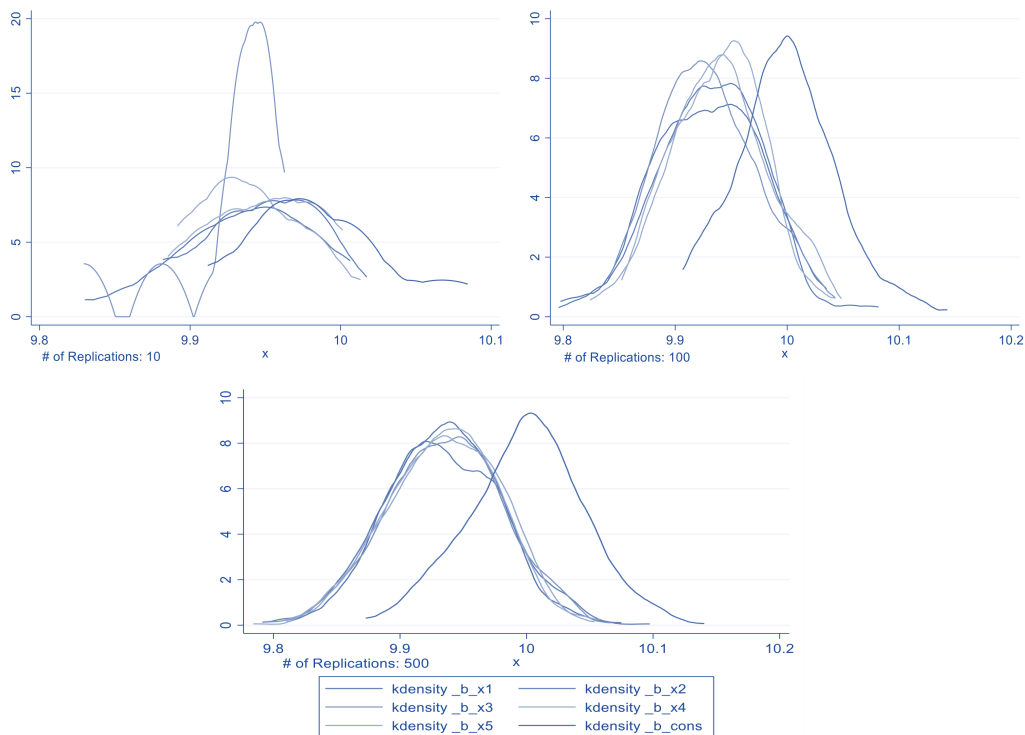
Table 17 Lasso Descriptive Statistics n=20

Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	476	9.889	.635	1.037	10.743
_b_x2	474	9.908	.296	8.608	10.746
_b_x3	474	9.904	.276	8.965	10.901
_b_x4	474	9.903	.31	8.986	10.962
_b_x5	474	9.917	.272	8.957	10.609
_b_cons	500	9.98	1.002	2.243	19.351

Source: Own construction.

The descriptive statistics tend to indicate some instability of the lasso regression with $n=10$ and 20 , which would be judge in overall with the 500 observations simulations. Proceeding with the analysis with $n=500$ simulations, the graphical pattern is shown ahead in Figure 13.

Figure 13. Lasso - Distributions of the Coefficients with $n=500$



Source: Own construction.

The distribution seems not to converge to the exact value of the DGP, lasso regression also seems to perform a different distribution relative to the other x variables and the constant coefficient. This doesn't mean Lasso regression is inconsistent, since it's close to 10, however is not as consistent as other estimations are. The descriptive statistics in Table 18 of the estimated parameters, tends to confirm this idea since the expected value of the estimators is not as close to the other types of estimations, also it tends to have a standard deviation a little bit higher than the others.

Table 18 Lasso Descriptive Statistics $n=500$

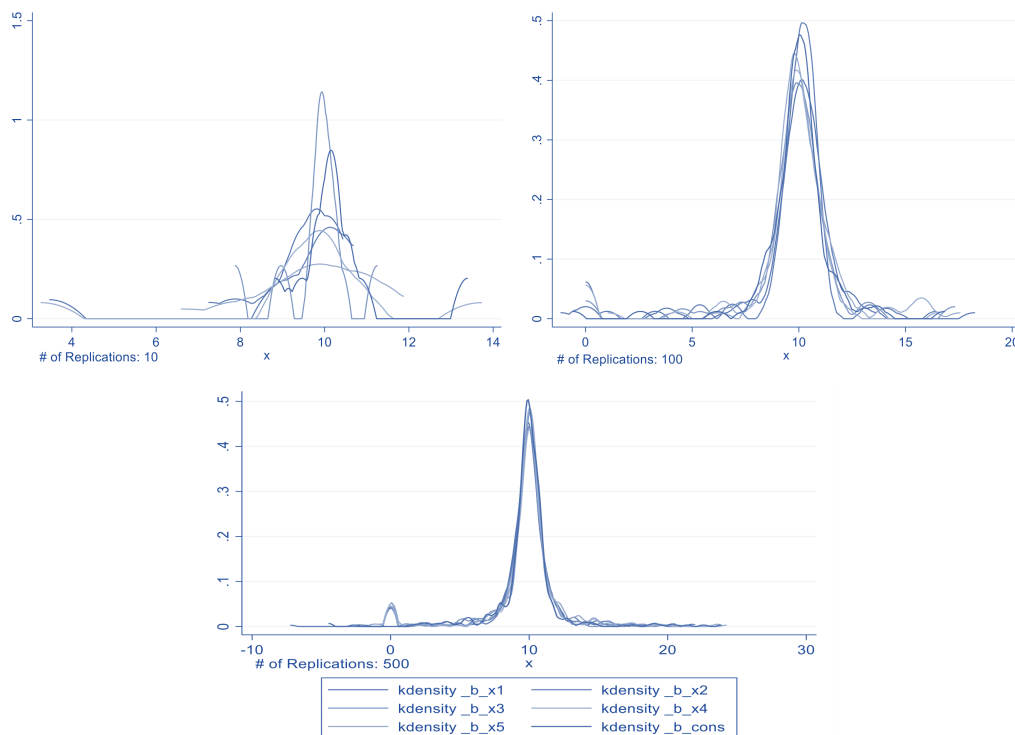
Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.934	.043	9.81	10.075
_b_x2	500	9.934	.047	9.791	10.097
_b_x3	500	9.936	.046	9.795	10.067
_b_x4	500	9.934	.044	9.784	10.059
_b_x5	500	9.935	.044	9.807	10.054
_b_cons	500	9.999	.046	9.873	10.14

Source: Own construction.

3.2.5. Robust regression

The last type of estimation we're analyzing is the robust regression, this one cannot be estimated with $n=6$ observations (the perfect micronumerosity case) so we're going straight forward to set $n=10$ observations and perform the graphical distribution patterns.

Figure 14. Robust Regression - Distributions of the Coefficients with n=10



Source: Own construction

With 500 simulations and n=10, Stata calculated 484 replications, the rest of the remaining replications failed in the maximization process. There are some appoints to make here, first: the range of the distribution with n=10 observations across replications is way too high in comparison OLS, Jackknife, Bootstrap or Lasso types of estimations, second: some of the distributions of some variables tend to have spikes closer to the value of 0 indicating that a significant number of times, the robust regression adjusted some coefficients as 0. According to the descriptive statistics in Table 19, the mean value of the coefficients tends to converge better than Lasso, however Jackknife and Bootstrap perform better with this set of observations.

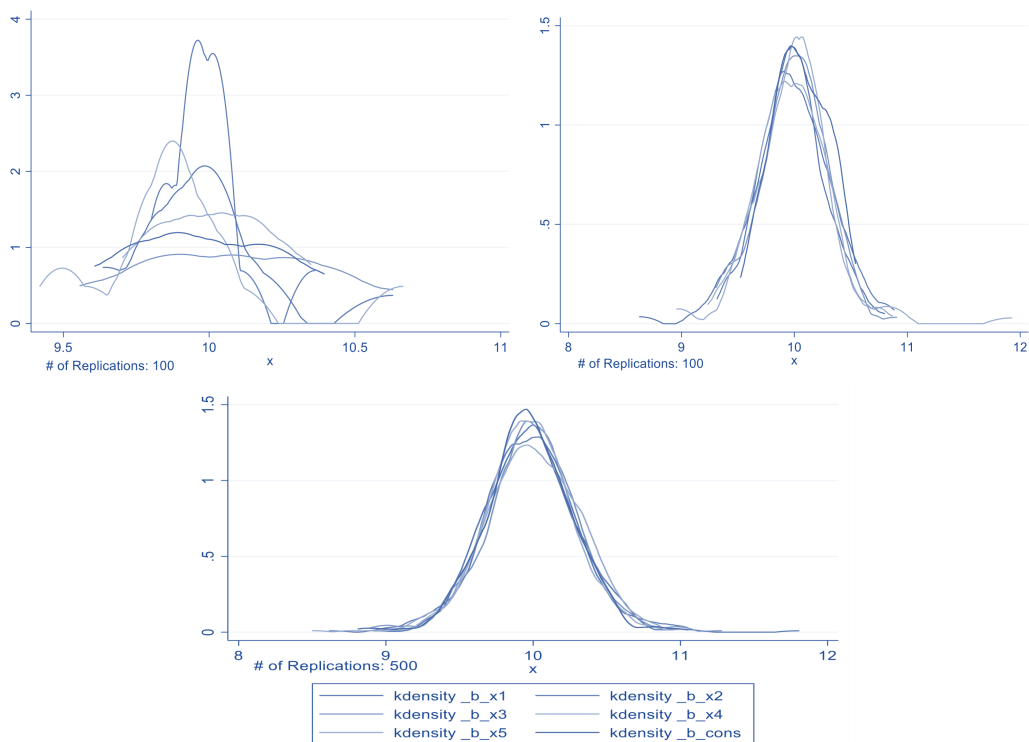
Table 19 Robust Regression Descriptive Statistics n=10

Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	484	9.704	2.682	-7.252	20.553
_b_x2	484	9.732	2.689	-2.542	21.981
_b_x3	484	9.494	2.57	0	19.703
_b_x4	484	9.794	2.661	-.849	23.795
_b_x5	484	9.694	2.949	-1.525	24.251
_b_cons	484	9.898	2.408	-4.489	23.887

Source: Own construction.

Moving forward and setting n=20 observations, we can observe that the graphical pattern of the distributions for each estimator of each variable is going more accurate with the robust regression technique, however no significant changes can be concluded from the other types of estimations.

Figure 15. Robust Regression - Distributions of the Coefficients with n=20



Source: Own construction.

The behavior with n=20 observations is far better than with n=10, also these results are consistent with a lesser range over the estimators. The mean value of the estimators is getting closer to 10 as we increased the number of replications.

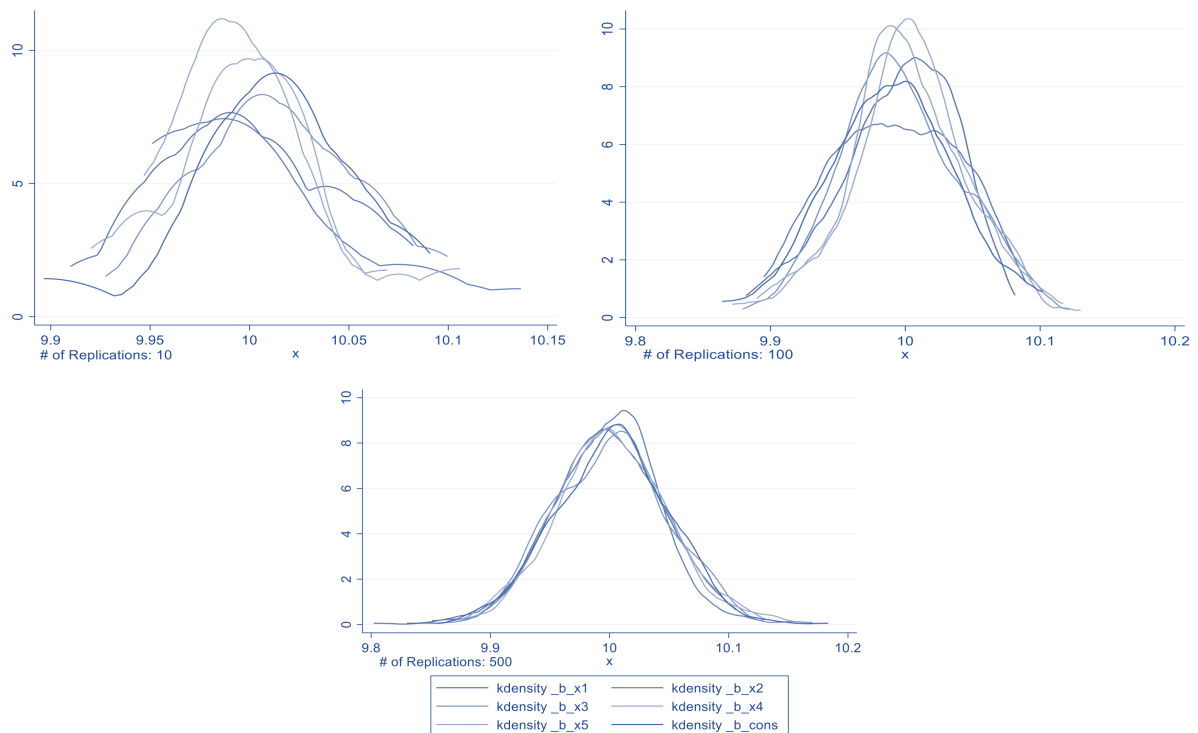
Table 20 Robust Regression Descriptive Statistics n=20

Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.989	.313	8.915	11.808
_b_x2	500	9.981	.324	8.613	11.054
_b_x3	500	9.998	.32	8.888	11.283
_b_x4	500	9.974	.3	8.499	11.044
_b_x5	500	10.003	.317	8.958	10.864
_b_cons	500	9.972	.3	8.808	11.054

Source: Own construction.

Setting the final simulations with n=500, the results of the distributions with kernel densities are shown ahead in Figure 16. The pattern tends to indicate a convergence to the true value of the parameter as the number of replications are increased, also with the descriptive statistics in Table 21, the mean value is closer to 10, leading to think that robust regression is also a good option in large samples.

Figure 16. Robust Regression - Distributions of the Coefficients with n=500



Source: Own construction.

Table 21 Robust Regression Descriptive Statistics n=500

Estimated Parameter	Replications	Mean	Standard Deviation.	Minimum Value of the Parameter	Maximum Value of the Parameter
_b_x1	500	9.998	.046	9.802	10.106
_b_x2	500	9.997	.043	9.851	10.129
_b_x3	500	10.002	.048	9.856	10.17
_b_x4	500	10.002	.046	9.872	10.132
_b_x5	500	10.002	.047	9.864	10.154
_b_cons	500	10.002	.048	9.83	10.183

Source: Own construction

3.3. Comparing the estimations

In order to synthesize the previous part, we can discriminate the results by the number of observations (from the lowest) and the descriptive statistics for the coefficients, in this order of ideas the mean value of the whole estimators across simulations would be our reference point, standard deviation as lower it is the better, and the minimum and maximum values closer to 10 would be ranked.

Table 22 Comparison between Estimations, n=10

Estimation Type n=10	Expected Value of the Estimators	Expected Std. Deviation	Expected Minimum Value	Expected Maximum Value
OLS	9,98266667	0,59366667	6,0585	12,74266667
Jackknife	10,00283333	0,579	7,69483333	12,68816667
Bootstrap	9,98783333	0,56983333	7,64633333	12,78866667
Lasso	9,541	2,4065	-1,49333333	20,0488333
Robust Regression	9,71933333	2,65983333	-2,77616667	22,36166667
Best Option	Jackknife	Bootstrap	Jackknife	Jackknife

Source: Own construction

According to Table 22, when we're considering a sample size with n=10 observations in the context of a 6-coefficient estimation in the regression models, the best option is the jackknife estimation technique. It should be

noted that the number of freedom degrees in the residuals for this case is equal to 4. It is expected that when this number gets higher, we might have more accurate estimators from the other techniques.

Table 23 Comparison between Estimations, n=20

Estimation Type n=20	Expected Value of the Estimators	Expected Std. Deviation	Expected Minimum Value	Expected Maximum Value
OLS	10,0011667	0,2735	9,0195	10,9645
Jackknife	9,98883333	0,2755	9,09916667	10,8118333
Bootstrap	9,99516667	0,28	8,99783333	10,9631667
Lasso	9,91683333	0,46516667	6,466	12,2186667
Robust Regression	9,98616667	0,31233333	8,78016667	11,1845
Best Option	OLS	OLS/Jackknife	Jackknife	Bootstrap

Source: Own construction.

When the number of observations is increased to n=20 and the degrees of freedom is higher to a value of 14, the OLS performs quite better in the expected value of the coefficients according to Table 23, meanwhile we got a draw with OLS and jackknife in the case for the lesser expected value of the standard deviation. It is noted that the jackknife approach has better performance regarding the minimum expected value of the estimator.

Table 24 Comparison between Estimations, n=500

Estimation Type n=500	Expected Value of the Estimators	Expected Std. Deviation	Expected Minimum Value	Expected Maximum Value
OLS	10,0003333	0,04366667	9,85966667	10,1286667
Jackknife	10,0003333	0,04433333	9,85933333	10,1335
Bootstrap	10,0001667	0,04416667	9,868	10,1305
Lasso	9,94533333	0,045	9,81	10,082
Robust Regression	10,0005	0,04633333	9,84583333	10,1456667
Best Option	Bootstrap	OLS	Bootstrap	Lasso

Source: Own construction.

In Table 24, when our sample size is sufficiently large (n=500), the bootstrap technique performs better than OLS, Jackknife, Lasso or Robust regression, although OLS tends to have a lesser expected deviation than the rest. Over this stage, since samples sizes are large, there are sufficient arguments to prefer one method over another but this selection needs to be accounted for specific contexts, for example, robust regression wasn't scored as the best in any of these statistics but it would be extremely useful when we got outliers in the sample, where in such case the OLS estimator fails to account for them (Adepoju & Olaomi, 2012). In fact, a new development performed by Mishra (2008) of the robust approach can be more useful in the presence of outliers.

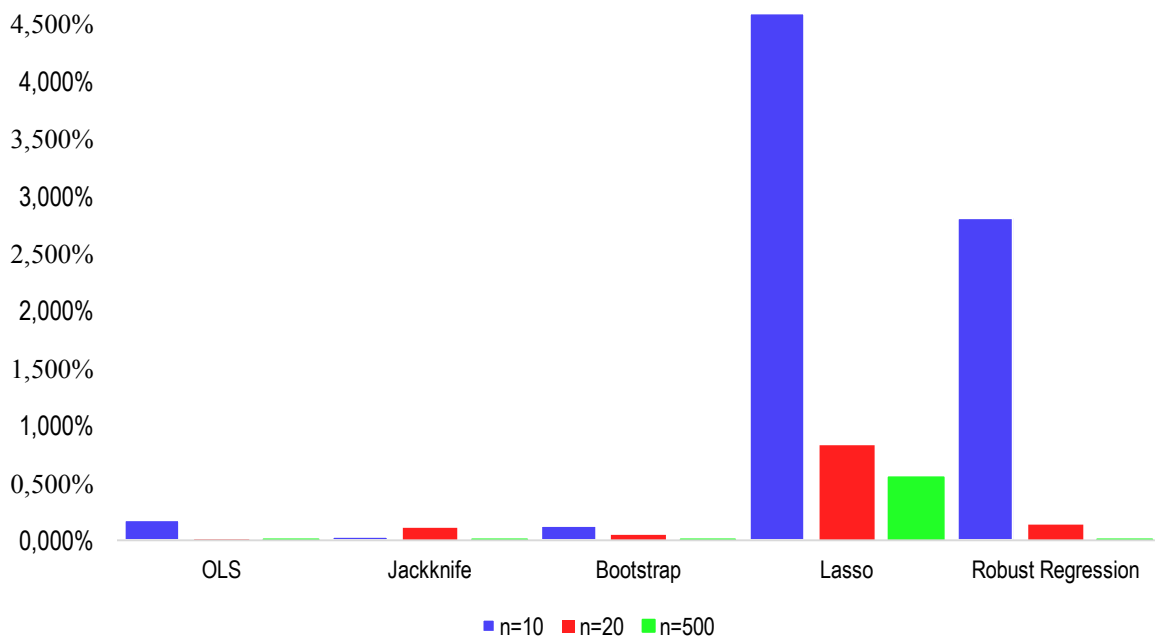
We need to remember that this analysis was performed with random variables that followed a distribution of $N \sim (0,1)$ and the main interest was to analyze the estimations for low samples (the perfect micronumerosity case n=6 and the others with n=10, n=20, n=500 with replications of 10, 100 and 500 simulations). The DGP in equation (1) was also established to be a cross-sectional type of data, so no autoregressive problems or incorrect specifications were assumed for the types of estimations.

The relative bias analysis in Figure 17, with n=10 observations, suggest that Lasso regression performs the worse bias value, reaching a score of deviation of 4.59% calculated from the expected value of the estimators compared with the true parameter, followed by the robust regression with a value of 2.807%. Bootstrap and OLS perform far better than these types of regressions with respective scores of 0.173% and 0.122%, the lower bias was obtained with the jackknife approach with a bias of 0.028%.

Moving to the sample size of n=20 observations, Lasso and robust regression performs also the worse value of the relative bias, respectively with values of 0.832% and 0.138%. Jackknife now turns to be in third place with a relative bias of 0.112% while bootstrap has a value of 0.048% and the OLS with a score of 0.012% indicating a lesser bias.

Finally, when the sample size is large (n=500), Lasso remains with the worse score in the relative bias with a value of 0.547%, meanwhile robust regression has a score of 0.005% of relative bias against the DGP. OLS and Jackknife have the same relative bias with a score of 0.003%. The best performance in terms of relative bias in this case was obtained with Bootstrap with a score of 0.002% of relative bias among the simulations, the proceeding graph summarizes this result.

Figure 17. Relative Bias for each estimation type by sample size



Source: Own construction.

Conclusion

This paper performed over 1500 simulations distributed among different sample sizes ($n=6$, $n=10$, $n=20$ and $n=500$) with a linear Data Generating Process in order to regress a model with six coefficients and five variables, these variables were normally distributed with zero mean and variance of one, the estimations types for the regressions across simulations were the approaches of OLS, Jackknife, Bootstrap, Lasso and Robust Regression.

The statistical significance of the coefficients across the models tends to follow the pattern described by Speed (1994) where a significant relationship is found in a small sample also will prevail when the sample size gets bigger. However, the Bootstrap approach seems to be sensitive to the sample size, since with $n=10$ observations it didn't present a significant relationship for one variable which was part of the DGP, suggesting that Bootstrap might discard significant relationships of certain variables during the regressions with a small sample size. As soon as the sample size increased to $n=20$, the bootstrap approach presented significant relationships with a 5% significance level, and with a larger sample size, the statistical significance was of 1%. On the other hand, OLS, Jackknife, Lasso and Robust regression performed well in terms of the statistical significance of the coefficients for all the variables in the DGP across the Monte Carlo simulations with different sample size.

Comparing the results with $n=10$ observations, the best estimation type was performed with the Jackknife approach, since the expected value of the coefficients was the best in terms to be closer to the true value of the DGP, also this approach suggests a lesser relative bias across the replications for the coefficients with this sample size. Bootstrap on the other hand with this sample size had the lowest expected standard deviation. In this case, it is confirmed that Speed (1994) was right in affirming that Jackknife and Bootstrap techniques are more suitable in small samples, however the drawback of the bootstrap approach is the sensitiveness in the statistical significance of the coefficients. According to these results, the jackknife approach seems to be more suitable for lower sample analysis.

In the case of $n=20$ observations, OLS obtained the best score regarding the accuracy of the estimators across simulations, as a reference for this, the relative bias was the lowest among the other types of estimations. In terms of the expected standard deviation, OLS matched the jackknife approach, but the minimum expected value of the estimators across replications of the jackknife was closer to the true value instead of the OLS regressions.

In the final simulations with $n=500$ observations, Bootstrap approach performed better than the rest of the estimation's types in terms of the accuracy of the estimator, a relative bias of 0.002% regarding from the true parameter was calculated with this approach. Also, the minimum expected value of the estimators was closer from this approach than the others, suggesting that bootstrap might be more appropriate for large samples.

According to the last results and as it is suggested by Speed (1994), researchers should perform also jackknife and bootstrap approaches when they're analyzing relationships from a set of variables in the multivariate regression framework, this in order to obtain more accurate estimations. However, the statistical significance might not be a good idea to be checked with the bootstrap approach since from this study, it was proved that its sensitive to the size of the samples and might induce to errors of type 1 more easily. Jackknife approach seems to be the most reliable method to perform correct inferences when the sample size is small.

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Impact of Certain Sales Promotion Tools on Consumers' Impulse Buying Behavior

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Abstract:

The manuscript investigates the impact of the observed sales promotion tools on the consumers' impulse buying behavior. Beside the theoretical analysis of sales promotion and impulsive consumer behavior, the authors try to determine which of the observed sales promotion tools is most effective in encouraging consumers to perform impulsive purchases. Analysis of collected data is done with the help of three statistical-econometric methods: factor analysis, regression analysis and reliability analysis. According to the results of researches carried out, discounts are the tool by which consumers are most motivated to pursue impulsive purchases. Also, free samples and demonstrations and product rehearsals are very effective, while loyalty cards are the most ineffective. Thanks to these research results, this manuscript will have a contribution both for marketers and brand managers (companies), as well as consumers and future researches on this or similar topic.

Keywords: sales promotion tools; consumers' impulse buying behavior.

JEL Classification: M21; M31.

Introduction

Although purchases of products and services are largely planned consumer actions, unplanned (impulsive) purchases are also frequent. These are the purchases that consumers do not specifically plan before entering the store, or in advance, but make the spur of the moment (Yin and Jin-Song 2014, Solomon 2017). Due to exposure to a particular stimulus, consumers can make quick purchases of those products that they believe represent a good deal. Also, such purchases affect consumers' emotions and feelings after performing the same (Piron 1991, Parboteeah 2005, Virvilaite, Saladiene and Bagdonaite 2009, Verma and Verma 2012, Yin and Jin-Song 2014, Solomon 2017). Therefore, many companies and their marketing departments make great efforts to influence consumers to make impulsive (unplanned) purchases.

There are many definitions of sales promotion in the literature. However, the most comprehensive definition is the one by which sales promotion encompasses a range of incentives, *i.e.* methods (mostly short-term) designed to encourage faster or greater purchase of certain products by consumers (Blattberg and Neslin 1990, Laroche, Pons, Zgolli, Cervellon and Kim 2003, Oyedapo, Akinlabi and Sufian 2012). Sales promotion can be directed to different participants in the distribution channel, *i.e.* towards consumers, business customers, and sales staff (Egan 2007, Kotler and Keller 2006, Percy 2008, Shimp 2007). However, in this paper, the focus will be on those sales promotion methods used by companies to encourage consumers to make impulsive purchases.

1. Literature review

Consumer-oriented sales promotion refers to incentives offered directly to the consumers of a particular company or its potential consumers with the intention of speeding up their decision-making process to buy products of a company rather than competitors (Kotler and Armstrong 1994, Moriarty, Mitchell and Wells 2012, Palmer 2004, Percy 2008). These are various short-term promotional methods that add value to products (either by reducing

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costs or adding benefits) and thus provide an unequivocal incentive to buy them (Srinivasan and Anderson 1998; Du Plessis, Bothma, Jordaan and Van Heerden 2010). More specifically, these methods are used to stimulate specific responses in consumer behavior, such as (Shi, Cheung and Prendergast 2005):

- brand change (procurement of competing products);
- inventory creation (purchase of a larger quantity of products than planned);
- speeding up purchases (pre-planned procurement);
- a trial of those products that have not been purchased so far;
- spending more money than planned.

Some of the most important consumer promotion methods that have also served as variables in research presented by this paper are: discounts, free samples, bonus packs, premiums, loyalty programs, rewards, coupons and product demonstrations and rehearsals. There is a quantum of research in the literature that has examined the impact of sales promotion methods on impulsive consumer behavior. It is important to note that almost all have come to the conclusion that most of the observed methods (if not all) have a given influence, expressed to a greater or lesser extent. Thus, for example, according to the results of some recent research (Osman, Fah and Foon 2011, Tinne 2011, Banerjee and Saha 2012, Rittipant, Kheawwilai, Suaingam, Promsoot and Vivatanaprasert 2013, Nagadeepa, Selvi and Pushpa 2015), discounts are the method that most motivates consumers to make impulsive purchases. The reason for this is certainly the consumer's desire for savings. In particular, discounts provide the buyer with a temporary reduction in price and thus immediate value, and therefore represent an unequivocal incentive to buy (Jobber and Fahy 2006). Others include bonus packs, loyalty cards, free samples, coupons and rewards, whose impact strengths vary depending on the research. According to Osman *et al.* (2011) discounts and free samples are the most significant methods that influence impulsive consumer behavior, while according to Tinne (2011) these are discounts and bonus packs. The results of the Tinne's study were also confirmed by Rittipant *et al.* (2013), stating that discounts, followed by bonus packs, loyalty cards, and coupons, have the greatest impact, with the least impact. On the other hand, Nagadeepa *et al.* (2015) found that discounts and loyalty cards are those methods that have a significant effect on encouraging consumers to go shopping ahead of schedule, whereas this cannot be said for coupons, rewards and bonus packs. Results of research done by Kelemen and Kemeny (2019) show that special events' shoppers could be segmented and these segments could assist retailers to find distinct shopper groups.

In accordance with the theoretical review and the results of previous research, the paper defines three hypotheses, which will be proven (tested):

H1: There is a statistically significant effect of sales promotion methods on impulsive consumer behavior;

H2: Discounts are a sales promotion method that has the greatest impact on impulsive consumer behavior;

H3: Overall, the methods that have the most effect are those that create value for the consumer or save money.

2. Methodology

2.1. Data collection and sample description

The survey was conducted during 2018 in the largest cities of the five regions of Serbia, which are usually taken in marketing and other segmentations (Eastern, Western and Southern Serbia, and Vojvodina and Sumadija-Central Serbia). A directed random sample was used to collect the data required for the survey. It was composed of respondents of different demographic profiles who were contacted on site, *i.e.* in front of three supermarket chains (Dis, Maxi and Idea), in which some of the mentioned sales promotion methods were used during that period. Based on the consent of the respondents to participate in the survey and the received e-mail addresses, the web address of the survey was sent and the respondents filled it via the Internet. This method was chosen because the respondents did not have enough time to answer all questions in direct contact, and also because this approach resulted in more precise answers that were later easier to compare. The study was conducted on a sample of 376 elementary units. Of these, 37.8% were male and 62.2% were female; the age of the respondents ranged from 20 to 84 years. Viewed by region, most respondents were from Sumadija and Western Serbia (58.5%), followed by Belgrade (19.4%), Vojvodina (12.5%), South and Eastern Serbia (8.2%) and lastly Kosovo and Metohija (1.3%). Out of the total number of respondents, 51.6% of them stated that they make purchases in supermarkets once a week, 24.2% of respondents make it daily, 11.4% of them once every two weeks, 7.4% once a month, 2.9% less than once a month, with the rest doing it once every three weeks.

2.2. Methods

When referring to the measuring instrument, the survey questionnaire (in the second and third part) contained precisely defined statements regarding:

- certain answers in the behavior of the respondents (change of brand, making inventories, speeding up purchases, trying out those products that have not been bought so far and spending more money than planned) that each of the observed methods (discounts, bonus packages, free samples, coupons, premiums), awards, loyalty programs and product demonstrations and rehearsals) creates;
- impulsive consumer behavior (Table 1).

Table 1. Observations regarding impulsive consumer behavior

Impulsive consumer behavior
I often buy products spontaneously, without thinking
If I see something I think I need, I'll buy it even though I went shopping for other things
I buy products the way I feel at the moment
I'm going shopping to improve my mood
I feel excited when I do impulsive shopping
I find it hard to control myself from buying, especially when I see a good deal
If I see a good deal, I tend to buy more than originally planned

Source: Authors

Respondents expressed the degree of their agreement with the definite findings on a five-point Likert scale (1 - disagree at all, 2 - disagree, 3 - partially agree, 4 - agree and 5 - completely agree). The aforementioned findings were selected based on a review of relevant literature in the field of sales promotion and consumer behavior, or factors that affect them (Gilbert and Jackaria 2002, Shi *et al.* 2005, Osman *et al.* 2011, Tinne 2011, Banerjee and Saha 2012, Rittipant *et al.* 2013, Ashraf, Rizwan, Iqbal and Khan 2014, Obeid 2014).

All data collected were stored in the SPSS (Statistical Package for Social Science, version 20.0) database. The same program was later used to analyze the statistics provided.

In order to determine the impact of the observed sales promotion methods on impulsive consumer behavior, regression analysis was used as one of the methods of predictive analysis. However, factor analysis was first conducted, which is one of the most popular multivariate techniques and is used to investigate the links between different traits, *i.e.* for reducing a large set of variables or scale items to a smaller number of dimensions or factors, which are easier to work with (Pallant 2011). After the obtained results of factor analysis, the mentioned regression analysis was conducted in order to show whether there is an influence of the obtained factors on the variable impulsive behavior of consumers. Also, it is important to emphasize that the reliability analysis was also used to measure the level of reliability of the obtained factors and internal agreement of the findings by Kronbach's alpha coefficient. To determine statistical significance, a 95% confidence interval, that is, a risk factor $\alpha = 0.05$, was used.

3. Results of the research

Prior to the actual implementation of factor analysis, the values of the KMO test (KMO = 0.901) and the Bartlett test ($p = 0.000$) confirmed that conditions for its application were justified (Table 1 in *Annex*). KMO index values can range from 0 to 1, and using factor analysis is inadequate if KMO values are below 0.5. Bartlett's test is based on hi-square statistics. The obtained value shows that the null hypothesis (no significant correlation between the variables) is rejected. The principal component analysis was used as a method of factor analysis in this study, which considers the total variance in the data. The diagonal of the correlation matrix contains units and the total variance is entered into the factor matrix. To determine the number of factors in this paper, two criteria were used, the first based on characteristic values and the second on the Scree Plot diagram. In the first case, we are only interested in those factors whose characteristic value is 1 or more (Kaiser's criterion), while in the second, only those factors above the crossing point are retained. The results of the application of both criteria are presented in the appendix. For the sake of clearer interpretation of the factors, Varimax method was used as one of the most commonly used orthogonal rotations. It minimizes the number of variables with high absolute values of factor loadings and provides factors that are not correlated (Pallant 2011).

The results of the factor analysis (presented in the following table) show that the findings clustered around the nine formed factors. The first "reward" factor explains 32.899% of the variance. This factor captures all five awards related statements. The second "free samples" factor, which includes all five statements regarding free samples, explains 9,640% of the variance. The third "loyalty card" factor describes 6.796% of the variance and

includes all the findings regarding loyalty cards. The fourth factor of “demonstrations and product rehearsal” refers to all findings regarding product rehearsal and explains 5.929% of variance. The fifth “coupons” factor explains 5.627% of the variance and includes all five coupons findings. The sixth factor of “premiums” concerns the findings regarding premiums. This factor describes 4.641% of the variance. The seventh “discount” factor explains 3.994% of the variance and refers to the findings regarding discounts. The eighth “bonus pack” factor captures the findings regarding the bonus pack and describes 3.509% of the variance. Finally, the ninth factor “changing the brand and product rehearsal” explains 2.955% of the variance and refers to those findings regarding bonus packages, discounts and premiums. Otherwise, all nine factors describe 76.030% of the total variance. On the basis of all of the above, it can be concluded that the theoretical basis of the questionnaire was almost completely confirmed.

The next step is a reliability analysis. According to the results obtained, all nine factors have a high level of reliability. As can be seen from Table 2, alpha coefficients are higher than the minimum confidence threshold of 0.7 recommended by Nunnally (1978). Since high values of the alpha coefficients were obtained (more than 0.8 for all factors except for the seventh one), it can be concluded that there is an internal agreement between the findings grouped around each individual factor. This justified the use of the above statements.

Table 2. Results of exploratory factor analysis

Statements	Factors								
	1.	2.	3.	4.	5.	6.	7.	8.	9.
Factor 1. Rewards									
Speeding up your shopping	0.843								
Spending more money	0.840								
Making stock	0.826								
Brand change	0.823								
Product rehearsal	0.809								
Factor 2. Free samples									
Speeding up your shopping		0.844							
Spending more money		0.804							
Making stock		0.802							
Changing the brand		0.796							
Product rehearsal		0.715							
Factor 3. Loyalty cards									
Making stock			0.850						
Speeding up your shopping			0.824						
Spending more money			0.805						
Changing the brand			0.760						
Product rehearsal			0.738						
Factor 4. Demonstrations and product rehearsal									
Changing the brand				0.852					
Speeding up your shopping				0.816					
Spending more money				0.814					
Product rehearsal				0.794					
Making stock				0.778					
Factor 5. Coupons									
Speeding up your shopping					0.859				
Changing the brand					0.826				
Making stock					0.802				
Spending more money					0.789				
Product rehearsal					0.780				
Factor 6. Premiums									
Making stock						0.827			
Speeding up your shopping						0.803			
Changing the brand						0.747			
Product rehearsal						0.719			
Spending more money						0.701			
Factor 7. Discounts									
Speeding up your shopping							0.809		
Spending more money							0.728		

Statements	Factors								
	1.	2.	3.	4.	5.	6.	7.	8.	9.
Making stock							0.683		
Product rehearsal							0.526		
Changing the brand							0.498		
Factor 8. Bonus packages									
Making stock								0.755	
Spending more money								0.737	
Speeding up your shopping								0.696	
Changing the brand								0.341	
Product rehearsal								0.344	
Factor 9. Changing the brand and product rehearsal									
Changing the brand (bonus packs)									0.708
Product rehearsal (bonus packs)									0.641
Changing the brand (discounts)									0.555
Product rehearsal (Discounts)									0.516
Changing the brand (premiums)									0.322
Product rehearsal (Premiums)									0.322
Eigenvalue	13.160	3.856	2.718	2.371	2.251	1.856	1.598	1.404	1.198
Percentage of variance described	32.899	9.640	6.796	5.929	5.627	4.641	3.994	3.509	2.995
Alfa	0.983	0.916	0.932	0.902	0.918	0.908	0.793	0.817	0.825

Source: Authors

Following the results of the factor analysis, a regression analysis was conducted to show whether there is an influence of the nine factors (factor scores - independent variables) on the dependent variable (impulsive consumer behavior). It is important to note that the dependent variable is created by calculating the total scores on the scale for each subject (respondent). More specifically, the total scores for each respondent on this scale consisted of the sum of scores for each item (constant) that related to impulsive consumer behavior (Table 1).

However, in order to perform the regression analysis, it was first verified that the assumptions about sample size, normality, linearity, multicollinearity, and homogeneity of variance were met. Tabachnick and Fidell (2007) provide a sample size calculation formula that considers the number of independent variables: $N > 50 + 8m$ (where m = number of independent variables). As in this paper, $m = 9$ and the total sample size $n = 376$, it can be concluded that the sample size assumption is satisfied. Also, the analysis showed that the remaining assumptions were not violated and it was justified to carry out the regression analysis (Charts 2 and 3 in the appendix).² In specific, the problem of multicollinearity was tested through a variance inflation factor (VIF). Since the VIF values for each factor were less than 10, which also represents the intersection point for determining the presence of multicollinearity, therefore it can be concluded that the same does not exist between the observed variables³.

The coefficient of determination of R^2 is 0.105, which shows that 10.5% of the variability of the dependent variable explains the nine factors obtained (Table 3 in the annex). Based on Snedekor's F random variable ($F=4.772$) and realized level of significance ($p = 0.000$), we can conclude that there is a mean, statistically significant regression of the influence of observed factors on impulsive consumer behavior (Table 4 in the appendix). This is also confirmed by Table 3, which presents the values of non-standardized coefficients B, standardized coefficients β , t-statistics and realized significance levels (column Sig.). Looking at column β we can see that the highest value of this coefficient (0.183) is recorded for the seventh factor (discounts). This means that this factor (variable) individually contributes most to explaining the dependent variable, when subtracting the variance explained by all

² In the Normal Probability Plot (P-P) diagram of the Regression Standardized Residual it can be seen that the points lie in approximately a straight diagonal line from the lower left to the upper right corner of the diagram. It indicates that there are no major deviations from normality. In the scatterplot diagram of standardized Scatterplot residuals, it can be seen that the residuals are approximately rectangular distributed and that most of the results are accumulated in the center (around point 0). This concludes that there is no deviation from the shape of the central rectangle, which means that some of the starting assumptions are not violated. In other words, the residuals are normally distributed around the predicted values of the dependent variable, thus fulfilling the assumption of normality. Also, residuals have a linear relationship with the predicted values of the dependent variable, *i.e.* their diagram is approximately a straight line. Thus the assumption of linearity is fulfilled. Among other things, the residual variance around the predicted values of the dependent variable is approximately the same for all predicted values, thus also assuming the variance homogeneity is also fulfilled.

³ Validation of the multicollinear assumption was performed according to: Pallant, J. (2011), SPSS priručnik za preživljavanje (prevod 4. izdanja), Beograd: Mikro knjiga.

other factors (variables) in the model. The values of the coefficients β for the second and fourth factors are less than 0.183, and therefore their contribution is smaller. It is important to note that of the nine, as many as six factors (first, third, fifth, sixth, eighth and ninth) did not have a statistically significant effect on impulsive consumer behavior ($p > 0.05$). Certainly, loyalty cards are at the top ($p = 0.983$). For all others, their statistically significant effect on the dependent variable was confirmed. The highest impact was recorded for the seventh factor ($p = 0.000$). Second ($p = 0.001$) and fourth ($p = 0.003$) follow. This (partially) confirmed the first defined hypothesis in manuscript (H1).

Table 3. Results of the regression analysis (dependent variable: impulsive consumer behavior)

Variable	B	β	t	Sig.
Factor 1. Rewards	0.370	0.056	1.126	0.261
Factor 2. Free samples	1.099	0.166	3.348	0.001**
Factor 3. Loyalty cards	-0.007	-0.001	-0.021	0.983
Factor 4. Demonstrations and product rehearsal	0.996	0.150	3.033	0.003**
Factor 5. Coupons	0.264	0.040	0.804	0.422
Factor 6. Premiums	0.355	0.054	1.082	0.280
Factor 7. Discounts	1.218	0.183	3.709	0.000**
Factor 8. Bonus packs	0.644	0.097	1.960	0.051
Factor 9. Changing the brand and Product rehearsal	0.446	0.067	1.359	0.175

Notes: $p < 0.01$ (**), $p < 0.05$ (*); $R^2 = 0.105$; $F = 4,772$ **

Source: Authors

The results obtained are broadly similar to the results of previous research on the same topic (Osman *et al.* 2011, Tinne 2011, Banerjee and Saha 2012, Rittipant *et al.* 2013, Nagadeepa *et al.* 2015). According to this and all of the previously conducted research, discounts are the method of sales promotion that motivates consumers the most for impulsive, *i.e.* unplanned purchases. Thus, the second defined hypothesis in manuscript (H2) is confirmed. Also, free samples and demonstrations and product rehearsals play a significant role and stand out from other variables, thus also confirming the third hypothesis (H3). This is almost certainly conditioned by the poor material condition of the average consumer, *i.e.* high share of consumer basket in individual or family income, which the authors plan to confirm in the next survey.

Conclusion

In order to investigate the influence of sales promotion methods on impulsive consumer behavior, a large set of variables was reduced to a smaller number of factors in order to show whether there was an influence of these isolated factors on the dependent variable impulsive consumer behavior. The factor analysis showed that the findings from the survey were grouped around nine separate factors that together describe 76.030% of the total variance. Among them, the factor that contributes most to explaining variance is rewards (32.899%). On the other hand, the least contributing factor is changing the brand and product rehearsal (2.649%). It refers to those statements regarding bonus packages, discounts and premiums. Also, the reliability analysis showed that all the factors have a high level of reliability, which justifies their use for further research on this topic. Based on the conducted regression analysis, it was concluded that there is a statistically significant influence of certain methods of sales promotion, *i.e.* factors, to impulsive consumer behavior. Therefore, the first defined hypothesis is partially confirmed. The factor that contributes most to explaining the dependent variable, when subtracting the variance explained by all other factors (variables) in the model, is discounts. Second in importance are free samples and the third is demonstrations and product rehearsal. This also confirmed the second and third hypotheses. On the other hand, all other factors have been shown to have no significant effect on impulsive consumer behavior, which is a surprise. Certainly, loyalty cards come first. They are the least contributing factor in explaining the dependent variable. The results obtained are broadly similar to the results of previous research on the same topic (Osman *et al.* 2011, Tinne 2011, Banerjee and Saha 2012, Rittipant *et al.* 2013, Nagadeepa *et al.* 2015). The reason for this claim lies in the fact that these sales promotion methods are relatively easy to understand and, on the basis of them, consumers can clearly assess the benefits they receive from a purchase. This also confirms the results of the research conducted so far (Gilbert and Jackaria 2002, Shi *et al.* 2005, Osman *et al.* 2011, Obeid 2014).

In addition to the fact that the results of the study coincide with the mentioned studies conducted in this and the previous decade, certain differences and variations exist both in the mutual conclusions of the mentioned studies and in comparison with this study. The authors assume that these differences are due to market diversities as well as cultural differences between different countries. Therefore, the authors propose and plan to conduct

research that would pair this type of research with Hofstede's extended theory of cultural dimension (Hofstede, Hofstede and Minkov 2010), in order to create the model in relation to different countries in one region (former Southeast Europe) or the continent.

This study has limitations due to the fact that the sample is not representative, but despite them, the results provide an empirical framework as a reference for further research and may also be useful for selling and managing brands of different orientations.

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APPENDIX

Table 1. Results of verification of the validity of the factor analysis

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		901
Bartlett's Test of Sphericity	Approx. Chi-Square	12184.120
	Df	780
	Sig.	.000

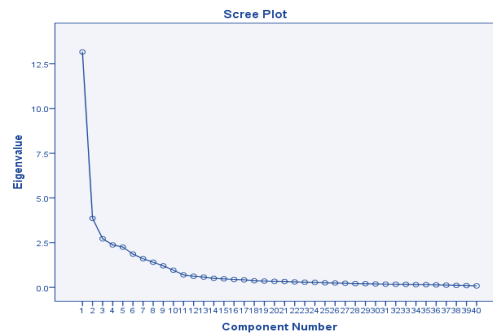
Table 2. Determining the number of factors using criteria based on eigenvalues

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of variance	Cumulative %
1	13.160	32.899	32.899	13.160	32.899	32.899	4.129	10.323	10.323
2	3.856	9.640	42.539	3.856	9.640	42.539	3.934	9.835	20.158
3	2.718	6.796	49.335	2.718	6.796	49.335	3.907	9.767	29.925
4	2.371	5.929	55.264	2.371	5.929	55.264	3.881	9.704	39.629
5	2.251	5.627	60.891	2.251	5.627	60.891	3.859	9.647	49.276
6	1.856	4.641	65.532	1.856	4.641	65.532	3.517	8.793	58.069
7	1.598	3.994	69.526	1.598	3.994	69.526	2.542	6.356	64.425
8	1.404	3.509	73.035	1.404	3.509	73.035	2.328	5.821	70.246
9	1.198	2.995	76.030	1.198	2.995	76.030	2.314	5.785	76.030
10	.954	2.385	78.415						
11	.695	1.738	80.153						
12	.617	1.544	81.697						
13	.572	1.430	83.127						
14	.501	1.253	84.380						
15	.471	1.179	85.559						
16	.441	1.102	86.661						
17	.418	1.044	87.705						
18	.367	.916	88.621						
19	.349	.874	89.495						
20	.334	.836	90.331						
21	.328	.820	91.150						
22	.303	.758	91.908						
23	.286	.715	92.623						
24	.275	.687	93.310						
25	.251	.628	93.938						
26	.241	.602	94.540						
27	.229	.572	95.111						
28	.208	.519	95.630						
29	.202	.506	96.136						
30	.188	.470	96.606						
31	.177	.443	97.049						
32	.172	.430	97.479						
33	.166	.415	97.895						
34	.149	.373	98.268						
35	.148	.371	98.639						

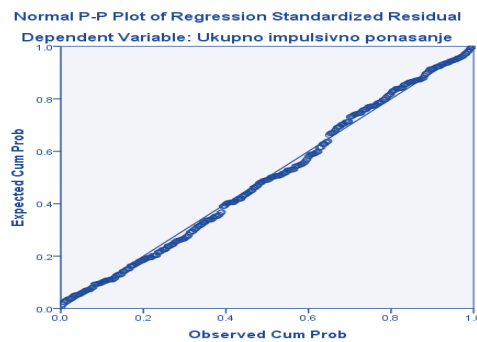
Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of variance	Cumulative %
36	.137	.343	98.982						
37	.123	.307	99.289						
38	.106	.266	99.554						
39	.097	.242	99.796						
40	.082	.204	100.000						

Extraction Method: Principal Component Analysis

Graph 1. Determining the number of factors using criteria based on the Scree Plot diagram



Graph 2. First diagram for checking the assumptions on which the regression analysis is based



Graph 3. Second diagram for checking the assumptions on which the regression analysis is based

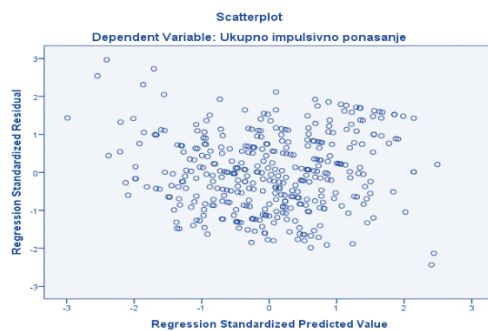


Table 3. Basic results of regression analysis (coefficient of determination, etc.)

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.324 ^a	.105	.083	6.359	1.121

Note: a. Predictors: (Constant), REGR factor score 9 for analysis 1, REGR factor score 8 for analysis 1, REGR factor score 7 for analysis 1, REGR factor score 6 for analysis 1, REGR factor score 5 for analysis 1, REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1; b. Dependent Variable: Total impulsive behavior

Table 4. Baseline regression analysis results (Snedekor's random variable and realized significance level)

ANOVA						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,736.708	9	192.968	4.772	.000 ^b
	Residual	14,801.504	366	40.441		
	Total	16,538.213	375			

Note: a. Dependent Variable: Total impulsive behavior; b. Predictors: (Constant), REGR factor score 9 for analysis 1, REGR factor score 8 for analysis 1, REGR factor score 7 for analysis 1, REGR factor score 6 for analysis 1, REGR factor score 5 for analysis 1, REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1.

Dynamic Analysis of the Local Government Revenue Generation of Padang City Before and After the Regional Autonomy

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Abstract:

This research will focus on the general allocation fund, investment and population growth factors towards regional revenue consisting of Regional Tax and Non Tax Revenue Posts. The analysis also focused on the analysis of the presence or absence of the flypaper effect on the realization of the Padang City Government's GRDP before and after regional autonomy. This research is classified as descriptive and associative research and also *expo facto*. Data on all variables in this study began from 1980 until 2018 in the city of Padang. Analysis of the data used in this study uses regression analysis. The analysis shows that 1) general allocation fund has a significant effect on Padang City original local government tax 2) Investment has no significant effect on Padang City original local government tax 3) Regional autonomy policy has a significant effect on Padang City original local government tax 4) Population Growth has no significant effect on Padang City original local government tax 5) DAU has a significant effect on Padang City original local government non-tax 6) Investment has no significant effect on Padang City original local government non-tax 7) Regional autonomy policy has no significant effect on Padang City original local government non-tax 8) Population growth has a significant effect on Padang City original local government non-tax 9) original local government tax has a significant effect on regional expenditure in Padang City 10) original local government non-tax has a significant effect on regional expenditure in Padang City 11) No flypaper effect occurs on regional expenditure on the realization of the Padang City Regional Budget.

Keywords: original local government revenue tax; original local government revenue non-tax; general allocation fund; regional expenditure; flypaper effect.

JEL Classification: O15; O18.

Introduction

The implementation of regional autonomy which has entered its two decades of implementation has made the community demand for the government to provide optimal services by promoting transparency in the historic momentum called "reform". At that moment there were various major changes in the practice of services and authority between the center and the regions. If before the reform period (New Order) used a centralized system, then the reform would actually give birth to a system that was the opposite (decentralized) with the birth of the policy of "regional autonomy".

In Law no. 9 of 2015 concerning Regional Government and Law no. 33 of 2004 concerning financial balances between the central government and regional governments, it has been regulated that government revenues consist of Original Regional Revenues, Balancing Funds and others that are legal. Regional autonomy gives freedom to each region to take care of the affairs of their respective regions. Local governments are required to collect local taxes and levies wisely. In addition, the allocation of the results of regional tax revenues and regional levies must be fair and equitable. In order to increase the financial capacity of the region in order to carry out autonomy, the government implemented various tax policy changes to Law No. 18 of 1997 concerning Regional Taxes and Regional Retribution. The granting of authority in the imposition of regional taxes and levies, is expected to further encourage the Regional Government to continuously strive to optimize Local Revenue, especially those originating from regional taxes and levies (Sidik 2002).

In connection with the management of OLGR and regional expenditure, Kuncoro (2004) concludes that OLGR is only able to finance local government spending at a maximum of 20%. This fact has led to asymmetric behavior in local governments, which can be seen from the indication of inefficiency in the transfer of funds, and can be seen from the response to government spending, better known as the flypaper effect. The comparison of the use of intergovernmental funds against regional revenues is still too high compared to other regional revenues, including OLGR. Many researches about local government have been conducted (Basuki 2019, Prabowo 2019, Marsyaf 2019, Ananda 2019, Andria 2019).

Various factors can be identified that can affect OLGR including tax revenue and revenue sharing from the central government, unemployment and the level of fiscal decentralization (Maličká 2012). Development Expenditures, Population Amounts, GRDP (Purbayu 2005, Oktavina 2012, and Gomes 2013) and government policies, emphasizing the effectiveness and reliability of the tax assessment collection system (Sorsa 2017). In this study, the focus will be on the GAF, investment and population growth factors towards regional revenue consisting of Regional Tax and Non-Tax Revenue Post. The analysis also focused on the analysis of the presence or absence of the flypaper effect on the realization of the Padang City Government's GRDP before and after regional autonomy.

1. Literature review

1.1. Regional autonomy

According to Law No. 23 of 2014 concerning Regional Government, "Regional autonomy is the right, authority and obligation of autonomous regions to regulate and manage their own government affairs and the interests of local communities in accordance with statutory regulations". From this understanding, it can be interpreted that regional autonomy is independence or freedom to determine their own rules based on legislation, in meeting regional needs in accordance with the potential and capabilities of the region.

Regional autonomy that has been running for more than twenty years is expected not only to transfer authority from the center to the regions to shift power. This was confirmed by Kaloh (2002), that regional autonomy must be defined as autonomy for the people of the region rather than "regional" autonomy in the sense of a particular territory / territory at the local level. Regional autonomy is not only a delegation of authority but also an increase in community participation in regional development.

Thus decentralization, deconcentration, and co-administration always appear together in the history of the implementation of regional autonomy in Indonesia, both in the new order through Law No. 5 of 1974, and during the reform order through Law 22 of 1999 and revised with Law no 32 of 2004 and Law No.23 of 2014.

1.2. General Allocation Fund (GAF)

The General Allocation Fund is one of the transfer funds originating from the expenditure budget which is allocated with the aim of increasing the equitable distribution of financial capacities between regions to fund regional needs in the context of decentralization. The General Allocation Fund according to Law No.25 of 1999 comes from the expenditure budget and is allocated with the aim of equitable distribution of financial capacity between regions to finance their expenditure needs in the context of the implementation of Decentralization. GAF is stipulated at least 25% (twenty-five percent) of the Domestic Revenues stipulated in the State Budget. Then, from 25% it is further divided into 90% for GAF for Regency / City areas and 10% for GAF for Provincial areas. As previously stated, GAF acts as a block grants transfer

1.3. Original Local Government Revenue (OLGR)

According to Law No. 33 of 2004 Regional Original Revenue is revenue that is obtained from the region which is collected based on regional regulations in accordance with statutory regulations, consisting of:

- OLGR Tax. According to Law No. 28 of 2009, local taxes, hereinafter referred to as taxes, are mandatory contributions to regions that are owed by individuals or entities that are coercive based on the Law, with no direct compensation and are used for the purposes of the Region for the greatest prosperity of the people;
- OLGR Non-Tax:
 - regional Retribution. According to Law No. 28/2009 in total there are 30 types of user fees that can be collected by regions which are grouped into 3 groups of levies, namely public service fees, business service fees and certain licensing fees;
 - the revenue from separated regional assets. Law No. 33 of 2004 classifies the types of results of the management of separated regional assets, broken down according to the object of income which includes the share of profits on equity participation in regionally-owned companies, the share of profits on equity participation in state-owned companies and the portion of profits on equity participation in a company owned. private or community groups;
 - other legitimate Local Government Revenue. According to Law No. 33/2004, it explains about legitimate Local Government Revenue, provided to budget regional revenues that are not included in the type of local tax, and the results of the management of separated regional assets.

1.4. Investment

Investment is the demand for goods and services to create or increase production capacity / income in the future (Dornbusch 2008). Investment includes two main objectives, namely to replace part of the supply of damaged capital (depreciation) and additional provision of existing capital (net investment). In the calculation of national income, investment is the whole value of the purchase of entrepreneurs on capital goods and expenditures to establish industry and the increase in the value of the stock of unprocessed and finished goods.

1.5. Flypaper effect

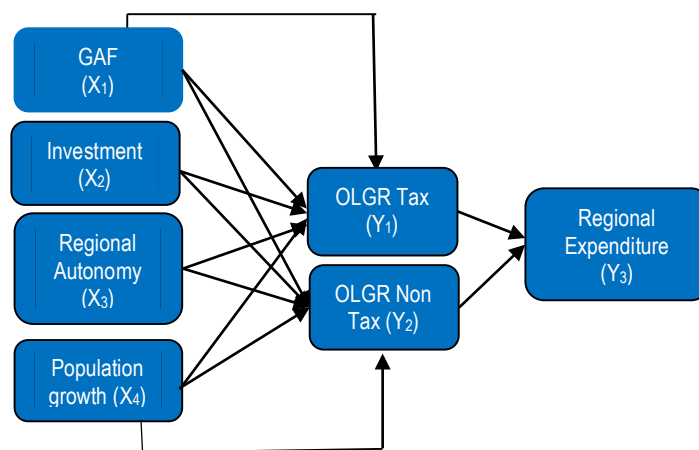
The flypaper effect has implications where one of them will increase regional government spending is greater than the revenue of the region itself (Turnbull 1998) as well as the tendency to wait for assistance from the center compared to managing regional resources themselves. Implicitly there are several implications of the occurrence of the flypaper effect on district / city regional spending, such as:

- causing the fiscal gap (Fiscal gap) will remain. Fiscal gap is a central government policy framework in providing GAF to the regions, so if a flypaper effect occurs, it means that the achievement of transfer funds is less than optimal. This can be seen in the analysis of the development of GAF and regional expenditure;
- leads to inaccuracies in the use of sources of income generating growth in OLGR, such as increased local tax revenue, as well as other natural resources. This can be seen from the proportion of the average ratio of GAF and OLGR, where the average proportion of GAF is greater than the OLGR which only contributes 10 percent of regional expenditure;
- causing the element of regional dependence on the central government to remain, because it directly provides GAF to the regions which means the central government subsidizes regional expenditure to reduce the burden of financing, so that it will weaken the region's ability to finance its own needs;
- there is an excessive response in the utilization of transfer funds where the central government should make the performance of monitoring and evaluation of local governments in order to monitor, control and evaluate the use of GAF, this is needed to prevent excessive response in exposing GAF revenue in the regions;
- resulting in a lack of regional financial independence in the district/city concerned (Walidi 2009).

The flypaper effect can generally be understood as the inequality of the effect of public expenditure from central government assistance and an increase in revenue by the same amount. Whatever the central government assistance to the regional government must have the same effect. An example is that every rupiah issued by the central government as assistance to local governments, should have an equal effect of one rupiah to an increase in government or local community income. If this does not happen, where there is a tendency that the influence of public expenditure in the form of central government assistance to regional governments does not have the same effect, this is called the flypaper effect.

Based on the explanations of the theories above, local government revenue in this study is influenced by GAF, population growth, regional autonomy policy and investment. To see the relationship between various variables above, it will be shown in the form of a conceptual framework in the following figure:

Figure 1. Conceptual framework



Based on the conceptual framework, a hypothesis can be found which is a temporary answer to the problem that will be discussed through this research. The hypotheses proposed are as follows:

- H1. GAF has a significant effect on OLGR Padang City Tax.
- H2. Investment has a significant effect on Padang City's OLGR.
- H3. Regional autonomy policy has a significant effect on OLGR Padang City Tax.
- H4. Population growth has a significant effect on OLGR Padang City Tax.
- H5. GAF has a significant effect on OLGR Not Padang City Tax.
- H6. Investment has a significant effect on OLGR Not Padang City Tax.
- H7. The policy of regional autonomy has a significant effect on Padang City's Non-Tax OLGR.
- H8. Population growth has a significant effect on Padang City's Non-Tax OLGR.
- H9. Tax GAF has a significant effect on Regional Spending in the City of Padang.
- H10. Non-tax GAF has a significant effect on Regional Spending in the City of Padang.
- H11. Flypaper effect occurred in Padang City Regional Budget.

2. Methodology

This research is classified as descriptive and associative research. Descriptive research is research that aims to describe or explain a thing as it is. While associative is research that aims to see the relationship between independent variables.

This research is also *an expo facto* that is research that is to find out what causes something to happen and sort back so that the factors known to cause. The data in this study are in the form of time series data. Data on all variables in this study began from 1980 until 2018 in the city of Padang.

Data analysis method is used to analyze the data obtained in order to determine the effect of independent variables on the dependent variable or to determine the effect of the General Allocation Fund (Investment, Population Growth, and Autonomy Policy) on OLGR, and to determine the effect of Original Revenue Regional from Tax and Regional Original Revenue is not a Tax on Regional Spending in Padang City Before and After the Implementation of Regional Autonomy (1980-2018) Data analysis used in this study uses regression analysis.

The general form for the regression equation above is:

$$Y1 = f(X1, X2, X3, DUMMY) \quad (1)$$

$$Y1 = \beta_0 + \beta_1X1 + \beta_2X2 + \beta_3X3 + \beta_4DUMMY + \mu_i \quad (2)$$

$$\text{LN}(Y1) = \beta_0 + \beta_1(\text{LN}(X1)) + \beta_2(\text{LN}(X2)) + \beta_3X3 + \beta_4DUMMY + \mu_i \quad (3)$$

where: LN(Y1) = OLGR Tax; LN(X1) = General Allocation Fund; LN(X2) = Foreign and Regional Investment; X3 = Population Growth (%); DUMMY= Regional Autonomy Policy.

2.1. Descriptive statistic analysis

The object of this study is the Government of the City of Padang, West Sumatra. The data examined are economic (financial) ratio data, including the General Allocation Fund, investment, Population Growth, Regional Allocation Revenue (Tax and Non-Tax), and Regional Expenditure in the period before implementation Regional autonomy (1980-1999) and after the implementation of regional autonomy in Padang City (2000-2018). The results of the descriptive statistical analysis before the implementation of regional autonomy can be fully seen in Table 1.

Table 1. Descriptive statistics of regional expenditures, GAF, investment, population growth, OLGR, and regional spending in Padang city government before regional autonomy

Descriptive Statistic	GAF (Million Rupiah)	Investment (Million Rupiah)	Population Growth (%)	OLGR Tax (Million Rupiah)	OLGR Non-Tax (Million Rupiah)	Regional Expenditure (Million Rupiah)
Mean	3,772.5740	20,630.320	1.726800	5,491.190	3,201.677	115,647.30
Median	1,658.6200	7187.625	1.773500	4,905.331	2,824.216	97,428.24
Maximum	14,595.5300	215,037.100	1.980000	15,581.860	9,136.907	214,718.80
Minimum	447.37790	850.800	1.348000	1,333.821	1,050.130	92,112.77
Std. Dev.	4,105.3640	47,430.310	0.201946	3,716.223	2,137.538	36,911.42

Source: Data Processing Results, 2019

From Table 2 it can be seen that the average General Allocation Fund (DAU) in the Regional Government of Padang City prior to the implementation of regional autonomy (in 1980-1999) was Rp. 3,772,574,000 and a standard deviation of Rp. 4,105,364,000. The average level of investment in Padang City reaches 20,630,320,000 and the standard deviation is 47,430,310,000, the average Regional Original Income (PAD) from Padang City Tax reaches Rp. 5,491,190,000 and a standard deviation of Rp. 3,716,223,000. The average of Local Original Revenue (PAD) instead of Padang City reached Rp. Rp. 8,647,260,000 and a standard deviation of Rp. 5,889,451,000. The average expenditure of the City of Padang reaches Rp. 115,647,300,000 and standard deviations of Rp. 36,911,420,000.

Table 2. Descriptive statistics of regional expenditures, DAU, investment, population growth, PAD, and regional spending in Padang city government after regional autonomy

Descriptive Statistic	GAF (Million Rupiah)	Investment (Million Rupiah)	Population Growth (%)	OLGR Tax (Million Rupiah)	OLGR Non-Tax (Million Rupiah)	Regional Expenditure (Million Rupiah)
Mean	643,186.90	385,340.60	1.541136	65,287.07	123,245.10	1,096,640.0
Median	628,472.60	123,131.00	1.838000	40,933.20	76,795.69	996,418.4
Maximum	1120,046.00	2,745,717.00	2.263167	220,736.60	348,898.10	2,177,973.0
Minimum	12,980.35	165.00	-3.458291	11,092.97	8,12	241,983.3
Std. Dev.	367,101.06	662,243.80	1.259420	57,768.30	102,490.20	692,169.1

Source: Data Processing Results, 2019

Based on Table 2 above it can be seen that the average General Allocation Fund of Padang City after the implementation of regional autonomy (in 2000-2018) is Rp. 643,186,900,000 and standard deviation of Rp. 367,101,600,000. The average investment level in Padang City reaches Rp. 385,340,600,000 and standard deviation of Rp. 662,243,800,000. the average population growth rate in Padang City reached 1.541136% and the standard deviation of 1.259420%. Average Local Own Revenue from Padang City Tax reaches Rp. 65,287,070,000 and a standard deviation of Rp. 57,768,300,000. The average of Local Original Revenue instead of Padang City reached Rp. Rp. 123,245,100,000 and standard deviation of Rp. 102,490,200,000. The average expenditure of the City of Padang reaches Rp. 1,096,640,000,000 and a standard deviation of Rp. 692.169.100,000.

2.2. Multiple regression analysis

Samples of data that have been collected and compiled are then performed calculations to get an appropriate estimation model and hypothesis testing regarding the influence of the General Allocation Fund, Investment, Population Growth, and Autonomy Policy on Local Revenue Taxes before and after the implementation of regional autonomy ; the influence of the General Allocation Fund, Investment, Population Growth, and Autonomy Policy on Regional Original Revenue instead of Tax before and after the implementation of regional autonomy; and the influence of the General Allocation Fund, Regional Original Revenue Tax, Regional Allocation Revenue instead of Tax on Regional Spending before and after the implementation of regional autonomy.

The results of multiple regression analysis are as follows:

Table 3. Multiple regression analysis

Dependent Variable	Independent Variable	Coefficient	Prob.	Adjusted R-squared	Prob (F-statistic)
Y1	X1	0.519	0.000	0.9305	0.000
	X2	0.056	0.111		
	X3	0.395	0.054		
	DUMMY	-0.479	0.005		
	C	9.769	0.000		
Y2	X1	0.567	0.000	0.9795	0.000
	X2	0.030	0.246		
	X3	0.477	0.003		
	DUMMY	-0.116	0.636		
	C	8.800	0.000		
Y3	X1	0.031	0.023	0.9996	0.000
	Y1	0.522	0.000		
	Y2	0.448	0.000		
	C	0.657	0.001		

Source: Data Processing Results, 2019

Based on the above table, the regression equation can be arranged as follows:

$$Y1 = 9.769 + 0.519.X1 + 0.056.X2 + 0.395.X3 - 0.479.DUMMY \quad (4)$$

$$Y2 = 8.800 + 0.567.X1 + 0.030.X2 + 0.477.X3 - 0.116.DUMMY \quad (5)$$

$$Y3 = 0.657 + 0.031.X1 + 0.522.Y1 + 0.448.Y2 \quad (6)$$

where: X1 = General Allocation Fund; X2 = Foreign and Regional Investment; X3 = Population Growth (%); DUMMY = Regional Autonomy Policy; Y1 = Tax PAD; Y2 = Non Tax PAD; Y3 = Padang City Regional Spending.

Analysis of acceptance or rejection of hypotheses based on the probability of the multiple regression t test in Table 3 can be summarized as follows:

Table 4. Analysis of acceptance based on multiple regression analysis

Hypothesis	Prob.	Description
H1 GAF has a significant effect on OLGR Padang City Tax	0.000	Accepted
H2 Investment has a significant effect on Padang City's OLGR	0.111	Rejected
H3 Regional autonomy policy has a significant effect on OLGR Padang City Tax	0.005	Accepted
H4 Population growth has a significant effect on OLGR Padang City Tax	0.054	Rejected
H5 GAF has a significant effect on OLGR Not Padang City Tax	0.000	Accepted
H6 Investment has a significant effect on OLGR Not Padang City Tax	0.246	Rejected
H7 The policy of regional autonomy has a significant effect on Padang City's Non-Tax OLGR	0.636	Rejected
H8 Population growth has a significant effect on Padang City's Non-Tax OLGR	0.003	Accepted
H9 Tax OLGR has a significant effect on Regional Spending in the City of Padang	0.000	Accepted
H10 Non-tax OLGR has a significant effect on Regional Spending in the City of Padang	0.000	Accepted

Source: Data Processing Results, 2019

While the analysis of acceptance or rejection of hypothesis 11 is conducted according to the opinion of Melo (2002) and Venter (2007) states that the flypaper effect occurs when the influence (coefficient value) of GAF on regional expenditure is greater than the influence (coefficient value) of OLGR on Regional Expenditure, and the value both are significant.

Table 4 shows that both Regional Original Revenue from Tax, Regional Non-Tax Revenue and GAF both have a significant influence on expenditure as indicated by prob. < 0.05. However, the GAF coefficient is smaller than Regional Original Revenue from Tax, Regional Original Revenue is not from Tax so it can be concluded that there is no fly paper effect on the Padang City Regional Budget or in other words H11 is rejected.

Based on the test results above, it shows that the General Allocation Fund in the Government of the City of Padang is able to increase Regional Original Revenue from taxes and non-taxes both before and after the implementation of regional autonomy. These results also indicate that the General Allocation Fund in Padang City has a significant role in horizontal equalization, namely by closing the fiscal gap between fiscal needs and the economic potential of the region. So that the Padang City General Allocation Fund that takes into account the potential factors of the natural resource sector (primary), the industrial sector and other services (non-primary), and the size of the workforce that has an impact on Local Revenue from Taxes and non-taxes. The decision to determine the General Allocation Fund which takes into account the needs and acceptance factors in Padang City is important because it will affect the Regional Original Revenue from City Taxes and Non-Taxes.

Based on the test results above, it shows that the Padang City Government's Investment has not been able to increase Regional Original Revenue from Taxes and Non-Taxes both before and after the implementation of regional autonomy. These results also indicate that the level of investment made by the Government of the City of Padang.

Both public investment, private investment, domestic investment, and foreign investment has not been able to have a significant impact on Local Revenue from tax and non-tax. This is supported also by more investments in the city of Padang conducted by the Government and the Government-Private. Where government investment is generally done not with a view to profit, but the main objective is to meet the needs of the community. In general, the private sector is not interested in this investment because it requires a very large cost and does not provide immediate benefits, but gradually over a long period of time.

Based on the test results above, it shows that Population Growth in the City of Padang has not been able to increase Regional Original Revenue from taxes both before and after the implementation of regional autonomy. This result also indicates that the population growth rate in Padang City which in general is the main resource in the development of an area has not been able to have a significant impact on the Regional Original Revenue from Taxes. However, population growth is actually able to increase Non-Tax Regional Revenue.

Based on the test results above, it shows that the implementation of the Regional Autonomy Policy in Padang City has an influence on the Regional Original Revenue from Tax but it is not significant to the non-Regional Original Revenue. These results also indicate that the implementation of the Regional Autonomy Policy in the City of Padang, which in general is able to have a significant impact on the Local Revenue of Taxes. The Central Government gives authority to the Regional Government (Decentralization). In line with the decentralization, aspects of financing are also decentralized. The implication is that the regions are required to be able to finance their own development costs.

Based on the test results above, it shows that the Regional Original Revenue from Tax and Non-Tax in Padang City Government will be able to increase Regional Expenditure both before and after the implementation of regional autonomy. This means that the Padang City government is making the best use of its revenue increase for regional spending intended for the maximum welfare of the people. The results showed that the increase in Regional Original Revenue from Taxes affected Regional Expenditures. The results of this study are in line with the results of Afrizawati's study (2015) which states that Regional Original Revenue significantly influences the amount of Regional Expenditures of seven Regencies/parent cities in South Sumatra. The results of this study are also in line with the results of research from Kurniawati (2010), which states GAF and PAD have a significant positive effect on regional spending.

The flypaper analysis analysis that can be concluded is that although the two independent variables (Tax and Non-Tax OLGR and GAF) can significantly influence the dependent variable (Regional Expenditure), tax and non-tax OLGR turns out to be more influential than GAF where the regression coefficient value of the tax OLGR variable and non-tax is greater than the GAF variable regression coefficient. This shows that there is no flypaper effect on regional spending on the realization of the Padang City Regional Budget. This means that the Regional Expenditure policy in Padang before and after regional autonomy is more dominated by OLGR than GAF.

Description of the new studies/ software/ artwork and the process of production. What has been done, how was it achieved and what was the rationale? This can be, for example, a report on the design and execution of a set of experiments, the development of an innovative software system or the making of innovative art works. If so, this chapter will illuminate it by explaining, at the very least, what is important and new about it.

Conclusion

From the results of testing the hypothesis that has been carried out it can be concluded as follows:

- GAF has a significant effect on Padang City Tax OLGR;
- Investment has no significant effect on Padang City Tax OLGR;

- Regional autonomy policy has a significant effect on Padang City Tax OLGR;
- Population Growth has no significant effect on Padang City Tax OLGR;
- GAF has significant effect on Padang City's Non-Tax OLGR;
- Investment has no significant effect on Padang City's Non-Tax OLGR;
- Regional autonomy policy does not significantly influence Padang City's Non-Tax OLGR;
- Population growth has a significant effect on Padang City's Non-Tax OLGR;
- OLGR Tax has a significant effect on Regional Spending in Padang City;
- Non-Tax OLGR has a significant effect on Regional Spending in Padang City;
- No flypaper effect occurs on regional expenditure on the realization of the Padang City Regional Budget.

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Investigation of Factors Influencing Traditional Retail Success in Small Cities in Indonesia

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Abstract:

This research investigates the key success of traditional retails in small cities in Indonesia and the dominant factors that attract people to become their consumers. The object of the research is traditional retails in a small city named Cimahi in Indonesia. The subject is the consumers of traditional retails with the criteria of: have already reached a mature age, have their own income, have already shopped in a traditional retail business with a minimum of ten times. To get the maximum results, a descriptive research method with a quantitative approach is used. The data is analyzed using factor analysis, rank test, and meaningful analysis. The result shows that most traditional retails are run by the owner and his/her family. The owner also doubles as an employee who serves the consumers. From the 38 factors that are analyzed, only six of them are proved to be the determinant of the success of traditional retails. Those six factors attract consumers to shop in traditional retails. Those six factors will be the subject of discussion and debate on this journal. The research results contribute to entrepreneurs' behavior in operating their traditional retails.

Keywords: critical success factor of retail; dominant factor; entrepreneur; traditional retail behavior.

JEL Classification: M50; M51.

Introduction

The research is done in a small city in Indonesia called Cimahi with the characteristic of densely populated, small area, and directly adjacent to the capital of West Java province. In 2015, the total of residents in Cimahi is 586,580 lives (BPS Cimahi, 2015). The source of the resident's income comes from several business sectors such as processing industry, trade, construction, information and communication, transportation and warehousing. The trade sector is the most dominant sector of the people's livelihood. Cimahi is a small city in Indonesia that is densely populated and which the main activity of the people is trading. The trading business that is carried out mostly by the people is a retail business, both retail food products and other products.

Retail business is a business that is run by a group of people or by a single person that sells various goods to ultimate consumers. There are two kinds of retail: modern retail and traditional retail. Traditional retail is a small shop, stall, or outlet that sells people's daily needs. It is being operated by a single person based on his or her knowledge and desire.

This research focus is to investigate the factors that determine the success of independent retail or traditional retail. Stores, stalls and outlets in the form of independent retails are far more numerous than modern retail. They appear, close and develop naturally, without notifying to the city government. The establishment of a traditional retail business does not require complete licensing. Therefore, the government has difficulty in recording how many shops traditional retail/independent retails in their area, and the exact data are not yet available.

Data from Outlook_Ritel (2017) illustrates that the prospect of traditional offline and online retail businesses in Indonesia is predicted to grow around 10% to 30% each year. In 2008, modern retail grew to 24.8% and traditional retail grew to 16.9%. This means that business opportunities in the retail sector for people who are interested in becoming entrepreneurs are still wide open and have favorable prospects.

The results from the observation at the research sites in 2018 show that the number of retails owned by individuals and run directly by the owner is higher than the number of moderns retails. However, the definite data

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is not available. Interviews with several retail owners give information that in the past five years, traditional retailers have sprung up quite a lot but many have also closed.

Seeing the development of modern and traditional retail in research sites, there is a tendency that people prefer shopping at modern retail. Research by Walker (1996) has proven that traditional retailers are threatened by modern retailers and they are less competitive from modern retail. This means that the traditional retail market is getting smaller and their market is being taken over by modern retail. Researchers have proven that modern retail is superior and able to take over the traditional retail market share (Amine and Cadenat 2003, Walker 1996, Cadilhon *et al.* 2006). Modern retailers have certain advantages that traditional retailers do not have, or they have superior values that are preferred by consumers in their area. Whereas Najib and Sosianika (2017) find that the existence of modern retail is increasing the competition in getting consumers and reducing traditional retail profits. The presence of modern retailers threatens the life of traditional retailers.

