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STOCHASTIC MODELING OF OPTIMAL LOGISTICS IN THE FUNCTION OF MAXIMIZING INTERNATIONAL BUSINESS EFFICIENCY OF SMEs

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ABSTRACT

The concept of business activity conditions specific procedures and activities in order to maximize the difference between output and input variables while taking into account the uncertainty of the business outcome. The business outcome is determined by a number of factors that are under the control of the decision maker. However, a number of factors are conditioned by stochastic quantities, which obey the laws of probability of a random variable whose value the decision maker cannot influence but must anticipate and respect in the business decision making process. Conditionality of business results with the market component refers to user expectations, and it requires a model approach by which the uncertain business future is recomposed into business expectations, with a high level of reliability. Modeling of the system by the process of mathematical simulation enables the calculation of variants of business future in the present time without realizing business strategies before their selection and classification. The modeling process includes business system analysis, factor selection, qualitative and quantitative expression, classification of variables, functional linking, formulation of probability distribution of random variables, and the choice of time frame for simulation. The process of mathematical simulation indicates the management consequences of business alternatives, thus the decision maker is guided by business expectations and recruits business logistics in accordance with the decision. The simulation model is adapted to the specific management problem, specific conditions and circumstances of decision-making. It does not have a universal character and must be constructed specifically for each management situation.

1. INTRODUCTION

1.1. Review of literature

International market positioning requires rationality in the business decision-making process, which links the consequences of business decisions to the business future, and "recovery" from the consequences of suboptimal in relation to the optimal business strategy which is inversely proportional to the size and age of the company and its financial strength (Todorović, 2003).

Small and medium enterprises require subtlety in the process of choosing business strategies, especially in the field of assessing market segments, current and future demand, competitive position and available resources (Sudarević, 2009).

The sensitivity of this business segment of SMEs in total gross domestic product is significant, especially in terms of the impact on total employment (Sredojević, 2016), which indicates the importance of optimizing business strategies to choose business strategy, and thus business competencies of a modeled system that will provide adequate responses to the challenges of the global economy.

New ways of doing business and trends have conditioned the emergence of new forms of organizational structure of the company, whose conceptual settings are based on information and communication at all levels of the company structure. The new organizational concept of the company creates the conditions for the development of the company in the global business environment (Mitrović, 2004).

The basic characteristics of small and medium enterprises and entrepreneurs, especially their size, flexibility, propensity for innovative and risky ventures, and greater opportunity for specialization allow these companies to adapt much easier than large business systems to continuous changes in consumer demands and business conditions in the global market (Erić et al., 2012).

Understanding the importance of improving the sector of small and medium enterprises is justifiably based on empirical data based on the environment. Although the accession of Croatia to the European Union has provided adequate benefits in terms of simplifying procedures for joining the global market, the desired prosperity in terms of business efficiency has not occurred.

This is evidenced by empirical data relating to the period from 2015 to 2019, and it shows the following results.

Data for 2019, as in previous years, indicate a lower level of productivity of micro, small and medium enterprises, compared to large enterprises. Also, compared to large enterprises, the sector of small and medium enterprises is still

characterized by insufficient capacity to internationalize and exploit the potential of the European Union's single market (Alpeza et al., 2020).

It is important to emphasize that in addition to the insufficient increase in business efficiency, a certain positive rate of change in business results is certainly realized, again, based on empirical results.

In 2019, the Croatian business sector recorded an increase in total profit by 4.2% compared to the previous year. The total consolidated result in 2019 was higher than in 2018 by 10.7%. Small, medium and large enterprises contributed to the positive consolidated result, while micro enterprises achieved a negative consolidated result in 2019, which confirms the conclusions about the lower level of productivity of this part of the Croatian economy (Alpeza et al., 2020).

It is certainly justified to look for sources of business efficiency in the sector of small and medium enterprises, especially in transition countries, but the traditional approach to business orientation needs to be enriched with significant contributions of management energy based on the results of theoretical models adapted to the business concept of a particular business system.

1.2. Economic-market and personnel aspects of inadequate positioning of small and medium enterprises (SMEs)

Economies of scale, as one of the possible strategic determinations of management structures that formulate and direct the behavior of the business system, globalization and market openness give the opportunity to reap all the benefits of business efficiency through business expansion and cost rationalization.

However, it should be taken into account that direction of business activities is not one-way, and that optimal management in the context of the concept of efficient operation of the business system will meet new aspects and requirements of an open market environment. This primarily refers to exposure to fierce competition from foreign business systems and taking the desired market position.

Reducing barriers to foreign trade provides a new dimension to the composition of decision-making systems that will be influenced by the abundance of choices made possible by globalization. Business systems aimed at reducing production costs through economies of scale will benefit from this business concept as long as the quality of production outputs is not compromised in order to reduce the possibility of parrying global market competition unreservedly encouraged by visibly growing diversification of consumption.

Long-term commitment to benefits based only on low prices without elements of the stated quality, and innovation and the right attitude towards customers and human capital does not promise the successful realization of the desired results. Gaining competitive advantage as a prerequisite for achieving defined business results is not exclusively related to the advantages of low costs, which confirms other recognizable business strategies aimed at creating competitive advantages, including product differentiation strategy and strategy of superior customer service with the ability to focus on certain specific market segments (Christian, 2006).

Competitive advantage exists when the company is (Tipurić, 1999):

- more effective than the competition,
- more successful in attracting customers and convincing them that its products have superior value,
- better in offering a quality product at a low price or the one that has a higher actual or perceived value for customers.

On the other side, economies of scale as a concept give additional space to the management structure of the business system in formulating business goals aimed at creating a positive and stimulating business climate within the business system. This primarily reflects on human satisfaction with generally accepted principles optimal balance of productivity and flexibility in horizontal and vertical specialization, as well as adequate motivation and reward policies as unavoidable system categories of optimal management process.

Human capital is characterized as a key component of the success of modern business systems, and special emphasis should be placed on the importance of management decisions in the context of achieving and maintaining optimal business results. Therefore, it should be reiterated "that human resources represent a competitive advantage of a company if they are managed wisely" (Tipurić, 1999). "The importance and complexity of human capital implies adequate prior knowledge of relevant subjective factors from the aspect of the selected group or individuals whose emphasis ensures maximizing business efficiency, and thus contributing to business results." (Vokić, 2004)

The wide range of management solutions offered for a particular business system aimed at lower costs per unit of production output only further confirms the importance of model selection, and in order to choose the most optimal variant with emphasis on respecting the consistency of selected strategies with the environment and organizational structures.

2. MATERIALS AND METHODS

2.1. Metric aspects of business success and stochastic correction of business result of SMEs

The complexity of the business result arises from the structure of the business process, market-institutional challenges, and inevitably a competitive position in the chosen field of business. The calculation of the business result includes the following steps:

- Breakdown of the business system into components that enable a complete and purposeful understanding of the analyzed process;
- Approximation, selection and systematization of the relevance of business process components and definition of variables;
- Distribution of probability of random variable;
- Deterministic component of the simulation model as a metric of the output/criterion variable;
- Selection of simulation time frame;
- Mathematical simulation procedure;
- Comparison of business outcomes of selected management options.

Mathematical simulation models are adapted to specific business systems, designed specifically for selected business systems and their management problems. The selection of business strategies allows the recomposition of input resources in the function of reproducing the desired business result.

3. RESULTS

3.1. Stochastic selection of business strategies

The business result is conditioned by a large number of factors, among which the selling price of the product (PP), production costs (PC), demand for the product (Qt) stand out. The managerial challenge refers to the formulation of a business strategy, which would enable the best business result. Model linking of these business efficiency indicators is possible by using the comparative analysis of strategies to improve product performance, as opposed to cost rationalization strategies.

The modeling process includes the following:

- Formulation of random variable probability distribution - the recommendation refers to the use of empirical probability of demand from the previ-

ous period, corrected by predictions of development tendency in the analyzed time period, and linking cumulative probability of product demand with random numbers;
- Strategy 1. Examination of the sensitivity of demand to improvements in product performance, as well as the correction of sales price in accordance with market opportunities;
- Strategy 2. Rationalization of production costs refers to savings in the use of production materials or production work, commercialization of production surplus in the form of marketable output;
- Strategy 3. Keeping the production process at the usual production regime.

Business outcome modeling refers to the creation of the following worksheets:

Table 1. Translation of empirical frequencies into the probability of a random variable, and linking the cumulative probability with the interval of random numbers

Qt	F(Qt)	P(Qt)	$P(Q \leq \Sigma Qt_i)$	The interval of random numbers
Qt_1	$F(Qt_1)$	$F(Qt_1)/\Sigma F(Qt_i)$	$P(Qt_1)$	$0 - [P(Qt_1)\%-1]$
Qt_2	$F(Qt_2)$	$F(Qt_2)/\Sigma F(Qt_i)$	$P(Qt_1)+P(Qt_2)$	$P(Qt_1)\% - [P(Q\Sigma \leq Qt_2)\% - 1]$
⋮	⋮	⋮	⋮	⋮
Qt_n	$F(Qt_n)$	$F(Qt_n)/\Sigma F(Qt_i)$	$\Sigma P(Qt_i)$	$P(Q \leq \Sigma Qt_{(n-1)})\% - 99$
Σ	$\Sigma F(Qt_i)$	1,0000	-	-

Source: Authors (Landika et al., 2021)

Table 2. Conducting a simulation

Day	*Next number*	Qt_i	*Business strategy (ordinal number of criteria)*			
			Qp_i	Qr_i	Qz_i	Pf_i
0	-	*E(Qt)*				
1	S_1	Qt_1	Qp_1	Qr_1	Qz_1	Pf_1
⋮	⋮	⋮	⋮	⋮	⋮	⋮
M	S_m	Qt_m	Qp_m	Qr_m	Qz_m	Pf_m
Σ	-	ΣQt_j	ΣQp_j	ΣQr_j	ΣQz_j	ΣPf_j

Source: Authors (Landika et al., 2021)

Conducting the simulation involves determining the indicators shown in the previous table, and refers to:

- The time frame for conducting the simulation includes m time units;

- Random numbers are generated by the RAND or RANDBETWEEN function;
- The random variable Qt (demand) is adjusted by the interval of random numbers according to the data in Table 1;
- The input variable Qp (quantity produced) results from the chosen market positioning strategy;
- Output variable Qr (realized quantity) = $\min_i$(Qti;Qpi), represents a smaller value between the requested and produced quantity;
- Output variable Qz (unsold produced quantity - stocks) = (Qpi - Qri), represents the difference between produced and sold product quantity;
- The criterion variable Pf (realized profit) is calculated as the difference between the realized and invested value and is adjusted to the chosen strategy.