Modern retailers become superior because of several factors such as strategic location, large capital, goods logistics, etc. Koo (2003) finds that the store's atmosphere and locations of modern retail become an appeal to the consumers and influence consumer satisfaction. Whereas Cornelius, Natter, and Faure (2010) and Nordfält *et al.* (2014) prove that in modern retailers, attractive interior displays influence consumers to buy products that were not planned beforehand. This means that there are certain values that are liked by consumers and become a special attraction that makes consumers prefer to be modern retail consumers. Although many researchers find traditional retailers are threatened to close because of modern retail, in fact at the research sites, some traditional retail still exists. This shows that traditional retail also has certain superior values that have not been revealed by researchers. This phenomenon becomes something interesting to be studied and analyzed by researchers in countries that have modern retail and traditional retail.

This research focuses on examining the keys to traditional retailers' success; why they can survive and even thrive despite the existence of modern retailers. The ability of some traditional retailers to adapt to modern retailers becomes something interesting to be analyzed academically. Based on the description above, it is important that this research and analysis be carried out by researchers in developing countries. The results of the research will be able to uncover the key factors that determine the success of traditional retailers according to the characteristics of each small city in developing countries.

1. Literature review

1.1. Retail

Retail is a mean of selling goods in small quantities that is done by a singular person or a group of people in the traditional and modern way, and they distribute the goods directly to ultimate consumers (Ayers and Odegaard 2018, Chaniago *et al.* 2019, Davies 1993, Perpres RI No. 112 2007). The examples of traditional retail are small shops and stalls. Meanwhile, examples of modern retail are minimarket, supermarket, and hypermarket.

Retailers have several functions. Generally, retail functions consist of analyzing market demand and supply, being buyers and various merchandise formation, providing goods needed by a community, storing goods for inventory, dividing goods into smaller quantities, providing services, increasing goods value and price controller (Grewal, Motyka and Levy 2018; Mghebrishvili and Urotadze 2016). Moreover, retailers can also control the distribution of goods in a community. Below functions of traditional retail:

- *Providing goods needed by a community:* Retail shops provide various goods and services needed by the community in which the retail shops operate. The owners of retail shops register the needs and the taste of their consumers;
- *Storing goods as stocks:* Most retail shops are able to fulfill the consumers' needs for several days. Retail shops have a number of stocks in their storeroom. Retail shops store certain goods as stocks for them to sell when their consumers need it;
- *Dividing goods into smaller quantities:* Retail shops divide the goods they sell into smaller quantities so their consumers do not have to buy goods in bulk and they can shop appropriately based on their funds;
- *Providing services:* Some of the retailers are selling goods as well as giving services. There are even retail shops that only give services. The form of the services that retail shops give is credit sales, delivery service, and insurance on the goods that they sell;
- *Increasing goods value:* Creative retail shops combine some goods together to get some added value to the goods. For example, they give goods wrapping with a brand and the name of the retail shop on it, and they combine one piece of goods with another to make a new product;
- *Controller of inventory and price:* In general, retail has enough inventories of goods in the long run, has operational standards (in traditional retail it is rarely written and this has become a habit), and the selling

price is determined by the retail owner. The determination of the selling price refers to market conditions. Each retail set prices and supplies according to the owner's wishes, and there are times when a price war occurs. However, in the modern retail price is determined by central management. Each store is not allowed to set prices with fluctuation (free without rules). Consequently, modern retail also acts as a controller of the selling price, and it is the opposite of traditional retail;

- *An independent distributor*: Traditional retail shops sometimes act as a distributor as well as selling goods in small quantities. As distributors, traditional retails are not bound to any company policies. They work independently. The local people can be suppliers to traditional retail shops. Negotiation with suppliers comes naturally, without the needs of a third party. The agreement between suppliers and retail owners is built solely on trust. Their agreement is usually only written on a small note as a reminder.

1.2 The defining factors in the success of retail

As this research is written in 2018, there are many researchers who have explained that modern retails take up traditional retail markets, and they even shut down traditional retail markets. The reason is that traditional retail is weak in the capital, supply chain, high operating costs, expertise, knowledge and professionalism (Najib and Sosianika 2017, Paddison and Calderwood 2007). Though many researchers have already warned people about the negative effects of modern retails, people still like being consumers of modern retails. This is proofed by the growing number of modern retails in research sites (Dinas Perindag Kota Cimahi 2017). Observation from the field also shows that there are a lot of modern retails that are still operating, and they take over some of its market shares.

Regardless of the fact above, both modern retail and traditional retail still have factors that make them excel. The factors that make modern retails excel are clean and comfortable area, competitive price, complete goods, and strategic location (Chaniago *et al.* 2019; Farhangmehr, Marques, and Silva 2000; Goldman and Hino 2005). However, factors that make traditional retail excel haven't been found. Most researchers only analyze modern retails and hypermarkets. Therefore, the investigation about the key factors of traditional retails' success is needed to be done.

Ayers and Odegaard (2018) say that the success of a retail business (both modern and traditional) is determined by the management of money, goods, pricing, supply chains, inventory, and innovation of goods that are being sold. Colla and Lapoule (2012), in their research, reminds all entrepreneurs that strategy marketing, relationship marketing, purchasing, e-marketing (ergonomics, assortment and price policy), logistic, strategy, and service are the key factors to the success of a retail business. Quite similarly, McKenzie (2006) proofs that key factors to the success of a retail business are the quality of the service, price, physical aspect (the display and the layout of the shop), information media, and professional employees. Another researcher finds that the success of a retail business is determined by strategy, supplier, innovation, technology, quality of the service, and professional human resources (McKenzie 2006; Megicks 2007; Reynolds *et al.* 2007; Sorescu *et al.* 2011; Swoboda *et al.* 2007; Tsironis, Gotzamani, and Mastos 2017). Innovation, strategy, and quality of the service are strongly depended on the human resources availability and the manager of the retail.

From the literature study and the description above, it can be conclude that theoretically, there are 11 keys to retail success, which are: *Strategy*, *Innovation*, *Physical* (appearance, layout, and location), *Product* (Completeness of goods), *Supplier and Inventory*, *Price*, *Technology used*, *Promotion*, *People* (quality of the services), *Finance*, and *Marketing mix* (place, product, price, promotion, people, physical, process). Some of those keys are parts of the marketing mix, such as completeness of goods (product), price of goods (price), location (place), service quality, media information (promotion), strategy and innovation (people), inventory (physical evidence), and financial. Only *supplier* and *technology* that are not included in the marketing mix. Academically, the key to retail success can also be seen from the combination of marketing mix concepts.

The explanation of the eleven key factors that determine the success of a retail business can be seen as follows:

- *Strategy*: strategy is an activity carried out by the owner together with the supervisor or his/her employees to determine their business tactics such as carrying out business principles that are honest, open, friendly and do not turn off surrounding retailers. This strategy will improve the performance and reputation of the store (Megicks 2007). Nguyen and Pham (2018) as proof that a reputable business will maintain customer trust;
- *Innovation*: innovation is the activities undertaken to attract consumers to shop, such as giving discounts, prizes, providing new products and new services, or other activities that attract consumers. Bacik, Gbuova, and Mikula (2018) find that consumers like discounts and payment at the lowest prices;

- *Physical (appearance, layout, and location)*: The appearance of retail must be made comfortable, clean, and safe and is located in a strategic location or near a settlement. Comfort, cleanness, and safety are things that are difficult to achieve by traditional retailers (Goldman and Hino 2005). A clean building, comfortable air, and security around the location of the store should be a concern to the retail manager. The installation of CCTV is needed to improve the safety and comfort of all parties. The building of traditional retail is usually not too large, the goods being sold are incomplete, not all goods are being displayed, the place is less comfortable, and consumers can still bargain about the price;
- *Product/completeness of goods*: the completeness of goods is a magnet that can invite consumers to come shopping. Consumers will like shopping at stores that have complete and various items (Dahab et al. 1997);
- *Supplier and inventory*: the owner together with the supervisor (if there is a supervisor) needs to choose who is worthy of being a supplier because the supplier will determine the quality and completeness of the items to be sold and stored as inventory;
- *Price*: in determining selling price, there are several factors that should be considered: other retail conditions, acquisition cost, and profits. Price is the determining factor for the success of a business (Bacik, Gburova, and Mikula 2018). If the selling price is too high, the consumers will switch to other retails, therefore pricing needs to be done carefully. In traditional retailers, buyers and sellers communicate directly, so the price can either be stated directly on the goods or not. In traditional retails, the sellers and the buyers are allowed to bargain;
- *Technology*: the using of modern technology (computers, internet, cash registers, CCTV, payment via debit/credit cards, transfer of funds) also becomes a consideration for someone to become a consumer. Many traditional retailers are managed without adequate technological support, which reduces consumers' comfort and trust (Hardiani and Sisharini 2017);
- *Promotion/information media*: Retailers owners should give the right information in the right way about new products, prices and other information that is needed to be conveyed to consumers. Consumers can see whether the information given is honest, trapping or not. Retail owners and their employees need to design information honestly and transparently. The information conveyed should be informative, impressive, intelligent, original and visually stunning (Birknerová et al. 2017). (Morimura and Sakagawa 2018) say a promotion had a positive impact on business performance.
- *Quality of service*: human resources really determine the quality of customer service, therefore the existing human resources (supervisors and employees) are always trained and reminded to serve the consumers professionally. Fongkam (2015) states that one of the traditional retail competitiveness is determined by the employees.
- *Finance*: Finances and funds to buy goods and pay suppliers to need to be regulated by a controlled system. The use of financial and accounting systems that are integrated with inventory and suppliers helps the owner & supervisor to make decisions. To get high-quality goods at reasonable prices, shop owners need to maximize negotiations with suppliers (Knežević, Naletina, and Damić 2016).
- *Marketing mix*: marketing mix is a strategy used by sellers to attract potential customers to become real and loyal consumers. Retailers use a combination of marketing mix elements in attracting customers, such as: providing discounts, placing certain products in strategic places, arranging shopping spaces to be comfortable and safe. Some elements of the marketing mix are listed in point one to ten above.

From the explanation above and the findings from researchers in various countries, which are varying in determining the key factors for retail success, it is important to conduct this research holistically to uncover the key factors for traditional retail success that can apply for small cities in developing countries.

1.3. Research concept

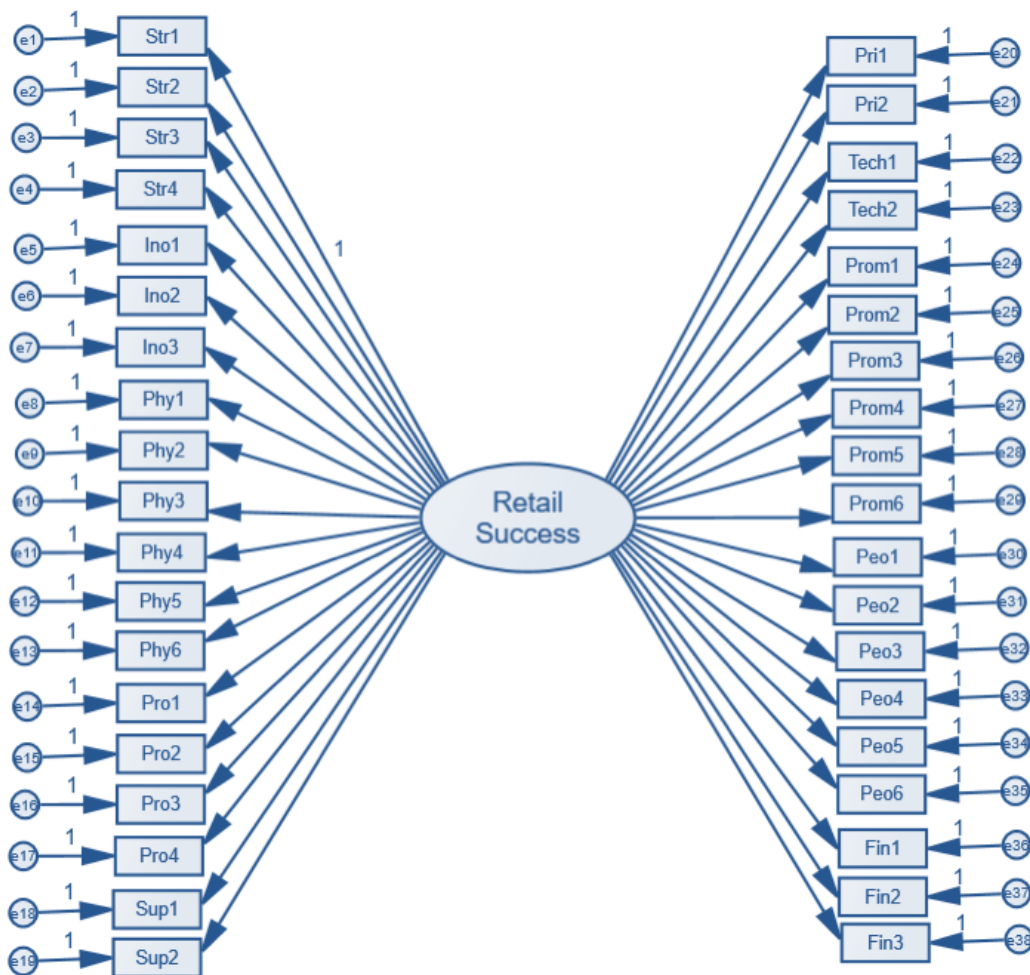
Modern retails and traditional retail are a business activity that sells goods and services directly to ultimate consumers. Traditional retail is different from modern retail. Modern retailers have a standard set by the holding company. The modern retail standards cover the land area, room area, display forms and shelves of goods, standards for goods that are being sold, price standards, service standards, payment standards, use of technology, standards for the employee, and retail management standards. It is different from traditional retail which does not have any established standards. The standards of traditional retail are largely determined by the wishes and knowledge of the owner. For retailers whose owners and/or managers are knowledgeable, some standards in modern retail will be easily adopted. However, if the owner's and/or manager's knowledge is limited, it is difficult to adopt and implement standards that can satisfy consumers. The statement above is based on the observation from

researchers in the research sites. The standards applied by traditional retailers vary greatly. Standards run by a retailer determine the success of the retail.

Experts conclude there are some standards that determine the success of retail. The standards referred to in this study are called critical success factors, such as innovation, strategy, technology, suppliers, quality of service and professional human resources (McKenzie 2006, Megicks 2007, Reynolds *et al.* 2007, Sorescu *et al.* 2011, Swoboda *et al.* 2007, Tsironis, Gotzamani, and Mastos 2017). While Kotler (2007) suggests that the success of a retail business is determined by the marketing mix factor such as place, product, price, promotion, people, physical, and process. Based on those theories, a retail's success is determined by a combination of various factors above such as strategy (honest business, openness, protecting the environment, marketing strategy), innovation (giving prize, giving discounts, providing new products), physic (appearance, layout, location, store facilities, store atmosphere, store area), products (quantity of goods, quality of goods, completeness of goods, daily necessities), price (selling price, negotiable price), technology (surveillance technology, payment technology), promotion (advertising, personal selling, precise information, honest information (the use of information media, sales relations with consumers), quality of service (professional human resource, polite human resource, speed of service, human resource hospitality, human resource communication, direct serving), finance (using financial system, using systems accurately, financial management).

The factors above are suspected to be interrelated and reinforcing each other, forming a holistic unity. So are the factors that determine the success of traditional retail. In the study of each of these factors, they are graphically depicted in the following form:

Figure 1. Design of the determinants of traditional retail success



Source: Literature study, 2018

Explanation:

Str1 = honest business

Str2 = openness

Str3 = protecting the environment

Ino1 = giving prize

Ino2 = giving discounts

Ino3 = providing new products

Pro1 = goods quantity

Pro2 = goods quality

Pro3 = completeness of goods

- Str4 = marketing strategy
- Phy1= appearance
- Phy2= layout
- Phy3= location
- Sup1 = supplier
- Sup2 = inventory
- Prom1 = advertising
- Prom2 = personal selling
- Peo1 = professional human resources
- Peo2 = polite human resources
- Phy4= store facilities
- Phy5= store atmosphere
- Phy6= store area
- Pri1 = price
- Pri2 = negotiable price
- Prom3 = precise information
- Prom4 = honest information
- Peo3 = speed of service
- Peo4 = human resource's hospitality
- Pro4 = daily necessities
- Fin1 = using a financial system
- Fin2 = using systems accurately
- Fin3 = financial management
- Tech1 = surveillance technology
- Tech2 = payment technology
- Prom5 = the use of information media
- Prom6 = sales relations with consumers
- Peo4 = human resources communication
- Peo6 = direct serving

Based on Figure 1, these factors need to be analyzed and tested for their validity by using factor analysis.

2. Methods

This research uses a descriptive method with qualitative approach. The data is gathered through questionnaires and observations. The secondary data is taken from the government of Cimahi city, Indonesia. As the exact number of buyers in traditional retail shops is unknown, the number of the sample is determined by multiplying the indicators by five or seven (Gursida and Harmon 2017, Hair *et al.* 2006). For this research, there are 38 indicators, so the number of samples is 38x7=280 respondents. The respondents that are taken as samples have the criteria of: live in a place where a traditional retail shop is located, live within 200 meters from a traditional retail shop, have their own income, and have already shopped in a traditional retail business with the minimum of ten times.

The measuring components and the indicators of the success of traditional retail are shown in Table 1.

Table 1. Measuring components and indicators

Variable	Factors/dimensions	Indicators & Symbols
Determining factors of the success of traditional retail	Strategy	Honest business, openness, protecting the environment, marketing strategy;
	Retailer's Innovation	Giving a prize, giving a discount, providing new products;
	Physical	Appearance, layout, location, store/retail facilities, store/retail atmosphere, store area;
	Merchandise & Assortment	Quantity of goods, quality of goods, completeness of goods, daily necessities;
	Supplier & Inventory	Suppliers, inventory;
	Price	Selling price, negotiable price;
	Technology	Surveillance technology, payment technology;
	Information media	Advertising, personal selling, precise information, honest information, the use of information media, sales relations with consumers;
	Service quality	Professional human resources, polite human resources, speed of service, human recourses' hospitality, human resources' communication, direct serving;
	Finance	Using the financial system, using systems accurately, financial management.

Source: literature study, 2018

3. Results

After the 38 factors are tested using factor analysis and Amos software, it is found that the reliability of research data that is still below 0.7. Data reliability is good if alpha Cronbach \geq 0.7 (Gozali 2008, Gursida and Harmon 2017, Hair *et al.* 2006). This shows that there are still factors (variables that are being studied) whose alpha Cronbach is still below 0.7 or the data are not distributed evenly, and there are indications that the data are not fit, as shown in Table 2.

Table 2 shows 0 probability, the data is not distributed evenly with Cr 27,086, and the model criteria give information that the model is not fit. Furthermore, the model is modified using the modification index in Amos software. The significant factors are removed from the research model. There are quite a lot of factors that are removed from the model.

Table 2. Goodness of fit indices (first processing)

Criteria	Cut off value*	Model results	Explanation
X ² Chi-Square		4.066,025	A small value is expected
Relative X2 (Cmin/DF)	≤ 2,00	6,114	Bad
Probability (P)	≥ 0,05	0	There is a difference between data and model
Cr	≤ 2,58	27,086	Data are not distributed evenly
RMSEA	≤ 0,08	0,135	Bad
GFI	≥ 0,90	0,486	Bad
AGFI	≥ 0,90	0,427	Bad
TLI	≥ 0,95	0,235	Bad
CFI	≥ 0,94	0,277	Bad

Note: *According to Ghozali, 2008.

From 38 factors, only six factors that play a role in the success of traditional retailers. The six factors can be seen in Figure 2. The data processing is done for the second time and the result can be seen in Table 3.

Figure 2. Determinants of traditional retail success

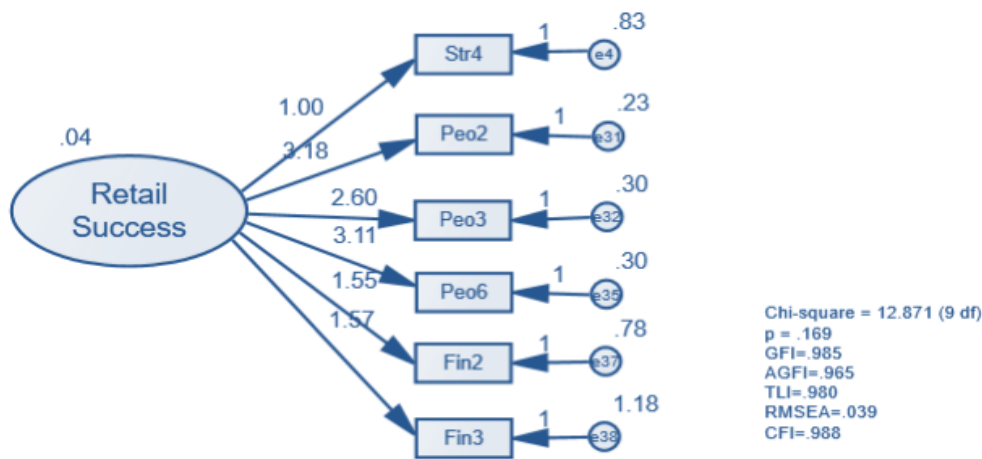


Table 3. The goodness of fit indices (second processing)

Criteria	Cut off value*	Model results	Explanation
X ² Chi-Square	-	12,871	A small value is expected
Relative X2 (Cmin/DF)	≤ 2,00	1,430	Good
Probability (P)	≥ 0,05	0,169	No difference between the data and the model
Cr	≤ 2,58	4,378	Data is not distributed evenly
RMSEA	≤ 0,08	0,039	Good
GFI	≥ 0,90	0,985	Good
AGFI	≥ 0,90	0,965	Good
TLI	≥ 0,95	0,980	Good
CFI	≥ 0,94	0,988	Good
IFI	≥ 0,95	0,988	Good

Note: *According to Ghozali, 2008.

The results gained from the second data processing is that the data is fit. However, the data normality is still not normal (Cr = 4.378). To overcome this problem, data bootstrapping at 500 is done. The comparison between before and after bootstrapping shows that the original value < critical value after bootstrapping. This means that there is no difference between model and data from the field, or the model is fit at bootstrapping 500.

From the data processing above, it can be concluded that there are only six factors that determine the success of a traditional retail business. The six factors are polite employees, quick services, being served directly and personally, accuracy in calculating the payment and having transactions being done directly by the owner. These six factors can attract consumers to shopping in traditional retail shops.

The ranking of the six factors can be seen in Table 4 below:

Table 4. Ranking of respondents' answers

Factors	Score from respondents	Rank:
Being served directly and personally	3,700	1
Polite employees	3,546	2
Having transaction being done directly by the owner	3,418	3
Quick services	3,414	4
Direct marketing	3,182	5
Accuracy in calculating the payment	2,789	6

Source: Research result, 2018

From the data displayed in Table 4, this research found that respondents like to shop in traditional retail because of being served directly and personally, polite employees, having transactions being done directly by the owner, quick services, direct marketing, accuracy in calculating the payment.

4. Discussion

Researchers have found that the superior values of each retail are different (Swoboda, Weindel, and Hälsig 2016). The same thing is also applied to traditional retails. From ten dimensions which consist of 38 factors, only six factors are proofed to be the superior values of traditional retails. These six factors attract consumers to shop in traditional retails.

This research has found and proofed that there are six factors that determine the success of a retail business. Those six factors are direct marketing, polite employees, quick services, being served directly and personally, accuracy in calculating the payment and having transactions being done directly by the owner. The factor 'being served directly and personally' is similar to the research done by Goldman and Hino (2005) who have proofed that traditional retails will excel with a personal relationship and being served by a person from the same ethnic. However, it is very different with research done by Fongkam (2015) in Chiang Mai, Thailand who has proofed that the competitiveness of traditional retails is determined by employees, products, value, location, store layout and arrangement of goods, various products and services, corporate social responsibility, relationships with business competitors, price and profitability, store decoration, inventory, promotion, and distribution. For traditional retailers in Indonesia, there is no evidence to show that this is true. The factors that Fongkam (2015) has mentioned are the weakness factors of traditional retails in Indonesia, and these weaknesses have been tolerated by the consumers.

Theoretically, these six factors are grouped into service quality. Colla and Lapoule (2012), Koistinen and Järvinen (2016) prove that service quality and customer service activities are factors that attract people to shop. Stoner (1987) and Knežević, Naletina, and Damić (2016) propose that maintaining goods quality, goods uniqueness, service quality, strategic location, and competitive price are the superior values that can be established by traditional retail's owners. Almost all traditional retail in densely populated small cities in Indonesia are located in strategic locations that are accessible to the consumer. The hard part is selling goods with a price that can compete with the price in modern retails. However, traditional retail consumers have tolerated the conditions of traditional retailers, such as those related to deficiencies: cleanliness, variety of items, price, store order, and store atmosphere (Goldman and Hino 2005). The cause of this obstacle is the small capital that traditional retails have. To overcome this, the use of strategic alliances and strategic cooperation (Farhangmehr, Marques, and Silva 2000; Knežević, Naletina, and Damić 2016) or making an alliance with other traditional retails and applying product differentiation (selling different product from modern retails) could streamline traditional retail capital (Knežević, Naletina, and Damić 2016). Traditional retail entrepreneurs in groups will be more empowered to negotiate when buying goods in large quantities and can reduce the price of transportation. The use of this strategy in a committed manner will increase traditional retail competitiveness and they will be able to sell goods at the same price as modern retail.

Traditional retail in Indonesia has a custom where the owners, who also act as the retail manager, run the business together with their families. This fact is similar to the research finding of Boulaksil *et al.* (2014) in Morocco. In the observation result from the research site, the majority of traditional retail owners run their businesses and serve their consumers directly. It is very rare for a traditional retail shop to not have transactions being done directly by its owner. Consumers can directly communicate with the owner whether they want to pay in cash or credit. Consumers usually only buy goods for daily needs (Sunanto 2012), such as milk, soap, cooking oil, etc., and they can directly make a bargain about the price of goods that they are going to purchase. It is different from modern retails, where the owners do not have direct contact with the consumers, and the cashier is usually an employee not have any family relationship with the owner. The direct service from the owner attracts consumers to shop in

traditional retails. Psychologically, when a consumer is being served directly by the owner, they can communicate freely, and they feel more valued.

Polite employees and quick service are also the factors that are liked by traditional retail consumers (deft, very attentive to every consumer). Traditional retails owners know their consumers personally. Therefore, they show good manners to consumers. They are afraid of social law in society. In quick service, they personally know which consumers they should give quick service to and which consumers do not require it. Quite similarly, Hardiani and Sisharini (2017) find that hospitality, speed, and certainty of opening time for traditional retail stores are the desired factors by consumers.

Other factors that are liked by consumers are direct marketing and the accuracy in calculating the payment. When serving consumers, retail owners often give them information about new products or substitute products. For traditional retail, direct marketing is very effective in introducing unique and new products. However, there should be no mistake in the information provided; for example, misinformation in pricing, specifications, etc. The consumers do not like miscalculation in payment because of the wrong information that the seller give. The information provided must be accurate and smart. This informal communication is more effective in marketing new products and other goods.

Another finding and factor that attract consumers to shop in traditional retail is the accuracy in calculating the payment. As the number of consumers is not that much, traditional retail owners simply use simple technology such as calculators and digital scales. The accuracy in counting the number of goods, the weight of goods, and the payment transaction will increase the consumers' trust in traditional retail.

Conclusion and Recommendation

Conclusion

There are several factors that determine the success of a traditional retail business. From 38 factors that are investigated using factor analysis, only six factors that are proofed to be the determinant of a traditional retail business's success. Those six factors are direct marketing, polite employees, quick services, being served directly and personally, accuracy in calculating the payment and having transactions being done directly by the owner. Those factors can be used by traditional retails to compete with modern retails and can be an appeal to consumers to shop in traditional retail.

Recommendation

In this study, the key factors to the success of traditional retails are seen from the consumers' point of view. In the future, the success of traditional retails should be viewed and analyzed from the consumers' and the owners of traditional retails' point of view.

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Air Transport Service Efficiency and Airport Connectivity of ASEAN Countries

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Abstract:

Southeast Asia countries have integrated their socio-economic development together as the ASEAN Community. The paper focuses on air transportation as one of the key drivers of the connectivity. The indicators, *i.e.*, air transport service efficiency and airport connectivity, reported by World Bank, are investigated. Each country's GDP per capita was mapped these indicators to reduce economic advantage gap. The results are suggestive that Malaysia, Indonesia, Thailand, and Singapore possess outstanding potential. The Philippines and VietNam are satisfiable in airport connectivity yet need improvement in air transport service. Cambodia, Lao PDR, and Brunei are lack behind in both areas.

Keywords: ASEAN community; air transport service efficiency; airport connectivity.

JEL Classification: F42; L93; N75.

Introduction

The ASEAN Community is the initiative of 10 Southeast Asian nations, *i.e.*, Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam, aiming at integrating economic, social and cultural development of the member countries. Toward 2025, ASEAN has visions to become a highly integrated and cohesive economy, a competitive, innovative, and dynamic ASEAN while enhancing connectivity and sectoral cooperation with a resilient, inclusive, people-oriented, and people-centered (ASEAN Secretariat 2015, Han and Soesastro 2003, Santiteerakul *et al.* 2018).

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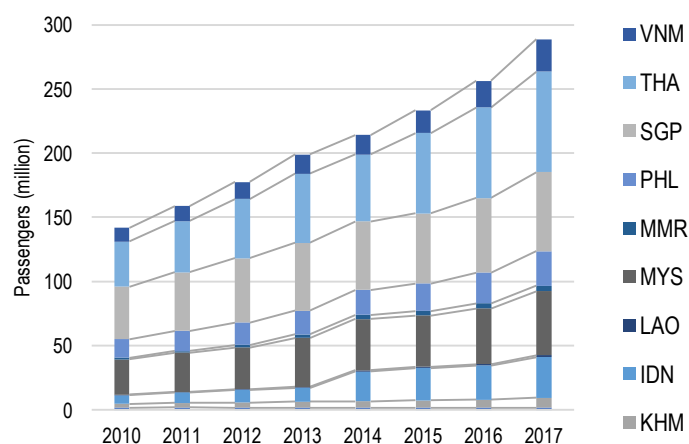
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Within the collaboration, transport cooperation is among key strategies where goods and people are allowed to flow freely within ASEAN. ASEAN can thus become competitive to the global economy (ASEAN Secretariat 2008, Forsyth *et al.* 2006, Tan 2014). For people movement, air transportation is the most famous one thanks to the entrance of low-cost airlines, technological advancement, and globalization. More and more passengers are able to fly with relatively low cost and high frequency. Statista.com estimated the number of flights performed globally expectedly to reach 39.4 million in 2019. Global air traffic passenger demand also increases by the rate of 5-7% yearly. The International Air Transport Association (IATA) forecasts number of passengers traveling in 2036 at 7.8 billion people; by which 45% are from the Asia Pacific region.

Focusing on people movement, intra-ASEAN and the rest of the world, ASEAN has developed ASEAN Single Aviation Market (ASAM) initiatives, aiming at becoming a seamless ASEAN sky connecting to the world. In 2018, the ASEAN Secretariat Statistics Division has reported that there are more than 288 million passengers traveling in and out ASEAN. 27% are from/to Thailand, 21% are from/to Singapore and 17% are from/to Malaysia. The growth rate is at 11% every year since 2010 (see Figure 1).

Figure 1. International air passenger traffic in ASEAN countries



Source: ASEAN secretariat

Recently, ASEAN also extends its collaboration into the global economy through FTAs and Comprehensive Economic Partnership agreements (CEPs) with China, Japan, the Republic of Korea, India, Australia, and New Zealand. These external economic relations will strengthen ASEAN economy.

This paper aims at investigating air transport service efficiency and airport connectivity of 10 ASEAN countries if they are aligned. Using published and reliable source of data, the comparison can be done and thus potential of each country can then be identified.

1. ASEAN community

1.1. Basic information of ASEAN

According to the ASEAN Secretariat statistics, the population of ASEAN is at 649.1 million. Reported visitors is 125.5 million. ASEAN GDP is at 2.99 US\$ billion, ranked as the world's 5th largest. The figure grows steadily with the annual average rate at 5.3%. The highest growth rates during the period of 2000-2017 are Myanmar (at 10.0%), followed by Cambodia (7.7%), Lao PDR (7.1%), and Viet Nam (6.5%). The services sector contributed more than 50% of the region's total GDP. Total trade 2.8 US\$ trillion. 23.5% is intra-ASEAN. Foreign direct investments inflow are 154,713 US\$ million (ASEAN Secretariat, 2018).

Table 1. Basic data of ASEAN countries

Country	Total land area (sq.km.)	Total population (thousand)	GDP at current prices (US\$ million)
BRN	5,765	442.40	13,557
KHM	181,035	15,981.80	24,634
IDN	1,916,862	265,015.30	1,041,562
LAO	236,800	6,887.10	18,096
MYS	331,388	32,385.00	358,412
MMR	676,576	53,625.00	77,264

Country	Total land area (sq.km.)	Total population (thousand)	GDP at current prices (US\$ million)
PHL	300,000	106,598.60	342,693
SGP	720	5,638.70	364,076
THA	513,140	67,831.60	505,060
VNM	331,230	94,666.00	241,039
ASEAN	4,493,516	649,071.50	2,986,391

Source: ASEAN Secretariat

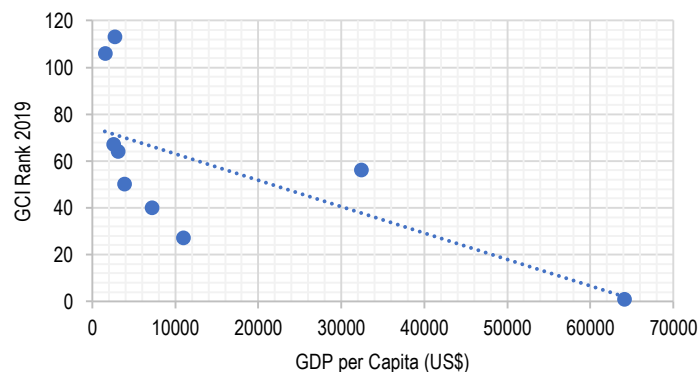
From Table 1, it can be seen that ASEAN countries are diverse in geography, population size, and economy. The country area ranges from 1,916,862 sq.km. of Indonesia to a small 720-sq.km. island of Singapore. Population ranges from 265.0 million of Indonesia (World's 4th populated country) to 0.4 million Brunei. GDP also ranges from 13.5 US\$ billion to 1.0 US\$ trillion.

1.2. Competitiveness of ASEAN countries

Based on World Bank's The Global Competitiveness Report 2019, the Global Competitiveness Index 4.0 (GCI 4.0) evaluates 103 individual indicators from 12 competitiveness pillars reflecting globalization and the 4th industrial revolution, *i.e.*, institutions, infrastructure, ICT adoption, macroeconomic stability, health, skills, product market, labour market, financial system, market size, business dynamism, and innovation capability of 141 economies (Klaus 2019).

Among ASEAN, in fact, the world, Singapore is the 1st rank. With great potential on institutions, infrastructure, ICT adoption, health, product market, labour market, and financial system. The GDP per capita of Singapore is also as high as 64,041.4 US\$, outlying all ASEAN countries with the regional average of 14,259.8US\$. The second best of ASEAN is Malaysia with GCI rank of 27th. Then, Thailand is at 40th and Indonesia is at 50th. Cambodia and Lao PDR both lie on the 100 rank band. It shall be noted that Myanmar data is not available in The Global Competitiveness Report 2019.

Figure 2. GCI rank 2019 vs GDP per capita of ASEAN countries



At first, a preliminary investigation is conducted to observe if the competitiveness of ASEAN country is aligned. Here, the GCI rank of each country is mapped with its GDP per capita to reflect the country's advantage based on economic potential.

The investigation is based on Figure 2 which maps GCI rank 2019 with GDP per capita. The linear trend line indicates the expectation of GCI rank per GDP per capita. If countries lie below the line, this is desirable. It means the country's competitiveness is over expectation based on ASEAN average. If the points lie above the line, it is otherwise.

Therefore, Figure 2 is suggestive that Malaysia has possessed very strong competitiveness. Malaysia lies far away below from the trend line. With Malaysia's GDP, the expectation can be as far as the 60th+ rank. But Malaysia is at 27th rank. Thailand and Indonesia are also in good location under the trend line. Philippines and Viet Nam are close to the trend line yet in the preferable position. On the other hand, Lao, Cambodia, and Brunei lie much above the trend line, indicating the undesirable ranks.

2. Airline and airport business in ASEAN countries

2.1. Airline business in ASEAN

There are 169 airlines in ASEAN. The total fleet is close to 2000 aircraft with a year-on-year growth of 6%. Top 10 largest airlines (by fleet size) are only from 6 countries, *i.e.*, Indonesia, Singapore, Malaysia, Thailand, Vietnam, and Philippines (see Table 2). Currently, ASEAN airlines currently have more than 1600 aircraft on order. Low-Cost Carriers (LCC) account for more than 70% of these aircraft on order.

Table 2. Top 10 largest airlines in ASEAN by fleet size

Rank	Airline Group	Number of Airline	Country	Number of Aircraft
1	Lion Air	5	IDN	294
2	Garuda Indonesia	2	IDN	192
3	Singapore Airlines	3	SGP	191
4	Air Asia	4	MYS	186
5	Thai Airways	3	THA	129
6	Vietnam Airlines	3	VNM	115
7	Malaysia Airlines	3	MYS	102
8	Philippine Airlines	2	PHL	88
9	Cebu Pacific	2	PHL	61
10	Sriwijaya Air	2	IDN	56

Source: Centre for Asia Pacific Aviation

The ASEAN Secretariat has reported that there are 108.9 million tourists flew into ASEAN countries and 42% of these tourists travelled within ASEAN. Intra-ASEAN passengers are 39.1%. Passenger traffic in ASEAN grew by approximately 10% each year (Center of Aviation, 2018). It is predicted that intra-ASEAN air travel will contribute to a third of world air traffic by 2036 (Gnanasagaran 2018).

2.2. Airport business in ASEAN

According to the Centre for Asia Pacific Aviation (CAPA), there are 383 airports in ASEAN and 73 are international. However, the busiest airports in 2017 are only belonged to 5 countries, *i.e.*, Indonesia, Singapore, Thailand, Malaysia, and Vietnam (see Table 3).

Table 3. Top 10 busiest airports in ASEAN

Rank	Airport	City	Country	Total passenger	% Change (in 2017)
1	Soekarno–Hatta International Airport	Jakarta	IDN	63,015,620	+8.0%
2	Singapore Changi Airport	Singapore	SGP	62,219,573	+6.0%
3	Suvarnabhumi Airport	Bangkok	THA	60,860,704	+8.9%
4	Kuala Lumpur International Airport	Kuala Lumpur	MYS	58,618,680	+11.2%
5	Ninoy Aquino International Airport	Manila	PHL	42,022,484	+6.1%
6	Don Mueang International Airport	Bangkok	THA	38,299,757	+8.8%
7	Tan Son Nhat International Airport	Ho Chi Minh City	VNM	35,900,000	+10.5%
8	Noi Bai International Airport	Hanoi	VNM	23,068,227	+12.0%
9	Ngurah Rai International Airport	Denpasar	IDN	22,863,647	+12.5%
10	Juanda International Airport	Surabaya	IDN	21,882,335	+10.9%

3. Air Transport and airport potential of ASEAN countries

Of interest in this paper are the efficiency of air transport service and the airport potential of ASEAN countries. These issues have been addressed with several models yet the data collection can be complicated (Boonekamp and Burghouwt 2017, Chaiwan and Tippayawong 2018, Pandey *et al.* 2018, Suwanwong *et al.* 2018). To simplify the assessment, these issues are reflected by “efficiency of air transport service” and “airport connectivity”, as the reported GCI indicators in World Bank’s The Global Competitiveness Report 2019. The definitions, computations, and data sources are noted in Table 4.

Table 4. Efficiency of air transport service and airport connectivity indicators

Indicators	Definitions	Computations	Data Sources
Efficiency of air transport services	Reflection of the efficiency (<i>i.e.</i> frequency, punctuality, speed, price) of air transport services	Response to the survey question "In your country, how efficient are air transport services?" (weighted average or most recent period available)	World Economic Forum, Executive Opinion Survey
Airport connectivity	Measurement of the degree of integration of a country within the global air transport network	For each airport, the number of available seats to each destination is weighted by the size of the destination airport (in terms of number of passengers handled). The weighted totals are then summed for all destinations, then for all airports in the country to produce a score. A log transformation is applied to the raw value before converting it to the 0 to 100 score.	International Air Transport Association (IATA)

Source: Klaus (2019)

In this investigation, the methodology of mapping GDP per capita with score indicators are used. Where score 100 represents the best potential. Thus, the position of the dot above the trend line is now preferable.

Figure 3. Efficiency of air transport service of ASEAN countries

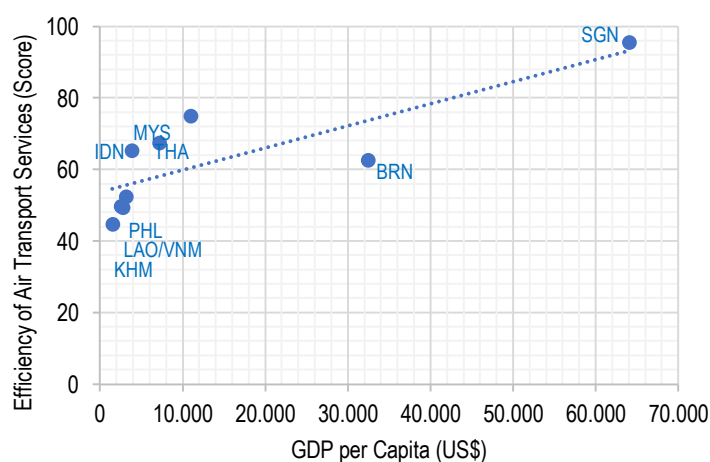
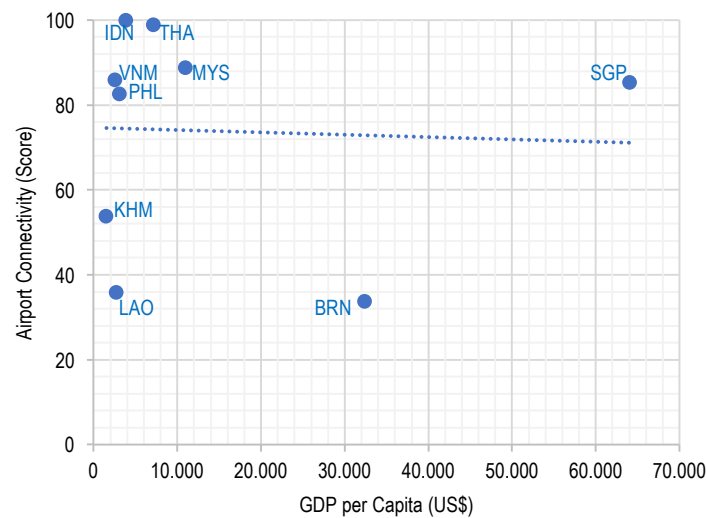


Figure 3 illustrates the mapping of country's efficiency of air transport service score with GDP per capita of 9 ASEAN countries. (Myanmar data is not available). The progressive trend line indicates that the efficiency of air transport service should be higher if the GDP per capita is higher. Singapore, again, possesses the best air transport service efficiency with a score of 95.5, ranked world's 1st. Malaysia, despite ranked world's 25th, is outstanding in ASEAN. In this case, Malaysia is positioned high above trend line. Thailand and Indonesia are also positioned in the desired positions. This means that these countries can provide satisfactory frequency, punctuality, speed and price in their air transport services. On the other hand, Philippines, Lao PDR, Viet Nam, Cambodia, and Brunei are in the subpar positions. This indicates room for improvement for these countries.

Figure 4 illustrates the mapping of country's airport connectivity score with GDP per capita of 9 ASEAN countries. There is no trend relationship between two axes. (If consider Singapore and Brunei outliers, the progressive trend will appear).

The average score of ASEAN in this indicator is as high as 73.9 out of 100. Indonesia scores 100 out of 100, ranked world's 5th. Thailand also scores 98.9, ranked world's 9th. This indicates the high connectivity of airports that can integrate into the global air transport network. Singapore, Malaysia, Viet Nam, and Philippines also possess satisfactory potential. However, Cambodia, Lao PDR, and Brunei are again in subpar positions.

Figure 4. Airport connectivity of ASEAN countries



Conclusion

Air transportation is among the key drivers of ASEAN development. Despite a large diversity in socio-economic development, ASEAN is trying to bridge the ASEAN sky to the world. Leading by Singapore, the world's 1st rank in GCI 2019, Indonesia, the world's 4th populated country, Malaysia, an outstanding country in terms of overall competitiveness, ASEAN are connecting to the world with airline and airport industries.

The air transport and airport potential investigation uses the methodology of mapping GDP per capita with the efficiency of air transport service and airport connectivity. The result is suggestive that Malaysia, Indonesia, Thailand, and Singapore are outstanding in terms of both air transport service and airport connectivity. Philippines and Viet Nam are good at airport connectivity yet need to improve their air transport service. Finally, Cambodia, Lao PDR, and Brunei need improvement in both air transport service and airport connectivity.

Acknowledgement

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European Integration Between Non-EU Countries and the EU Member Countries – Romania and the Southeast Region

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Abstract:

Romania shares much of its borders with non-EU countries. As a consequence, one of its main future missions should be to be an active player in the process of continual enlargement of the European Union both to the east and to the south. This will allow Romania to change its peripheral EU status into a central state within the Union. In order to be economically successful, Romania must be able to extend its commercial operations to the east, west, north and south. To achieve this, it is important for all surrounding states to have good economic development, and trade barriers to be reduced or non-existent.

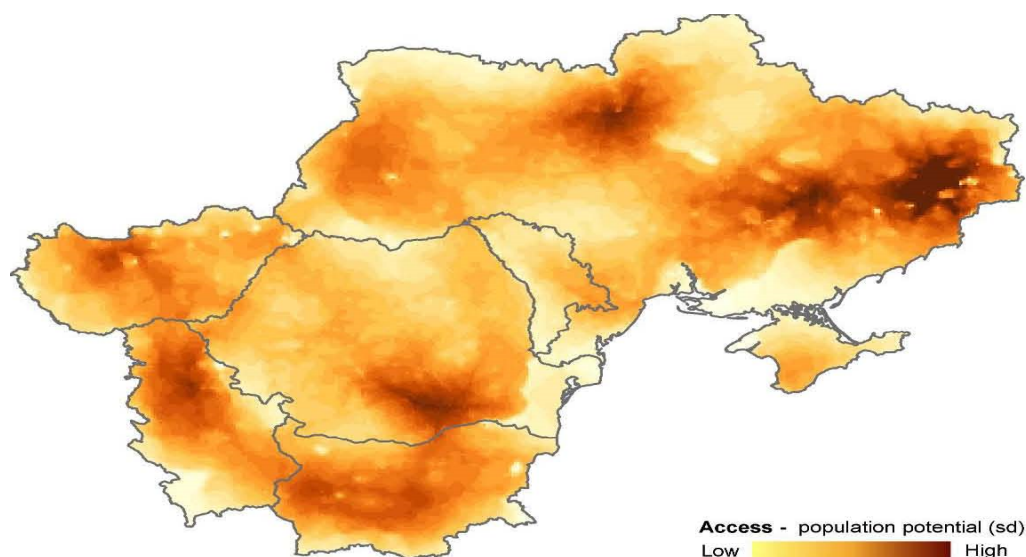
Keywords: integration; the European Union; connectivity; progress, development.

JEL Classification: O18; O52; F15.

Introduction

The deep integration in the European Union should be the first and most important priority of Romania, which will be subordinated to the integration in the group of the states of South-East Europe. However, the latter form of regional integration in the south-east region (hereinafter referred to as "ISE") is a medium and long term stake. Romania cannot play an important role in the mechanism of the European economy, given the isolation of its immediate neighbors, but even the speed and sustainability of the future development of the country, which is expected to lead to a more favorable position within the European Union economy, depend on the degree of ISE of Romania.

Figure 1 The demographic gravitational model in South-East Europe



Source: World Development Report 2013

Of course, this is easier said than done, but it is important for Romania to use its political influence within the European Parliament and the European Commission to force the "thinening" of the borders and, finally, the integration of the neighboring states in the EU. In the light of the common language, culture and history, the Republic of Moldova is a special case. In addition, policymakers should explore the possibility of strengthening links

with neighboring states by developing a connective infrastructure (where the current or potential flow of people and goods would justify this) and by establishing institutions to enable collaboration border.

As the above gravitational model also emphasizes, Romania has weak cross-border synergies. Apart from the connection over the Danube from Giurgiu to Ruse, there are only a few gravitational attraction points.

In part, the cause of this phenomenon is the small number of border crossing points. Another cause for the reduced gravitational attraction is the lack of large settlements on both sides of the border. As the map above shows, some of the weakest connected regions in Romania are the border regions - for example, the Danube Delta region, the connection between Serbia and Bulgaria to Drobeta Turnu Severin, as well as the north, where the Carpathians pass into Ukraine. In such areas, increased connectivity can only have a small contribution in terms of boosting cross-border synergies and development. Unfortunately, the low population density also makes these regions among the poorest in the country.

This configuration can become problematic in a Europe that is becoming increasingly interconnected. For example, Hungary, Serbia and Bulgaria are connected seamlessly, which could lead to Romania's circumvention in intra- and interregional trade. For this reason, it is essential to identify ways to improve future links with neighboring states, especially with Hungary, Serbia and Bulgaria (where cross-border synergies seem to be the strongest).

There are, of course, limitations regarding Romania's ability to integrate into the South-East group. Most of these limitations refer to the same aspects that make the integration in the European Union the first priority refers to the fact that Southeast European states simply do not have the resources to obtain ISE independently of their integration into the EU. Their opening to the European Union is, in fact, an opening of the Union to the South-East region in a quadruple sense. On a purely economic level: (a) the EU market is the largest driver of demand for goods from Southeast Europe and (b) EU states are the main source of investment capital for Southeast Europe.

Then there is the institutional dimension: (c) although, sometimes, contrary to the national forces, the reforming influence of the European Union has a colossal force to bring down the division. The common market policies, as well as the various regulations and uniform reform requirements, also have an impact on Romania's ability to integrate at regional level. The fourth factor of the European Union's openness to the southeast is related to (d) the availability of integration funds.

Given that ISE must be based on resources that either come from the EU or are the result of the opportunities and influences involved in the EU integration process, it can best be conceived as an adjacent element of EU integration. This concept is based on the intelligent and economical use of resources in the ISE process. Thus, for example, the interconnection of growth areas in the south-east - generally concentrated around large cities - must be carefully superimposed with the network of pan-European corridors.

Again, the medium-term objective of ISE is to catalyze EU integration by ensuring that Romania unites its forces with neighboring states. In the long term, ISE is an autonomous goal, which refers to the fact that the South-Eastern group must become a recognizable component of the European economic engine. Currently, Romania can more easily track these desires in its relationship with three states: Turkey, Hungary and Bulgaria. First, the volume of Romania's trade with these three states taken together rises close to the level of trade between Romania and its most prominent trading partner, Germany, while all trade flows with other neighbors (e.g., with Serbia, the Republic Moldova, Ukraine) adds up even less than the volume of trade with Bulgaria alone.

Despite the fact that it is not a neighboring state, Turkey has become a true economic center located at the confluence of Europe and Western Asia, being also one of the most important trading partners of Romania. Hungary and Bulgaria are member states of the European Union. Moreover, Hungary, whose territory is transited through a large part of Romania's trade flows to the EU, owns the most developed economy within the group (including Romania) and, like Turkey, carries out extensive and consistent trade with Romania. Despite weaker but developing ties with Romania, Bulgaria is perhaps Romania's most natural economic partner. In any case, these states were part of the same wave of enlargement of the European Union, and, in the process of EU integration, Bulgaria was correctly considered as forming a regional development unit with Romania. In view of the similarity of the internal social, political and economic conditions of the two states, it is quite understandable that Romania and Bulgaria should join forces in order to benefit from regional integration together, especially considering the fact that both states have allocated significant European funds.

Following the same logic, it is not difficult to understand why Serbia, the Republic of Moldova and Ukraine cannot have the same weight as Hungary, Turkey and Bulgaria in the role of Romania in the ISE, at least for the next ten or twenty years. Like Romania, Hungary, Turkey and Bulgaria were not without social and political turmoil. However, like Romania, these states were favored by a variety of factors, some of them already mentioned. None of these states were confronted with the consequences of the war or with the problems of identity and independence

affecting a state. In contrast, Serbia had to redefine itself after the disintegration of Yugoslavia. In its turn, the Republic of Moldova is still divided between opposing political forces and is economically losing, after it broke away from the Soviet economy. Ukraine has gone through serious internal and external problems to assert itself in the region. Overall, Serbia, the Republic of Moldova and Ukraine were less likely to grow than Romania, Hungary and Bulgaria.

As a rule, business integration follows economic growth, not vice versa. The statistical figures indicate a remarkable parallelism between the evolution of trade flows between Romania and its direct neighbors, respectively Turkey, on the one hand, and the pace of economic growth in these countries, on the other. This parallelism is not accidental at all. In this context, two aspects must be mentioned. First, the curves of foreign trade - especially those reflecting trade with Turkey, Hungary and Bulgaria - appear to be much steeper than curves reflecting the evolution of GDP (per capita). Responsible for this difference is not a feature of commercial flows, but a more pronounced economic growth of Romania's GDP (per capita) compared to that of these neighbors. Second, Serbia appears somewhat like an abnormality in this comparative picture. Specifically, while Serbia's GDP curve almost overlaps with that of Bulgaria, the representation of trade flows between this state and Romania differs considerably from the line indicating trade flows between Romania and Bulgaria. This anomaly can be explained by the sudden destruction of Serbia's economy following events related to the dismemberment of Yugoslavia. Yugoslavia's economy was the most robust of the economies of the Balkan communist states, and Serbia began to recover little from the economic downturn caused by war and political turmoil, and its ties with Romania suffered in a way that did not allow their real relaunch. The anomaly also demonstrates the potential of Serbia's economy and, more generally, the potential of the entire former Yugoslav area. Some of the economic links in this region will certainly be resumed to partially recreate a market that Romania should be very interested in. In addition to the high potential of this market, another factor that should boost Romania's interest in its southwestern Danube neighbors is the fact that Timisoara is significantly closer to the Croatian ports on the Adriatic Sea, with direct access to the Sea. Mediterranean, except the Constanta port from the Black Sea.

The aforementioned considerations suggest that Romania's efforts to develop institutional and infrastructure links should follow the path of natural energies of international trade in the region. The country should do its utmost to support de facto integration as a result of a growing economic interconnection starting from the private sector. More specifically, policy makers should explore the possibility of strengthening links with neighboring states by establishing connective routes where current or potential flows of people and goods really justify such an approach and by creating institutions that truly cultivate cross-border collaboration. The development of roads and highways that connect Romania with its immediate neighbors is an extremely useful topic for political decision makers in starting the dialogue with the main exporters of the country. Prioritizing the construction of a highway infrastructure in the direction of the European Union and discussing other details regarding the east-west infrastructure network would also have to be gained from such a dialogue. However, as opposed to the location of the Romanian bridges to the nearest neighbors, the main routes to the west have already been established.

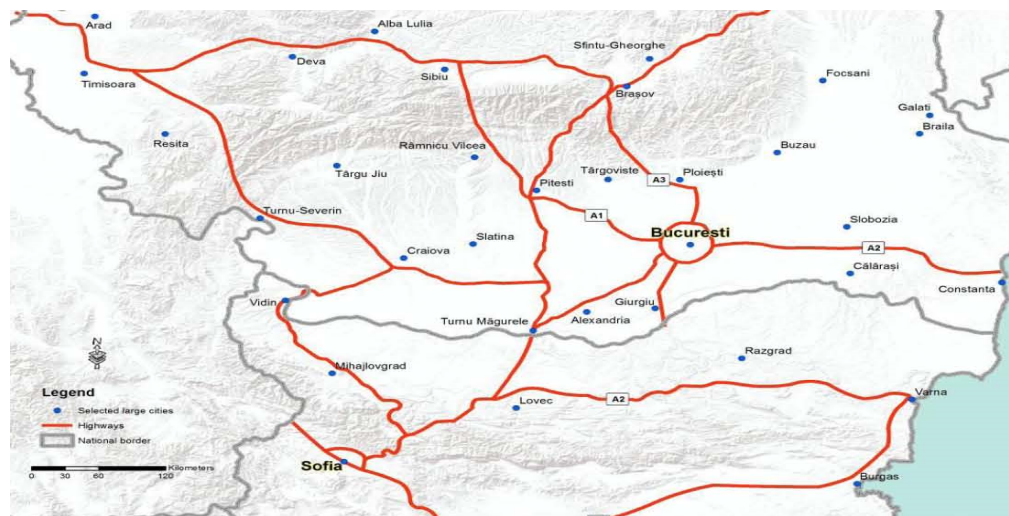
As is the case in most market economies, a significant share of a country's exports are generated by a limited number of companies. In Romania, the 30 largest exporters generate about 42% of the country's exports. This is a significant share, and the development of the infrastructure that is expected to increase trade should be done based on a consultation with these major exporters. These big companies know best what kind of connecting roads they need, know how to connect them to the railway network or how to easily transport their goods to Constanta port. But not all of these businesses predominantly export to the European Union, and their infrastructure needs go beyond a simple highway connection to the western border.

In many cases, however, it is superfluous to measure or estimate the traffic levels of certain routes. For example, a simple logic requires the most direct road link to connect Sofia from Bucharest (the capitals of Bulgaria and Romania). This route happens to pass through Turnu Măgurele, where, unfortunately, a bridge is missing over the Danube. Despite the fact that any new crossing point from one country to another should, in principle, lead to mutual commercial benefits, the bridge inaugurated between Calafat and Vidin is located outside any major trade route in Romania. In fact, this bridge unites two of the least developed regions of the two countries.

The route connecting the cities of Sofia and Bucharest through Turnu Măgurele has more utility for Romania, all the more so as this route overlaps with the future Hemus highway in Bulgaria. The need for a bridge at Turnu Măgurele will be increasingly felt as the economic ties between Romania and Bulgaria intensify. Also, both the need for a bridge at Turnu Măgurele and the existence of a bridge between Calafat and Vidin enhance the reasons mentioned above, in favor of a concentrated and rapid implementation of the A1 highway project (Bucharest - Pitești - Sibiu - Timisoara). Apart from the fact that it offers the prospect of an easy connection with Craiova and, further on, with Bulgaria, which would increase the usefulness of the Vidin-Calafat bridge, the A1 motorway would probably

stimulate the flows between Timisoara and the Serbian cities of Belgrade and Novi Sad, which would provide Romania greater openness to the former Yugoslavian space.

Figure 2 Route proposal Bucharest Sofia via Turnu Magurele



Source: World Development Report 2013

Compared to other Eastern European countries, Romania is not in a precarious position regarding the number of days for import / export, although it has not registered any progress since 2006, when, in the context of preparing for integration into the European Union, has reduced these times to less than half. The country has not made the same progress in terms of the quality of the commercial infrastructure and the efficiency of the customs processes, where, as a result, there is enough room for improvement.

Of course, in addition to drastically improving logistics, the best way to facilitate trade across non-EU borders is to apply uniform policies of the common market to all neighboring states. For Romania, this is reduced to advocating for the inclusion of its neighbors in the European Union, which is undoubtedly easier said than done. Due to their economic and institutional potential, most ex-Yugoslav states represent areas of paramount importance. In the Republic of Moldova, it is a special case, considering that the language, culture and history it shares with Romania are natural factors that "thin" the borders. Unfortunately, the fact that Romania's current priority is to improve its connections to the west, the poor condition of the roads on both sides of the Prut and the small size of the Moldovan market means that the integration of Moldova into the European transport network will be done only when Romania will have resources to develop its infrastructure from the northeast. Until then, Romania should endeavor to keep alive its economic, diplomatic and cultural ties with the Republic of Moldova. In particular, it should increase its attractiveness for Moldovan citizens - finally, by facilitating the mobility of capital and labor between the two states - at least for two reasons:

- as the development gap between the two states accentuate, the growing Romanian capital will start to travel over Prut to benefit from the opportunities existing in a related culture (including an easily navigable business environment);
- as bilingual persons, familiar with the ex-Soviet culture (especially Russians and Ukrainians), the citizens of the Republic of Moldova can serve as mediators for the Romanian businesses that will want to explore the vast Eastern markets in the future.

Conclusion

In addition to its immediate neighbors, Romania should strive to increase and facilitate links with states where there is a large Romanian diaspora - for example, the US, Canada, Australia. The easier the trips between these countries will become, the greater the benefits obtained from the exchange of ideas, the flow of capital and the creation of business and investment opportunities. Fortunately, in this regard a lot of infrastructure needs coincide with the imperatives of developing Romania's connectivity with the Member States of the European Union. However, specific institutional and diplomatic efforts can be undertaken to unlock new resources abroad. For example, the government should use diplomatic channels to help eliminate the need for travel visas, to organize national themed forums where graduates of higher education institutions and professionals can share their experiences and knowledge from abroad.

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Analysis of the Intergovernmental Transfer Impact on Regional Income Inequality in Indonesia

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Abstract:

Up until now, the income inequality between regions in Indonesia is still high. In the long term, this will become a serious problem if it is not immediately resolved by inter-regional investment allocation policies. The intergovernmental transfer is an instrument of fiscal decentralization policy in Indonesia since 2001 with three instruments namely shared revenue, general purpose grant, and specific purpose grant. The purpose of this study is to analyze the impact of the intergovernmental transfer on income inequality between provinces in Indonesia since the implementation of fiscal decentralization in 2001-2017, as well as to propose the recommended policies to reduce the basic service inequality. The object of this research was the amount of inequality between regions by using Theil Index. This study was conducted in 32 provinces in Indonesia. Data was processed with SPSS and Microsoft Excel software. The results of this study found that income inequality between provinces in Indonesia was still high. The study also found that the general purpose grant had a negative effect on income inequality between provinces, while the shared revenue had a positive effect on income inequality between provinces, and the specific purpose grant had no effect on income inequality between provinces in Indonesia.

Keywords: income inequality; intergovernmental transfer; decentralization.

JEL Classification: O15; O18; O38.

Introduction

In 15 years, the implementation of fiscal decentralization in Indonesia needs to be evaluated to the extent that fiscal decentralization can achieve its objectives, as stated in Law number 33 of 2004, concerning the financial balance of the central and regional governments. Research by Sukwika (2018) found a fairly high economic inequality (GRDP per capita) between provinces in Indonesia during the 2010-2015 period. This is shown by the value of the Williamson Index of GRDP per capita during the period 2010-2015 ranging from 0.7. The regional economic inequality in Indonesia is still relatively high based on the coefficient value of the variation. This condition lead to the question whether the intergovernmental transfer system which is intended as an instrument of equality has not been effective as an approach of regional development policies to create regional equality.

The intergovernmental transfer, which is a fiscal decentralization instrument consisting of the general purpose grant, specific purpose grant, and shared revenue, is a type of central government transfer to local governments to support the implementation of regional government authority in achieving the objectives of granting autonomy to regions, and to reduce development inequality between regions in Indonesia, especially to improve services and welfare to be more fair and equitable. Many researches regarding intergovernmental transfer have been conducted (Aritenang 2019, Tamai 2019).

The general purpose grant is distributed by the Central Government to the Regional Government which must be determined by the government at least 26% of net domestic income with the aim to equalize the fiscal capability and distribution of financial capacity between regions, and to reduce inequality of financial capacity between regions with the principle of fiscal gap, which is the difference between the fiscal needs and the fiscal capacity in one region. In this case, the financial capacity of the region is determined based on fiscal capacity which is the amount of shared revenue and regional revenue reduced by mandatory expenditure per year.

Specific purpose grant is a matching grant that functions to fund the development needs of national priority facilities and infrastructure to equalize development in accordance with specific problems faced by one region, such as poverty, damaged infrastructure, the infectious diseases and etc. Prior to 2005, specific purpose grant was allocated only to the education, health, government infrastructure, maritime, and fisheries. Up to 2017, specific purpose grant was allocated to 17 aspects including non-physical activities. The direction and policy of specific purpose grant are getting further away from their original objectives in which there are more aspects to be funded.

Shared revenues are funds that are collected and allocated according to a certain proportion of the proportionality of collection or the incidence of revenue from the Central Government. Shared revenue allocation for taxes is set at 20% for producing regions and 80% for the central government, while shared revenue for natural resources is determined at 15% for each province and the remaining 85% for the central. While the allocation of 15% for the next region is also divided by 6% for producing regions and the rest for the surrounding regions.

These three grants have almost the same functions. If these three grants are implemented and used effectively and efficiently, it will lead to economic growth and equitable development among regions in Indonesia. In practice, the allocation of intergovernmental transfer raises considerable inequality of regional financial capacity. This happens because the shared revenue system was allocated to regions based on production capability. As a result, regions that are already relatively prosperous due to their higher production capacity will receive a greater allocation of funds. While regions that are still relatively poor due to their smaller production capacities will also get smaller fund allocations. Consequently, the prosperous regions become more prosperous, whereas the poor regions do not have significant changes, thus regional economic development inequality tends to widen.

Harrod-Domar in Arsyad (2010) developed Keynes's theory by giving a key role to investment in the process of economic growth, especially regarding the dual characteristic of investment. First, investment creates income (which is the impact of investment demand), and second, investment increases the production capacity of the economy by increasing the capital stock (which is the impact of investment supply).

In accordance with Harrod-Domar's theory, regions that receive greater investment allocations from the government, or can attract more private investment to their regions will tend to have a faster economic growth rates. This condition will certainly also be able to encourage the regional development process through the provision of more jobs and a higher income levels per capita. On the other hand, the small investment from government and private sector in a particular region causes economic activity and regional development are less well developed. This leads to the differences in the region's financial capabilities and economic inequalities between regions in Indonesia.

In order to encourage regional economic growth and to reduce economic inequalities between regions, it is necessary to analyse and control the allocation of regional investment. The allocation of private investment can only be controlled indirectly through market mechanisms by improving the position of regional competitiveness. Whereas regional allocation of public investment can be controlled directly by the central government through the establishment of laws and government regulations. The ideal thing is when the allocation of private and government investment support each other (Sjafrizal 2012).

This study is focused on analysing inequality between provinces in Indonesia since the implementation of fiscal decentralization using the Theil Index and investigating the effect of the intergovernmental transfer on inequality between provinces using the linear regression method.

1. Literature review

Many researches related to the relationship between fiscal decentralization and inequality in income between regions have been conducted (Nursini 2019, Timushev 2019). From the academic debate related to fiscal decentralization, there are two point of views regarding the effect of decentralization on regional income inequalities. The first opinion said that decentralization would reduce the disparity. It is stated in Lessmann's research entitled 'Fiscal Decentralization and Regional Disparity: A Panel Data Approach for OECD Countries'. The research analyzed the impact of fiscal decentralization on regional disparities. The regression of cross-country had shown that countries with high levels of decentralization show small regional disparities. Decentralization is not bad for distribution between regions of a country, moreover, decentralization reduces regional disparity. However, some researches are needed. This result can only be applied in developed countries (Lessmann 2006). Daerobi (2019) studied about the disparity in Province in Indonesia.

Research by Bahl and Martinez-Vazquez (2006) entitled 'Sequencing Fiscal Decentralization' stated that decentralization, if well-designed, can make the good decision to people, therefore increasing the efficiency and responsiveness of public service delivery. It can also increase economic growth and offer potentially powerful tools to reduce poverty and inequality.

Research by Bahl and Wallace (2006) investigated the impact of fiscal decentralization on the equality in Rusia. The object of the research were 21 regions in Rusia in 1997, in which the regional government used the mixed fiscal instrument to equalize the expenditure of regional autonomy that need a more amount of allocation and reduce the inequality of regions.

Many countries in the world implement policies in order to reduce poverty and improve income distribution through fiscal decentralization policies. Sepulveda, C.F and Vazquez, J.M. (2011) conducted research focusing on the impact of fiscal decentralization on poverty and income inequality. The samples used were 34 developing countries in Africa in the period 1976-2000. The results showed that fiscal decentralization had a significant effect on poverty and income inequality. Fiscal decentralization increases poverty, but reduces income inequality.

Different opinions stated the danger of fiscal decentralization related to competition for regional and central redistribution collection. Research by Prud'homme (1995) entitled "The Dangers of Decentralization" showed that the increase in inequality is due to competition between governments. The prosperous regions will have a larger tax base, and therefore be able to collect more taxes to provide more public services than other poorer regions. Therefore, regional income inequality will occur.

Research by Brodjonegoro and Asanuma (2000) with the title 'Regional Autonomy and Fiscal Decentralization in Democratic Indonesia' found that shared revenue from central and regional governments sourced from natural resources exacerbate regional disparities in fiscal capacity between regions.

Jaime Bonet (2006) examined the impact of fiscal decentralization on regional income inequality in Colombia. By using interdepartmental panel data sets, it was found that the process of fiscal decentralization increased the regional income inequality.

Study by Rodriguez-Pose and Ezcurra (2010), entitled 'Fiscal Decentralization and Economic Growth in Central and Eastern Europe'. investigated the relationship between decentralization and regional inequality in developed and developing countries with 16 samples of Eastern European Countries for 1990-2004. The results of this study indicated that fiscal and political decentralization is completely cut off from the evolution of inequality between these regions. This means that there are constraints of fiscal and political institutional capacity where poorer regions confronted with rich, strong, or larger regions that receive a greater autonomy.

2. Methodology

2.1. Analysis of regional economic inequality in Indonesia

In measuring development inequality between regions the Theil Index is used as used by Akita and Alisjahbana (2002) in their studies conducted in Indonesia. An index is considered as a good measure of the inequality if it meets several criteria, such as, anonymity, mean independence, population-size independence, and the Pigue-Dalton principle of transfer (Shorrocks 1980). Seen from the criteria that must be owned by the index, Theil Index meets the criteria as an index that measures the income inequality in one region.

Following Akita (2003), the mathematical derivation of the calculation of economic inequality within and between regions is as follows:

$$T = \sum_{i=1}^n \left(\frac{y_i}{Y}\right) T_d + \sum_{i=1}^n \left(\frac{y_i}{Y}\right) \log \left(\frac{y_i/Y}{n_i/N}\right) \quad (1)$$

$$T = \sum_{i=1}^n \left(\frac{y_i}{Y}\right) T_d + T_{BR} \quad (2)$$

$$T = T_{WR} + T_{BR} \quad (3)$$

Equation (3) shows that the regional T index inequality can be decomposed into two parts, namely inequality within region (TWR) and inequality between region (TBR), where:

$$T_{WR} = \sum_{i=1}^n \left(\frac{y_i}{Y}\right) T_d \quad (4)$$

2.2 Factor analysis of intergovernmental transfer that affect regional economic inequality

The next analysis is the analysis of main causative factors of the inequality of the region. This can be done by using the regression method of the index calculation results. In this case, the index calculation results are as the

dependent variable (the factor explained) and certain variables are as the independent variable (the explaining factor) with the following equation:

$$TI = \alpha_0 + \alpha_1 SPG + \alpha_2 GPG + \alpha_3 SR \quad (5)$$

where: TI - Theil index; SPG - specific purpose grant; GPG - general purpose grant; SR - shared revenue.

3. Research findings and discussions

3.1. Analysis of the current economic inequality between regions in Indonesia

In the introduction, one of the objectives to be achieved through this research was to look at trends and levels of economic inequality between provinces in Indonesia. Theil Index was used as the measurement of economic inequality as described in the methodology. The measurement of economic inequality between regions in Indonesia was calculated based on GRDP data per capita of 2010 from 2001-2017 in 33 provinces.

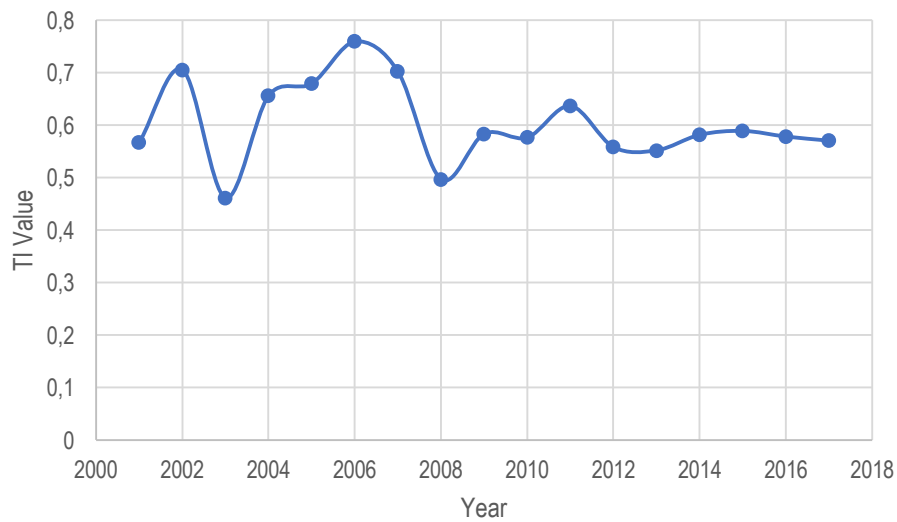
The results of Theil Index calculations from 2001 to 2017 can be seen in Table 1. If the index approaches 1, it means that development between regions is unequal, and vice versa, if the index approaches 0, it means that development between regions is equal. From the calculation results of Theil Index based on GRDP between provinces in Indonesia from 2001 to 2017, the total value of Theil Index ranges from 0.46 to 0.75. This indicated that development between regions (provinces) can be said to be unequal.

Table 1. Theil Index Based on GRDP Between Provinces in Indonesia from 2001 to 2017

Year	Theil Index Inter	Theil Index Intra	Theil Index Total
2001	0.159834	0.406786	0.56662
2002	0.354179	0.350941	0.705119
2003	0.270926	0.18998	0.460906
2004	0.333904	0.32187	0.655774
2005	0.285687	0.393125	0.678812
2006	0.366005	0.39286	0.758865
2007	0.319416	0.382285	0.701701
2008	0.205139	0.291443	0.496582
2009	0.234429	0.348542	0.58297
2010	0.229249	0.346809	0.576057
2011	0.295138	0.341066	0.636204
2012	0.222728	0.335132	0.55786
2013	0.217972	0.333584	0.551557
2014	0.307416	0.273731	0.581148
2015	0.269208	0.319417	0.588626
2016	0.265465	0.312361	0.577826
2017	0.262332	0.307727	0.570058

Source: Research Result

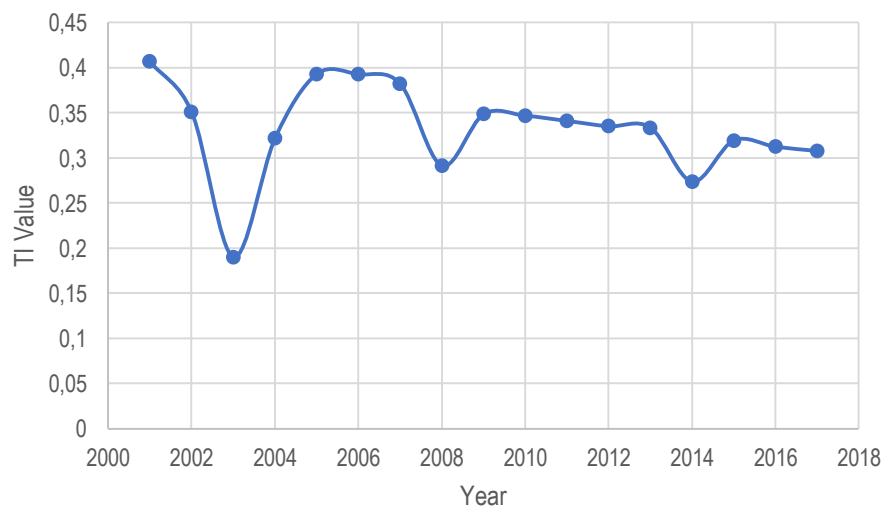
Figure 1. Graph of Theil Index Total



Source: Research result

As stated in methodology, the use of Theil Index as a measure of economic inequality between regions has certain advantages. The Theil Index can calculate inequality within the region and inequality between regions.

Figure 2. Graph of Theil Index Intra



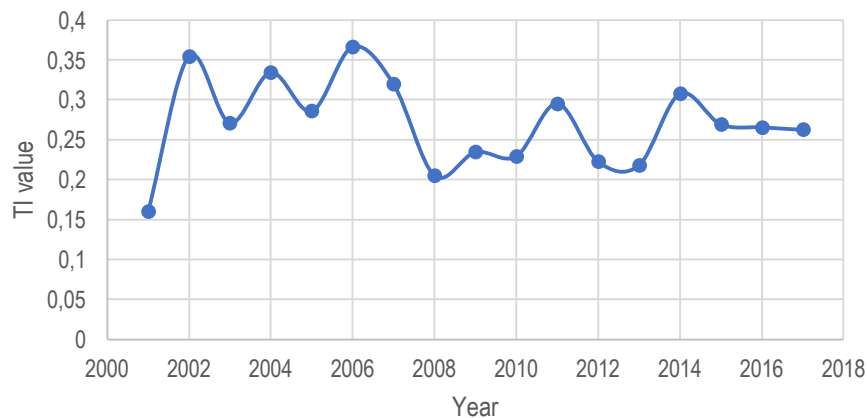
Source: Research result

If more emphasized on Theil Index intra (between provinces), it was found that Theil Index intra values are quite low but fluctuated from year to year. The highest inequality occurred in 2001 amounted to 0.406786 while the lowest occurred in 2003 amounted to 0.18998. In general, it can be stated the same amount of inequality almost happens every year, as shown in Picture 2.

Furthermore, Theil Index can also investigate inequality within the province using the Theil Index Inter calculation. The highest inequality occurred in 2006 amounted to 0.366005 and the lowest inequality in 2001 was 0.159834. Overall, the results of calculations show that the economic inequality between provinces in Indonesia in the last five years was still high. The average of Theil Index total value is 0.6, the Theil Index inter is 0.27, and the Theil Index intra is 0.33.

The second result is that the pattern of inequality between regions is caused by contributions from within and between the region. This indicated that there has been a development inequality within and between provinces in Indonesia.

Figure 3. Graph of Theil Index Inter



Source: Research result

3.2. Factor analysis of intergovernmental transfer that affect interregional economic inequality

In the introduction, the second objective in this study was to analyse what components of government investment allocation caused the inequality between regions. Thus, a regression analysis is performed between the Theil Index coefficients as the dependent variable and the variation of the intergovernmental transfer (general purpose grant, specific purpose grant, and shared revenue) as the independent variables.

Prior to be used, the model was tested whether it has a root unit or not. Then proceed with the classical assumptions test that underlie the analysis of the regression model used.

Classic assumption test includes:

- **Multicollinearity Test:** Tests the linear relationship between independent variables in the regression model. If there are symptoms of multicollinearity in a regression model, then the regression model cannot be used. If there is no VIF value greater than 10 or 5 (many books require no more than 10, but there is also a requirement of no more than 5), so it can be said that there is no multicollinearity in the two independent variables.

Table 2. ANOVA of SR, GPG, and SPG on TI

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,665	,142		4,688	,009		
	SR	-4,326	,000	-,183	-,364	,0734	,846	1,182
	GPG	-1,604	,000	-,462	-,822	,0457	,677	1,477
	SPG	9,143	,000	,173	,331	,0757	,781	1,280

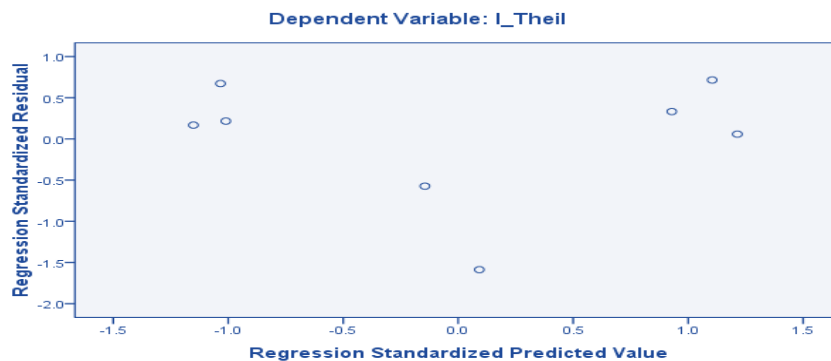
Note: a. Dependent Variable: Theil Index

Source: Research Result

Based on the classical assumptions of linear regression with OLS, a good linear regression model is free from multicollinearity. Thus, Table 2 obtained from the VIF value ranges from 1 is said to be free from the presence of multicollinearity.

- **Heteroscedasticity Test:** It is a regression problem where the interference factor (error) does not have the same variant (the variance is not constant) which causes the OLS estimator to be biased. Heteroscedasticity test is done by creating a Scatterplot (flow distribution) between residuals and predictive values of standardized dependent variables. Heteroscedasticity test results can be seen in Figure 4. From Figure 4, it can be seen that the distribution of points does not form a particular pattern/plot, thus it can be concluded that heteroscedasticity does not occur, or in other words, homoscedasticity occurs. The classical assumptions about heteroscedasticity in this model are fulfilled, which is free from heteroscedasticity.

Figure 4. Heteroscedasticity Test
Scatterplot



Source: Research result

Autocorrelation shows the correlation between members of a series of observations. If the model has a correlation, then the estimated parameters become biased and the variations are no longer minimum and the model becomes inefficient.

The Durbin-Watson listed in the SPSS output is called the calculated DW. This number will be compared with the acceptance or rejection criteria that will be made with the dL and dU values determined based on the number of independent variables in the regression model (k) and the number of samples (n). The dL and dU values can be seen in Table DW with a significance level of 5% ($\alpha = 0.05$).

Table 3. Autocorrelation test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,782 ^a	,146	-,495	,03152	,146	,227	3	4	,873	2,676

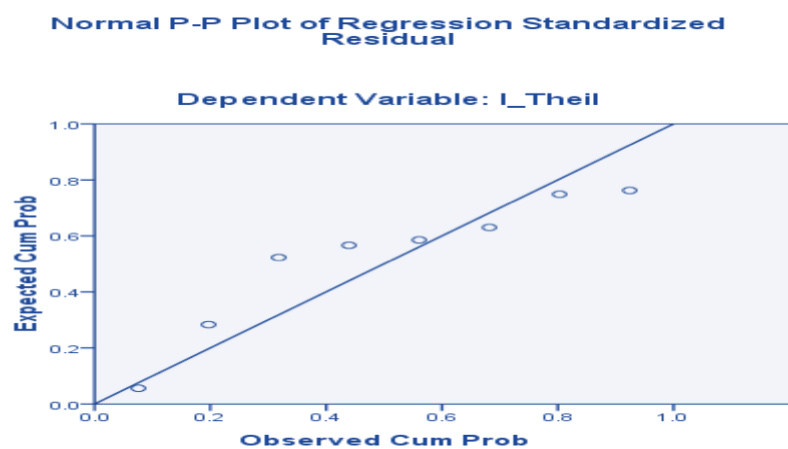
Note: a. Predictors: (Constant), GPG, SPG, SR; b. Dependent Variable: Theil Index

Source: Research result

From Table 3, it can be seen that the Durbin Watson value of 2.676 indicated that there is no autocorrelation because the value of 2.676 falls in the area.

- *Normality*: it is used to determine whether residuals are normally distributed or not by using normal PP-Plot. If the distribution of points approaches a straight line, it can be concluded that the data used in the ECM model is normally distributed.

Figure 5. Normality test



Source: Research result

From Figure 5, it can be said that the data has spread normally because most data are approaching a straight line.

Table 4. ANOVA with 3 independent variables

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,001	3	,000	,227	,073 ^b
	Residual	,004	4	,001		
	Total	,005	7			

Note: a. Predictors: (Constant), SPG, SR, GPG

Source: Research Result

The analysis of variant (ANOVA) from Table 4 shows a regression model that uses three independent variables (SPG, GPG, SR) in investigating the causes of inequality based on the Theil Index. The result showed that the model used intergovernmental transfers (GPG, SPG and SR) can be used to study the causative factors of development inequality between regions (Provinces) in Indonesia.

Furthermore, by conducting a partial test of each coefficient and the assumptions test to investigate whether there is influence of intergovernmental transfer on economic inequality between provinces in Indonesia. Table 2 shows that at a significant level $\alpha = 10\%$, there are two independent variables of SR and GPG that significantly influence economic inequality in Indonesia because the Sig < α values are 0.0734 and 0.0457, while the SPG variable is not significant at $\alpha = 10\%$ at 0.0757. In order to analyse the effect of the overall intergovernmental transfer (GPG, SPG, and SR) on economic inequality between regions, a simple regression analysis model is used with TI as the response variable and the intergovernmental transfer as a predictor variable. The regression model as follows:

Table 5. Regression coefficient of intergovernmental transfer and Theil Index

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	
	B	Std. Error	Beta			
1	(Constant)	,606	,046		13,274	,000
	Total	-5,857E-17	,000	-,234	-,589	,0577

Note: TI=0,921-1,603IT

Source: Research result

where: TI= Theil Index; IT= Intergovernmental Transfer

The analysis of the regression equation is: if 1% of intergovernmental transfer is given, it causes the Theil Index to decrease by 5.857. Table 5 shows that the intergovernmental transfer has a significant effect on development inequality at a real level of 5%.

Conclusion

After 15 years of Fiscal Decentralization in Indonesia, the tendency of inequality between regions has declined but is still relatively high, where the economic inequality measure used by Theil Index from 2001-2017 shows the value of Theil Index totals were ranging from 0.68 to 0.97. This condition shows that development between regions (Provinces) can be said to be very unequal. Inequality between regions is caused by contributions within and outside the region. Thus, it indicated that there is a development inequality both within and between the province in Indonesia. Inequality caused by internal influences is smaller than from outside provinces, where the Theil Index Intra is 0.3 while the Theil Index Inter is 0.49. Then it can be concluded that the intergovernmental transfer has not been able to create equality between regions in Indonesia.

The intergovernmental transfer component that affects economic inequality between regions are shared revenue and general purpose grant. The shared revenues have a negative effect, which increase the regional economic inequality, while the general purpose grants provide a positive effect which reduce economic inequality between regions. On the other hand, the specific purpose grant does not significantly affect economic inequality between regions.

Policies Implication

The inequality between provinces is caused by the influence from both within and outside provinces. It needs to propose a new policy for the intergovernmental transfer which pays more attention to the aspect of equity and allows the increasing of general purpose grants to regions that have small fiscal capacity.

Since the shared revenue has a negative effect on inequality between regions, new policies in the allocation of shared revenue must be proposed in order to reduce the percentage received by producing regions and give them to the surrounding regions thus equity can be better.

Because the effect of specific purpose grant is not significant, it is suggested that in the future SPG allocation will be given to certain regions, particularly border, coastal, disaster-prone areas and disadvantaged areas whose fiscal capacity is below the national average. SPG is only intended for regions where the achievement of minimum service standards is still below the national average, so that the recipient regions of this SPG will increase their capital capacity especially limited to three areas, namely the achievement of educational services, health services, and basic infrastructure based on proposal regions synchronized with national priorities.

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Unemployment Duration of Educated Workers in the Provinces of Indonesia: A Cross Sectional Analysis From Labor Supply Perspectives

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Abstract:

This study aims to analyze the factors that affect the unemployment duration of educated workers in 34 provinces in Indonesia using National Labor Force Survey data. The research model was developed from the job search theory using dummy variables tested by logistic regression analysis. This study found that in general educated unemployment in Indonesia experienced unemployment duration of 0-3 months. The unemployment duration of educated workers is determined by the level of education, job training, work experience, age, marital status, position in the household and residential area, while the gender do not affect the duration of unemployment.

Keywords: unemployment duration; educated workers; job search theory.

JEL Classification: J01; J12; J22; J16; J64.

Introduction

The characteristic of unemployment in Indonesia is the high number of educated unemployed. Educated unemployment in 2016 has decreased from the previous year which is from 36.91% to 30.74% but in 2017 the number of educated unemployed increased again to 31.76% consisting of 11.41% graduated from vocational school, 8.29% graduated from high school, 6.88% graduated from the academy and 5.18% graduated from the university. In 2018 the total educated unemployment was 31.10% consisting of 11.24% graduated from a vocational school, 7.95% graduated from senior high school, 6.02% graduated from academy and 5.89% graduated from university (BPS 2019).

Based on the data it appears that there is a phenomenon, where the labor force graduates of vocational high schools who have been prepared to enter the labor market but the percentage of unemployment rates are higher than those of general secondary school graduates who are not prepared to enter the labor market. The next phenomenon is that there are still many unemployed college graduates. This certainly will be a serious problem for the world of education in Indonesia because of the high level of education there is no guarantee for

them to get a job. This causes the rate of return obtained by the educated workforce does not match those sacrificed to complete education.

The high number of educated unemployed is a serious problem for Indonesia and real efforts are needed to get out of this problem and of course a study is needed to find out what factors can influence the duration of unemployed educated workers. This study examines the unemployment duration of educated workers in terms of labor supply consisting of levels of education, job training, work experience, age, gender, marital status, position in the household and residential area

1. Literature review

An educated unemployment is someone belonging to the labor force who is actively looking for work but has not yet found a job with a minimum level of senior high school education/equivalent and above (Mankiw 2010, Elfindri and Bachtiar 2004, Adrimas 2012, BPS 2019). In the context of changing the structure of the labor market, unemployment can be linked to the expansion of education. There is an interesting thing in this study, namely the existence of a paradigm of unemployment of educated labor. Formal education is very instrumental and is needed to increase individual capacity so that education is considered an investment in human capital in the industry (Woodhall and Psacharopoulos 1997).

There are several views on the problem of unemployment which is a friction in the matching process between job seekers and available jobs. In microanalysis, unemployment is associated with the duration of job search or duration of unemployment. According to Mankiw (2010) the duration of unemployment is the time needed by the workforce to find and get a job that best matches the expertise and tastes of the workforce. Furthermore, Khan and Yousef (2013) explained that the duration of unemployment is the waiting period for someone to get a job after completing their last education.

The duration of unemployment is a description of the problem of the unemployment phenomenon that has never been resolved. One of the factors that can justify this condition is the search friction that occurs in the labor market. The existence of search friction in the job market will result in unemployment duration for job seekers who always need time to get a job. Analysis of labor market friction which causes the duration of unemployment is theoretically explained in the discipline of labor economics in the context of individual labor supply. The analysis of its application to the labor market was pioneered by Stigler (1961, 1962) and further developed by Diamond (1982), Mortensen (1970, 1977, 1984, 1986), and Pissarides (1982). This analysis model is better known as the search theory. This theory has undergone many developments and has become one of the well-established theories in the discipline of labor economics. Mankiw (2010) mentioned that job training programs will be able to help people find work. According to McConnel (1999), an experienced workforce is more skilled in completing work. The work experience will make it easier for someone to get a job so that the duration of unemployment will be short (Ashenfelter and Ham 1979).

Foley (1997) study of the determinants of unemployment duration at the beginning of an economic transition, found that:

- women tend to be unemployed longer than men and married women experience much longer periods of unemployment compared to married men;
- the younger workforce will be unemployed longer than the elderly;
- married workers are found to experience a much shorter unemployment period compared to unmarried people;
- workers with higher education will not be unemployed longer than those who have secondary education or even elementary school;
- low local labor market demand will extend the duration of unemployment;
- individuals who live in the area will experience a higher duration of unemployment than those who live in the city.

Research Grogan and Berg (2001) which uses longitudinal survey data to assess the factors that affect the duration of unemployment in Russia. This study found that personal characteristics (gender, level of education, and area of residence) had a significant influence on the duration of unemployment. Long duration of unemployment occurs in unmarried men, individuals with low education, and individuals who live in rural areas.

Tansel and Tasci (2004) use the results of the Household Labor Force Survey to assess the duration or period of unemployment. The results of this study indicate that:

- women experience a higher duration of unemployment than men;
- young people tend to be unemployed longer than those who are not young;
- education has a negative relationship with the duration of unemployment, those who have higher education tend to have a shorter duration of unemployment compared to those with less education;
- the effect of the local unemployment rate is positive on the duration of unemployment, the higher the local unemployment rate will certainly extend the duration of the unemployed workforce in the area.

Theodossiou and Zarotiadis (2010) looks at the distribution of experience of workers and unemployed people in less developed regions in Greece (northwestern Epirus), where unemployment has a detrimental impact on local labor. This study uses a dataset obtained through a questionnaire created specifically to assist local authorities in implementing regional labor market policy projects. Found that the duration of unemployment hurt the duration of work at present and vice versa, which is known as the "unemployment trap" phenomenon. Also, personal characteristics and socioeconomic conditions are the cause of unemployed people. Workers over the age of 45, women, sales employees and other service jobs, face a much shorter work period so that they have a longer duration of unemployment.

Pasay and Indrayanti (2012) examined unemployment in Indonesia, length of time seeking work, and reservation of educated workers. This research found that the unemployment rate of educated workers continues to increase every year. The average length of time seeking work reaches 11 months. The length of time seeking work for highly educated people is longer than for those with low education. The desired minimum wage with social, demographic and regional characteristics of a highly educated workforce is greater than the others

Khan and Yousef's (2013) research on analyzing the determinants of unemployment as a first-time job seeker, by taking primary data from all working individuals or entrepreneurs aged 20-35 years. The dependent variable is the duration of unemployment. The independent variable is the level of education (professional and general), training, age, salary, gender, marital status, position in the household. The research findings that professional degree holders have a shorter duration of unemployment, but in the case of general education, holders of higher education degrees experience a shorter duration of unemployment than their counterparts with lower degree holders. Job training, marital status, high salaries, household heads, and household size reduce the duration of unemployment.

Skenderi and Uka (2015) examine about explaining that the type of unemployment that occurs in Kosovo is frictional unemployment caused not by structural changes even though the Kosovo economy goes through a severe transition. The fact is found that workers generally work in sectors that do not have "entry barriers". This study also explains that the workforce that has a high education has a much higher job opportunity than those who have low education. Furthermore, it was found that seasonal workers get higher compensation, seasonal unemployment is present because of the large number of employees in agriculture, trade, and construction.

Perazzi *et al.* (2017) examined the duration of unemployment of unemployed people in the Bolivarian Republic of Venezuela. This study analyzes the average duration of unemployment. The results show that long-term unemployment encourages some people not to look for work again (stop being part of the labor market) and others to move to work in the informal sector.

Cheron and Terriau (2018) examine the impact or externality of the training on the skills of the workforce both those who are looking for work and those who are already working by considering the age factor. This research found that the impact of training externalities for the workforce is: improving work skills, making jobs easier; creating jobs. All of these effects apply to all age groups both old and young, only training is more effective given to the younger workforce than older ones.

Research conducted by Blanco and Preugschat (2018) examined the impact of ranking based on the duration of unemployment. This study builds theory based on recruitment behavior in companies that make calls to applicants to be interviewed and offer a reduction in wages. This study divides the two types of applicants, namely applicants who have never worked and applicants who quit their old jobs. This research found that in general companies prefer to accept applicants who have never worked and have a short duration of unemployment.

Baitenizov, *et al.* (2018) discuss some aspects of self-employment and the influence of several social and economic factors on this labor phenomenon, including GDP, the level of unemployment, the level of education, and the level of service share in a national economy. This research states that the predicted level of self-employment in Kazakhstan corresponds to the European trend of decreasing the level of self-employment,

however in Kazakhstan this decrease is more noticeable due to the higher level of self-employment compared to the EU countries and the global trend of lowering agricultural self-employment. Tvrdon (2019) examines the labor market performance and the Beveridge curve: The case of Visegrad group countries. Empirical results showed shifts of the Beveridge curve to the left and upward (the job vacancy rate was increasing, while the unemployment rate was declining), which is peculiar to the prosperity phase from 2014Q1 to 2018Q3.

The Sansale, *et al.* (2019) study examines the role of personality in determining the duration of unemployment for the young labor force in the United States. Using a competing risk model, this study found that when individuals are faced with unemployment, young people are significantly more likely to find work rather than continuing education. People who have high neuroticism at a young age are more likely to choose to work than continuing education. The implication of this research is the need for work education and training programs for the young workforce to have skills to enter the workforce. This study provides two important contributions to the literature on the importance of the role of personality in determining the duration of unemployment.

2. Methodology

This type of research is *ex post facto* conducted in 34 provinces in Indonesia with a total sample of 2,464 educated unemployed people. This study uses secondary data in the form of Indonesian National Labor Force Survey data for the August 2017 period obtained from the Indonesian Central Statistics Agency. The dependent variable is the duration of unemployment while the independent variable is the level of education, work training, work experience, age, sex, marital status, position in the household and residential area. This research model was developed from job search theory which is tested by logistic regression because it uses dummy variables. The operational definitions of the research variables are explained in the following table.

Table 1. Operational definitions of research variables

No	Variable	Symbol	Defenition	Measurement
1	Duration of Unemployment	Du	The duration of the workforce unemployed who has a high school education/equivalent and above	1 = Unemployed >3 months (Long) 0 = Unemployed 0-3 months (Short)
2	Level of education	Edu	The last formal level of education is the educated workforce	1 = SMA/equivalent 0 = College
3	Work training	Wt	Job training that has been attended by educated and certified workers	1 = Never attended job training 0 = Ever
4	Work experience	Exp	Work experience possessed by an educated workforce	1 = Inexperienced 0 = Experienced
5	Age	Age	Age of educated workforce	1 = 15-24 years (young) 0 = > 24 years (old)
6	Gender	Gend	The sex of the educated workforce	1 = Female 0 = Male
7	Marital status	Ms	Marital status of an educated workforce	1 = Single 0 = Married
8	Position in haushold	Ph	Position of educated workforce in the household	1 = Not head of household 0 = Head of household
9	Residence area	Ra	The area where the educated workforce lives is settled	1 = Village 0 = City

3. Result and discussion

This research was conducted in 34 provinces in Indonesia. Educated workers generally experience unemployment duration of 0-3 months (short) as much as 88.03% and those unemployed over 3 months (long) are as much as 11.97%. In general, 70.33% of high school graduates/equivalent and 29.67% of tertiary graduates and 79.13% had never attended job training and only 20.87% had attended job training. This data shows that generally educated unemployed do not yet have sufficient access to take part in job training ore.

Based on work experience, it is known that the majority do not have work experience, namely 81.13% and only 18.87% have work experience. This data indicates that in general, the workforce who become educated unemployed are those who have just finished their education so that they do not have work experience. The variable labor supply crosstab with unemployed duration is as follows.

Table 2. Crosstab variable labor supply with unemployed duration

No	Characteristics	Information	Duration of Unemployment (%)		Total (%)
			0-3 Months	> 3 Months	
1	Level of education	College	28.81	0.85	29.67
		SMA/equivalent	59.21	11.12	70.33
2	Work training	Ever	33.64	1.99	35.63
		Never attended job training	54.38	9.98	64.37
3	Work experience	Experienced	37.82	5.52	43.34
		Inexperienced	50.20	6.45	56.66
4	Age	Old	79.42	8.93	88.35
		Young	8.60	3.04	11.65
5	Gender	Male	53.21	7.14	60.35
		Female	34.82	4.83	39.65
6	Marital status	Married	75.57	8.52	84.09
		Single	12.46	3.45	15.91
7	Position in haushold	Head of household	43.83	4.10	47.93
		Not hhead of household	44.20	7.87	52.07
8	Residence area	City	58.00	5.52	63.51
		Village	30.03	6.45	36.49
Total			88.03	11.97	100

Source: Processed data output, 2019

Based on the age group, it is dominated by the young age group as much as 75.53% and old as much as 24.47%. This data also shows educated unemployed who have 0-3 months unemployment duration are young age group while those who have unemployment duration more than 3 months are educated unemployment who are in the old category. Based on gender data it is known that in general educated unemployment is male as much as 53.23% and women as much as 46.77%.

Based on marital status, generally unmarried 69.37% and 30.63% married. In general, educated unemployment is not towards households which is as much as 82.91% and domiciled as heads of households is as much as 17.09%. This data shows that there are still many household heads who are classified as educated unemployed. Furthermore, it was also seen that both households and non-household heads generally had an unemployment duration of 0-3 months.

Based on the region where educated unemployed people live, it is known that in general educated unemployed people in Indonesia generally live in rural areas as many as 50.85% and those who live in urban areas are 49.15%. This data shows that in general educated unemployed in Indonesia are generally those who live in rural areas. Based on residential data, it is known that in general educated unemployed people live in rural areas with a duration of unemployment between 0-3 months. The duration of unemployment is more than 3 months, generally residing in urban areas. This data shows that educated unemployed stay longer in the city than those who live in the village

Then the data are analyzed by logistic regression to see the probability of the unemployed duration of the educated workforce, as presented in the following tablet

Table 3. Estimated model of unemployment duration

No	Variable	Coef.	t-value	Prob.	Odd Ratio	Marginal Effect
1	Edu	1.463	6.12	0.000	4.317	0.1407926
2	Wt	0.711	4.16	0.000	2.036	0.0684199
3	Exp	-0.280	-2.10	0.036	0.756	-0.0269885
4	Age	0.557	3.05	0.002	1.746	0.0536573
5	Gend	0.089	0.56	0.577	1.093	0.0085931
6	Ms	0.435	2.47	0.013	1.545	0.0418468
7	Ph	0.389	2.28	0.023	1.476	0.0374514
8	Ra	0.684	5.23	0.000	1.982	0.0658492
9	Constant	-4.320	-15.72	0.000		

Note: Pearson chi2 (172) = 313.84 Prob > chi2 = 0.00

Source: Processed data output, 2019

Based on the results of data analysis it is known that the Pearson chi-square value is 313.84 with a probability value of 0.00. Thus, it can be stated that the logistic regression model used is sufficient to be able to explain the data/match, in other words, the logistic regression model is suitable for further analysis because there is no real difference between the predicted classification and the observed classification.

The level of education has a significant positive effect on the duration of unemployment. Educated workers graduating from senior high school/equivalent have a long duration of unemployment probability is 14.07% higher than college graduates. The odd ratio value of 4.32 means that the duration of unemployment is a senior high school/equivalent degree 4.32 times longer than a college graduate. This proves that senior high school/equivalent graduates will be unemployed longer than college graduates because of the higher the level of education, the shorter the duration of unemployment. The findings of this study are supported by the findings of Foley (1997) stating workers with higher education will not be unemployed longer than those who have secondary education or even elementary school. Kettunen (1997) states that people who are unemployed and have an education level of around 13-14 years are highly likely to be able to return to work and the duration of unemployment is short. Takii (1997) argues that the level of education of the workforce determines the size of the workforce be accepted by companies, where the workforce that has a high education will have a high chance of being accepted to work and vice versa. Grogan and Berg (2001) found that a long duration of unemployment occurred in individuals with low education. Tansel and Tasci (2004) state that the labor force with higher education tends to have a shorter duration of unemployment compared to those with less education. Khan and Yousef (2013) found that holders of higher education degrees experienced shorter unemployment durations than their fellow holders of lower degrees. Skenderi and Uka (2015) found that the workforce who had a high education had a much higher job opportunity than those who had low education. However, the findings of this study are different from the findings of Pasay and Indrayanti's (2012) research which found that the length of time for seeking work for highly educated people is longer than for those with low education.

Job training has a significant positive effect on the duration of unemployment. Educated workers who have never attended the training have a longer duration of the probability of unemployment being 6.84% higher than those who have attended job training. The odd ratio value of 2.04 means that the duration of unemployment who has never attended job training is longer than 2.04 times than those who have attended job training. This shows that job training plays a role in determining how long or short a person becomes unemployed, whereby following job training for educated educators, it will shorten the duration of unemployment. The research findings are supported by research findings by Khan and Yousef (2013) who found that the existence of job training would reduce the duration of a person's unemployment. Cheron and Terriau (2018) stated the impact of training externalities for the workforce is to improve work skills, make it easier to find work, create jobs. Sansale *et al.* (2019) stated the need for work education and training programs for a young workforce to have skills to enter the workforce.

Work experience has a significant negative effect on the duration of unemployment. Educated workers who have work experience have a longer duration of unemployment probability of 2.70% higher than those without work experience. The odd ratio value of 0.76 means that the duration of the unemployed who has work experience is 0.76 times longer than those who did not have job training. If you have work experience, you will experience a longer duration of unemployment compared to those without work experience. This finding indicates that recruitment companies prefer to accept those who do not have work experience compared to experienced ones. The findings of this study are in line with the findings of Blanco and Preugschat (2018) who find that in general companies prefer to accept applicants who have never worked. But contrary to the findings of McConnel (1999) who found that experienced workers are more skilled in completing work. The work experience will make it easier for someone to get a job so that the duration (Ashenfelter and Ham 1979).

Age has a significant positive effect on the duration of unemployment. The probability of a young educated workforce experiencing a longer duration of unemployment is 5.37% higher than that of the elderly. The odd ratio value of 1.75 means that the duration of unemployed youth is 1.75 times longer than the elderly. This shows that age is a factor that determines the duration of unemployed educated workers. Young workers tend to be unemployed longer than older workers. This condition occurs because in general educated workers who are young are more likely to look for work that is more suited to their abilities and skills so that they will pick and choose jobs that will certainly display their unemployment duration. The findings of this study are in line with the findings of Foley (1997) which states that a young workforce will be unemployed longer than the elderly. Tansel and Tasci (2004) stated that young people tend to be unemployed longer than those who are not young. Khan and Yousef (2013) state that those who are young tend to be unemployed longer than those who are old.

However, other studies find different, namely Hernaes (2001) found that the higher a person's age will extend the person's unemployment period. Likewise, younger workers will experience shorter periods of unemployment compared to older workers. Theodossiou and Zarotiadis (2010) found that workers aged over 45 years faces a much shorter period of work so that it has a longer duration of unemployment. Mukoyama (2004) states that older workers experience longer periods of unemployment than younger workers. Sansale *et al.* (2019) found that when individuals are faced with unemployment, young people are significantly more likely to find work rather than continuing education.

Gender has no significant effect on the duration of unemployment. This shows that female-educated workers do not necessarily have a longer duration of unemployment compared to men. The findings of this study are supported by the findings of Foley (1997) which states that women tend to be unemployed longer than men and married women are found to have a much longer unemployment period compared to married men. Tansel and Tasci (2004) stated that women experience a higher duration of unemployment than men. Theodossiou and Zarotiadis (2010) found that female workers face a much shorter work period so that they have a longer duration of unemployment

Marital status has a significant positive effect on the duration of unemployed educated workers who are not married has a longer duration of unemployment probability is 4.18% higher than those who are married. The odd ratio value of 1.55 means that the duration of unemployed who is not married is 1.55 times longer than the one who has been married. This shows that marital status is a determining factor for the duration of unemployed educated workers, where educated workers who are not married tend to experience a longer duration of unemployment compared to those who are married because workers with married status certainly have a higher economic burden of living compared to unmarried. The findings of this study are supported by the opinion of Kaufman and Hotchkiss (2006) stating that marital status causes differences between men and women in labor force participation, married women are required to carry out home activities, and the available labor market mostly accepts single-status women or single. In contrast to married men usually do not have significant barriers to entering the job market so that they will have a shorter duration of unemployment. Foley (1997) found that married women were found to experience periods of unemployment that were far longer than those of married men. Grogan and Berg (2001) found that a long duration of unemployment occurs in unmarried men. Khan and Yousef (2013) state that marital status determines the duration of unemployment, those who are not married tend to be unemployed longer than those who are married.

The position in the household has a significant positive effect on the duration of unemployment. Educated workers who are not head of the household have a probability of longer duration of unemployment is 3.75% higher than the head of the household. he odd ratio value of 1.48 means that the duration of unemployed who is not the head of the household is 1.48 times longer than the head of the household. This shows that the duration of unemployed educated workers is determined by the position in the household. Where workers who are non-head of households will have a longer duration of unemployment. The findings of this study support the results of Khan and Yousef's (2013) research which states that workplace employees who have the status of head of household tend to be unemployed compared to those who are not head of the family.

The residential area has a significant positive effect on the duration of unemployment. Educated workers who live in rural areas have a probability of experiencing a longer duration of unemployment is 6.58% higher than those living in cities. The odd ratio value of 1.98 means the duration of unemployed people who live in the village is 1.98 times longer than those who live in the city. This shows that the duration of unemployed educated workers in Indonesia is determined by the region of residence. This is because at this time not all rural areas have complete means of communication between workers who live in villages and cities so that information is related to employment. The research findings are supported by Foley (1997) which states that individuals who live in the area will experience a higher unemployment duration than those who live in cities. Grogan and Berg (2001) found that a long duration of unemployment occurs in individuals who live outside of big cities (rural)

Conclusion

The unemployment duration of educated workers will be longer determined by the level of education, job training, work experience, age, marital status, position in the household and residential area while the gender do not affect the duration of unemployment. Educated workers graduating from senior high school/equivalent have a chance to be unemployed longer than college graduates, who have never been in job training have a chance to be unemployed longer than those who have already attended work training, who have work experience with a chance to be unemployed longer than those without work experience. Young educated

workers have the opportunity to be unemployed longer than the elderly, those who have not married have the opportunity to be unemployed longer than those who have been married, who are not heads of households have the opportunity to be unemployed longer than family heads and educated workers who live in villages have the opportunity to be unemployed longer compared to those who live in the city.

Research Implications

Policy implications that need to be carried out by related parties to shorten the duration of unemployed educated workers are: first, encourage the workforce graduating from senior high school/equivalent to continue their education to tertiary institutions so that the workforce has the skills needed by the labor market. Secondly, there should be more work training centers in every region in Indonesia to provide training, upgrading, and counseling so that the workforce will be better prepared to enter the labor market. Third, a more informative job market needs to be expanded to bring together job seekers and companies that need workers. Fourth, educational institutions must increase their apprenticeship activities for students in various agencies and companies in order to find work experience.

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The Correlation Between Time Preference and Incomes is Spurious: They Are Bridged by Fluid Intelligence

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Abstract:

The rate of time preference (RTP) has been observed to be negatively correlated with incomes, but the mechanism behind this correlation is not yet sufficiently understood. Here, I examine it on the basis of fluid intelligence in an economy in which households behave according to the maximum degree of comfortability. I show that heterogeneity in fluid intelligences among households causes heterogeneous RTPs and incomes at the same time. This means that the negative correlation between RTP and incomes is spurious, and there is no direct causality between them. They only appear to be correlated because they are bridged by fluid intelligences.

Keywords: the rate of time preference; maximum degree of comfortability; fluid intelligence.

JEL Classification: D11; D14; D91; E21; E22; E71.

Introduction

The rate of time preference (RTP) is regarded as negatively correlated with income, and many empirical studies have supported this correlation (e.g., Fisher 1930, Lawrance 1991, Becker and Mulligan 1997, Samwick 1998, Frederick *et al.* 2002, Ventura 2003). Even though the causality in this relationship is not necessarily clear, it is believed by many economists to exist (e.g., Fisher 1930, Uzawa 1968, Epstein and Hynes 1983, Lucas and Stokey 1984, Epstein 1987, Obstfeld 1990, Becker and Mulligan 1997, Frederick *et al.* 2002), and many endogenous RTP models in which households' RTPs are assumed to be formed on the basis of household current income have been constructed and used (e.g., Uzawa 1968, Epstein and Hynes 1983, Lucas and Stokey 1984, Epstein 1987, Obstfeld 1990). However, the mechanism behind this causality is not clearly demonstrated in these endogenous RTP models. In addition, these models have the inherent problem that they are unstable because of the assumption of this causality.

In this paper, I examine the mechanism behind the observed negative correlation between RTP and income from a different point of view on the basis of the concept of fluid intelligence in an economy under the maximum degree of comfortability (MDC)-based procedure introduced by Harashima (2019). Fluid intelligence is one of several types of human intelligence, and it is usually defined as the ability to solve novel problems by thinking logically without depending only on previously acquired knowledge. The importance of fluid intelligence has been emphasized in psychology and psychometrics (e.g., Cattell 1963, 1971), and it is usually modeled on the basis of item response theory (e.g., Lord and Novick 1968; Van der Linden and Hambleton 1997). Harashima (2012) showed that, as fluid intelligence increases, the probability of solving unexpected problems increases and therefore productivity and labor incomes increase (Harashima 2009, 2016, 2017b).

Harashima (2018, 2019) presented a MDC-based procedure by which households reach a steady state. In most economic studies, it has been assumed that a household reaches a steady state by generating rational expectations on the basis of its RTP (*i.e.*, the RTP-based procedure). However, rational expectations impose substantial demands on households in that they have to do something equivalent to computing complex large-scale non-linear dynamic macro-econometric models. Harashima (2018, 2019) indicated that the capital-wage ratio (CWR) at MDC under the MDC-based procedure is equivalent to RTP under the RTP-based procedure. Furthermore, it is highly likely that households do not actually use the RTP-based procedure but instead use the MDC-based procedure, because the latter is far easier to use than the former but both equally lead households to the same steady state. The MDC-based procedure is very simple—a household simply behaves on the basis of whether or not it feels most comfortable with its combination of labor income and capital (wealth).

In this paper, I show that heterogeneity in fluid intelligences among households causes heterogeneities in CWR at MDC and RTP as well as incomes. That is, the observed correlation between RTP and income is spurious and there is no direct causality between the two. They only appear to be correlated because they are bridged by fluid intelligence.

1. Fluid intelligence

1.1. Model of fluid intelligence

In psychology and psychometrics, many types of intelligence have been considered, including fluid intelligence, crystallized intelligence, short-term memory, long-term storage and retrieval, reading and writing ability, and visual processing. Among these, the importance of the difference between fluid intelligence and crystallized intelligence has been particularly emphasized. According to Cattell (1963, 1971), fluid intelligence is the ability to solve novel problems by thinking logically without depending only on knowledge previously acquired. This is the ability to deal with unexpected situations without relying only on knowledge obtained from schooling or previous experience. With the help of fluid intelligence, people can flexibly adapt their thinking to new problems or situations. By contrast, crystallized intelligence is the capacity to acquire and use knowledge or experience. This is the ability to communicate one's knowledge and to reason by using previously learned experiences.

Fluid intelligence can be modeled on the basis of item response theory, which is widely used in psychometric studies (e.g., Lord and Novick 1968, Van der Linden and Hambleton 1997). In particular, the item response function is used to describe the relationship between abilities and item responses (e.g., test scores or performances). A typical item response function is:

$$p(\eta) = c + \frac{1-c}{1+\exp[-a(\eta-b)]} \quad (1)$$

where: p is the probability of a correct response (e.g., answer) to an item (e.g., test or question); η ($\infty > \eta > -\infty$) is a parameter that indicates an individual's ability; a (> 0) is a parameter that characterizes the slope of the function; b ($\infty \geq b \geq -\infty$) is a parameter that represents the difficulty of an item; and c ($1 \geq c \geq 0$) is a parameter that indicates the probability that an item can be answered correctly by chance.

1.2. Fluid intelligence, productivity, and labor income

1.2.1. Productivity

Harashima (2009, 2012, 2016, 2017b) showed that total factor productivity is positively correlated with the probability of ordinary (typical) workers' solving unexpected problems in a unit of time, where "ordinary" means workers who are not highly educated and trained experts. In the process of production, many (although minor) unexpected problems occur, and fluid intelligence is indispensable to solve these unexpected problems.

On the basis of item response theory, the probability of a worker's solving unexpected problems in a unit of time, $\hat{p}(FI)$, can be modeled as

$$\hat{p}(FI) = \hat{\delta} + \frac{1-\hat{\delta}}{1+\exp[-\hat{\gamma}(FI-\hat{D})]} \quad (2)$$

where: FI ($\infty > FI > -\infty$) is a parameter that indicates an ordinary worker's (household's) fluid intelligence; $\hat{\gamma}$ (> 0) is a parameter that characterizes the slope of the function; \hat{D} is a parameter that indicates the average difficulty of unexpected problems that the worker has to solve; and $\hat{\delta}$ ($1 \geq \hat{\delta} \geq 0$) is the probability that unexpected problems are solved by chance.

Harashima (2012) showed that productivity is positively correlated with $\hat{p}(FI)$; that is, fluid intelligence is positively correlated with productivity. Equation (2) indicates that the higher a worker's fluid intelligence (i.e., a higher value of FI), the greater the probability of solving unexpected problems in a unit of time.

An ordinary worker's ability to solve problems quickly with fluid intelligence affects productivity substantially. Fluid intelligence is therefore closely related to productivity, and furthermore, the causality runs from fluid intelligence to productivity. Equation (2) indicates that as a worker's fluid intelligence increases, the worker's productivity increases; that is,

$$\frac{dP_R}{dFI} > 0 \quad (3)$$

where: P_R is an ordinary worker's (household's) productivity.

1.2.2. Labor incomes

Harashima (2009, 2012, 2016, 2017b) showed that labor incomes are positively proportionate to productivity, because a production function can be deduced from the basic natures of capital and labor inputs and the experience curve effect to be

$$Y = \bar{\sigma} \omega_A \omega_L A^\alpha K^{1-\alpha} L^\alpha, \quad (4)$$

where: Y is output; A is technology; K is capital input; L is labor input; α is a parameter ($0 < \alpha < 1$) that indicates labor share; $\bar{\sigma}$ (> 0) a parameter that represents a worker's accessibility limit to capital with regard to location; and ω_A and ω_L are positive parameters.

The value of $\bar{\sigma} \omega_A \omega_L A^\alpha$ indicates total factor productivity and $\omega_A \omega_L$ is heterogeneous among workers, but $\bar{\sigma}$ and A^α are common to all workers. Hence, a worker's productivity can be represented by $\omega_A \omega_L$. In essence, workers can be interpreted as households, and therefore, worker productivity can be interpreted as household productivity.

By equation (4), the labor income of a worker (household) (w) is given by:

$$w = (1 - \alpha) \bar{\sigma} \omega_A \omega_L A^\alpha k^{1-\alpha} \quad (5)$$

Hence, the worker's (household's) labor income is a linear increasing function of $\omega_A \omega_L$.

Because productivity is caused by, and positively correlated with, FI (as shown in Section 1.2.1), a worker's (household's) labor income (w) is also caused by, and positively correlated with, its fluid intelligence.

1.2.3. Approximation

Ordinary workers are required to solve unexpected problems, but only minor ones. Solving difficult unexpected problems is basically delegated to highly educated and trained experts. Because unexpected problems with regard to $\omega_A \omega_L$ that are delegated to ordinary workers are not difficult for most of these workers, the average difficulty (*i.e.*, \widehat{D}) of the problems will be far smaller than most ordinary workers' FIs . When \widehat{D} is sufficiently smaller than most ordinary workers' FIs , the value of $\exp[-\hat{\gamma}(FI - \widehat{D})]$ will be far smaller than unity, and therefore approximately:

$$\frac{1}{1 + \exp[-\hat{\gamma}(FI - \widehat{D})]} \cong 1 - \exp[-\hat{\gamma}(FI - \widehat{D})] \quad (6)$$

Hence, by equation (2), approximately,

$$\hat{p}(FI) \cong \hat{\delta} + (1 - \hat{\delta}) \{1 - \exp[-\hat{\gamma}(FI - \widehat{D})]\} \quad (7)$$

Taking this nature into consideration, the $\omega_A \omega_L$ determined by $\hat{p}(FI)$ as shown in Sections 1.2.1 and 1.2.2 can be approximately described as an exponentially decelerating increasing function of FI such that by equation (7), where $\bar{\delta}$ is a positive constant. Here, it is assumed for simplicity that $\tilde{\delta} = 0$, and therefore

$$\omega_A \omega_L \cong \bar{\delta} \{ \hat{\delta} + (1 - \hat{\delta}) [\exp(-\hat{\gamma}\widehat{D}) - \exp(-\hat{\gamma}FI)] \} \quad (8)$$

$$\omega_A \omega_L \cong \bar{\delta} [\exp(-\hat{\gamma}\widehat{D}) - \exp(-\hat{\gamma}FI)] \quad (9)$$

Because the worker's (household's) labor income (w) is a linear increasing function of $\omega_A \omega_L$, as shown in Section 1.2.2, then it is also approximately an exponentially decelerating increasing function of FI such that by equation (9), where $\tilde{\delta}$ is a positive constant.

$$w \cong \tilde{\delta} [\exp(-\hat{\gamma}\widehat{D}) - \exp(-\hat{\gamma}FI)] \quad (10)$$

This approximation means that, in a situation where unexpected problems with solutions that are (1) delegated to ordinary workers and (2) not difficult (*i.e.*, \widehat{D} is far smaller than most workers' FIs), an ordinary worker's wage does not have the same relative increase even if the worker's fluid intelligence is relatively high.

2. MDC-based procedure

The MDC-based procedure is explained briefly in this section. For a more detailed presentation, see Harashima (2018, 2019).

2.1. "Comfortability" of the capital-wage ratio (CWR)

Let k_t and w_t be per capita capital and wage (labor income), respectively, in period t . Under the MDC-based procedure, a household should first subjectively evaluate the value of $\frac{\check{w}_t}{\check{k}_t}$ where \check{k}_t and \check{w}_t are the k_t and w_t of the household, respectively. Let Γ be the household's subjective valuation of $\frac{\check{w}_t}{\check{k}_t}$ and Γ_i be the value of $\frac{\check{w}_t}{\check{k}_t}$ of household i ($i = 1, 2, 3, \dots, M$). The household should next assess whether it feels comfortable with its current Γ , that is, its combination of income and capital. "Comfortable" in this context means at ease, not anxious, and other similar related feelings.

Let the "degree of comfortability" (DOC) represent how comfortable a household feels with its Γ . The higher the value of DOC, the more a household feels comfortable with its Γ . For each household, there will be a most comfortable capital-wage ratio (CWR) value, because the household will feel less comfortable if CWR is either too high or too low. That is, for each household, a maximum DOC exists. Let \tilde{s} be a household's state at which its DOC is the maximum (MDC), and let $\Gamma(\tilde{s})$ be a household's Γ when it is at \tilde{s} . $\Gamma(\tilde{s})$ therefore indicates the Γ that gives a household its MDC, and $\Gamma(\tilde{s}_i)$ is the Γ_i of household i at \tilde{s}_i .

2.2. Homogeneous population

Suppose first that all households are identical (*i.e.*, a homogeneous population).

2.2.1. Rules

Household i should act according to the following rules:

Rule 1-1: If household i feels that the current Γ_i is equal to $\Gamma(\tilde{s}_i)$, it maintains the same level of consumption for any t ;

Rule 1-2: If household i feels that the current Γ_i is not equal to $\Gamma(\tilde{s}_i)$, it adjusts its level of consumption until it feels that Γ_i is equal to $\Gamma(\tilde{s}_i)$ for any t .

2.2.2. Steady state

Households can reach a steady state even if they behave only according to Rules 1-1 and 1-2. Let S_t be the state of the entire economy in period t , and $\Gamma(S_t)$ be the value of $\frac{w_t}{k_t}$ of the entire economy at S_t (*i.e.*, the economy's average CWR). In addition, let \tilde{S}_{MDC} be the steady state at which MDC is achieved and kept constant by all households, and $\Gamma(\tilde{S}_{MDC})$ be $\Gamma(S_t)$ for $S_t = \tilde{S}_{MDC}$. Let also \tilde{S}_{RTP} be the steady state under an RTP-based procedure, that is, one derived in a Ramsey-type growth model in which households behave by discounting utilities by θ and generating rational expectations, where $\theta (> 0)$ is household RTP. In addition, let $\Gamma(\tilde{S}_{RTP})$ be $\Gamma(S_t)$ for $S_t = \tilde{S}_{RTP}$.

Proposition 1: If households behave according to Rules 1-1 and 1-2, and if the value of θ calculated from the values of variables at \tilde{S}_{MDC} is used as the value of θ under the RTP-based procedure in an economy where θ is identical for all households, then $\Gamma(\tilde{S}_{MDC}) = \Gamma(\tilde{S}_{RTP})$. Proof: see Harashima (2018, 2019).

Proposition 1 indicates that we can interpret that \tilde{S}_{MDC} is equivalent to \tilde{S}_{RTP} . This means that both procedures can function equivalently and that CWR at MDC is substitutable for RTP as a guide for household behavior.

2.3. Heterogeneous population

In actuality, however, households are not identical, they are heterogeneous, and, if heterogeneous households behave unilaterally, there is no guarantee that a steady state other than corner solutions exists (Becker 1980, Harashima 2010, 2017a). However, Harashima (2010, 2017a) showed that a sustainable heterogeneity (SH) at which all optimality conditions of all heterogeneous households are simultaneously satisfied exists under the RTP-based procedure. In addition, Harashima (2018, 2019) showed that SH also exists under the MDC-based procedure, although Rules 1-1 and 1-2 have to be revised and a rule for the government must be added in a heterogeneous population.

Suppose that households are identical except for their CWRs at MDC (*i.e.*, their values of $\Gamma(\tilde{s})$). Let $\tilde{S}_{MDC,SH}$ be the steady state at which MDC is achieved and kept constant by any household (*i.e.*, SH in a heterogeneous population under the MDC-based procedure), and let $\Gamma(\tilde{S}_{MDC,SH})$ be $\Gamma(S_t)$ for $S_t = \tilde{S}_{MDC,SH}$. In addition, let Γ_R be a household's numerically adjusted value of Γ for SH based on its estimated value of $\Gamma(\tilde{S}_{MDC,SH})$ and several other related values. Specifically, let $\Gamma_{R,i}$ be the Γ_R of household i . Also let T be the

net transfer that households receive from the government with regard to SH and T_i be the net transfer that household i receives ($i = 1, 2, 3, \dots, M$).

2.3.1. Revised and additional rules

Household i should act according to the following rules in a heterogeneous population:

Rule 2-1: If household i feels that the current $\Gamma_{R,i}$ is equal to $\Gamma(\tilde{s}_i)$, it maintains the same level of consumption as before for any i ;

Rule 2-2: If household i feels that the current $\Gamma_{R,i}$ is not equal to $\Gamma(\tilde{s}_i)$, it adjusts its level of consumption or revises its estimated value of $\Gamma(\tilde{S}_{MDC,SH})$ so that it perceives that $\Gamma_{R,i}$ is equal to $\Gamma(\tilde{s}_i)$ for any i .

At the same time, the government must act according to the following rule:

Rule 3: The government adjusts T_i for some i if necessary to make the number of votes cast in elections in response to increases in the level of economic inequality equivalent to the number cast in response to decreases.

2.3.2. Steady state

Even if households and the government behave according to Rules 2-1, 2-2, and 3, there is no guarantee that the economy can reach $\tilde{S}_{MDC,SH}$. However, thanks to the government's intervention, SH can be approximately achieved. Let $\tilde{S}_{MDC,SH,ap}$ be the state at which $\tilde{S}_{MDC,SH}$ is approximately achieved, and $\Gamma(\tilde{S}_{MDC,SH,ap})$ be $\Gamma(S_t)$ at $\tilde{S}_{MDC,SH,ap}$ on average. Here, let $\tilde{S}_{RTP,SH}$ be the steady state that satisfies SH under the RTP-based procedure. In addition, let $\Gamma(\tilde{S}_{RTP,SH})$ be $\Gamma(S_t)$ for $S_t = \tilde{S}_{RTP,SH}$.

Proposition 2: If households are identical except for their values of $\Gamma(\tilde{s})$ and behave unilaterally according to Rules 2-1 and 2-2, if the government behaves according to Rule 3, and if the value of θ_i that is calculated back from the values of variables at $\tilde{S}_{MDC,SH,ap}$ is used as the value of θ_i for any i under the RTP-based procedure in an economy where households are identical except for their θ s, then $\Gamma(\tilde{S}_{MDC,SH,ap}) = \Gamma(\tilde{S}_{RTP,SH})$. *Proof:* see Harashima (2018, 2019).

Proposition 2 indicates that we can interpret that $\tilde{S}_{MDC,SH,ap}$ is equivalent to $\tilde{S}_{RTP,SH}$ and that CWR at MDC is substitutable for RTP as a guide for heterogeneous households' behavior. Furthermore, no matter what values of T , Γ_R , and $\Gamma(\tilde{S}_{MDC,SH})$ are severally estimated by households, any $\tilde{S}_{MDC,SH,ap}$ can be interpreted as the objectively correct and true steady state. In addition, a government need not necessarily provide the objectively correct T_i for $\tilde{S}_{MDC,SH,ap}$ even though $\tilde{S}_{MDC,SH,ap}$ is interpreted as objectively correct and true.

3. CWR at MDC and fluid intelligence

3.1 The degree of freedom of choice

3.1.1 Fluid intelligence and economic activities

As discussed in Section 1.2 and shown by Harashima (2009, 2012, 2016, 2017b), total factor productivity depends not only on the level of technology (A) but also on ordinary workers' abilities to solve a large number of unexpected minor problems ($\omega_A \omega_L$), and the workers' fluid intelligence is indispensable to solving these unexpected problems (Harashima 2012).

Nevertheless, fluid intelligence is indispensable not only after unexpected problems occur but also before they occur. The future is uncertain, and people understand that there are always risks of unexpected problems in the future. However, if the future can be more precisely foreseen, the probability of occurrence of these kinds of problems can be reduced, so that some of the problems can be anticipated or solved before they occur. As more previously unexpected problems are anticipated, higher levels of consumption can be enjoyed. Hence, reducing the number of unexpected problems *ex ante* is as important as solving them *ex post*.

Both solving and preventing or avoiding unexpected problems require fluid intelligence, and fluid intelligence is indispensable to fix unexpected problems, as discussed in Section 1 and by Harashima (2012). Both solving and reducing the number of unexpected problems are achieved in the same manner, by newly uncovering the mechanism, by which a hitherto unknown problem occurs and innovating a way to fix or avert it.

Humans are endowed with reason and therefore can foresee the future and plan for their future actions. As Harashima (2018, 2019) indicates, even under the MDC-based procedure, households behave fully considering the future and choose the best plan for their futures. Hence, households make an effort to foresee the future to the

extent possible even under the MDC-based procedure. Of course, foreseeing the future includes activities related to reducing the number of unexpected problems to the greatest degree possible before they occur.

What should a household foresee when making a future plan with regard to MDC? Households need to clarify choices between consumption and saving, because MDC indicates how much a household prefers to save out of its labor income. In a future plan for consumption and saving, goods and services that are to be consumed in the future should be clearly distinguished from those consumed at present. Hence, the plan should be made fully considering what kinds of goods and services can be consumed and how they can be consumed in the future while at the same time preventing or avoiding unexpected problems as much as possible with fluid intelligence. Because CWR means the combination of consumption and saving, therefore a household's CWR at MDC reflects its future plan for consumption and saving.

3.1.2. Consumption opportunities

Let a "consumption opportunity" be a technologically and physically feasible opportunity of consuming a good or service in a future period for a household. Opportunities of consuming different goods and services in the same future period are counted as different consumption opportunities. Nevertheless, a household cannot simultaneously realize more than one consumption opportunity from among many consumption opportunities. This means that each household has a large number of consumption opportunities in each period, but it can realize only a fraction of them in that period. Therefore, when a household makes its future plan, it has to carefully examine which consumption opportunities should be realized from among the many competing consumption opportunities.

Some of the consumption opportunities may be technologically or physically feasible, but they still may not be accessible to all households. It is highly likely that the number of consumption opportunities that each household can actually realize is heterogeneous among households, because the scopes of accessible consumption opportunities from which the households choose are highly likely to be heterogeneous among households.

When a household makes its future plan for consumption and saving, it should first ascertain which consumption opportunities it can access. Households will sort consumption opportunities into "accessible consumption opportunities" that are thought to be accessible and "inaccessible consumption opportunities" that are not. Different households sort consumption opportunities differently because households are by nature heterogeneous.

Various factors will influence household sorting choices. For example, affordability will matter because consumption requires money or other exchangeable resources. If the opportunity for consumption of an expensive good or service is not affordable because of a budget constraint, it will be thought of as inaccessible. As compared with necessities, luxuries will be thought to be inaccessible far more often than necessities. Another factor is qualification or privilege, because some consumption opportunities require a household to possess some type of qualification - for example, a high score on an entrance exam for an exclusive school. Even if a household can afford this consumption opportunity, it cannot access it if it does not possess the required qualification.

However, the most important factor is probably uncertainty. The future is uncertain because humans are imperfect, and unexpected problems inevitably will occur. The affordability and qualification factors themselves are not certain. If a household is uncertain whether some consumption opportunities are affordable because its budget constraint is uncertain, it may sort these opportunities as inaccessible. When a household makes a future plan for its consumption and saving, therefore, its perception of uncertainty about its future will be very important. If a household estimates that its future is more uncertain, it will give up a larger amount of consumption opportunities and sort them as inaccessible. Conversely, it may sort more opportunities as accessible if it perceives a more certain future. A household's amount of accessible consumption opportunities will therefore depend significantly on its perceived uncertainty about the future.

It will not matter to a household nevertheless even if it can access only a handful of consumption opportunities, because consumption opportunities include both necessities and luxury items. In the industrialized economies, most of the consumption opportunities could be considered to be luxuries in a broad sense, and consumption opportunities corresponding to civil minimums will make up a relatively small fraction of all consumption opportunities. Hence, a household will generally be able to access many consumption opportunities of necessities.

3.1.3. Timing of consumption

Households obtain utilities by consuming goods and services, but even if the same good or service is consumed, the level of utility obtained by each household will differ, depending on the timing of consumption. A household may strongly desire to consume a good or service in a specific favorable period but may never want it in other periods. If a household cannot avoid consuming a good or service in a less desirable or even unwanted consumption period,

the utility it obtains will be far less than that if it can consume it in the desired period. For example, in summer, people do not want to consume a good or service that is useful only in winter. Similarly, when people are old, they do not want to consume a good or service that is useful only for young people. In addition, people may become tired of consuming a good or service if the amount is excessive, and they may want to consume only part of it in the current period.

The most desirable period or best timing of consumption will vary across goods and services as well as households. The best timing may occur only once, or it may be repeated at some interval. In any case, it may not always be easy for a household to consume a good or service exactly at the best or most desired timing. In general, a household can realize the consumption of daily necessities at the best consumption timings, but it may not necessarily be easy to realize the consumption of some goods and services that are consumed much more infrequently at the best timing.

If a household cannot realize consumption opportunities that match the desired timings, its utilities are lower than if it can. Hence, households also have to estimate whether they can realize the consumption opportunities that match the best consumption timings in future plans for consumption and saving. If a household can clearly foresee that a consumption opportunity does not match the best timing, it will most likely exclude this consumption opportunity from consideration. In general, the less certain a household is about whether a consumption opportunity matches the best timing, the more likely it will be to exclude the opportunity from consideration. The reluctance to give up consumption opportunities because of uncertainty about the best timings will be far lower in the case of luxuries than necessities. Because most consumption opportunities are for luxuries, as discussed in Section 3.1.2, a household will generally not pursue an accessible consumption opportunity if it is uncertain whether this opportunity matches the best timing.

3.1.4 The degree of freedom of choice

Consumption accessibility

Suppose for simplicity that each household has N consumption opportunities. A household can access only a small portion of the opportunities because of the constraints discussed in Section 3.1.2. Therefore, in making its future plan for consumption and saving, it determines which consumption opportunities it can access. Here, household i estimates that it can access n_i ($\leq N$) out of N consumption opportunities. Let the ratio:

$$\frac{n_i}{N} = \mu_i \quad (11)$$

be the "consumption accessibility" of household i , and evidently

$$\frac{dn_i}{d\mu_i} = N = \text{const.} \quad (12)$$

Consumption accuracy

Suppose that, for any household, the best consumption timing of any good or service arrives within a finite period, and even if the best consumption timings are multiple and arrive repeatedly, each of the repeated best timings arrives in a finite period after the last one. Let a "best timing consumption opportunity" be a consumption opportunity that matches the best consumption timing. Household i estimates that it can realize m_i best timing consumption opportunities out of n_i accessible consumption opportunities. Let the ratio

$$\frac{m_i}{n_i} = \pi_i \quad (13)$$

be the "consumption accuracy" of household i , and evidently $\frac{dm_i}{d\pi_i} = n_i = \text{const.}$ (14)

Degree of freedom of choice in consumption

By the nature of consumption accessibility and accuracy, indicates how much household i has freedom of choice in consumption in the future.

$$F_i = \mu_i \pi_i = \frac{m_i}{N} \quad (15)$$

If F_i is higher, household i can choose a consumption opportunity in a future period from among a larger amount of best timing consumption opportunities. Let F_i be the "degree of freedom of choice" (DFC).

By the natures of μ_i and π_i , for any i ,

$$\frac{\partial F_i}{\partial \mu_i} > 0 \quad (16)$$

and

$$\frac{\partial F_i}{\partial \pi_i} > 0 \quad (17)$$

3.2 The DFC model

3.2.1 Fluid intelligence and DFC

Fluid intelligence and accessible consumption opportunities

As discussed in Section 3.1.2, uncertainties about the future are significantly important in a household's determination of the accessibility of its consumption opportunities. In addition, as discussed in Section 3.1.1, fluid intelligence is indispensable to reducing uncertainties about consumption opportunities. Hence, the number of accessible consumption opportunities is substantially influenced by fluid intelligence. Taking this nature into consideration, it is highly likely that if a household possesses a higher fluid intelligence it can access a larger number of consumption opportunities than households with lower fluid intelligences. That is,

$$\frac{d\mu_i}{dFI_i} > 0 \quad (18)$$

where: FI_i is the degree of fluid intelligence of household i .

Note that affordability, which is a factor in accessibility, directly depends on labor incomes, and labor incomes (as well as productivity) depend on fluid intelligence, as indicated in Section 1.2. Hence, the number of accessible consumption opportunities is also influenced by fluid intelligence directly through this channel. In addition, in modern societies, many qualifications, which are also a source of accessibility (as discussed in Section 3.1.2), are based on abilities in specific fields, because a "qualification" in this sense basically means some kind of superiority over other people. Because fluid intelligence is one of the most important sources of human intellectual abilities, fluid intelligence will also substantially affect the amount of accessible consumption opportunities through this channel.

Fluid intelligence and best timing of consumption

As discussed in Section 3.1.1, fluid intelligence is indispensable to reducing uncertainty as a whole, and therefore it is also reducing uncertainty about best consumption timings. If a household possesses a higher fluid intelligence, it can probably realize best timing consumption opportunities than households with lower fluid intelligences. That is,

$$\frac{d\pi_i}{dFI_i} > 0 \quad (19)$$

Fluid intelligence and DFC

By the total derivative of F_i , for any i ,

$$\frac{dF_i}{dFI_i} = \frac{\partial F_i}{\partial \mu_i} \frac{d\mu_i}{dFI_i} + \frac{\partial F_i}{\partial \pi_i} \frac{d\pi_i}{dFI_i} \quad (20)$$

By inequalities (16), (17), (18), and (19) and equation (20),

$$\frac{dF_i}{dFI_i} > 0 \quad (21)$$

That is, DFC (F_i) is a function of fluid intelligence FI_i , and as FI_i increases, F_i increases.

3.2.2. The DFC model

Because DFC (F) is a function of fluid intelligence (FI), item response theory can be used to construct a model of DFC. That is, F_i can be modeled on the basis of equation (2) such that

$$F_i = \tilde{p}(FI_i) = \tilde{\delta} + \frac{1 - \tilde{\delta}}{1 + \exp[-\tilde{\gamma}(FI_i - \tilde{D})]} \quad (22)$$

where: $\tilde{\gamma}$ (> 0) is a parameter that characterizes the slope of the function; \tilde{D} is a parameter with regard to "difficulty" in the "economic environment;" and $\tilde{\delta}$ ($1 \geq \tilde{\delta} \geq 0$) is the probability that a consumption opportunity is accessible and also accurately realized by chance.

The “economic environment” consists of various elements such as technology, political stability, legal system, diplomatic situation, natural environment, and restrictions on usable natural resources. “Difficulty” indicates how difficult it is for a household to reduce future uncertainties (*i.e.*, to anticipate potential problems) because of various obstacles existing in the economy. For example, a more difficult economic environment means more unstable technological progress, more frequent political turbulence, a more unpredictable legal system, more unstable international situations, and more unsure restrictions on natural resources.

Equation (22) indicates that DFC is determined by fluid intelligence (F_i), as well as by difficulty in the economic environment (\tilde{D}). F_i is an internal factor and \tilde{D} is an external factor for a household. As is evident from equation (22), if F_i is higher, F_i is higher, and if \tilde{D} is higher, F_i is lower. Suppose that F_i , \tilde{D} , $\tilde{\delta}$, and $\tilde{\gamma}$ are all not correlated with each other, and that \tilde{D} , $\tilde{\delta}$, and $\tilde{\gamma}$ are common to all households. Hence, by equation (22),

$$\frac{dF_i}{dF_i} > 0 \quad (23)$$

This inequality is the same as inequality (21). Also, by equation (22),

$$\frac{dF_i}{d\tilde{D}} < 0 \quad (24)$$

Suppose for simplicity that \tilde{D} , $\tilde{\delta}$, and $\tilde{\gamma}$ are constant.

3.2.3. Approximation

Even if households are heterogeneous, they will not be largely different from each other. Hence, it is highly likely that most F_i are contiguously located around a certain value between 0 and 1. Furthermore, because a household can realize only a small fraction of the huge number of consumption opportunities, most households' F values will be close to 0; that is, most households' F_i will be sufficiently smaller than \tilde{D} in equation (22). If $\exp[-\tilde{\gamma}(F_i - \tilde{D})]$ is sufficiently large because F_i is sufficiently less than \tilde{D} , then approximately

$$\frac{1}{1 + \exp[-\tilde{\gamma}(F_i - \tilde{D})]} \cong \frac{1}{\exp[-\tilde{\gamma}(F_i - \tilde{D})]} \quad (25)$$

Hence, approximately, there is an exponential relation between F_i and F_i such that

$$F_i = \tilde{p}(F_i) \cong \tilde{\delta} + (1 - \tilde{\delta}) \frac{\exp(\tilde{\gamma}F_i)}{\exp(\tilde{\gamma}\tilde{D})} \quad (26)$$

Here, it is assumed for simplicity that $\tilde{\delta} = 0$, and therefore

$$F_i = \tilde{p}(F_i) \cong \frac{\exp(\tilde{\gamma}F_i)}{\exp(\tilde{\gamma}\tilde{D})} \quad (27)$$

That is, approximately, F_i increases exponentially as F_i increases.

What this approximation means is that in a situation where a household can realize only a small fraction of consumption opportunities and therefore most households' F values are close to 0, if F_i increases even a little, a large number of consumption opportunities becomes additionally accessible and realizable. A small increase in F_i reduces the uncertainty substantially and provides a large number of additional consumption opportunities (*i.e.*, an exponential increase in consumption opportunities).

In addition, taking the natures of μ_i and π_i discussed in Section 3.1 into consideration, equation (15) strongly implies that μ_i and π_i are affected by F_i in the same manner. Hence, by equation (27), it is highly likely that

$$\mu_i \cong \lambda \frac{\exp(\tilde{\gamma}F_i)}{\exp(\tilde{\gamma}\tilde{D})} \quad (28)$$

and

$$\pi_i \cong \lambda^{-1} \frac{\exp(\tilde{\gamma}F_i)}{\exp(\tilde{\gamma}\tilde{D})} \quad (29)$$

where: λ is a positive constant.

3.3. DFC and capital

3.3.1. Motives for saving and investment

Under the MDC-based procedure, a household's CWR at MDC reflects its future plan for consumption and saving, as discussed in Section 3.1.1, particularly in the sense that the household's CWR indicates its feeling about whether

the future is sufficiently secure economically. Because CWR is the ratio of labor income to capital, CWR at MDC indicates the extent to which a household eventually wants to accumulate capital by saving out of its labor income. Therefore, to examine the relation between DFC and CWR at MDC, we first should examine a household's motives to save and invest money (or other types of economic resources).

First, suppose a primitive agricultural society in which currency or money has not yet been invented. Even in this society, people should save some economic resources. For example, harvested grains are not eaten only at the time of harvest but throughout the year, so most grains are saved at the time of harvest. That is, people put aside and stock some portion of their resources for future consumption. People save resources not only for later consumption, however, but also to increase production in the future so as to consume a much larger amount than the amount saved. A portion of the current resources that are put aside can be exchanged for tools or animals that enable production to increase in the future. This is the second motive for saving—resources are saved to be invested.

Even in our modern society, these essential motives remain the same. Savings and investments are made primarily because (a) people need to spread out the consumption of production (earnings) over time, and (b) people sacrifice some portion of current resources to increase production in the future, thereby increasing possible future consumption.

Savings from motive (a) are not invested and therefore no return (*i.e.*, increases in future production) is expected from these resources. They do, however, depend on how accurately the best consumption timings in the future can be foreseen. Savings from motive (b) are invested and returns are expected. Production (*i.e.*, the number of accessible consumption opportunities) is expected to increase by investments. Hence, the amount of resources that should be saved from motive (b) depends on the amount of expected future increases in production.

3.3.2. Capital, accessibility, and accuracy

It is assumed for simplicity that the returns from, and risks of, any investment are identical, finite, and common knowledge for all households (*e.g.*, interest rates in financial markets are identical and commonly known to all households). Suppose also for simplicity that the amount of money (economic resources) that is used to realize a consumption opportunity is identical for any consumption opportunity; in other words, any consumption opportunity equally consists of a unit of consumption opportunity that has the same "price."

Capital, motive (b)

A household will save and invest with motive (b) only if it estimates that some consumption opportunities are made additionally accessible in the future as a result of the investment. It will not accumulate capital infinitely, because the number of consumption opportunities is finite in a future period. A household will accumulate capital with motive (b) up to the point at which it feels that the combination of the estimated future increase in accessible consumption opportunities and the necessary present resulting decrease in consumption is most comfortable. There will be a unique combination that is felt to be most comfortable by each household.

An important point is that a household only intuitively feels whether the aforementioned combination is most comfortable. There is no predetermined objectively true and correct most comfortable combination. Nobody knows whether the combination with which a household subjectively feels most comfortable is equal to the predetermined objectively true and correct most comfortable combination. We can only say that the amount of capital eventually held by a household is the one that makes it subjectively feel most comfortable.

Because any consumption opportunity consists of a unit of consumption opportunity that has the same price as assumed above, a household's amount of capital derived from motive (b) is a linear increasing function of the number of additional consumption opportunities that are estimated to be accessible by investments. Let $\bar{n}_i + \tilde{n}_i$ be accessible consumption opportunities of household i , where \bar{n}_i is the accessible consumption opportunities that are originally accessible without the capital from motive (b), and \tilde{n}_i is those that are additionally made accessible because of the capital (accumulated investments) of household i from motive (b) at MDC ($k_{b,i}$). Because $k_{b,i}$ is a linear increasing function of \tilde{n}_i ,

$$\tilde{n}_i = \chi k_{b,i} \quad , \quad (30)$$

where: χ is a positive constant.

Taking this capital accumulation behavior into consideration, the consumption accessibility of household i indicated by equation (11) should be modified such that:

$$\mu_i = \frac{\bar{n}_i + \tilde{n}_i}{N} = \frac{\bar{n}_i + \chi k_{b,i}}{N} \quad (31)$$

at MDC for household i . By total derivative of equation (31),

$$\frac{dk_{b,i}}{d\mu_i} = \chi^{-1} \left(N - \frac{d\bar{n}_i}{d\mu_i} \right) \quad (32)$$

Here, it seems highly likely that $\frac{d\bar{n}_i}{d\mu_i}$ is constant because \bar{n}_i is irrelevant to motive (b) and therefore will have the same natures as equations (11) and (12). Hence, by equation (32),

$$\frac{dk_{b,i}}{d\mu_i} = \text{const} \quad (33)$$

In addition, it seems highly likely that $N > \frac{d\bar{n}_i}{d\mu_i}$, because N indicates the number of all consumption opportunities, and thereby, by equation (32)

$$\frac{dk_{b,i}}{d\mu_i} > 0 \quad (34)$$

Therefore, by equation (33) and inequality (34), as μ_i increases, the amount of capital from motive (b) at MDC ($k_{b,i}$) increases linearly.

Capital, motive (a)

A household also sets aside some resources with motive (a). As discussed in Section 3.1.3, if a household feels less certain about the best timing of an accessible consumption opportunity, it will be less likely to set aside resources for this consumption opportunity and will thereby accumulate less capital with motive (a).

Let $\bar{m}_i + \tilde{m}_i$ be best-timing consumption opportunities of household i , where \bar{m}_i is the best-timing consumption opportunities that are irrelevant to capital (savings) with motive (a) and \tilde{m}_i is those that are estimated to certainly match the best timings and make household i save money with motive (a) at MDC ($k_{a,i}$). Because any consumption opportunity consists of a unit of consumption opportunity that has the same price as assumed above, a household's capital (accumulated investments) from motive (a) is a linear increasing function of the number of consumption opportunities that are set aside with motive (a); that is, $k_{a,i}$ is a linear increasing function of \tilde{m}_i such that

$$\tilde{m}_i = \xi k_{a,i} \quad (35)$$

where: ξ is a positive constant.

Taking this capital accumulation behavior with motive (a) into consideration, the consumption accessibility of household i , as indicated by equation (13), should be modified such that

$$\pi_i = \frac{\bar{m}_i + \tilde{m}_i}{\bar{n}_i + \tilde{n}_i} = \frac{\bar{m}_i + \xi k_{a,i}}{\bar{n}_i + \chi k_{b,i}} \quad (36)$$

at MDC for household i . By total derivative of equation (36),

$$\frac{dk_{a,i}}{d\pi_i} = \xi^{-1} \left[\bar{n}_i + \chi k_{b,i} - \frac{\bar{m}_i}{d\pi_i} - \frac{\bar{m}_i + \xi k_{a,i}}{\bar{n}_i + \chi k_{b,i}} \left(\chi \frac{dk_{b,i}}{d\pi_i} + \frac{d\bar{n}_i}{d\pi_i} \right) \right] \quad (37)$$

It seems highly likely that the values of $\frac{d\bar{m}_i}{d\pi_i}$, $\frac{\bar{m}_i + \xi k_{a,i}}{\bar{n}_i + \chi k_{b,i}}$, $\chi \frac{dk_{b,i}}{d\pi_i}$, and $\frac{d\bar{n}_i}{d\pi_i}$ are all far smaller than that of $\bar{n}_i + \chi k_{b,i}$ because $\bar{n}_i + \chi k_{b,i}$ indicates the number of all accessible consumption opportunities. Therefore, by equation (37), approximately,

$$\frac{dk_{a,i}}{d\pi_i} \cong \xi^{-1} (\bar{n}_i + \chi k_{b,i}) \quad (38)$$

Here, both μ_i and π_i will be affected by F/I_i in the same manner as shown in Section 3.2.3; therefore, \bar{n}_i and $k_{b,i}$ will increase as π_i increases and thereby

$$\frac{d^2 k_{a,i}}{d\pi_i^2} \cong \xi^{-1} \left(\frac{d\bar{n}_i}{d\pi_i} + \chi \frac{dk_{b,i}}{d\pi_i} \right) > 0. \quad (39)$$

In addition, as with the case of $\frac{d\bar{n}_i}{d\mu_i}$, it seems highly likely that $\frac{d\bar{n}_i}{d\pi_i}$ and $\frac{dk_{b,i}}{d\pi_i}$ are positive constants and thereby approximately

$$\frac{d^2k_{a,i}}{d\pi_i^2} \cong \text{const} \quad (40)$$

Equations (38) and (39) indicate that, as π_i increases, the amount of capital from motive (a) increases at a greater than linear rate; that is, $k_{a,i}$ is approximately a quadratic and increasing function of π_i .

As was the case with capital from motive (b), the amount of a household's capital from motive (a) is also finite, because the number of accessible consumption opportunities is finite in a future period and the best consumption timing of any consumption opportunity arrives within a finite period.

3.4. Fluid intelligence and MDC

3.4.1. Existence of a unique CWR at MDC

As shown in Section 3.3.2, capital from cases (a) and (b) has the common feature that it is finite. Hence, for a given level of labor income and, equivalently, for given levels of technology (A) and fluid intelligence (FI_i), any household has a certain finite level of capital that it feels is most comfortable. That is, a unique finite value of CWR at MDC exists for each household.

3.4.2. Fluid intelligence and capital

As equation (33) indicates, the amount of capital from motive (b) ($k_{b,i}$) is a linear increasing function of consumption accessibility (μ_i) and, as equation (28) indicates, μ_i is approximately an exponentially increasing function of FI_i . Hence, the amount of capital from motive (b) of household i ($k_{b,i}$) is approximately an exponentially increasing function of FI_i . In addition, as equation (39) indicates, the amount of capital from motive (a) ($k_{a,i}$) is approximately a quadratic and increasing function of consumption accuracy π_i and, as equation (29) indicates, π_i is approximately an exponentially increasing function of FI_i . Hence, the amount of capital from motive (a) of household i ($k_{a,i}$) is also approximately an exponentially increasing function of FI_i . Therefore, the amounts of both types of capital are approximately exponentially increasing functions of FI_i , and thereby the combined capitals ($k_{a,i} + k_{b,i}$) are also approximately an exponentially increasing function of FI_i .

As equations (22), (27), (28), and (29) indicate, a higher FI_i causes higher F_i , μ_i , and π_i , and as Section 3.3.2 indicates, increases in F_i , μ_i , and π_i cause an increase in the amount of capital. That is, an increase in FI_i causes an increase in the amount of capital. The causality clearly runs from fluid intelligence to capital.

3.4.3. Fluid intelligence and MDC

Whereas capital ($k_i = k_{a,i} + k_{b,i}$) amounts are approximately an exponentially accelerating increasing function of FI_i , as shown in Section 3.4.2 and by equation (27), labor incomes (w_i) are an exponentially decelerating increasing function of FI_i , as equation (10) indicates. Therefore, by equations (10) and (27), the CWR at MDC of household i (the ratio of w_i to k_i at MDC; i.e., $\Gamma(\tilde{s}_i)$) can be approximately described as

$$\Gamma(\tilde{s}_i) = \Phi \frac{\exp(-\hat{\gamma}\hat{D}) - \exp(-\hat{\gamma}FI_i)}{\exp(\tilde{\gamma}FI_i)} \quad (41)$$

where: Φ is a positive constant. In equation (40), $\exp(-\hat{\gamma}\hat{D}) - \exp(-\hat{\gamma}FI_i)$ represents labor income (w_i) and $\exp(\tilde{\gamma}FI_i)$ represents capital (k_i).

By equation (40),

$$\frac{d\Gamma(\tilde{s}_i)}{dFI_i} = \frac{\Phi}{\exp[(\hat{\gamma} + \tilde{\gamma})FI_i]} \langle \hat{\gamma} - \tilde{\gamma} \{ \exp[\hat{\gamma}(FI_i - \hat{D})] - 1 \} \rangle. \quad (42)$$

Because $\exp[-\hat{\gamma}(FI_i - \hat{D})]$ is far smaller than unity, as discussed in Section 1.2.3 (i.e., $\exp[\hat{\gamma}(FI_i - \hat{D})]$ is far larger than unity) and both $\hat{\gamma}$ and $\tilde{\gamma}$ are parameters that characterize the slopes of item response functions with regard to solving unexpected problems by FI for the same population and therefore will take similar values, then by equation (41), generally

$$\frac{d\Gamma(\tilde{s}_i)}{dFI_i} < 0 \quad (43)$$

Inequality (42) indicates that as FI increases, the CWR at MDC decreases. The CWR at MDC of a household

with a higher FI is lower than that of a household with a lower FI .

As shown in Section 1.2, a higher fluid intelligence causes higher labor income, and as shown in Section 3.4.2, a higher fluid intelligence also causes higher capital amount. Therefore, equation (40) clearly shows that the causality runs from fluid intelligence to CWR at MDC.

3.5. Technological progress and MDC

3.5.1. Technological progress and consumption opportunities

As technologies progress, the number of technologically and physically feasible opportunities of consuming goods and services will increase because, for example, technological progress increases the varieties of goods and services available to households. However, how do consumption opportunities increase by technological progress?