Model prediction of business outcomes implies comparison of the cumulative value of the criterion variable in the selected time interval.

4. CONCLUSIONS

The driving power of any socio-economic system is based on the development potential of small and medium enterprises, whose optimal functioning requires starting of model support. This implies a careful analysis and adequate inclusion of relevant factors in the model, which shifts the boundaries of business outcome from uncertain to expected values.

Quantitative predictions of business results enriched with model selection of competitive strategic commitments enables maximum utilization of resource opportunities and their optimal direction to market opportunities.

The protocol of the conducted research selects business strategies adapted to specific business problems and business conditions, the generality of which enables application to various business systems and characteristic problems.

The modeled information configuration provides a solid foundation for composing input components in virtual space while projecting a reliable business outcome without materialization, and requires a high degree of agreement of real system and its model projection (Landika, 2021).

Adequately modeled logistics platform enables the establishment and permanent harmonization of the optimal mode of operation with consideration of the management consequences of suboptimal choices, and thus the permanent improvement of business efficiency.

Modeling optimal strategies is not the final process, because every change in business conditions requires model adjustment, which permanently relaxes the efficiency and effectiveness of business with resource opportunities and market opportunities, and thus converts business results from business uncertainty to business expectations.

Recruitment and functional application of decision-making models require consulting services, the effects of which significantly outweigh the costs of acquisition. Initiating the potential of mathematical models and the effects of modeled management harmonizes internal and external factors, relaxes the logistics platform and optimizes the results of business processes tailored to concrete business systems.

Conflict of interests

The authors declare there is no conflict of interest.

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СТОХАСТИЧКО МОДЕЛИРАЊЕ ОПТИМАЛНЕ ЛОГИСТИКЕ У ФУНКЦИЈИ МАКСИМИЗАЦИЈЕ МЕЂУНАРОДНЕ ПОСЛОВНЕ ЕФИКАСНОСТИ МиСП – а

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САЖЕТАК

Концепт ефикасног функционисања пословног система темељи се на оптималном управљању, а реализује скупом сврсисходних акција усмјереним достизању пословних циљева. Формулисање пословних циљева подразумијева идентификацију скупа тачака којима се тежи свјесним и управљивим поступцима организоване групе појединаца балансираних са идентификованим факторима окружења диферентних дубина и граница, њихове адекватне квантификације и преференције по мјери утицаја на анализирани систем.

Квалитет управљачких одлука директно кореспондира са њиховим капацитетом да дугорочно контролишу и усмјеравају понашање пословних система, тако да континуираним, комплексним и свеобухватним поступцима компонују адекватан управљачки модел. Композиција унапријед заданих циљева, умрежених са аспектима и захтјевима окружења захтијевају висок степен сагласности између нивоа реалитета пресликаног у управљачки модел. Моделска апроксимација дијела реалитета подразумијева селекцију теоријског модела као вјерне копије оригиналног система, а тиме и сврсисходну експлоатацију моделираних управљачких информација на задацима повећања функционалне потентности, а тиме и адекватног позиционирања. Сврха моделирања односи се на повећање квалитета функционисања и контроле одабраног пословног система, те на општи контекст пословног система као системске компоненте глобалног економског система. Компоновање система одлучивања обухвата управљачку идентификацију фактора релевантних за конкретан управљачки проблем чиме се, реалном метриком и моделском предикцијом, постиже, одржава и унапређује тржишна позиција и конкурентска компетенција. Тржишне компетенције темеље се на поузданости моделских предикција, тангентних са потентношћу конструктора и креатора модела одлучивања да реалном метриком обухвати, квантификује, селектује факторе системских категорија релевантних за достизање и одржавање оптималних пословних резултата. Логистика пословног

система подређена пословним и управљачким захтјевима омогућава тржишне компетенције, одрживост и перманентну међународну конкурентност заснива се и на трошковној рационализацији, а постиже моделском селекцијом управљачких рјешења. Оживотворење пословног система математичком симулацијом, у оквиру одабраног временског интервала, омогућава сагледавање консеквенци управљачких рјешења у контексту прорачуна пословних резултата стохастичких процеса. Предикција управљачких консеквенци понуђених управљачких рјешења елиминише субјективизам доносиоца одлуке, непотребне и неоправдане консеквенце субоптималних управљачких рјешења, али и метрику диференција у односу на оптималне изборе, а тиме и утемељеност моделских преференција у односу на пословне стратегије.

Кључне ријечи: *ефикасно функционисање, оптимално управљање, моделска предикција, реална метрика, међународна конкурентска позиција.*

MACROECONOMIC DETERMINANTS OF INVESTMENT IN THE BALKAN COUNTRIES

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ABSTRACT

This study analyzes the impact of crucial macroeconomic variables on investments for six selected Balkan countries (Croatia, Serbia, Bosnia and Herzegovina, Montenegro, North Macedonia and Albania) in the period from 2005 to 2020. Most of these countries are on the path to European integration, and Croatia has been a member of the EU since 2013. Their development and macroeconomic goals are mostly identical, and one of the main is the requirement of a high level of investment in order to achieve higher growth rates and overcome the development gap in relation to EU countries. The research starts from the hypothesis that the selected factors (independent variables): gross savings, FDI, interest rate, GDP growth and external debt, affect the total investments in the region. To prove this hypothesis, a panel analysis model was applied, that is the panel with a fixed effect as a more relevant model for estimation. The results show that savings and external debt are significant variables, whereby savings have a positive impact on investment, while the impact of public debt is negative. Real interest rates also determine investment, which is shown by their marginal significance and negative numbers. In other words, higher interest rates discourage investment. Finally, the analysis shows that GDP growth is not significant, but the direction is logical and slightly encourages investment. Foreign investments are also an insignificant variable, but they have a positive direction, which explains why the deficit of domestic investments is only partially compensated through the FDI.

1. INTRODUCTION

Economic development depends on a number of factors. It can be observed from the general growth equation that the factors that lead to an increase in GDP are: funds (capital accumulation), labor, technical advancements, natural resources and residual factors. A number of factors influence the accumulation of capital, but the level of domestic savings, i.e. domestic investments, and the inflow of foreign investments have a significant impact as well. The level of savings is also a measure of well-being of society. However, saving also depends on the activities of state institutions that can encourage it, or treat it as inferior. Certainly, preferences, traditions, and customs in the community are also important. Therefore, with more or less initiative, it is possible to create national macroeconomic policies with the aim of stimulating the growth of savings as domestic savings are the most favorable resource for accelerating economic growth. In this context, governments use different means to encourage domestic savings, although interest rates have proven to be the most effective instruments for stimulating savings.

Investments are a significant constituent of the essential balance equation, as well as a condition for achieving higher and dynamic long-term GDP growth rates. This can be seen from the decomposition of GDP, i.e. the balance equation:

$$C + S + T = C + I + G + (X - Z) \quad (1)$$

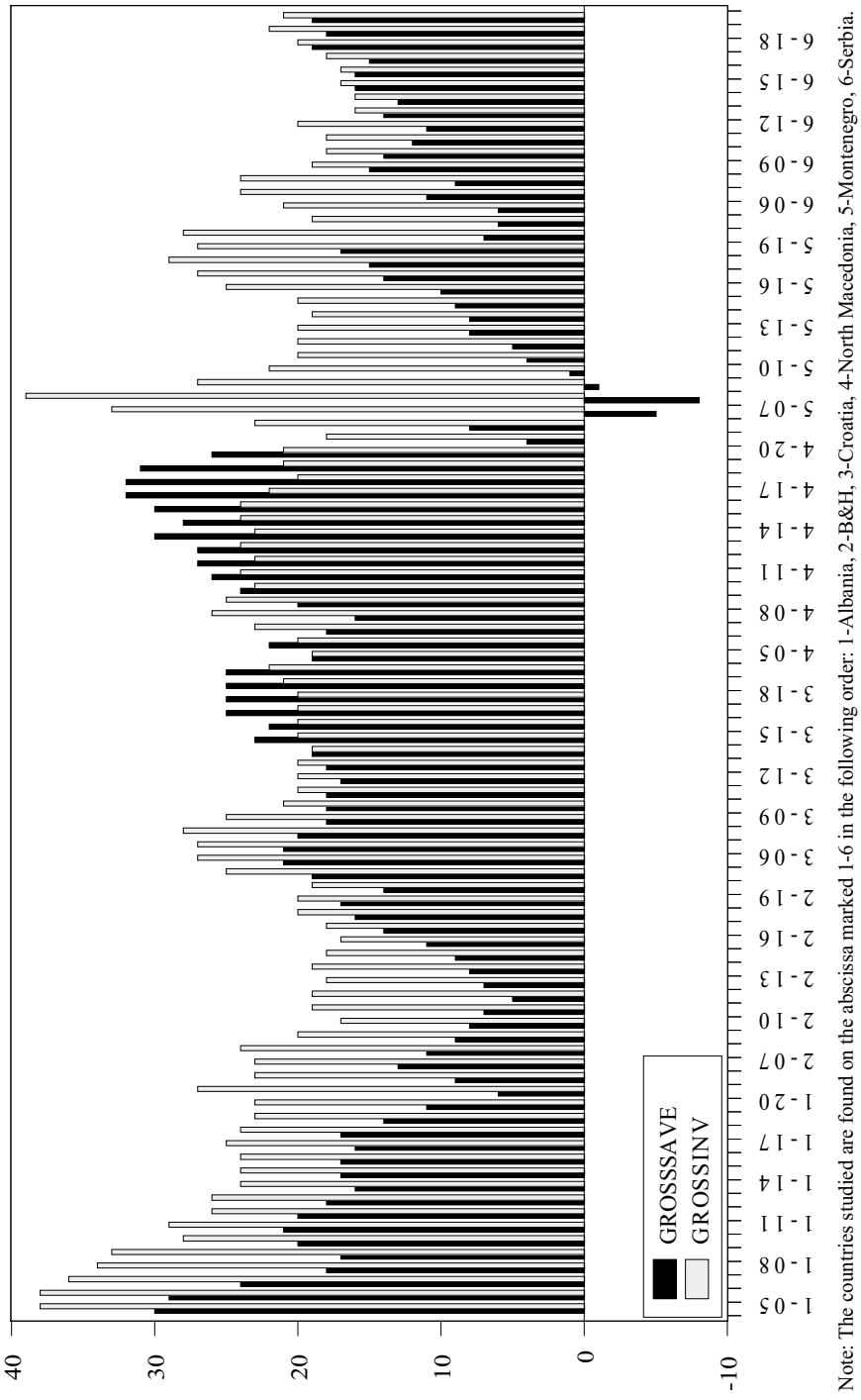
Rearranging the equation results in:

$$(S - I) + (T - G) = (X - Z) \quad (2)$$

With the variables being: C – aggregate consumption; S – savings; I – investments; T – transfers; G – government expenditure; (X – Z) – foreign trade balance (import - export).

The second equation shows the importance of investments for a national balance, because they can equate to more or less than the savings. If the invested amount is larger than domestic savings, the balance equation is corrected through the foreign trade deficit ($X < Z$). And if the savings are greater than investments, the private sector is a net saver, while the economy has a foreign trade surplus. This simplified review of the relationship between investment and savings clearly shows their connection and roles in economic growth.

At a time of stability of the global economy, investments make up about 1/5 of the GDP. Thus, the rate of investment in the countries of the European Union



Note: The countries studied are found on the abscissa marked 1-6 in the following order: 1-Albania, 2-B&H, 3-Croatia, 4-North Macedonia, 5-Montenegro, 6-Serbia.

Graph 1. Ratio of investments and savings in the Balkan countries (GDP%, 2005-2020)

Source: World Bank, 2021

averaged about 20% of GDP before the economic crisis flared up, while after 2009 it decreased slightly (17-18%) (Popović & Erić, 2021). WB countries also have approximately the same investment rates, which are to some extent financed by domestic savings. The investment and savings gap varies from country to country, as seen in the following chart. It is obvious that the ratio of these two macroeconomic indicators is similar for Albania, B&H, Serbia, and Montenegro, while the gap between investments and savings in Croatia and North Macedonia is so small that after 2012 savings even exceeded gross investments.

The chart shows that in almost the entire period, savings are lower than investments. As these countries have been recording foreign trade deficits for a longer period of time, it can be concluded that this relation converges with the theoretical setting from the previous balance equation. Or rather, it turns out that $S < I$ has an effect on $X < Z$.

Scientific research on the relationship between investment, savings and economic growth for the countries of the Western Balkans is generally very rare. The one standing out is Bađun & Franić (2015), who investigated the determinants of an extremely important category of housing savings in Croatia for the period 2000–2013. The results of the research showed that the analyzed variables: salaries, interest rate, stock exchange index, availability of loans and unemployment rate, do not affect the volume and dynamics of housing savings. Housing savings showed independence from recession and the economic decline, while being dependent on government incentives. They are also resistant to institutional change, so government interventions can disrupt the savings system. In general, savings depend on the level and growth of GDP, but also on consumption. Radulescu, Serbanescu & Sinisi (2019) investigated how much the growth rate and employment of CEE countries depended on consumption and investment in the period 2004-2017. Research showed that private consumption is positively associated with short-term economic growth, but not with employment growth. The impact of domestic investment on GDP growth is weaker than the impact of private and public spending. It is positively correlated with GDP growth and negatively with the unemployment rate. The correlation between FDI and economic growth is very weak. The authors found that economic growth in CEE is largely based on private consumption in the short run. On the other hand, private consumption does not encourage short- and long-term employment either. Investments and savings also depend on the state of the banking sector. Kubiszevska (2019) studied the economic situation and the banking sector of selected European countries. She explored the economic transformation of the banking sector and banking stability in the Western Balkans region and provided an assessment of the determinants of banking stability. She found that in most

countries the key factors of banking stability are market concentration (size) and market competition. The stability of the banking systems in Croatia and Serbia is affected by similar factors, while other banking systems in the region differ in terms of factors that lead to banking stability.

Along with savings and the banking system at the macroeconomic level, economic stability and growth, and thus the amount of savings, are also affected by the state of the budget, that is, its stability. Rant, Mrak & Marinč (2020) explored the budget flows of the Western Balkan countries in the context of the enlargement process. EU budget flows to the Western Balkans after accession showed a sharp increase in gross and net tranches in the first few years. The enlargement of the Western Balkans had minimal budgetary costs for EU members. The impact of public debt was studied by Madžar (2019). He analyzed the arguments for public debt for large projects and the equalization of public spending flows. He believes that high public debt undermines the power of the state and creates mistrust in the economy. His research states insufficient participation of public investments in the GDP in Serbia (about ½ of the participation in neighboring countries). The author notices problems in investments on part of the government. The problem are the reforms of the economy, but also the reforms of the government itself.

Cvetanović, Despotović & Milovanović (2018), and Popović & Erić (2018) researched the economic growth of the Western Balkan countries in the context of the influence of FDI. The research deals with the inflow of foreign direct investments for the period 2000-2017. The authors conclude that these countries are forced to use foreign investments due to insufficient domestic savings. They are one of the conditions for achieving higher and more stable GDP growth rates. They found that after the crisis in 2009, growth rates were insufficient, so FDIs were a supplement to domestic accumulation. However, they are not a permanent development resource, and the domestic savings of the Western Balkan countries even show to be significantly lower.

Petrović (2019) analyzed quantitative and qualitative growth factors in the context of attracting FDI to Serbia. Foreign investment is beneficial for economic growth and general social progress. Serbia invests large amounts of budget funds into attracting FDI. This paper also reviews the following incentive measures: donations from the budget, fiscal measures in special economic zones and fiscal incentives. Mihajlović (2018), Mencinger, (2003) and Erić (2018) emphasized the importance of foreign investments in the economic development of countries. They see them as an alternative in conditions of a capital and domestic accumulation deficit.

Investments in WB are also discussed in an extensive study by IMF (Atoyan et al., 2018). The need to invest in WB is also analyzed, with special reference to the development of public infrastructure. They identify and quantify shortcomings in several sectors, as well as "limiting factors" that require investment in infrastructure. The study quantifies the benefits that will be the result of investing in infrastructure. The authors conclude that building infrastructure in the WB is vital to higher GDP growth rates and faster entry into the EU.

World Bank (2017) also examined the regional investment policies of the Western Balkan countries and their compliance with international standards. Their economies need to be further developed and they need to cover various technicalities, as well as promote attractiveness for foreign investment. They need to meet the requirements of corporate investors more efficiently. The economies of the Western Balkans must increase the region's appeal for foreign investments. The trade integration of the region also stimulates strongly FDI inflows due to market growth. Likewise, the growing presence of multinational companies contributes to the growth of trade and investment.

Investments are increasingly becoming a geoeconomic as well as a geopolitical instrument. China's influence is increasing in the Western Balkans region. First of all, the economic role is growing through the intensive growth of trade and investment. Markovic Khaze & Wang (2021) investigated China's economic impact on the Western Balkans over the past decade. They analyze the investments and trade between China and the countries of the Western Balkans in individual cases of Croatia, Serbia, Albania and North Macedonia. Russia's economic presence is growing as well, especially in the energy industry. The delay in joining has enabled Russia to strengthen its influence in the region. This situation was inspected further by Panagiotou (2021). Russia's economic presence (although less than that of the EU) has proven to be successful, and more importantly, there has been continued growth and expansion of cooperation.

Therefore, the future economic activity of the EU, as the largest foreign trade and investment partner, is necessary for further progress in the expansion process.

2. MATERIALS AND METHODS

The database used for analysis in this paper is World Development Indicators (WDI) from which data on dependent and explanatory variables is taken. Explanations and definitions of the variables are presented in the following table and the continuation below.

Table 1. Variables in the model and statistics sources

	Label in the model	Source of data
A) Dependent variable		
1. Gross investments (% GDP)	Gross inv.	World Bank national accounts data, WDI
B) Explanatory variables		
2. Gross savings (% GDP)	Gross save	World Bank national accounts data, WDI
3. Growth of the gross domestic product	GDP growth	World Bank national accounts data, WDI
4. Foreign direct investments	FDI	World Bank national accounts data, WDI
5 Countries' external debt	External debt	World Bank national accounts data, WDI
6. Real interest rates	Interest rates	World Bank national accounts data, WDI

Source: Created by authors, using data from (World Bank, 2021).

1. Gross fixed capital formation (formerly gross domestic investment) includes land improvements (fences, canals, drains, etc.); purchase of industry plants, machinery and equipment; construction of roads, railways, etc., including schools, hospitals, private housing units, and commercial and industrial buildings. According to the 1993 SNP, net acquisitions of valuables are also considered a form of investment.

2. Gross savings are calculated as the total consumption subtracted from the gross national income, plus net transfers.

3. Annual GDP growth rate percentage per capita based on local currency.

4. FDIs are net investment inflows for the acquisition of a permanent management interest (10 per cent or more of the voting shares) in an enterprise operating in the economy not domiciled to the investor. It is the sum of equity, reinvested earnings, other long-term capital and short-term capital, shown in the balance of payments. This data shows the net entries into the observed economy from foreign investors, and are put in relation to the GDP.

5. Total external debt stocks by gross national income. Total external debt is debt to non-residents that is repaid in currency, goods or services. Total external debt

is the sum of public, publicly guaranteed and private guaranteed long-term debt, the use of IMF loans and short-term debt. Short-term debt includes all debts with an original maturity of one year or less and arrears of interest on long-term debt. Gross national income GNI (former GNP) is the sum of the added value of all resident producers plus all taxes on products (with subsidies subtracted) not included in the valuation of production plus net receipts of primary income (compensation of employees and property income) from abroad.

6. The real interest rate is the interest rate on loans, adjusted for inflation, measured by the GDP deflator. Terms and conditions related to credit rates vary from country to country, which limits their comparability.

The econometric method, used to estimate the intensity and direction of the relationship of dependent and explanatory variables is panel analysis. The panel analysis assesses the impact of selected predictor and control variables (explanatory) on total investments. The advantage of panel analysis over multiple regression is that it allows the definition and testing of complicated econometric models (Baltagi, 2015). Moreover, panel data reduces the problem of multicollinearity. There are combined panel models, with fixed and random effect. The paper explains panels with fixed and random effect, while the combined model will not be presented due to numerous limitations.

The fixed-effect model is a linear model in which a constant factor changes with each unit of observation while being constant in time.

The random effect model is a simple linear model in which it is assumed that the observation units are chosen at random, and that the differences between the observation units are random. The results of the application of the panel model are presented in the next chapter.