Consumption opportunities will probably expand evenly or uniformly as technologies progress, whereas the composition structure of consumption opportunities remains unchanged on average because firms will keep the user interfaces with their products unchanged even as technologies progress. If the user interface is worse, sales of products and profits will decrease. Hence, if a firm recognizes that its sales and profits are lower because the user interface with its product is worse than expected, it will improve the user interface up to the level at which the firm's profits are maximized. Because the average intelligence of households will not change basically, even if technologies progress, the level of user interface that is required for a firm to maximize its profits also will not change on average, even if technologies progress. Because the average user interface is unchanged, the number of consumption opportunities (N) will increase at the same rate as production in the economy increases by technological progress.

3.5.2. Technological progress, DFC, and difficulty

Because fluid intelligence is highly likely given by nature, it will not change by technological progress. On the other hand, difficulty (\bar{D}) in equations (22) and (27) may change as technologies progress. However, because firms will keep the user interfaces unchanged on average, \bar{D} will not be affected by technological progress. By equations (22) and (27), therefore, the DFC that is determined by FI and \bar{D} will also not change by technological progress.

3.5.3. Technological progress and MDC

The accessible consumption opportunities that are originally accessible without the capital from motive (b) (\bar{n}_i) and the best timing consumption opportunities that are irrelevant to capital (savings) with motive (a) (\bar{m}_i) will increase at the same rate as N considering the natures of \bar{n}_i and \bar{m}_i . Therefore, given a level of fluid intelligence and thereby values of μ_i and π_i , the amount of capital (k_i) will increase at the same rate as N , as equations (31) and (36) imply. Hence, because FI and \bar{D} are not affected by technological progress (as indicated in Section 3.5.2) and N increases at the same rate as production in the economy increases with technological progress (as indicated in Section 3.5.1), the amount of capital (k_i) will increase at the same rate as production in the economy increases with technological progress. This nature is consistent with most economic growth models in that, at steady state and on a balanced growth path, the entire capital amount in an economy increases at the same rate as production in the economy increases by technological progress.

At the same time, by equations (4) and (5), a household's labor income (w_i) increases at the same rate as the production in the economy increases with technological progress at steady state and on a balanced growth path. This nature is also consistent with most economic growth models.

Therefore, the capital (k_i) and labor income (w_i) of each household increase at the same rate as the production in the economy increases with technological progress. As a result, CWR at MDC does not change with technological progress; that is, $\Gamma(\bar{s}_i)$ is irrelevant to technological progress.

4. Spurious correlation

I examine the correlation between CWR at MDC (equivalently RTP) and labor income in Section 4.1, and then I examine the correlation between CWR and capital as well as capital income in Section 4.2. The case where SH (*i.e.*, when all optimality conditions of all heterogeneous economies are simultaneously satisfied, Harashima 2010, 2017a) is not achieved is not examined, because if SH is not achieved, then the extreme and highly unrealistic state where the household with the lowest CWR at MDC (*i.e.*, the highest fluid intelligence) eventually monopolizes all capital will emerge as Becker (1980) and Harashima (2010, 2017a) indicate.

For this discussion, I assume for simplicity that there are many economies in a country, and each economy has a homogeneous population (households). In addition, economies are identical except for household fluid

intelligence.

4.1. Correlation with labor income

The correlation with labor income is examined first in the case where economies are isolated from each other, and therefore SH does not matter. In this case, a higher fluid intelligence causes a higher productivity, as shown in Section 1.2.1, and higher labor income, as shown in Sections 1.2.2 and 1.2.3. At the same time, a higher fluid intelligence causes a lower CWR at MDC, as shown in Section 3.4.3. Hence, a household with a relatively low CWR at MDC can obtain relatively high labor incomes. As a result, CWRs at MDC can be observed to be negatively correlated with labor incomes among economies. Because CWR at MDC is substitutable with RTP, as indicated in Section 2 and by Harashima (2018, 2019), RTPs can also be observed to be negatively correlated with labor incomes.

An important point is that the observable correlation between CWRs at MDC (or RTPs) and labor incomes is spurious and does not indicate any direct causality between the two. Causalities exist only between fluid intelligence and other relevant elements. Correlations between CWRs at MDC (or RTPs) and these other elements can be observed only because all of them are being bridged by fluid intelligence.

Next, I examine the case where heterogeneous economies are fully open with each other except for labor force, and SH is maintained among them by appropriate government interventions. As noted above, a higher fluid intelligence causes a lower CWR at MDC and also causes higher productivity and labor income. These properties are unchanged even under SH, because SH affects capital accumulation, not the production function. Therefore, CWRs at MDC (or RTPs) can be still observed to be negatively correlated with labor incomes among economies. The observable correlation between CWRs at MDC (or RTPs) and labor incomes under SH is still spurious and does not indicate any direct causality between the two.

4.2. Correlation with capital and capital income

Next, the correlations with capital and capital income are examined. In the case where economies are isolated from each other and SH does not matter, CWRs at MDC (or RTPs) can also be observed to be negatively correlated with capital and capital income by the same reasoning discussed in Section 4.1, and the observable correlations are still spurious. The case where heterogeneous economies are fully open with each other except for labor force, and SH is maintained among them by appropriate government interventions, is not as simple, however, because SH substantially and differently affects capital accumulations across economies.

Because a higher fluid intelligence causes not only lower CWRs at MDC (as shown in Section 3.4.3) but also higher productivity and labor incomes as well as high amounts of capital and capital incomes (as shown in Sections 1.2 and 3.4.2), all of these factors become simultaneously heterogeneous with heterogeneous fluid intelligences. Hence, the state where only CWRs at MDC are heterogeneous does not exist.

Under SH, capital accumulations of economies with relatively low CWRs at MDC are restrained and those with relatively high CWRs at MDC are enhanced. As a result, the amounts of capital that economies own do not greatly differ. Hence, CWRs at MDC (or RTPs) may not clearly be observed to be negatively correlated with capital and capital income.

However, in reality, SH may not be “correctly” achieved (Harashima 2010, 2017a). In this case, a government will intervene only up to the point at which the number of votes cast in elections in response to increases in the level of economic inequality is equivalent to that in response to decreases. If government intervention for SH is implemented in this manner, the amounts of capital that economies own still may differ substantially, even though SH appears to have been achieved. Therefore, CWR at MDC (or RTP) may be still clearly be observed to be negatively correlated with capital and capital income. An important point, however, is that even if negative correlations between them are observed, these correlations are still spurious and no direct causality exists.

5. Discussion

5.1. RTP as a shadow of CWR at MDC

As Section 2 and Harashima (2018, 2019) indicate, RTP and CWR at MDC can be substituted for one another. The nature that fluid intelligence significantly influences CWR at MDC therefore means that it should also influence the process of RTP formation - or at least it can be interpreted as doing so.

Harashima (2004, 2014) presented a model of RTP that eliminates the serious drawback of Uzawa's (1968) RTP model, which is one of the most familiar endogenous RTP models. The key variable in Harashima's (2004, 2014) model is W , which indicates the size of the utility stream. It is defined as

$$W = \lim_{T \rightarrow \infty} E \int_0^T \rho(t) u(c_t) \exp(-\psi t) dt \quad (44)$$

on a balanced growth path on which y_t , k_t , and c_t as well as technology grow at the same constant rate (ψ), where c_t is consumption in period t , $u(\cdot)$ is the utility function, E is the expectation operator, and

$$\rho(t) = \frac{1}{T} \text{ if } 0 \leq t \leq T \quad (45)$$

$$\rho(t) = 0 \text{ otherwise.} \quad (46)$$

Let c^* be:

$$Eu(c^*) = \lim_{t \rightarrow \infty} E[u(c_t) \exp(-\psi t)] \quad (47)$$

If $\psi = 0$ (i.e., no economic growth), c^* is a positive constant and indicates consumption at steady state. Even if the economy grows (i.e., $\psi > 0$), c^* is still a positive constant because c_t grows at rate ψ . In this sense, we can interpret c^* as consumption at “steady state” not only when the economy does not grow but also when it is growing. By equations (44) and (47),

$$W = E[u(c^*)]. \quad (48)$$

An essential feature of this endogenous RTP model is that RTP (θ) is sensitive to, and a function of, W such that:

$$\theta = \tilde{\theta}(W) = \tilde{\theta}\{E[u(c^*)]\} \quad (49)$$

where the function $\tilde{\theta}(\cdot)$ is monotonically continuous and continuously differentiable and

$$\frac{d\theta}{dW} = \frac{d\theta}{dE[u(c^*)]} < 0 \quad (50)$$

That is, RTP (θ) has a one-to-one correspondence with the expected utility at steady state, $E[u(c^*)]$. As equations (5) and (10) indicate, a higher FI means a larger value of $W = E[u(c^*)]$, and by inequality (50), a lower RTP. The causality clearly runs from FI to RTP. Hence, fluid intelligence also significantly influences the formation of RTP.

Because W indicates steady state consumption, a larger W value means a better future in a sense, which means that an estimated brighter future lowers RTP. It seems highly likely that a higher FI causes a household to have a brighter outlook on the future, which in turn lowers its RTP.

As shown in Section 3.2, a household with a higher FI can realize a greater number of best-timing consumption opportunities. This also means that a higher FI indicates a brighter future. Because a household with a higher FI has a lower CWR at MDC, as shown in Section 3.4.3, a brighter future also means a lower CWR at MDC. The common property in determining RTP and CWR at MDC is therefore that both are governed by future prospects - particularly by an indicator that signals how optimistic a household's view of the future is - and fluid intelligence significantly influences this view.

Note that, in the above endogenous RTP model, technological progress does not affect the formation of RTP because W is not affected by it, as indicated in equation (44). As shown in Section 3.5, technological progress also does not affect CWR at MDC.

Also note that the above endogenous RTP model predicts that an increase in uncertainty about the future economy results in an increase in RTP (Harashima 2004, 2014). An increase in uncertainty will correspond to an increase in difficulty (\tilde{D}) in equations (22) and (27). An increase in \tilde{D} consequently decreases F and increases CWR at MDC by inequalities (24), (23), and (42). Hence, CWR at MDC and RTP also have this common property.

5.2. Indicator of a brighter future and impatience

RTP has been regarded as indicating the degree of impatience. However, the endogenous RTP model shown in Section 5.1 and by Harashima (2004, 2014) indicates that impatience may be irrelevant to RTP. Considering the nature of RTP as a “shadow” of CWR at MDC, however, we can still interpret RTP as an indicator of the degree of impatience.

As shown in Section 5.1, a higher FI leads to a brighter future and a lower CWR at MDC and RTP. It is highly likely that a household with a brighter future behaves less impatiently—in other words, it can tolerate more current displeasure. We can see this nature in the capital derived from motive (b). As discussed in Section 3.3.2.1, a household accumulates capital with motive (b) until it reaches its most comfortable combination of the additional

future increase and the present decrease in accessible consumption opportunities. In this model, some resources are not consumed at present to gain future rewards, which means that a household must exercise patience. A larger additional future increase means a brighter future, but it also means a larger amount of resources that has to be given up at present, and a brighter future means a higher degree of patience (*i.e.*, a lower degree of impatience). Hence, a lower CWR at MDC and RTP mean a lower degree of impatience. RTP as a shadow of CWR at MDC therefore still can be interpreted as an indicator of the degree of impatience. Nevertheless, the origin of impatience is not RTP (or CWR at MDC)—it is fluid intelligence, because a higher *FI* causes a lower RTP (or CWR at MDC).

Although RTP can be interpreted as an indicator of impatience, we cannot necessarily say that a household discounts its expected utilities with a constant RTP in every future period, as the RTP-based procedure indicates. Because of the nature of CWR at MDC, we can say that a household with a lower RTP (CWR at MDC) is less impatient overall, but we do not know whether its degree of impatience remains unchanged for any future period.

5.3. “True and correct” CWR at MDC

As discussed in 3.3.2.1, nobody knows whether the combination that a household subjectively feels to be most comfortable eventually is equal to the predetermined objectively true and correct most comfortable combination. If CWR at MDC is essentially determined by fluid intelligence, however, the objectively true and correct CWR at MDC itself may exist, because fluid intelligence is highly likely given by nature (*i.e.*, exogenously). Even if the objectively true and correct value does exist, a household still cannot know its objectively true and correct values of *FI* and CWR at MDC. It can only make its best estimate at several economic values and behave on the basis of whether its CWR at MDC is most comfortable in an uncertain environment.

Conclusion

RTP has been regarded to be negatively correlated with income, and many empirical studies have supported this correlation. A causality from income to RTP has generally been thought to exist, but the mechanism behind this causality has not been sufficiently explained theoretically.

In this paper, I examine this problem from a different point of view, one based on the concept of fluid intelligence in an economy under the MDC-based procedure (Harashima 2019). Fluid intelligence is a type of human intelligence, and its importance has been emphasized in psychology and psychometrics (*e.g.*, Cattell 1963, 1971). Harashima (2019) described the MDC-based procedure through which a household reaches a steady state and showed that households probably use this procedure rather than a RTP-based procedure, because the former is far easier to use than the latter and both procedures lead households to the same steady state.

I show that a higher fluid intelligence causes a lower CWR at MDC (RTP) and causes higher levels of productivity, labor income, capital income, and capital. Hence, CWRs at MDC (RTP) can be observed to be negatively correlated with labor incomes. CWRs at MDC (RTPs) may not be clearly observed to be negatively correlated with capital and capital income at SH, because SH affects capital accumulation in different ways across heterogeneous households. However, if a government intervenes up to the point at which the numbers of votes cast in elections in response to increases and decreases in the level of economic inequality are balanced, SH may not be achieved correctly. Therefore, negative correlations between the above factors may be still clearly observed.

In any case, however, the observed negative correlations are spurious and there is no direct causality between them. They appear to be correlated only because they are bridged by fluid intelligence.

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Create Competitive Advantage as a Strategy to Improve the Marketing Performance of Small Food Industry Business in Indonesia

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Abstract:

This research wants to prove that the development of product innovation, competitive advantage and effective strategies are critical to the company's success. The population of 8,701 small businesses Food industry. The number of samples was 382 respondents drawn proportionally from 12 cities. Criteria for respondents are business owners. It is proven that business strategy and market orientation are the determinants of the high performance of marketing companies in the food industry. The new findings in this study are that business strategy has no effect on competitive advantage, and competitive advantage has no effect on marketing performance. It was also found that the competitive advantage variable did not act as an intervening variable. Suggestions for companies to focus and increase competitive advantage with new product innovations that have a unique and funny shape, as well as innovation in production equipment using new technology.

Keywords: business strategy; product innovation; market orientation; competitive advantage; marketing performance.

JEL Classification: M21; M31.

Introduction

The company's ability to create competitive advantage is an important key to winning business competition. Competitive advantage can be achieved if the company is able to provide better value, than what is given by competitors. Competitive advantage can come from a variety of company activities such as in designing, producing, marketing, delivering, and supporting their products. Each of these activities should be directed to support the company's relative cost position and create differentiation from competitors (Slater and Narver 1995).

Problems that occur in the small food product industry include rising raw material prices, and decreasing consumer purchasing power. The increasingly fierce level of competition in the small food product industry occurs due to increased food industry entrepreneurs and reduced market share, thus requiring companies to implement strategies that are relevant to company conditions, and the changing environment. The company must keep trying to maintain its survival. The company's progress depends entirely on the company's ability to create and grow competitiveness that can adjust quickly to changes. Small businesses in the food industry in Indonesia experience significant turnover developments, especially in the months of Ramadan. This study will operate three variables: business strategy, product innovation, and market orientation as factors that influence competitive advantage, and marketing performance. Where this has become Novelty in this study.

1. Literature review and hypotheses

1.1. Business strategy

Strategy explicitly, is the key to success in dealing with changes that occur in the business environment. The strategy will provide unity of direction, for all members of the organization, and if the concept of strategy is not clear, then the decisions taken will be subjective, and only based on intuition and will ignore other decisions. Basically a marketing strategy is an integral part of business strategy, which provides direction to all management functions within an organization.

Business strategy is a means of the company that is used to achieve its objectives. The strategy implies management concepts from the business scope, mission, purpose, and purpose. Corporate strategy has an important role in maintaining the company (Cravens 2008). The company's strategy relates to a strategy in formulating the overall activities of the company (Bruche 2000). If the company has the same strategy as competitors, that means the company does not have a strategy.

Therefore, the company's business strategy should be based on the company's market position, and build the company's characteristics as a competitive advantage (Švárová and Vrchota 2014). Nwachukwu *et al.* (2017), states that systematic strategy formulation is needed to achieve and maintain performance marketing. According to Slávik *et al.* (2019), strategy adjustments will have an impact on business performance. Olson *et al.* (2005), Zhou *et al.* (2009), stated that overall company performance is influenced by how well the structural characteristics of marketing organizations, and the emphasis on strategic behavior, complements alternative business strategies. Each type of strategy requires a different combination of marketing, organizational structures, where strategic behavior is used to achieve success. According to Slávik *et al.* (2019), strategy adjustments will have an impact on business performance. Based on the description above, the hypothesis is as follows:

- H1: There is a significant positive relationship between business strategy and the competitive advantage of small food industry businesses
- H2: The business strategy has a significant positive relationship with the marketing performance of the small food industry business.

1.2. Product innovation

Product innovation is a breakthrough that is related to the creation of new products, which can bring products a step ahead of competing products. Business success will be achieved, when companies can quickly react to market changes, and consumer needs. In addition, the company continually seeks creative solutions, and continuously innovates products in accordance with market demand, thus the company must adapt and innovate at all times.

Product innovation as a process of using new technology into a product so that the product has added value (Lukas and Ferrel 2008, Hurley and Hult 2008, Kotler 2014). Product innovation will provide added value compared to similar products, and product innovation must have advantages compared to other similar products, thereby increasing sales (Cooper 2016, Li and Calantone 1998, Wahyono 2012, Collazos *et al.* 2018). The innovation process must be a top priority and carried out in a sustainable manner. Based on the description above, the hypothesis is as follows:

- H3: There is a significant positive relationship between product innovation and competitive Advantage of small food industry businesses.

1.3. Market orientation

Market orientation is concrete actions taken by the company in maintaining variations in market demand and supply, and trying to provide an appropriate response to various changes that may occur. The aim of the market orientation strategy is to shape the company's business and superior products, so that the company is able to achieve profit targets and grow. Market orientation as the ability of an organization to produce, disseminate, and use the best information about consumers and competitors (Richard 2005, Zainul *et al.* 2016, Talaja *et al.* 2017, Narver and Slater 1990, McNaughton *et al.* 2001).

Customer and competitor information is processed and forwarded through cross-functional coordination to create superior value for customers, because consumer decisions in buying a product are supported by a product expected value greater than other products, thus the company wants to create superior value for consumers to produce superior performance for the company, thus market orientation influences marketing performance. While Djunaedi *et al.* (2017), states that market orientation is one of the determinants of successful marketing performance. Based on the description above, the hypothesis is as follows:

- H4: There is a significant positive relationship between market orientation and the competitive advantage of small food industry businesses.
- H5: Market orientation has a significant positive relationship with the marketing performance of the small food industry business.

1.4. Competitive advantage

A superior company is a company that is able to create superior value, face competition, and breakthroughs that can be made by creating new products. The company's competitive advantage is the company's ability to create products that are more valuable and superior than its competitors, and that value should bring benefits to customers. A company's competitive advantage is a unique organizational position against its competitors, and the company's competitive advantage is largely gained from resources and capital (Colgate 1998).

Implementation of a strategy that utilizes a variety of available resources, is a competitive advantage of the company. His unique expertise and assets are seen as a source of corporate excellence (Bharadwaj *et al.* 1993, Ejrami *et al.* 2016, Storey and Kahn 2010). Li (2000), mentioned the positive contribution of competitive advantage, to the company's performance improvement. Dewi (2006), revealed that of two factors (market orientation, and product innovation), it is known that market orientation is the dominant factor influencing competitive advantage. Based on the description above, the hypothesis is as follows:

- H6: There is a significant positive relationship between competitive advantage and marketing performance of small food industry businesses.

1.5. Marketing performance

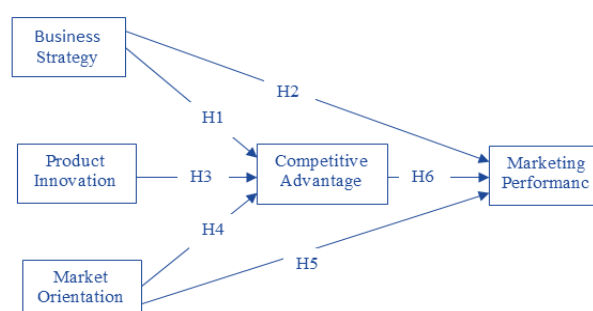
Marketing is a performance factor that is often used to measure the impact of the strategies implemented by the company in terms of its marketing aspects. Marketing performance is a measure of achievement obtained from the activities of the overall marketing process of a company. In addition, marketing performance can also be seen as a concept used to measure, to what extent market performance has been achieved by a product produced by the company (Voss and Voss 2000, Zhou *et al.* 2009).

Performance marketing has an impact on business performance, where business performance can be seen from customer satisfaction, customer loyalty, market share and quality. Customer satisfaction is an important measure of business performance. This measure provides factual information, to what extent the company carries out its activities, the main objective in business activities is to provide products that can satisfy customers. If the customer is satisfied, the company gains both short and long term benefits. Market share shows the market share of a product compared to similar products. If the market share increases, the company is superior to competitors, and vice versa. Baker *et al.* (1994) revealed that indicators of performance measurement and competitive advantage that are often used are market share and profitability. The market share is the market share percentage of similar products. Other marketing performance measurements that can also be used are pre-tax profits and sales growth (Li and Calantone 1998). Ejrami *et al.* (2016), mentions that marketing potential has an effect on competitive advantage, marketing capabilities have an impact on company performance, while competitive advantage can affect company performance. Handoyo (2015), revealed that marketing performance can be improved through competitive advantage, where competitive advantage will be created by product innovation.

1.6. Research framework and hypothesis

From the results of the discussion of several theories and the results of previous studies, a research concept framework was developed that explains the relationship between research variables. Figure 1 explains the relationship between variables in this study.

Figure 1. Research logic framework



2. Research methods

This research is a causal and explanatory study (Cooper and Emory 2005, Maholtra 2013). The research population was 8,701 Small Food Industry Enterprises in East Java, Indonesia. Analysis using SEM (Warp PLS). With the Slovin formula (Bungin 2011), the number of samples studied = 382 respondents. Samples for each city are determined by the Taro Yamane formula (Riduwan 2015) shown in Table 1. Using proportional random sampling, and the criteria of respondents are small food industry entrepreneurs, who is still actively operating.

Table 1. Distribution of research samples

No	Regency/City	Population (Food Industry Small Business)	Proportional number of samples
1	Madiun	827	36
2	Magetan	731	32
3	Tulungagung	657	29
4	Bojonegoro	718	32
5	Mojokerto	643	28
6	Kediri	763	34
7	Malang	871	38
8	Jember	705	31
9	Banyuwangi	612	27
10	Pamekasan	208	9
11	Surabaya	1203	53
12	Sidoarjo	763	33
Total		8.701	382

Source: East Java SME Cooperatives Office, 2017

3. Result and discussion

3.1. Descriptive data analysis

This study used a questionnaire instrument with a 5 level Likert scale. The variable business strategy uses 3 indicators adopted from Bruche (2000), namely: company goals, competitive environment, and customer satisfaction. Product innovation uses 3 indicators adopted from Wahyono (2012), Han *et al.* (1998), namely: product superiority, product similarity, and product costs. Market orientation uses 3 indicators adopted from Kohli and Jaworski (1990), Zainul *et al.* (2016), namely: customer orientation, competitor information, and cross-functional coordination. Competitive advantages use 4 indicators adopted from Droge *et al.* (1994), Song and Parry (1997), namely: product uniqueness, imitability, product quality, and competitive prices. Marketing performance uses 4 indicators adopted from Bharadwaj *et al.* (1993); Zhou *et al.* (2009), namely: sales volume, the sales growth rate, customer growth, and ability to generate profits.

Table 2. Characteristics of respondents (N = 382)

Characteristics		Frequency	Percent
Gender	Male	188	49,2
	Female	194	50,8
Age (years)	≤ 20	047	-
	21 - 35	206	12,3
	36 - 50	129	54,0
	≥ 51	-	33,7
	Education	Middle School	109
	High school	142	28,5
	Diploma	131	37,2
	Bachelor	084	34,3
Long time trading (years)	< 1	096	22,0
	1 - 3	158	25,0
	4 - 5	044	41,4
	> 5		11,6

Source: SPSS Analysis

Descriptive data analysis of 382 respondents (Table 2), showed that: According to gender, it was dominated by men, which was 50.8% compared to women 49.2%. Based on age, it can be seen that respondents aged less

than 20 years are absent, ages 20-35 years are 12.3%, respondents aged 36-50 years are 54.0% and in the age range > 50 years are 33.7%. The majority of respondents' education level is Diploma, which reaches 37.2%, while the rest in Bachelor education is 34.3%, 28.5% High School, and there are no Junior High School.

3.2. Instrument test

The instrument test results in Table 3, show that the Pearson correlation value is greater than 5.0, and the alpha coefficient value is greater than 0.6. This informs that the instrument is valid and reliable.

Table 3. Instrument test results

Research variables	Indicator	Question Number	Pearson correlation	Coefficient Alpha (α)
Business Strategy	BS1	01-03	0,667**	0,832
	BS2	04-06	0,712**	
	BS3	07-10	0,814**	
Product Innovation	PI1	11-14	0,672**	0,754
	PI2	15-17	0,806**	
	PI3	18-20	0,683**	
Market Orientation	MO1	21-24	0,722**	0,782
	MO2	25-27	0,714**	
	MO3	28-30	0,721**	
Competitive Advantage	CA1	31-33	0,824**	0,729
	CA2	34-36	0,776**	
	CA3	37-39	0,843**	
	CA4	40-43	0,796**	
Marketing Performance	MP1	44-46	0,826**	0,834
	MP2	47-49	0,847**	
	MP3	50-53	0,846**	
	MP4	54-57	0,798**	

Note: ** Correlation is significant at the 0.01 level (2-tailed).

3.3. Analysis of the research model

Model analysis is performed to determine the entire model (Inner and Outer). Table 4, informs that all indicator variables are significant. That is, each indicator can explain the construct variable.

Table 4. Model analysis results

Research variables	Relationship	Loading Factor (λ)	SE.	Probability
Business Strategy	B_Str → BS1	0.909	0.046	0.000
	B_Str → BS2	0.844	0.045	0.000
	B_Str → BS3	0.840	0.045	0.000
Product Innovation	P_Inov → PI1	0.698	0.049	0.000
	P_Inov → PI2	0.754	0.045	0.000
	P_Inov → PI3	0.750	0.045	0.000
Market Orientation	M_Orie → MO1	0.736	0.045	0.000
	M_Orie → MO2	0.735	0.045	0.000
	M_Orie → MO3	0.808	0.046	0.000
Competitive Advantage	C_Adv → CA1	0.669	0.045	0.000
	C_Adv → CA2	0.753	0.046	0.000
	C_Adv → CA3	0.675	0.049	0.000
	C_Adv → CA4	0.763	0.046	0.000
Marketing Performance	M_Perf → MP1	0.746	0.047	0.000
	M_Perf → MP2	0.829	0.046	0.000
	M_Perf → MP3	0.834	0.047	0.000
	M_Perf → MP4	0.738	0.047	0.000

Note: B_Str = Business Strategy; P_Inov = Product Innovation; M_Orie = Market Orientation; C_Adv = Competitive Advantage; M_Perf = Marketing Performance.

Source: SEM data analysis.

3.4. Testing the validity of variables

The variable validity test is done by convergent validity test and discriminant test. Table 5, informs that the average variance value extracted (AVE) shows a value greater than 0.5. This means that all convergent measures of variable validity are eligible.

Table 5. AVE value and correlation between latent variables

Variable	AVE	B_Stra	P_Inov	M_Orien	C_Adv	M_Perf
B_Stra	0.695	0.834	0.139	0.186	0.182	0.503
P_Inov	0.521	0.139	0.722	0.503	0.722	0.205
M_Orie	0.672	0.186	0.503	0.820	0.524	0.373
C_Adv	0.522	0.182	0.550	0.524	0.750	0.286
M_Perf	0.565	0.503	0.205	0.373	0.286	0.682

Source: WrapPLS output

Table 5, informs that the value of the diagonal block is greater than the value of the same block. This means that all research variables, meet the discriminant validity criteria.

3.5. Research variable reliability test

Reliability tests are measured by two criteria (composite reliability and Cronbach's alpha). Table 6 informs that all research variables have a composite reliability, value ≥ 0.7 and Cronbach's alpha is ≥ 0.6 . This means that the structural model used is appropriate.

Table 6. Reliability test results

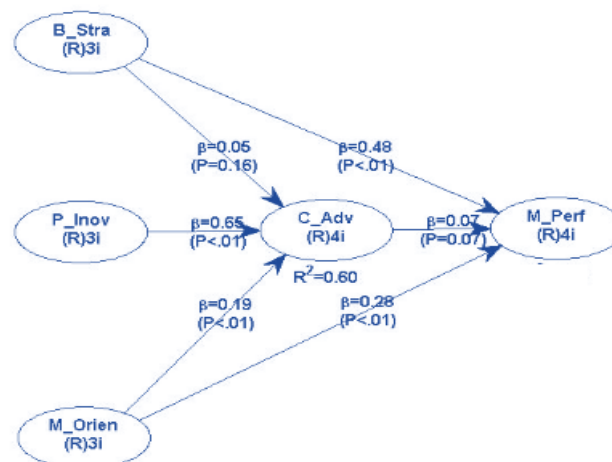
Variable	Reliabilities	
	Composite Reliability	Cronbach's Alpha
Business Strategy	0.872	0.779
Product Innovation	0.742	0.594
Market Orientation	0.859	0.753
Competitive Advantage	0.800	0.659
Marketing Performance	0.773	0.605

Source: WrapPLS output

3.6. Evaluate the model's goodness of fit

With the sample data of 382, the result of WrapPLS analysis shows APC value = 0.287, ARS value = 0.495, AARS value = 0.491 with a significance of 0.000. This means that the research model is good enough to explain the phenomenon under study (the accepted model).

Figure 2. The path coefficient of the research model



3.7. Hypothesis testing

By considering the estimated value of the parameters of the research model (Table 7), the hypothesis testing is carried out as follows.

Table 7. Hypothesis testing

H	Relationship	Standardized Coefficient	SE	P	Decision
H1	B_Stra → C_Adv	0.051	0.051	0.157	Reject
H2	B_Stra → M_Perf	0.478	0.048	0.000	Accepted
H3	P_Inov → C_Adv	0.653	0.047	0.000	Accepted
H4	M_Orie → C_Adv	0.188	0.050	0.000	Accepted
H5	M_Orie → M_Perf	0.282	0.050	0.000	Accepted
H6	C_Adv → M_Perf	0.074	0.051	0.073	Reject

Source: WrapPLS output

Table 7, informs that business strategy has no effect on competitive advantage (0.051, 0.051, 0.157). This means that hypothesis 1 is rejected. Business strategies affect marketing performance (0.478, 0.048, 0.000) This means that hypothesis 2 is accepted. Product innovation affects competitive advantage (0.653, 0.047, 0.000). This means that hypothesis 3 is accepted. Market orientation influences competitive advantage (0.188, 0.050, 0.000). This means that hypothesis 4 is accepted. Market orientation influences marketing performance (0.282, 0.050, 0.000). This means that hypothesis 5 is accepted. Competitive advantage has no effect on marketing performance (0.074, 0.051, 0.051). This means that hypothesis 6 is rejected.

4. Discussion

H₁ shows that a business strategy does not affect the company's competitive advantage. This result means that the business strategy implemented by the small food industry in East Java has not been able to shape and increase the company's competitive advantage.

Therefore, the small food industry still needs to study more about the business strategy as it should be done. The dominant indicator that forms a business strategy variable is an indicator of company objectives followed by competitive environment indicators, and finally an indicator of customer satisfaction. Not the dominant indicator of customer satisfaction, the company deserves more attention to customer satisfaction. Paying attention to customer satisfaction can be done by serving customers well, politely, creating and delivering superior quality products to consumers. Management should also inform each employee that customer satisfaction is the main goal of the company and all employees to serve consumers with all their heart. Companies also need to develop business strategies by always making product innovations and service innovations to maintain customer satisfaction, as a means of increasing competitive advantage.

H₂ shows that business strategy influences marketing performance. The results of this verification mean that the business strategy implemented by the small food industry in East Java has been able to increase the company's marketing performance. This result also informs that some of the food industry business objectives have been achieved, where the food products produced already have advantages compared to other food products, although the achievement of this success is still not optimal. Therefore, the influence of business strategy on marketing performance still needs to be improved, and to improve it, it can be done through new product and market expansion. The strategy includes adding products and expanding markets related to small food industry businesses, as well as to new products and markets. The main success of a business strategy is to be able to combine competitive advantage with existing opportunities, to achieve customer satisfaction in the long run. The results of this study are in accordance with the findings of Olson *et al.* (2005).

H₃ shows that innovative products affect consumer competitive advantage. The results of this evidence mean that product innovation that has been carried out by small food industry businesses in East Java has been able to increase competitive advantage. The results of this verification also explain that product innovation is one that consumers consider when buying food. Therefore, the company should conduct continuous innovation products. Product innovation can be done through cultural innovation by creating new products, which follow market tastes, and keep up with the times so companies can excel with competitors. Technical innovation where companies try to create new products with the latest technology machines. The dominant indicators that make up product innovation variables are product similarity indicators followed by product cost indicators, and finally indicators of product excellence. Product superiority can be done by producing superior quality products, thereby satisfying consumers, and according to consumer desires. These results are in accordance with the opinions of Song and Parry (1997), Li and Calantone (2008). That the advantages of new products include unique designs, novelty and cost efficiency.

H₄ shows that market orientation influences the company's competitive advantage. The results of this verification mean that market orientations that have been run by small food industry businesses in East Java have been able to increase the small industry competitive advantage of food. The evidence also informs that small food

industries in East Java have been able and successful in disseminating and using important and best information about consumers, competitors and also understanding the conditions of the target market. This can help companies develop strategies, by taking advantage of existing opportunities and rejecting threats that come. Strategic planning and implementation of market-oriented small-scale food industry business is a managerial process to be able to develop and maintain that the goals, expertise, and resources of small-scale food industry businesses can match changing market opportunities, where the purpose of strategic planning is to shape and refine the organization and company product innovation so as to meet marketing performance targets, profits and the company will continue to grow. The results of this study are in accordance with the findings of Suharto and Subagja (2018). The results of this study are different from the findings of Zainul *et al.* (2016), which shows market orientation does not have an impact on competitive advantage.

H₅ shows that market orientation affects the company's marketing performance. The results of this verification mean that market orientations carried out by small food industry businesses in East Java have been able to increase the company's marketing performance. The evidence also informs that small food industries in East Java have been able and successfully implemented orientation strategies for customers and have been able to identify the needs and desires of consumers, so that small food industry businesses are able to bring up product solutions according to the needs and wants of consumers. The dominant indicators that form the variable market orientation are cross-functional coordination indicators, competitor orientation indicators and finally customer orientation indicators. Dominating the coordination indicators across these functions, companies deserve to pay great attention to the issue of coordination across these functions. This can be done by conducting cross-functional coordination in all parts that have an impact on creating high value for buyers. Orientation to competitors also needs to be taken into account in anticipation, because understanding the strengths and weaknesses of a competitor's company can design a strategy that can be used as a superior strategy. The results of this study are in accordance with the findings of Lapian *et al.* (2016), Talaja *et al.* (2017), that market orientation and product innovation affect marketing performance. Handoyo (2015), market orientation and customer innovation affect marketing performance.

H₆ shows that competitive advantage does not affect the company's marketing performance. The results of this verification mean that the company's current product competitive advantage has not been able to increase the company's marketing performance. This shows that food products produced by small businesses in East Java do not have advantages compared to other similar products. Therefore, the company should plan and create new products that are innovative and unique from existing products. This can be done by producing food products that have various flavors and various interesting forms. For example, chocolate flavor, various fruit flavors, and others. Thus the product development of the innovation carried out has advantages over the previous products. The dominant indicators that form competitive advantage variables are competitive price indicators, followed by indicators of imitability, product quality indicators, and finally indicators of product uniqueness. Not the dominant indicator of product uniqueness, the company deserves more attention to the problem of product uniqueness. The uniqueness of the product can be done by producing foods with unique designs and taste innovations that can be done by combining several flavors into one. The results of this study are different from the findings of Ejrami *et al.* (2016), which shows that competitive advantage influences company performance.

Conclusions and Recommendations

This research proves that business strategy and market orientation are the determining variables for the high performance of marketing companies in the food industry. This study also found that business strategy has no effect on competitive advantage, and corporate competitive advantage has no effect on marketing performance. This study is also able to explain that the competitive advantage variable does not play an intervening variable in the relationship between business strategy, product innovation, and market orientation with the marketing performance of food industry companies.

It is recommended for small food industry business management, it is better to pay attention and increase competitive advantage which until now has not shown a positive impact on the company's marketing performance, which is a new finding in this research. To increase competitive advantage, it can be done by creating new product innovations that have a unique and funny shape, which can attract the attention of consumers, which have an impact on product performance and increase business performance. Innovating production equipment with the use of new technology. Cooperating with other companies that aim to create a competitive advantage together.

This discussion only focuses on the variables of business strategy, product innovation, market orientation, and competitive advantage, and there are still many other variables that can affect marketing performance.

Therefore, further research can be continued on variables not yet covered in this paper, for example by including the characteristics of the target market.

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The Dynamics of Economic Growth and Development Inequality in Borneo Island, Indonesia

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Abstract:

Every economic development expects high economic growth and inter-provincial equality on Borneo Island in 2014-2018 to experience fluctuating and increasing economic growth. Economic growth seems to be uneven and the difference in GRDP per capita is quite striking in the region. This shows the imbalance between Borneo Province. The purpose of this study was to analyze the imbalances that occurred between the Provinces of Borneo during the observation period. The data used in this study are based on secondary data and the analysis model used is the Klassen Typology and the Williamson Index. The results showed that of the 5 objects, having an inequality index that was greater than the average reference area (Borneo Island) there were 2 Provinces (West and East Borneo). Economic development, initiated by the government, was not sustained without limited liability corporations and capitalist markets due to the inefficiencies associated with government planning and resulting bureaucracies without any other mechanisms to correct them.

Keywords: economic growth; inequality; Klassen typology; Williamson index.

JEL Classification: O11; R11; D63.

Introduction

Economic development is a multifaceted and multidimensional process in terms of its substance, characteristics, and goals. While the traditional indicators of economic development, such as economic growth, is still important, there are other factors of development that are not necessarily captured by economic growth and the

improvement of overall economic efficiency, such as relief of poverty, inequality, and unemployment (Seers 1979). Additional development goals include better education, higher standards of health and nutrition, a cleaner environment, more equality of opportunity, greater individual freedom, and a richer cultural life (World Bank 1991). However, for conceptual clarity, there should be a distinction between economic development and development in a broader sense encompassing non-economic values and goals, and these additional development goals are more appropriately included in the latter (Lee 2017). This section discusses the three essential components of economic development; *i.e.*: “growth”, “distribution”, and “innovation”.

However, many other developing countries adopting this policy were not as successful; simply increasing capital for investment did not lead to sustained growth. The question was how to use the capital in an economy that consists of a combination of interrelated production processes (Romer 1986). New theories also emphasize factors other than capital as a source of growth; according to the new growth theory, growth results from increasing returns to the use of knowledge rather than labor and capital and lower levels of investments in human capital (education), infrastructure, or research and development (R&D) also erode growth potential. The theory of coordination failure explains the relationship between investment in human capital and capital for investment. This theory indicates that investment may not occur, even if capital is available, when returns of an investment depend on the presence or extent of other investments and an investor does not believe that the other investors will make the needed investment; *i.e.*, coordination failure occurs, and growth potential does not realize (Glăvan 2008). This suggests a role for the government in coordination and provides support for state-led development policies, including state investments in education, infrastructure, and R&D.

The development of the provinces on Borneo since the 2000s and decentralization are thought to have pushed inequality between regions wider. Inequality has both positive and negative impacts. The positive impact of inequality is that it can encourage other less developed regions to be able to compete and increase their growth to improve their welfare. Meanwhile, the negative impacts of extreme inequality include: economic inefficiency, weakening social stability, solidarity, and high inequality which are generally seen as unfair (Todaro and Smith 2003).

Gross Regional Domestic per capita is one of the tools to determine the level of welfare of a population in a province, where if the larger GRDP per capita can be interpreted the better the level of welfare of the people. Conversely, on the contrary, getting a smaller GRDP, it can be interpreted the worse the level of welfare of its people. Certain regions that experience higher economic growth than other regions, there will be an increase that continues to increase because many residents from other regions continue to move to these areas. This condition occurs because there is a pull of more job opportunities in the urban area. Urban areas continue to develop rapidly because potential resources continue to advance to developed areas as centers of growth with higher economic growth. This condition then causes the growth of the center to increase even higher because it is supported by the potential of the resources that have been moved.

Table 1 shows the total GRDP per capita on Borneo Island in 5 years has increased, the highest in 2018 (Rp. 188.70 billion) and the lowest Rp. 174.52 billion in 2014. However, when viewed by region, there are 4 out of 5 provinces on the island of Borneo, which on average The per capita GRDP looks far away, namely: West Borneo (Rp. 22.93 billion), Central Borneo (Rp. 29.23 billion), South Borneo (Rp. 24.85 billion), and North Borneo (Rp. 33.98 billion). Meanwhile, from an average of Rp 182.88 billion, East Borneo is a province with the highest per capita GRDP with an average achievement of Rp 71.89 billion.

Table 1. GRDP per capita between provinces on Borneo, 2014-2018 (billion rupiahs)

Province	Year					Average
	2014	2015	2016	2017	2018	
West Borneo	22.70	23.09	23.22	23.12	22.52	22.93
Central Borneo	26.71	28.03	29.33	30.47	31.63	29.23
South Borneo	22.63	23.74	24.85	25.97	27.04	24.85
East Borneo	71.63	72.39	72.29	72.38	70.76	71.89
North Borneo	30.85	32.41	34.01	35.87	36.75	33.98
Borneo (total)	174.52	179.66	183.70	187.81	188.70	182.88

Source: BPS-Statistics Indonesia 2019

Achievement of per capita GRDP value in the Province of East Borneo is due to greater revenues from the oil and gas sector because it is an oil-producing province for the island of Borneo. Besides, the high flow of foreign investment is investing in the region by opening their companies.

The development aims to equalize the results of economic development, but in reality, many deviations occur, so that the results of development have not been enjoyed by residents on the island of Borneo equally. Inequality has been ongoing and manifested in various forms, aspects or dimensions. The development imbalance between provinces in Borneo is caused by various obstacles, both in terms of investment, as well as the potential of natural resources owned by each region that are not the same. This research was conducted to determine the dynamics of economic growth and inequality that occurred between the Provinces of Borneo Island in 2014-2018.

The poverty decrease in Indonesia is still dominated by monetary policy, *i.e.* the inflation stability as one indicator of Indonesian macroeconomic stability. However, fiscal policy doesn't really contribute to the poverty rate decrease even though the government budget for community empowerment programs is huge but it misses the target (Tanjung *et al.* 2019).

1. Related literature

1.1. Economic growth

Economic growth or "growth," measured by increases in gross national income (GNI) or gross domestic product (GDP) is a traditional criterion for economic development (Todaro and Smith 2009). Growth alone is neither equated with successful economic development nor translated into the achievement of other objectives of economic development (Seers 1969). Nonetheless, growth is significant because it creates an essential economic foundation for a country to meet the other objectives of economic development, such as poverty relief, increased employment, and higher income for the majority of population. Earlier development theories considered growth a function of investment (Domar 1947) and postulated that growth requires capital formation through raising domestic savings and acquiring foreign capital (particularly when there was a shortage of domestic savings). Development economists, such as Rosenstein-Rodan and Hirschman, supported coordinated investment programs to promote economic development. State-led development policies of East Asian countries, such as South Korea, Taiwan, Singapore, and China, were consistent with this policy prescription emphasizing investment and achieved remarkable success.

Kuznets (1955), who has been instrumental in pioneering the analysis of historical growth patterns in developed countries, states that in the early stages of growth, income distribution tends to deteriorate, but in later stages, it will improve. This observation came to be widely known as the concept of the inverted "U Kuznets" curve (Todaro 2000). The polar theory of growth popularized by Perroux (1970) states that growth does not appear in various regions at the same time. Growth only occurs in several places which are the center (poles) of growth with different intensities.

To find a picture of the pattern and structure of regional economic growth, Klassen's typology can be used as an analysis tool. Sjafrizal (1997) explains that by using this analysis tool, four growth classifications for each region can be obtained, is: rapid growth region, retarded region, growing region, and relatively backward region. Aswandi and Kuncoro (2002) use this analysis tool to classify an area into four groups, namely: low growth, high income; high growth, high income; high growth, low income; and low growth, low income.

1.2. Economic income inequality

Various studies on regional disparities have been carried out. Kuznets (1955) was noted as one of the earliest researchers in researching inequality. He examined the disparity in various countries in a cross-sectional way and found a pattern of "U inverse". Kuznets concluded that the average per capita income at the beginning of the country's development was still low, and the level of inequality was also low. When the average income rises, the gap also increases. Then when the average income rises higher, the gap will fall again (Todaro and Smith 2004).

These empirical formulations brought forth a generation of growth and development theories whose object was to explain the stylized facts. Kaldor himself presented a growth model which claimed to produce outcomes consistent with constancy of factor shares, as did Robert Solow. Kuznets also developed a model of rural-urban transition consistent with his prediction, as did many others (Kanbur 2012).

However, the Kaldor-Kuznets stylized facts no longer hold for advanced economies. The share of capital as conventionally measured has been on the rise, as has interpersonal inequality of income and wealth. Of course, there are variations and subtleties of data and interpretation, and the pattern is not uniform. But these are the stylized facts of our time. Bringing these facts centre stage has been the achievement of research leading up to Piketty (2014).

The new realities of high inequality have revived old debates on policy interventions and their ethical and economic rationale (Stiglitz 2012). Standard analysis which balances the tradeoff between efficiency and equity

would suggest that taxation should now become more progressive to balance the greater inherent inequality against the incentive effects of progressive taxation (Kanbur and Tuomala 1994).

One counter argument is that what matters is not inequality of “outcome” but inequality of “opportunity”. According to this argument, so long as the prospects are the same for all children, the inequality of income across parents should not matter ethically. What we should aim for is equality of opportunity, not income equality. However, when income inequality across parents translates into inequality of prospects across children, even starting in the womb, then the distinction between opportunity and income begins to fade and the case for progressive taxation is not undermined by the “equality of opportunity” objective (Wagstaff and Kanbur 2015).

2. Methodology

2.1. Data

Secondary research-based supporting data in the form of time-series data obtained from the Indonesian Central Statistics Agency. The data analyzed are data on Gross Regional Domestic Product without oil and gas (at constant prices) in 2014 - 2018.

The method of data collection is done by the documentation method that is looking for data about things or variables in the form of notes, transcripts, books, newspapers, magazines, and *etc.* (Arikunto 2002). This study documents statistical data that are publications from government agencies.

2.2. Analysis model

The analytical model used is descriptive analysis with a regional economic analysis approach. Analysis of the data used following the objectives of this study is the Klassen Typology and the Williamson Index. To find out the pattern of economic growth between the Provinces on Borneo Island, the Klassen Typology was used. This analysis model was developed to find a picture of the patterns and structures of economic growth in each region (Klassen 1965). Klassen's typology divides regions based on two main indicators, namely regional economic growth and regional per capita income. By determining the average economic growth as a vertical axis and average per capita income as a horizontal axis, the observed area can be divided into four classifications, namely: rapid growth region, retarded region, growing region, and relatively backward region (Sjafrizal 1997).

Table 2. Grouping regional development based on Klassen typology

GRDP per capita Growth rate (r)	(y)	$y_i < y$	$y_i > y$
$r_i > r$		Quadrant II - Growing region	Quadrant I Rapid growth region
$r_i < r$		Quadrant III - Relatively backward region	Quadrant IV Retarded region

Noted: y_i (per capita income between provinces), y (Borneo per capita income), r_i (GRDP growth rate between provinces), r (Borneo PDRB growth rate).

Source: Sjafrizal (1997)

The rate of economic growth is determined by the rate of increase of goods and services produced in an area. Economic growth shows the extent of the performance or activities of various economic sectors. Economic growth is measured through indicators of GRDP growth from year to year. The rate of economic growth can be calculated with a simple formula:

$$g = \frac{GRDP_1 - GRDP_0}{GRDP_0} \times 100\% \quad (1)$$

If the economic growth (g) is negative, it means that the $GRDP_1$ of the particular observation year is smaller than the previous year's $GRDP$, on the contrary, if the economic growth (g) is positive means the $GRDP_1$ of the previous year certain observations were greater than the previous year's $GRDP_0$. In essence, regional income does not always increase every year. Positive growth indicates an improvement in economic conditions that occur, on the contrary, if negative growth means a decline in economic performance and activity.

Williamson (1965) examined the relationship between regional disparities with the level of economic development, using data from advanced economies and developing economies, it was found that during the initial stages of development, regional disparities became greater and development was concentrated in certain

regions. At a more mature stage of economic growth, it appears that there is a balance between regions and the disparity is reduced significantly.

To find out the disparities in development between regions, it can be analyzed using a regional inequality index called the Williamson Index. In measuring Provincial GRDP inequality, Ying (2000) uses a regional inequality index. Theil's regional inequality index can be divided/broken down into two sub-indications namely regional imbalances within the region and regional disparities between regions or regions.

To find out the inter-development disparities that occurred between Provinces on the island of Borneo during 2014-2018, it can be analyzed using the Williamson Inequality Index (Sjafrizal 1997):

$$IW = \frac{\sqrt{(\sum(Y_i - \bar{Y})^2 \cdot f_i/n)}}{\bar{Y}} \quad (2)$$

where: IW (Williamson Index), y_i (Provincial GRDP per capita), \bar{y} (average GDP per capita of all regions in Borneo), f_i (total population of the Province), n (population of all regions in Borneo).

The Williamson Index ranges from $0 < IW < 1$, were getting closer to zero means that the region is less imbalanced. Meanwhile, when approaching one, the imbalance in the area under study (Sjafrizal 2008).

The allocation of development budgeting as an instrument to reduce economic inequality seems to need more attention in the future. The budget allocation strategy must encourage and accelerate national economic growth while at the same time becoming a tool to reduce regional disparities (Majidi 1997).

Excessive differences in the level of economic progress between regions will cause backwash effects to dominate the spread effects on regional growth, in this case resulting in an imbalance process (Myrdal 1957). Actors who have power in the market normally will tend to increase rather than decrease, resulting in regional disparities (Arsyad 1999).

3. Empirical findings

3.1. Analysis of regional economic growth

Klassen's typology can be used to identify priority sectors or sub-sectors, businesses or commodities of a region. This analysis tool can be used through two approaches, the first is a sectoral approach and a second approach is a regional approach such as to find out the classification of regions based on two main indicators, namely economic growth and income or regional per capita GRDP. By determining the average economic growth as a vertical axis and the average per capita GRDP as a horizontal axis, the regional approach produces four regional classifications, each of which has different economic growth characteristics.

Table 3. Klassen typology calculation results between provinces on Borneo, 2014-2018

Province	Economic growth (%)	Income per capita (Rp billion)	Quadrant
West Borneo	2.40	22.93	III
Central Borneo	5.90	29.24	II
South Borneo	6.00	24.85	II
East Borneo	2.95	71.89	IV
North Borneo	6.66	33.98	II

Source: BPS-Statistics Indonesia, 2019

Tables 3 and 4 show that East Borneo (Quadrant IV) is a developed region, but is depressed. This province is a relatively developed area but within a few years experienced relatively small growth, due to depressed main activities of the region concerned.

Quadrant II is dominated by Central Borneo, South Borneo, and North Borneo. This means that the region is a fast-growing province. The provinces included in this category are regions that have great potential but have not been well managed so that even though their growth is fast, their income is still below average income. This indicates that the income of the three regions is still relatively low compared to other provinces, so the future must continue to be developed to obtain income that is no longer relatively low.

West Borneo (Quadrant III) is classified as a relatively underdeveloped region. The regions included in this category are provinces that are economically very disadvantaged, both in terms of economic growth and per capita income. In other words, the Province in this category is the province with the worst conditions compared to other regions on the island of Borneo.

In Quadrant I, no reference area is classified as a fast-growing and fast-growing Province. Provinces that are categorized as fast-growing and fast-growing regions are generally regions that are advanced both in terms of development or speed of growth.

Table 4. Recapitulation of quadrant areas on Borneo, 2014-2018

GRDP per capita (y) Growth rate (r)	$y_i < y$	$y_i > y$
$r_i > r$	Quadrant II - Central, South, and North Borneo	Quadrant I
$r_i < r$	Quadrant III - West Borneo	Quadrant IV - East Borneo

Source: Author's calculation, 2020

The three aspects of planning that have always been applied as a reference in development, is macro planning, sectoral planning, and regional planning which are all arranged in a single unit. This publication is intended specifically to support regional planning, especially to see the achievement of the GRDP figure which is the total added value created as a result of sectoral activities in processing goods and services from 5 Provinces on the island of Borneo during the study period (2014-2018).

Each of these regions has different characteristics from each other. This difference can cover the area, population, natural resources owned, facilities, and transportation facilities which will then influence the development of each region. Therefore, by using the Klassen Typology approach a mapping of the conditions of all research objects can be carried out so that the characteristics of each region can be known.

Empirical findings are consistent with previous research developed by Khusaini *et al.* (2018). The results show that trade openness can improve inequality but at the same time impede growth. The effect of fiscal policy on reducing inequality is only generated by tax collection but is temporary. Meanwhile, government spending on infrastructure and health proved to encourage growth. On the other hand, education sector spending and tax collection can actually hamper growth.

3.2. Analysis of the level of inequality between regions

In this study, economic inequality is measured by the Williamson Index which is used to see the percentage of inequality starting from 0 to 1. It appears that the development of economic inequality in the 5 Provinces (Borneo Island) tends to vary from one another. Of the 5 regions, there are 2 which have an inequality index above the average, namely West Borneo and East Borneo. On one hand, the 3 reference regions have below-average inequality indexes, is: Central Borneo, South Borneo, and North Borneo.

This indicates that the level of development imbalance in the Provinces is relatively greater than that of Borneo. Table 5 shows the results of the calculation of economic inequality between regions. If seen from the average WI achievements during 2014-2018, the provinces with the highest were in West Borneo (0.706) and East Borneo (0.698). Meanwhile, the lowest average index is South Borneo Province (0.361).

The GRDP index per capita inequality between provinces on the island of Borneo during 2014-2018 with an average of 0.526 (quite high). If seen from these figures, it can be seen that there is a considerable distance between the provinces with the highest inequality and the provinces with the lowest inequality during the study year. This indicates that inequality on the island of Borneo is uneven and there is a wide gap between rich and poor areas.

Comparison of development on the island of Java with other islands that are very far away makes the island of Java more densely populated while other islands such as Borneo and other large islands are increasingly left behind. Not long ago, we heard that Indonesians who were on the border with Malaysia preferred to become citizens of neighboring countries because the facilities they needed were closer to neighboring countries than in their own country, this also became an unavoidable population problem due to uneven development. in various regions in Indonesia.

Table 5. Recapitulation of WI values between provinces in Borneo, 2014-2018

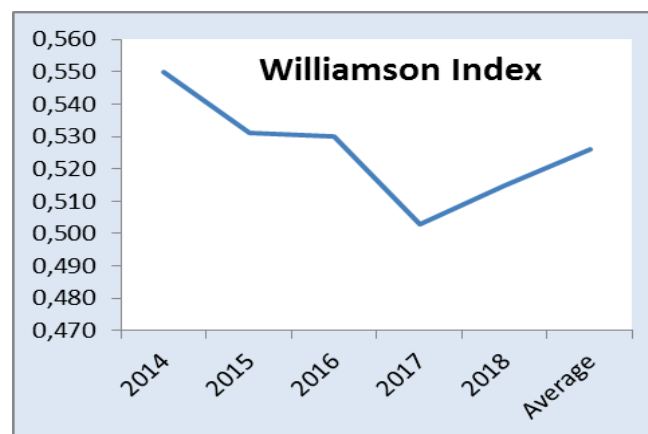
Province	Year					Average
	2014	2015	2016	2017	2018	
West Borneo	0.835	0.744	0.707	0.650	0.592	0.706
Central Borneo	0.432	0.472	0.519	0.484	0.524	0.486
South Borneo	0.361	0.354	0.357	0.351	0.380	0.361
East Borneo	0.744	0.710	0.698	0.662	0.678	0.698
North Borneo	0.377	0.374	0.370	0.368	0.402	0.378
Borneo	0.550	0.531	0.530	0.503	0.515	0.526

Source: Author's calculation, 2020

The effort carried out by the government to smooth the population of Indonesia is through resettlement or what is called transmigration. Some residents from areas that are densely populated, moved to areas that are still empty or lacking in inhabitants. It can be seen that the decline in community self-help presentations compared to funds from central assistance, this is due to the problem of the rural economy itself in the village, experiencing a striking change: modernization of agriculture brings higher production, migration to the city results in labor shortages in several places, and turns back resulting in further mechanization. The nature of rural agriculture in the nineties was completely different from the general pattern prevailing in 1970.

At that time the rhythm of life and the rhythm of work depended on the monsoon, which determined when people could plant and harvest, but the most striking was the rural urbanization, due to contact with the city becomes stronger then daily life and Repelita III transmigration program becomes a priority in the distribution of population, because the government policy regarding the transmigration program has the expected impact of creating a prosperous and prosperous society. Furthermore, in the framework of implementing more equitable national development throughout the region, efforts will be made to harmonize the growth rates between regions, among others in increasing inter-regional and inter-island transportation, providing assistance and stimulation to increase development of relatively backward regions, and a more even distribution of population through transmigration, where the area of origin was not promising, and towards new areas is very promising for their future.

Figure 1. Williamson index between provinces in Borneo, 2014-2018



The results of this analysis, supported by research Amos Jr (1988) which states it is hypothesized that once the inverted-U pattern is completed, regional income inequality incentives, rather than remaining stable. Four analyzes of infrastructure per capita income inequity among countries are undertaken to test the hypothesis that regional inequality increases. Results indicate strong support for the hypothesis that regional income inequality increased in the latter stages of development.

Conclusion

Conclusions that can be drawn based on regional typologies on the island of Borneo can be classified based on growth and income per capita into four groups namely East Borneo Province (Quadrant IV), including developed, but depressed areas. The provinces of Central Borneo, South Borneo and North Borneo (Quadrant II) are fast-developing regions, while East Borneo Province (Quadrant III) is a relatively underdeveloped region.

Economic inequality between regions based on per capita GRDP values in 5 Provinces (Borneo Island) during the 2014-2018 period from the Williamson Index, three regions have below average averages index and two regions with an average index above the island average index Borneo.

State industrial policy, as a coordinator of market failure and a facilitator of industries, as well as political leadership are important for economic development, regardless of governance style.

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Deposit Interest Rates Dynamics in Indonesia: A Quadratic Cost Function Approach with Twin Shock Variables

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Abstract:

The purpose of this study is to estimate the deposits interest rate dynamics using quadratic cost function approach with twin shock variable (economic and foreign exchange fluctuations). Using this approach, a backward- and a forward-looking model with twin shock variables may be derived. Based on non-nested test, the empirical studies reveal that the two models can not be discriminated or the results are inconclusive. With respect to the level of development of financial feature in Indonesia, the results may allow us to suggest that the future forcing variable and twin shock variables can be potentially key variable of the deposit interest rates dynamics in Indonesia. The findings may indicate that in the short- and long-term, the inflation rate, the twin shock variables (economic fluctuations and exchange rate shock) have a positive effect on the deposit interest rates in Indonesia.

Keywords: interest rate dynamics; inflation; economic and exchange rate fluctuations; quadratic cost function; a backward- and a forward-looking model with twin shock variables.

JEL Classification: E43; C51; C61; E32.

Introduction

Key macroeconomic variables such as interest rates, inflation, government budget deficits and economic growth significantly affects a country's economic performance. The movement of these variables is always reported almost every day by mass media because they affect the lives of the people and are related to the health of the economy. Interest rates also affect individual decisions, such as whether they will consume or save their wealth in the form of other assets. Similarly, for companies, whether they will use their funds to buy new equipment or save their money in the bank. High deposit rates, for example, may indicate the scarcity of third party funds and the high cost of intermediation and may restrict potential borrowers to enter credit markets. This phenomenon may also indicate chaotic economic performance and may inhibit investment and slow economic growth and job creation. Therefore, interest rates should be observed and examined because this variable is also one of the important key factors in formulating and making macroeconomic policies (Wilson and Sheefani 2014, Kikote 2015).

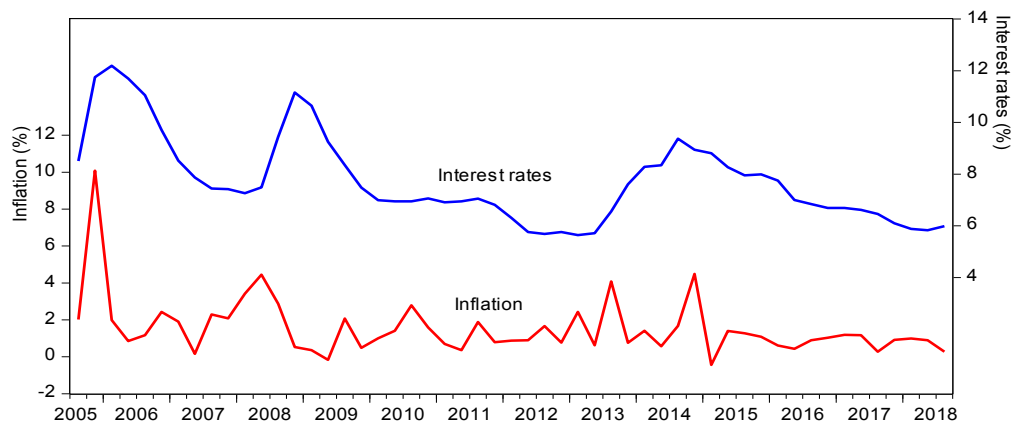
The study on short-term and long-term behavior of interest rates or interest rates dynamics has always been an important and interesting issue both from the perspective of central bank and academics. From the perspective of the central bank, the study of dynamic interest rates can be a reference for formulating the rate policy reaction function, an illustration of determining past interest rates, and a background information in formulating and making decisions in the future. On the other hand, from the academic perspective, the model of dynamic interest rates determination or interest rate reaction function may include the main considerations or factors underlying the interest rate setting (Gerlach-Kristen 2003, Aas 2016, Bikker and Gerritsen 2018).

This study investigated deposit interest rates in Indonesia because since October 1988 the behavior of all interest rates was determined by the banking system in line with the implementation of financial reforms. This means that the deposit interest rates (hereinafter referred to interest rates) were determined by the force and condition of the money market. According to the Keynesians, in disequilibrium condition, interest rates have a direct relationship with prices or inflation (Harris 1985, 391). Studies conducted by Amaefula (2016) and Bikker and Gerritsen (2018) also support a positive relationship between deposit interest rates and inflation rates in respective countries observed, namely Nigeria and the Netherlands.

Graph 1 shows the behavior of interest rates and inflation in Indonesia during the period of 2005Q3 - 2018Q3. In general, the movement of interest rates and inflation is in the same direction, although fluctuation in interest rates

are relatively lower than that in inflation. In 2006, the interest rates reached 12% per year, but declined to approximately 6% per year in 2012 and slightly increased in 2014 and returned to a rate of 6% in 2018. Quarterly inflation increased at the end of 2005 and reached its peak in 2006 at approximately 10% and decreased to a relatively stable rate of approximately 1% in 2018.

Figure 1. Movement of Interest Rates (%) and Inflation (%) in Indonesia: 2005Q3-2018Q3

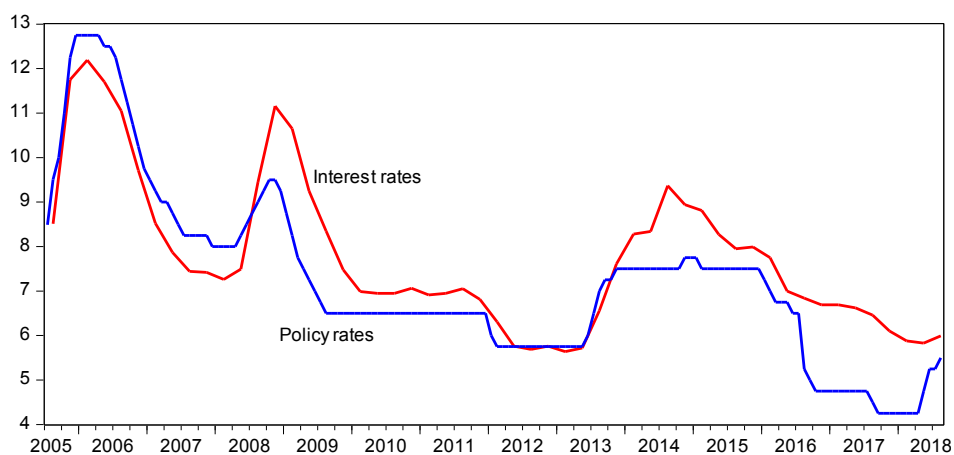


Source: Bank Indonesia, 2019

In addition, since the implementation of the monetary target of interest rate of Bank of Indonesia (BI rate) in mid-2005, the interest rate behavior tends to be in line with the BI rate. Graph 2 shows the interest rates does not significantly differ from the BI rate and their movement are also in line with the BI rate. In the third quarter of 2016, the BI Rate declined rather sharply because since August 2016 BI changed the reference interest rate from the BI rate into the BI 7-day Repo Rate. However, since the beginning of 2018, this interest rate has continued to increase to reach approximately 6% in mid-2018.

This study aims to estimate the interest rates dynamic model by using the disequilibrium approach in the money market. Disequilibrium may occur due to the difference between the desired interest rate and the actual interest rate. In this case, economic agents encounter two types of costs, namely disequilibrium costs and adjustment costs that make it possible to derive the model of interest rates dynamics either with or without shock variables and either from demand or supply side (for surveys of deriving dynamic models using this approach, see for example: Cuthbertson (1988, 1997), Domowitz and Elbadawi (1987), Price and Insukindro (1994).

Figure 2. Deposit interest rates and BI rate in Indonesia: 2005 Q3 - 2018 Q3



Source: Bank Indonesia, 2019

1. Methodology

1.1. Research framework

Based on the Keynes' liquidity preference theory, interest rates are determined in the money market. In equilibrium, interest rates are determined by the force of interaction between money demand and supply see Harris (1985, 306-307), Kikote (2015, 12). In order to obtain an illustration of this approach, the equilibrium in the money market is described below.

Suppose that the real money demand is expressed by equation (1) as follows.

$$md = ky + L(i) \quad (1)$$

where: md is demand for real money, y is real income, P is price level and M is money supply.

In the equilibrium $md = M/P$, or

$$ky + L(i) = \frac{M}{P} \quad (2)$$

so that:

$$L(i) = \frac{M}{P} - ky \quad (3)$$

thus, a equilibrium interest rate is obtained:

$$i = L^{-1} \left(\frac{M}{P} - ky \right) \quad (4)$$

From equation (3), it can be seen that $\frac{di}{dM} < 0$; $\frac{di}{dP} > 0$ and $\frac{di}{dy} > 0$.

Furthermore, Keynesians argue that if the money market is in disequilibrium due to the disequilibrium between money demand and supply, price increase (or inflation) will increase in interest rates (Harris 1985, 391). If the money supply is determined by the monetary authority, disequilibrium in the money market can occur because the desired money demand is not equal to the actual demand, so that economic agents may face disequilibrium costs and adjustment costs as well as dynamic interest rate behavior.

Empirical studies on positive relationship between the interest rates and inflation have been conducted in developing and developed countries. Amaefula (2016) in his study in Nigeria found a positive relationship between deposit interest rates and inflation rates in the long-term. Kurniawan and Prajanti (2017) in their study in Indonesia also found a positive effect of inflation on deposit rates. Similarly, Bikker and Gerritsen (2018) stated that inflation is one of the macro variables that has a positive effect on the deposit interest rates in the Netherland.

1.2. Derivation of dynamic interest rate model

An assumption used in this approach is that unanticipated behavior can be regarded as the difference between the desired interest rates and the actual interest rates, so that economic agents encounter the disequilibrium costs and need to make adjustments. This behavior can then be used to explain why economic agents face the temporary deviation between the desired and the actual. They must optimize all costs encountered in order to obtain a model of interest rates dynamics.

The model of interest rates dynamics in this study is derived by using a single period and multiple period quadratic cost function approach that make it possible to obtain the Autoregressive Distributed Lag (ARDL) or Error Correction Model (ECM) with shock variable and a forward-looking Partial Adjustment Model with shock variable.

The role of the shock variable is also of great concern to economists, especially economists from new macroeconomic school: New Neoclassical Synthesis. Their macroeconomic modeling discusses the effect of shock from aggregate demand and supply side on real interest rates and inflation (Hubbard *et al.* 2014, Ch 11). Insukindro (2018) also studied the role of twin shock on fiscal sustainability in Indonesia.

Furthermore, in order to derive the dynamic interest rate model using the cost function approach, suppose the desired interest rate can be formulated with the following simple model.

$$X_t^* = a + bIF_t + \epsilon_t \quad (5)$$

X_t^* is the desired interest rates and IF is the inflation rates.

1.3. Error Correction Model (ECM) with shock

In order to illustrate this model, suppose that the economy is in disequilibrium. In general, economic agents will find that the actual interest rates may diverge from the desired interest rates. This deviation may be caused by shock variable and slow adjustment process. The behavior of economic agents are assumed to be based on their decision with the single period quadratic cost function as stated by equation (6) below (see: Insukindro 1998, 2018):

$$C = c_1(\dot{X}_t - X_t^*)^2 + c_1(\dot{X}_t - \dot{X}_{t-1} - \beta\Delta Z_t)^2 \quad (6)$$

$$\dot{X}_t = X_t + S_t$$

where: C is the single period quadratic cost function of the interest rates.

The first part of equation (6) is disequilibrium costs and the second part is adjustment costs, as follows: X is the actual interest rate, \hat{X} is the expected interest rate in the short term, X^* is the desired interest rate in the long term, Z_t is the vector of variables affecting the interest rate, S is shock variable. Economic agent minimizes C of the equation (6) with respect to X_t and reparametrizes the solution, then an error correction model (ECM) with shock variable will be obtained as follows.

$$\Delta X_t = \theta_1 \Delta IF_t - \theta_2 (X_{t-1} - \hat{a}_0 - \hat{a}_1 IF_{t-1}) + \theta_3 \Delta S_t + \theta_4 S_{t-1} \quad (7)$$

$$\Delta X_t = \theta_1 \Delta IF_t - \theta_2 \hat{e}_{t-1} + \theta_3 \Delta S_t + \theta_4 \Delta S_{t-1} \quad (8)$$

$$0 < \theta_2 < 1$$

In this study we use twin shock, therefore equation (8) can be modified as follows.

$$\Delta X_t = \alpha_1 \Delta IF_{t-1} + \alpha_2 u_{t-1} + \alpha_3 \Delta f e_t + \alpha_4 f e_{t-1} + \alpha_5 f e_{t-2} + \alpha_6 \Delta f k_t + \alpha_7 f k_{t-1} + e_t \quad (9)$$

The shock variable (S) cannot be observed so that a method is needed to proxy it, for example: AR, MA, deviation of linear/nonlinear trend & filter method (H-P and Kalman).

1.4. Forward-Looking Model (FML) with shock variables

In this model, individual's behavior in general is considered to be based on an infinite discounted sum of his expected value of cost function. It is argued that the economic agent's multiperiod quadratic cost function can be written as follows, see: Cuthbertson (1988, 1997), Price and Insukindro (1994) Insukindro and Sahadewo (2010):

$$C_t = E \sum_{i=0}^{\infty} D^i [a_1 (X_{t+i} - X_{t+i}^*)^2 + a_2 \{(1-L)X_{t+i}\}^2] \quad (10)$$

where: E is the expectations operator based all information available at time $t-1$, D is the discount factor, L is lag operator and X_{t+i} and X_{t+i}^* are the actual and optimal or desired interest rate.

The first component of equation (10) is the equilibrium cost whereas the second one represents the adjustment cost. The parameter a_1 and a_2 are the weight which economic agent places on the disequilibrium cost and the adjustment cost.

Minimizing equation (10) with respect to X_t and then use the Sargent's method for forward operators (Sargent 1987, chapter IX) to construct the forward-looking specification as follows.

$$X_t = r_1 L X_t + (1 - r_1)(1 - r_1 D) \sum_{s=0}^{\infty} (r_1 D)^s E X_{t+s}^* \quad (11)$$

The shock variable (S_t) can be introduced in the component of adjustment cost of equation (10) as follows (Cuthbertson 1988):

$$C_t = E \sum_{i=0}^{\infty} D^i [a_1 (X_{t+i} - X_{t+i}^*)^2 + a_2 \{(1-L)X_{t+i} - S_{t+i}\}^2] \quad (12)$$

The optimal solution of equation (12) is:

$$X_t = r_1 L X_t + (1 - r_1)(1 - r_1 D) \sum_{s=0}^{\infty} (r_1 D)^s E X_{t+s}^* + r_1 S_t - (1 - r_1) \sum_{s=0}^{\infty} (r_1 D)^s E S_{t+s} \quad (13)$$

Cuthbertson (1988) states that it might be assumed that $E S_{t+s}^* = 0$ if $s \geq 1$, so we can obtain the following equation:

$$X_t = r_1 L X_t + (1 - r_1)(1 - r_1 D) \sum_{s=0}^{\infty} (r_1 D)^s E X_{t+s}^* + r_1 S_t \quad (14)$$

As mentioned above, in this study we use twin shock, so equation (14) can be modified as follows:

$$X_t = r_1 L X_t + (1 - r_1)(1 - r_1 D) \sum_{s=0}^{\infty} (r_1 D)^s E X_{t+s}^* + r_2 f e_t + r_3 f e_{t-1} + r_4 f k_t + r_5 f k_{t-1} + \varepsilon_t \quad (15)$$

2. Data analysis

2.1. Data

This study uses the following variables: deposit interest rates, inflation rates, economic fluctuations and exchange rate fluctuations. The definition of the variables and data sources are shown in Table 1. The data to be used in this study are quarterly time series data from the third quarter of 2005 to the second quarter of 2018.

Table 1. Variable definitions and data sources

Variable	Symbol	Unit	Description	Source
Deposit interest rates	X	Percent	Quarterly end-of-period deposit interest rates of commercial banks.	Bank of Indonesia
Inflation	IF	Percent	Quarterly inflation. The percentage change in the CPI (consumer price index) for a quarterly period compared to the past quarterly period.	The Indonesian Central Bureau of Statistics (BPS)
Real Output (real GDP)	y	Billion Rupiah	Real GDP with 2010 base year	The Indonesian Central Bureau of Statistics (BPS)
Exchange rate of US \$/Rp	K	Rupiah	The exchange rate of US \$/Rp/ USD at the end of quarterly period.	Pacific Exchange Rate Services.
Potential output	y^*	Billion Rupiah	Obtained by using HP Filters	
Expected exchange rates	K^*	Rupiah	Obtained by using HP Filters	
Economic fluctuations	fe	Percent	$fe_t = \frac{y_t - y_t^*}{y_t^*} \times 100\%$	
Exchange rate fluctuations	fk	Percent	$fk_t = \frac{K_t - K_t^*}{K_t^*} \times 100\%$	

2.2. Stationarity

This study uses time series variables, so that it is necessary to perform stationarity tests. If the variable observed is not stationary or integrated of order non-zero ($I \neq 0$) or integrated of order one or $I(1)$, for example, the next step can use cointegration techniques to estimate the long run relationship between observed variables; on the contrary, if the variable used is stationary or $I(0)$, the standard economic estimation can be used (Nelson and Plosser 1982, Engle and Granger 1987, Clemente *et al.* 2017).

Table 2. Stationarity test

Unit Root Tests for stationary at level						
Variables	DF		ADF		KPSS (intercept)	KPSS (Intercept. & Trend)
	t-stat.	Prob.	t-stat.	Prob.	LM-Stat.	LM-Stat.
Interest rates (X)	-4.4458 ^a	0.0008	-4.4612 ^a	0.0042	0.4793 ^b	0.1111
Inflation (IF)	-6.3294 ^a	0.0000	-7.1155 ^a	0.0000	0.5708 ^b	0.1121

Note: ^a significant at 1% level. ^b significant at 5% level.

Table 2 reports the results of the unit root test based on the DF, ADF (Augmented Dickey-Fuller) and KPSS (Kwiatkowski-Phillips-Schmidt-Shin) tests which state that the interest rate (X) and inflation rate (IF) variables are stationary or $I(0)$. Therefore, the cointegration test could not be performed and further estimation could use the standard regression analysis method.

2.3. Granger Causality test

The causality test is employed to identify the presence and direction of causality between the interest rates and inflation rate. Since the variables used are $I(0)$, the Granger causality test will be applied in this study. Table 2 shows the Granger causality test between interest rates and inflation rates and reveals that Granger causality occurred in one direction from inflation to interest rates and not vice versa. It seems that this result also supports the Keynesian approach as described above.

Table 3. Granger Causality test

Null Hypothesis:	F-Statistic	Prob.
Inflation does not Granger Cause Interest rates	7.3676 ^a	0.0002
Interest rates does not Granger Cause Inflation	1.4348	0.2402

Notes: lag length 4, Reject null hypothesis at a) $\alpha=1\%$; b) $\alpha=5\%$; c) $\alpha=10\%$.

2.4. Basic Long Run Model of Interest Rate

Based on the literature review and stationary tests, we may develop a basic model interest rate and estimate using standard regression because all variables used in this study are $I(0)$ or stationary. The best result of estimation is

reported in Table 4. This Table shows the long run specification of interest rate is well defined and has a sensible magnitude and is correctly signed. The residual of this basic model is stationary or $I(0)$. Furthermore, the residual u_t and fitted values of X_t will be used to estimate our ECM with shock variabel in equation (9) and forward looking model with variabel in equation (15).