3. RESULTS AND DISCUSSIONS

Prior to the formation of the econometric model, the correlation between pairs of explanatory variables was examined due to possible multicollinearity. This problem can disrupt the estimation of parameter values, their significance, and the direction of impact on the dependent variable. To date, there is no appropriate test for detecting multicollinearity in panel models. According to Baltagi (2008; 2015), empirical papers using panel models to observe multicollinearity problems employ correlation coefficients between pairs of potentially independent variables.

Table 2. Correlation matrix of variable values in the model

	Invest	Save	External debt	FDI	GDP growth	Interest rate
Invest	1					
Save	0.149	1				
External debt	-0.260	-0.160	1			
FDI	0.279	-0.610	-0.123	1		
GDP growth	0.217	0.085	-0.428	0.183	1	
Interest rate	0.243	0.088	0.0248	-0.082	-0.201	1

Source: Authors-created

The correlation test shows that pairs of explanatory variables should not cause the problem of multicollinearity because the correlation is extremely weak in almost all cases. Thus, the correlation coefficients are not at the level that can lead to multicollinearity problems.

The level of national savings largely determines total investments. Although the values of savings in Balkan countries in a longer time period are significantly lower than investments, the results of the panel model show that the variable of savings is extremely important for the movement of investments in the region, which confirms the theoretical assumption of a connection between savings and investments. In addition, the movement of savings in the model is proportional to the movement of investments (positive impact with a coefficient of about 0.10). This implies a recommendation to the governments of these countries to further stimulate saving at a national level. In addition, governments need to further liberalize all segments of financial markets, in cooperation with European partners as particularly important. Thus, through savings, investments can increase and indirectly contribute to GDP growth.

The state of external debt in the region, measured in relation to the GDP, represents another significant variable in the model, with the movement of gross investment and changes in external debt in the region being inverted. However, the coefficient of change in external debt is very small and amounts to 0.08%, which means that with an increase in external debt of 1%, there is a decrease in gross investment of 0.08%. The external debt of all analyzed countries grew continuously, and this growth was not accompanied by investments. It can even be said that investments decreased with the growth of external debt. This result can be explained from two standpoints. Firstly, in a theoretical sense, the relationship between investments, savings and external debt converges with theoretical set-

tings, which can be seen from the essential balance equation. The reason is that the continuous negative difference between investment and savings is always accompanied by a trade deficit. And secondly, the lack of investment and the growth of external debt are specific to countries in transition that can be recognized by unjustifiably high public and personal spending, as well as the neglect of investment spending.

Similar conclusions are pointed out by the FDI, whose movement is of the same direction as that of total investments, but with a very small coefficient explaining the change in gross investment. Regardless of the results of the analysis, which mainly confirm the contribution of FDI to total investments, the need for further liberalization and creation of a business environment in cross-border investment should be emphasized. Thus, Serbia is liberalizing foreign investments to the maximum, opening free zones and making joint investments. The positive effects of such a policy are high growth rates and a significant drop in unemployment.

Gross domestic product growth is in line with investments, but despite the small impact coefficient (less than 0.1%), it was not statistically significant for investment growth in this region. However, the fact that these variables are moving in the same direction indicates that more developed and dynamic economies can count on higher investments; with that being said the macroeconomic aspects of amortization are not to be neglected, because that is what spills over into investment funds in the final distribution.

Real interest rates in the countries of the region have a negative impact on gross investment, they are low in intensity and far from the limit of statistical acceptability. But, although not relevant, the negative correlation still shows that higher interest rates increase the cost of capital and negatively affect the level of investment.

Table 3. Results of the panel analysis with fixed effect, Investment dependent variable (2005-2020)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.303220	0.073166	17.81178	0.0000
Gross save	0.096237	0.045979	2.093073	0.0393
External debt	-0.000856	0.000364	-2.351531	0.0210
FDI	0.001239	0.002297	0.539272	0.5911
GDP growth	0.000489	0.002101	0.232632	0.8166
Interest rate	-0.000949	0.002228	-0.425934	0.6712

Source: Calculations by authors

Table 4. Results of the panel analysis with random effect, Investment dependent variable (2005-2020)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.167298	0.057679	20.23767	0.0000
Gross save	0.133154	0.034997	3.804683	0.0003
External debt	-0.000403	0.000235	-1.715827	0.0896
FDI	0.006761	0.001614	4.189295	0.0001
GDP growth	0.000489	0.002101	0.232632	0.8166
Interest rate	0.003559	0.001804	1.972435	0.0516

Source: Calculations by authors

Table 5. Results of the Hausman specification test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	25.744978	4	0.0000

Source: Calculations by authors

4. CONCLUSIONS

Research on the impact of key macroeconomic variables on investments for the following selected countries in the Balkans: Croatia, Serbia, Bosnia and Herzegovina, Montenegro, North Macedonia and Albania in the period from 2005 to 2020, showed that the analyzed variables largely move within the boundaries of theoretical standpoints, and most of the pragmatic results of previous research.

The analysis starts from the basic assumption that one macroeconomic goal is inherent in all these economies: the need and desire for a high level of investment. As these are countries that show the need for higher growth rates, investments are an ideal resource for achieving such macroeconomic goals. Therefore, it is hypothesized that independent variables such as gross savings, FDI, interest rates, GDP growth and public debt affect total investment.

Panel analysis with the implemented Hausman specification test, i.e. the panel with fixed-effect, shows that savings and public debt are significant variables. Savings have a positive effect on the level of investment, while public debt has a negative impact. Although only marginally relevant, real interest rates have a negative impact on investments (higher interest rates reduce the level of investment and vice versa). One of the insignificant variables is GDP, although its direction is logical (GDP growth slightly encourages investment). Another insignificant variable that has a logical direction is FDI. A positive number may explain that total investments are only partially offset by FDI.

The results obtained are in line with the research conducted by Radulescu, Serbanescu & Sinisi (2019) which showed that the impact of domestic investment on GDP growth is weaker than the impact of private and public consumption, and that the correlation between FDI and economic growth is very weak. Another standpoint confirmed was that of Kubiszewska (2019), stating that the banking sector also affects investments, and that the amount of savings is affected by the state of the budget, or rather, debt (Rant, Mrak & Marinch, 2020). The results confirmed Madžar's view (2019) on the insufficient share of investments in the GDP in Serbia. In addition, the results align greatly with the research conducted by Cvetanović, Despotović & Milovanović (2018), Popović & Erić (2018) and Menzinger (2003), which proves that countries are forced to use FDI due to insufficient domestic savings. Overall, the results confirmed the conclusions reached by Atoyan et al. (2018) that the Balkan countries have a great need for investment. They prefer investments in infrastructure and see them as a key factor of GDP growth.

Finally, the research largely confirmed the justification of the hypothesis about the importance of investments, as well as the factors that determine them. Although previous research in this area is modest, it is notably consistent with the results of this study.

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Conflict of interests

The authors declare there is no conflict of interest.

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МАКРОЕКОНОМСКЕ ДЕТЕРМИНАНТЕ ИНВЕСТИЦИЈА У ЗЕМЉАМА БАЛКАНА

1 Јелена Бијелић, Управа за индиректно опорезивање у Босни и Херцеговини /Докторанд Економског факултета Универзитета у Бањој Луци, Босна и Херцеговина
2 Огњен Ерић, Економски факултет Универзитета у Бањој Луци, Босна и Херцеговина
3 Славиша Ковачевић, Економски факултет Универзитета у Бањој Луци, Босна и Херцеговина

САЖЕТАК

У овом истраживању анализира се утицај кључних макроекономских варијабли на инвестиције за шест изабраних земаља Балкана (Хрватска, Србија, Босна и Херцеговина, Црна Гора, Сјеверна Македонија и Албанија) у периоду од 2005. до 2020. године. Већина тих земаља је на путу евроинтеграција, а Хрватска је од 2013. године чланица ЕУ. Споразуми ЦЕФТА и ССП им омогућавају најбољу трговинску и економску сарадњу са Европском унијом. Развојни и макроекономски циљеви су им углавном идентични, а један од кључних је захтјев за високим нивоом инвестиција како би остварили више стопе раста, и што брже превазишле развојни јаз (гап) у односу на земље ЕУ. Истраживање полази од хипотезе да изабрани фактори (независне варијабле): бруто штедња, ФДИ, каматна стопа, раст ГДП и спољни дуг утичу на укупне инвестиције региона. Ради доказивања хипотезе примијењена је панел анализа (модел) и имплементиран Хаусман тест који преферира панел са фиксним ефектом као релевантнији модел процјене утицаја изабраних варијабли на кретање бруто инвестиција. Резултати показују да су штедња и спољни дуг сигнификантне варијабле при чему штедња има позитиван утицај на инвестиције, док је утицај јавног дуга негативан (односно, раст штедње утиче на раст инвестиција, док раст дуга

доводи до смањења инвестиција). И реалне каматне стопе детерминишу инвестиције о чему говоре њихова гранична сигнификантност и негативан предзнак. Односно, веће камате дестимулишу инвестирање (и обрнуто). Коначно, анализа показује да је раст БДП несигнификантан, али је смјер логичан јер раст БДП незнатно подстиче инвестирање. Несигнификантна варијабла су и стране инвестиције али имају позитиван предзнак што објашњава да се дефицит домаћих само дјелимично компензира преко ФДИ.

Кључне ријечи: *инвестиције, бруто штедња, задуженост, БДП, ФДИ, каматна стопа, Балкан.*

KNOWLEDGE MANAGEMENT AND DOWNSIZING: IMPLICATIONS FOR ORGANIZATIONAL PERFORMANCE

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JEL Classification: M54, M21

ABSTRACT

Downsizing as a corporate restructuring strategy aims to reduce significantly the number of employees in order for the company to adjust to the reduction of revenues resulting from the influence of environmental factors. Workforce reduction is most often implemented during economic crises, which is why it is associated with ambivalent outcomes. Reducing the number of employees through reducing the budget for salaries can have a favorable impact on reducing costs and thus enable the company to operate in the short term. The departure of employees from the organization is associated with a potential loss of organizational knowledge that can reduce the company's competitiveness and have a negative impact on business. The purpose of this paper is to identify the impact of workforce reduction on knowledge management and organizational performance. A questionnaire filled out by managers from 75 companies was used to collect data. Correlation analysis and multiple hierarchical regression were applied to determine the relationship between the observed variables. The results showed that downsizing has a statistically significant and negative impact on organizational performance. Knowledge management has a positive impact on organizational performance and reduces the negative impact of workforce reduction on organizational performance during the implementation of downsizing. The obtained results give clear practical guidelines to managers that downsizing can have negative consequences on organizational performance if the protection of organizational knowledge is not taken into account and that managers must focus on knowledge in order to preserve potential for competitiveness and per-

formance. The obtained results have a much broader significance in all those situations (restructuring, digitalization, business model change, etc.) in which the company needs to reduce the number of employees.

1. INTRODUCTION

Various factors from the global environment generate economic crises that imply significant challenges in corporate governance. The Covid-19 pandemic, although lacking an economic basis, has created a tremendous impact on business around the world through the introduction of various restrictions that have led to a reduction in economic and business activity. Negative trends at the level of the national economy are reflected in companies through a decline in revenues and/or rise in costs, creating pressure on company management to adapt to the circumstances (Koutoupis et al., 2021). The most common measure of quickly adapting to such business conditions is aggressive cost reduction. Starting from the fact that employees in each company generate serious costs that come from the salary budget, a significant number of management actions in times of crisis are implemented in order to reduce the number of employees through the application of some of the downsizing strategies. The focus is on rapidly reducing costs to align with current revenue, but this does not take into account the effect on other costs and processes in the organization that can affect negatively performance and in the long run lead to the loss of competitiveness (De Meuse & Dai, 2013). Downsizing as a corporate strategy is becoming an attractive option during a recession and economic crisis with the goal of maintaining business stability in the short term.

The process and effects of organizational restructuring are in the center of attention of all managers in the company, and certainly human resource managers, primarily due to the fact that a large part of restructuring activities relates to downsizing, ie reducing the number of employees (Dalton et al., 1996). The first serious wave of workforce reduction in companies in the world occurred in the late 1970s and early 1980s, and by the 1990s the number of people who lost their jobs increased dramatically (Feldman, 1996; Feldman & Leana, 2000). As modern business conditions are characterized by increasing competition and digitalization of business, it is realistic to expect that in the coming period the number of people who lose their jobs will increase, even when the effects of the Covid-19 pandemic weaken.

Downsizing can be described as a set of managerial activities whose primary goal is to improve organizational efficiency, productivity, and competitive advantage. It is a process of reducing the size of a company by eliminating assets, capital and employees (Freeman & Cameron, 1993). Since in most cases it means reducing the number of employees, downsizing is often equated with layoffs. However, the concept of downsizing differs from layoffs because its focus is on the organizational perspective rather than the individual level (Schmitt et al., 2012). Therefore, downsizing can be understood as reducing the number of employees, the number of jobs and job positions in the company in order to increase efficiency, and not as the layoffs or retirement of individuals (Cascio, 1993; Petković & Aleksić Mirić, 2009). Although it is one of the popular and frequently used strategies, downsizing often does not allow a firm to achieve the desired results (Dalton et al., 1996). The main reason for that are the employees themselves. After downsizing, it can happen that employees have a larger scope of work and extended working hours, which has a negative effect on their satisfaction. In addition, if the company has not created a clear strategy of downsizing and people who have specific and unique knowledge have left the company, it cannot achieve satisfactory performance (Evangelista & Burke, 2003). On the other hand, those employees who have "survived" downsizing often feel a loss of morale, fear, anger, depression or dissatisfaction, which leads to a decrease in organizational commitment, motivation, commitment to work, work effort and the creation of resistance to change. Such negative effects further jeopardize the functioning of the company: there is a decrease in productivity, loss of product and service quality, the creation of dissatisfied customers, high employee turnover and difficult recruitment of new workers. Ultimately they cause poor financial results and threaten the survival of the company in the market (Hutchinson, et al., 1997; Farell & Mavondo, 2005; Devine et al., 2003; Trevor & Nyberg, 2008).

There are several reasons why downsizing does not lead to desired companies outcomes, such as structural and coordination problems, difficult planning, and delegation of authority (Orpen, 1997). Structural problems are reflected in the fact that the loss of a certain number of jobs, and consequently the dismissal of employees are at the center of the restructuring process. As a result, there is an increase in the range of control that requires from managers to spend much more time monitoring their subordinates. Difficult coordination, which has several causes, is an additional problem. First of all, those who remain in their position begin to care much more about performance at the workplace, without paying too much attention to how their work affects the performance of others in the company. Difficult coordination also occurs due to the fact that some employees

have difficulties in overcoming the newly assigned job, but also because of the increase in the total scope of work as a result of the integration of work obligations. Because of difficulties in coordination and the aforementioned control, managers are not able to effectively delegate responsibilities and have to perform a large number of tasks on their own, which leads to a reduction in time for dealing with planning tasks. In order to overcome these problems, it is necessary to carefully plan the strategy and goals of downsizing and connect it with the vision and strategy of the company, and this strategy should eliminate only those processes and positions that are not important to the company and do not generate value (Dalton et al., 1996; Evangelista & Burke, 2003; Lamarsh, 2009).

In order for the implementation of downsizing to be effective, human resource managers need to implement several important activities. At the very beginning, it is necessary to determine the clear reasons why downsizing is carried out. Additionally, when it comes to human resources, it is necessary to determine whether downsizing can be replaced by some other alternative that would keep employees within the company. If this is not possible, in the next step it is necessary to communicate to employees the clear reasons why downsizing is carried out, in order to reduce their stress and avoid negative reactions. Human resource managers must also plan future jobs, which means engaging employees in new tasks and determining the knowledge that employees must have. This activity is accompanied by the definition of a new way of measuring the achieved performance and the design of a system for providing feedback to employees (Campion et al., 2011; Hutchinson et al., 1997). What is very important in downsizing is that human resource managers must constantly keep in mind that employees with specific knowledge, skills and abilities must remain in the company (Orpen, 1997).

As early as the late 1980s, it became clear that knowledge was one of the most valuable components of an asset that could lead to business success. A resource-based view, as well as a knowledge-based view of the firm, assumes that employee skills, abilities, and experience are a source of sustainable competitive advantage (Bollinger & Smith, 2001; Sitlington, 2012). Of course, this is not only because of the knowledge of individuals in the company, but also the organizational culture, systems, structure, procedures and behavior that can lead to knowledge sharing between employees in the company and consequently achieving good business results (Walsh & Ungson, 1991). That is why it is necessary to keep people who have specific human capital in the company not only because they will successfully do the job thanks to their knowledge, but also because that knowledge can be used in the future to achieve strategic goals, and also to acquire additional knowledge (Madsen et al., 2003). If not implemented

carefully, downsizing can not only destroy valuable knowledge in the company, but can destroy individual and group connections, system, procedures and routine that enable successful knowledge exchange, leading to long-term negative consequences in business (Fisher & White, 2000; Littler & Innes, 2003). The company will be in deficit with specific knowledge, not only because some employees left the company, but also because of the so-called "survivor syndrome," which refers to a state of stress, anxiety, and anger that prevents an employee from doing their job effectively (Sitlington, 2012).

Knowledge lost in the downsizing process must be compensated, which is why it is necessary to manage knowledge in order to avoid negative effects. Knowledge management strategies in the downsizing process are numerous and they can include activities such as preparing and planning changes in the company, documentation of policies and procedures, providing support to employees, improving and disseminating knowledge, codification and transformation of knowledge explicitly, providing training to employees and similar (Sitlington & Marshall, 2011; Cascio, 1993). The concept of knowledge management in the downsizing process gets a completely new role, with the basic goal of preserving existing knowledge in the company. This role implies the transition from the traditional to the knowledge-based approach, in which the criteria of downsizing that must be met are the determination of key competence, mapping, ie presentation of knowledge, identification of leaders, ie employees who have specific and unique knowledge and finally, the codification of knowledge and its personalization, ie transforming implicit knowledge into explicit (Babić et al., 2008). By preserving existing knowledge, the company will be able not only to improve its own performance, but also to preserve the existing network of formal and informal relations between employees which enable knowledge sharing, improvement of existing knowledge and development of new knowledge that will be of strategic importance in the company (Schmitt et al., 2011). Special attention must be paid to those who "survived" downsizing (Petković & Aleksić Mirić, 2009). In order to return their emotional state to normal, human resource managers must provide these employees with appropriate support in the form of communication, giving professional advice, information on working in a new position, etc. As downsizing involves elimination and integrating certain jobs and functions in the company, a particularly important strategy for knowledge management is to provide training and development to employees (Gandolfi, 2009). Those who remain in the company will often do new or additional jobs that require additional knowledge, which can be acquired through internal mobility, or job rotation at different functions and levels in the company, mentoring by managers at the same or different hierarchical levels, constantly giving feedback so that the em-

ployee knows what they need to learn, building team spirit, informal leadership and consulting (Feldman, 1996). In addition to preserving and improving existing knowledge, employee training also leads to easier acceptance of changes, advancement, delegation of authority that has a positive effect on job satisfaction and commitment to the company, and ultimately on performance (Gandolfi, 2009; Sitlington & Marshall, 2011).

2. MATERIALS AND METHODS

Research on the impact and importance of knowledge management during the implementation of the downsizing strategy was conducted using a questionnaire that consists of three parts. The first part of the questionnaire contained statements related to knowledge management (KM) and they were observed through three key knowledge management processes (Armistead, 1999): knowledge creation (example of items are "Stimulating formal and informal networking between employees and experts", "Exchanging information with professionals and experts", and "Exchanging the best practices"), knowledge transfer (example of items are "Formal mechanisms enabling exchange of the best practices" and "Using procedures to collect and distribute suggestions coming from the employees, customers/clients and business partners") and knowledge application (used items are "Applying suggestions given from the customers/clients for improving products/services", "Application of knowledge and experience in a work process" and "Using knowledge for practical purposes and problem solving"). To measure these variables, we used statements verified in the previous studies conducted by Darroch (2003), López et al. (2004), Lloria (2007), Huang & Li (2009), Wang & Ellinger (2011), Slavković & Babić (2013), and Anwar & Ghafoor (2017). The second part of the questionnaire included statements that measured organizational performance (OP), such as "Capability of reducing operative costs", "Productivity comparison with the competition", "Product/service quality in comparison with the competition", "Satisfaction of customers/clients in comparison with the competition", "Speed of solving new problems" and "Organizational reputation". The validity of these statements was previously confirmed through research conducted by Delaney & Huselid (1996), Lee et al. (2010), Goldoni & Oliveira (2010), Sheehan & Cooper (2011), Slavković & Babić (2013) and Shanker et al. (2017). The third part of the questionnaire contains categorical variables such as the size of the company measured by the number of employees, the type of industry in which the company operates and the change in the number of employees used as an independent variable in observing the downsinning strategy. Five-point Likert scale, from "Totaly disagree" to

"Totaly agree" was used to measure the state of variables in the first and second part of the questionnaire.