Table 4. OLS estimate of Basic Model of interest rate

$X_t = a_1 + a_2IF_{t-1} + u_t$		
Variables	Coefficient	t-stat.
Constant	7.0751 ^a	23.1962
IF_{t-1}	0.4333 ^a	3.1793
R-squared	0.1682	
F-statistic	10.1081	
Prob(F-statistic)	0.0025	
Stationarity test for residual (DF-test statistic)	-3.2642 ^a	
Theil Inequality Coefficient	0.0978	

Note: ^a significant at 1% level.

2.5. Error Correction Model (ECM) and Forward-Looking Model (FLM) with Twin Shock

In this study, ECM and FLM with twin shock as mentioned in eq. (9) and (15) will be used to estimate the effect of twin shock on interest rate dynamics in Indonesia. The hypothesis testings for eq. (9) and (15) are as follows:

Table 5. Hypothesis testing for equation (9)

Ho: $\alpha_3 = 0$	Ho: $\alpha_4 = 0$	Ho: $\alpha_5 = 0$	Ho: $\alpha_6 = 0$	Ho: $\alpha_7 = 0$
Ha: $\alpha_3 \neq 0$	Ha: $\alpha_4 \neq 0$	Ha: $\alpha_5 \neq 0$	Ha: $\alpha_6 \neq 0$	Ha: $\alpha_7 \neq 0$

If only α_3 , and α_6 are significantly different from zero, it means that the twin shock occurred in the short run, whereas if α_4 (or α_5) and α_7 are significantly different from zero, the twin shock variables are continuously for the long run (see also: Insukindro 2018). Hypothesis testings for equation (15) are similar to test for equation (9) in which we just substitute λ_i into α_i , see also equation (15) in Table 6.

2.6. Error Correction Model (ECM) with Twin Shock

The best results of the ECM with twin shock is well defined as reported in Table 6. Based on the DF statistic, it shows that the residual of the model is stationary. This result may provide evidence of the existence of homoscedasticity and the absence of serial correlation. The error correction term coefficient reveals evidence of the existence of long run relationship between the interest rate and inflation rate in Indonesia, and the adjustment coefficient is 0.2307. In the short- and long-term, the twin shock variabels namely the economic and exchange rate fluctuation have significantly positive effect on the interest rate.

Table 6. OLS Estimate of ECM with Twin Shock

$\Delta X_t = \alpha_1 \Delta IF_{t-1} + \alpha_2 u_{t-1} + \alpha_3 \Delta fe_t + \alpha_4 fe_{t-1} + \alpha_5 fe_{t-2} + \alpha_6 \Delta fK_t + \alpha_7 fK_{t-1} + e_t$ (9)		
Variables	Coefficient	t-stat.
ΔIF_{t-1}	0.0671 ^c	1.9125
u_{t-1}	-0.2307 ^a	-4.0852
fe_t	0.1638 ^b	2.4127
fe_{t-1}	0.2414 ^a	2.7177
fe_{t-2}	0.1229 ^c	1.8719
fK_t	0.0445 ^a	2.7965
fK_{t-1}	0.0338 ^b	2.5749
R-squared	0.4747	
Stationarity test for residuals (DF-test statistic)	-4.5021	
Theil Inequality Coefficient	0.0819	

Note: ^a significant at 1% level. ^b significant at 5% level. ^c significant at 10% level.

2.7. Forward Looking Model (FLM) with Twin Shock

The empirical result of the restriction FLM (D=0.99) with twin shock is presented in Table 7. The result is relatively well defined and the residual is also stationary. The J-statistic reveals evidence of the existence of overidentification condition. The value of λ_2 is 0.2733. As expected that the speed of adjustment is faster than the result obtained in

the ECM with twin shock discussed above. However, the effects of twin shock on our interest rate dynamics can not be supported in this study. The results show that only fluctuation of exchange rate has a positive effect on interest rate dynamics in Indonesia in the short run.

Table 7. GMM Estimate of FLM with Twin Shock

$X_t = \lambda_1 + \lambda_2 X_{t-1} + (1 - \lambda_2)(1 - D\lambda_2) \sum_{i=1}^{\infty} (\lambda_2 D)^i X_{t+i}^* + \lambda_3 f e_t + \lambda_4 f e_{t-1} + \lambda_5 f K_t + \lambda_6 f K_{t-1} + \varepsilon_t$ (15)		
	Coefficient	t-stat.
λ_1	1.6062 ^c	1.8395
λ_2	0.7267 ^a	4.4315
λ_3	0.1954	1.2922
λ_4	0.0285	0.2353
λ_5	0.1756 ^a	3.0876
λ_6	-0.0888 ^c	-1.8464
Instrument rank	7	
J-statistic	1.950	
Prob(J-statistic)	0.1626	
Instrument specification:	$X_{t-2}; X_{t-3}; X_{t-4}; IF_{t-2}; IF_{t-3}; IF_{t-4}$	
Stationarity test for residuals (DF-test statistic)	-6.4437 ^a	
Theil Inequality Coefficient	0.1076	
Note: ^a significant at 1% level. ^b significant at 5% level. ^c significant at 10% level.		

2.8. Non-Nested test

Having discussed ECM with twin shock and FLM with twin shock, our discussion is now concentrated on non-nested test to make comparison among regression models with different variables and functional forms. In such cases, we are often confronted with the problem of making choice among alternative models.

Based on the *J* test proposed by Davidson and MacKinnon (1981), the results of non-nested tests are reported in Table 8. The findings show that the estimated *t*-values are not significantly difference from zero, therefore we can not discriminate between the back-ward and forward-looking models. With respect of the level of development of financial feature in Indonesia and the ambiguity of the non-nested tests, the findings may allow us to argue that the future forcing variables can be potentially important components but we should not wish to suggest that the FLM is the “true model” for our deposits interest. Based on empirical results, it may be concluded that the ECM with twin shock can be the “best model” for interest rate dynamics in Indonesia

Table 8. Non-Nested test

H ₀	H ₁	t-stat.	Prob.
Forward + Shock	ECM + Shock	1.1915	0.2403
ECM + Shock	Forward + Shock	-0.8627	0.3932

Conclusion and Recommendation

The aim of this study is to estimate the interest rate dynamics in Indonesia using the quadratic cost function approach with twin shock variables. Using this approach, we may derive and estimate ECM as well as FLM with twin shock. Based on the non-nested test, it can be concluded that the ECM with twin shock may be the best model in explaining the effect of twin shock on the interest rate dynamics in Indonesia.

Based on the best model ECM with twin shock, it is concluded that in the long run the inflation rate has significantly positive relationship with the interest rate. Furthermore, the twin shock variables indicate that in the short- and long-term, economic fluctuations and exchange rate shock have a positive effect on the interest rate in question. Therefore, unanticipated increase of output and of exchange rates will increase interest rates. The positive effect of the output shock reveals that an increase in economic activity driven by aggregate demand will increase interest rates. In the other hand, if the economic fluctuations are driven by an increase in aggregate supply or potential output, it will lead to a decline in interest rates. Unanticipated rupiah depreciation or US \$ appreciation, for example, can lead to an increase in interest rates. Therefore, efforts should be made to increase output or reduce aggregate demand and prevent an increase in exchange rate fluctuations because they can reduce interest

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Analyzing of External Environment Force and Islamic Business Ethics on Baitul Maal Wat Tamwil Performance through Organizational Commitment

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Abstract:

This study aims to analyze the influence of external environmental forces and Islamic business ethics which directly have a significant influence on Baitul Maal wat Tamwil (BMT) performance and have a significant influence indirectly through organizational commitment as a mediator on BMT performance. The CEO of BMT must know the fundamental theory in order to improve the BMT performance but also be able to analyze the advantages and limitations in practice. This study uses a survey strategy and is cross-sectional involving 283 BMT CEOs as respondents to get primary data through questionnaires and then analyzed using partial least square (PLS). The results show that directly external environmental forces and Islamic business ethics significantly influence on BMT performance as well as organizational commitment can mediate indirect effect of external environment forces and Islamic business ethics on BMT performance.

Keywords: Islamic; microfinance; external environmental forces; business ethics; organizational commitment; performance.

JEL Classification: D23; G21; M21.

Introduction

Performance is an important element in a company. Performance appraisal as a tool to evaluate previous activities and become an important foundation in order to increase company growth. Simionescu (2016) state the concept of performance of the company is based on the theory of the stakeholders. Managers can not maximize firm value ignoring the interests of the social partners: shareholders, employees, creditors suppliers, customers, state, and others. The company's performance will run based on the targets set by the company CEOs, if the company's management is run in accordance with the rules imposed by the company (Laitinen 2004). This also happened at the Baitul Maal wat Tamwil (BMT). Dewi (2017) state that BMT is a Microfinance Institution with sharia concept which consists of two businesses, namely Baitul Maal and Baitul Tamwil. Baitul Maal is more directed towards efforts to collect and channel non-profit funds, such as: *zakat*, *infaq*, and *sedeqah*. While the Baitul Tamwil is a business for collecting and distributing commercial funds (Ridwan 2004). These efforts become an inseparable part of BMT as an institution supporting the economic activities of micro and small economic communities based on Islam. BMT operates in accordance with Islamic sharia provisions, especially those concerning Islamic *muamalah*

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procedures (Rokhman 2013). In the Muamalah procedure, it is avoided from practices that are feared to contain elements of usury (*riba*) to be filled with investment activities on the basis of profit sharing and trade financing.

The existence of BMT is very strategic for further investigated, where the target of financing is aimed at micro and small entrepreneurs which in total 98.8% of all business operators in Indonesia (Kemenkop UKM 2020). In addition, BMT fills in non-formal vacuum functions of Sharia Banks including Islamic Rural Bank (BPRS), which have not yet reached the Micro and Small Enterprises (MSEs), even though this MSEs is a provider of employment for around 112.9 million people (Kemenkop UKM 2020). Constraints that limit sharia banks or BPRS reaching MSEs are collateral problems and financing formalities, a matter that is not an absolute requirement in BMT (Suhendi 2004). The gap between Islamic banks and MSEs is bridged by BMT. Another strategic value, that BMT is an institution that is not only business oriented, but also socially oriented. BMT pays close attention to low level entrepreneur up to an average of 81.69% of total funds, and entrepreneurs are having financial difficulties on 10.82% of total funds (Rokhman 2013).

Another reason, Sakti (2013) state that BMT drives the economy at a lower level community such as micro and small enterprises (MSEs) based on Sharia principles that have a social role and increase the distribution of people's income and reduce economic and social inequality. Thus in general BMT can support MSEs in business, as well as the role of making MSEs in the form of social values so they can grow and grow. Thus BMT is considered by the community to be able to build a mandate that has religious values based on Islamic law. BMT is growing year by year. Quantitatively, the history of BMT travel between 1980 and 2010 has grown to 3,307 BMT units throughout Indonesia. In the following four years (2014) there were 5,000 BMT units with assets of Rp 4.7 trillion and customers reaching more than three million customers (Hasbi 2015). Neither the BMT assets, continues to experience growth.

Cahyadi (2012) state BMT in running its business still has problems that must be an important concern for company management in advancing its institutions to be able to compete with similar and conventional companies. These problems trigger the development of the company, so that it can slow down company growth. Matters faced by BMT include capital. BMT generally has a relatively small capital, therefore BMT always expects an injection of funds, both from the government or parties interested in investing, so that in general the average BMT capital source is relatively weak, because it comes from funding sources, the majority of which comes from customers, not BMT owners (Hasbi 2015).

Another thing faced by BMT is bad financing from customers. As a result of the bad financing, BMT's capital turnover has reduced the company's growth. This issue has become a recurring occurrence in many financing agreements, although not all Debtors always have problems. Sakti (2013) findings in his research that the level of non-performing financing (NPF) BMT problem is quite large, NPF average of 4.97% in Central Java, 10.86% NPF in Jabar and the average of three provinces (East Java, Central Java, West Java) was 7.31%. The cause of non-performing financing for BMT problems in the three provinces is the failure of business from customers of BMT (55.52%) because almost 100% of BMT financing is aimed at productive motives, while non-performing financing based on loss to follow-up factors reaches of 26.91%.

BMT problems tend to face liquidity when customers withdraw funds. This liquidity problem has the potential to be a problem in almost all BMT, because the majority of the main funding sources for financing (66.75%) come from customers compared to sources of funds from their own capital only 18.70%, and capital from linkage with BUS / UUS of 6.23%. If the BMT faces liquidity problems, most of it is overcome from BMT owner funds (an average of 42.81%), other BMT (23.64%), other sources (11.18%), Bank of Sharia loans (8.4%), individual loans (7.67%), and the smallest loans from the government (3.19%).

Based on the phenomenon, BMT needs to know that there are factors that affect company performance, especially the determinants of non-financial company performance. Non-financial factors are indeed important to be concern (Giovanni 2012). The non-financial factors studied are evidence of company performance based on the external environment force, Islamic business ethics, and organizational commitment.

The relationship of external environment force and Islamic business ethics to company performance can be explained by organizational commitment variables. These variables can be predicted to act as a mediator between external environment force on company performance and Islamic business ethics on company performance. Although the influence of mediators has not been found in the context of path analysis, the relationship of these variables has been proven separately in various studies. The influence of external environment force on organizational commitment is evidenced in the study of Jassmy *et al.* (2018), Ozsahin (2013).

Furthermore, the effect of organizational commitment on company performance is proven by Meyer *et al.* (2012), Miller and Lee (1999), Kuo (2013), and Hayati and Caniago (2012). The influence of Islamic business ethics on organizational commitment by Nor (2010), Manan *et al.* (2013), Yousef (2000). Research by Grbac and Loncaric

(2009), Ali and Al-Owaihan (2008) shows there is a positive influence of Islamic business ethics on company performance, even though Hayati and Caniago (2012) and Salem and Syed (2012) state otherwise.

This makes the theme of BMT performance is very interesting to analyzed especially non-financial factors, the variable of organizational commitment as a mediator is a value in the construct as a whole in this study. Testing the relationship of numbers of variable both directly and indirectly through mediator variables on company performance where Baitul Maal wat Tamwil (BMT) is the object of research. Based on the results of the study, recommendations will be made in the form of BMT development models by including non-financial variables. This model is schematic, supplemented by theoretical explanations based on empirical results.

1. Literature review

BMT is a non-bank microfinance institution that is categorized as one of the Sharia savings-loans and financing cooperative institutions (KSPPS) or the Sharia Sharia savings-loans and financing Unit (USPPS), often also called Integrated Business Centers, although BMT is not a sharia cooperative. BMT as KSPPS / USPPS has so far complied with Law No.25 / 1992 concerning Cooperatives, although it has not accommodated the existence of BMT as a microfinance institution that serves the community needs (Dewi 2017).

BMT's position in the Indonesian economy is very strategic, BMT as an intermediary institution between customer who have excess funds (*aghniya*) and customer who lack funds that not have access to banking institutions. BMT fills in non-formal functions of banks which have not been maximized in reaching Micro and Small Enterprises (MSEs). Meanwhile MSEs is a provider of employment up to 98.8%. The obstacle that limit Bank of Sharia reaching MSEs are collateral and formalities (Sakti 2013). This service gap between bank of sharia and MSEs is bridged by BMT.

Even though BMT have a significant role in drive of people's economy, BMT management still needs to be improved. However, BMT also has potential resources that can be increasingly empowered. These sources are not only tangible assets, also intangible assets, namely valuable, rarely, imperfect imitability, and non-substitution. BMT performance evaluation can be seen from two aspects (i) aspects of Ruhayah consisting of vision, mission, social sensitivity, strong sense of belonging and the implementation of social principles (ii) aspects of Service which consist of financial and institutional performance and management (Puspitasari 2014).

1.1. External environment force

The External environment force is defined as a factor of opportunities and threats from outside the organization which has implications for internal changes in the company (Banham 2010). In this study, external environment force is a company's ability to respond to pressures from the external environment which include market demand, political and legal power, social and ethical influence, technology, and competition. Nguyen and Nguyen (2013) identifies external environment forces can affect changes in a company including government regulations, market globalization and business internationalization, major political and social events, technological advancements, consumer expectations, supplier requirements, increased competition, organizational growth, and fluctuations in the business cycle. The turbulent conditions in the business environment affect the performance and changes in the company.

Mason (2007) conceptualizes external environment force from five of external environment dimensions. The five dimensions are:

- environmental capacity that focuses on the level of resources available to the organization;
- heterogeneity, referring to the extent to which organizations face different demands from different stakeholders;
- environmental concentration is the distribution of resources used by the organization;
- domain consensus represents the extent to which there is agreement between organizations that deal with organizations and other groups in society that have the right to provide certain goods/services;
- environmental uncertainty related to environmental instability or changes related to wide environmental aspects such as technology, legal politics and demographics.

Meanwhile regulations, legislation, pressures in competition, suppliers, consumers, all of which have increased awareness about the external environmental issues and their impact on company performance. External management is carried out by the company not only to reduce the impact of external environment, but also to carry out strategies to create competitive advantage and improve company performance and social welfare (Giovanni 2012). Suryana (2015) shows that an organization must respond quickly to changes in environmental forces in order to survive in a growing market. Organizational change as the impact of external environment changes, eventually becomes a change in employee perception of the organization.

1.2. Islamic business ethics

According to Al Qur'an from the standpoint of philosophy and epistemology, humans are leaders on earth (*khalifatul-ardli*). The concept of *khilafah* is one of the main reasons for human existence through acts of worship. The concept of worship applies to all aspects of life, including business aspects (Beekun and Badawi 2005). This means that Islamic business ethics is a moral culture or habits associated with a company's business activities. Agaoglu (2014) mention business ethics based on religion, namely there is a tendency for variations in business ethics between one country and another, depending on differences in the practice of local religion and culture.

Elmelki and Arab (2009) states that Sharia norms and values are used to strengthen business ethics in Moslem practices, since the values of Islamic business ethics can be applied to companies. To understand sharia, in Islam it is known as Usul-Fiqh which is the procedural law of sharia.

Tlaiss (2015) describes 13 items contained in Islamic business ethics, including: trust, legitimate sources in obtaining wealth, ordering to shop, zakat, order of business, productive, honesty in business matters, taking into account humanitarian aspects in making business agreements, satisfying all business obligations, reasonable handling by staff, mutual respect, clear business transactions, fair in making purchases and sales.

Muhammad *et al.* (2008) state there are a number of things that are unethical (*haram*) based on Islamic business ethics, namely: selling prohibited goods/services such as selling liquor, narcotics, stolen goods, *etc.*; conducting fraud in business transactions; often taking oaths in selling their products; displaying products/services not in accordance with reality (window dressing); violating/not fulfilling agreements in transactions; hoarding goods, food, *etc.* others to obtain future profits; speculative business activities; include interest in transactions; price fixation; selling forbidden animal meat; buying and selling weapons that cause the destruction of humanity; fraudulent transactions; making uncertain transactions.

1.3. Organizational commitment

This organizational commitment is needed in organizations because a committed worker is important in the organization, especially to maintain the continuity and achievement of goals (Rizal *at al.* 2019). Yousef (2000) define organizational commitment as a psychological attitude that attaches an employee to an organization in a manner that reduces his or her turnover intention. Organizational commitment typically relates to the characteristics, work and behavior of employees, and the socio-cultural environment of an organization. Organizational commitment consists of the most powerful emotional components and includes the public interest, principles, values, and goals (Reade and Lee 2012).

In addition, organizational commitment is a measure of employee identification with the organization. Organizational commitment consists of three elements, namely belief and strong acceptance of the goals and values of the organization, want to carry out efforts for the organization, and have a strong desire to remain a member of the organization (Hung *et al.* 2015). Meanwhile Allen and Meyer (1990) divide into three component processes, namely affective commitment, continuous commitment, and normative commitment. Organizational commitment can impact and or relate to employee retention, employee involvement, productivity, work quality, and the desire to make sacrifices in an effort to strengthen the image and performance of the organization.

Encouraging organizational commitment among human resources is essential, bearing in mind that human resources who are highly committed to their organization are likely to stay longer at the organization, have higher productivity, better performance, and they have high involvement. Human resources that has high organizational commitment tends to have high loyalty to the organization, has a more positive attitude towards the goals and values of the organization, thus supporting the development of positive work behavior (Hanaysha 2016). Organizational commitment is considered as a significant issue, because it is related to job satisfaction, both related to organizational profitability and superior competitiveness (Marri *et al.* 2012).

1.4. Company performance

Richard *et al.* (2009) said company performance must be distinguished between organizational performance and organizational effectiveness. The concept of organizational performance is concerned with the results of corporate work, which consists of three areas, namely: financial performance, product performance, and returns for shareholders. If the three fields which are financial and non-financial indicators are combined, the meaning is wider than financial performance, so it is referred to as the economic performance of a corporation.

Venktrakaman and Ramanugan (1986) divide company performance into operational performance and financial performance. Operational performance includes market share, product quality, and marketing effectiveness. Meanwhile financial performance is divided into two, namely market-based financial performance (stock prices, dividend payments, earnings per share, *etc.*) and accounting-based financial performance (such as

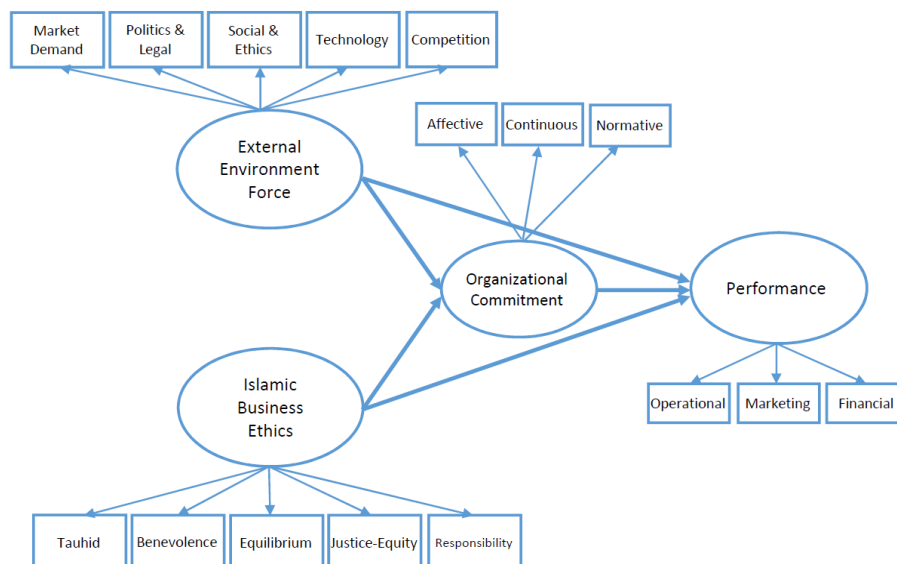
return on assets and return on equity). Fauzie, *et al.* (2010) suggested that the concept of company performance in the accounting literature usually refers to financial aspects such as earnings, ROA, and economic added value. Then the scope was extended by Kaplan and Norton (1996) with the concept of the balanced scorecard, which is to obtain a balance in performance measurement, which so far has been dominated by financial measurements, so that it is balanced with non-financial measurements, namely marketing and operations.

The performances of the Small and Medium Enterprises depend on the effective appeal and implementation of concepts, approaches, methods, techniques and other elements (Văcărescu-Hobeanu 2017). Giovanni (2012) states the performance of micro and small business sector is influenced by two main factors namely external environment force and internal environmental force. Internal force includes HR, finance, production techniques, and marketing aspects. External force includes government policies, socio-cultural and economic aspects, and the role of institutions related to government, universities, private sector and NGOs.

Fauzie *et al.* (2010) states the more comprehensive measure of company performance is three bottom line (TBL) consisting of economic performance, social performance, and environmental performance, while Tyagi and Anil (2013) divides 2 measures of company performance namely social performance and economic performance. Company performance concerns the results of corporate work which includes 4 domains of corporate performance, namely: finance, marketing, operations, innovation and leadership (Florian 2013). BMT performance in this study was measured using 3 (three) indicators including: financial performance, marketing performance, and operational performance.

Based on the literature review described above, a research framework has been developed that will examine the relationship and its effects both directly and indirectly seen in Figure 1.

Figure 1. Research framework model



Source: Own preparation

Based on the literature review and research framework model above, the research hypothesis is formulated as follows:

- H1: External environment force has a significant effect on BMT performance.
- H2: Islamic Business Ethics has a significant effect on BMT performance.
- H3: External environment force has a significant effect on organizational commitment.
- H4: Islamic Business Ethics has a significant effect on organizational commitment.
- H5: Organizational commitment has a significant effect on BMT performance.
- H6: Organizational commitment can mediate the effect of external environment force on BMT performance
- H7: Organizational Commitment can mediate the effect of Islamic Business Ethics on BMT performance.

2. Methodology

This study uses a quantitative approach, where the unit of analysis is Baitul Maal wat Tamwil (BMT) Institution in all provinces in Java under management of the Syariah Cooperative Parent (*Inkopsyah*), which 312 BMT CEOs are respondents. All members of the population were sampled with the reason that the error rate was relatively small in making generalizations. In the implementation, 283 respondents returned. Data were analyzed using partial least square. This study uses a survey strategy and cross-sectional where to obtain primary data using a questionnaire instrument through a closed-ended statement and produce numerical data (Creswell 2014). It also uses secondary data sourced from books, journals, documents to complete the required data.

Measurement scale uses itemized rating scale, in this case using the Likert Scale method. The code for the answers to the questionnaire was determined by the following categories: as strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, and strongly agree = 5. Descriptive analysis is used to determine the profile of BMT profiles, description of respondents' profiles and description of research variables based on the results of questionnaires that have been carried out to measure the validity and reliability of the instrument.

The stages in the analysis include:

- the outer model testing stage, including: convergent validity, discriminant validity and composite reliability;
- the goodness of fit model testing phase to see whether the model is declared perfect fit;
- the inner model testing phase, among others: the test of the significance of direct influence, testing the indirect effect and measurement of the effect of each exogenous variable on endogenous variables and testing mediation effect using Variance Account For (VAF) (Hair 2014).

3. Results and discussion

3.1. Baitul Maal wat Tamwil profile

BMT generally (38.16%) have total assets of 11 to 25 billion, in addition 30.04% BMTs have a total asset of 1 to 10 billion, MBT that have total assets of less than 1 billion are still 20.85% and large BMTs that have total assets exceed 25 billion of 10.95%. This shows generally that BMT begin to growth with the magnitude of the total value of their assets and this also shows the BMT growth from year to year. The growth of their total assets indicates that BMT is trusted by customers, increased ability of BMT leaders to develop their companies and the support of stakeholders such as the government and other financial institutions that BMT can grow and develop as expected.

Generally, (62%) profit sharing for BMTs at 51% BMTs and 49% customers up to 75% BMTs and 25% customers, while the rest (38%) profit-sharing composition is 25% to 50% for BMTs. This shows that profit sharing obtained by BMT is generally getting bigger and this revenue can be utilized by BMT to expand business financing, allocate it to lower level society and other benefits to promote BMT financially, operationally and market share.

Table 1. Baitul Maal wat Tamwil profile

Characteristics	Category	Frequency (f)	Percentage (%)
Growth per year	1-10%	122	43.11
	11-20%	102	36.04
	21-30%	51	18.02
	>30%	8	2.83
Funding Yield for BMT (Profit Sharing)	25-50%	108	38.00
	51-75%	175	62.00
Total Asset	< 1 billion	59	20.85
	1 - 10 billion	85	30.04
	11 - 25 billion	108	38.16
	> 25 billion	31	10.95

Source: Data reprocessed (2019)

The average growth of BMT is generally (43.11%) ranging from 1% to 10% and then to 36.04% in the range of 11% to 20% and 18.02% grow by an average of 21% to 30% and the rest grow to an average above 30%. This is very encouraging that BMT can really develop BMT business both in terms of managerial, financial and operational capabilities of BMT, if this continues to be developed and maintained surely the BMT growth will be more significant further and the prospect of BMT in the community is more potential.

3.2. Instrument validity and reliability

The validity test used to compare the values of corrected items - total correlations with r table, which are verified as valid if the values of corrected items - total correlations exceed r table. Based on the validity test shows that all the instrument variable external environment force, Islamic business ethics, organizational commitment, and company performance have a corrected item value - total correlation exceeds r table (0.2787) this means all items in the instrument variable are valid. The reliability test in the study used Cronbachs alpha reliability test. The instrument is declared reliable if it has an Cronbachs alpha value exceeding 0.7. The reliability test results showed that the Cronbach alpha obtained was 0.885 which exceeds the stipulation of 0.7, this states that the variable instruments are reliable that presented in Table 2.

Table 2. Validity and reliability test

Indicators	Corrected Item-total Correlation	r Table	Validity	Cronbachs Alpha	Reliability
Market Demand	0.590	0.2787	Valid	0.885	Reliable
Politics & Legal	0.622	0.2787	Valid		
Social & Ethics	0.722	0.2787	Valid		
Technology	0.668	0.2787	Valid		
Competition	0.627	0.2787	Valid		
Unity of God	0.655	0.2787	Valid	0.926	Reliable
Benoviolance	0.731	0.2787	Valid		
Equilibrium	0.584	0.2787	Valid		
Fair, Capital, Sincere, Trusted	0.775	0.2787	Valid		
Responsibility	0.711	0.2787	Valid		
Affective Commitment	0.737	0.2787	Valid	0.935	Reliable
Continuous Commitment	0.584	0.2787	Valid		
Normative Commitment	0.781	0.2787	Valid		
Financial Performance	0.847	0.2787	Valid	0.954	Reliable
Marketing Performance	0.836	0.2787	Valid		
Operational Performance	0.824	0.2787	Valid		

Source: data reprocessed (2019)

Based on the results, it can be concluded that all the variables are valid and reliable, so that it is feasible to use for research data collection.

3.3. Descriptive analysis

The results of data processing on the assessment of respondents as outlined in the questionnaire will be made in a summary overview of each variable in this study shown in Table 3. In this study, the variable of external environment force is measured in five indicators, namely market demand, political and legal, social and ethics, advanced technology and increased competition. Based on the results of filling out the questionnaire shows that among the five indicators that the most influential external factors on BMT sustainability are increased competition, social and ethics, as well as political and legal while advanced technology and market demand are the lowest external factors affecting BMT sustainability.

The analysis shows that the average rating of respondents is quite good, this shows according to the perception of most respondents, external environment force is sufficient to support BMT sustainability, according to most of the BMT respondents have paid good attention to the rights of customers, among others, profit sharing, the certainty of withdrawing funds, information if there are changes in rules or regulations, besides BMT product advertising in accordance with reality and BMT can compete in increasing marketing among other Islamic financial institutions. However, to balance the market demand from customers, BMT needs to review the profit-sharing system that can accommodate customer desires, in addition there must be an increase in providing good services for customers any time, give attention to customers, sincere and appropriate a target that will eventually become a loyal customer to BMT. In addition, BMT has also begun to improve its work systems and policies in accordance with government policies to support BMT sustainability, in addition to increasing the ability of information technology available and able to support BMT operation.

Islamic business ethics in this study is described by 5 indicators namely unity of god, nonviolence, equilibrium, fair-capital-sincere-trusted and responsibility. Based on the analysis conducted, it was found that Islamic business ethics has been directed, programmed and always monitored by manager/CEO continuously in

every opportunity during operational working hours. The monitoring results showed that the policy factors, equilibrium, fair-capital-sincere-trusted, gave good results while other factors that still needed to be improved were unity of god and equilibrium. However, the average score of respondents' answers on each item is good/high, this shows that generally BMT has tried to implement Islamic business ethics for all BMT employees properly and leads to the mandatory.

This can be seen when working, employees work honestly, politely, do not commit fraud, be transparent in explaining products and regulations, convey information using effective communication to customers, this makes the customer more trustworthy and not worried about saving funds or borrowing funds at BMT so as to strengthen relations between customers and BMT and at the same time strengthen the brand image of BMT as driver to lower-level community economy as well as help customers who cannot borrow funds from Islamic Banks, Sharia Rural Banks or other Islamic financial institutions. In addition, BMT employees also need to show the character and behavior of moslem who are simple in their daily lives, behave humbly, not display worldly luxury, and also work with efficient resources.

Table 3. Description of questionnaire score

No	Indicators	Mean
External Environment Force		
1	Market Demand	3.700
2	Politics & Legal	3.883
3	Social & Ethics	4.060
4	Technology	3.795
5	Competition	4.145
Average		3.917
Islamic Business Ethics		
1	Unity of God	4.430
2	Benoviolance	4.460
3	Equilibrium	4.465
4	Fair, Capital, Sincere, Trusted	4.453
5	Responsibility	4.425
Average		4.450
Organizational Commitment		
1	Affective Commitment	4.383
2	Continuous Commitment	4.340
3	Normative Commitment	4.357
Average		4.360
BMT Performance		
1	Financial Performance	4.366
2	Marketing Performance	4.395
3	Operational Performance	4.405
Average		4.380

Source: data reprocessed (2019)

Organizational commitment is described by 3 indicators, namely affective commitment, continuous commitment and normative commitment. The results of the analysis show that organizational commitment of almost all BMT employees is good/high, this is reflected when BMT experiences problems, most employees assume that the problems faced by BMT are problems that must be solved together because it involves common interests and the loyalty that is inherent in each employee so it is quite difficult for them to resign and work in other companies. However, it is different from a continuous commitment where there are many choices of companies or business sectors where they can move to other companies.

Events like this are usually for employees who have different educational backgrounds, work locations, or desire to try on other jobs, but until now they still work at BMT because they feel that BMT has a good work environment family work atmosphere, feels challenged to improve and grow BMT, want to pursue a career in BMT, happy to be able to help fellow moslem or help lower-level people and feel happy at the time these communities can improve their lives and finally is an Islamic environment that they do not get in other companies. For BMT is to be able to create and foster loyalty, qualified ability and professionalism of employees in the field of Islamic finance,

especially in BMT so that it is expected that there will be a sense of ownership, feel heavy to leave BMT, feel a career in BMT is in accordance with the desires of employees and feel they have little choice to leave BMT.

BMT performance described in 3 indicators including marketing performance, operational performance and financial performance. Based on the results of the analysis among the three performance measurement indicators, operational performance is the highest BMT performance compared to the other two performance measurement indicators. This shows that the performance of BMT which contributes significantly to the company in the daily work results is reflected in high employee productivity in terms of serving customers, the community and also other parties. In addition to operational aspects, BMT's marketing performance is also quite high, this shows that the marketing techniques used in order to enlarge the target market on target which are targeted at potential individual customers and potential companies are quite successful. In addition, the product sales reflected in market share and the level of customer satisfaction of most BMTs is also quite high. Marketing performance is currently very competitive with other Islamic financial institutions by providing more attractive offers of products and flexible policies to get customers, besides BMT needs to provide prime services to increase public confidence and prospective new customers to retain customers and even get new customers.

The slowing growth of the macroeconomic condition in the world has also affected Indonesia's macroeconomic conditions, so that the government and other stakeholders have also changed their policies to a more stringent direction, which has directly or indirectly affected the BMT business conditions, such as the decline in customer funding levels, the increase in market share is not as expected, increase nonperforming financing, violates the BMT financial ratios. This was responded by BMT by making efficient the available resources, streamlining operational activities appropriately, changing rules and standard operation to be more flexible, revising policies so that the company could continue to grow and be able to maintain customers, market shares and other funding sources for BMT businesses continuity according to expectations.

Based on the results of the analysis show that generally BMT is performing well, it can be seen that most BMTs have been rated well by the customer, the productivity and efficiency of BMT employees are high. However, in order to improve the BMT performance, BMT needs to improve the financial performance such as having a low Non-Performing Financing Ratio and the appropriate cash ratio in accordance with regulations.

3.4. Data analysis

In this study to determine, describe, test and analyze the influence of external environmental forces and Islamic business ethics on BMT performance mediated by organizational commitment used partial least square. The stages in the analysis include the outer model testing stage, the goodness of fit test stage and the inner model testing stage.

3.4.1. Testing the Outer model

The testing phase of the measurement model includes convergent validity, discriminant validity, and composite reliability testing.

Convergent validity

Convergent validity test is tested by looking at the loading factor value of each indicator against the construct. For confirmatory research, the loading factor limit used is 0.7 (Hair *et al.* 2013). All indicators that seen at Table 4 for each construct have a loading factor value exceeds 0.7. Based on the loading factor, it means that all indicators in each construct are valid in measuring the construct. In addition, the AVE value of each construct exceeds 0.5 which indicates that all constructs have met the required convergent validity criteria.

Discriminant validity

Discriminant validity is carried out to ensure that each concept of each latent variable is different from the other variables. The model has good discriminant validity if the AVE squared value of each exogenous construct (the value on the diagonal) exceeds the correlation between the construct and the other construct (the value under the column) (Hair *et al.* 2013). Based on Table 5, all constructs have AVE square root values above the correlation value with other latent constructs, it can be concluded that the model has met the discriminant validity.

Table 4. Convergent validity test

Construct	Indicators	Loading Factor	Cut Value	AVE	Conv. Validity
External Environment Force (EEF)	Market Demand	0.828	0.7	0.714	valid
	Politics & Legal	0.924	0.7		valid
	Social & Ethics	0.884	0.7		valid
	Technology	0.786	0.7		valid
	Competition	0.793	0.7		valid
Islamic Business Ethics (IBE)	Unity of God	0.909	0.7	0.803	valid
	Benovolence	0.885	0.7		valid
	Equilibrium	0.852	0.7		valid
	Fair, Capital, Sincere, Trusted	0.950	0.7		valid
	Responsibility	0.881	0.7		valid
Organizational Commitment (OC)	Affective Commitment	0.941	0.7	0.895	valid
	Continuous Commitment	0.949	0.7		valid
	Normative Commitment	0.948	0.7		valid
BMT Performance (BP)	Financial Performance	0.940	0.7	0.861	valid
	Marketing Performance	0.921	0.7		valid
	Operational Performance	0.921	0.7		valid

Source: data reprocessed (2019)

Table 5. Discriminant validity test

Construct	IBE	EEF	BP	OC
IBE	0.896			
EEF	0.761	0.841		
BP	0.828	0.797	0.928	
OC	0.768	0.703	0.774	0.946

Source: data reprocessed (2019)

Composite Reliability

Construct reliability can be assessed from the Alpha Cronbachs value and the Composite Reliability value of each construct. The recommended composite reliability and Cronbachs alpha values are more than 0.7 (Hair *et al.* 2013). The reliability test results in Table 7 show that all constructs have composite reliability values exceed 0.7 and Cronbach's Alpha exceed 0.7, which indicates that all constructs have met the required reliability.

Table 6. Composite reliability test

Construct	Cronbach's Alpha	Composite Reliability
IBE	0.938	0.953
EEF	0.895	0.923
BP	0.919	0.949
OC	0.941	0.962

Source: data reprocessed (2019)

3.4.2. Testing of goodness of fit model

After fulfilling the validity and reliability of the construct at the outer model testing stage, the test continues on the Goodness of fit model testing. The PLS model is stated to have met the criteria of goodness of fit model if the SRMR value less than 0.10 and the model declared perfect fit if the SRMR value less than 0.08 (Heir *et al.* 2013).

The results of goodness of fit test in Table 7 show that the SRMR value of the saturated model is 0.060 and the estimated model is 0.060. Because the SRMR value of the model is good on the saturated model and the estimated model is below 0.08, the model is perfect fit and is suitable for testing the research hypothesis.

Table 7. Goodness of Fit Model Test

Item	Saturated Model	Estimated Model
SRMR	0.060	0.060

Source: data reprocessed (2019)

3.4.3. Testing of inner model

Testing the inner model includes the test of the significance of direct influence, testing the indirect effect and measurement of the effect of each exogenous variable on endogenous variables. All of these tests will be used to test the research hypothesis.

Testing of direct effects

Significance of the direct effect test is used to test the effect of exogenous variables on endogenous variables. Based on the test results, if the p value less than 0.05 concluded that the exogenous variables significantly influence the endogenous variables, whereas if the p value exceed 0.05 concluded that the exogenous variables did not significantly influence the endogenous variables (Hair *et al.* 2014). Based on the test results on the direct effect in Table 8, the following conclusions:

- The influence of external environment force on BMT performance (EEF → BP) shows that the p value is 0.244, because the p value exceed 0.05, it is concluded that external environment force has no significant effect on BMT performance.
- This is different from the influence of Islamic business ethics on BMT performance (IBE → BP), external environment force on organizational commitment (EEF → OC), Islamic business ethics on organizational commitment (IBE → OC), and organizational commitment to BMT performance (OC → BP) which has a p value less than 0.05 concluded that exogenous variables have a significant effect on endogenous variables.

Table 8. Direct effects test

No	Variables	Original Sample (O)	Sample Mean (M)	St dev	t Statistics	p Values	Explanation
1	EEF -> BP	0.334	0.345	0.143	2.341	0.244	No significant
2	IBE -> BP	0.396	0.385	0.141	2.811	0.005	Significant
3	EEF -> OC	0.289	0.303	0.115	2.508	0.012	Significant
4	IBE -> OC	0.551	0.542	0.108	5.098	0.000	Significant
5	OC -> BP	0.491	0.475	0.072	6.790	0.000	Significant

Source: data reprocessed (2019)

R Square value

Based on the calculation of the value of R square that seen in table 9, the following results are obtained:

- R square value of BMT performance (BP) is 0.773, because in this model BMT performance is influenced by organizational commitment, external environment force and Islamic business ethics, then R square value of 0.773 indicates that the contribution of external environment force, organizational commitment and Islamic business ethics on BMT performance was 77.3%, while the remaining 22.7% variance in BMT performance was influenced by other factors.
- R square value of organizational commitment (OC) is 0.623, because in this model organizational commitment is influenced by external environment force and Islamic business ethics, then R square value of 0.623 indicates that the contribution of external environment force and Islamic business ethics on BMT performance is 62.3%, while the remaining 37.7% of the variance of organizational commitment of BMT employees is influenced by other factors outside.

Table 9. R Square Value

Items	R Square	R Square adjusted
BP	0.776	0.773
OC	0.626	0.623

Source: data reprocessed (2019)

Testing of mediation effects

In PLS analysis involving mediating variables, mediator variables can be stated as mediating variables if they meet the following conditions:

- The direct effect of exogenous variables on endogenous variable before significant mediator variables are entered with path coefficient "c";
- After entering the mediator variable, the indirect effect of the exogenous variable on the endogenous variable through a significant mediator variable with path coefficient "a*b";
- VAF value less than 20%, then it is stated not to be a mediating variable, furthermore if the VAF value is at an interval of 20% to 80% then the mediating variable is proven to be able to mediate with partial mediation and if the VAF value exceeds 80%, then it is stated that the mediating variable is proven to be able to mediate with full mediation. The VAF calculation formula is:

$$VAF = \frac{a*b}{(a*b)+c} \quad (1)$$

Based on the results of the calculation of VAF values with the steps and formulations above shown in Table 10, and can be interpreted as follows:

- The value of VAF on the path that connects the external environment force variable to the BMT performance variable through organizational commitment mediator is 34.71%, because the VAF value is at an interval of 20% to 80%, it is concluded that the organizational commitment variable is a partial mediation on the indirect effect of external environment force on BMT performance;
- The value of VAF on the path that connects Islamic business ethics variables through organizational commitment mediator is 29.00%, because the VAF value is at an interval of 20% to 80%, it is concluded that organizational commitment variable is a partial mediation on the indirect effect of Islamic business ethics on BMT performance.

Table 10. Variance Account For (VAF) Value

No	Line	a	b	C	VAF	Nature of mediation
1	EEF --> OC --> BP	0.638	0.619	0.743	34.71%	Partial mediation
2	IBE --> OC --> BP	0.643	0.526	0.828	29.00%	Partial mediation

Source: data reprocessed (2019)

3.5. Hypothesis test

Based on the Direct Effects Test in Table 8, it can answer the hypothesis in this study as follows:

- Hypothesis 1: The results of the analysis show the influence of external environment force on BMT performance has a p value of 0.2440, because p value exceeds 0.05 concluded that external environment force does not significantly influence BMT performance.
- Hypothesis 2: The influence of Islamic business ethics on BMT performance has a p value of 0.005 because p value less than 0.05 concluded that Islamic business ethics has a significant effect on BMT performance.
- Hypothesis 3: The influence of external environment force on organizational commitment has a p value of 0.012, because the value of p value less than 0.05 concluded that external environment force has a significant effect on organizational commitment.
- Hypothesis 4: The influence of Islamic business ethics on organizational commitment has a p value of 0,000, because the p value less than 0.05 concluded that Islamic business ethics has a significant effect on organizational commitment.
- Hypothesis 5: The influence of organizational commitment on BMT performance has a p value of 0,000, because the p value less than 0.05 concluded that organizational commitment has a significant effect on BMT performance.

Based on the calculation of VAF values in Table 10, it can be concluded as follows:

- Hypothesis 6: The external environment force on BMT performance through organizational commitment has a VAF value of 34.71%, because VAF value is in the range of 20% to 80%, it is concluded that organizational commitment is a partial mediation on the indirect effect of external environment force on BMT performance.

- Hypothesis 7: The Islamic business ethics through organizational commitment has a VAF value of 29.00%, which is in the range of 20% to 80%, concluded organizational commitment is a partial mediation on the indirect effect of Islamic business ethics on BMT performance.

The analysis shows that external environment force does not significantly influence on BMT performance. This shows that the increase and decrease in external environment force directly can not affect the BMT performance, it needs for other factors that follow increase or decrease performance so that the increase in external environment force can have an impact on increasing or decreasing BMT performance. Based on the results of the mediation effect test, organizational commitment is proven to be a partial mediation indirect influence of external environmental forces on BMT performance. The results of this study indicate that when conditions in external environment get worse, the BMT performance will not directly decrease, if the worsen condition of external environment force does not reduce the organizational commitment of BMT employees. High organizational commitment to employees can overcome the poor condition of external environment force so that BMT performance remains good.

World Bank report in 2019 that the economic recession that hit the United States, the decline economic engine in the European Union, especially the economic crisis in Greece, Turkey and several other EU countries and slowing growth in China, also affected Indonesia's economy which has slowed down in recent years. In addition, it was also strengthened by the Central Statistics Agency (BPS) releasing the Business Tendency Index (ITB) announcing that in the third quarter of 2019 ITB was 105.33. That number is lower than the position of quarter II-2019 of 108.81 and estimates ITB quarter IV-2019 will again decline to 104.79. This indicates that the business in Indonesia or the real sector is under pressure from external environment force and macro economic factors, Indonesia's economic growth is slowing. This will influence government policy, the direction of government policy, state financial policy and the policies of bank and non-bank including BMTs.

Inkopsyah also released information that these few years were a tough year for BMT because some government policies that hampered BMT's performance, the cessation of grants from the government, protection to BMTs had not been given real attention, so BMTs were told to stand alone. Besides being associated with the mediating effect of organizational commitment, the influence of external environment forces on BMT performance is also due to BMT performance being influenced more by internal factors. Giovanni (2012) states the company has two environments, namely the internal environment and external environment. If the external environment is good and stable, then the obstacles that exist in the internal environment will have a stronger influence on BMT performance. This also impacts the global economic crisis on the poor population (Kaya 2017).

The results of this study are supported by the results of previous research conducted by Rosyafah (2017) conducted in several MSEs in Sidorejo regency, the results of her research indicate that the external business environment does not significantly influence the business performance of MSE's superior products, but the results of this study were not in line with Mason (2007), Giovanni (2012), Banham (2010), Suryana (2015), Nguyen and Nguyen (2013) which shows that there is a relationship between external environment force on company performance.

Based on the results of descriptive analysis, most of them have implemented Islamic business ethics well, for example the prohibition to stay away from usury (*riba*) has been used as business ethics in each BMT. Although it has implemented Islamic business ethics well, but in terms of employee responsibilities, BMTs need to improve the attitude of employee responsibility so that all employees can take actions to use the most efficient resources and can prioritize social interests above personal interests. Islamic business ethics is based on Islamic divine values, which are sourced from the Al Quran and Sunnah. Islamic business ethics has core values, among others: all activities (not including business activities) are intended not only to pursue economic, social and environmental values, but also to worship Allah SWT. Islamic business ethics upholds honesty, fairness, efficiency and savings. Treat customers equally and seek financial and social sustainability. Islamic business ethics values, if implemented in a company are believed to affect company performance (Muhammad *et al.* 2008). Research by Grbac and Loncaric (2009), Hayati and Caniago (2012), Hadisi (2014) proves that there is a relationship between Islamic business ethics on company performance.

Organizational commitment is the willingness of employees to devote themselves and loyalty to the company (Hanaysha 2016). Organizational commitment can affect company performance, considering that organizational involves employees' behavior and organizations. Therefore, the highs and lows of organizational reflected in the behavior of employees and organizations can affect to company performance. Meyer and Allen (1990). Yousef (2000), Kuo (2013), Hayati and Caniago (2012) find that organizational commitment influences company performance.

The extent to which of external environment force on BMT performance, can also be mediated by organizational commitment. This is considering the influence of external environment force through the process of one of the three elements of organizational commitment. These three elements are belief and strong acceptance of the goals and values of the organization, want to carry out efforts for the organization, and have a strong desire to remain a member of the organization Reade and Lee (2012). Hung *et al.* (2015) prove there is a relationship between external environment force on organizational commitment. Meanwhile Allen and Meyer (1990), Miller and Lee (1999), and Kuo (2013) find that organizational commitment influences company performance.

There are variations in the implementation of Islamic business ethics (Hadisi 2014). The variation of Islamic business ethics implementation in each company depends on the organizational commitment of employees and company leaders. In other words, organizational commitment can mediate the influence of Islamic business ethics on BMT performance. Yousef (2000), Salem and Syed (2012), Hayati and Caniago (2012) show the relationship between Islamic business ethics and organizational commitment. Steers (1997) found that organizational commitment is not related to company performance. However, other studies have found the opposite results. Meyer and Allen (1997). Miller and Lee (1999), Kuo (2013), London (1983) find that organizational commitment influences company performance.

The implications of the results of hypothetical analysis above must motivate the CEO/Manager to develop sustainable BMT by continuing to identify the risks around stakeholders, they can understand and calculate financial fundamentals so that the BMT business becomes solid so that it fosters trust in the community, especially Moslem, to become an good Islamic finance institution and can increase employee organizational commitment which ultimately increases employee performance and will directly have a significant impact on BMT performance.

Conclusion

Increased public confidence, especially Moslem towards BMT in Indonesia marks the rise of Islamic microfinance institutions amidst the incessant other financial institutions. As an Islamic financial institution that bases itself on the Alquran and hadiths, it is hoped that it will bring benefit to the Moslems. It is expected that with the significant growth of the BMT it will also be supported by stakeholders such as the government, investors, capital owners and even the community.

In addition, BMT internal factors must also be continually improved to build high organizational commitment, so that loyalty, professionalism, integrity and integrity will feel BMT is their property that must be protected from the external and internal environment and practice Islamic business ethics is sourced from Alquran and Hadith.

It is seen that organizational commitment can mediate the indirect relationship of external environment forces and Islamic business ethics to BMT performance, and it is hoped that BMT will continue to grow continuously and become the main choice of Indonesian Moslem community.

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Profitability – Financial Liquidity Relation Under Bank Dependence During the Financial Crisis. Case of Polish Companies

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Abstract:

The aim of the paper is to find the impact of financial crisis on profitability, financial liquidity, and on the relation between profitability and financial liquidity. We did it by including additional dimension: companies' dependence on bank financing (companies that rely and do not rely on the bank financing). Our analysis covers the country that was perceived as resistant one to financial crisis – Poland. The analysis was conducted for panel sample of 183 companies listed on Warsaw Stock Exchange for the period of 2005-2016 (8,784 quarter-company observations). We found that Polish companies seem to be quite robust to the financial crisis impact in general. The strongest impact of financial crisis was on turnover ratios – DIO and DPO increased during and after financial crisis. As for companies with low and high bank dependence we found that high bank dependent companies underwent the financial crisis more heavily – their profitability and financial liquidity decreased radically during financial crisis time but also after financial crisis (in the short and long-term).

Keywords: profitability-financial liquidity trade-off; net working capital management; financial crisis; bank-dependence.

JEL Classification: G30; L21; M20.

Introduction

Profitability shows the company ability to generate profit on invested money. Profitability reflects the owners' interest because they expect high rate of return. Financial liquidity is the term reflecting how quickly company can turn the current assets into cash to meet short term obligation. Financial liquidity management refers also to working capital management and it depends on the level of liquid (current) assets such as: inventory, receivables, cash and short-term liabilities (operating cycles). Financial liquidity reflects managers' interests because they are required to ensure the business safety and continuity.

It is important to decide on the priority: profitability (owners' interests - growth) or financial liquidity (managers' interests – company financial security) as in corporate finance there is trade-off between profitability and financial liquidity identified. The decision on this priority is important especially during the crisis (slowdown) period.

We contribute to the research on corporate finance by conducting comprehensive research using different proxies for financial liquidity and profitability. We also include specific economic situation regarding recent financial crisis (before, during and after) and specific company situation as for bank financing use (companies with or without bank dependence).

The rest of the paper is organized as follows: next, it reviews the literature on financial liquidity and profitability during financial crisis. This part also reviews the specificity of Polish economy and financial market during financial crisis. Third, it describes the research design. Fourth, it presents the empirical findings. Last one, it contains discussion with previous research. Finally, it concludes the study.

1. Literature review

1.1. Financial liquidity and profitability

Profitability shows the company ability to generate profit on sales revenue (return on sales) or on invested money (by owners – return on equity or by company – return on assets). It is a measure of business efficiency. The higher profitability the better. Profitability reflects the owners' interest because they need higher rate of return. Company investing owners' money effectively is able to develop, and create wealth which is essential for growth.

Financial liquidity is the term reflecting how quickly company can turn the current assets into cash to meet short term obligation. Financial liquidity is measured as the relation of current assets to short-term liabilities. Financial liquidity management refers also to working capital management and it depends on the level of liquid (current) assets such as: inventory, receivables, cash and short-term liabilities (operating cycles). Financial liquidity reflects managers' interests because they need to ensure the business safety and continuity. Company having financial liquidity is able to survive and avoid bankruptcy (Berryman 1983, Dunn and Cheatham 1993). According to Chandra (2001, 72), normally a high financial liquidity is considered to be a sign of financial strength and safety.

It is important to decide on the priority: profitability (owners' interests - growth) or financial liquidity (managers' interests – financial security of the business) as in corporate finance there is trade-off between profitability and financial liquidity identified. Maintaining a proper financial liquidity indicates that the company has to cover costs of maintaining current assets and this might affect negatively the overall profitability of the firm. In other words, increasing financial liquidity would tend to reduce firm's profitability. Therefore, firms should always strike to maintain a balance between conflicting objectives of financial liquidity and profitability. The firm's financial liquidity should not be too high or too low. Excessive financial liquidity indicates the accumulation of not working funds that don't earn any profits for the firm but generate costs. On the other hand, insufficient financial liquidity might damage the firm's goodwill, deteriorate firm's credit standings. Insufficient liquidity might lead to forced liquidation of firm's assets. In this situation the relationship between financial liquidity and profitability might be positive, especially when a low financial liquidity is linked with low profitability. Low financial liquidity does not allow a company to function and generate profits. Too low level of inventory or cash makes it impossible to manufacture and sell and generate sales revenue and profits.

The level of financial liquidity is the result of the working capital elements management (level of inventory, accounts receivable, cash pool and accounts payable). They have direct effects on firm financial liquidity (Chiou and Cheng 2006, Kim *et al.* 1998, Moss and Stein 1993, Opler *et al.* 1999, Schilling 1996) Net working capital elements have also impact on profitability (Deloof 2003, Garcia-Teruel and Martinez-Solano 2007, Gill *et al.* 2010, Enqvist *et al.* 2014, Vu and Phan 2016, Nhung *et al.* 2019).

There is quite big number of research proving negative relation between profitability and financial liquidity. But it is difficult to compare the result because of different methodology adopted (different way of calculating profitability and financial liquidity). Jose *et al.* (1996) in his study, by using return on assets (ROA) and return on equity (ROE) as proxies for profitability, found a negative association with the cash conversion cycle (CCC) for a sample of 2,718 firms. Similar results were obtained by Deloof (2003) for a sample of 1,009 Belgian firms using gross operating profit and net operating profit as profitability measures. Eljelly (2004) also found negative relationship between profitability and financial liquidity (measured by current ratio and CCC). Higher profitability associated with a smaller cash conversion cycle was also supported by Garcia-Teruel and Martinez-Solano (2007), Falope and Ajilore (2009) and Quayyum (2011), among others. Raykov (2017) also found weak but clearly negative relationship between financial liquidity (quick ratio) and profitability for Bulgarian companies. Shin and Soenen (1998) also proved that there is a contra-relationship between cash conversion cycle and profitability of firms. They encouraged firms to reduce cash conversion cycle to increase profitability. Studied the influence of working capital elements on profits of companies in the food industry of Poland and some other European countries during 2005-2009 by using the Linear Regression, Bieniasz and Golas (2011) confirmed that lower cash pool increase profitability. In order to increase profits, firms should also reduce accounts receivables and inventory and lengthen payment time to suppliers.

So far the researchers have shown the important role of financial liquidity and working capital elements for the profitability of the enterprise. But firstly, there is no consensus on whether the relation between the profitability and liquidity is positive or negative. And secondly, the impact of the environment, especially in the context of the economic crisis is often ignored. In this perspective, we try to fill the gap by focusing on the relation between financial liquidity and working capital elements and profitability. We use different proxies of financial liquidity, working capital elements and profitability. But we also add to our research different economic environment conditions by analyzing the years before financial crisis, years of financial crisis and after crisis with the reference

to short and long-term perspective recovering from financial crisis. Our research refers to Polish companies. Poland is thought to be not severely hit by the financial crisis. What is more, Polish financial market has low bank concentration which should expose Polish economy to a bigger negative reaction to financial crisis (Gonzales 2015, Berlin and Mester 1999, Petersen and Rajan 1995). We also add company's bank dependence perspective to detect whether companies with low and high use of bank loans differ in their reaction to the financial crisis in terms of profitability and financial liquidity. There are research showing that companies that refrain from bank financing underwent the financial crisis quite softly (Chava and Purnanandam 2011).

1.2. Financial liquidity, and profitability, and net working capital management during financial crisis

The most important effect of recent financial crisis on real economy was increase in uncertainty. Large output losses were common to many crises. Also macroeconomic variables (consumption, investment and industrial production) registered significant declines (Claessens and Kose 2013). Uncertainty resulting from financial crisis led to lower demand for company products, lower sales revenue, lower profits. That is why a crisis had negative impact on profitability, and increased the volatility of earnings of non-financial corporations. Prasad *et al.* (2015) analyzed currency Asia crisis of 1997 and they showed that a financial crisis led to immediate drops in the profitability of firms, and the profitability levels at the end of 6 years after the crisis were still not at the pre-crisis levels.

Claessens *et al.* (2012) examined how the 2007-2009 crisis affected firm performance and they found that the crisis had a heavy negative impact on company performance. Brun *et al.* (2013) analyzed the impact of the financial crisis of 2007-2009 on profitability in the corporate sector in six European countries (Belgium, Germany, France, Spain, Portugal and Italy). They found too that most non-financial companies suffered a profitability slowdown. Also in euro area the drop in profitability was noticed (Corporate finance and economic activity in the Euro area 2013).

The financial crisis led also to an unprecedented drop in aggregate investment in the Euro area in 2009: gross fixed capital formation declined by 13% in real terms between 2008 and 2009 (Corporate finance and economic activity in the Euro area 2013). In the group comprising Greece, Ireland, Italy, Portugal and Spain, the investment downturn has been unusually deep and long (Unlocking lending in Europe 2014). Campello *et al.* (2010) surveyed 1,050 Chief Financial Officers (CFOs) in the US, Europe, and Asia to assess whether their firms are credit constrained during the global financial crisis of 2008. Their evidence indicates that constrained firms during financial crisis planned deeper cuts in tech spending, employment, and capital spending.

As for working capital, the theory assumes that in a recession firms should reduce their purchases as the attempt to offset the collapse of their sales. As a consequence, current assets (especially inventories and receivables) and liabilities (payables, trade credit) should quickly decline. The only one exemption is cash holdings - firms hold cash for two main reasons. First, they need cash to carry out transactions, *i.e.* to make payments without incurring the costs involved in converting non-cash assets into cash. Second, and perhaps more important, firms hold cash as a precautionary measure, to cover against the risk of potential cash shortfalls. During recession precautionary measure is more significant than transaction reasons which should lead to increase in cash holdings.

There is some research on working capital management which confirm the theoretical assumptions. As the statistics show, in euro area countries DSO (receivables collection period) ratios decreased by 9% (*i.e.* by five days) between 2006 and 2008, except in Portugal where the ratio remained considerably above the euro area average. At the end of 2008, the crisis interrupted this positive trend and DSO ratios significantly increased in the period 2009-10, with only two exceptions – France and Germany. In Germany, firms remained in a position to benefit from a renewed shortening of their DSO ratios in 2009. The ratio rose slightly in 2010, but only by one day of sales. In France, legal solution prevents any increase in the DSO ratios of non-financial companies during the crisis (Corporate finance and economic activity in the Euro area 2013). Ramiah *et al.* (2014) conducted a survey in Australia on changes in working capital management strategies. The results suggest that 52 percent followed conservative policies. These firms tended to tighten their credit controls, to focus on the preservation of cash and to reduce cash conversion cycles. They also reduced inventory and debt with the intention of keeping additional funding buffers. The average ratio of working capital to revenue for Australian listed companies is shown to have risen significantly in 2008. It was especially true for the companies that were underperforming (lower than industry average). The majority of the outstanding firms did not alter their working capital practices. Daisuke (2017) for Japanese firms found that during the global financial crisis, the level of working capital trade receivables, inventories, and trade payables increased during financial crisis. After late 2009, the level decreased and returned to its pre-crisis level. Scholleova (2012) for Czech companies found that firms that have had long-term ineffective conservative financing coped relatively well with the crisis by releasing excessive working capital strategies.

The various financial liquidity indicators also suggest that non-financial companies' ratios of short-term assets to liabilities have increased across euro area countries during the crisis. The increase is relatively large for most indicators in Cyprus, the Netherlands, France and Finland, while there has been a decline in all the financial liquidity measures in Slovakia, Slovenia, Ireland and Greece. The countries that consistently achieved relatively high financial liquidity ratios within these indicators include Estonia, Cyprus, Luxembourg and the Netherlands, while the opposite is the case for Italy, Portugal and Slovenia (Corporate finance and economic activity in the euro area 2013). Vu and Phan (2016) for Vietnamese listed companies found that receivables collection period (DSO) and inventory conversion period (DIO) and payables conversion period (DPO) has negative correlation with the firm's return on equity (ROE). Which means that declining profitability is accompanied by increase in the receivables, inventory, payables conversion period. Kahle and Stulz (2013) document that in the USA cash holdings faced sharp increase after the collapse of Lehman and through 2009. Pinkowitz *et al.* (2013) find an increase in abnormal cash holdings by US companies of 87% from before the crisis. The statistics for euro area show that non-financial corporations between 2000 and 2010 hold a big part of their assets in the form of liquid assets with upward trend in the late 2000s, in spite of the associated opportunity costs. There is also identified a negative relationship between cash holdings and leverage (increasing cash holdings and decreasing leverage) (Corporate finance and economic activity in the Euro area 2013).

So, the first research question is as following: how profitability, financial liquidity and net working capital elements changed during and after financial crisis. We assume that:

H1: Profitability decreased during the financial crisis.

H2: Financial liquidity increased during the financial crisis.

H3: The net working capital increased during financial crisis with DIO and DSO increasing more than DPO.

Additionally, referring to the relation between profitability and financial liquidity we assume that:

H4: The relation between profitability and liquidity is negative – increase in financial liquidity is accompanied by decrease in profitability during financial crisis and decrease in financial liquidity with increase in profitability before and after financial crisis.

1.3. Specific reaction to the financial crisis in Poland

Central and Eastern Europe belongs to the regions most severely affected by the world economic crisis (Analiza sytuacji gospodarczej w krajach Europy Środkowej i Wschodniej 2010, Dullien *et al.* 2010, Terazi and Senel 2011).

But Poland has been recorded as the only European Union (EU) member state that did not record economic recession and it can boast economic growth throughout the entire crisis duration (Terazi and Senel 2011, Duszczuk 2014, Dogaru 2016). The moderate reaction is quite surprising as Poland belongs to countries having banking system with bank concentration rate (0.47) comparing with other European countries (Gonzalez 2015): Austria: 0.65, Belgium: 0.87, Denmark: 0.80, Finland: 0.96, France: 0.60, Germany: 0.70, Greece: 0.68, Italy: 0.47, Netherlands: 0.79, Norway: 0.93, Portugal: 0.85, Spain: 0.66, Sweden: 0.95, Switzerland: 0.85, the UK: 0.52. Gonzales (2015) found that the higher level of bank concentration is to reduce the negative impact of the financial crisis on corporate debt maturity. Also Berlin and Mester (1999) and Petersen and Rajan (1995) found that firm in less concentrated credit markets are subject to greater financial constraints. According to these results, Polish companies (running business in low bank concentrated environment) should be exposed to more difficult conditions and their reactions (in terms of financial liquidity and profitability) to the financial crisis should be deeper.

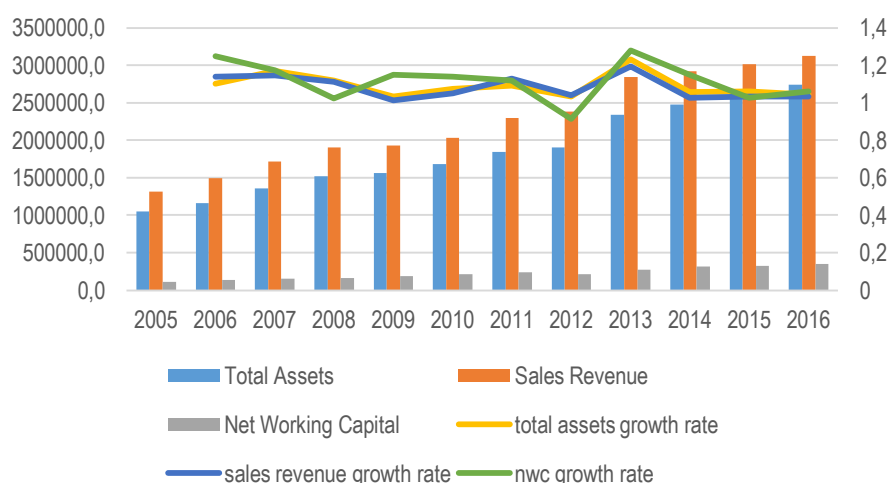
By the end of 2009 Poland was the only country that hasn't experienced a decline in GDP and reached the growth of 1.7 %. While investments (gross fixed capital formation) decreased in the region of Central and Eastern Europe in 2009 (an average of nearly 12%), the decrease was relatively small in the case of Polish (0.3%). The highest decrease in export of commodities and services was in Slovakia and Slovenia, and reached 16.5% and 15.6%. In Poland the decline amounted to 9.1%. The highest decline of industrial production was observed in Estonia and amounted to -25.6% comparing to the previous year. The lowest decrease in industry production was in Poland, at the level of 3.5%. The drop in production on an annual basis could be observed only in Slovenia, Lithuania and Bulgaria. On the contrary, in Slovakia and Poland there were the double-digit increases in industrial production (Kozub-Idżkowska and Proniewski 2011).

The quite stable economic situation in Poland made demand for corporate credit remain quite strong. But the financial crisis had impact on financial market in Poland. Although Polish financial institutions were not involved in the purchase of "toxic" international assets, the high foreign ownership made them vulnerable to the outbreak of the global financial crisis. Financial crisis affected Poland via the capital markets and decrease in foreign demand

on Polish goods and services. The first three quarters of 2009 were characterized by a decrease in confidence on the interbank market, by a threefold jump in loan-loss provisions and write-downs compared to 2008. Bank profits and profitability dropped to around 50% of 2008 results in September 2009. But Polish banks are mostly domestic players and as such they have been partly insulated from the turmoil on foreign financial markets. In the result of financial crisis banks redefined corporate lending standards. Since the outbreak of the financial crisis, more than 80% of banks have raised their margins to corporate clients and nearly 60% expect higher guarantees to cover risk, while a third of them have reduced the maximum credit amounts available. Consequently, credits granted to the corporate sector decreased by 13.8% in the three quarters of 2009. In order to boost credit, the Polish central bank (NBP) has been steadily reducing its reference rate (Strojwas 2010).

To present the situation of Polish companies in general we analyzed the aggregated financial data of companies that are obliged to report to Main Statistical Office in Poland. The basic statistics of corporate finance in Poland are presented in the Figure 1 and 2 and 3. Figure 1 presents the level (left scale) and growth rate (right scale) of total assets, sales revenue and net working capital.

Figure 1. The basic descriptive statistics on assets and sales revenue for Polish companies

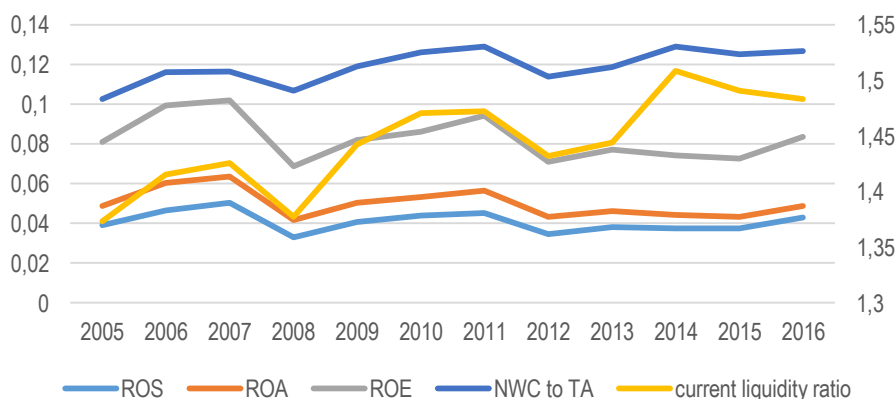


Source: Main Statistical Office in Poland.

The value of total assets, sales revenue and net working capital in Polish zloty increased over the whole period of 2005-2016 with the exception of 2009 and 2010 and after 2014. The value of sales revenue doubled its value over the whole period of 2005-2016 while the value of net working capital almost tripled. The value of total assets increased by 130%.

Additionally, data on financial standing of Polish companies confirm that there were no dramatic deterioration of financial liquidity and profitability. Figure 2 presents the data on profitability ratios (ROS, ROA, ROE – left scale) and financial liquidity ratios (net working capital to total assets – left scale and current liquidity ratio – right scale).

Figure 2. The basic descriptive statistics on profitability and liquidity for Polish companies



Source: Main Statistical Office in Poland.

Corporate profitability (ROS, ROA) remain positive for the whole period with high fluctuations and two bottoms in 2008 and 2012. The profitability in 2016 regain the level of 2005. Current liquidity ratio and NWC ratio increased slowly for the whole period of 2005-2016 with slight decrease in 2008 and 2012. The NWC ratio increased by almost 20% while current liquidity ratio increased by 8% over the analyzed period.

There is another aspect of financial crisis and companies' reaction. Because it was financial market in Poland that was more affected by the financial crisis (than the demand and the whole economy) we think that dependence on bank financing might have impact on the company's reaction to the financial crisis. Chava and Purnanandam (2011) found that firms that primarily relied on banks financing suffered larger valuation losses during this period and subsequently in the post crisis period they experienced a higher decline in their capital expenditure and profitability. The companies that depend on banking lending were more severely impacted by financial crisis and stricter lending conditions.

There are also other research proving that because of decline of bank lending to corporate sector during the global financial crisis period the firms were also enforced to sacrifice profitable investment opportunities (Ivashina and Scharfstein 2010, Campello *et al.* 2010, Cotugno *et al.* 2013, Akbar *et al.* 2013, Gaiotti 2013, Murni *et al.* 2019).

So, the third research question is as following: How did dependence on bank loans affect the relation between financial liquidity and profitability and on net working capital management. We assume that:

H5: Bank dependent companies observed bigger negative changes in profitability and financial liquidity and net working capital during financial crisis while companies with low bank dependence observed small negative changes.

2. Research design

We conducted our analysis on the data for Polish listed companies. We employed panel data for the companies listed on the Warsaw Stock Exchange. All the data cover the period 2005-2016 (12 years).

The panel data were restricted to the companies that were listed on WSE for the whole period of 2005-2016. We found 8,784 observations (quarter-company) for the panel data of listed companies (12 years and 183 companies). The panel data excludes companies acting within the financial, banking and insurance markets and with incomplete financial statements. All the financial data were collected by using Notoria Service.

We employed several ratios as the variables included in the analysis:

- Proxies for profitability: ROA - return on assets - the relation of net profit to total assets; ROS – return on sales - the relation of net profit to sales revenue; ROE – return on equity - the relation of net profit to equity.
- Proxies for financial liquidity: CR - current ratio – the relation of current assets to short term liabilities; QR - quick ratio – the relation of current assets less inventory to short term liabilities; CASH - the share of cash in total assets; NWCR - net working capital ratio – net working capital to total assets; CCC - cash conversion cycle – the sum of DIO and DSO minus DPO; DIO – days inventory outstanding – inventories x 90 days in the relation to sales revenue; DSO – days sales outstanding – receivables x 90 days in the relation to sales revenue; DPO – days payables outstanding – payables x 90 days in the relation to sales revenue.
- *Control variables*: SIZE - proxy for the size of the company – in of Total Assets, TANG - proxy for tangibility – the relation of fixed assets to total assets; INVEST - proxy for the investment – increase in total assets in relation to total assets in period $t-1$ (quarterly); GROWTH - proxy for the growth - increase in sales revenue in relation to sales revenue in period $t-1$ (quarterly).
- All the analysis is conducted for subperiods: 2005-2007 - precrisis – PRECRIS; 2008-2010 - crisis – CRIS; 2011-2013 - short-term after crisis – SACRIS; 2014-2016 - long-term after crisis – LACRIS.

Additionally, we decided to distinguish out of our sample two subsamples:

- low bank dependence – 10th percentile of the sample - companies using the lowest bank loan ratio in pre-crisis period (2005-2007) with 866 quarter-company observations (18 companies, 12 years),
- high bank dependence – 90th percentile of the sample - companies using the highest bank loan ratio in pre-crisis period (2005-2007) with 864 quarter-company observations (18 companies, 12 years).

Because we found our sample quite diversified we decided to exclude outliers. All necessary calculations are conducted on the corrected data (after excluding the outliers). We also employed regression analysis (OLS) to find out what impact on profitability and financial liquidity has financial crisis. To conduct regression analysis, we implemented following equation (where DV is the vector of dependent variables representing dependent variable in each regression model):

$$DV_{ti} = \beta_0 + \beta_1 CrisV + \beta_2 CV_{ti} + e_i \quad (1)$$

We prepared eleven models for several dependent variables (DV): profitability (ROS, ROA, ROE), and financial liquidity (CR, QR, NWCR, CASH), net working capital (CCC, DIO, DSO, DPO). We employed four independent variables referring to the financial crisis (Crisis Variable – CrisV): PRECRIS – is represented by dummy variable that takes the value of 1 for the years 2005-2007, and 0 otherwise; CRIS – is represented by dummy variable that takes the value of 1 for the years 2008-2010, and 0 otherwise; SACRIS – is represented by dummy variable that takes the value of 1 for the years 2011-2013, and 0 otherwise; LACRIS – is represented by dummy variable that takes the value of 1 for the years 2014-2016, and 0 otherwise. We also want to include several control variables (CV): SIZE, TANG, GROWTH, and INVEST. We did all the calculations both for the whole sample and for two subsamples (with low and high bank dependence).

Eventually, to detect the relation between profitability and financial liquidity we calculated the correlation coefficient between the measures of profitability (ROS, ROA, ROE) and financial liquidity (CR, QR, NWCR, CASH) and net working capital elements (CCC, DIO, DSO, DPO). The correlation coefficient is calculated for each sub-period (PRECRIS, CRIS, SACRIS, LACRIS). Additionally, we did all the calculations both for the whole sample and for two subsamples (with low and high bank dependence).

3. Research findings

3.1 Descriptive statistics

The descriptive statistics for the whole sample and both subsamples (low and high bank dependence) are presented in Table 1. We present the descriptive statistics for all variables (dependent, independent and control). All the data were left without outliers. We employed the Shapiro-Wilk normality test and we got for all variables p-value equal 0 (zero) which allows us to assume that the distribution of our variables is not normal. Additionally, we compare the value of the descriptive statistics for both subsample (low and high bank dependent companies) by using non-parametric U Mann Whitney tests (for two independent samples with the not normal distribution). The null hypothesis is that the distributions of both populations are equal.

Table 1. Descriptive statistics for the sample

Variables	Total sample	Low bank dependent companies	High bank dependent companies	U Mann-Whitney Z statistics tests
Total Assets (mln PLN) -Median	348	105	649	-23,538
Mean	1,611	393	1,952	***
St. dev.	5,114	726	3,632	
Tangibility (%) - Median	50.1	51.5	51.8	-7,228
Mean	50.2	48.1	56.0	***
St. dev.	21.0	20.7	24.1	
Investment (%) - Median	1.5	1.4	1.5	-1,181
Mean	5.3	5.1	4.4	
St. dev.	97.1	22.4	23.2	
Growth (%) - Median	2.0	2.2	2.1	-0,561
Mean	15.6	13.7	18.2	
St. dev.	100.4	83.5	86.7	
Bank financing (%) – median	15.0	0.0	37.3	-31,862
Mean	19.2	7.0	40.4	***
St. dev.	22.0	13.9	20.3	
ROA (%) - Median	1.0	0.8	0.9	-2,318
mean	0.9	0.8	1.0	*
st. dev.	6.8	4.5	3.8	
ROS (%) - Median	3.4	2.6	4.8	-7,885
Mean	5.3	-0.9	4.3	***
St. dev.	204.4	183.6	76.4	
ROE (%) - Median	2.0	1.5	2.0	-4,034
Mean	2.5	1.5	3.3	***
St. dev.	28.7	16.2	29.5	
CR –Median	1.4	1.5	1.4	-3,298
mean	2.3	2.7	1.8	***
st. dev.	5.8	6.1	1.7	

Variables	Total sample	Low bank dependent companies	High bank dependent companies	U Mann-Whitney Z statistics tests
QR - Median	1.0	1.1	0.8	-8,973
Mean	1.7	2.2	1.0	***
St. dev.	5.7	6.2	0.7	
CASH (%) - Median	4.7	2.9	4.6	-7,442
Mean	7.6	6.4	7.2	***
St. dev.	8.8	8.9	8.5	
NWCR (%) - Median	10.5	8.4	13.2	-8,277
Mean	10.7	8.3	16.6	***
St. dev.	23.2	16.8	20.8	
CCC (days) - Median	35	26	68	-9,999
Mean	54	8	157	***
St. dev.	371	336	616	
DIO (days) – median	39	38	47	-3,923
Mean	57	59	91	***
St. dev	78	66	130	
DSO (days) – median	62	77	59	-4,721
Mean	74	86	72	***
St. dev	63	69	53	
DPO (days) – median	71	86	74	-4,380
Mean	93	103	95	***
St. dev	78	67	84	

Note: *p<0,1; ** p<0,01; *** p<0,001; Source: author's own calculation.