The process of conducting the research began with the formation of a sample through the definition of criteria for its constitution. Starting from the observed variables, such as knowledge management, organizational performance and reduction of the number of employees, it was concluded that they are part of the process of strategic human resource management. In practical terms, this gave indications that small firms and young organizations are not suitable to form a sample. The argument that they should be excluded from the sample was further confirmed by research conducted by Kotey & Slade (2005) which found that there is a significant difference in the level of formalities in human resource management practice between small and medium enterprises and large companies. Based on the above, it was arbitrarily decided that the sample consists of companies with more than 50 employees which were established more than 5 years ago. The reason for introducing the second constraint is related to two important arguments: first, the establishment of formalized processes and procedures for strategic human resource management and knowledge management requires some time, and second, greater certainty of organizational performance assessment if established companies instead of start-ups are observed. In addition to the above, an additional restriction was aimed at excluding public and state-owned companies from the sample. The reason for this limitation is reflected in several important facts: process efficiency or performance is usually not imperative in such companies, decisions in the field of human resource management are often based on political voluntarism, and the number of employees tends to be stable or increase, regardless of performance. Starting from the proportion for the sample size defined by Green (1991) for regression analysis models, it was determined that a minimum of 58 companies is needed for the validity of the research.

By using social networks, the authors contacted 110 representatives of companies operating in the Balkan region (Serbia, Bosnia and Herzegovina, Montenegro and Macedonia) and their representatives, who could give valid answers to the defined variables of the research, namely general managers, executive managers, human resource managers and project managers. After obtaining consents for participation in the research and positive verification that their companies meet the defined criteria for the formation of the sample, the process of distributing the questionnaire in electronic form began. After two weeks, an initial response rate of 37% and 41 valid questionnaires was obtained. To increase the response rate, the procedure suggested by Menon et al. (1999) was applied. An additional reminder was sent to complete the questionnaire and after three weeks, 75 valid

questionnaires were received, with an overall response rate of 68%. In that way, the condition on the required number of companies for the valid research was met.

3. RESULTS

After the research, the procedure of processing and analysis of the obtained data was initiated with the application of appropriate statistical methods. SPSS software package version 23.0 was used for data processing. Sample statistics show that companies with 50-249 employees make up 37.3% of the sample, while companies with more than 250 employees make up the largest part of the sample, or 62.7 percent. The results of the summary report presented in Table 1 show that there are more companies that generate revenue through the service industry than in the production industry, 52.0% and 48% respectively.

Table 1. Characteristics of the companies in the sample: summary report

		Frequency	Proportion (%)
1.	Number of employees		
	50 - 249 employees	28	37.3
	More than 250 employees	47	62.7
	Sum	75	100
2.	Type of industry		
	Production	36	48.0
	Service	39	52.0
	Sum	75	100
3.	Workforce number changes		
	Increased	23	30.7
	No change	25	33.3
	Reduced by up to 10%	12	16.0
	Reduced by more than 10%	15	20.0
	Sum	75	100

Source: Author's survey data

The last categorical variable in Table 1 shows the movement of the number of employees in the observed companies in the previous year. This variable was used to identify the application of the downsizing strategy. The companies in which the reduction of the number of employees was identified cumulatively make up 36% of the sample and represent the companies in which some of the types of downsizing strategy have been applied. A higher percentage of workforce reductions indicates greater organizational adjustment to the new circumstances caused by the Covid-19 pandemic and potentially greater challenges in

knowledge management and sustaining existing performance. Companies with no change in the number of employees make up 33.3% of the sample, while 30.7% of the sample is comprised of companies with an increased number of employees.

The first step in the analysis of the observed variables was the analysis of Cronbach's alpha coefficient. The obtained results showed that the value of Cronbach's alpha coefficient satisfies the necessary criteria for both observed variables measured with the Likert scale: knowledge management and organizational performance, which were 0.92 and 0.88, respectively.

The degrees of linear dependence between key variables were identified using correlation analysis, the results of which are shown in Table 2. The table itself clearly shows that knowledge management (KM) is positively correlated with organizational performance (OP) and Paerson's correlation coefficient of 0.777 shows a strong and statistically significant relationship between these two variables. The obtained result suggests that the improvement of the knowledge management process (knowledge creation, knowledge transfer and knowledge application) is positively correlated with organizational performance, ie the strengthening of knowledge management initiatives can be positively related to the business success of companies.

Table 2. Intercorrelations between Study Variables

Variable		1	2	3	4
1	KM	–			
2	OP	0.777**	–		
3	No. of employees	0.042	-0.081	–	
4	Workforce reduction	-0.296**	-0.385**	0.061	–

Source: Author's calculation, *p < .05. **p < .01

The total number of employees, as a control variable in the correlation analysis, was not statistically and significantly correlated with any other variable in the model, which confirmed the homogeneity of the sample. In this way, the correctness of the application of the restriction that the sample consists only of companies with more than 50 employees was confirmed, which at the same time eliminates the influence of the number of employees, as a category variable, on other results of statistical analysis.

The reduction in the number of employees, as a variable representing the downsizing strategy, shows a strong negative correlation with knowledge management and organizational performance. The correlation coefficients of -0.296

and -0.385 are statistically significant and indicate the need for a more detailed analysis of the relationships between these variables. For that reason, the procedure of hierarchical multiple regression analysis was applied, which is shown in Table 3.

Table 3. Hierarchical Multiple Regression Analysis Summary of Organizational Performance

Variable entered		R^2	R^2 change	F	β	t	Tolerance	VIF
Block 1:	Workforce reduction	0.148		13.197**	-0.385	-3.633**	1.000	1.000
Block 2:	Workforce reduction	0.630	0.482	63.931**	-0.169	-2.305*	0.912	1.096
	KM				0.727	9.892**	0.912	1.096

Source: Author's calculation, *p < .05. **p < .01

Block 1 shows the impact of workforce reduction on organizational performance. The coefficient R^2 explains 14.8% of the variance in the stated ratio. In Block 2, knowledge management (KM) was included as a variable and the R^2 coefficient increased to 63.0%, which explains the increase in the variance of the introduced variable of 48.2%. The whole observed model, which consists of the following variables: downsizing strategy, KM (knowledge management) and organizational performance (OP), is statistically significant, which shows the value of F = 63.931, p = 0.000, which also shows that the research model is relevant for explaining variance in organizational performance change. The standardized coefficient β in Block 1 shows a value of -0.385 which reveals the negative and high impact of workforce reduction on organizational performance. In Block 2, the coefficient β for the workforce reduction variable also shows a negative impact, but the value is significantly lower amounting to -0.169. On the other hand, in Block 2 the variable knowledge management is 0.727 and shows a very significant impact on organizational performance. At the same time, comparing the value of the coefficient β for the variable workforce reduction in Model 1 and Model 2, it can be concluded that in both models it retains a negative value, but in Model 2 the value of this coefficient decreases under the influence of variable KM (knowledge management). The multicollinearity test, which can be evaluated on the basis of VIF indicators, is important in the evaluation of the overall model. In relation to the allowed value, the VIF coefficient is 1.096 and significantly below the maximum allowed value, which is why it can be stated that there is no problem with multicollinearity in the model, ie that the influence of variables in the model is independent.

4. DISCUSSIONS

Important finding in this study was that downsizing strategy or reducing the number of employees significantly affects organizational performance. First, the results of the correlation analysis showed an indication that downsizing or workforce reduction is negatively correlated with organizational performance (OP) and knowledge management (KM), with the value of the Paerson's coefficient being rated high and the relationship between variables being described as strong. In practical terms, these results show that the reduction in the number of employees is negatively related to organizational performance and knowledge management processes in companies. Reducing the number of employees will lead to a decrease in organizational performance and weakening of processes related to the knowledge management program: knowledge creation will slow down, knowledge transfer between employees will decrease, and the application of required knowledge in operational processes will be lower than required. Correlation analysis showed a strong positive relationship between knowledge management (KM) and organizational performance (OP), and this relationship can be assessed as extremely strong. In this way, it was found that strengthening the knowledge management initiative has a positive impact on organizational performance. The results of the correlation analysis indicated a linear relationship between downsizing (workforce reduction), knowledge management (KM) and organizational performance (OP), but did not establish a causal relationship between these variables.

Identifying the essence of the relationship between the observed variables and guidelines for practical implications in the implementation of downsizing was obtained through hierarchical multiple regression analysis. Two models were used in this analysis, in which OP was the dependent variable. Model 1 showed that downsizing has a statistically significant impact on organizational performance, but that the impact is negative. This confirmed the indications obtained in the correlation analysis. In Model 2, knowledge management (KM) was introduced as an independent variable and the obtained results gave two significant results: first, knowledge management has a positive and statistically significant impact on organizational performance, and second, the negative downsizing effect is reduced. Such results of regression analysis have significant practical implications for the implementation of the downsizing strategy. First, knowledge management significantly contributes to organizational performance during downsizing. Second, the negative impact of workforce reductions on organizational performance can be significantly offset by strengthening the knowledge management process and preparing employees for this process, which is in line with the results of research conducted by Sitlington & Marshall (2011).

The above indicates the strategic importance and implications of the downsizing strategy, which is why it is necessary for the reduction of the number of employees in the organization to be a planned decision and a determined process, as suggested by Band & Tustin (1995). The implementation of downsizing, as a corporate strategy, requires a planned approach that respects knowledge as a key resource for sustainable competitive advantage (Babić et al., 2008; Schmitt et al., 2012). In human resource management practice, downsizing should result in enhanced knowledge management initiatives that will prevent negative effects. These measures should target employees as key constituents in the knowledge management process, and some of them include the following actions: mapping and retaining employees whose knowledge is crucial in the organization, encouraging and motivating talents to stay in the company, encouraging knowledge exchange between employees, mapping the existing knowledge among employees, application of knowledge to improve processes in the company and other.