The average level of bank financing for the whole sample is app. 20% (while the average for all the companies in Polish economy is 12%). This means that listed companies are more willing to use bank financing than the average Polish company. Low bank dependent companies show that on average only 7% of their total assets is financed by the bank, while high bank dependent companies show the average 37% (three times higher than the average for companies in Poland).

Low and high bank dependent companies differ significantly. The U Mann-Whitney Z statistics and p-value are the evidence of differences with statistical significance. In almost each proxy they present statistically significant diversity. Generally, low bank dependent companies are smaller, have lower tangibility, have lower profitability, but higher financial liquidity (both current and quick), lower cash holdings and lower net working capital ratio. Low bank dependent companies have shorter cash conversion cycle and this is the result of shorter DIO, longer DSO and longer DPO. Because low bank dependent companies are smaller they have also smaller negotiating power and that is why to sell their product they should offer longer deferred payment and try to pay their payables later.

Both group of companies do not differ as for the growth rate of sales revenue (GROWTH) and assets (INVEST). As we assume to find a relation between variables, we first calculated the correlation coefficients. The Pearson's pairwise correlation matrix of the variables used in our study is depicted in Table 2 from Annex 1.

Generally, profitability (ROS, ROA, ROE) is positively correlated with CASH, NWCR, GROWTH, SIZE, but negatively with INVEST, TANG. This means that that bigger companies are more profitable. But companies having more fixed assets are less profitable. Only ROS is correlated with financial liquidity (CR, QR, CCC) and turnover ratios and this relation is negative. Other measures of profitability are weakly correlated with financial liquidity. This means that higher profitability is connected with lower turnover ratios.

Financial liquidity (CR and QR) is positively correlated with CASH, GROWTH, and turnover ratios, but negatively SIZE, TANG, and Bank Financing. This means that bigger companies and companies having more fixed assets have lower financial liquidity. Companies with low use of bank financing have higher financial liquidity. This is quite understandable as companies with high financial liquidity do not need external financing.

CASH is positively related to all measures of profitability (ROS, ROA, ROE), but negatively with SIZE, TANG, Bank Financing and turnover ratios. The more profitable company the more cash pool. This might mean that the main source of cash is net profit. The bigger company is and the more fixed assets possesses the lower cash pool. And the more cash pool the lower use of bank financing.

NWCR is positively related to SIZE, DIO and DSO and negatively to CASH, GROWTH, TANG, Bank Financing and DPO. CCC is positively related with NWCR, GROWTH, turnover ratios. Turnover ratios (DIO, DSO, DPO) are positively related to the financial liquidity (CR and QR, CCC and NWCR) but negatively related to profitability (ROS, ROA, ROE) and SIZE and TANG.

SIZE has positive impact on profitability but negative on the financial liquidity (CR, QR, CASH). SIZE is negatively correlated with GROWTH and INVEST but positively with TANG. SIZE of the company is positively related to the profitability but not to financial liquidity. This means that the bigger company is the more profitable it is and the lower financial liquidity it has.

TANG is negatively related to profitability and financial liquidity, GROWTH and INVEST. This means that companies having more fixed assets are less profitable and have lower financial liquidity, grow slower and invest less. GROWTH depends on profitability and financial liquidity (positive sign). INVEST depends on GROWTH (positive sign) and profitability and SIZE (negative sign).

Bank financing depends on size and tangibility with positive signs – the bigger company and the more has fixed assets the more bank financing use. Bank financing depends also on financial liquidity but negative sign – the higher financial liquidity the less bank financing. This is justified as the companies that have access to liquid assets (have higher financial liquidity) do not need additional funds. But the bank financing is negatively related to ROA and ROS, and positively to ROE. The higher ROE and lower ROA the more bank financing is used by companies. This relation is justified by the positive effects of financial leverage that comes from the positive difference between ROE and ROA. The positive difference between ROE and ROA shows that the companies might use debt safely. To achieve positive difference between ROE and ROA company should have high ROE and low ROA.

3.2. Regression analysis results

To detect what impact had the financial crisis on profitability and financial liquidity we employed regression analysis. Dependent variable was profitability, financial liquidity and turnover ratios, independent variables was dummy variables for analyzed sub-periods (PRECRIS, CRIS, SACRIS, LACRIS). Because all our control variables are correlated with each other we decided on not including these variables into our models.

We assumed to find negative changes in profitability (decrease) during financial crisis and positive (increase) before and after financial crisis). We also assumed to find that high bank dependence companies react more radically to financial crisis. The results of regression analysis are presented in the Table 3 (for profitability ratios), 4 (for financial liquidity ratios) and 5 (for cash conversion cycle and turnover ratios).

Table 3. Regression analysis results for profitability

Sample	Total sample			Low bank dependent companies			High bank dependent companies		
	ROA	ROS	ROE	ROA	ROS	ROE	ROA	ROS	ROE
PRECRIS	0.100 ***	0.024 *	0.056 ***	0.088 *	0.031	0.069 *	0.174 ***	0.139 ***	0.190 ***
CRIS	-0.031 **	0.008	-0.012	-0.044	0.010	-0.039	-0.111 **	-0.092 *	-0.169 ***
SACRIS	0.004	-0.029 *	-0.004	-0.099 *	-0.063	0.002	-0.201 ***	-0.185 ***	-0.207 ***
LACRIS	-0.010	-0.018	-0.016	-0.120 **	-0.041	-0.169 ***	-0.210 ***	-0.140 ***	-0.194 ***
R square	0.011	0.002	0.004	0.012	0.005	0.026	0.038	0.025	0.037
F, p-value	31,675 ***	6,424 ***	12,206 ***	3,434 *	1,367	7,626 ***	11,407 ***	7,365 ***	11,058 ***

Note: *p<0,1; ** p<0,01; *** p<0,001; Source: author's own calculation.

The pre-crisis period had positive impact on the profitability. In the crisis period there are significant changes in profitability (ROS and ROA) with negative signs. This is the evidence proving that Polish companies do not react dramatically to the financial crisis. After the crisis (both in short and long term) there are no statistically changes although the beta is negative which means negative impact on profitability. This might indicate delayed effects of the financial crisis on the Polish companies.

There are more statistically significant betas in all regression models for high bank dependent companies. This means that the changes in economic conditions have bigger impact on these group of companies. Their profitability reacts dramatically to changes stemming from different economic conditions (pre-crisis, crisis, post-crisis).

In the pre-crisis period the profitability of both low and high bank dependent companies increased (positive sign), while during crisis and after the financial crisis the profitability of high bank dependent companies decreased dramatically. At the same time the profitability of low bank dependent companies did not change significantly. This discrepancy proves that high bank dependent companies observed bigger negative reaction in profitability during financial crisis comparing to low bank dependent companies.

As for the time after crisis, there are negative reactions in profitability for both subsamples and again they are bigger (and with stronger statistical significance) for high bank dependent companies. Negative reaction in profitability both in short and long term after crisis is the evidence for delayed effects of financial crisis on Polish companies.

In the pre-crisis period the CR and QR declined. This means that the financial liquidity (CR and QR) decreased in good times. The company in good economic environment might decrease their safety as the economic conditions are relatively safe. What is important, financial liquidity did not change dramatically during financial crisis and after financial crisis. But during the financial crisis the financial liquidity still decreased slightly while in the after financial crisis increased slightly. Increase in financial liquidity means that companies try to increase their safety buffer. And these changes took place after the financial crisis which indicate delayed effects of financial crisis.

CASH increased in the pre-crisis period, and it was the result of good economic situations. During financial crisis it decreased slightly but after financial crisis the cash tended to decrease. Increase in CASH before crisis means that companies were cash rich due to good economic time. While during and after financial crisis the worsening economic conditions made the companies

Table 4. Regression analysis results for financial liquidity

Sample	Total sample				Low bank dependent companies				High bank dependent companies			
	CR	QR	CASH	NWCR	CR	QR	CASH	NWCR	CR	QR	CASH	NWCR
PRECRIS	-0.022 *	-0.012	0.114 ***	-0.038 **	-0.038	-0.041	0.196 ***	0.106 **	-0.051	0.052	0.270 ***	-0.017
CRIS	-0.007	-0.001	-0.012	0.038 ***	0.051	0.042	0.130 **	0.058	0.050	-0.070 *	-0.275 ***	0.052
SACRIS	0.011	0.005	-0.058 ***	-0.007	-0.007	-0.006	-0.138 ***	0.002	0.090 *	-0.040	-0.279 ***	0.040
LACRIS	-0.002	0.009	-0.020	-0.069 ***	0.006	0.015	0.088 *	0.106 **	0.013	-0.046	-0.256 ***	-0.041
R square	0.000	0.000	0.022	0.004	0.005	0.005	0.027	0.058	0.007	0.003	0.073	0.007
F, p-value	1,175	0,971	65,632 ***	11,781 ***	1,507	1,396	7,904 ***	17,694 ***	1,904	0,976	22,650 ***	2,056

Note: *p<0,1; ** p<0,01; *** p<0,001 Source: author's own calculation.

NWCR decreased in the pre-crisis period, increased during financial crisis and decreased after which again means the companies reacted to changes in economic conditions. This might mean that good economic conditions result in decreasing net working capital but worsening economic condition in the long term (after financial crisis) forced the companies to use the liquidity reserves.

As for financial liquidity (CR and QR) there are no specific differences in changes for both groups of the companies (low and high dependent). This means that both group of companies did not react dramatically due to financial crisis. But high bank dependent companies changed their cash pool level radically. It decreased significantly during and after financial crisis not changing the overall level of financial liquidity and net working capital. This means that both group of companies changed their financial liquidity in similar way with high bank dependent companies changing their cash pool more radically. The data again shows delayed effect of financial crisis (negative changes with statistical significance long after financial crisis).

Table 5. Regression analysis results for net working capital elements

Sample	Total sample				Low bank dependent companies				High bank dependent companies			
	CCC	DIO	DSO	DPO	CCC	DIO	DSO	DPO	CCC	DIO	DSO	DPO
PRECRIS	-0.003	-0.052 ***	0.015	-0.045 ***	0.015	-0.010	-0.002	-0.060 *	-0.044	0.043	0.043	-0.050
CRIS	-0.003	0.052 ***	-0.008	0.034 *	0.054	0.014	-0.015	0.006	0.038	0.054	0.001	0.042
SACRIS	0.018	0.046 ***	0.020	0.046 ***	-0.071 *	0.026	0.028	0.083 *	0.046	0.063	0.005	0.005
LACRIS	-0.006	0.056 ***	-0.011	0.056 ***	-0.108 **	-0.081 *	-0.007	0.092 *	-0.132 **	-0.054	-0.052	-0.082 *
R square	0.000	0.003	0.001	0.002	0.014	0.007	0.001	0.010	0.021	0.003	0.006	0.007
F, p-value	1,328	7,829 ***	2,383 *	6,831 ***	3,895 **	20,86 *	0,389	2,751 *	6,141 ***	0,822	1,731	1,966

Note: *p<0,1; ** p<0,01; *** p<0,001; Source: author's own calculation.

Cash conversion cycle do not show any statistically significant changes. This might mean that the changes in its elements (inventory, receivables, payables) neutralize the changes in CCC. The biggest changes are present in inventory and payable turnover ratios. DIO decreased before crisis and increased during and after financial crisis.

Increase in inventory turnover ratios means that the companies had problems with selling their goods and services. Similar changes are present as the payable turnover ratio is concerned. DPO decreased before crisis and increased during and after financial crisis. Increasing payable turnover ratio means that the companies have problems with repaying the liabilities. The receivables turnover ratio did not change significantly.

The changes in turnover ratios are more significant for low bank dependent companies with decrease in cash conversion cycle after the crisis, decrease in DIO after the crisis and increase in DPO after the crisis. Increase in payable turnover ratios means that these companies had problems with repaying their liabilities. As for the high bank dependent companies there are changes in CCC – decrease long after financial crisis and in DPO – again decrease long after financial crisis.

3.3. Profitability-financial liquidity correlation coefficient

To detect the relation between profitability and financial liquidity we calculated the correlation coefficient between all measures of profitability (ROS, ROA, ROE) and financial liquidity (CR, QR, NWCR, CASH, CCC) and between profitability (ROS, ROA, ROE) and net working capital elements (DIO, DSO and DPO). The correlation coefficient is calculated for each sub-period (PRECRIS, CRIS, SACRIS, LACRIS). We did all the calculations both for the sample and for two subsamples (with low and high bank dependence).

We assumed to find negative relation between profitability and liquidity – increase in financial liquidity is accompanied by decrease in profitability during financial crisis and decrease in financial liquidity with increase in profitability before and after financial crisis.

In the Table 6 we present only the results showing statistically significant correlation coefficient. We give up presenting correlation coefficient that are not statistically significant.

Table 6. The results of correlations analysis between profitability and financial liquidity

Period	Total sample	Low bank dependent companies	High bank dependent companies
PRECRIS	ROS-CASH: 0.108*** ROS-NWCR: 0.072*** ROS-CCC: 0.181*** ROA-CR: 0.045** ROA-CASH: 0.082*** ROA-NWCR: 0.146*** ROE-CASH: 0.053**	ROS-CCC: -0.141* ROA-CCC: -0.153*	ROS-CR: 0.410*** ROS-QR: 0.*** ROS-CASH: 0.244*** ROA-CR: 0.202** ROA-CASH: 0.152*
CRIS	ROS-CR: -0.057** ROS-QR: -0.061** ROS-CCC: 0.139*** ROA-CASH: 0.088*** ROA-NWCR: 0.108*** ROA-CCC: 0.078*** ROE-CCC: -0.073***	ROS-CR: 0.294*** ROS-QR: 0.297*** ROS-CCC: -0.373*** ROA-CR: 0.151* ROA-QR: 0.147* ROA-NWCR: 0.140* ROE-NWCR: 0.137*	ROS-QR: 0.168* ROS-CASH: 0.193** ROE-CASH: 0.240***
SACRIS	ROS-CR: -0.086*** ROS-QR: -0.093*** ROS-NWCR: 0.104*** ROS-CCC: 0.177*** ROA-CASH: 0.113*** ROA-NWCR: 0.117*** ROA-CCC: 0.089*** ROE-NWCR: -0.054* ROE-CCC: -0.145***	ROS-NWCR: 0.328*** ROS-CCC: 0.388*** ROA-NWCR: 0.292*** ROA-CCC: 0.289*** ROE-NWCR: -0.371*** ROE-CCC: -0.728***	ROS-CR: 0.150* ROS-NWCRA: 0.226*** ROS-CCC: 0.185** ROA-NWCR: 0.241*** ROE-NWCR: 0.246***
LACRIS	ROS-CASH: 0.067** ROS-NWCR: 0.126*** ROS-CCC: 0.053* ROA-CASH: 0.138*** ROA-NWCR: 0.171*** ROA-CCC: 0.102*** ROE-NWCR: 0.062** ROE-CCC: 0.046*	ROA-CR: 0.148* ROA-QR: 0.142* ROA-CASH: 0.146* ROE-CASH: 0.167* ROE-NWCR: 0.421***	ROS-NWCR: 0.191** ROS-CCC: 0.281*** ROA-NWCR: 0.282*** RA-CCC: 0.313*** ROE-CASH: -0.139*

Note: *p<0,1; **p<0,01; ***p<0,001; Source: author's own calculation.

We found that the relation between profitability and financial liquidity is mostly positive. For the whole sample the positive relation is present in the pre-crisis period and long after crisis. For high bank dependence companies, the positive relation is present in pre-crisis, crisis and short after crisis period. For low bank dependent companies, the positive relation is present long after financial crisis.

The positive relation between profitability and financial liquidity during and after financial crisis represent the situation when decrease in profitability is accompanied by decrease in financial liquidity. The positive relation between profitability and financial liquidity present after financial crisis might indicate that the negative effects of the financial crisis are more severe not only during the financial crisis but also after. The negative relation between profitability and financial liquidity is present when ROE or ROS is taken into account before crisis.

Next step of our analysis is to find any relation between profitability and net working capital elements. We assumed to find negative relation between profitability and net working capital elements – increase in financial net working capital elements is accompanied by decrease in profitability during financial crisis and decrease in net working capital elements with increase in profitability before and after financial crisis.

In Table 7 we present only the results showing statistically significant correlation coefficient. We give up presenting correlation coefficient that are not statistically significant.

Table 7. The relations between net working capital elements and profitability

Period	Total sample	Low bank dependent companies	High bank dependent companies
PRECRIS	DIO-ROS: 0.073*** DIO-ROE: 0.144*** DSO-ROS: 0.124*** DPO-ROS: -0.053*	DIO-ROA: -0.148* DSO-ROA: -0.157*	DIO-ROS: 0.290*** DIO-ROA: 0.357*** DIO-ROE: 0.357*** DPO-ROS: 0.222*** DPO-ROA: 0.168* DPO-ROE: 0.156*
CRIS	DIO-ROA: -0.043* DPO-ROS: -0.094*** DPO-ROA: -0.137*** DPO-ROE: -0.056*	x	DSO-ROA: -0.229** DSO-ROE: -0.195** DPO-ROS: 0.210**
SACRIS	DSO-ROS: -0.135*** DSO-ROA: -0.141*** DSO-ROE: -0.061** DPO-ROS: -0.101*** DPO-ROA: -0.201*** DPO-ROE: -0.093***	DSO-ROE: -0.259*** DPO-ROS: 0.271***	DSO-ROA: -0.186** DPO-ROS: -0.285*** DPO-ROA: -0.368*** DPO-ROE: -0.321***
LACRIS	DIO-ROA: -0.046* DSO-ROS: -0.117*** DSO-ROA: -0.135*** DSO-ROE: -0.064** DPO-ROS: -0.150*** DPO-ROA: -0.193***	DSO-ROS: -0.524*** DSO-ROA: -0.156* DSO-ROE: -0.146* DPO-ROS: -0.542*** DPO-ROE: -0.160*	DIO-ROS: 0.192** DPO-ROS: 0.225**

Note: * $p < 0,1$; ** $p < 0,01$; *** $p < 0,001$; Source: author's own calculation.

As for the relation between profitability and turnover ratios there are more negative signs especially for the total sample during and after financial crisis, low bank dependent companies before and long after financial crisis and high bank dependent companies short after financial crisis. This means that the negative relation between profitability and financial liquidity is more noticeable when financial liquidity is defined on the basis of turnover ratios.

Conclusions and discussion

The aim of the paper was to find the impact of financial crisis on profitability, financial liquidity, net working capital elements and the relation between profitability and financial liquidity. We did it by including two additional dimensions: time dimension (that refers to the time before, during and after financial crisis) and companies' dependence on bank financing (companies that rely and do not rely on the bank financing).

Our analysis covers the country that was perceived as one resistant to financial crisis – Poland. The analysis was conducted for panel listed companies sample of 183 companies present on Warsaw Stock Exchange for the whole period of 2005-2016. We based our analysis on quarterly financial data which give us 8784 observations (quarter-company observation for the panel data of 183 listed companies over 12 years).

Before financial crisis the profitability increased, financial liquidity and net working capital elements decreased. This proves that companies felt quite safe and could decrease financial liquidity in order to prioritize

profitability. But as for the impact of financial crisis on profitability and financial liquidity we found ambiguous results. We found that Polish companies seem to be quite resistant to the financial crisis impact in general. Their reaction to financial crisis in terms of profitability and financial liquidity (CR, QR) is quite weak. The proxy of financial crisis had no or weak impact on the dependent variables describing profitability and financial liquidity. Cash holdings decreased during and after financial crisis which is consistent with Kahle and Stulz (2013) findings. This is consistent with the research results of Duszczuk 2014, Dogaru 2016, Terazi and Senel 2011, Kozub-Idzkowska and Proniewski 2011 that present the notion of weak Polish companies reaction to financial crisis. This is at the same contradictory to the notion that countries that have low bank concentration should expose economy to a bigger negative reaction to financial crisis (Gonzales 2015, Berlin and Mester 1999, Petersen and Rajan 1995). The financial crisis had no impact on cash conversion cycle which contradicts the previous research of Ramiah *et al.* (2014). The strongest impact of financial crisis was on turnover ratios – DIO and DPO increased during and after financial crisis. These findings confirm partially findings of Daisuke (2017) and Vu and Phan (2016).

What is important, if the financial crisis had an impact on profitability, financial liquidity and net working capital elements it was long term impact on Polish companies. There is stronger negative effect of the financial crisis on profitability and financial liquidity long after the financial crisis. This is consistent with the finding that financial crisis had long-lasting effects (Prasad *et al.* 2015). To sum up, we can only partially confirm hypothesis 1, hypothesis 2 and hypothesis 3 assuming radical impact of financial crisis on profitability, financial liquidity and net working capital elements.

We found both positive and negative relation between profitability and financial liquidity for the whole sample and whole period. Negative relation is present as the ROS is a measure of profitability and CR, QR, CCC is a measure of financial liquidity. Positive relation is present when ROS and ROE are the measures of profitability and CASH is a measure of financial liquidity and when ROA is a measure of profitability and NWCR and CASH are the measures of financial liquidity. So we can both support and contradict at the same time all the research findings referring to the relation between profitability and financial liquidity (Jose *et al.* 1996, Eljelly 2004, Raykov 2017). What is important, we can see clearly that profitability (ROS, ROA and ROE) is negatively related with turnover ratios (DIO, DSO and DPO).

Looking deeper into the relation between profitability and financial liquidity we found that in the pre-crisis period the relation was positive. There is present negative relation during and short after financial crisis especially when ROS is a measure of profitability. This means that decrease in profitability (mostly ROS and ROE) is accompanied with the increase in financial liquidity (mostly CR and QR). But when turnover ratios are concerned there is noticeable only negative relation between profitability and turnover ratios during and after financial crisis. This is evidence that the decrease in profitability was accompanied by increase in turnover ratios. Again this changes in the relation between profitability and financial liquidity are noticeable in the long term which confirms although weak but long lasting effects of financial crisis on Polish companies. To sum up, we can partially confirm the hypothesis 4.

As for companies with low and high bank dependence we found different reaction to the financial crisis. Low bank dependent companies are smaller, have lower tangibility, have lower profitability, but higher financial liquidity (both current and quick), lower cash holdings and lower net working capital ratio. Low bank dependent companies have shorter cash conversion cycle and this is the result of shorter DIO, longer DSO and longer DPO. Because low bank dependent companies are smaller they have also smaller negotiating power and that is why to sell their product they should offer longer deferred payment and try to pay their payables later.

But it was high bank dependent companies that underwent the financial crisis more heavily – their profitability decreased radically during financial crisis time but also after financial crisis (in the short and long-term). As for financial liquidity the cash holdings decreased to a more extent during and after financial crisis. But there were almost no changes in cash conversion cycle and net working capital elements. Our findings are consistent with previous research showing that high dependence on bank financing make the companies more vulnerable to changes in economic conditions (Chava, Purnanandam 2011). To sum up, we could fully confirm the hypothesis 5.

To sum up, we found that Polish companies seem to be quite robust. Their reaction to financial crisis weak. The proxy of financial crisis had no or weak impact on the dependent variables describing profitability and financial liquidity. Cash holdings decreased during and after financial crisis. The strongest impact of financial crisis was on turnover ratios – DIO and DPO increased during and after financial crisis.

What is important, if the financial crisis had an impact on profitability, financial liquidity and net working capital elements it was long lasting impact on Polish companies. There is stronger negative effect of the financial crisis on profitability and financial liquidity long after the financial crisis.

We found both positive and negative relation between profitability and financial liquidity for the whole sample and whole period. But we can see clearly that profitability is negatively related with turnover ratios. This is evidence that the decrease in profitability was accompanied by increase in turnover ratios. As for companies with low and high bank dependence we found that high bank dependent companies that underwent the financial crisis more heavily – their profitability and financial liquidity decreased radically during financial crisis time but also after financial crisis (in the short and long-term).

Our study is not free of limitations. We focused on the financial crisis as the only reason of changes in the financial ratios. But we found that control variables are strongly correlated with each other. The limitations give ground for future research as we can extend our future research. It seems reasonable to consider e.g. tangibility or size or industry belongings as other factors affecting financial ratios. Another limitation is concentration on one country only. It seems reasonable to consider comparative analysis including several countries with different specificity (e.g. different bank concentration rate).

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Table 2. Correlation matrix

Variables	ROA	ROS	ROE	CR	QR	CCC	NWCR	CASH	GROWTH	INVEST	SIZE	TANG	BankFin	DIO	DSO
ROS	0.195***	1													
ROE	0.233***	-0.073***	1												
CR	0.014	-0.043***	-0.004	1											
QR	0.012	-0.048***	-0.004	0.981***	1										
CCC	0.005	-0.317***	-0.005	0.008	0.002	1									
NWCR	0.108***	0.069***	-0.002	0.049***	-0.019*	0.039***	1								
CASH	0.108***	0.055***	0.039***	0.128***	0.134***	-0.004	-0.072***	1							
GROWTH	0.067***	0.021**	0.008	0.066***	0.063***	0.019*	-0.025*	0.016	1						
INVEST	-0.097***	0.009	-0.112***	-0.001	0.000	0.000	0.004	0.013	0.190***	1					
SIZE	0.026**	0.035***	0.000	-0.108***	-0.11***	0.005	0.044***	-0.082***	-0.045***	-0.029**	1				
TANG	-0.037***	0.012	-0.027**	-0.131***	-0.096***	-0.011	-0.227***	-0.309***	-0.024*	-0.022**	0.241***	1			
BankFin	-0.031**	-0.106***	0.045***	-0.107***	-0.106***	-0.008	-0.015*	-0.139***	-0.002	-0.021**	0.087***	0.137***	1		
DIO	-0.029**	0.004	0.010	0.025*	-0.025**	0.229***	0.248***	-0.045***	-0.006	-0.007	-0.020	-0.118***	0.098***	1	
DSO	-0.081***	-0.076***	-0.039***	0.044***	0.055***	0.037***	0.034**	-0.019	-0.030**	0.017	-0.099***	-0.111***	-0.008	0.010	1
DPO	-0.120***	-0.101***	-0.022*	0.022*	0.018	0.216***	-0.199***	-0.001	0.027*	0.025*	-0.028**	-0.050***	0.095***	0.219***	0.427***

Note: *p<0,1; ** p<0,01; *** p<0,001

Source: author's own calculation.

Causative Factors of Consumer Engagement in National Commercial Banks in Padang, Indonesia

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Abstract:

This study investigated the causative factors of customer engagement in national commercial banks (BCA Bank, BRI Bank, Mandiri Bank, BNI Bank, CIMB Niaga Bank) in Padang, Indonesia. Data source were primary data obtained from questionnaire of the respondent customers. Results of Structural Equation Modeling (SEM) showed that customer engagement in national commercial banks in Padang were influenced by the service performance and customer relationship management through customer satisfaction in Padang as the mediating variable.

Keywords: customer relationship management; service performance; customer satisfaction; customer engagement.

JEL Classification: G21; G23.

Introduction

After the financial crisis of 1997-1998 there were a lot of government banks and private banks in Indonesia which had to be closed because of the deteriorating financial condition caused by a violation of the rules and regulations made by the management. However, various efforts and attempts have been made by the government to public confidence in the Bank to be good, people are willing to re-use the services of the Bank. The efforts taken by the government include improvement efforts and restructuring of the banking industry by changing the structure of ownership and deregulation in the banking sector. This situation resulted in the change of competition, so that industry performance has endeavored to increase, the level of profitability has improved as indicated by increasing return on assets (ROA). But it does not indicate the true performance because approximately 40% of revenues are still derived from securities that zero risk assets (SBI and government bonds), although the ratio of operating expenses to operating income which reflects the level of efficiency is also increased. The capital adequacy ratio of ten large banks average has been above 8% and non-performing loans below 5%.

This indicates that the big banks do not have the ability to better appeal in the profit of small banks or foreign banks owned by the same as a bank owned by the State. This means that large banks in Indonesia do not have market power that caused them to get excess profit (Sucianti and Naomi 2009). With the attention of Indonesian

Bank and the government to the banking industry, banking performance should continue to rise with several countries in the ASEAN banking, but in reality the performance of banks remains relatively stagnant.

The growth in credit transactions of third party fund in national commercial bank (BCA Bank, BRI Bank, Mandiri Bank, BNI Bank, CIMB Niaga Bank) in Padang tends to decrease. Indonesian Bank of Padang showed the growth of third party funds in 2016 only amounted to Rp.34,1 trillion or slowed by 7.87% compared to 2015 which reached 11.3%.

On the other hand, then the transaction volume of bank credit and the addition of debit transaction banking in national commercial banks in Padang tends to decrease, this is caused by incapacity of bank in building customer engagement, where 65.9% of customers feel less bound by the bank, because of their activities with banks only in the savings or deposits and demand deposits. While 22.2% of customers feel bound by the bank because it has no credit loans collateral in the bank, in which to refund the monthly use of savings bank account number/deposit/current accounts with customers in the bank, so the savings credit transactions continue to be made each month. Similarly, 1.9% of customers feel very attached, because they have a home or car ownership loan, so that their bank account is only for the loan repayment.

This phenomenon indicates that customers have less engagement characterized by having several savings accounts in several banks, so there is a decision process (discharge) at the bank, but saving money (credit) on the other bank by the same customer. These conditions encourage customers tend to be rational loyalist. Customers who do not have a loan at a bank, is less tied to the commercial bank, making it less profitable for the bank. On the other hand, this phenomenon also shows the lack of success in establishing a common banking customer engagement through retention efforts as well as the creation of programs migration barrier on both products.

1. Literature review

The phenomenon of the lack of engagement to customers and banks can also be derived from the presence of some elements such as the lack of confidence of customers related to the bank (confident), customers are less credible associated with the bank (integrity), customers are less felt served with passion or enthusiasm (passion) and customers are less proud associated with the bank (pride). Some researches related to bank have been conducted (Boedi 2019, Wati 2019).

Patterson (2016) explained that customer satisfaction affects customer engagement. Companies which are able to maintain the satisfaction of their customers will be able to increase the number of customers, in addition to the performance of services and relationship. This means that the banking industry's perception of service performance is very close to the customer, so the perception of service performance tends to directly influence the engagement of customer.

Then Kumar and Gangal (2012) explained that there is a positive effect of customer satisfaction on customer engagement, low engagement of national commercial banks customers tends to be caused by lower customer satisfaction. It refers to the results of a survey conducted by Marketing Research Indonesia 2014 in four cities, Jakarta, Bandung, Pekanbaru and Banjarmasin. Customers are less satisfied, indicated by dissatisfaction with aspects of service personnel front liner, such as officer security guards over the service so that it does not make the customer comfortable. As well as customer service representative, teller and a telephone receiver that their skills could not keep abreast of ever-increasing customer expectations.

Chen (2011) stated that customer relationship management is a comprehensive approach to create, maintain and enhance relationships with consumers where customer retention is much cheaper for companies than to find new customers. Companies should always strive to offer new opportunities to create more individualized relationship between the seller and the customer (Hunt 2011). This was confirmed by the results of research Mohagar and Gashemi (2011). Thus, it costs five times to get a new customer than to retain someone who is already a customer.

Furthermore, Bena (2010) explained that the customer satisfaction of a bank has several dimensions, namely satisfaction at the time of transaction, ease of access to the bank, the satisfaction on the quality of relationships, bank reactions on complaints of customers, satisfaction in service promotions bank, satisfaction at the communication, satisfaction of operational hour. Besides, the dimensions of the bank's customer satisfaction are the satisfaction of the branch of service, satisfaction in product and service quality, satisfaction on the availability of branches in a particular location, the satisfaction in e-banking, branch personnel satisfaction in hospitality, satisfaction at the development of the ATM network. Kumar and Ganggal (2012) found that the dimensions of the bank's customer satisfaction are the bank branch, account number management, handling of inquiry.

Navaratnase and Elangkumaran (2014) conducted a study on the customers of commercial banks that service performance is a significant positive impact on customer satisfaction, therefore maintaining high quality

services in commercial banks will have customer satisfaction very well where low quality service will cause a decrease in satisfaction customers, and also can lead to loss of customers.

Teimuori (2013) analyzed the impact of service quality dimensions on customer satisfaction in the banking industry in Iran. Results found that the dimensions' responsiveness have the greatest impact on customer satisfaction and loyalty. Among the dimensions of service performance, and the two dimensions of reliability and empathy do not have a significant impact on customer satisfaction. Taleghani (2011) conducted a study in Saudi showed that the intensity of the relationship and customer satisfaction is 90%. In other word, 81% of the change of customer satisfaction can be explained by the benefits of the relationship. Khandabi (2014) also conducted research on banks in India about the influence of relationship marketing on customer satisfaction which shows that the dimensions of the marketing relationship have positive and significant impact on the level of customer satisfaction. Dimension "trust" has the greatest influence and dimension "shared values" have the lowest effect on customer satisfaction. Puriwat and Tripopsalkul (2014) conducted research on the effect of service quality on customer engagement various industries in Thailand. Results found that the performance of services has a significant positive relationship towards customer engagement. The study by Goetz (2014) showed that the moderating had positive results and significant impact on customer engagement on brand image and relationships.

Furthermore, Malthouse (2013) found that the customer relationship management must evolve if it wants to survive in the market, by producing the contact point of engagement desired customer and deliver value for both companies and consumers. Soliman (2011) found that the relationship with customer relationship management performance affected positively and significantly on financial institutions. Bena (2010) also found that customer satisfaction in banking management services focus on service to the customer satisfaction evaluation approach in banks in Romania.

Yao (2011) used framework to analyze the data collected from a questionnaire survey and found that factors of assurance and tangibles had significant effect on customer satisfaction. Dharmayanti (2006) conducted a study on savings customers of Mandiri Bank in Surabaya branch. Result found that the interaction between service performance and customer satisfaction as mediating variables can better explain variations in customer loyalty than each variable.

Furthermore, Kumar (2010) provided a comprehensive framework that can eventually lead to more efficient marketing strategy to contribute better long term for the customer. Result found that it is very important for banks to obtain useful feedback about the response time and the perception of quality of service to customers. Retail bank, which in turn will help in taking positive steps to maintain a competitive advantage research is very helpful for new banks in India.

Hawari and Ward (2006) conduct research on the impact of service quality automatically on financial performance and the mediating role of customer satisfaction with the bank in Australia. Result showed that customer satisfaction was confirmed as a mediator in the relationship between the automated service quality and financial performance. Caruana (2002) also conducted research on the influence of the quality of service and a mediating role in customer satisfaction. The study found that customer satisfaction mediates the relationship in service quality significantly.

Muniz and O'Guinn (2001) argued that communities can strengthen customer loyalty and customer commitment. According to Reichheld (2000) and Zhang (2010) community of customers is the most excellent tool to bind and create customer loyalty. Hunt (2000) also stated that the commitment was instrumental in developing customer loyalty.

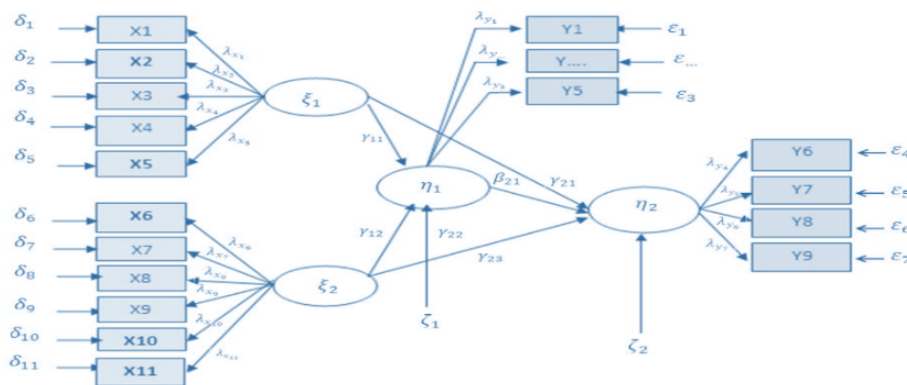
From the previous description, it was conducted a study on causative factors of consumer engagement in national commercial banks (BCA Bank, BRI Bank, Mandiri Bank, BNI Bank, CIMB Niaga Bank) in Padang and factors that act as a mediator variable on customer engagement.

2. Methodology

This research is descriptive which aims to describe and examine the relationship service performance and customer management as independent variable that affect the customer satisfaction and customer engagement as dependent variable with Structural Equation Modeling (SEM). The unit of analysis in this study are customers of the national commercial banks (BCA Bank, BRI Bank, Mandiri Bank, BNI Bank, CIMB Niaga Bank) in Padang. Based on the description of the theory, hypotheses and framework can be formulated as follows:

- H1: there is an effect of service performance on customer satisfaction in national commercial banks in Padang.
- H2: there is an effect of customer relationship management on customer satisfaction in national commercial banks in Padang.
- H3: there is an effect of customer service performance on attachment in national commercial banks in Padang.
- H4: there is an effect of customer relationship management on customer engagement in national commercial banks in Padang.
- H5: there is an effect of customer satisfaction on customer engagement in national 6 commercial banks in Padang.
- H6: there is an effect of service performance on customer engagement and customer satisfaction as mediating in national commercial banks in Padang.
- H7: there is an effect of customer relationship management on customer engagement and customer satisfaction as mediating in national commercial banks in Padang.

Figure 1. Framework based on SEM model



Where: ξ_1 = service performance; ξ_2 = customer relationship management; η_1 = customer satisfaction; η_2 = customer engagement; X1 - X5 = Manifest (Dimension) of service performance; X6 - X11 = Manifest (Dimension) of customer relationship management; Y1 - Y5 = Manifest (Dimension) of customer satisfaction; Y6 - Y9 = Manifest (Dimension) of customer engagement.

3. Research findings and discussions

Table 1. R² Value

Servqual	R Square
Customer relationship management on customer satisfaction	0.628284
Customer satisfaction on customer engagement	0.541781

Source: SPSS 18.0 processing

Table 2. Summary of inter-variable decomposition effect

	Customer Satisfaction	Customer Engagement
Service Performance	-0.012260	-0.051563
Customer Relationship Management	0.794272	0.574431
Customer Satisfaction		0.799777

Source: SPSS 18.0 processing

The reliability value of each variable research was very greater than 0.7 and met the criteria of composite reliability. The result of discriminant validity test using the output test of average variance extracted (AVE) was greater than 0.5, thus all latent variables in this study had a very good discriminant validity. Cross loading value obtained (0.880051) also showed a good level of discriminant validity with X1 dimension on variable service

performance, which was greater than cross loading value X1 with customer relationship management of 0.536453, satisfaction variable of 0.441053, and customer engagement variable of 0.281430. The value of the cross loading dimension with its variable was greater than the cross loading with other variables. Based on discriminant validity test results, the square root value of AVE on latent variable was greater than 0.7 and the correlation value with all other latent variables that have good discriminant validity.

Table 3. Summary results of hypothesis test

Hypothesis	Variables	Standardize/ Determination coefficient	T/F-value	Statistical inference
H1	Service Performance -> Customer Satisfaction	0.006224	0.316189	Rejected
H2	Customer Relationship Management -> Customer Satisfaction	0.784808	28.510207	Accepted
H3	Service Performance -> Customer Engagement	-0.032170	4.389801	Accepted
H4	Relationship Management -> Customer Engagement	0.566707	21.471630	Accepted
H5	Customer Satisfaction -> Customer Engagement	0.019310	2.109292	Accepted
H6	Service Performance -> Customer Satisfaction -> Customer Engagement	0.767299	71.887576	Accepted
H7	Customer Relationship Management -> Customer Satisfaction -> Customer Engagement	-0.088217	3.250602	Accepted

Source: SPSS 18.0 processing

The square root value of AVE on service performance variable was 0,746, greater than the correlation value between service performance with other variables of 0,669. The square root value of AVE on customer relationship management variable was 0,796, greater than the correlation value between customer relationship management with other variables of 0,786. The square root value of AVE on customer satisfaction variable was 0,769, greater than the correlation value between customer satisfaction with other variables of 0,730. The square root value of AVE on customer engagement variable was 0,754, greater than the correlation value between customer engagement with other variables of 0,539. Thus, the square root value of AVE was greater than the correlation value of other variables. This means that all the latent variables in this study had good discriminant validity. The AVE values for all variables in the study were ranged from 0.55 to 0.63. This proved that the AVE values of the research variable were greater than 0.5. The results indicated that all the indicators and dimensions of the variables had a good convergent validity. Thus, indicators and valid dimensions' measure each of the latent variables.

Furthermore, the value of R² indicated that the customer satisfaction variable can be explained by the service performance variable of 62.8%, the rest was explained by other variables. The customer engagement variable was explained by the customer satisfaction variable of 54,2%, the rest was explained by other variables.

T-statistics value of 0,3161 on first hypothesis (H1) was smaller than t-table of 1,645 at confidence interval of 95%, and df = 326, thus the first hypothesis was rejected. There was no influence of service performance on customer satisfaction. The second hypothesis (H2) stated that partially, there was an effect of customer relationship management on customer satisfaction, where t-statistics value of 28,51 was greater than t-table of 1,645 at confidence interval of 95% and df = 326. Partially, there was a positive and significant effect of customer relationship management on customer satisfaction. The third hypothesis (H3) stated that partially, there was an effect of service performance on customer engagement, where t-statistics value of 4,389 was greater than t-table of 1,645 at confidence interval of 95%, alpha level of 5%, and df = 326. There was a positive and significant effect of service performance on customer engagement.

T-statistics value of 21,47 on fourth hypothesis (H4) was greater than t-table of 1,645 at confidence interval of 95%, and df = 326. It indicated that there was a significant effect of customer relationship management on customer engagement. T-statistics value of 71,88 on fifth hypothesis (H5) was greater than t-table of 1,645 at confidence interval of 95%, alpha level of 5%, and df = 326. It indicated that there was a positive and significant effect of customer satisfaction on customer engagement. T-statistics value of 3,25 on sixth hypothesis (H6) was greater than t-table of 1,645 at confidence interval of 95%, alpha level of 5%, and df = 326. It indicated that there was an effect of service performance on customer satisfaction on customer engagement with customer satisfaction as mediating variable.

The beta value of -0.0122 on hypothesis 6 and 7 was greater than the effect of service performance on customer engagement total value of -0.05156. This proved that customer satisfaction variables mediate the effect of service performance on customer engagement negatively. It means that customer satisfaction decreased the effect of service performance on customer engagement. T-statistics value of 2,1 on seventh hypothesis (H7) was

greater than t-table of 1,645 at confidence interval of 95%, alpha level of 5%, and df = 326. It indicated that there was an effect of customer relationship management on customer engagement with customer satisfaction as mediating variable.

Conclusion

From the research, we can conclude several things as follows:

- There was no significant effect of service performance on customer satisfaction in national commercial banks in Padang;
- There was a positive and significant effect of customer relationship management on customer satisfaction in national commercial banks in Padang;
- There was a positive and significant effect of customer service performance on customer engagement in national commercial banks in Padang;
- There was a positive and significant effect of customer relationship management on customer attachment in national commercial banks in Padang;
- There was a positive and significant effect of customer satisfaction on customers attachment in national commercial banks in Padang;
- There was a significant indirect effect of customer service performance on customer engagement in national commercial banks in Padang with customer satisfaction as mediating variables;
- There was a significant indirect effect of customer relationship management on customer engagement in national commercial banks in Padang with customer satisfaction as mediating variables.

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Investment Strategies Using Beta and Dividend Yield

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Abstract:

This study aims at analyzing whether the dividend yield and beta can be applied on creating the investment strategies to beat the stock market. According to the data on the listed companies in Stock Exchange of Thailand during 1995 – 2018, it is found that the portfolios which consist of high-dividend yield and low beta stocks significantly yield a higher return than the stock market. The results show that the return of High Dividend and Low Beta Portfolio in the past 24 years from 1995 to 2018 was significantly higher than Stock Exchange of Thailand Total Return Index (SET TRI) for 19 years.

Keywords: trading strategy; high dividend yield; low systematic risk.

JEL Classifications: G11; G12.

Introduction

According to Gordon Growth Model (Gordon 1959, Gordon and Shapiro 1956) the expected return on a security consists of expected dividend yield and expected long-term growth rate. If the stock has higher expected dividend yield, it is likely to have higher expected return on a security. In addition, based on classic Capital Asset Pricing Model (CAPM) (Sharpe 1964, Lintner 1965, Mossin 1966), the micro view regarding the expected return and risk was expanded from the research of Markowitz (1952) and developed to macro view or overall economic view related to the expected return and risk. In other words, Markowitz's research mentioned the relationship between expected return and risk in the view of each investor on their appropriate portfolio allocation (individual optimization). However, the research conducted by Sharpe (1964), Lintner (1965) and Mossin (1966) suggested that, if all investors allocate the appropriate portfolio by analyzing mean and variance in accordance with Markowitz's notion with determination of additional conditions and assumptions, we will be able to identify the relationship between the expected return and risk in the form of general equilibrium.

Additional conditions and assumptions include:

- The investor is rational and risk averse investor;
- The investor has the equal period of investment;
- Existence of risk-free assets;
- All investors can take out loans or offer loans at the interest rate equivalent to the risk-free return rate;
- The capital market is perfectly competitive and frictionless.

Based on the above conditions and assumptions at equilibrium level, the asset price will be determined by demand and supply of the assets, meaning the investor behavior reflects the asset expected return. In other words, the expected return of each asset in the market must be determined risk-free rate, beta and market risk premium. According to the Capital Asset Pricing Model or CAPM, the beta value is used to measure systemic risk of stocks. According to the theory, the stock containing a higher beta value will have a higher systemic risk and supposed to have a higher expected return. The stock having the beta value higher than 1 shall bear a higher risk than the stock market which also should have a higher expected return than stock market while the stock having the beta value lower than 1 should have a lower risk than the stock market which should also have a lower expected return than the expected return on stock market.

This study aims at analyzing whether the dividend yield and beta value can be applied on creating the investment strategies to beat the stock market. It was found that the portfolios which consist of high-dividend yield and low beta stocks significantly yield a higher return than the stock market.

1. Literature review

Based on the related research and articles, it was found that the articles supporting investment in dividend stocks have been increasingly published, which reflects the potentials of dividend stocks to yield higher returns than other alternatives that yield lower dividend or growth shares as dividend is important for the overall returns. Examining equity returns for the 2000 years, Arnott (2003) concluded that dividends were the main important source of the real return investors would expect from stocks. Tweedy and Browne (2007) published the article "The high dividend yield return advantage: an examination of empirical data associating investment in high dividend yield securities with attractive returns over long measurement periods" with the aim of investigating the return which is higher than the market in the past period by using the stocks with top 20 dividend yield in S&P 500 Index as the basis to calculate the return rate. It was found that those stocks had higher return than the overall return of S&P 500 Index. This article also mentioned that the result of Dividend Reinvestment at the time of the stock market decline could reduce the loss of stocks.

Graham and Dodd (1934) mentioned that the prime purpose of a business corporation is to pay dividends regularly and, presumably, to increase the rate as time goes on. They emphasized that the stocks paying high dividend would have higher return than the past and lower frustration than the stocks without dividend payout. Furthermore, during the economic crisis or decline, the stocks with dividend payout would give higher return than the market.

Korn and Kuntz (2015) studied and presented the potentials of employing low beta investment strategies. It was found that the portfolio with small stocks having low beta have more weight than stocks with higher beta, resulting higher average return than the portfolio giving more weight to stocks with high beta. It was stated that the stocks with low beta could produce positive premium, leading to higher return. Therefore, employment of these strategies on investment could be promising. Safari (2009) suggested that long-term investors in Malaysia tend to use the dividend yield to measure the value of stocks prior to purchase regardless of economic situation. It was found that dividend yield and return rate are significantly related. It was also found that the stocks with higher dividend yield will have higher return. However, this correlation will be positive during Bear Market and negative during Bull Market.

Dimson *et al.* (2002) published the article concerning the result of dividend yield by classifying the stocks in accordance with the high and low level of dividend yield and allocate them to portfolio to calculate the superior return in comparison with the market. This is in line with the research by Visscher and Filbeck (2003) which mentioned Canada's stock market and compared the stocks with high dividend yield with Toronto Index during the period of 10 years. It was found that the stocks with dividend yield have higher return than the market, and this higher gap can be compensated by other costs such as transaction cost and tax cost, which is the reason to support investment in the stocks with high dividend yield. Baker and Wurgler (2004) proposed that the prevailing investor demand for dividend payers was a key driver for the company to pay dividends. Managers provided to investors by paying dividends when investors put a stock price premium on payers. Long and Hanh (2019) examined the short and long - run relationship among macroeconomic indicators and the Vietnamese stock prices. This study suggested that in the long run dynamics, there were one positive relationships between Vietnamese stock prices index measuring by VN-Index and real industrial production and five negative relationships between VN-Index and the others macro indicator.

Christoffersen and Simutin (2017) found that high-risk investment may not always result in high return but adversely affect the investment potential. Investment in the stocks with low beta instead of the stocks with high beta may result in better return as the stocks have lower frustration and risk. This aligns with the research by Baker, Bradley and Wurgler (2011) suggesting that the stocks with high beta have lower efficiency than the stock with low beta as when the demand of stocks with high beta increases to the extent that the stock price increases, the future return is like to get low. It can be concluded that beta value and the future return are negatively correlated. This is in line with Sialm and Starks (2012) arguing that investment in the stocks with high beta is not suitable for long-term investment.

2. Method

This study obtained the information of listed companies in the Stock Exchange of Thailand and SET Total Return (SET TRI) Index during 1995 – 2018, whereas SET Total Return (SET TRI) Index is the calculation of return of all kinds of the investment in stocks to reflect the result in the form of index, which include capital gain/loss, rights, and dividends. The company information used to establish high dividend and low beta portfolio consists of the stock price and dividend per share. The process of establishment of high dividend and low beta portfolio is as follows:

Step 1: Use the stock price and dividend per share (DPS) to calculate dividend yield based on the following formula:

$$\frac{DPS_n \times 100}{Stock Price_n} \quad (1)$$

Table 1 exemplifies the calculation of dividend yield of 10 companies in 2015.

Table 1. Calculation of dividend yield of 10 companies in 2015

Stock	Stock price	DPS	Dividend Yield (%)
ASK	19.40	1.30	6.70%
KWC	210.00	5.50	2.62%
NSI	93.00	6.00	6.45%
PATO	10.70	0.92	8.60%
SAMTEL	14.80	0.25	1.69%
SAUCE	23.70	1.10	4.64%
SCG	5.05	0.18	3.56%
TOPP	139.50	4.60	3.30%
TVO	23.50	1.00	4.26%
TMB	2.42	0.06	2.48%

For instance, in 2015, SAMTEL price was 14.8 Baht and the dividend per share was 0.25 Baht per share. Based on the above formula, the Dividend Yield was:

$$\frac{0.25 \times 100}{14.8} = 1.689\% \quad (2)$$

Step 2: Calculation of Beta

At this stage, the daily return of SET Index and daily return of the stocks in the past one year were obtained to run Ordinary Least Square (OLS) Regression. The slope of OLS Regression was used as beta of the stocks that year. Table 2 exemplifies the beta of the stocks of 10 companies in 2015.

Table 2. Beta of the stocks of 10 companies in 2015

Stock	Beta
ASK	0.552
KWC	-0.032
NSI	0.653
PATO	0.247
SAMTEL	1.768
SAUCE	0.177
SCG	0.369
TOPP	0.233
TVO	0.288
TMB	1.166

Step 3: In each year, the stocks were arranged according to the dividend yield calculated in Step 1.

The stocks with high dividend yield were ranked number 1, followed by those with lower dividend yields to the stocks with the lowest dividend yield. After that, the stocks were arranged according to beta calculated in Step 2 whereby the stocks with lowest beta were ranked the top. Then, the ranks of dividend yield and beta were combined as total rank. Table 3 exemplifies the ranking of stocks of 10 companies in 2015. For example, in 2015 SAMTEL was ranked 192 in the list of stocks with high dividend yield and 273 in the stocks with low beta. Then, the two ranks were combined to make the total rank. Therefore, in 2015, the total rank of SAMTEL was $192 + 273 = 465$.

When obtaining the total rank of all stocks in each year, they were arranged from low to high and classified into 5 Quintiles. The stocks belonging to Quintile 1 had the highest dividend yield with the lowest beta while those

in Quintile 5 had the lowest dividend yield with the highest beta. According to the classification, the stocks with the lowest total rank have the highest dividend yield and high beta. Based on Table 3, in 2015, PATO was classified in Quintile 1 while SAMTEL was in Quintile 5.

Table 3 Calculation of total rank of sample stocks in 2015

Stock	Rank Dividend Yield	Rank Beta	Total Rank	Rank Percentile
ASK	17	137	154	0.141
KWC	136	8	144	0.112
NSI	21	153	174	0.188
PATO	8	72	80	0.021
SAMTEL	192	273	465	0.938
SAUCE	54	57	111	0.068
SCG	93	100	193	0.253
TOPP	102	69	171	0.177
TVO	63	86	149	0.126
TMB	143	236	379	0.807

Step 4: Build portfolio consisting of stocks belonging to each Quintile in the form of equally weighted portfolio and calculate the return of each portfolio in comparison with the return from SET TRI Index. Table 4 shows the return of 5 Quintile Portfolio in comparison with the return from SET TRI Index in 2015.

Table 4. Return of 5 Quintile portfolio in comparison with the return from SET TRI Index in 2015

2015					
Quintile	1 st	2 nd	3 rd	4 th	5 th
Portfolio Return	7.75%	1.24%	0.47%	1.48%	-4.59%
SET TRI	-11.21%	-11.21%	-11.21%	-11.21%	-11.21%

As seen from Table 5, Portfolio Quintile 1 which consists of the stocks with high dividend yield and low beta yielded higher return in comparison with other Quintiles and SET TRI Index.

3. Results

Table 5 shows the return of Portfolio Quintile 1 which is high dividend yield and low beta portfolio in comparison with the return from SET TRI Index from 1995 to 2018, totaling 24 years.

Table 5. Return of portfolio Quintile 1 which is High Dividend Yield and Low Beta Portfolio in comparison with the return from SET TRI Index from 1995 to 2018

Year	High Dividend Yield and Low Beta Portfolio Return	SET TRI	T-value
1995	-5.50%	-4.68%	-1.01
1996	-10.08%	-33.34%	17.58***
1997	-30.98%	-52.61%	9.41***
1998	31.42%	-3.54%	13.56***
1999	67.96%	37.65%	15.40***
2000	1.11%	-42.93%	38.73***
2001	62.32%	22.77%	23.20***
2002	78.40%	20.98%	24.70***
2003	145.37%	121.64%	3.19***
2004	12.96%	-10.73%	5.62***
2005	14.78%	11.02%	1.50
2006	31.10%	-0.08%	26.42***
2007	33.51%	30.33%	-7.10***
2008	-25.91%	-43.62%	43.89***
2009	81.98%	68.86%	9.30***
2010	59.70%	45.60%	8.39***
2011	13.22%	3.47%	16.54***
2012	68.32%	39.71%	34.14***

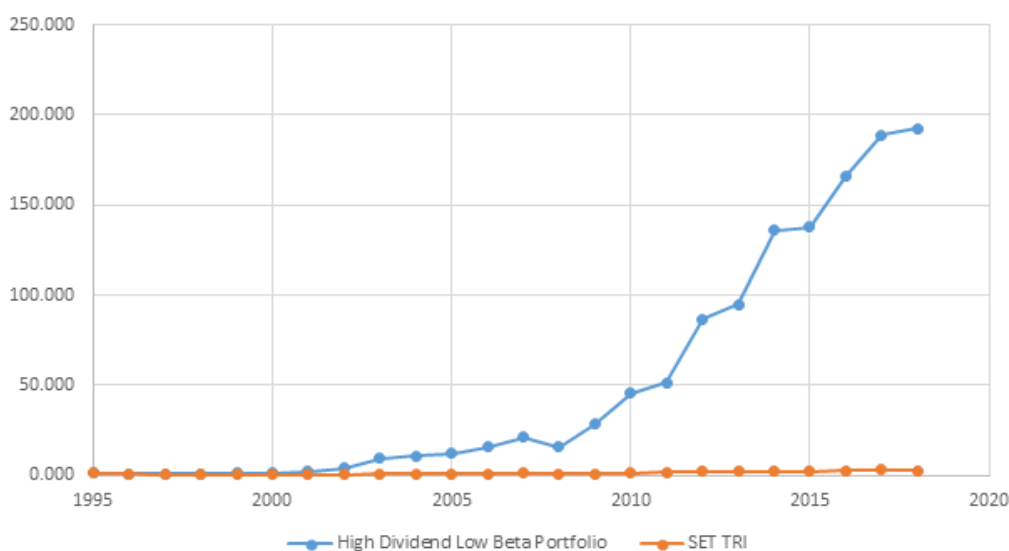
Year	High Dividend Yield and Low Beta Portfolio Return	SET TRI	T-value
2013	9.24%	-3.43%	24.77***
2014	43.66%	18.88%	23.14***
2015	7.75%	-11.21%	27.13***
2016	20.63%	23.85%	-4.35***
2017	13.78%	17.30%	-8.94***
2018	1.91%	-8.08%	18.55***

Note: *, **, *** statistically significance at 0.1, 0.05 and 0.01 accordingly

The results of this study suggest that the return of high dividend and low beta Portfolio in the past 24 years from 1995 to 2018 was significantly higher than SET TRI Index for 19 years and significantly lower than SET TRI Index for 3 years. It can be concluded that the dividend yield of the stocks with high dividend yield tend to be higher than the market despite the period of low total return.

Figure 1 shows that if 1 Baht is invested at the beginning of 1995 in high dividend and low beta portfolio and SET TRI Index and the investment continues to 2018, in 2018, the value of high dividend and low beta portfolio would increase to 192.5 Baht while the value of SET TRI Index would grow to 2.645 Baht only, which can be concluded that high dividend and low beta portfolio obviously yielded better return than SET TRI Index.

Figure 1 Comparison of 1-Baht Investment in High Dividend and Low Beta Portfolio with SET TRI Index



Conclusion

Based on Gordon Growth Model and Capital Asset Price Model (CAPM), the expected stock return should depend on expected dividend yield and systematic risk measured by stock's beta. Theoretically, stocks with higher expected dividend yield and higher systematic risk should yield higher expected return. This study analyzed whether the dividend yield and beta value could be used to create investment strategies that win over the market.

According to the information about the listed companies in the Stock Exchange of Thailand during 1995 – 2018, The results showed that out of 24 years, there were 19 years where the return of high dividend and low beta portfolio was significantly higher than SET TRI Index.

Thus, it was found that high dividend and low beta portfolio yielded higher return that wins over the market. The stocks with high dividend having high expected return were in line with the theory. However, the stocks with low beta should be theoretically yielded low expected return resulted in high expected return than the market if dividend yield is used for establishment of high dividend and low beta portfolio.

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The Importance of Entrepreneurial Skills for the Success of Agricultural Entrepreneurs

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Abstract:

Dynamic changes in the economy, new arrival of quick qualitative changes, development of information technologies, as well as financial, economic and technological turbulences keep influencing changes also in agriculture. Creation of proper conditions for career development and attracting young people into agriculture represent important milestones of its development. In addition to professional expertise and specific skills fundamental in agriculture, general entrepreneurial skills, adequate knowledge and skills in the area of information technologies together with the constant personal development of the entrepreneur and his co-workers are deemed necessary in the environment of small and medium-sized farms. The aim of the paper is to analyze the range of entrepreneurial activities in agriculture and explore the current situation in the area of further personal development of entrepreneurs as well as their co-workers in the sphere of small farms in Slovakia.

Keywords: agricultural entrepreneur; entrepreneurial skills; IT skills; personal development; development of co-workers.

JEL Classification: O13; O32; O52; Q01; Q12; R11.

Introduction

The stabilization of the indigenous population, *i.e.* working-age individuals and especially the young generation below 25 years of age belongs among the most current challenges of the Slovak countryside. The article is based on the concept of agricultural policy of the Slovak Republic to increase the productivity of agricultural enterprises and to intensify the introduction of innovations by means of developing private farming and providing them with active supporting. A professional career in agriculture has lots of specifics and together with the increasingly competitive environment, it places many demands upon the entrepreneurs. The requirements do not include only professional skills needed in agriculture, but more and more general managerial and IT skills based on long-life education of both entrepreneurs and their employees.

1. Literature review

Numerous scientific publications discuss the topic extensively within the European Union (De Wolf and Schoorlemmer 2007, McElwee *et al.* 2005, McElwee 2006, 2008, Pyysiäinen *et al.* 2006, Rudmann *et al.* 2008, Vesala and Pyysiäinen 2008, Zondag *et al.* 2015, Zagata and Sutherland 2015), in individual European countries (Altalb and Filipek 2016 – Poland, Hakelius 1999 – Sweden, Hamilton *et al.* 2015 – England, Materia 2012 – Italy, Morgan *et al.* 2010 – Tuscany, Wales, Várallya and Herdon 2013 – Hungary, Seuneker *et al.* 2013 – Netherlands, Von Muchhausen and Haring 2012 – Germany, Rădoi and Șerban 2019 – Romania, Anokhina *et al.* 2018 –

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Russia), and also globally (Mukasheva *et al.* 2018, Atalb *et al.* 2015, Baig *et al.* 2013, Biratu 2008, Davis 2008, Katchova and Ahearn 2015, Schmidt *et al.* 1994).

In the European publications, McElwee and Bosworth (2010) McElwee and Robson (2005) Vesala and Pyysiäinen (2008), Rudmann, *et al.* (2008) study the diversification of agriculture and agricultural enterprises, while others deal with competitiveness of agricultural enterprises and the necessity of mastering both professional and entrepreneurial skills, *e.g.* Altalb and Filipek (2016), De Wolf and Schoorlemmer (2007), Rudmann *et al.* (2008) *etc.* Yet others, such as Kountios (2001), McElwee (2006), Pyysiäinen *et al.* (2006) Rudmann *et al.* (2008), emphasize the importance of education. Europe currently faces an unfavorable population trend which increases the difficulties in attracting and supporting young people to work in that segment, *e.g.* Hakelius (1999), Hamilton *et al.* (2015) Rudmann *et al.* (2008) and others.

In response to the issues surveyed in the abovementioned literature, we focused our attention at the following areas: necessary entrepreneurial skills, IT skills and development of human resources, within the legal forms of agricultural enterprises (private farmers), then professional agricultural skills and possible solutions of the problems specific for small-sized and young farmers. An overview of literature covering the particular areas of interest in the domestic and foreign literature is provided in Tables 1 and Table 2.

Table 1. An overview of foreign literature covering the researched topic

Author(s)/ Focus Area	Country	Typology & diversification of agricultural enterprises	Professional agricultural skills	Managerial skills	IT skills	Human resources (development & training)	Focus at small-sized & young farmers
Altalb and Filipek 2016	Poland		x	x			
Altalb <i>et al.</i> 2015	World		x				
Baig <i>et al.</i> 2013	Asia		x				
Biratu 2008	Ethiopia		x				
Davis 2008	Africa		x				x
De Wolf and Schoorlemmer 2007	EU	x		x			
Fairweather and Keating 1990	Europe	x					
Garforth 1994	Thailand		x				
Hafkin and Taggart 2001	Asia, Latin America, Middle East		x	x	x	x	
Hakelius 1999	Sweden		x	x	x		x
Hamilton <i>et al.</i> 2015	England		x	x			x
Haq 2012	Bangladesh		x	x			
Katchova and Ahearn 2015	USA	x		x		x	x
Kountios <i>et al.</i> 2011	Europe			x	x	x	x
Levchenko <i>et al.</i> , 2018	Ukraine					x	
Martin 1987	USA					x	x
Materia 2012	Italy		x				
McElwee 2006	EU	x		x		x	
McElwee 2008	EU	x					
McElwee and Bosworth 2010	EU, UK	x		x			x
McElwee and Robson 2005	EU	x					
McElwee <i>et al.</i> 2005	EU	x		x			
Morgan <i>et al.</i> 2010	Tuscany, Wales			x			x
Pyysiäinen <i>et al.</i> 2006	EU			x		x	
Rezai <i>et al.</i> 2011	Malaysia			x			x
Rudmann <i>et al.</i> 2008	EU	x	x	x	x	x	
Schmidt <i>et al.</i> 1994	USA				x	x	

Author(s)/ Focus Area	Country	Typology & diversification of agricultural enterprises	Professional agricultural skills	Managerial skills	IT skills	Human resources (development & training)	Focus at small-sized & young farmers
Schmitzberger <i>et al.</i> 2005	Austria	x					
Seuneke <i>et al.</i> 2013	Netherlands		x	x	x	x	
Šikýř <i>et al.</i> 2018	Czech Republic, Russia					x	
Šimpachová Pechrová <i>et al.</i> 2018	Czech Republic	x					x
Văcărescu-Hobeanu, 2018	Romania					x	
Várallyaia and Herdon 2013	Hungary				x		
Vesala and Pyysiäinen 2008	EU	x		x			
Von Munchhausen and Haring 2012	Germany		x	x		x	
Walder <i>et al.</i> 2012	Europe	x					
Zagata and Sutherland 2015	Europe		x	x		x	x
Zondag <i>et al.</i> 2015	EU		x	x			x

Source: prepared by authors

Table 2. An overview of Slovak literature covering the researched topic

Autor (s)/Focus Area	Country	Typology & diversification of agricultural enterprises	Professional agricultural skills	Managerial skills	IT skills	Human resources (development & training)	Focus at small-sized & young farmers
Blaas 2003	Slovakia	x					X
Blaas <i>et al.</i> 2010	Slovakia		x	x			
Falt'an and Pašiak 2005	Slovakia	x					X
Jahnátek <i>et al.</i> 2013	Slovakia	x					X
Kapustová <i>et al.</i> 2017	Slovakia		x	x			
Kučera <i>et al.</i> 2005	Slovakia				x		
Látečková <i>et al.</i> 2018	Slovakia				x		
MARD SR 2013	Slovakia	x					
Commission Regulation (EC) No 1242/2008	EU	x					
Rozborilová 2012	Slovakia	x					X
Rumanovská, <i>et al.</i> 2018	Slovakia	x		x			X
Szabo <i>et al.</i> 2017	Slovakia				x		

Source: prepared by authors

As seen in Table 2, presenting the Slovak relevant sources, the studies published in Slovakia deal with specific agricultural topics or proposals and options for improvement of the economic results (Blaas *et al.* 2010, Kapustová *et al.* 2017). In addition to the already mentioned authors, Rumanovská *et al.* 2018, also researched entrepreneurial skills and Kučera *et al.* 2005, Szabo *et al.* 2017, Látečková *et al.* 2018, published the results of their research concerning the use of IT in agricultural enterprises.

Hitherto, information about human resources working in the legal form of a private farmer as well as human resources employed by them has been missing in the published studies and even The Farm Structure Census 2010 – Complex Results (Rozborilová 2012) does not tackle it either. The document deals with the category of private farmers only by dividing them according to regions and sums up their basic production factors and economic assets. The main reason for our research was the insufficient (in comparison with foreign literature) coverage of

entrepreneurial skills necessary for farmers, or their IT skills in Slovakia and the absence of any attention to the education of the farmers and their employees.

1.1. Characteristics of the chosen research topics

The position of farmers as entrepreneurs is both studied in the professional and scientific literature (Table 1), and supported in the European and national legislation. Various authors have proposed different typologies of farmers based on various perspectives. Fairweather and Keating (1990), published a study on "goals and success from the farmers' point of view", where they detected three distinct types or management styles (Dedicated Producer, Flexible Strategist and Life-styler). Schmitzberger *et al.* (2005) offer a detailed analysis of different farming styles with regard to their effects on biodiversity. They are Yield optimizer, Traditionalists, Innovative, Support Optimizer, Idealist, Part-time farmer, Forced farmer and the Social farmer.

McElwee (2008) presents four types of farmers based on their economic activities:

- Type I: farmer as a farmer – traditional land-based economic activity;
- Type II: farmer as an entrepreneur – innovative, opportunity oriented. Changing, flexible and diverse economic activities;
- Type III: farmer as a contractor – ownership of specific skills/expertise and experience coupled with possible ownership of „plant“;
- Type IV: rural entrepreneur, not a farmer – ownership of farm, land or business.

Further aspects of the typology of farmers are specified in Walder *et al.* 2012. We included into our research agricultural entrepreneurs (small, family, young farmer) as defined in the current Slovak legislation (Jahnátek *et al.* 2013) with incorporated recommendations of the European Commission 2003/361/EC.

1.2. Skills of agricultural entrepreneurs

In the studied literature, several authors characterized the necessary skills of farmers from various perspectives. We chose some of them: McElwee and Bosworth 2010 included IT skills (tools for cooperation), skills in the area of marketing and trade, accountancy and finance (strategic awareness, opportunity recognition) and skills in the area of human resources management (entrepreneurial qualities and values, need for achievement, personal control, and alertness).

Pyysiäinen *et al.* 2006, characterizes 3 groups of skills:

- personal skills (innovation, initiative, risk-taking, ability to deal with the unknown with ease, accepting challenges, taking responsibility, seeking opportunities in change);
- interpersonal skills (interacting with others effectively, communicating effectively, negotiating, influencing, demonstrating leadership);
- process skills (ability to plan and organize, ability to analyze, synthesize and evaluate, ability to execute the plan).

The ESOF research - Entrepreneurial Skills and their Role in Enhancing the relative Independence of Farmers (Rudmann *et al.* 2008) studied 5 skill categories:

- professional skills: plant or animal production skills, technical skills;
- management skills: financial management and administration skills, human resources management skills, customer management skills, general planning skills;
- opportunity skills: recognizing business opportunities, market and customer orientation, awareness of threats, innovation skills, risk-management skills;
- strategic skills: skills to receive and make use of feedback, reflection skills, monitoring and evaluation skills, conceptual skills, strategic planning skills, strategic decision-making skills, goal setting skills;
- co-operation/networking skills: skills related to co-operation with other farmers and companies, networking skills, team-work skills, leadership skills.

We chose 3 out of the abovementioned groups and adapted them to the conditions of the farmers in Slovakia and included them into the research model. They are as follows: managerial skills, IT skills and human resources management (personal and employee development).

2. Methodology

The theoretical basis of our empirical research was founded on the opinions of various authors about the requirements concerning competencies necessary for the development of entrepreneurship, and conceptions and action plans for the development of agriculture in the SR published by the Ministry of Agriculture and Rural Development of the Slovak Republic. The subjects of the research were private farmers, their family members and

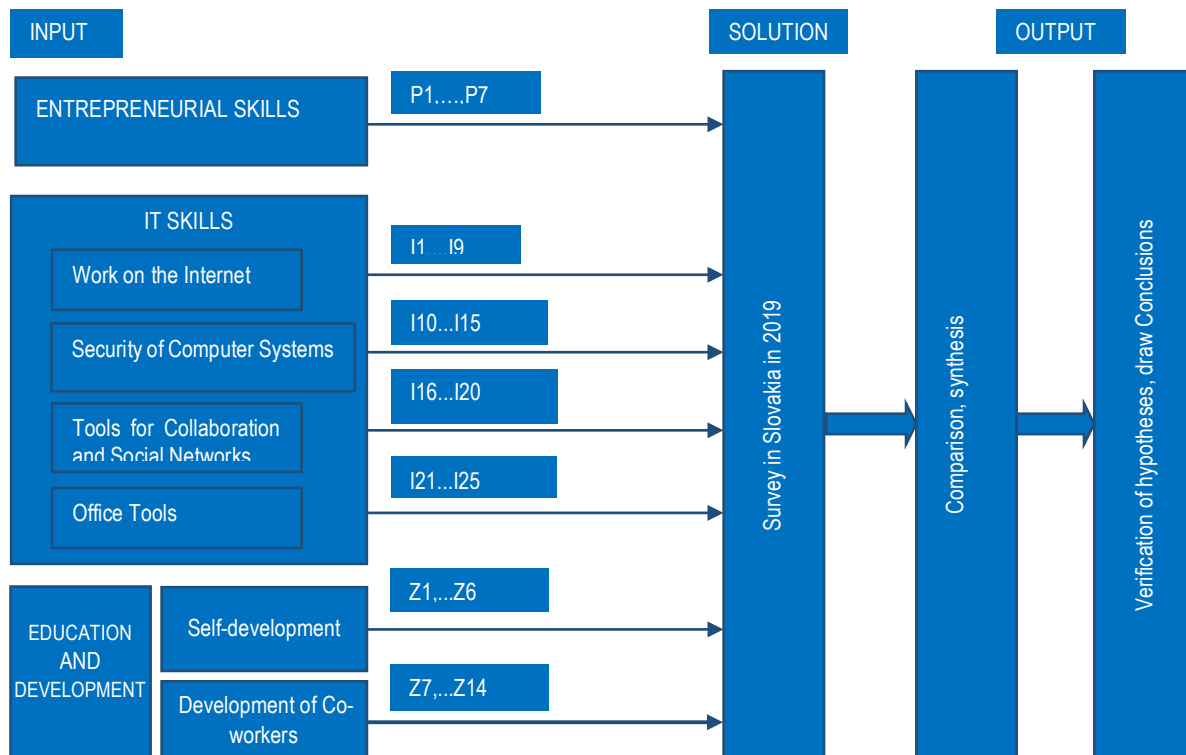
co-workers (employees). We did not take into consideration any other type of agricultural enterprises created since 1990, after the transformation of cooperatives and privatization of state-owned farms.

We stipulated the following research hypotheses (formulated as null and alternate ones):

- 1st Hypothesis – an enquiry into entrepreneurial skills;
- 1H0 a, b, c, d, e, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income does not influence the level of entrepreneurial skills of the farmers;
- 1H1 a, b, c, d, e, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income influences the level of entrepreneurial skills of the farmers;
- 2nd Hypothesis - an enquiry into IT skills;
- 2H0 a, b, c, d, e, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income does not influence the level of IT skills of the farmers;
- 2H1 a, b, c, d, e, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income influences the level of IT skills of the farmers;
- 3rd Hypothesis – an enquiry into further education and development;
- 3H0 a, b, c, d, e, f, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income does not influence the level of further education and development of the farmers;
- 3H1 a, b, c, d, e, f, where a) gender, b) age, c) education (number of years of school attendance), d) number of employees, e) main or supplementary source of income influences the level of further education and development of the farmers.

Description and justification of the research methods used. Normally, the methods will be selected from known and proven examples. In special cases the development of a method may be a key part of the research, but then this will have been described in Introduction section and reviewed in first one. We developed a research framework including a research model (Figure 1).

Figure 1. The research framework



Source: prepared by authors

2.1. Research model

The research model consists of parameters (Table 3) and 4 groups of research indicators (Table 4, Table 7). Parameters R1, R2, ..., R5 characterize the research sample and based on them, we evaluated the other groups of parameters in the research model. The 2nd group of parameters (P1, ..., P7) includes evaluations of the entrepreneurial skills of the farmers, the 3rd one (I1, ..., I25) refers to the use of information technologies and the 4th group (Z1, ..., Z14) is aimed at the evaluation of development of both entrepreneurs and their co-workers on the farm. We identified the parameters and research indicators based on researches published in the literature (Table 3).

Table 3. Identification of literature covering the elements of the research

Parameters		Literature
R1	Respondent's gender	Hafkin and Taggart (2001), McElwee <i>et al.</i> (2005), Rudmann <i>et al.</i> (2008);
R2	Respondent's age	Hakelius (1999), Rudmann <i>et al.</i> (2008), Haq (2012);
R3	Respondent's education	Martin (1987), Hakelius (1999), Hafkin and Taggart (2001), Rudmann <i>et al.</i> (2008), Haq (2012);
R4	Number of employees (in 2018)	Commission Regulation (EC) No. 1242/2008
R5	Agriculture as a source of income	Blaas 2003; Schmitzberger <i>et al.</i> 2005; Walder <i>et al.</i> 2012
P1, ... P7	Entrepreneurial skills	5 th column Table 1 a Table 2
I1, ... I25	IT skills	6 th column Table 1 a Table 2
Z1, ... Z14	Human resources	7 th column Table 1

Source: prepared by authors

3. Case study

To verify the hypotheses, we carried out a survey in the form of a questionnaire among the small farms in Slovakia. The survey was executed in two stages, first, we completed a pre-research in the form of interviews which served as a starting point for the development of the research model used in the main stage of the research. The questionnaire survey was carried out from May to October 2019, the respondents were 121 agricultural entrepreneurs, *i.e.* private farmers (young, small and family farmers). We ensured a proportional regional representation by a purposeful selection of respondents. The particular parameters were assessed by the respondents using a 7 – point Likert scale from 0 to 6 with the following meaning: 0 – disagree, 1 – somewhat agree, ..., 6 – strongly agree.

Various statistical methods (descriptive statistics, reliability analysis, and linear regression were implemented to evaluate the results of the survey and to verify their statistical significance. The PSPP program was implemented for processing. (Hanák 2016).

3.1. Results and discussion

We provide the results according to the following structure: a) reliability of the research tool; b) evaluation of the research sample based on the chosen parameters; c) descriptive statistics and description of extreme values of the results; d) linear regression.

- The reliability of the results was tested by means of Cronbach's alpha receiving the following results: $\alpha = 0.957$ in total, $\alpha = 0.923$ for parameters P1, ..., P7, $\alpha = 0.964$ for parameters I1, ..., I25, $\alpha = 0.773$ for parameters Z1, ..., Z14. The presented scores (all higher than 0.7) prove the high reliability of the questionnaire (Hanák 2016).
- Evaluation of the parameters for the research sample (Table 4)

Table 4. Parameters characterizing the research sample

Parameters		Attributes	% occurrence
R1	Gender	Male	84.40%
		Female	15.60%
R2	Respondent's age	21 – 30	6.60%
		31 – 40	39.30%
		41 – 50	33.60%
		51 – 60	20.50%

Parameters		Attributes	% occurrence
R3	Respondent's education	Primary	54.10%
		Secondary	36.90%
		Tertiary level, Bachelor's degree	3.30%
		Tertiary level Master's degree	5.70%
		Tertiary level Doctorate	0.00%
R4	Number of employees (in 2018)	Less than 5	4.90%
		5 to 10	38.50%
		10 to 20	51.60%
		More than 20	4.90%
R5	Agriculture as a source of income	Main	73.77%
		Supplementary	26.23%

Source: prepared by authors

- c) Selected descriptive statistics of the particular groups of parameters (Table 5, Table 6, Table 7, the highest scores are highlighted in grey and the lowest ones printed in boldface)

Table 5. Indicators of the farmers' entrepreneurial skills - descriptive statistics

Level of the farmer's entrepreneurial skills		Mean	STDEV	N
P1	Administrative skills (writing on a typewriter, computer, writing letters, reports...)	2.11	1.60	121
P2	Mathematical and statistical skills (calculate my economic results, average results etc.)	1.40	1.53	121
P3	Numeric skills for the planning of the economic year (SWOT analysis)	1.24	1.52	121
P4	Professional economic and communicative skills needed for communication with governmental institutions (social insurance agency, tax office...)	3.17	1.77	121
P5	Professional economic and communicative skills needed for communication with the financial community (investors, banks, financial institutions...)	2.48	1.74	121
P6	Presentation and communication skills needed for communication with clients, public or media	1.95	1.63	121
P7	Communicative skills needed for communication with customers and suppliers (of products, raw materials, technology...)	4.14	1.78	121

Source: prepared by authors

Table 6. IT utilization parameters – descriptive statistics

Use of Information Technology		Mean	STDEV	N
Work with Internet				
I1	Acquisition of current news connected with work (current exchange rates, tax returns, weather information, pollen information, ...)	2.86	1.54	121
I2	Using information from published price lists of products and services	2.43	1.44	121
I3	Return of online forms for governmental and public institutions (health insurance company, social insurance agency, ...)	3.72	1.69	121
I4	Using information from maps and navigation	2.28	1.32	121
I5	Using information published by government agents and institutions (government, ministries, statistical office, tax office, social insurance agency, health insurance companies, ...)	2.63	1.76	121
I6	Using data from publicly accessible portals (Land Register Portal, Trade Register, Business Register, FINSTAT ...)	2.23	1.71	121
I7	Using publicly available published data from the internet (Open data)	1.38	1.23	121
I8	Using data from commercial databases (Albertina, Datamax, European Databank, Kompass, Golden Pages, ...)	1.47	1.23	121
I9	Using online marketing	2.27	1.99	121
Security and Computer Systems				
I10	I use the appropriate and current internet browser, e.g. Internet Explorer, Google Chrome, Mozilla Firefox, Opera	4.70	1.99	121

Use of Information Technology		Mean	STDEV	N
I11	I use efficient antivirus protection	2.97	1.70	121
I12	I regularly backup important data	2.98	1.93	121
I13	I understand the meaning of http cookies	1.34	1.59	121
I14	To protect myself from phishing sensitive information, I always verify the safety of the connection to web pages when uploading sensitive information	2.11	1.77	121
I15	If an e-mail demands a password check or any other sensitive information I always verify the authenticity of the sender	2.07	1.86	121
Tools for Collaboration and Social Networks				
I16	We use MS Outlook for collaboration	0.90	1.61	121
I17	We use Google Calendar for collaboration	0.45	0.97	121
I18	We use MS Exchange for collaboration	0.23	0.70	121
I19	We share files through Google disk for collaboration	0.27	0.60	121
I20	We use social networks (Facebook) for collaboration	2.74	2.27	121
Office Tools				
I21	We use MS Office for work	2.87	1.63	121
I22	We use MS Excel for carrying out calculations and creating graphs	1.57	1.30	121
I23	We use MS Word for administrative work	2.57	1.68	121
I24	We use MS PowerPoint for presentations	0.94	1.04	121
I25	We use other office software for work	1.90	1.56	121

Source: prepared by authors

Table 7. Parameters of further development of the entrepreneur and his co-workers – descriptive statistics

Self-development and Development of Co-workers		Mean	STDEV	N
Self-development of the Entrepreneur				
Z1	I engage in knowledge acquisition (laws, rules, regulations) only when I realize that I lack them	3.74	1.51	121
Z2	I prefer self-study (of professional literature)	2.93	1.67	121
Z3	I prefer courses in educational institutions (schools)	1.04	3.74	121
Z4	I regularly improve my knowledge and skills	1.03	1.38	121
Z5	I do not have time for further education	1.42	1.86	121
Z6	I perceive education as very important and I wish to pursue it systematically	1.84	1.84	121
Professional Training of Co-workers				
Z7	They complete only training required by law (Occupational Safety and Health Training, driving license for agricultural vehicles and machines etc.)	4.48	1.34	121
Z8	They complete only training needed for new technologies, changes in law etc.	3.48	1.70	121
Z9	Regular training to ensure improvements in the workplace	3.57	2.10	121
Z10	Regular training to ensure improvements outside the workplace	0.66	0.92	121
Z11	We do not engage in any training	0.71	1.52	121
Z12	We would like to engage in it, but we do not have time and finances	1.84	1.46	121
Z13	Lack of training opportunities	2.10	1.59	121
Z14	The only time for training is bad weather	2.38	2.00	121

Source: prepared by authors

d) Linear regression

We studied the impact of the separate parameters R1, R2, R3, R4, R5, R6 (independent variables) on the level of entrepreneurial skills, IT skills and further development of farmers (dependent variables) by means of multiple regression analysis. Each indicator of the research model was studied separately with the assumption that the overall impact is caused by the partial ones. The results of the linear regression analysis are summarized in the following tables (Table 8, Table 9, Table 10).

Table 8. Regression model for the level of entrepreneurial skills of farmers

		Independent variables					Adjusted R2	F (5,116)	N
		R1	R2	R3	R4	R5			
Dependent variables	P1	0.14* (0.29)	0.12* (0.01)	0.74*** (0.04)	-0.03 (0.02)	-0.17*** (0.23)	0.65	45.83***	121
	P2	0.04 (0.27)	0.21*** (0.01)	0.79*** (0.04)	-0.09 (0.02)	-0.08 (0.21)	0.66	48.81***	
	P3	-0.04 (0.27)	0.19** (0.01)	0.83*** (0.04)	-0.09 (0.02)	-0.03 (0.22)	0.65	45.41***	
	P4	0.14 (0.37)	0.10 (0.01)	0.60*** (0.05)	0.16* (0.02)	-0.21** (0.29)	0.51	26.43***	
	P5	0.18* (0.36)	0.17* (0.01)	0.58*** (0.05)	0.20** (0.02)	-0.15* (0.28)*	0.54	29.73***	
	P6	0.16 (0.39)	0.07 (0.01)	0.52*** (0.05)	0.13 (0.02)	-0.08 (0.31)	0.37	5.48***	
	P7	0.21* (0.48)	-0.17* (0.02)	0.10 (0.06)	0.24* (0.03)	-0.26** (0.38)	0.20	6.92***	

Note: Values: Standardized Beta, Standard error in parentheses; *p<0.05, **p<0.01, ***p<0.001
Source: Prepared by authors

We can state, based on Table 8 that the model is statistically significant, while more than 50% of the variability is due to the majority of variables. We consider education (predicts P1, P2, P3, P4, P5, P6), age (P1, P2, P3, P5, P7) and source of income to be statistically significant predictors.

Table 9 indicates that the regression model is statistically significant, while more than 25% of variability is due to 19 out of 25 indicators. Education is the only statistically significant predictor (22 out of 25 indicators).

Table 9. Regression model for IT skills

		Independent variables					Adjusted R2	F (5,116)	N
		R1	R2	R3	R4	R5			
Dependent variables	I1	-0.15 (0.33)	0.18* (0.12)	0.78*** (0.15)	-0.19* (0.18)	-0.24** (0.28)	0.48	23.89***	121
	I2	0.07 (0.34)	0.06 (0.12)	0.62*** (0.15)	-0.02 (0.18)	-0.18* (0.28)	0.40	17.03***	
	I3	0.14 (0.38)	0.05 (0.14)	0.57*** (0.17)	0.10 (0.21)	-0.22** (0.32)	0.43	19.38***	
	I4	0.09 (0.36)	-0.20* (0.13)	-0.07 (0.16)	0.27** (0.20)	-0.24* (0.30)	0.16	5.78***	
	I5	0.20* (0.42)	0.17* (0.15)	0.51*** (0.19)	-0.09 (0.23)	-0.19* (0.35)	0.38	15.54***	
	I6	0.17 (0.41)	0.11 (0.15)	0.54*** (0.18)	-0.06 (0.22)	-0.23** (0.34)	0.38	15.75***	
	I7	0.24* (0.30)	0.07 (0.11)	0.45*** (0.14)	0.04 (0.17)	-0.12 (0.25)	0.32	12.52***	
	I8	0.37*** (0.30)	-0.05 (0.11)	0.31** (0.14)	0.08 (0.17)	-0.12 (0.25)	0.33	12.67***	
	I9	0.13 (0.53)	-0.24** (0.19)	0.22* (0.24)	0.29** (0.29)	-0.07 (0.45)	0.20	7.07***	
	I10	0.05 (0.29)	0.01 (0.10)	0.45*** (0.13)	0.01 (0.16)	-0.09 (0.24)	0.19	6.69***	
	I11	0.24* (0.43)	0.05 (0.16)	0.38*** (0.19)	0.05 (0.24)	-0.22 (0.36)	0.27	10.09***	
	I12	0.23** (0.47)	0.10 (0.17)	0.43*** (0.21)	0.10 (0.26)	-0.21* (0.39)	0.34	13.73***	
	I13	0.09 (0.38)	0.30*** (0.13)	0.55*** (0.17)	-0.09 (0.21)	-0.03 (0.31)	0.38	5.69***	
	I14	0.18 (0.44)	0.10 (0.16)	0.49*** (0.20)	-0.06 (0.24)	-0.20* (0.37)	0.38	12.45***	

		Independent variables					Adjusted R2	F (5,116)	N
		R1	R2	R3	R4	R5			
	I15	0.14 (0.46)	0.11 (0.17)	0.50*** (0.21)	-0.09 (0.25)	-0.22* (0.39)	0.31	11.81***	121
	I16	-0.12 (0.42)	0.18* (0.15)	0.51*** (0.19)	0.18 (0.23)	0.01 (0.35)	0.26	9.52***	
	I17	-0.02 (0.25)	0.04 (0.09)	0.40*** (0.11)	0.34** (0.14)	0.00 (0.21)	0.25	9.02***	
	I18	0.00 (0.20)	0.05 (0.07)	0.29** (0.09)	0.17 (0.11)	0.01 (0.17)	0.08	3.08***	
	I19	0.06 (0.18)	0.07 (0.06)	0.03 (0.08)	0.25* (0.10)	0.08 (0.15)	0.02	1.44	
	I20	0.27* (0.64)	0.05 (0.23)	0.06 (0.29)	0.33** (0.35)	0.16 (0.53)	0.13	4.54***	
	I21	0.03 (0.40)	0.18* (0.14)	0.57*** (0.18)	-0.12 (0.22)	-0.07 (0.34)	0.33	12.69***	
	I22	0.09 (0.33)	-0.10 (0.12)	0.47*** (0.15)	0.06 (0.18)	-0.22* (0.28)	0.27	10.13***	
	I23	0.15 (0.43)	0.16 (0.16)	0.40*** (0.19)	0.05 (0.24)	-0.23* (0.36)	0.26	9.46***	
	I24	0.33*** (0.26)	-0.15 (0.09)	0.26** (0.12)	0.24** (0.14)	-0.09 (0.22)	0.32	12.16***	
	I25	0.10 (0.35)	0.10 (0.13)	0.63*** (0.16)	-0.06 (0.19)	-0.22* (0.29)	0.44	19.74***	

Note: Values: Standardized Beta, Standard error in parentheses; *p<0.05, **p<0.01, ***p<0.001
 Source: Prepared by authors

Table 10. Regression model for the level of education and further development

		Independent variables					Adjusted R2	F (5,116)	N
		R1	R2	R3	R4	R5			
Dependent variables	Z1	0.19* (0.35)	0.06 (0.12)	0.54** (0.15)	0.03 (0.19)	-0.25** (0.29)	0.42	18.36***	121
	Z2	0.27** (0.37)	-0.13 (0.13)	0.46*** (0.16)	0.19* (0.20)	-0.19* (0.31)	0.46	21.73***	
	Z3	0.38*** (0.34)	-0.05 (0.12)	0.17 (0.15)	0.23* (0.19)	-0.05 (0.29)	0.25	8.94***	
	Z4	0.28** (0.33)	0.05 (0.12)	0.42*** (0.15)	0.20* (0.18)	0.08 (0.27)	0.38	15.72***	
	Z5	0.00 (0.56)	0.12 (0.20)	-0.02 (0.25)	-0.11 (0.31)	0.12 (0.47)	0.00	1.09	
	Z6	0.09 (0.49)	0.12 (0.17)	0.42*** (0.22)	0.14 (0.27)	0.11 (0.41)	0.23	8.07***	
	Z7	0.14 (0.33)	0.09 (0.12)	0.38*** (0.15)	0.19* (0.18)	-0.28** (0.28)	0.31	12.06***	
	Z8	0.12 (0.42)	-0.20* (0.15)	0.28** (0.19)	0.35*** (0.23)	-0.24* (0.35)	0.34	13.25***	
	Z9	0.24* (0.55)	-0.25** (0.20)	-0.14 (0.25)	-0.47*** (0.30)	-0.09 (0.46)	0.27	9.97***	
	Z10	0.27** (0.25)	-0.01 (0.09)	-0.00 (0.11)	0.40*** (0.14)	-0.09 (0.21)	0.20	7.00***	
	Z11	-0.10 (0.41)	0.30** (0.15)**	0.18 (0.18)	-0.39*** (0.22)	0.07 (0.34)	0.20	7.14***	
	Z12	-0.06 (0.43)	-0.06 (0.15)	0.21 (0.19)	0.08 (0.24)	0.16 (0.36)	0.03	1.72	
	Z13	0.01 (0.47)	-0.05 (0.17)	0.07 (0.21)	0.24* (0.26)	0.28* (0.39)	0.04	2.03	
	Z14	-0.14 (0.60)	-0.02 (0.21)	0.01 (0.27)	0.21 (0.33)	0.09 (0.50)	0.01	1.31	

Note: Values: Standardized Beta, Standard error in parentheses; *p<0.05, **p<0.01, ***p<0.001; Source: Prepared by authors

The regression model accounts for more than 20% of variability due to 10 out of 14 indicators. Only the number of employees (8 out of 14 indicators) can be considered to be a statistically significant predictor.

Results of hypotheses verification:

- Based on the results presented in Table 8, we accept the partial hypotheses 1H0a, 1H1b, 1H1c, 1H0d, 1H0e, and reject the partial hypotheses 1H1a, 1H0b, 1H0c, 1H1d, 1H0e.
- Based on the results presented in Table 9 we accept the partial hypotheses 2H0a, 2H0b, 2H1c, 2H0d, 2H0e, and reject the partial hypotheses 2H1a, 2H1b, 2H0c, 2H1d, 2H1e.
- Based on the results presented in Table 10 we accept the partial hypotheses 3H0a, 3H0b, 3H0c, 3H1d, 3H0e, and reject the partial hypotheses 3H1a, 3H1b, 3H1c, 3H0d, 3H1e.

Conclusion

Our research was based on the idea that educated private farmers would facilitate the development of the countryside and contribute to increased employment in rural area and support for private farmers could solve the problem of a generational shift in agriculture.

The aim of our paper was to search for options and suggest measures based on both research of domestic and foreign literature and our own research for reviving the interest of young people in settling down in the countryside and to identify spheres with potential for their employment and life in the countryside which would meet the current standards of life. If agriculture is to become one of the key branches of economy, it requires flexible, highly effective and professionally adaptable human resources not just in the agricultural enterprises but also among agricultural entrepreneurs (private farmers).

The findings of our research show that agricultural entrepreneurs naturally prefer professional agricultural activities and they develop any other entrepreneurial skills much less. Therefore, we registered the highest scores in - Communication skills needed for communication with suppliers and customers and - Duties towards state and financial institutions resulting from their daily activities. Among the less valued knowledge and skills belong mostly mathematical, statistical and analytical (SWOT) ones compensable by outsourcing to professional consultancies used especially for the creation of new projects and investment acquisition. Such services are offered by *e.g.* experts from the local territorial administration and lecturers from specialized educational institutions.

In the area of IT, agricultural entrepreneurs use the internet mostly for filing on-line forms for governmental and public institutions (health insurance company, social insurance agency, ...). Active use of office software is mostly limited to MS Word used for administrative work. Presentation and collaboration software are rarely used. There are still great deficiencies in presenting the work and products of agricultural entrepreneurs. Electronic collaboration would be also very useful for sharing and exchanging information, experience and skills in the professional community.

The personal development of the entrepreneurs is clearly subordinated to farming. They collect new information only when they realize they lack them, usually concerning new regulations. Only a few entrepreneurs study on a regular basis. The professional development is focused on the education required by law (Occupational Safety and Health Training, driving license for agricultural vehicles and machines, ...).

We assumed that the evaluation of entrepreneurial skills, IT skills, and additional education would be statistically significant depending on the respondents' gender, age and education, the residence of the agricultural enterprise, number of employees and whether the agricultural activities, present the main or supplementary source of income of the entrepreneur. But, the results confirmed that the level of entrepreneurial skills is predicted by age, education and main or supplementary source of income, while IT skills are predicted only by education and the level of further education by the number of employees. As for the remaining parameters.

The results of the research proved that agricultural primary sector is not attractive in Slovakia for young people to build a career (but neither is in Europe, according to the sources). Keeping the population in the countryside and especially young people could be possible by means of diversification of activities including non-agricultural ones. Small farmers play a dominant role in the development of small villages. To ensure architectural and urban development of the countryside, to protect their values and develop the identity and community of the rural population, educational and advisory activities appear to be very important with special focus at agricultural consultancy but also consultancy in discovering new opportunities for the development of the countryside and raising employment in the rural areas. Educational activities must follow the latest trends in entrepreneurship, in the development of entrepreneurial and managerial skills and IT skills. Based on the research, educational activities can be planned in rural settlements creating opportunities for local institutions or educational centers set up by the local administration. These could become the basis of the development of the countryside and could support the small entrepreneurs (private farmers) engaged in agricultural and non-agricultural activities.

Limitations of the research

We consider the lack of interest among the agricultural entrepreneurs in participating and supplying information as one of the main limitations of the research. This resulted in a smaller research sample than originally planned. Another limitation could be a possibly subjective self-assessment of the respondents.

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Comparison of Macro Factors' Influences on Energy Stocks and Alternative Energy Stocks

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Abstract:

This research investigates macro factors' influence on energy and alternative energy stocks. The market risk premium, industry risk premium, and the percentage change in oil price from January 2003 to December 2019 are examined for their impact on energy stocks' risk premium by applying the multifactor model analysis. The results suggested that market sentiment plays an important role on both fossil and alternative energy stocks' return but at unequal level. The impact of oil price change is rather low. Surprisingly, the industry risk premium is not statistically significant in this study. The results suggest that fossil energy stocks and alternative energy stocks are not integrated. Investors could gain diversification benefit from holding these two sub-sectors together. The unexplained part is still high, accordingly, the uncounted variables in this study should be further explored.

Keywords: alternative energy; market risk premium; industry risk premium; multifactor model; energy stock; integrated.

JEL Classification: G10; G12.

Introduction

The energy development is always the interesting and important issue in both real and financial sectors, since energy is the major part in production and in profits and losses of companies. The rising oil prices make profits to energy producers and traders, but cause losses to energy-consumed businesses. The abrupt surges in oil prices since the first decade of the millennium and all time high in 2008 have changed the landscape of global economy and business sectors. The rising oil prices fuel up not only the growth and enlargement of the traditional petroleum-related energy companies, but also the development and attention toward alternative energy companies, and increase the financial performance, as well as stock prices, of both energy and alternative energy companies.

Higher energy prices in decades of 2000 reflect the rapidly increasing global demand for oil, especially from emerging market economies like China and India. Coupled with increased concern about the worsening environment and climate like the global warming, the research and development of renewable energy that is less harmful to environment helps spur the demand for alternatives, such as wind and solar, to the traditional energy that relies on fossil fuels. Therefore, increasing demand for energy and environmental concerns are driving factors for rising oil prices and the financial performance of both traditional and alternative energy companies and their stock prices.

Since the rising oil prices in the first decade of 2000 have trigger the attention toward demand of both traditional and alternative energy, this study will explore empirically the relationship between oil price changes and stock returns of those companies.

1. Literature review

Since the energy industry is one of the major industries in every country, and other industries mostly are energy-demanding, the companies in the energy industry are normally big and powerful in terms of economic, political, and social impacts. Therefore, the energy companies' stocks are often the targets for both local and international

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investment. The recent development in the energy industry is due to the fluctuation in oil prices, the scarcity of fossil-fuel reserves, and the environmental concern on the global warming. The effort to decrease the dependency on fossil fuels; namely, oil, coal, and natural gas, has shifted the energy-developers' attention toward "green" or "alternative" energy fuels; *i.e.*, hydro, solar, wind, and biofuel, *etc.* The large demand of energy with the diversity of petroleum and renewable energy sources not only changes the industrial landscape, but also gives directions of the investment strategies in the financial markets.

Several studies explore the relationship between oil price fluctuations and stock market performance, both the aggregate returns and the stock returns of energy companies. (Kaneko and Lee 1995) use a vector autoregressive (VAR) model to analyze macroeconomic factors that influence the returns of stock markets in US and Japan. They find that international factors, such as changes in oil prices, are most significant in Japanese stock market returns. (Sadorsky 1999) also employs a VAR analysis to study the effect of oil prices and oil price volatility on real stock returns and find that oil price changes have more influence on real stock returns than do interest rates. For the effect of macro factors on energy companies' stock returns (Sadorsky 2001) finds that exchange rates, crude oil prices and interest rates have significant impacts on stock price returns in the Canadian oil and gas industry.

Hammoudeh and Huimin (2004) study the relationship between oil sensitivity and systematic risk in oil-sensitive stock indices, and find that the growth in oil price has a positive effect on the stock returns of the oil-exporting countries and the US oil-sensitive industries. However, investors view the systematic risk more importantly than the oil sensitivity in pricing the oil-sensitive stocks. Ewing and Thompson (2007) studies the empirical relationship between crude oil prices and several key macroeconomic variables including output, consumer prices, unemployment, and the aggregate stock market returns. They find the leading influence of oil prices on consumer prices.

For the studies on alternative energy stock performance, Henriques and Sadorsky (2007) explore the relationship between alternative energy stock prices, technology stock prices, oil prices, and interest rates. They find that technology stock prices and oil prices has an effect on stock prices of alternative energy companies, and a shock to technology stock prices has a larger impact on alternative energy stock prices than does a shock to oil prices. Huang, Cheng, Hu, and Chen (2011) explore the relationship between crude oil prices and stock prices of alternative energy companies and find that oil prices lead the stock performance of alternative energy companies after 2006.

Gormus, Soytaş, and Diltz (2015) analyze the relationship between the fossil-fuel and alternative energy stock returns and the changes in oil prices, currency, aggregate market index, and gold prices, and find that changes in oil prices and exchange rates do not have any effect on petroleum companies' stock returns while there is a significant relationship between oil price changes and most energy sub-industry stock returns in the long run. Lee and Baek (2018) use the nonlinear autoregressive distributed lag (ARDL) approach and find that oil prices have a positive effect on the stock prices of renewable energy companies only in the short-run, and the relationship does not last in the long-run.

This study uses the case of the energy industry in the Stock Exchange of Thailand (SET) since the energy industry is one of the major industries in the SET, and the stocks in the energy industry are always get the market attention. This industry in the SET has the market capitalization more than 20% of the total market value. The changes in value or return of the stocks in this industry would have a major effect on the overall market. In addition, it is a popular industry not only for the domestic investors but also for the international investors. The research is questioning whether the stock market investors of both fossil-fuel and alternative-energy companies incorporate any macroeconomic factors into their trading decisions. The factors, such as the aggregate market returns, energy industry returns, interest rates, and changes in oil prices (incorporating exchange rates), are explored in this study. Market return and risk-free rate from government bonds' return are considered as important variables in the Capital Asset Pricing Model suggested by Sharpe (1964) while industry risk premium is also an important variable in many studies, for example, the study of (Sun and Zhou 2017).

2. Methodology

This research paper collects monthly data of Dubai crude oil price (in US dollars/barrel), US dollar value in Baht (Baht per US dollar), and the total return indices of SET index, SET Energy Industry index, and 51 listed companies under energy industry of the Stock Exchange of Thailand (SET) from Reuter database from January 2003 to December 2019. The data are grouped into fossil energy group and alternative energy group. The first group is composed of 34 companies and the later includes the remainder. Also, the data of total return index of Thai government bond is collected from The Thai Bond Market Association (ThaiBMA) during the same period. The

Dubai crude oil price is converted into Baht by multiplying the price by the US dollar value in Baht (Baht per US dollar) before the investigation begins to match the other indices which are in Baht value.

The research starts from converting the data into log return (R_t) for further analysis as follows:

$$R_t = \ln(I_t/I_{t-1}) \quad (1)$$

where: I_t is the index at time t , and I_{t-1} is the index at time $t-1$.

The study's investigation is based on panel data analysis. Initially, the modified indices are built. The values of SET Index, SET Energy Index, Dubai crude oil price, and Thailand Government Bond Index are reset at 100 in January 2003 and the indices would be adjusted to move at the same percentage as their calculated returns. The graphs drawn on these new indices would be initially used to show their association. Then, the related variables Risk Premium for Fossil Energy Stock (RFOSSIL, $t - RGOV, t$), Risk Premium for Alternative Energy Stock (RALTER, $t - RGOV, t$), Market Risk Premium (RSET, $t - RGOV, t$), Energy Industry's Risk Premium (RENE, $t - RGOV, t$), and Percentage Change in Oil Price (ROIL, t) are calculated where RFOSSIL, t is the fossil energy stocks' return at period t , RALTER, t is the alternative energy stocks' return at period t , RGOV, t is the Thai government bond's return, RSET, t is the SET index return at period t , RENER, t is the SET energy index's return at period t , and ROIL, t is the percentage change in crude oil price at period t . These new data would be examined to deliver their distribution information before they would be further explored in the next part.

To obtain the impact of market, energy industry, and oil price movement on the return of fossil energy group and the return of alternative energy group, this research adapts the multifactor model under multiple regression analysis for the investigation. The model is widely used in financial research since it could count the impact factors beyond market risk as suggested by (Ross 1976). The model is explained in the equation as follows:

$$(R_{i,t} - R_{GOV,t}) = \beta_{i,0} + \beta_{i,1} (R_{SET,t} - R_{GOV,t}) + \beta_{i,2} (R_{ENER,t} - R_{GOV,t}) + \beta_{i,3} ROIL,t + e_i \quad (2)$$

where: $\beta_{i,0}$ is the y-intercept; β_i is beta coefficient which show the influence of each factor on the stock i 's risk premium; $R_{i,t}$ is stock i 's return at period t .

The difference between the stock return and the government bond's return ($R_{i,t} - R_{GOV,t}$) represents investors' risk premium for the stock investment, the difference between the SET index return and the government bond's return ($R_{SET,t} - R_{GOV,t}$) represents the market risk premium, and the difference between SET energy index's return and the government bond's return ($R_{ENER,t} - R_{GOV,t}$) represents the energy industry's risk premium. As a result, the impact of these risk premiums together with the impact of oil price change would be total in the model.

3. Result

The Figure 1 shows the comparison of the modified indices of SET return, SET Energy Industry return, Thai Government Bond return and Dubai Crude Oil return during Jan 2003 to Jan 2019. The indices are made to be 100 at the end of January 2003 and adjusted with their returns. Except the index of Thai Government Bond return, other modified indices show some positive relation of the movement. Accordingly, the movement of the stock market, energy industry stock in overall, and crude oil price might have some impact on the energy stocks' return. The separate testing for fossil energy and alternative energy stocks should provide profound evidences for the influences of these factors. Additionally, the steadiness of the movement in government bond return index implies that there might be no association on its movement and other variables' movement. The testing on the impact of the market premium and energy industry risk premium might reasonably provide more precise results than the testing on the impact of the straight market return and the straight industry return.

Table 1 provides the information of the distribution of the studied data. The risk premium for fossil energy stock at the average of 0.11% is obviously higher than the risk premium for alternative stock market of 0.03%. Market risk premium and energy industry risk premium average at the first and the second ranks of 0.41% and 0.23%, consecutively. The lowest average is the percentage change in oil price of -0.22%.

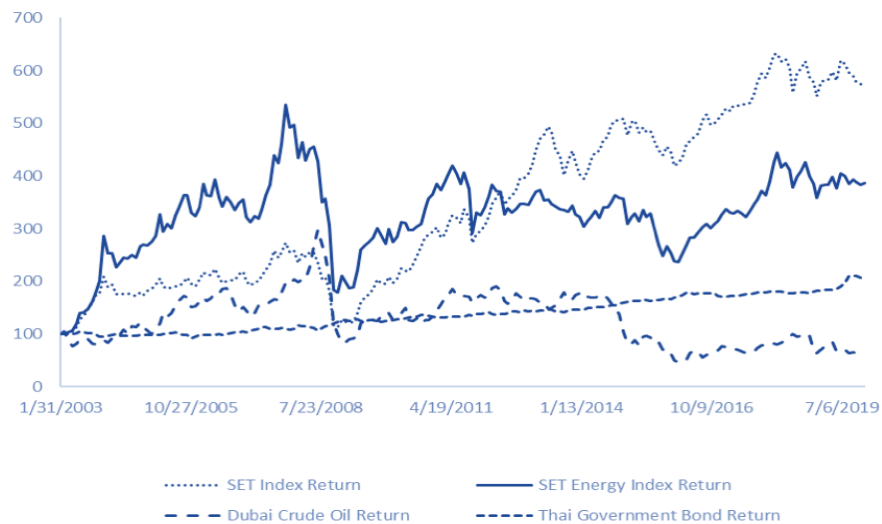
The fluctuation of all of these variables are very high, comparing to their averages. The first rank is the standard deviation of the risk premium for alternative energy stock at 12.30%, followed by the standard deviation of risk premium for fossil energy stock, the percentage change in oil price, energy industry risk premium, and market risk premium of 11.46%, 9.20%, 7.17%, and 5.59%, respectively.

For the skewness, though risk premiums for fossil energy stock and alternative stock are skewed to the right, the independent variables including market risk premium, energy industry risk premium, and percentage change in oil price are skewed to the left. However, all degrees of skewness are not very high. The highest

skewness belongs to the market risk premium at -1.68 and the lowest skewness belong to the risk premium of fossil energy at 0.41.

Lastly, all of these data are highly leptokurtic. The highest kurtosis belongs to the market risk premium of 13.70 and the lowest belongs to the percentage change in oil price of 5.39.

Figure 1. Modified indices of SET return, SET Energy Industry return, Thai Government Bond return and Dubai Crude Oil return during Jan 2003 to Jan 2019. The indices are made to be 100 at the end of January 2003



Source: Reuter Database and the Thai Bond Market Association

Table 1. Descriptive Statistics of Risk Premium for Fossil Energy Stock ($R_{FOSSIL,t} - R_{GOV,t}$), Risk Premium for Alternative Energy Stock ($R_{ALTER,t} - R_{GOV,t}$), Market Risk Premium ($R_{SET,t} - R_{GOV,t}$), Energy Industry Risk Premium ($R_{ENER,t} - R_{GOV,t}$), and Percentage Change in Oil Price ($R_{OIL,t}$).

	Risk Premium for Fossil Energy Stock ($R_{FOSSIL,t} - R_{GOV,t}$)	Risk Premium for Alternative Energy Stock ($R_{ALTER,t} - R_{GOV,t}$)	Market Risk Premium ($R_{SET,t} - R_{GOV,t}$)	Energy Industry Risk Premium ($R_{ENER,t} - R_{GOV,t}$)	Percentage Change in Oil Price ($R_{OIL,t}$)
Mean	0.11%	0.03%	0.41%	0.23%	-0.22%
Median	0.00%	-0.31%	0.91%	1.13%	1.38%
Maximum	100.92%	86.12%	17.68%	42.52%	28.64%
Minimum	-84.83%	-85.54%	-39.32%	-43.31%	-44.22%
Std. Dev.	11.46%	12.30%	5.59%	7.17%	9.20%
Skewness	0.41	0.60	-1.68	-0.64	-0.87
Kurtosis	12.47	9.78	13.79	11.37	5.39
Observations	4,717	1,419	6,150	6,150	6,150

Note: * Significant at 0.10; ** Significant at 0.05; *** Significant at 0.01

Table 2 shows the comparison of multifactor model's coefficients for all energy industry stocks, fossil energy stocks, and alternative energy stocks. The OLS multiple regression analysis reports many similar results. The risk premiums of all energy industry stocks, fossil energy stocks, and alternative energy stocks are statistically significantly influenced by market risk premium and the percentage change in crude oil price. In addition, these impacts are positive at the significant level of 1%. The energy industry's risk premium is not statistically significant to both fossil energy stocks and alternative energy stocks.

The impact of stock market on the energy stocks is higher than the impact of oil price. For all energy industry stocks, every 1% changes in market risk premium would make the stocks' risk premium increases by 1.059%. The impact is stronger for the alternative energy stocks. 1% changes in market risk premium would cause up to 1.596% change in these stocks' risk premium. For the fossil energy stocks, the impact of stock market is less. 1% changes in market risk premium would cause 0.940% change in the stocks' risk premium.

Oppositely, the influence from the change in oil price is very limited. In overall, 1% changes in oil price would cause only 0.044% change in energy stocks' risk premium. In details, the impact is stronger for fossil energy stocks. 1% changes in oil price would cause only 0.063% change in these stocks' risk premium while 1% changes in oil price would cause only 0.011% change in the alternative energy stocks' risk premium.

Overall, the model could explain the risk premium by 24.06%. In particular, the three independent variables could explain the risk premium of fossil energy stocks better than the risk premium of alternative energy stocks at 26.29% and 19.36%, consecutively.

Table 2. Comparison between the Multifactor Models of ALL Energy Stocks, the Multifactor Model of Fossil Energy Stocks and the Multifactor Model of Alternative Energy Stocks

	$R_{ALLEN,t} - R_{GOV,t}$	$R_{FOSSIL,t} - R_{GOV,t}$	$R_{ALTER,t} - R_{GOV,t}$
$R_{SET,t} - R_{GOV,t}$	1.059***	0.940***	1.596***
$R_{ENER,t} - R_{GOV,t}$	-0.061	0.036	-0.518
$R_{OIL,t}$	0.044***	0.063***	0.011***
Constant	-0.003**	-0.003**	-0.003**
Adjusted R-Squared	0.2406	0.2629	0.1936

Note: * Significant at 0.10; ** Significant at 0.05; *** Significant at 0.01; $R_{ALLEN,t}$ is Energy Stocks' Return, $R_{FOSSIL,t}$ is Fossil Energy Stocks' Return, $R_{ALTER,t}$ is Alternative Energy Stocks' Return, $R_{GOV,t}$ is Thailand Government Bond Index's Return, and $R_{OIL,t}$ is Dubai Crude Oil's Return.

Conclusion

This study investigates the macro factors' influences on fossil energy stocks and alternative energy stocks in Thailand during January 2003 to December 2019. The association of the movements in energy stock return, market return, and the percentage change in crude oil price suggests that these macro variables might have some contribution to the return of energy stocks and alternative energy stocks. The research applies multifactor models under OLS multiple regression to verify the truth and finds that stock market and oil price could statistically significantly influence the energy stocks' return but the impact from stock market is stronger than the impact from the crude oil price. In details, these two variables positively influence the risk premium of both fossil energy and alternative energy stocks. However, the impact from stock market is rather strong, especially, for alternative energy stocks. The results suggest that market sentiment plays an important role on the energy stocks' return.

The impact of oil price change on fossil energy firms is unsurprisingly more than on alternative energy. Interestingly, the impact from oil price change is very small for both fossil and alternative energy stocks' risk premium. In other words, the role of oil price on the energy industry stocks is quite limited. This result might be due to several possible reasons. The energy firms might be able to deal with the fluctuation of oil price effectively through the available hedging instruments such as futures or forward contracts or these firms might diversify their business into other less related business, for example, the launching of grocery stores in many gas stations.

Additionally, the different coefficients of the multifactor models from this study also advocate that fossil energy stocks and alternative energy stocks are not quite integrated. Investors could still gain some diversification benefit from putting both fossil and alternative energy stocks in their portfolio.

Lastly, the low adjusted R-squared value for the model suggests that there are still many independent variables affecting the energy stocks' return. Accordingly, further studies should be done to explore the uncounted variables.

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Crude Oil Price Shocks, Monetary Policy and Output Growth in African Oil Producing Countries

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Abstract:

This study examined the interrelationships among monetary policy transmission mechanism, oil price shocks and output growth in the selected African oil producing countries. Data for the study were sourced from World Development Indicators published by the World Bank and International Monetary Fund (World Economic Outlook). The study employed Structural Vector Autoregressive (SVAR) as estimation techniques. Findings from the SVAR Impulse Response Functions revealed that the over-dependence on exploitation of oil by African oil producing countries without a corresponding diversification and switching to alternative sources of energy leads to ineffectiveness of oil economies in Africa to confront and combat some negative impacts of global oil price shocks. Findings from the study equally showed that the economies of oil producing countries in Africa are prone to shocks from the US real interest rate which represents the foreign interest rate. Finally, the study also showed that the expansionary monetary policy (in which interest rate is reduced to stimulate investment) is more effective in compensating and offsetting the negative effect of the decline in global oil price in the selected African oil producing countries.

Keywords: monetary policy; crude oil price; economic growth; structural vector autoregressive; African oil producing countries.

JEL Classification: E52; O47; Q41.

Introduction

For a long time, the prevailing arguments among development economists is the issue of Dutch disease in the resource rich economies. There is a broad consensus among various empirical studies that many countries that are rich in natural resources display poor economic performance than the less resources endowed economies (Olomola 2007, Bulmer-Thomas 1994, Sachs and Warner 1997). For instance, in the past four decades, members of the Organization of Petroleum Exporting Countries (OPEC) have been experiencing stunted GDP growth (Gylfason 2017). In some African oil producing countries, the story is the same as enormous resources generated from oil have not been translated to their overall economic development (World Bank 2016, IMF 2016). The prevalence of unemployment, poverty and excessive importation of manufactured goods, decay infrastructures, inadequate power and energy supplies and low human development index are pointers to the position of World Bank and International Monetary Fund.

One of the most widely used macroeconomic policies, especially in improving output performance in many countries, is monetary policy (Jordi and Mark 2007). However, the fluctuations in crude oil price have continued to aggravate monetary policy dynamics in most Africa's oil producing countries (World Bank 2016). Considering the monetary policy uncertainty as a result of crude oil price shock which has some implications on the overall output performance of the Africa's oil producing countries, this study therefore contributes to the literature by investigating empirically the interrelationships among monetary policy transmission mechanism, oil price shocks and output growth of the selected Africa's oil producing countries.

1. Literature

Jones and Paul (2005) examined how oil price shocks affect the output growth of selected Middle East and North African (MENA) countries that are either exporters or net importers of oil commodities. They employed a Structural Vector Autoregressive (SVAR) model to focus explicitly on World oil prices and the real GDP over the period of 1960-2003. Findings from their impulse response results suggest that the effects of the world oil price on GDP of Algeria, Iran, Iraq, Jordan, Kuwait, Oman, Qatar, Syria, Tunisia and United Arab Emirate (UAE) are positively and statistically significant. However, for Bahrain, Egypt, Lebanon, Morocco and Yemen, they did not find a significant impact on oil price shocks.

Apere and Ijomah (2013) examined the effect of oil price shock on monetary policy in Nigeria by applying Structural VAR model between 1970 and 2010. Their results revealed that there is a long-run relationship involving oil prices, inflation rate, treasury bill rate, exchange rate, interest rate and money supply in Nigeria. The results further revealed that an unexpected oil price shock is followed by an increase in inflation rate and decline in exchange rate and interest rate in Nigeria.

Mwabutiwa and Bittercourt (2016) studied the evolution of monetary policy transmission mechanism in Malawi between 1980 and 2010 using a time varying parameter vector Autoregressive (TVP-VAR) model with stochastic volatility. The study evaluated how the responses of real output and general price level to bank rate, exchange rate and credit shocks had changed over time, since Malawi adopted financial reforms in 1980s. The findings revealed that inflation and real output response to monetary policy shocks changed over the period under the research work.

Mutuku and Koechi (2015) examined the joint impact of fiscal and monetary policy shocks on some fundamental macroeconomic indicators in three emerging African economies: Ghana, Nigeria and South Africa. By employing Vector Autoregressive (VAR) method to explain the relationships among real GDP, Inflation and Trade, their results showed that the impacts of fiscal policy shocks were more pronounced and significant than monetary policy shocks. Macroeconomic variables were seen to respond considerably to both contractionary and expansionary fiscal policy shocks in these countries.

Omolade and Ngalawa (2014) examined the impact of revenue on the growth of the manufacturing sector in Africa's oil exporting countries. They focused their study on six major net oil exporters in Africa, namely: Nigeria, Algeria, Sudan, Gabon, Cameroon and Egypt. By employing both static and dynamic panel data techniques, between 1970 and 2010, the findings of the study showed that the six countries did not exhibit significant country-specific effects and the existence of Dutch disease is confirmed. The study also revealed that there is a dearth of capital formation in the six countries' manufacturing sectors and the more capital-intensive the manufacturing sector is, the less the negative effect of the oil sector's dominance.

Omolade and Ngalawa (2016) in another dimension also examined the role of exchange rate regimes in determining the nature of relationship between monetary policy transmission mechanisms and manufacturing output growth in oil producing economies in Africa, Libya and Nigeria were practiced in both oil exporting countries. By employing structural VAR, the results revealed that exchange rate regime has some influences on the monetary policy transmission mechanism and its effectiveness on the manufacturing output growth instrument appears to be ineffective in promoting output growth of the manufacturing sector in Libya that practices fixed exchange rate, the reverse is the case in Nigeria.

Some of the past empirical studies reviewed in this study were more concerned with oil price shock as it affects economic growth of the oil producing countries without any emphasis on the role of monetary policy in the process. On the other hand, some studies investigated monetary policy separately and study the effect on output without clear emphasis on oil price. However, the study of Omolade and Ngalawa (2016) that studied the role monetary policy in the interplay between oil price and output performance was more focused on manufacturing sector output alone which might not reflect the entire output performance of the oil producing countries in Africa. Consequently, this study therefore contributes to the literatures by taking a holistic view of the interrelationship among monetary policy transmission mechanism, oil price shocks and output growth of the oil producing countries in Africa.

2. Methodology

2.1. Model Set-up

In the basic model set-up in this study, a four variable Structural Vector Autoregressive (SVAR) model is used. This model is similar to that used by (Demachi 2012), (Beckermans 2005) and (Kutu and Ngalawa 2015). The VAR model assumes that each of the selected African oil producing economy (comprising of Angola, Sudan, Cameroon,

Cote D'Ivoire, Nigeria, Algeria, Libya, Tunisia, Mauritania, Egypt, Republic of Congo, Gabon, Chad, Democratic Republic of Congo and Equatorial Guinea) is represented by a structural form equation as follows:

$$B(L)y_t = U_t \tag{1}$$

where: $B(L)$ is a matrix polynomial in the lag operator L , such that $B(L) = B_0 - B_1L - B_2L^2 - \dots - B_pL^p$. B_0 is a non-singular matrix normalized to have ones on the diagonal and summarizes the contemporaneous relationship between the variables in the model contained in the vector y_t . y_t is an $N \times 1$ vector of endogenous variables which includes $\{WOP, USRINTR, GDPgr, RINTR\}$. U_t is an $N \times 1$ vector of structural disturbances with 0 mean and $Var(U_t) = \theta$ (where θ denotes a diagonal matrix) we assume that the structural disturbances are mutually uncorrelated.

Associated with this structural model is the reduced form VAR which is estimated as:

$$A(L)y_t = \varepsilon_t \tag{2}$$

where: $A(L)$ is a matrix polynomial in the lag operator L , ε_t is a vector of the VAR residuals with 0 mean and $VAR(\varepsilon_t) = \Sigma$.

The relationship between the components of equations (1) and (2) are stated as Follows:

$$A(L) = B_0^{-1}B(L) \tag{3}$$

$$\varepsilon_t = B_0^{-1}U_t \tag{4}$$

By normalizing $N \times 1$ diagonal elements of B_0 to ones (i.e unity), we need at least $n \left[\frac{n-1}{2} \right]$ restrictions on B_0 to achieve identification.

The idea behind the choice of SVAR method in this study as against the commonly used Cholesky decomposition is that the identification approach of the latter assumes only a recursive method. This recursive method has been adjudged to be prone to wrong causal ordering of variables if the researcher is interested in looking at more than just monetary shocks (Gottschalk 2001). This shortcoming can be efficiently corrected by non-recursive SVAR.

2.2. Model Identification: Non-Recursive Approach

The approach used to impose restrictions on the contemporaneous matrix of structural parameter B_0 in this study is based on the work of Demachi (2012), Berkermans (2005) and Kutu and Ngalawa (2015). In this model, the vector $[Y_t: WOP, USRINTR, GDPgr, RINTR]$ is assumed to be divided into two blocks. The exogenous vector $[X_t: WOP, USRINTR]$ is assumed to be a foreign block. The foreign variables are included to control for exogenous change in the global economic stance. The endogenous vector $[Z_t: GDPgr, RINTR]$ is assumed to be a domestic block which comprises both policy and non-policy variables. Policy variable comprises of $[RINTR]$ which is assumed to be controlled by the monetary authorities while the non-policy variable comprises of $[GDPgr]$ which is the target variable.

WOP stands for World Oil Price, $USRINTR$ represents the US Real Interest Rate (which captures foreign interest rate), $GDPgr$ is the Gross Domestic Product growth rate, $RINTR$ is the Domestic Real Interest Rate. The equation 5 below therefore shows the non-recursive identification approach as follows:

$$\begin{bmatrix} U^{WOP} \\ U^{USRINTR} \\ U^{GDPgr} \\ U^{RINTR} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 \\ a_{31} & 0 & 1 & a_{34} \\ a_{41} & a_{42} & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon^{WOP} \\ \varepsilon^{USRINTR} \\ \varepsilon^{GDPgr} \\ \varepsilon^{RINTR} \end{bmatrix} \tag{5}$$

where: U^{WOP} , $U^{USRINTR}$, U^{GDPgr} , U^{RINTR} are the structural disturbances on the endogenous variables respectively and ε^{WOP} , $\varepsilon^{USRINTR}$, ε^{GDPgr} , ε^{RINTR} are reduced- form residual that describe the unanticipated movements of each regressor respectively.

The first two rows in equation 5 relate to World Oil Price (WOP) and United State Real Interest Rate (USRINTR) which represent foreign variables. Similar to the work of Demachi (2012), we assume that domestic shocks do not affect the external sector variables, but domestic variables are assumed to be affected by external shocks. Following the work of Berkermans (2005), we allow GDPgr in the third row to be affected by world oil price and domestic interest rate while the foreign monetary policy variable (USRINTR) do not affect it. According to the

works of Kutu and Ngalawa (2015), we assume that domestic interest rate (RINTR) in the last row is affected by the foreign variables (WOP and USRINTR).

2.3. Sources of data

This paper consists of quarterly data over the period of the first quarter of 1981 to the fourth quarter of 2017. The four variables of SVAR model include the following: World Oil Price (WOP), United State Real Interest Rate (USRINTR), Gross Domestic Product growth rate (GDPgr), Real Interest Rate (RINTR). Data on WOP was sourced from International Monetary Fund (World Economic Outlook) while data on USRINTR, GDPgr and RINTR were sourced from World Bank (WDI).

3. Results and discussion

3.1. Results of SVAR impulse response function

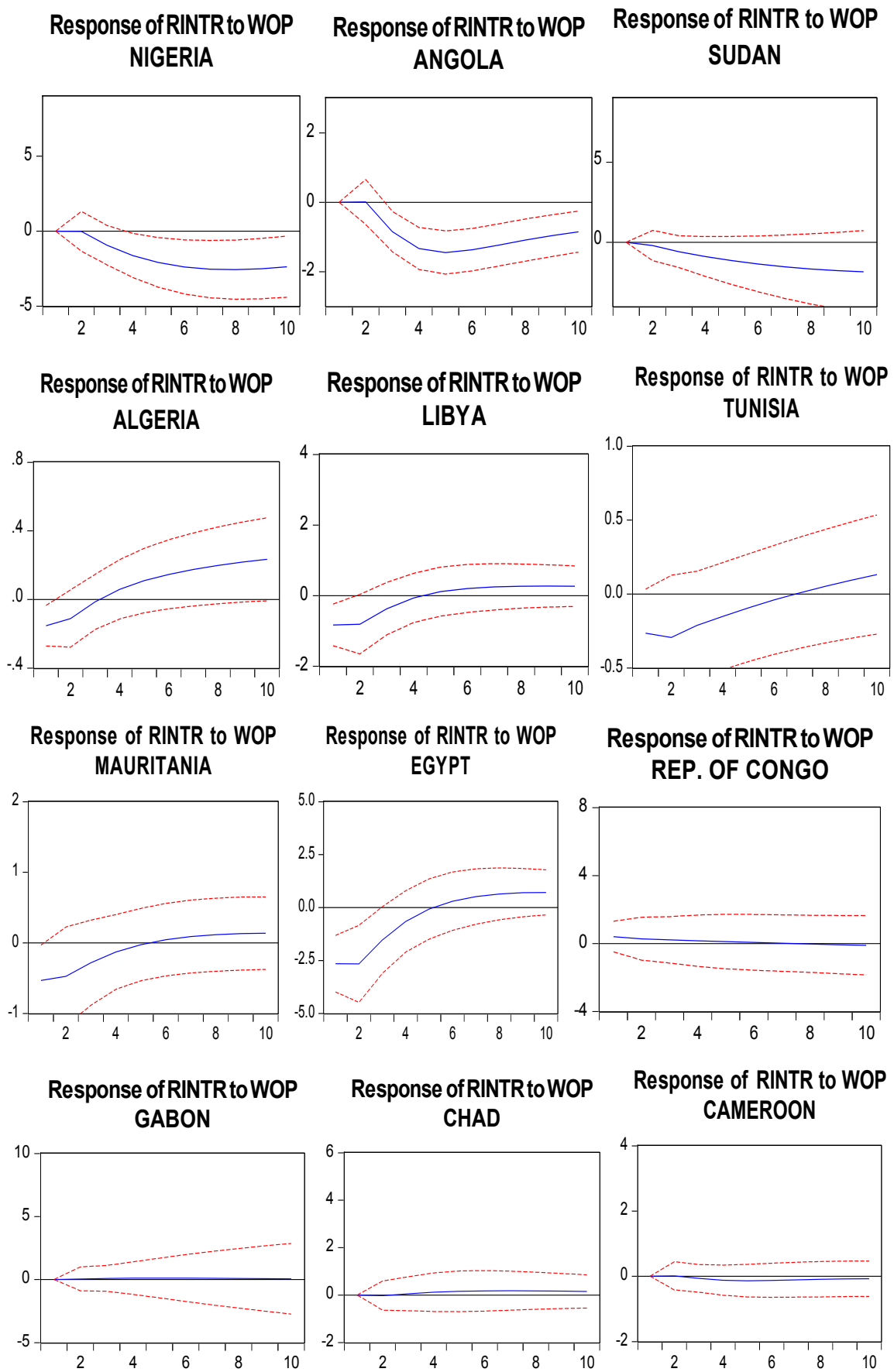
Figure 1 below showed the response of domestic interest rate to world oil price shock in the selected oil producing countries in Africa. Results from the figure revealed that the response of interest rate to a standard deviation shock from world oil price is negative and significant in Nigeria, Angola and Sudan. The reverse is the case for some countries like Algeria, Libya, Tunisia, Mauritania and Egypt as the response of interest rate to a standard deviation shock from world oil price was negative and significant initially, but later diverged towards equilibrium and eventually increased above equilibrium (positive axis) as time increases. The result is totally different in the remaining countries such as Republic of Congo, Gabon, Chad, Cameroon, Democratic Republic of Congo, Cote D'Ivoire and Equatorial Guinea as the response of interest rate to a standard deviation shock from world oil price is insignificant during the period under review.

The reason for divergent findings from these results might be due to different monetary policy regimes adopted by some of these countries. A careful assessment of some countries like Nigeria, Angola and Sudan revealed that these countries employed expansionary monetary policy by reducing interest rates. A decline in interest rate therefore stimulates investment and thus an increase in output growth rate even during a decline in the global oil price. Increase in earnings from high output growth is sufficient enough to compensate any negative impacts of a fall in global oil price. No wonder the response of domestic interest rate to world oil price shock is negative and significant in these three countries (*i.e.* Nigeria, Angola and Sudan). This finding is in line with the work of (Taiwo 2011). Also, in the same findings, a critical observation of some countries like Algeria, Libya, Tunisia, Mauritania, and Egypt proved that these countries adopted contractionary monetary policy caused by increasing interest rate in the later period of these countries. The increase in interest rate discourages potential investors thereby leading to a decline in output growth. Decline in the output growth will be insufficient to offset some of the negative outcomes that arise during a decline in the global oil price in these countries. Moreover, the insignificant response of domestic interest rate to world oil price shock in the remaining countries like Republic of Congo, Gabon, Chad, Cameroon, Democratic Republic of Congo, Cote D'Ivoire and Equatorial Guinea might be attributed to the pegged exchange rate policy employed by these countries. This fixed exchange rate regime often constraints the monetary authorities to establish independent monetary policy through the variability of interest to regulate some of the negative shock of oil price fall (Gancia and Malet 2007).

Figure 2 depicted the SVAR Impulse Response of output growth (GDPgr) to a standard innovation from World Oil Price (WOP) in the selected oil producing countries in Africa. findings from the SVAR impulse response function results showed that the response of output growth (GDPgr) to a standard deviation shock from World oil price (WOP) was initially positive and significant but later diverged to negative axis in some countries like Nigeria, Algeria, Libya, Tunisia, Mauritania, Egypt, Republic of congo, Gabon, Chad, Democratic Republic of Congo and Equatorial Guinea. This finding might be hinged on the two price cycle regimes that are associated with the global oil price, that is, global oil price fall and global oil price increase. These findings corroborate the assertions of Bjornland (2009) that an oil price decrease is expected to have a negative impact on oil producing countries while a rise in the global oil price is expected to have a positive impact on oil producing countries.

However, findings from the same SVAR impulse response function recorded different results for Angola, Sudan, Cameroon and Cote D'Ivoire, as the response of output growth (GDPgr) to the shocks coming from World oil price is positive and significant throughout the period reviewed in this study. These findings might be attributed to some of the strong measures adopted by these countries to reduce the level of over-reliance on oil global market by identifying, exploring and switching to alternative sources of energy. This might have helped these countries in great term to compensate and offset some of the negative impacts of a decline in the global oil price. As a result of these laudable projects, several biofuel plants were established in these countries, with several plantations of *Jatropha* oil seeds, cassava and Molasses on thousand hectares of land (Mitchell 2011).

Figure 1. Response of Real Interest Rate to World Oil Price in the Selected Oil Producing Countries in Africa



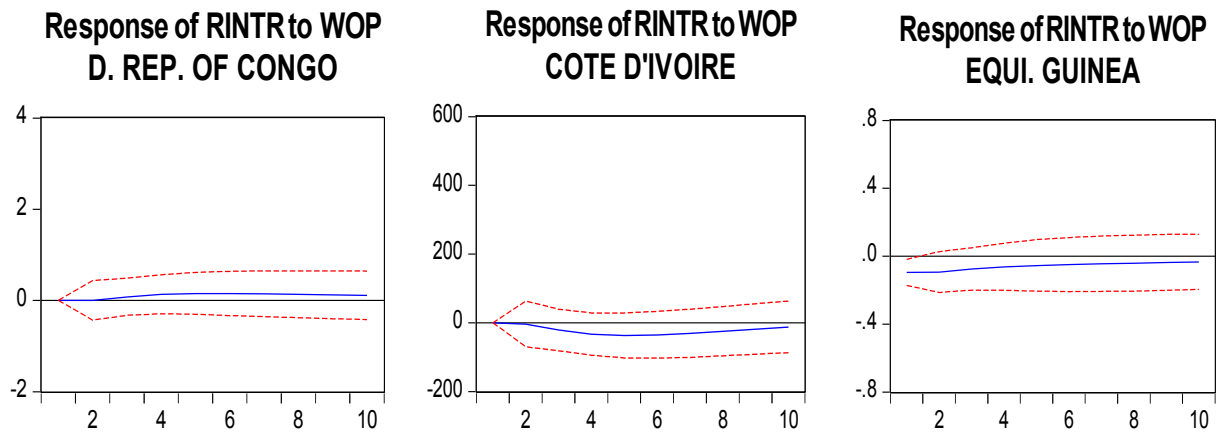
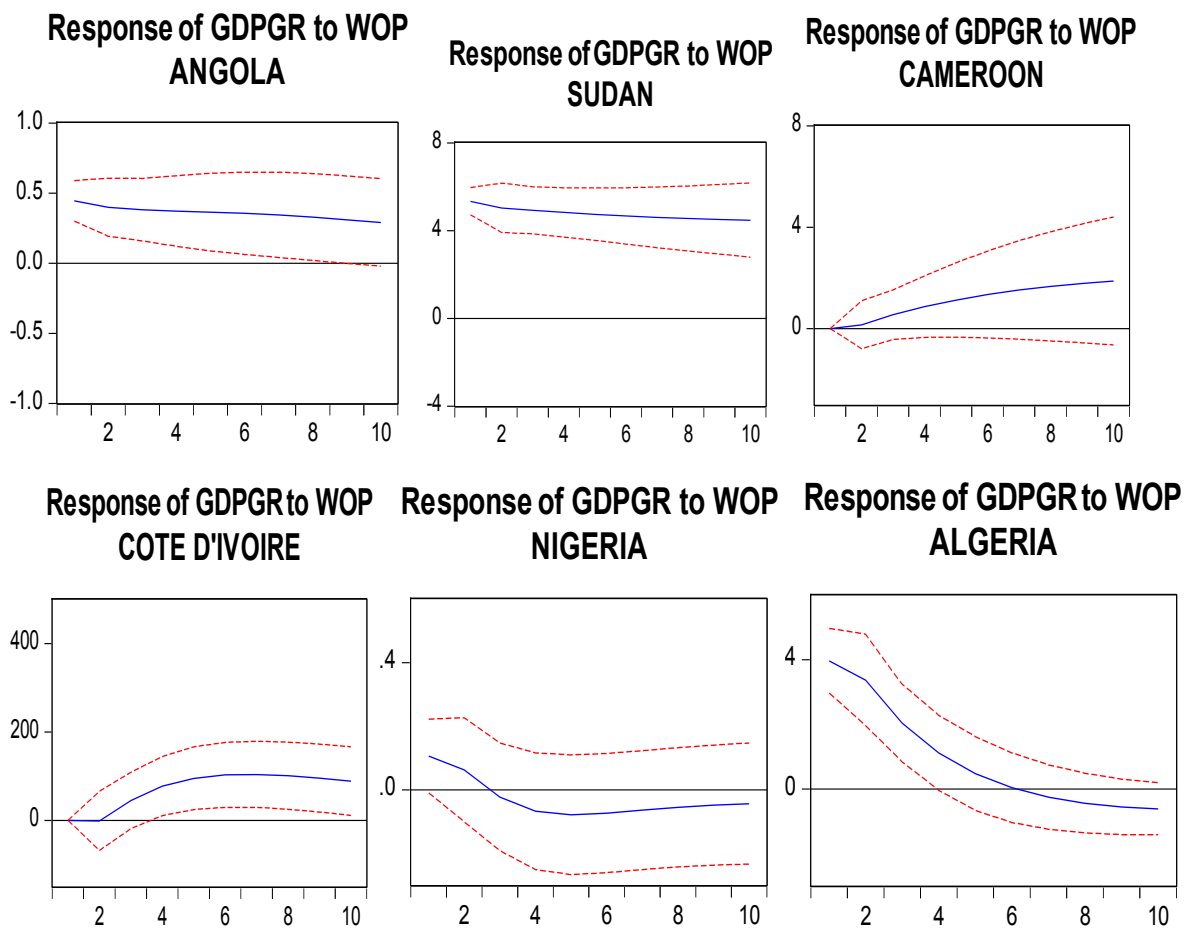


Figure 2. Response of GDP growth rate to World Oil Price Shock in the selected oil producing countries in Africa



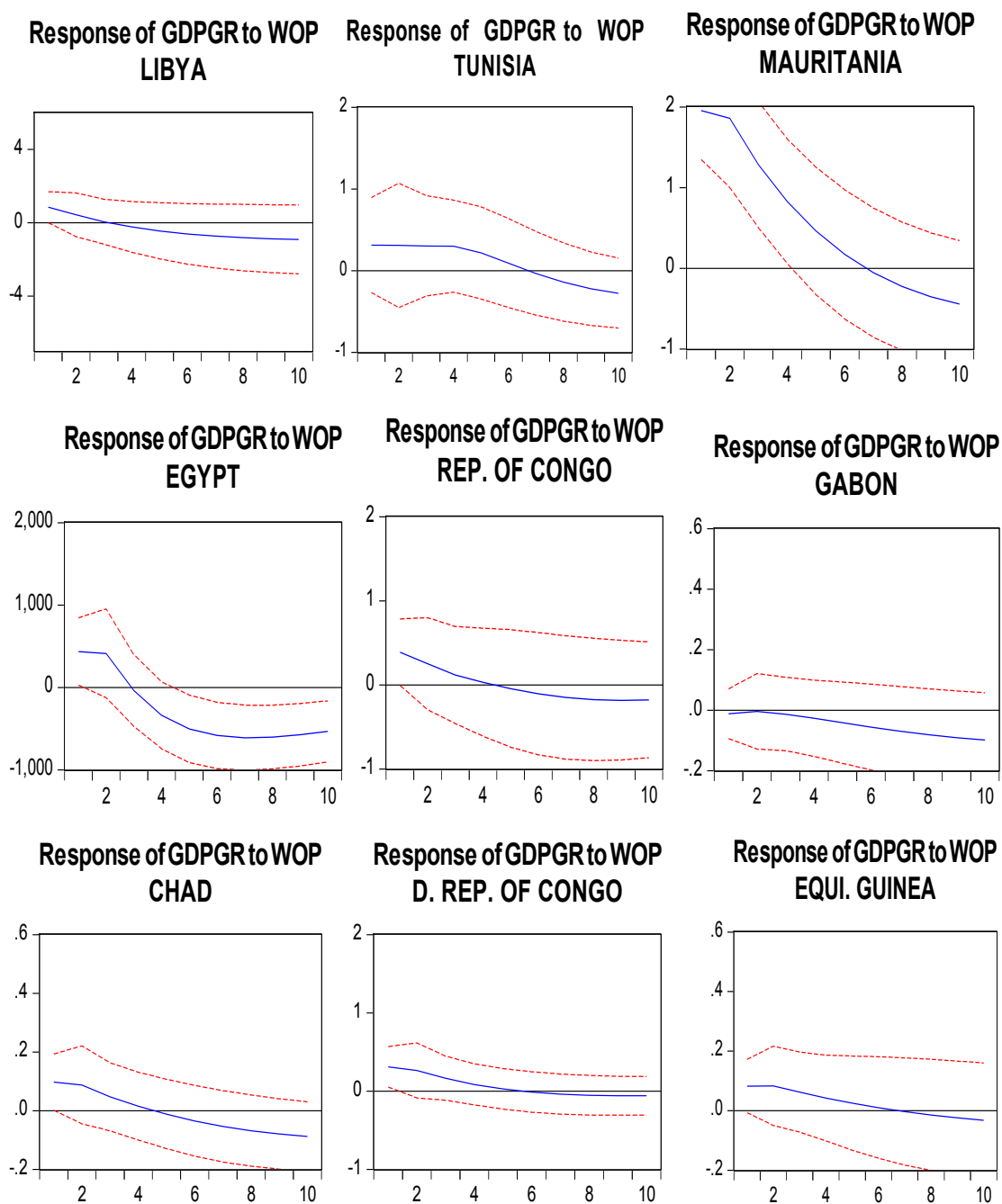
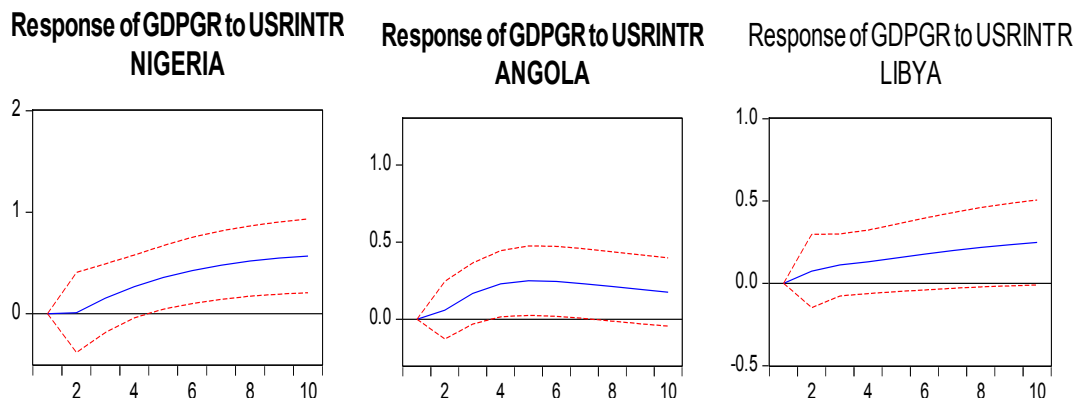
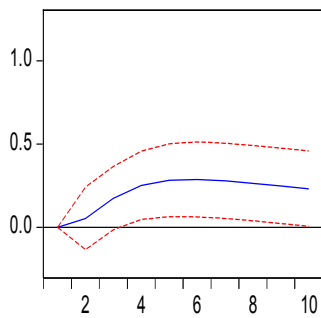


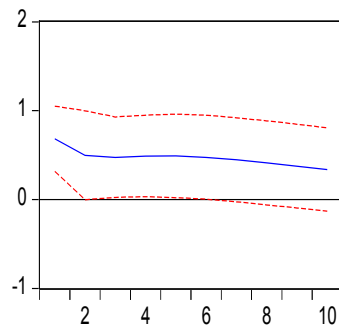
Figure 3. Response of Output Growth (GDPgr) to Foreign Interest Rate (USRINTR) Shock in the Selected Oil Producing Countries in Africa



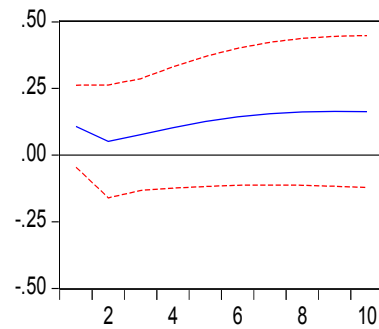
**Response of GDPGR to USRINTR
ALGERIA**



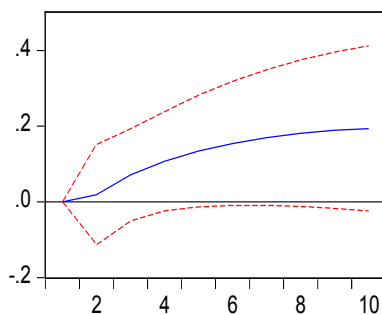
**Response of GDPGR to USRINTR
SUDAN**



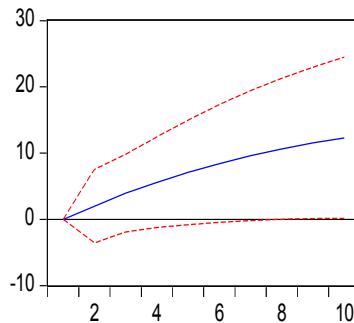
**Response of GDPGR to USRINTR
TUNISIA**



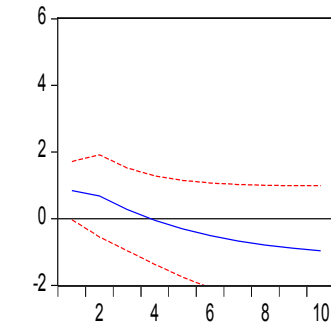
**Response of GDPGR to USRINTR
MAURITANIA**



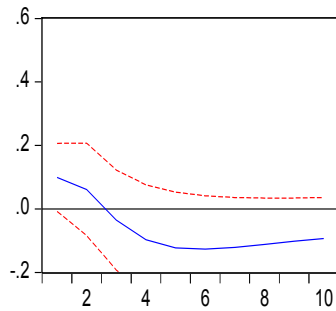
**Response of GDPGR to USRINTR
EGYPT**



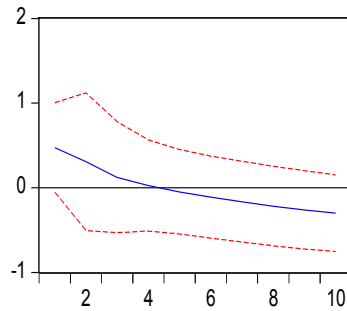
**Response of GDPGR to USRINTR
REP. OF CONGO**



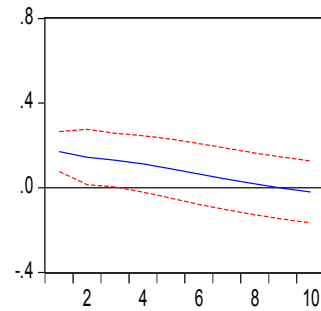
**Response of GDPGR to USRINTR
GABON**



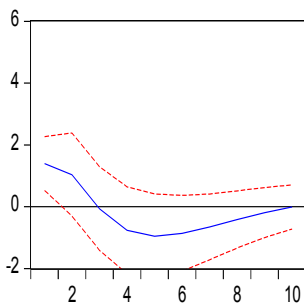
**Response of GDPGR to USRINTR
CHAD**



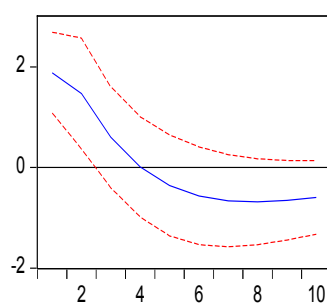
**Response of GDPGR to USRINTR
CAMEROON**



**Response of GDPGR to USRINTR
D. REP. OF CONGO**



**Response of GDPGR to USRINTR
COTE D'IVOIRE**



**Response of GDPGR to USRINTR
EQUI. GUINEA**

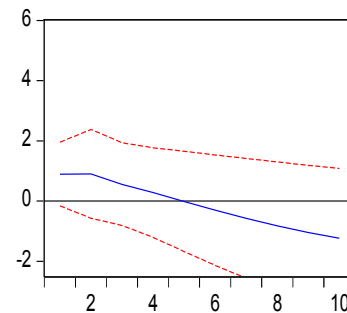


Figure 3 above showed the response of GDP growth rate to US real interest rate shock in the selected oil producing countries in Africa. Results from the figure revealed that a standard deviation shock from US real interest rate has positive and significant impact on output growth (GDPgr) throughout the period under review in some African countries such as Nigeria, Angola, Libya, Algeria, Sudan, Tunisia, Mauritania and Egypt. This finding might be linked to the type of Exchange rate policy being practiced in these countries which can either be pure floating exchange rate or managed floating exchange rate policy. These exchange rate policy regimes make it easy for these countries to employ automatic adjustment of monetary policy to regulate and confront any shock coming from foreign interest rate, this will therefore insulate their output from being affected negatively during recession period. (Gancia and Malet 2007)

This finding is quite different in the remaining countries like Republic of Congo, Gabon, Chad, Cameroon, Democratic republic of Congo, Cote D'Ivoire, Equatorial Guinea as the responses of output growth (GDPgr) to shocks coming from USINTR was initially positive but later diverged to negative axis as time increases in these countries. Reason for this finding might be due to the fixed exchange rate policy adopted by these countries. This type of exchange rate policy always restrains these countries called the Central African Economic and Monetary Community to employ automatic adjustment of monetary policy to repel the shocks coming from the foreign interest rate during recession. This therefore have negative impacts on the output growth of these countries (Hegert 2010).

Conclusion

Based on the results of SVAR impulse response function which showed that the response of output growth (GDPgr) to the foreign interest rate shock is significant in the selected African oil producing countries. According to this finding, this study therefore concludes that the economies of oil producing countries in Africa are prone to the shocks from the US real interests which represent the foreign interest rate. Moreover, based on the negative and significant responses of output growth (GDPgr) to the shocks coming from world oil price shock in some African oil producing countries, this study therefore concludes that over-dependence on exploration of oil by oil producing countries without a corresponding diversification and switching to alternative sources of energy brought about ineffectiveness of oil economies in Africa to confront and combat some negative impacts of global oil price shocks. Finally, based on the results of the SVAR impulse response function in this research work, it is therefore concluded that expansionary monetary policy (in which interest rate is reduced to stimulate investment) is more effective in compensating and offsetting the negative effect of the decline in global oil price in the selected African oil producing countries.

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Determinants of External Indebtedness in Heavily Indebted Poor Countries: An Empirical Evidence Using Panel - Corrected Standard Error Regression

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Abstract:

At the early stage of development, most developing and emerging countries borrow from abroad to finance their resource gap and domestic investment. Nevertheless, once the debt grows more prominent and unmanageable, it becomes a major macroeconomic problem. Regarding this, the countries which are classified as Heavily Indebted Poor Countries (HIPCs) suffering a lot because of their substantial external debt stock and these has been on researchers and policymaker's agenda in identifying the causes which leading them. However, the potential empirical studies of the determinants of external indebtedness with the latest methodology have received little attention in the case of HIPCs, and these has resulted in lack of knowledge and methodology in the available literature. Therefore, this study aimed to examine the determinants of external debt accumulation in HIPCs employing the recent estimation technique (Panel - Corrected Standard Error) for the period between 1990 to 2017.

The results show that debt service, imports, and growth rate of advanced countries significantly increase external debt while exports reduce it. Further, foreign direct investment and political stability significantly reduce the external debt of HIPCs, but these variables insignificant for HIPCs in SSA. The study recommends appropriate policies which improve the volume and revenue of exports, attract foreign direct investment, offer political stability, and also, those policies that reduce imports and become essential to overcome the external debt stock of HIPCs.

Keywords: determinants; external indebtedness; panel - corrected standard error; HIPCs.

JEL Classification: C32; E62.

Introduction

The countries aim to achieve rapid and sustainable economic growth. However, the economic problem of developing countries like Africa, Asia, and Latin America can be a composite of interrelated factors of both an internal and external nature and these factors become a cause for the HIPCs debt crisis. The Economists argue that the accumulation of foreign debt is a common phenomenon of developing countries at the early stage of economic development. However, if external debt becomes unsustainable, it will adversely affect the macroeconomy.

Starting from early 1970 up to now, the external debt accumulation of developing countries in general and HIPCs in particular increased. Sub-Saharan African (SSA) countries total external debt stock was US\$60.02 billion in 1980, had jumped to US\$110.64 billion in 1988 and US\$172.98 billion in 1990. Further, their total external debt stock amounted to US\$218.298 billion in 1995 (IMF, 2017). Between 1980 and 1995, the debt stock increased by US\$158.278 billion or on the average annual rate of 10.55. Furthermore, the average debt stock from 1995 to 2005 was US\$ 215.5 billion. Besides, on average, from 2006 to 2013, the external debt of SSA was US\$ 285.6 billion. The overseas debt of SSA nations was increasing from time to time and reached US\$ 385.5 billion during 2013 (IMF 2017).

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Similarly, the Latin America and Caribbean developing countries external debt increased continuously since 1970. It was only US\$ 22.8 billion and reached at more than seven times during 1980. Besides, the magnitude increased until 1988 and 1989 and then starting from 1990 to 1999, the external debt raised and reached US\$ 543.25 billion. However, it was reduced in 2000 to 2002. Except for 2005, the external debt increased for ten years between 2003 and 2014, and during 2014 it was US\$ 1.3 trillion (IMF 2017).

Since the early 1970s, determinants of external indebtedness of developing countries has been an issue for researchers, academicians, and policymakers (Maghyereh and Hashemite 2003, Berensmann 2004, Menbere 2004, Bader 2006). Commonly, the causes of foreign debt classified into domestic (Sachs 1985, Osei 1995, Uzun et al. 2012, Berensmann 2019) and external (Cline 1985, Iyoha 2000, Easterly 2002, Berensmann 2019) factors and both of them are interrelated each other.

Most developing countries borrow from abroad to finance their resource gaps and domestic investment, thereby enhancing their economic growth and development (Umaru et al. 2013, Siddique et al. 2015). According to the neoclassical economic growth model, each state should achieve a steady-state level of capital. Thus, any investment injection could lead them to have accelerated economic growth. However, once the debt grows more prominent and unmanageable, it becomes a major macroeconomic destabilising factor and a severe bottleneck to the promotion of the economy. To keep countries away from the macroeconomic instability generated by the unsustainable external debt, identifying the primary causes of external indebtedness of HIPCs needs a precise empirical analysis.

Even though there is one empirical study using panel time-series data, Chiminya and Nicolaidou (2018), about determinants of external debt in the case of African countries, it did not focus specifically on HIPCs. From the HIPCs perspective, Menbere (2004) examined the determinants of external debt in HIPCs and developing countries while Mensah et al. (2017) have investigated for HIPCs in Africa. This implies that empirical studies on the determinants of external debt in African and HIPCs are a few (leads knowledge and literature gap). Further, previous studies did not consider the existence of serial correlation, heteroskedasticity and cross-sectional dependence among the error terms which leads spurious result. Besides, even though Menbere (2004) examined the determinants of external debt for HIPCs, it is outdated. As a result, this study filled the literature, methodology, and time gaps of previous studies by considering both HIPCs in Africa and non-Africa countries, take into account serial correlation, heteroskedasticity and cross-sectional dependence and by employing Panel - Corrected Standard Error estimation technique. Therefore, the main objective of this study is to examine the determinants of external indebtedness of (fifteen) HIPCs in general and HIPCs in SSA (twelve) using time series data running between 1990 to 2017.