5. CONCLUSIONS

Downsizing is not an unknown strategy in management practice and, as a rule, gains momentum in times of crisis. The Covid-19 pandemic caused significant negative consequences for the economy and actualized workforce reduction as a realistic strategic option in the intention of management to adapt to current challenges. Numerous previous papers and this research too have shown that knowledge management has a positive impact on organizational performance, as well as a positive contribution to organizational performance during the implementation of downsizing or during a significant reduction in the number of employees in the company. Downsizing, as a planned decision, should respect the knowledge resources or employees as key knowledge carriers in the company, in order to prevent knowledge erosion and thus jeopardize the competitive advantage in the long run. This is especially important if one considers the causal relationship between performance before and after downsizing (Cascio et al., 2021).

Despite the fact that downsizing is most relevant and important in times of crisis, it can be expected that this strategy will be relevant in the coming period, primarily thanks to the digitalization process. By digitizing business processes and through the investment in ICT and the replacement of human labor with machines many companies create the opportunity to reduce the number of employees. The process of company restructuring stimulated by digital transformation in the context of downsizing has the same strategic determinants as the restructuring of companies during the crisis, both in terms of knowledge management and in the approach to human resource management.

Based on the above, the practical implications of this work may be significant for management practice even after the normalization of circumstances caused by the Covid-19 pandemic. At the same time, it gives authors the opportunity to design future research in which the relationship between downsizing and organizational performance can be viewed in the context of business digitalization or digital transformation of companies. In addition to digital transformation, future research will focus on identifying other contextual variables that may reduce negative effects during workforce reduction.

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Conflict of interests

The authors declare there is no conflict of interest.

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УПРАВЉАЊЕ ЗНАЊЕМ И СМАЊЕЊЕ БРОЈА ЗАПОСЛЕНИХ: УТИЦАЈ НА ОРГАНИЗАЦИОНЕ ПЕРФОРМАНСЕ

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САЖЕТАК

У суочавању са различитим изазовима који долазе из глобалног окружења, бројне компаније покрећу програме реструктуирања са циљем очувања или унапређења конкурентске позиције. Стратегија смањивања броја запослених, као корпоративна стратегија реструктуирања, циља на значајно смањење броја запослених како би се кроз снижавање расхода за зараде смањили укупни трошкови и ускладили са текућим приходима. Стављајући у фокус само финансијске аспекте примјене ове стратегије, менаџери компанија који су се опредијелиле за програм редукције броја запослених, занемарују остале ефекте примјене ове стратегије која у фокус ставља запослене и њихово знање. Губитак вриједног и суштински важног организационог знања, који је посљедица одласка талената и кључних запослених из компаније, може да угрози организационе перформансе и конкурентску спо-

собност компанија. Пандемија проузрокована ковидом19 изазвала је бројне економске проблеме и актуелизовала атрактивност примјене стратегије смањивања броја запослених. Истраживање, чији су резултати приказани у овом раду, имало је за циљ да утврди утицај редукције броја запослених на управљање знањем и организационе перформансе. Подаци који су коришћени у анализу прикупљени су путем упитника који су попуњавали менаџери компанија које имају више од 50 запослених. За успостављање односа између варијабли и доношење закључака о међусобном утицају коришћена је корелациона анализа и вишеструка хијерархијска регресија. Резултати су показали да је редукција броја запослених негативно корелирана са организационим перформансама и управљањем знањем и да је тај однос статистички значајан. Модел вишеструке регресионе анализе је показао да редукција броја запослених има статистички значајан и негативан утицај на управљање знањем и организационе перформансе, али да управљање знањем има позитиван статистички значајан на организационе перформансе и да он током имплементације стратегије смањивања броја запослених смањује негативан утицај редукције броја запослених на организационе перформансе. Ово истовремено представља кључни научни допринос рада и даје смјернице за практичне импликације које указују на потребу управљања ресурсима знања, односно запосленима као кључним носиоцима знања организације током редукције радне снаге.

Кључне речи: *управљање знањем, стратегија смањивања броја запослених, организационе перформансе, економска криза, редукција радне снаге, пандемија ковида19*.

POSSIBILITIES OF DEVELOPING A SERVQUAL MODEL FOR MEASURING USER SATISFACTION

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ABSTRACT

This paper will explore the possibility of adapting the original SERVQUAL model for measuring customer satisfaction. The possibility of developing this model is given through its adaptation in practice. When it comes to services, customization of the original model is necessary due to their intangible nature. In the empirical part, the analysis of the level of user satisfaction with innovative electronic products and services of banks will be conducted through five dimensions of the adapted SERVQUAL model: efficiency, reliability, responsibility, trustworthiness and kindness, where the differences between the characteristics of an excellent bank and the consumer's perception of the performed services of the bank were examined. The collected data were statistically processed in the IBM SPSS program and included in the regression analysis, correlation matrix formation, as well as the analysis of importance – performance. The results of this research can provide additional useful information to decision makers to identify which dimensions of satisfaction with the service cause a sense of happiness in a customer, and which dimensions offer room for improvement of the service levels, in order to achieve the goal – a happy and satisfied customer.

1. INTRODUCTION

Companies operating on the market are facing increased and sophisticated competition. In order to survive in a highly competitive services market, they realized that by using new technologies and innovative products/services, they can influence the level of consumer satisfaction, and meet their requirements that change very quickly. Consumer satisfaction and loyalty are a constant challenge and the ultimate goal of every company. Innovative products/services can differentiate

companies from the competition and enable them to gain a competitive advantage on the market. In order to know which direction to move, it is necessary to constantly measure the level of satisfaction of service users. This paper will seek to explore the effects and impact of innovative services on the perception and experience of bank service users in relation to five dimensions: efficiency, reliability, responsibility, trustworthiness and kindness, using the SERVQUAL model. In this way, the difference between expected and experienced experience of the using innovative products/services of the bank will be explored, the dimension that has the largest and the smallest impact on satisfaction will be determined, and based on this information it will be possible to give guidelines and recommendations to banks. This paper will try to prove that the development of models for measuring customer satisfaction can measure changes in customer satisfaction.

1.1. Customer satisfaction

Consumers are individuals or companies that buy and use products or services. The buyer of a product does not have to be a consumer. "A consumer is a person who consumes products and services to satisfy his needs and desires. The consumer is at the end of the product production chain, which is why the term end or an end consumer is often used." (Macura, 2009, p. 74). In order for a product or service to cause consumer satisfaction, it must make or do enough for the consumer, i.e. satisfaction is the consumer's assessment of the degree to which a product or service meets his expectations. "Satisfaction is the consumer's response to fulfillment. It is the assessment that the characteristics of a product or service, or the product or service itself, have provided (or provide) a comfortable level of consumption-related fulfillment, including levels of under- or over-fulfillment." (Oliver, 2015, p. 8). In order for a consumer to buy a product or service, in addition to meeting the needs, it is necessary to make the cost of obtaining the product or service lower than the benefits obtained. "Empirical research has shown that consumer satisfaction is a function of expectations associated with certain important attributes and performance evaluations of attributes" (Martilla & James, 1977, p. 77). In order for a company to meet the needs, desires and expectations of consumers, it is necessary to understand consumer: The American Marketing Association (AMA) says that consumer behavior is: "the dynamic interaction of affect, cognition, behavior, and environmental situations by which human beings manage aspects of exchange in their lives." (Peter & Olson, 2010, p. 5). "When choosing and buying a product or service, the individual does not act completely rationally, but also emotionally, and depending on the situation in the environment, there is a combination of these actions that

cause the purchase. Depending on the situation in this combination, sometimes rational action can prevail, sometimes emotional, and sometimes there can be an even influence of these actions" (Macura, 2009, p. 73). By using products and services, the consumer creates certain personal stances about the product or service. If a product or service causes a feeling of satisfaction in the customer every time, then that long-term relationship can grow into consumer loyalty. The road to a loyal consumer is long, so companies make additional efforts to get a loyal consumer with every transaction and interaction with the consumer.

1.2. Measuring customer satisfaction

SERVQUAL (SERVice QUALity) is a model for measuring the amount of customer satisfaction, so it can be used as a model for measuring the perception of service quality. We use the Likert scale (Rensis Likert) to assess the expectations and perceptions of service users. The Likert scale in a certain range gives the possibility to the service user - the respondent, to express his agreement or disagreement with the statement given, to express his position and perception or opinion on the given statement. The questions to which the respondents give answers are most often divided into two groups, so different Likert scales are used to express the respondents' views. In the first group of questions, where the given statements about the "excellent" service provider are evaluated, the respondents can evaluate the attitudes numerically from 1 to 5, i.e. respondents give answers in the range where the lowest score of 1 is less important and the highest score of 5 is very important. In the second group of questions, where the Likert scale is also used, respondents evaluate attitudes related to the perceived situation about the service provider and they can evaluate attitudes numerically from 1 to 5, where the lowest score is 1 – "I do not agree at all", and the highest grade is grade 5 – "I totally agree". In this way, the gaps that arise between the expectations and the perception of the respondents are identified. Authors Parasuraman, Cajtaml and Berry developed the SERVQUAL (Parasuraman, Zeithaml & Berry, 1985, pp. 41-50) model for service quality analysis. The last developed model contained five dimensions (Parasuraman, Zeithaml & Berry, 1988, p. 46): tangibility, reliability, responsibility, trustworthiness, and kindness. However, given the intangible and abstract nature of some (innovative) services, it is possible to adjust the original model by replacing the first dimension (tangibility) from the original model with the efficiency dimension, so in this paper the SERVQUAL model for measuring service quality examined the following dimensions:

- Efficiency - means the convenience and speed of using innovative services of service providers, the appearance of the web presentation, the appearance of the application, etc.

- Reliability - this dimension shows that the service provider tends to deliver on the promises made.
- Responsibility (affability) - is the will of employees to inform the service user when exactly things will be done, give them attention, promote services and respond in accordance with customer requirements.
- Trustworthiness (security) - is the security and knowledge of employees. Parasuraman says trustworthiness indicates employees' attitudes, behaviour, and ability to provide friendly, confidential, and competent services.
- Kindness (empathy) - means caring, paying attention and providing services to the user. The basis of kindness is that the user feels special and unique.

2. EMPIRICAL ANALYSIS (Banking services)

2.1. Research methodology

Primary data were collected using the questionnaire method. The sample is a structured quota. The questionnaire contains 22 questions that are divided into five dimensions: efficiency, reliability, responsibility, trustworthiness and kindness.

Cronbach's alpha model was used to test the reliability of the measuring instrument, as well as correlation and regression analysis to determine the degree and direction of correlation between model variables. To demonstrate the importance of each relevant attribute, Importance-Performance Analysis was used. This method of sampling was chosen because a structured quota sample involves selecting people who are well informed about the topic or have experience, thus reducing costs and saving time.