1. Literature review

This section has theoretical and empirical literature about the topic. Specifically, the theoretical framework and literature that explain the causes of external debt of a given/group country/countries are discussed, besides, empirical findings which describe the causes of external indebtedness presented.

1.1. Theoretical framework and causes of external indebtedness

This section has theoretical and empirical literature about the topic mentioned. The theoretical framework that justifies the need for external borrowing developing links the increase in gross external debt (current account deficit - direct and long-term portfolio capital inflows) + (official reserve increases + other private capital outflows) (Dornbusch 1984, McFadden et al. 1985, and Menbere 2004). The model begins by summarizing the determinants of the current account (CA) balance, where CA is the difference between items that generate foreign exchange and those that require foreign exchange expenditure.

$$CA = X - M - ILF - OTP \quad (1)$$

where: X = exports, M = imports, ILF = interest paid on loans from foreigners and OTP = other net factor payments and transfers to foreigners.

We can write equation (2):

$$CA = \Delta NIR + \Delta BF - \Delta LF - FDI \quad (2)$$

where: ΔNIR = change in international reserves,

ΔBF = change in foreign bonds held domestically,

ΔLF = change in loans from foreigners,

$FDI =$ foreign direct investment, and

$\Delta NIR = NIR - NIR_{-1}$ denotes a net addition to stock

Let $NFL =$ new foreign loans and $PLF =$ payments of foreign loan principal due. Then $\Delta LF = NFL - PLF$ and then, the demand for new foreign loans (NFL) would be:

$$NFL = PLF + ILF + \Delta NIR + \Delta BF - FDI + OTP - X + M \quad (3)$$

debt service paid is a summation of interest and principal payments on foreign loans ($ILF + PLP = DSP$). Debt service paid can also be written as debt service due (including past arrears outstanding) less current arrears, $DSP = DSD - A$. Substituting these definitions in (3) yields:

$$NFL + A = DSD + \Delta NIR + \Delta BF - FDI + OTP - X + M \quad (4)$$

According to Menbere (2004), the assumption here is that countries prefer to protect their reputation by rolling over their external debt rather than by arrears. This gives an equation for a one-period – ahead ex-ante demand for new loans, which satisfies:

$$NL^D = DSD^e + \Delta NIR^e + \Delta BF^e - FDI^e + OTP^e - X^e + M^e \quad (5)$$

where: NL^D stands for new loan demanded, and the superscripts e stands for expectations.

Equation (5) implies that the demand for overseas borrowing a function of total debt service, the change in international reserves, the change in foreign bonds placed domestically, trade balance along with net factor payments and transfers to foreigners (which partly reflects Current account balance). Using this theoretical framework, Imimole *et al.* (2014) analyzed the determinants of external debt for the case of Nigeria. Besides to Dornbusch (1984), McFadden *et al.* (1985) and Menbere (2004) – the two-gap model which is prepared by Chenery and Strout (1966) and its elongated Bacha (1990) fiscal gap model is the well-known models how external debt accumulated. Hence, this study adopted the theoretical framework of Dornbusch (1984), McFadden *et al.* (1985), Menbere (2004) and Imimole *et al.* (2014) in analyzing determinants of external indebtedness of HIPCs.

As we discussed previously, the causes for the external indebtedness fall into two categories – the domestic factors and the external factors. Regarding this, poverty (savings-investment gap) is one of the domestic factors for external indebtedness of developing countries. According to growth economists, poverty has a leading role for external indebtedness of a country. The wide gap between savings and investment because of different factors especially during a depressed economy leads to the accumulation of foreign debt (Solomon *et al.* 1977; Menbere 2004). Besides, Ayadi and Ayadi (2008) and Uzun *et al.* (2012) argued that since developing countries saving is low relative to investment and investment is essential for growth, it is rational to look for external funds.

The foreign trade performance is another factor for external borrowing of developing countries. The import structure of developing countries focused on imports of capital goods which are vital for the further expansion of the tradable sector. Moreover, export earnings of developing countries are usually insufficient to generate enough foreign exchange for financing imports; external borrowing is the essential means of gaining access to the technology that is vital for the expansion of the export sector and rapid economic growth (Menbere 2004). Also, the worse trade balance of developing countries is one of the causes of external debt accumulation (Helkie and Howard 1990, Ng'eno 2000).

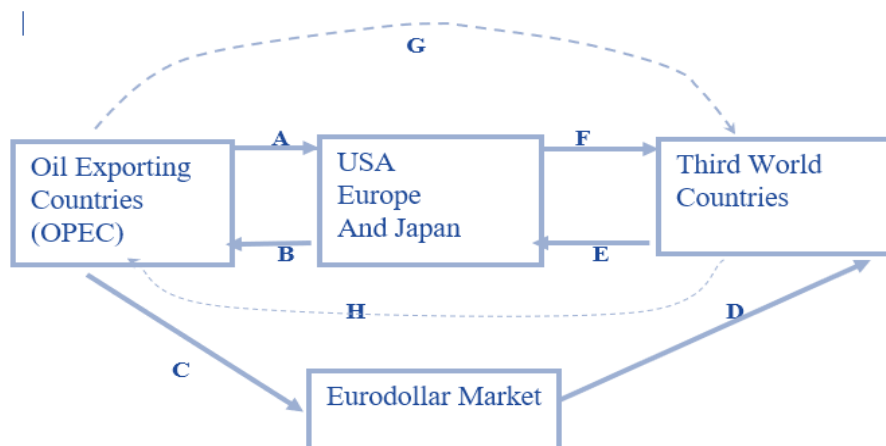
Further, because of wrong macroeconomic policies, extensive and repeated fiscal deficit and the current account deficit can accumulate external debt in developing countries (Ajayi 1991). Fischer and Easterly (1990) set four ways (printing money, running down foreign exchange reserves, borrowing abroad, and borrowing domestically) of financing the budget deficit. They argue that the budget deficit in developing countries aggravate the current account deficit and leads to external indebtedness.

Moreover, political economy models explain how countries get indebted (Chiminya and Nicolaidou 2018). Strategic considerations by politicians can produce inefficiently high public deficits and lead to debt accumulation (Snider 1990). The theory of strategic debt accumulation suggests that the current policymakers can restrain future policymakers spending by increasing debt levels. For many developing nations, irresponsible political leaders make countries indebted (Alesina and Tabellini 1990, Easterly 2002). Besides, governments accumulate more debt during transitions, thereby leaving the burden to the next government.

The oil price shocks, along with policies of developed countries and their banks, are the external factors for foreign borrowing. The increase in oil prices due to the Egypt-Israel war during 1973 and 1979 was one of the factors for the 1970s international debt crises. At that time the non-oil producing developing countries knocked by

macroeconomic imbalance. The fall in primary commodities terms of trade worsened the trade balance and made things complex. Because of the rise in oil price, the revenue of oil exporters increased and which is more than their demand. Hence, they deposited these “petrodollars” in the Eurodollar markets by OPEC (Organization of the Petroleum Exporting Countries) (Menbere 2004, Ali and Mustafa 2012). Figure 1 shows the evolution of the debt build-up in developing countries in the 1980s.

Figure 1. The recycling of the petrodollar scheme



Note: A and G. Oil transfers; B, C, D, E, and H. Monetary transfers; and F. Transfer of Goods.
 Source: Menbere (2004, 84)

According to Suma (2007) and Dymski (2011), the policies adopted by the developed countries and their banks are other factors for debt crisis during the 1970s and early 1980s. The rise in oil price, oil exporter countries deposited a large amount of petrodollar, which is above their economy, in the banks of developed countries. Contrary, developing countries needed funds for their economic development programs which these banks 'recycled' in the form of loans to developing countries.

1.2. Empirical literature

In this part, we presented the empirical findings (studies) related to the topic. These studies have different methodologies, time scope, case studies, and variables included in the study, along with their empirical results.

Table 1. Empirical literature

Source	Model Type Adopted	The scope and case study	The variables used (all except the first are independent variables)	Results
Ajayi (1991)	OLS (Ordinary Least Square)	From 1970 to 1988, Nigeria	External debt, TOT the growth rate of income of the industrialized country, foreign real interest rate, REER the fiscal position of the government, and linear time trend.	Deteriorating of the terms of trade, the rise in foreign real interest rates, a fall in the growth of industrial countries increase external debt. However, the reverse is true for improvement in the fiscal positions.
Mbire and Atingi (1997)	OLS	From 1970 to 1995, Uganda	External debt, TOT, debt service ratio, the growth rate of income of the industrialised country, foreign real interest rate, REER, fiscal deficit, and linear time trend	An increase in the foreign interest rate, appreciation in the real effective exchange rate, deterioration of the fiscal position, worsening of the terms of trade significantly worsens the debt to export ratio.
Menbere (2004)	Random and Fixed effects	From 1982 to 1999, For 60 developing countries	Total external debt, exports, total debt service, capital flight, TOT, imports, GDP, the growth rate of GDP, and population.	Poverty (saving gap), income instability, debt service payment and capital flight are the leading causes of external borrowing.
Greenidge et al. (2010)	Dynamic OLS	From 1987 to 2005, For 12 Caribbean Community	External public debt, government expenditure, current deviation of real output, the real cost of foreign	An increase in the output gap, the decline in government spending, a rise in the real effective exchange rate leads to

Source	Model Type Adopted	The scope and case study	The variables used (all except the first are independent variables)	Results
			borrowing, domestic export, and REER	a reduction in the stock of external debt, but the higher the difference between actual and expected government expenditure, and depreciation of currency leads to more accumulation of foreign debt.
Sulley (2010)	OLS	From 1975 to 2008, Tanzania	External debt to GDP, budget deficit, trade deficit, domestic saving, interest payment, and real exchange rate.	Domestic factors such as budget deficit and low domestic saving have a significant share in explaining external debt compared to external factors such as trade deficit, real exchange rate, and interest payment even though all are the causes of foreign debt.
Awan <i>et al.</i> (2011)	Johansen Cointegration	From 1972 to 2008, Pakistan	External debt in monetary term, nominal exchange rate, fiscal deficit, and TOT.	The fiscal deficit has no significant impact on external debt. However, three channels of uni-directional causality were found running from fiscal deficit to foreign debt, terms of trade to exchange rate and fiscal deficit to terms of trade.
Bittencourt (2015)	Pooled OLS, Fixed Effects, difference-GMM and system-GMM estimators	From 1970 to 2007, For nine Young Democracies of South America	External debt to GDP ratio, growth, openness, liquid liability, inflation rate, population, urbanization, government share to GDP, and income inequality.	Economic growth, Trade openness, liquid liability, and inflation reduces the debt burden. However, income inequality increases the external debt.
Awan <i>et al.</i> (2014)	ARDL	From 1976 to 2010, Pakistan	External debt in monetary term, fiscal deficit, trade openness, terms of trade, foreign aid, and the nominal exchange rate	The budget deficit, nominal exchange rate, and trade openness increase the debt burden.
Imimole <i>et al.</i> (2014)	Error correction and the Johansen cointegration test	From 1986 to 2010, Nigeria	External debt to GDP, terms of trade, the ratio of external debt services to export, openness, budget deficit as a percentage of GDP, GDP, FDI, and exchange rate.	The debt service and exchange rate significantly increase external debt, while GDP reduces it.
Al-Fawwaz (2016)	ARDL	From 1990 to 2014, Jordan	External debt, deficit, trade openness, the term of trade, exchange rate, and, domestic product per capita.	Terms of trade lead to indebtedness in the long run. However, GDP per capita has a negative impact.
Adamu and Rasiah (2016)	ARDL	From 1970 to 2013, Nigeria	External debt to GDP ratio, oil price, official exchange rate debt service to export ratio, gross domestic savings and the fiscal deficit to GDP ratio	Oil price, exchange rate debt service, gross domestic saving and fiscal deficit are causes for external debt accumulation.
Mensah <i>et al.</i> (2017)	Accounting and panel VAR	From 1980 to 2010, 24 African countries	External debt, investment, consumption, taxation, domestic debt, Inflation, and GDP growth rate.	In the long run, external debt growth rates respond positively to changes in government investment spending, consumption spending, and domestic borrowings while in the medium term, external debt growth rates respond negatively to a change in tax revenue,

Source	Model Type Adopted	The scope and case study	The variables used (all except the first are independent variables)	Results
				inflation, and output growth rates.
Chiminya and Nicolaidou (2018)	Pooled OLS and fixed effects	From 1975 to 2012, 36 Sub Saharan Africa countries	External debt, GDP growth rates, trade openness, real interest rate, a dummy of HIPC initiatives, inflation, the share of government to GDP, total reserves to external debt, gross capital formation, and other political factors.	Political factors – democratic governments accumulate more debt than autocratic, while, countries which parliamentary system accumulate more debt than presidential. However, constrained executives' governments tend to accumulate less debt than unconstrained and countries with more open and competitive electoral systems are likely to accumulate less debt. Further, other factors like GDP growth rates, trade openness, a dummy of HIPC initiatives reduce external debt while real interest rate and gross capital formation increase external debt.
Beyene and Kotosz (2019)	Johansen Co-Integration	From 1981 to 2012, Ethiopia	External debt, current account balance, budget deficit, capital flight, total debt service, Interest rate, and terms of trade.	Current account deficit, fiscal deficit, capital flight, debt service and the interest rate contributed for external indebtedness. However, appreciation of the terms of trade is significantly reduced external debt.
Bayo <i>et al.</i> (2020)	Fully Modified OLS	From 1981 to 2018, Nigeria	External debt, official exchange rate, external debt service, trade openness, Insecurity level	Insecurity level and exchange rate significantly increase external debt while debt service and trade openness reduce it.

Source: Constructed by the authors

The results of most of the studies in the determinants of external debt have some similarities, even though their time scope, case studies and methodologies are different. However, only a few works like Menbere (2004), Greenidge *et al.* (2010), and Bittencourt (2015) Mensah *et al.* (2017), Chiminya and Nicolaidou (2018) used the panel data along with different methodologies. Also, only Menbere (2004), Mensah *et al.* (2017), and Chiminya and Nicolaidou (2018) examined for the case of HIPC and African countries. Menbere (2004) analyzed for HIPC and developing countries using static models of fixed and random effects 15 years ago. However, Mensah *et al.* (2017) and Chiminya and Nicolaidou (2018) are the latest studies even though the first one focused only on African HIPC while the latter focused on sub-Saharan African countries. Generally, all studies did not consider the existence of serial correlation, heteroskedasticity and cross-sectional dependence among the error terms in their estimation with static models.

2. Methodology of the study

This section contains the data type, sources, and data analysis of the study. Furthermore, it shows how the model is specified and its estimation technique.

2.1. Data type, source, and data analysis

This study uses panel time-series data. All, excepting polity 2, data were collected from the World Development Indicator (WDI) (see Table 2). Further, this study used empirical (econometrics) approach to identify the causes of indebtedness for two country groups – the HIPC³s and HIPC⁴s in SSA⁴ for the period between 1990 to 2017.

Table 2. Definitions, measurement and sources

Variables	Definition	Source
ED	External debt as a percentage of GDP	WDI database
DSR	Debt service as a % of Gross national income.	WDI database
IMP	Import of goods and services % of GDP	WDI database
EXP	Export of goods and services % of GDP	WDI database
FDI	Foreign direct investment as a % GDP	WDI database
POP	Population growth rate (%)	WDI database
GDPGR	GDP growth rate (annual %)	WDI database
INF	Inflation, GDP deflator (annual %)	WDI database
POLITY2	Political Stability is measured as the country's elections competitiveness and openness, the nature of political involvement in general, and the degree of checks on administrative authority. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, ranging from -10 to +10.	Polity 2 data series from the Polity IV database
GRMAC	Growth rate of major advanced countries (%)	WDI database

Source: Constructed by the authors

2.1. Model specification and estimation technique

Like other empirical studies, the analytical framework for this study includes both domestic and external causes of the foreign debt variables. Therefore, based on the theoretical framework described so far, the study uses the following model:

$$ED_{it} = \alpha + \beta X_{it} + \varepsilon_t \quad (6)$$

where: ED is external debt stock to GDP ratio at period t ; X_{it} is a vector of explanatory variables included in the model at period t ; ε_t is the error terms at period t .

Besides, variables in the vector X identified based on theoretical and empirical evidence in the literature. It captures both internal and external factors which cause indebtedness directly or indirectly. Hence, X can be specified as:

$$X_{it} = f(DSR, IMP, EXP, FDI, POP, GDPGR, INF, POLITY2, GRMAC) \quad (7)$$

Finally, the model we used is:

$$ED_{it} = \beta_0 + \beta_1 DSR_{it} + \beta_2 IMP_{it} + \beta_3 EXP_{it} + \beta_4 FDI_{it} + \beta_5 POP_{it} + \beta_6 GDPGR_{it} + \beta_7 INF_{it} + \beta_8 POLITY2_{it} + \beta_9 GRMAC_{it} + \varepsilon_{it} \quad (8)$$

where: β_0 is an intercept term, and (+) β_1 , (+) β_2 , (-) β_3 , (-) β_4 , (+) β_5 , (-) β_6 , (-/+) β_7 , (-) β_8 and (-/+) β_9 are the estimated long-run coefficients. The signs in the parenthesis are the expected hypothesized signs of the variables.

2.2. Estimation techniques and procedures

Due to the existence of cross-sectional dependence in the errors in our model (see Table 6), this study estimated the two empirical models (for HIPC³s and HIPC⁴s in SSA) using the Panel - Corrected Standard Error (PCSE) regression. According to Pesaran (2006), occurrences such as recessions, economic or financial crises potentially affect all countries, even though it might start from one or two countries. These occurrences inevitably introduce some cross-sectional interdependencies across the cross-sectional unit, their regressors and the error terms. Unfortunately, the traditional panel data estimation methods such as the Fixed Effects, Random Effects, Mean Group estimations, Pooled Mean Group, and GMM estimators mistakenly ignored these possible inter-

³ Benin, Burundi, Cameroon, Central African Republic, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, Togo, Honduras, Bolivia, Nicaragua.

⁴ Benin, Burundi, Cameroon, Central African Republic, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, Togo.

dependences among the cross-sectional unit and their regressors. Hence, erroneously neglecting the cross-sectional dependence among regressors and across countries when it is present in the data, can lead to misleading inferences to (Pesaran 2007).

To avoid this trap of biased estimates and ensure the validity of the results, this study adopts the two-stage modified Ordinary Least Squares (OLS) estimator commonly known as the PCSE estimator. This estimation technique, according to Hoechle (2007), is more robust in correcting the cross-sectional dependence, serial correlation and heteroskedasticity in the datasets when the number of the cross-sectional units is smaller to the time series. In the estimation, the PCSE estimator implicitly assumes that the error terms are autocorrelated within the panel and heteroskedastic across the panel with the autocorrelation parameter assuming to be fixed across panels or vary for each panel (Ampah and Kiss 2019).

The first stage involves testing the time-series properties of the data with respect to cross-sectional dependence among the cross-sectional units. This is done using the Pesaran (2004) *CD* test (see Table 6). Once cross-sectional dependence is detected, this study used the cross-sectional augmented Pesaran *et al.* (2007) unit root test called CIPS to address the stationarity properties of the data. The choice of the CIPS test is based on the fact that the first generational panel unit test like the Levin *et al.* (2002), the Pesaran *et al.* (1999), Maddala and Wu (1999), and Im *et al.* (2003) and the Fisher-Type Chi-square panel unit root tests erroneously overlooked the issue of cross-sectional dependence.

3. Results and discussions

Econometric results, interpretations along with the theoretical and empirical support of the study are offered in this section. More specifically, the descriptive statistics, the cross-sectional dependence test, unit root test, and the estimated determinants of external indebtedness are presented.

3.1. Descriptive statistics of the variables

The descriptive statistics of the variables in the models found in the Table 3 and describes as – the mean values indicate the average value of the variables. The standard deviation expresses the distribution of the data from the mean value. Further, the table presents the minimum and maximum values of the variables and also we can derive the range (the difference between the maximum and the minimum value) of the variables, which shows the spread of data and it is an indicator of the level of variation in the variables used for the study. Due to the different number of countries in the models, the number of observations (420 or 336) also varies. For both models, the range of the dependent variables is between 10.2 to 279 implies that the variation is not high since the variable is external debt. Similarly, the debt service variable has a mean of 3.44 and 2.74 for HIPCs and HIPCS in SSA, respectively, and the range between 0.06 to 47 for HIPCs and 0.06 to 20 for HIPCs in SSA (see Table 3 for other variables).

Table 3. Descriptive statistics of the variables

Variables	Obs	Mean	Std. Dev.	Min	Max
ED	420(336)	57.88(55.63)	41.46(37.77)	10.23(10.23)	278.97(278.97)
DSR	420(336)	3.44(2.74)	3.42(2.42)	0.061(0.06)	47.1(19.9)
IMP	420(336)	37.34(34.71)	15.46(14.06)	12.53(12.53)	84.76(84.76)
EXP	420(336)	24.15(21.34)	12.24(10.18)	4.68(4.68)	59(56.13)
FDI	420(336)	3.46(3.25)	5.5(5.97)	-2.49(-2.13)	41.8(41.8)
POP	420(336)	2.48(2.61)	1.17(1.25)	-6.76(-6.76)	8.11(8.11)
GDPGR	420(336)	3.79(3.78)	5.79(6.39)	-50.24(-50.24)	35.22(35.22)
INF	420(336)	31.9(9.10)	328.87(14.42)	-9.15(-9.15)	5016.1(128.76)
POLITY2	420(336)	1.87(0.46)	5.23(4.89)	-8(-8)	9(9)
GRMAC	420(336)	1.7(1.70)	1.40(1.40)	-4.2(-4.2)	3.75(3.75)

Note: the values in the bracket are for HIPCs in SSA; however, the other values are for HIPC

Source: Computed by the authors using Stata15.

3.2. Serial correlation, Heteroskedasticity and Cross-Sectional Dependence, Unit root, and Cointegration Tests

Panel-data models are probably to include cross-sectional dependence in the errors, which may arise from frequent shocks, unobserved components, spatial dependence and idiosyncratic pairwise dependence. Neglecting cross-section dependence can lead to biased estimates and spurious inference. Hence, in this study, we conducted a cross-sectional dependence test using Pesaran (2004) (see Table 4). The result confirms that there is a cross-sectional dependence in both models of HIPCs and HIPC in SSA. However, there is no cross-sectional

dependence for the case of HIPCs in non-SSA (see Table 4). As a result, this study only focuses on HIPCs and HIPCs in SSA countries.

Table 4. Serial correlation, heteroskedasticity and cross-sectional dependence

Serial correlation and heteroscedasticity tests						
Tests	HIPCs		HIPCs in SSA		HIPCs in non-SSA	
	F statistics (chi2)	Prob	F statistics (chi2)	Prob	F statistics (chi2)	Prob
Serial correlation: Wooldridge test for autocorrelation	210.179	0.000***	626.352	0.000***	116.909	0.000***
Heteroskedasticity: Modified Wald test for GroupWise Heteroskedasticity	1559.62	0.000***	429.01	0.000***	1451.6	0.000***
Cross-Sectional Dependence test						
Tests	HIPCs		HIPCs in SSA		HIPCs in non-SSA	
Pesaran's test of cross-sectional independence	10.028		7.999		-1.282	
The average absolute value of the off-diagonal elements	0.313		0.286		0.157	
Probability	0.0000*		0.0000*		0.2000	

Note: * ⇒ presence of cross-sectional dependence; *** ⇒ presence of serial correlation and heteroscedasticity

Source: Computed by the authors using Stata 15

Following the cross-sectional dependency test, we checked the stationarity of the variables in the model. Depending on the result of cross-sectional dependence test, the panel unit root test can be classified as first-generation and second-generation panel unit root test. The first-generation panel unit root tests (Im *et al.* 2003, Maddala and Wu 1999, Choi 2001) works when there is no cross-sectional dependence while the second-generation test (Pesaran 2007 – CIPS) can be used to test the panel unit root when there is cross-sectional dependence. Using the first-generation panel unit root test in case of cross-sectional dependence in errors resulting in the null hypothesis of nonstationary being quickly rejected (Pesaran 2007, Eberhardt and Presbitero 2015). Therefore, due to the existence of cross-sectional dependence in our models, this study uses the 'CIPS' test of Pesaran (2007) (see Table 5). Since all the variables are highly statistically significant at first difference, we notice that all measures are integrated of order one I (1). Thus, we might expect there is a long-run connection between these variables together, see Table 5).

Table 5. Pesaran (2007) Unit Root Test

Variables	CIPS (intercepts only)				Critical values		
	HIPCs		HIPCs in SSA				
	Levels Statistic	1 st diff. Statistic	Levels Statistic	1 st diff. Statistic	10 %	5 %	1 %
ED	-2.086	-4.691***	-2.458***	-4.781***	-2.14	-2.25	-2.45
DSR	-2.678***	-5.731***	-2.935***	-5.207***			
IMP	-2.528***	-4.843***	-2.539***	-4.877***			
EXP	-1.665	-4.618***	-1.635	-4.735***			
FDI	-3.293***	-5.544***	-3.433***	-5.662***			
POP	-1.910	-3.533***	-3.239***	-3.705***			
GDPGR	-4.584***	-3.533***	-4.681***	-6.175***			
INF	-3.968***	-5.897***	-4.548***	-6.190***			
POLITY2	-2.661***	-2.663***	-3.012***	-5.503***			
GRMAC	2.610***	2.610***	2.610***	2.610***			

Note: *** ⇒ significant (stationary) at 1% level.

Source: Computed by the authors using Stata 15

The most common cointegration tests when there is cross-sectional dependence are Westerlund (2007), Westerlund and Edgerton (2007), and McCoskey and Kao (1998). Both the Westerlund (2007) error-correction panel cointegration test and Westerlund and Edgerton (2007) test could be used both in existence and non-existence of cross-sectional dependence. These tests allow autocorrelation to differ from cross-section to another cross-section. In these tests, the bootstrap method is used in the existence of cross-sectional independence, while McCoskey and Kao (1998) are used in the non-existence of it. However, the Westerlund (2007) and Westerlund

and Edgerton (2007) cointegration tests are not working if the number of variables is more than six. Therefore, since the variables in our model are many, this study used the McCoskey and Kao (1998) cointegration test. Table 8 shows that there is a long-run relationship among the variables in both models of HIPC and HIPC in SSA at 5% level of significance.

Table 6. Panel cointegration test, McCoskey and Kao (1998)

	HIPC		HIPC in SSA	
	Statistic	p-value	Statistic	p-value
Modified Dickey-Fuller t	-2.1792	0.0147**	-3.9264	0.0000***
Dickey-Fuller t	-1.8534	0.0319**	-2.8336	0.0023***
Augmented Dickey-Fuller t	-3.6145	0.0002***	-2.2659	0.0117**
Unadjusted modified Dickey-Fuller t	-3.0198	0.0013***	-4.3243	0.0000***
Unadjusted Dickey-Fuller t	-2.2408	0.0125**	-2.9673	0.0015***

Note: **, *** \Rightarrow significant at 5% and 1% level, respectively.

Source: Computed by the authors using Stata 15

3.3. Panel - Corrected Standard Error Estimation results

Due to the existence of cross-sectional dependence, this study estimated only for HIPC and HIPC in SSA countries (see Table 9). The result shows that debt services, imports and growth of major advanced countries significantly increase the external debt accumulation of HIPC and HIPC in SSA. A one percentage point increase in debt servicing leads to the rise of external debt of HIPC and HIPC in SSA by 5% and 6%, respectively. This is because the debt service payment incites further demand for external borrowing, especially when the debt service is announced suddenly. This result is similar to Menbere (2004), Adamu and Rasiah (2016), Beyene and Kotosz (2019). Our study is different from Menbere (2004) it is latest in time and methodology. For example, the current HIPC are not similar to 15 years ago. Further, the methodologies (fixed and random effects) of Menbere (2004) cannot consider the dynamic nature of the variables with unobserved heterogeneity (for more details, see Hill et al. 2019). However, our study considered the dynamic nature of the variable. Unlike Menbere (2004), our study also considered the existence of serial correlation, heteroskedasticity and cross-sectional dependence among the error terms. Similarly, this study is different from Adamu and Rasiah (2016), Beyene and Kotosz (2019) in which it examined for a group of countries rather than one country case. Also, the result of this study coincides with the sign of our hypothesis and the theoretical framework.

Equally, the one percentage point rises in imports increases the indebtedness of HIPC and HIPC in SSA by 1.6% and 1.4%, respectively. When imports of goods and services increases, HIPC lack foreign exchange and reserves to undertake different development. As a result, the countries forced to borrow from foreign even at worth terms and condition of the loan. This result also coincides with Menbere (2004). Also, a percentage point increase in the growth rate of major advanced countries increases the external debt stock of HIPC and HIPC in SSA countries by 3.3% and 2.5%, respectively. This condition, for instance, happened during 2007/8 global financial crisis— when most developed countries knocked by financial crises, their economy reduced and hence the external debt of HIPC also declined – implies when the economy of major advanced countries increases, they can borrow money to demanders, and the external debt accumulation of HIPC rises. Previous studies like Ajayi (1991) and Mbire and Atingi (1997) also included the growth rate of industrialized countries as independent variable even though its contribution is negative and insignificant which makes our result different from the previous findings. Further, this study is the latest and included many countries relative to Ajayi (1991) and Mbire and Atingi (1997).

However, a one percentage point increase in exports of good and service reduces the indebtedness of HIPC and HIPC in SSA by 2% and 1.5%, respectively. When exports of HIPC increases, they will have enough foreign exchange to fill the existing resource gap and hence their demand for external debt will reduce. Furthermore, this result is in line with our hypothesis, the sign of the theoretical framework and with the work of Greenidge *et al.* (2010) in the case of 12 Caribbean community. Further, the foreign direct investment and political stability significantly reduce the external debt of HIPC but not HIPC in SSA. A one percentage point rise in foreign direct investment and political stability reduces the external debt of HIPC by 1% and 0.6%, respectively. The foreign direct investment can reduce the resource gap, especially the saving-investment gap of countries and hence their demand for overseas borrowing will reduce. Likewise, when countries have political stability, their overall economy will increase and then their resource gap decline, and finally, the external debt accumulation of countries will be reduced. Also, when countries have a stable political environment, the lenders expect (a guarantee) that borrowers can repay their liability quickly and also due to stable political environment, the foreign direct investment will increase and hence all these can reduce the external debt accumulation. However, surprisingly, both foreign direct

investment and political stability are insignificant in reducing the external debt accumulation of HIPC of SSA. This implies that the inflow of (the incumbent) foreign direct investment is not enough to reduce the external debt. Besides, due to the existence of frequent political instability in SSA, the countries use the resources for unproductive purpose and hence the external indebtedness of the countries could not be reduced. However, a one percentage point increment of inflation increases the external debt of HIPC in SSA by 0.7 percentage point.

Table 7. Estimated determinants of external indebtedness in HIPS and HIPC in SSA

Variables	HIPC		HIPC in SSA	
	Coefficient	Std. Err	Coefficient	Std. Err
DSR	4.933***	0.832	6.089***	0.972
IMP	1.663***	0.216	1.481***	0.215
EXP	-2.027***	0.240	-1.561***	0.203
FDI	-1.044*	0.585	-0.855	0.539
POP	-0.303	1.330	1.878	1.212
GDPGR	0.100	0.299	0.071	0.264
INF	0.013	0.010	0.727***	0.140
POLITY2	-0.635*	0.269	-0.418	0.312
GRMAC	3.309**	1.526	2.546*	2.547
CONSTANT	26.857	5.74	7.644	6.764

Note: *, **, *** ⇒ significant at 10 %, 5% and 1% level, respectively

Source: Computed by the authors using Stata 15

Conclusions

Borrowing from abroad is a common characteristic of the developing and emerging countries at the early stage of development. However, unmanageable and unsustainable external debt accumulation can adversely affect the macroeconomic variables and can be a bottleneck for the economy. Therefore, the central focus of this study was to examine the determinants of external indebtedness in the case of HIPC using two models – HIPC and HIPC in SSA using panel time-series data ranging between 1990 to 2017.

This study partially filled the literature, methodological, and time gaps of previous studies by considering both HIPC in Africa and non-Africa countries, take into account serial correlation, heteroskedasticity and cross-sectional dependence and by employing Panel - Corrected Standard Error estimation technique. For both models, the debt service, imports, and growth rate of major advanced countries increase significantly the external debt. However, exports reduce external debt. Further, the foreign direct investments and the political stability significantly reduce the external debt of HIPC, but these variables are insignificant in reducing the external debt for HIPC in SSA.

Hence, this study recommends increasing the export volume and revenue through export diversification, simplify regulation related to exports, providing the short and long-term credits to the exporters. Similarly, attracting foreign direct investment by reducing the restrictions on foreign direct investment, providing open, transparent and dependable conditions for all kind of firms which assure basic and quality infrastructures, reforming domestic financial markets, and also political stability of countries, increasing FDI. Finally, reducing luxury imports by increasing tax on them and the import substitutions are essential to reduce the external debt stock of HIPC.

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Testing the Effectiveness of Johnsonian Approach Using India's Balance of Payments

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Abstract:

The main aim of the study is to test the relevance and effectiveness of Harry Johnson's monetary approach using Balance of Payments Account and Money supply in India. The study uses annual data from 1991 to 2018, especially since the execution of LERMS in 1991. This study uses the Augmented Dickey-Fuller and Phillips-Perron test for stationary conditions. In order to detect the automatic equilibrium process under a flexible exchange rate system and to analyse the short-run and long-run relationship, the study employed Autoregressive Distributed Lag-Error Correction Model (ARDL-ECM) for analysis.

The test results from the ARDL model depicts that there is a long-run association between BOP and independent variables like Exchange rate, money supply and capital outflows. ARDL-ECM model did not found any causality in the short run. Also, the study did not find any automatic restoration process in India Balance of Payments since LERMS. So this study found less relevance of the monetary approach/Johnsonian approach in solving disequilibrium in India's Balance of Payments. Also, the study observed that the role of monetary policy is not effective in the context of India's BOP. In the present scenario, this may not be an issue for an emerging economy like India. But in the long run, to achieve external equilibrium based on the Mundell-Flemings assignment rule, the study strongly recommended Friedman's monetary rule for the effectiveness of the monetary policy.

Keywords: balance of payments; ARDL model; exchange rate; current account adjustment; capital movements; money supply.

JEL Classification: C32; E51; E52; F14; F31; F32.

Introduction

The Balance of Payments (BOP) is a statistical statement that systematically summarises overall economic transactions of the resident of the reporting country with the rest of the world, during a specific period of time, usually a year. The BOP account visibly points out the stability, sustainability and performances of the economy, especially in the external sector front. The surplus in the BOP account is mostly not an issue but the deficit is a major issue for all nations, which needs to be eliminated.

Many economists developed their models and theories to eliminate issues in the BOP. Among all the theories, three approaches occupy significance in the context of Balance of Payments and International Trade as a whole. The approaches are; Marshall-Lerner's Elasticity approach, Sydney Alexander's Absorption approach and Harry Johnson's Monetary approach.

The first two models suggested a devaluation of domestic currency for the problem of Balance of Payments. Marshall-Lerner's condition gave a solution to BOP problem via the price effects of devaluation by making imports costlier and exports cheaper, provided that there should be an appropriate level of elasticity of demand for exports and imports. Similarly, Sydney Alexander's Absorption approach gave a solution to the BOP problem via the income effect of devaluation by increasing the demand for domestic-made commodities in the reporting country as well as the rest of the world. Here, the problem of both of the approaches is that it focuses only on the current account, especially exports and imports of goods. So, the two models have their own limitations in solving the issues in BOP account.

Many empirical studies proved the importance and significance of Harry Johnson's monetary approach to the problem of the Balance of Payments. Several economists are also proved the superiority of the Monetary Approach over the Elasticity approach and Income approach due to its focus on overall Balance of Payments and not only on merchandise trade.

Monetary Approach to BOP is mainly associated with Harry Johnson, Jacob Frenkel, Robert Mundell and Marcus Fleming. Other economists also investigated the BOP problem via monetary approach includes Michael

Mussa, David Hume, Rudiger Dornbusch and D Kemp. The basic proposition of the monetary approach is that the problem of BOP is always and everywhere a monetary phenomenon.

According to Harry Johnson's Monetary approach, BOP disequilibrium is mainly because of changes in money supply or money demand. It can be stated as:

$$\Delta M^S / \Delta M^D = \Delta B \quad (1)$$

The process in which the changes in *money supply* affects BOP is stated as:

$$M^S = M^D = B \quad (2)$$

Suppose, the central bank increases in money supply which will lead to creating a deficit in the current account as well in the capital account. It can be stated as:

$$\uparrow M^S \rightarrow \uparrow P \rightarrow \uparrow M_s \ \& \ \downarrow X_s \rightarrow -CAD \rightarrow -B \quad (3)$$

Similarly:

$$\uparrow M^S \rightarrow \downarrow i \rightarrow \uparrow K_o \rightarrow -KA \rightarrow -B \quad (4)$$

$$-CAD \ \& \ -KA \rightarrow -B \quad (5)$$

Just the opposite case will occur when the central bank of the country decreases its money supply.

According to Harry Johnson, money demand is a stable function of the price level, income and interest rate. It can be expressed as:

$$M^D = f(P, Y, i) \quad (6)$$

In the above equation, P and Y are denoted as price level and nominal income which is direct proportion to money demand. Whereas i is denoted as the interest rate which is inversely related to money demand. Since money demand is a stable function of the price level, income and interest rate, the Johnsonian approach did not give much importance to money demand in influencing the Balance of Payments but money supply occupies significance.

Johnson defined money supply is a multiple of a monetary base that consists of domestic money supply and the stock of foreign exchange reserves. It can be stated as:

$$M^S = DM + RM \quad (7)$$

Therefore, any changes in P , Y , i , DM and RM will affect money supply and money demand, which in turn affects the Balance of Payments.

The Johnsonian model can be applied to improve or correct disequilibrium in the Balance of Payments under fixed and flexible exchange rate systems. Under a fixed exchange rate system, the BOP is highly monitored and controlled by the Central Bank via accommodating flows. Whereas in the flexible exchange rate system, market forces play a significant role in determining the exchange rate, which in turn corrects BOP disequilibrium automatically through autonomous flows.

In the present scenario, the majority of the countries are following either a flexible exchange rate system or a managed float exchange rate system. So, the present study tries to test the relevance and effectiveness of Harry Johnson's monetary approach to the problem of balance of payments under a flexible exchange rate system.

The government of India has introduced the Liberalised Exchange Rate Management System (LERMS) in 1991 and it came into effect from 1992. Since then the exchange rate of the rupee is mainly determined by the market forces. To test the effectiveness of Harry Johnson's monetary approach to BOP under a flexible exchange rate system, the study chooses India's BOP account since the implementation of LERMS (1992) occupies significance.

Several eminent economists tested monetary approach to Balance of Payments. Of which, some of them like Robert Mundell (1968, 1971), Mc Kinnon (1968), Jacob A. Frenkel (1971), Harry G. Johnson (1968, 1972, 1977) Swaboda (1973) and Michael Mussa (1974) are the significant approaches offers clear cut evidence that proved the effectiveness of monetary policy in the context of Balance of Payments disequilibrium. After the 1980s, especially under openness regime, the role of monetary policy on external sector equilibrium and Balance of Payment variables lacks significance and raises doubts about various theories offered by Robert Mundell, Harry Johnson, Michael Mussa and so on. In continuation of the above, the present study tries to estimate the relevance of the monetary approach to Balance of Payments. Especially, the study connects Harry Johnson's monetary

approach using India's Balance of Payments since the implementation of the Liberalised Exchange Rate Management System (LERMS 1992).

Milton Friedman, Harry Johnson, Mundell-Fleming, David Hume, Michael Mussa and others proved the relevance and effectiveness of macroeconomic policies (Monetary and Fiscal Policy) in achieving external and internal sector goals (BOP Equilibrium and Full Employment). Among all the approaches, Harry Johnson's approach occupies significance in the background of the Balance of Payments. In this context, the present study tries to test the effectiveness of Harry Johnson's monetary approach using India's Balance of Payments account.

Therefore, the present study attempts to answer the following research questions:

- To what extent India's Balance of payments account responds to the changes in the money supply?
- Does BOP disequilibrium restore automatically under a flexible exchange rate system, especially after the implementation of the Liberalised Exchange Rate Management System (LERMS) in India in 1992?
- Does the change in money supply have more impact on the capital account than in the current account?
- How effective the Harry Johnson's monetary approach in solving issues in India's Balance of Payments?

Against the background and research issues, the major objectives of the study are to evaluate the effectiveness of Monetary policy under a flexible exchange rate system, especially since the implementation of LERMS in India in 1992. It will be interesting to compare the effect of changes in the money supply on the current account as well as in the capital flows. So, that the relevance of Harry Johnson's Monetary Approach to BOP can be investigated. For this purpose, the present study uses twenty-seven years of secondary data since the inception of LERMS in India in 1992 to till date. The required data were collected from various national and international sources like Handbook of Statistics on the Indian Economy (RBI), Report on Currency and Finance (RBI), Global Financial Development Report of World Bank report and Balance of Payments manual of IMF.

1. Literature review

Friedman, Milton (1948) analysed the monetary and fiscal framework in the context of economic stability. He found that the explicit control of the quantity of money by the government and the explicit creation of money to meet fiscal deficit will influence inflationary effect in the economy. This problem cannot be rectified with fiscal discipline. Instead, eliminating government control on the quantity of money with the balanced budget will provide a solution to economic fluctuations. Also, he articulated several interesting questions relating to the effectiveness of the monetary policy. Some of them are: how important change in the supply of money compared with changes in the demand for money? Are transaction variables most important in determining the demand for money? How elastic is the demand for money concerning interest rates? When changes in demand or supply occur that produce discrepancies between the quantity of money that the public holds and the quantity it desires to hold, how rapidly do these discrepancies tend to be eliminated? Does the adjustment impinge mostly on prices or mostly on quantities? Is the adjustment to sharp changes over short periods different in kind or only in degree from the adjustment to slower changes over longer periods? For all the above questions, he concluded that full adjustment to monetary disturbances takes a very long time and affects many economic magnitudes. If the adjustment were swift, immediate, and mechanical, as some earlier quantity theorists may have believed, or, more likely, as was attributed to them by their critics, the role of money would be clearly and sharply etched even in the imperfect figures that have been available. But, if the adjustment is slow, delayed, and sophisticated, then crude evidence may be misleading, and a more suitable examination of the record may be needed to disentangle what is systematic from what is random and erratic (Milton Friedman 1970).

Johnson, Harry G. (1972) developed a new approach to the theory of Balance of Payments and BOP adjustment. This new approach plays a dominant role in the British Economy during the 70s when devaluation failed to produce the desired result. This new approach is originated from the original work of J.J. Koopmans and Robert A. Mundell. The new approach mainly focused at the forefront of analyzing the monetary aspects of adjusting BOP instead of price aspects. The new approach also focuses on relative price changes but not on the direct influence of excess demand for and supply of money on the balance between income and expenditure. Specifically, not on total acquisition and disposal of funds whether through production and consumption or borrowing and lending, and therefore on the overall BOP.

Mussa, Michael (1974) tested the efficacy of the monetary approach to Balance of Payments analysis. The study set forth the most relevant and important principles of monetary policy and tested the same in a simple model of trade and payment behavior. The study found that the money demand function and money supply process plays a central role in the balance of payments analysis, especially in the long run. The study concludes stating that the monetary approach is not identified with the view that "only money matters," nor is it asserted that the monetary

approach is encompassed in any single, specific, theoretical model. Reasonably, it is argued that the monetary approach incorporates an extensive course of models that share certain elementary features but can vary in many central respects, mainly about short-run processes of adjustment.

Frenkel, Jacob A. and Carlos A. Rodriguez (1975) correlated monetary approach to the Balance of Payments in the context of portfolio balances. They aimed to analyse the adjustment mechanism using a small country with the condition of full employment with trading commodities, securities and money. Frenkel and Rodriguez focused on both restricted and open economic perspectives, especially, the impact of money supply on inter-temporal trade, accumulation of real and financial assets in the balance of payments.

Magee, Stephen P. (1976) reviewed *The Empirical Evidence of Monetary Approach to the Balance of Payments and Exchange Rates* under fixed and flexible exchange rate system. This approach did not pay attention to a single country experience or single approach, it focuses the effect of monetary policy to BOP and exchange rate by considering the approaches of Robert Mundell (1968, 1971), Harry Johnson (1972), Arthur Laffer (1979), Ryutaro Komiya, Rodriguez Dornbusch (1971) and Jacob Frenkel (1971). Stephen Magee concluded by stating the demand for nominal money balance is mainly determined by the price level, real income and the interest rate. Similarly, the supply of money equals the money multiplier times the supply of high powered money. Also, he observed that the domestic supply and demand for money are equated and international reserves are separated from high powered money.

Johnson, Harry G. (1977) analysed *Monetary Approach to Balance of Payments Theory and its Implications*. The main aim of his analysis is to introduce to a wider audience an emerging approach to the balance of payments theory and policy, generally described as "the monetary approach", to describe the theoretical differences between this approach and previous approaches (See Johnson, Harry 1972).

Frenkel, Jacob A., Thorvaldur Gylfason and John F Helliwell (1980) correlated Monetary and Keynesian approaches in the context of Balance of Payments analysis and found the difficulties of empirical estimation in the short run. The study contrasted some principles of the Monetary and Keynesian approach and reformulated a more general model by taking essential features of both. The study observed that long term modeling is required to test the composition and growth of foreign and domestic portfolios. The short term model paid no attention to evaluate the role and expectations concerning interest rate, prices, GDP, taxes, government expenditure and so on. A more complete analysis would have to incorporate these features within modeling that considers the long-run effect.

Mayer, Thomas (1980) well-articulated the scholastic work of David Hume concerning Monetarism. The study focuses on twelve important propositions of monetarism on Hume's perceptions and found Hume is explicitly a monetarist on quantity theory, transmission process, the stability of the private sector, short term inflationary effect on output and private market economy. Also, the study found Hume is implicitly a monetarist in terms of the irrelevance of allocation and the focus on the price level as a unit rather than on individual prices. Hume was indifferent and strongly opposed the monetarist position to inflation.

Kannan R. (1989) applied the monetary approach to the balance of payments in the context of the Indian Economy from 1968 to 85. The study attempted to analyse whether the disequilibrium in the money market affects the balance of payments or not. The study has been done by using the Jonsonian Approach (1972) and Mundellian Approach (1968). Also, the study compares the Elasticity approach and monetary approach using India's BOP statistics from 1968 to 85 when India followed a restricted exchange rate system. The study has applied Granger and Sims causality test and found that an exogenous change in domestic credit led to causes a more than proportionate change in international reserves. Also, the study found that the central bank actively sterilizes the impact of the changes in forex reserves on the money supply. Finally, the study concluded by stating that the disequilibrium in the money market has a significant effect in the Balance of Payments.

Raghavan and Saggur (1989) tested the applicability of the Monetary Approach to Balance of Payments using India's BOP data from 1960 to 1981. By taking the inapplicable conditions from past studies, this study tries to verify the relevance of the monetary approach in the context of Indian Economy during the restricted exchange rate system. Like Kannan (1989), this study also uses Granger and Sims causality test and invalidated the core proposition of MBOP that domestic credit creation feeds to BOP deficit. Granger test proves a strong causal relationship between forex reserves with domestic credit.

Khatiwala, Yuba Raj (1992) tested the applicability and relevance of the monetary approach to the balance of payments in the context of the Nepalese economy. The study uses OLS method and found an inverse relationship between domestic credit and reserve flow. But the study also found a positive relationship between real income and prices with reserve flow, which is contradictory to the Keynesian approach on the balance of payments. Based on the observation that all goods are traded, the study inferred that the increase in domestic credit led to an increase in prices which in turn affects the balance of payments via increased transaction demand

for nominal money. Finally, the study concluded by suggesting that the monetary authorities should restrict domestic credit to counteract additional demand for nominal money so that the monetary policy objectives can be met without affecting the goods market, capital market and foreign exchange assets.

Bhattacharya, Indranil and Partha Ray (2007) assessed monetary policy stance by observing various monetary policy announcements in India from 1973 to 1998. This study used Vector Auto-Regressive (VAR) framework and found that the monetary policy seemed to have been more effective in price control than output growth. The impulse response from the VAR model depicted the success of monetary policy in inflation control rather than on GDP reflecting proactive monetary management in a regulated environment. So the study recommended the necessity of future analysis of monetary policy in the pre and post the 90s to trace causal impact on growth-inflation trade-off.

Hutchison, Michael M., Rajeswari Sengupta and Nirvikar Singh (2010) investigated the applicability of the discretionary monetary rule of the Reserve Bank of India in relation to Taylor-type rule. The study estimated an exchange-rate-augmented Taylor rule for India for a period of 28 years from 1980 to 2008. The study compares monetary policy effects during the pre- and post-liberalisation periods to capture the potential impact of macroeconomic structural changes on the RBI's monetary policy conduct. The study found that the output gap appears to be important to RBI rather than consumer price inflation and exchange rate changes.

Imoisi, Anthoni Ilegbinosa, Lekan Moses and Bosco Ito Ekpenyong (2013) analysed monetary policy and its implications for the Balance of Payments stability in Nigeria. To evaluate the effectiveness of monetary policy on the Balance of Payments of Nigeria, the study uses 30 years of time series data and applied OLS technique. The study uses BOP as the dependent variable and money supply, Interest Rate and Exchange Rate as independent variables. The study found a positive relationship between the dependent and independent variables. Especially, Money supply and interest rates are highly significant and positive relation with BOP, whereas exchange rate was positive but not significant to the BOP.

Odili, Okwuchukwu (2014) correlated the exchange rate and balance of payments of Nigeria using Auto-Regressive Distributed Lag (ARDL) model. The main aim of the study is to detect the short-run and long-run dynamic relationship between BOP and other independent variables like exchange rate, exports and imports. The study has applied the Elasticity approach and monetary approach to Nigerian Balance of Payments. The study found a positive and significant relationship in the long run, whereas in the short run, the study found a positive coefficient but statistically insignificant.

Tijani, Julius O (2014) conducted an experimental study on the effect of various monetary instruments in the Balance of Payments account of Nigeria during 1970-2010. The study was done by using a linear regression model and found a positive relationship between BOP with domestic credit, exchange rate, and balance of trade. Whereas, the inflation rate and gross domestic output are inversely related to the BOP. Overall, the study observed that the monetary measures constitute immensely to BOP position causes disequilibrium. So, monetary measures can be used as an instrument to adjust Balance of Payments.

Osisanwo, Sherifdeen and Bolade Abolaji Adesoye (2019) examined the impact of monetary policy on the Balance of Payments of Nigeria using annual data from 1980 to 2015. The dynamic econometric study observed a long-run relationship between monetary policy and BOP of Nigeria. Similarly, Onuchuku, Chukueggu, Nenber and Wosu (2018) also found a strong relationship between monetary policy and BOP of Nigeria. They confirmed apriori expectations between money supply, interest rate, exchange rate and GDP of Nigeria.

Senyefia, Oduro-Okyireh and Eunice (2019) observed that the BOP in Ghana is purely a monetary phenomenon, both short-run and long-run relationship exists between monetary policy variables and BOP variables. Exchange Rate, Net Domestic Credit, Inflation Rate and Interest Rate are found to have a significant influence on the BOP position in the long run. Also, Net Domestic Credit and Broad Money Supply have a highly significant effect on the BOP position in the short run.

Having adequate examination from the past studies, it is not easy to refuse the fact that the monetary approach to the balance of payments is still an unsolved phenomenon. From the literature survey, it is observed that some studies confirmed concrete evidence by establishing the effect of monetary policy on BOP. Several other studies, especially after the 1980s invalidated the effective role of monetary policy on the Balance of Payments. Theoretically (Robert Mundell, Michael Mussa, Jacob Frenkel, Harry Johnson and Milton Friedman), the expansionary monetary policy leads to create short-run deficit in BOP and LR surplus or equilibrium in BOP through price adjustment mechanism. The main objective of the study is to test the above relationship and offer appropriate evidence from the Indian context since the introduction of Liberalised Exchange Rate Management System (LERMS).

2. Research methodology

After reviewing extensive scholarly work in the past and the significance of co-integrating money supply with BOP variables, the present study chooses Autoregressive Distributed Lag-Error Correction Model (ARDL-ECM) model for analysis. This study mainly focuses on the impact of changes in money supply on the Balance of Payments account via the Exchange rate, Interest Rate, Inflation Rate and Openness in the short run as well as in the long run. The error correction approach is very useful and appropriate for estimating and comparing short term and long term effects of a one-time series with the other time series.

Therefore, ARDL-ECM approach occupies significance for this study. Before applying the ARDL-ECM approach, this study first uses the Augmented-Dickey Fuller unit root test to check whether the selected time series is stationary or not. After grasping the stationary conditions, the study ARDL bound test for co-integration. After that, the study will employ ECM framework to establish a link between the Dependent variable (Variables in BOP account) with several independent variables like Money Supply, Exchange Rate, Inflation Rate, Interest Rate and Openness of the Economy. Finally, the Granger Causality test will be applied to check the causal relation between Money supply and BOP variables in India. All the estimates and analysis will be done by using E-views 8 software.

2.1. Model specification

To test the effectiveness of the Johnsonian approach in the context of India's Balance of payments, the study uses the Balance of Payments as a Dependent variable and Money Supply as the major independent variable. Also, the study includes Exchange Rate, Interest rate, Inflation Rate and Openness as other explanatory variables for analysis. Based on the background and literature survey, the study will estimate the following functional form:

$$BOP = f(MS, ER, CAD, CO) \quad (8)$$

where: BOP is Balance of Payments, MS is Money Supply, ER is Exchange Rate, CAD is Current Account Deficit, and CO is Capital Outflows from India.

The model can be rewritten in a linear equation form:

$$BOP_t = \alpha_0 + \alpha_1 MS_t + \alpha_2 ER_t + \alpha_3 CAD_t + \alpha_4 CO_t + U_t \quad (9)$$

In order to evaluate the short-run and long-run relationship between money supply and balance of payments variables, this study uses the Autoregressive Distributed Lag-Error Correction model (ARDL-ECM). The ARDL model first verifies long-run causality between the variables and then it checks short-run causality and the speed of adjustment using the error correction term. Therefore, the present study uses ARDL-ECM approach using the transformed log-linear model which are as follows:

$$\begin{aligned} \Delta \ln BOP_t = & \alpha_0 + \sum_{k=1}^{P_1} \alpha_1 \Delta \ln BOP_{t-k} + \sum_{k=1}^{P_2} \alpha_2 \Delta \ln MS_{t-k} + \sum_{k=1}^{P_3} \alpha_3 \Delta \ln ER_{t-k} + \\ & \sum_{k=1}^{P_4} \alpha_4 \Delta \ln CAD_{t-k} + \sum_{k=1}^{P_5} \alpha_5 \Delta \ln CO_{t-k} + \Omega ECT_{t-1} + \beta_1 \ln BOP_{t-1} + \\ & \beta_2 \ln MS_{t-1} + \beta_3 \ln ER_{t-1} + \beta_4 \ln CAD_{t-1} + \beta_5 \ln CO_{t-1} + U_t \end{aligned} \quad (10)$$

In the equation, $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ and α_5 are the short-run coefficients of the explanatory variables. Similarly, $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 are the long-run coefficients. Ω is the coefficient for measuring the speed of adjustment for equilibrium in the ECM model.

2.2. Granger causality

In the Granger Causality Test, the directional relationships between two variables are very sensitive which can be used efficiently by using the optimal number of lags in the model. It can be inferred from the computed statistical values, based on the given equations, if the beta coefficients become zero or less than the conventional value of 0.05 and the computed F statistic is low for the first hypothesis in the equation (8) indicate that the lagged MS do not possess in the regression (Accepting null hypothesis). This means Money Supply in India does not Granger cause Current Account Deficit, similarly for other beta coefficients in the first hypothesis of the rest of equations. When we move to the second hypothesis which states that the Current Account Deficit does not Granger cause Money Supply in India if the computed F statistic is low or P-value is less than the conventional value, we can reject the hypothesis and infer that the Current Account Deficit does not Granger cause Money Supply in India. Similar results can be derived for other beta coefficients in the second hypothesis of the rest of the equations.

2.2.1. Causality test for the changes in Money Supply and Balance of Payments variables in India

To test causality between the changes in Money Supply in India with the Variable in India's Balance of Payments, the following model developed by Engel and Granger, (1987) will be used. The models are:

▪ Money Supply and Current Account Deficit in India

$$MS_t = \beta_0 + \sum_{i=1}^n \beta_{1i} MS_{t-i} + \sum_{i=1}^n \beta_{2i} CAD_{t-i} + u_{1t}$$

$$CAD_t = \beta_3 + \sum_{i=1}^n \beta_{4i} CAD_{t-i} + \sum_{i=1}^n \beta_{5i} MS + u_{2t} \quad (11)$$

▪ Money Supply and Capital Outflows from India

$$MS_t = \beta_0 + \sum_{i=1}^n \beta_{1i} MS_{t-i} + \sum_{i=1}^n \beta_{2i} CO_{t-i} + u_{1t}$$

$$CO_t = \beta_3 + \sum_{i=1}^n \beta_{4i} CO_{t-i} + \sum_{i=1}^n \beta_{5i} MS_{t-i} + u_{2t} \quad (12)$$

▪ Money Supply and Balance of Payments (Net) in India

$$MS_t = \beta_0 + \sum_{i=1}^n \beta_{1i} MS_{t-i} + \sum_{i=1}^n \beta_{2i} BOP_{t-i} + u_{1t}$$

$$BOP_t = \beta_3 + \sum_{i=1}^n \beta_{4i} BOP + \sum_{i=1}^n \beta_{5i} MS_{t-i} + u_{2t} \quad (13)$$

▪ Money Supply and Exchange Rate in India

$$MS_t = \beta_0 + \sum_{i=1}^n \beta_{1i} MS_{t-i} + \sum_{i=1}^n \beta_{2i} ER_{t-i} + u_{1t}$$

$$ER_t = \beta_3 + \sum_{i=1}^n \beta_{4i} ER + \sum_{i=1}^n \beta_{5i} MS_{t-i} + u_{2t} \quad (14)$$

▪ Exchange Rate and Balance of Payments in India

$$ER_t = \beta_0 + \sum_{i=1}^n \beta_{1i} ER_{t-i} + \sum_{i=1}^n \beta_{2i} BOP_{t-i} + u_{1t}$$

$$BOP_t = \beta_3 + \sum_{i=1}^n \beta_{4i} BOP + \sum_{i=1}^n \beta_{5i} ER_{t-i} + u_{2t} \quad (15)$$

where: MS = Money Supply, CAD = Current Account Deficit, CO = Capital Outflows, BOP = Balance of payments and ER = Exchange Rate.

3. Empirical results

To analyse the relationship between money supply and balance of payments in India and to test the effectiveness/relevance of Harry Johnson's monetary approach to the balance of payments, this study is designed at four stages. The first stage verifies stationarity conditions using Augmented-Dickey Fuller (ADF) and Philips Perron's (PP) unit root test. Stage two uses ARDL bound test and long-run causality. Stage three uses error correction term to evaluate short-run causality and the speed of adjustment for equilibrium. Finally, Engel-Granger causality will be employed to verify directional causality between two variables separately.

3.1 Unit Root Test

The present study uses two popular unit root tests, namely, Augmented-Dickey Fuller Test and Philips Perron test for unit root and stationary conditions. The results are given in Table 1.

Table 1. Unit Root Test ADF & PP method

Variables	Augmented-Dickey Fuller		Philips-Perron	
	Level	First Difference	Level	First Difference
BOP	0.0001	0.0000	0.0001	0.0000
MS	0.6351	0.1121	0.6170	0.0011
ER	0.2218	0.0001	0.2318	0.0001
CAD	0.2458	0.0012	0.2000	0.0012
CO	0.8883	0.0009	0.8899	0.0009

Source: Computed from RBI data using E-Views 8th version

It is clear from the test results that the selected variables are almost non-stationary at level and stationary at first difference except money supply. Also, it is noted that the ADF and PP results revealed that the BOP variable is stationary at a level and first difference. So, it is observed from the unit root test that the study must employ the ARDL model for analysis.

3.2. Autoregressive Distributed Lag Model (ARDL Approach)

A literature survey reveals that the variables should be non-stationary at $I(0)$ and Stationary at $I(1)$ to apply major econometric techniques for analysis. Variables selected in this study are also fulfilled almost all criteria for the application of ARDL model. The ARDL model is highly appropriate for this study for two reasons. The first one is, the independent variables are a mixture of $I(0)$ and $I(1)$. The second reason is that the study will try to establish the short-run and long-run causality between money supply and BOP variables. The reason is to test Johnsonian notion on money supply and BOP variables *i.e.*, an increase in money will create temporary disequilibrium in BOP in the short run and it will be automatically restored in the long run under flexible exchange rate system.

First, the study uses the ARDL long-run model with various lags using Akaike Info Criterion (AIC) and Schwarz Criterion (SIC) for lag selection. Since the number of observations is less than 30 and low AIC and SIC value observed for lag 1, the study chooses lag 1 for analysis and the results are given in Table 2.

Table 2. ARDL test results for long run Causality

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.742213	0.841386	-2.267384	0.0397
LBOP(-1)	-0.145408	0.346632	-6.189291	0.0000
LM1(-1)	-0.948960	0.539731	-0.956368	0.3551
LER(-1)	0.115541	0.603784	3.791321	0.0020
LCAD(-1)	0.014550	0.206357	0.070507	0.9448
LCO(-1)	-0.197504	0.293664	-0.027079	0.9788
R-squared	0.903505		Mean dependent var	0.773106
Adjusted R-squared	0.834580		S.D. dependent var	11.14769
S.E. of regression	4.533977		Akaike info criterion	5.161257
F-statistic	13.10850		Schwarz criterion	6.697563
Prob(F-statistic)	0.000018		Hannan-Quinn criteria.	6.310006
Durbin-Watson stat	2.388935			

Source: Computed from RBI data using E-Views, 8th version

After getting results for the selected model, the study must check the stability of the model and the occurrence of serial correlation. For this purpose, the study uses Breusch-Godfrey's serial correlation technique and the results are given in Table.

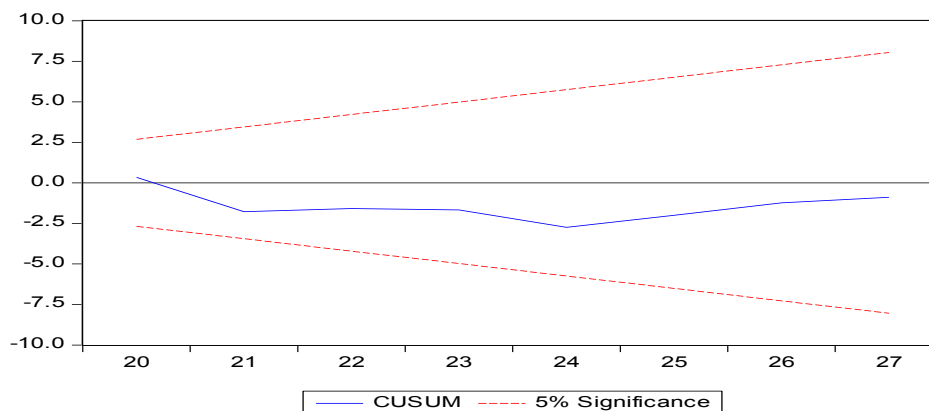
Table 3. Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.166200	Prob. F(1,13)	0.2998
Obs*R-squared	2.058068	Prob. Chi-Square(1)	0.1514

Source: Computed using the information in table 2.

It is flawless from Table 3 that the probability for observed chi-squared value is 15.14 percent lead to the rejection of the null hypothesis. Meaning that the model does not have any serial correlation and it satisfied the criteria for a good model. After completing the serial correlation, the study also tried to check the stability of the model using CUSUM's stability test. The results are shown in the Figure 3.

Figure 1. CUSUM's Stability Test



From Figure 1, it is clear that the blue line falls in between the two red lines (2 dotted lines: within ± 2 s.e bands). Meaning that the model is stable at 5% level of significance. So the study observed that the model is highly stable without any serial correlation.

Table 4. Wald test for long-run causality

Test Statistic	Value	df	Prob
F-statistic	4.693279	(4, 8)	0.0303
Chi-square	18.77312	4	0.0009

Source: Computed

Table 5. ARDL Bound test results

Variable	F-Statistic	Lower Bound	Upper Bound
Ln BOP	4.6932	2.86	4.01

Source: Computed

From Table 4, the observed F-statistic value is 4.7 and the probability value is less than 5% leads to the rejection of the hypothesis. Meaning that the selected variables are not equal to zero indicated that there is a causality between the variables. Also, it is clear from Table 5 that the observed F statistic value of 4.7 is greater than the Pesaran (2001) upper bound value of 4.01 leads to the acceptance of the alternative hypothesis. From the ARDL bound test and Wald test statistics, the study rejects the null hypothesis and inferred that the variables have long-run causality.

The long-run test statistics from Table 2 reveal that the exchange rate (LER) and current account deficit (LCAD) have a positive correlation and the other two variables like money supply (LM1) and capital outflows (LCO) have a negative coefficient. The only exchange rate has a positive coefficient (0.1154) and a statistically significant value (0.0020). It states that, in the long run, a 10 percent increase in exchange rate leads to improving India's BOP at a low rate of 1.15%. The positive coefficient for the current account value also supports this argument. All the other dependent variables are not statistically significant (high prob values) proves less relevancy of the Johnsonian approach. As per the Johnsonian approach, an increase in money supply leads to a decrease in BOP via trade deficit and capital outflows. But this study observed a negative coefficient and a statistically insignificant value of 35 percent for money supply and 94% for capital outflows also proves less relevance of the Johnsonian approach in India's Balance of Payments.

After observing the long run test results, the study must focus on short-run causality using the error correction term.

3.3. Error Correction Model

To correlate short-run and long-run relationships, the study needs the inclusion of Error Correction Term (ECT) using residuals of the model. The error correction model is more or less similar to the basic ARDL approach with ECT values and the results are given in Table 6.

Table 6. ARDL – ECM test results for long run Causality

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.433473	0.370222	1.904149	0.3779
D(SERIESLBOP(-1))	0.303488	0.167938	1.807146	0.0875
D(LM1(-1))	-0.880450	0.241126	-0.003651	0.9971
D(LEXC(-1))	0.462021	0.205621	2.246899	0.0374
D(LCAD(-1))	-0.949960	0.196754	-0.482816	0.6350
D(LKAOUT(-1))	0.690825	0.350418	1.526014	0.1444
ECT(-1)	-0.559939	0.318916	-4.891380	0.0001
R-squared	0.827529	Mean dependent var		0.773106
Adjusted R-squared	0.770038	S.D. dependent var		11.14769
S.E. of regression	5.345800	Akaike info criterion		6.421996
F-statistic	14.39420	Schwarz criterion		6.763281
Prob(F-statistic)	0.000005	Hannan-Quinn criteria.		6.516654
Durbin-Watson stat	2.096643			

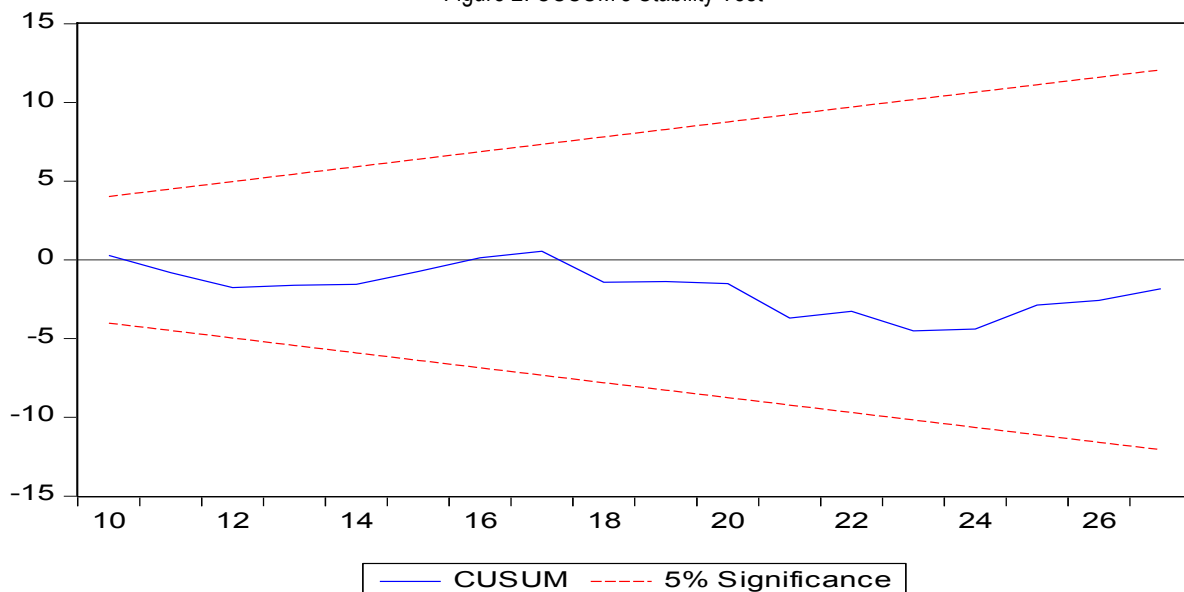
Source: Computed from RBI data using E-Views 8th version

In the first part of the ARDL analysis, the study observed long-run causality between the selected variables (at a low significant level). So the criteria for satisfaction of the ECM approach is that the ECT coefficient should be negative and the probability value for the error correction term should be less than 5%. It is clear from Table 6 that the observed ECT coefficient is negative (-0.559939) and the ECT prob value is less than 5% (0.0001) confirmed the efficiency of the model. Still, the study needs to check serial correlation and stability of the model. For this purpose, the study again uses Breusch-Godfrey's serial correlation technique and CUSUM's stability test at a 5% level of significance. The results are as follows:

Table 7. Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.111157	Prob. F(1,17)	0.7429
Obs*R-squared	0.162405	Prob. Chi-Square(1)	0.6870

Figure 2. CUSUM's Stability Test



From Table 7, the study has observed the high chi-squared value of 68% leads to the rejection of the null hypothesis and confirms that the model has no serial correlation. Similarly, CUSUM's test also confirms the stability of the model which is seen from Figure 2 (blue line falls within ± 2 s.e bands). After observing the non-occurrence of serial correlation and stability test, the study has applied Wald test. The Wald test results 17% probability for F-statistic and 12% probability for Chi-Square value leads to the rejection of the null hypothesis. It states that there is no causality between money supply and balance of payments variables in the short run.

The ARDL-ECM test results from Table 6 pointed out that there is no causality in the short-run (high prob values) and there is causality in the long run (ECT prob 0.0001). The only exchange has low significant values in the short run. This means, in the short-run, a 10% increase in the exchange rate will lead to change BOP by 3%.

Except for the exchange rate, all the independent variables are statistically insignificant to India's BOP in the short run. Some variables established negative coefficients, but it doesn't matter when they are statistically insignificant. This means, the short-run relation invalidated the relevance of Johnsonian approach to India's Balance of Payments. But the ECT coefficient value of -0.559939 and ECT probability value of 0.0001 confirms the existence of long-run causality. It can be inferred that there is a long-run relationship exists in the whole system and getting adjusted at the speed of 55% towards the long-run equilibrium. The high R^2 value of 0.8275 shows the goodness of fit of the model. The Durbin Watson value of 2.1 confirms the non-existence of autocorrelation in the data series. The F-Statistic value of 14% and low p-value (0.000005) also proves that all the regressors in the model are statistically significant for analysis.

Table 8. Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.	Result
LM1 does not Granger Cause LCAD	25	1.66592	0.2142	No causality
LCAD does not Granger Cause LM1		2.88111	0.0795	
LM1 does not Granger Cause LEXC	25	1.82798	0.1866	No causality
LEXC does not Granger Cause LM1		0.11754	0.8897	
SERIESLBOP does not Granger Cause LEXC	25	0.89768	0.4233	Unidirectional causality
LEXC does not Granger Cause SERIESLBOP		5.30074	0.0142	
LM1 does not Granger Cause LKAOUT	25	4.85208	0.0191	Unidirectional causality
LKAOUT does not Granger Cause LM1		0.08953	0.9147	
SERIESLBOP does not Granger Cause LM1	25	0.06804	0.9344	No causality
LM1 does not Granger Cause SERIESLBOP		0.91061	0.4183	

Source: Computed from RBI data using E-Views 8th version

This study also uses the Granger Causality test for a directional relationship between two variables separately, instead of overall results. The main purpose is to use forward and the backward relationship between money supply and balance of payments variables.

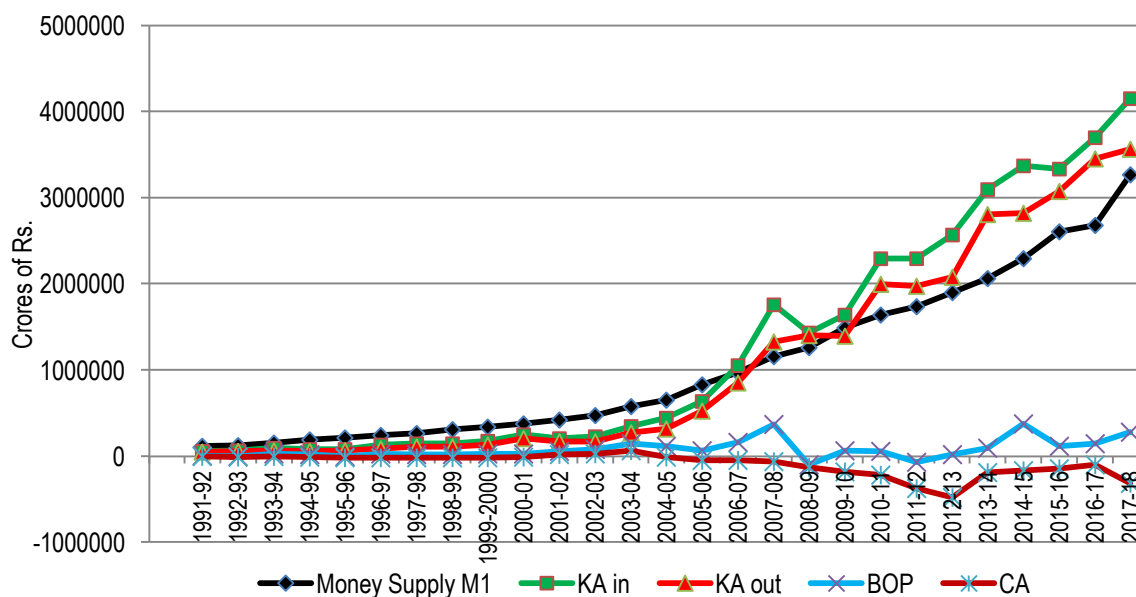
Pairwise Granger Causality test results from Table 8 support the inferences drawn from the ARDL-ECM model. Granger Causality test result observed no causality for equations 4, 6 and 7. Which means that there is no correlation between money supply, current account deficit and exchange rate in India. As per the Johnsonian approach, an increase in money supply leads to increase current account deficit and exchange rate through price effect. This observation validated/supports ARDL-ECM results of no correlation in the short run. Similarly, the Pairwise Granger Causality test results observed unidirectional causality for equations 5 and 8 meaning that there is a unidirectional causality between money supply, capital outflows and balance of payments. It can be inferred that the increase in money supply leads to increase capital outflows (by decreasing interest rate) which causes the exchange rate to rise. The rise in exchange rate will create a deficit in the balance of payments. This observation validated/supports ARDL-ECM results of correlation in the long run.

Interestingly, the Granger Causality test result validated the test results of the ARDL-ECM approach used in this study.

Finally, the study also uses descriptive statistical data for supportive evidence/confirmations. Based on the raw data, the study has established trend lines for the money supply, capital inflows and outflows, current account flows and overall balance in India.

The study has observed several interesting results in Figure 3. It is clear from the figure that there is a positive correlation that prevails between money supply and capital flows in India since 1991. The increasing money supply is also affecting the current account inversely. These two results validate the relevance of the Johnsonian approach to India's Balance of Payments. But the simultaneous increase in capital inflows and failure in the restoration of current account flows strongly invalidates Johnson's perspectives. That's why the empirical results also yield mixed implications.

Figure 3. Trends in Money Supply and Balance of Payments in India Since 1991



Conclusions

The central theme of the study is to test the effectiveness and relevance of Harry Johnson's monetary approach using India's Balance of Payments account from 1991, especially in the context of liberalized exchanged rate regimes (Since LERMS 1992). The main findings of the study can be observed in three dimensions.

First, the study answers to what extent India's BOP responds to changes in the money supply. The empirical findings from the ARDL approach revealed that there is a long-run causality in the model. It implies that the log BOP responds to overall explanatory variables. When the study correlates BOP with every independent variable alone, the majority of variables are statistically insignificant. Granger Causality test results from table 8 are the evidence. Findings from ARDL-ECM and Granger Causality observed no correlation in the short run.

Secondly, the study observed the effect of changes in money supply on capital outflows are always higher than the current account deficit. Coefficient values from the ARDL approach and Granger causality test are the evidence for the above inferences. The trends in Money supply and capital outflows are almost similar but it is not true when the study compares it with the current account (Figure 3).

Thirdly, the study answers the commanding question called the relevance of the Johnsonian approach and the automatic restoration process in the flexible exchange rate system. Based on the ARDL-ECM approach, Granger Causality test and descriptive statistics, the study observed the Johnsonian approach has less relevance in the Indian context even though there is a long-run causality. Moreover, the study did not find any shreds of evidence that support the automatic restoration process in India's Balance of Payments. Especially, during the LERMS regime since 1992, money supply and trade deficit is increasing endlessly. It can be inferred that India is an importing nation that does not have market access globally led to the failure of the automatic restoration process.

Finally, the study observed that the role of monetary policy is not effective in the context of India's BOP. In the present scenario, this may not be an issue for an emerging economy like India. But in the long run, to achieve external equilibrium based on the Mundell-Flemings assignment rule, the study strongly recommended Friedman's monetary rule for the effectiveness of monetary policy in India.

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