The questionnaire consists of three parts. In the first part, the identification of the respondents is offered as an option, with the name of the evaluated bank being obligatory. In the second part of the questionnaire, the respondents assess the importance of the excellent bank's indicators and give assessments of the perception of satisfaction with the electronic products and services of the bank they assess. The Likert scale, which has values from 1 to 5, was used to evaluate indicators (claims) of importance and perception.

The questionnaire contains questions on the performance of components of banking products and services in five dimensions: efficiency - four indicators (claims) from 1 to 4, reliability - five indicators, from 5 to 9, responsibility (af-

fability) - four indicators, from 10 to 13, trustworthiness (security) - four indicators, from 14 to 17, and kindness (empathy) - five indicators, from 18 to 22. In the third part of the questionnaire, several standard questions were asked in order to determine the structure of the respondents to this research.

2.2. Theoretical and conceptual bases of used analysis methods

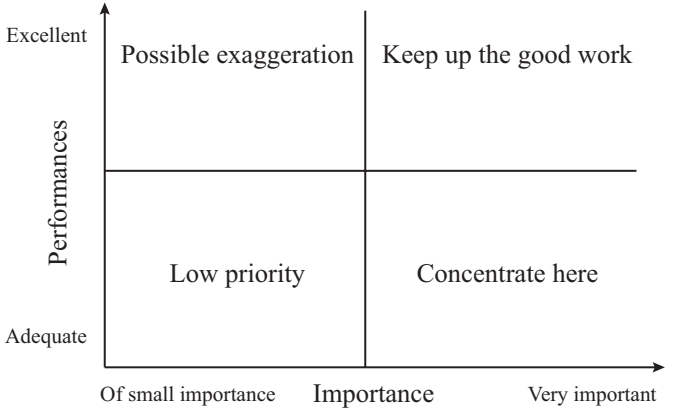
Several statistical methods were used to analyze the collected primary data using IBM SPSS Statistics.

Cronbach's alpha reliability coefficient

The analysis of the reliability measure of the measuring scale was performed using Cronbach's alpha reliability coefficient. Cronbach's alpha reliability coefficient was used to measure the internal consistency, i.e. reliability of the model, of both individual indicators and the overall sample. The Cronbach's alpha parameter can have values "grater than or equal to" $\alpha \geq 0.9$, where consistency is excellent, and $0.5 > \alpha$, where consistency is unacceptable.

Importance / performance analysis

The importance / performance analysis was used in the analysis of the collected data in order to examine which of the five basic characteristics (dimensions) most affect the satisfaction of users of electronic products and services of banks. The graph is obtained by first ranking the performance (performance) and the importance of the characteristics, and thus generating a two-dimensional matrix which is then divided into four quadrants.



Picture 1. Importance/performance analysis map

Source: Hemmasi, Strong & Taylor, 1994, p. 28

The meanings of these quadrants are (Ortinau et al., 1989, p. 80): Concentrate here - users think that a specific attribute is very important, but indicate that they are not satisfied with the performance of that attribute, keep up the good work- users think that specific attribute is very important and they are satisfied with the performance of that attribute, low priority - users think that specific attribute is not important and are not satisfied with performance of that attribute, possible exaggeration - users think that specific attribute is not important but satisfied with performance of that attribute.

Regression and correlation analysis

The correlation matrix provides insight into the linear relationship of variables. It contains the coefficients of linear correlation between all variables that are part of the model. Columns and rows are variables in the model, and the point of intersection of the row and column represents the correlation coefficient of the observed variables. The correlation matrix is symmetric. Observed along the diagonal of the correlation matrix, all the coefficients on it are one. This means that each variable is in a perfect direct linear relationship with itself. Multiple linear regression will be used for the analysis, because we have several independent variables (predictors) that determine the value of the dependent (outcome) variable, the regression function is linear by coefficient β, and regression will give good results predicting the value of the dependent variable based on independent variables. The general equation of the multiple linear regression model is (Žižić, Lovrić & Pavličić, 2000, p. 317):

$$Y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \cdots + \beta_k x_{ki} + \varepsilon_i$$

Where: Y_i-th is dependent variable, x_{1i}, x_{2i},…, x_{ki} -th are values of independent variables, β_0, β_1, β_2,..., $\beta_к$ are model parameters, i.e. regression parameters - unknown constants, ε_i is a stochastic term, that is, a random error - a random component of the model, k is the number of independent variables. When calculating multiple regression analysis, the Backward Elimination method in the IBM SPSS Statistics program will be used. In this method, all independent variables are first put into the model (regression equation), and then those variables that do not meet the given conditions are successively removed from the model. At each subsequent step, the variables that are most likely to have occurred by chance are removed from the model. The value p (Pearson's p) is taken as the ejection criterion. The higher the value of the parameter p, the more likely it is that the results were random. The smaller the value (closer to zero) p, the more significant and relevant obtained results are. Darbin-Watson (Durbin & Watson, 1951,

pp. 159-178) statistics reveal whether there is an autocorrelation in the residuals (prediction errors) from the regression analysis. The values of this parameter are always between 0 and 4. Interpretation of Darbin-Watson (d) statistics results are: d = 0 - perfect positive autocorrelation, 0<d<2- positive autocorrelation, d = 2 - no autocorrelation in the observed sample, 2<d<4 - negative autocorrelation, d = 4 - perfect negative autocorrelation.

3. ANALYSIS RESULTS - SAMPLE STRUCTURE ANALYSIS

Primary data were collected by filling out survey questionnaires, and a quota sample was chosen as a research sample, with the control variable being bank.

Combined electronically and by sharing the printed version of the questionnaire, a total of 258 completed questionnaires were collected. Out of the total number of questionnaires, 187 collected questionnaires are acceptable for this analysis. These 187 questionnaires contain questions answered by respondents from three banks (banks A, B and C). Other rejected questionnaires were either incomplete or related to banks that were not evaluated in this paper due to the insufficient number of collected questionnaires for those banks.

The structure of the research sample is shown in the following tables:

Table 1. Sample frequency according to the rated banks

Bank	Sample frequency	Percentage of bank participation in the total sample frequency	Cumulative percentage
A	72	38.50%	38.50%
B	64	34.22%	72.73%
C	51	27.27%	100.00%
In total	187	100.00%	-

Source: Authors' calculation

Table 2. Sample structure according to the gender of respondents

Gender	Frequency	Percentage	Cumulative percentage
Male	111	59.36%	59.36%
Female	76	40.64%	100.00%
In total	187	100.00%	

Source: Authors' calculation

Table 3. Sample structure according to the age of the respondents

Age	Frequency	Percentage	Cumulative percentage
15 – 24	5	2.67%	2.67%
25 – 34	56	29.95%	32.62%
35 – 44	80	42.78%	75.40%
45 – 54	18	9.63%	85.03%
55 – 64	19	10.16%	95.19%
65 +	9	4.81%	100.00%
In total	187	100.00%	

Source: Authors' calculation

Table 4. Sample structure according to the educational background of the respondents

Educational background	Frequency	Percentage	Cumulative percentage
Primary school	1	0.53%	0.53%
High school	51	27.27%	27.81%
Higher Education School	12	6.42%	34.22%
College	88	47.06%	81.28%
Master degree	19	10.16%	91.44%
Magister degree	12	6.42%	97.86%
Doctor	4	2.14%	100.00%
In total	187	100.00%	

Source: Authors' calculation

Table 5. Sample structure according to the monthly net income of the respondents

Monthly net income	Frequency	Percentage	Cumulative percentage
Up to 500BAM	19	10.16%	10.16%
501KM – 1000BAM	68	36.36%	46.52%
1001KM – 2000BAM	81	43.32%	89.84%
More than 2000BAM	19	10.16%	100.00%
In total	187	100.00%	

Source: Authors' calculation

Table 6. Sample structure according to the frequency of the use of electronic products and services by respondents (monthly)

Frequency of use of electronic products and services (monthly)	Frequency	Percentage	Cumulative percentage
1 – 3 times	75	40.11%	40.11%
4 – 6 times	53	28.34%	68.45%
7 – 10 times	29	15.51%	83.96%
11 and more times	30	16.04%	100.00%
In total	187	100.00%	

Source: Authors' calculation

Table 7. Sample structure according to the time of the use of electronic products and services by respondents (years)

Time period of using electronic products and services of banks	Frequency	Percentage	Cumulative percentage
Less than a year	33	17.65%	17.65%
1 – 5 years	94	50.27%	67.91%
5 and more years	60	32.09%	100.00%
In total	187	100.00%	

Source: Authors' calculation

Table 8. Sample structure according to the number of banks whose electronic products and services are used by respondents

Number of banks whose electronic products and services are used	Frequency	Percentage	Cumulative percentage
1	132	70.59%	70.59%
2	44	23.53%	94.12%
3	10	5.35%	99.47%
4 and more	1	0.53%	100.00%
In total	187	100.00%	

Source: Authors' calculation

Table 9. Sample structure according to the frequency of the use of electronic products and services in relation to the total number of respondents

Electronic products and services used by respondents	Frequency	Percentage of frequency in relation to the total number of respondents (187)
E-Mail	91	48.66%
ATM	179	95.72%
Payment terminal	70	37.43%
Debit/credit cards	142	75.94%
on-line bank services	70	37.43%
Electronic payment	127	67.91%
Electronic means of transfer of funds (EFT/NEFT/RTGS)	37	19.79%

Source: Authors' calculation

3.1. Servqual analysis of customer satisfaction with banking products and services

We will first examine the consistency of the results obtained by using the Cronbach's alpha coefficient.

Table 10. Reliability of perception of the total test sample

Cronbach's alpha	Cronbach's alpha based on standardized indicators	Number of indicators
0.955	0.955	22

Source: Authors' calculation

Based on the results obtained from the analysis of the survey questionnaires, it was concluded that the value of Cronbach's alpha for the reliability of perception of the total test sample was 0.955. Given that Cronbach's alpha acceptability scale says that for all α values greater than 0.9 the internal consistency is excellent, we can conclude that for the reliability of perception of the total test sample there is an excellent consistency of indicators within the dimensions.

Table 11. Overall statistics of perception indicators

	Arithmetic mean	Minimum	Maximum	Rank	Maximum/ Minimum	Variance	Number of items
Arithmetic mean of the indicators	4.080	3.807	4.422	0.615	1.162	0.037	22
Variance of indicators	0.833	0.605	1.102	0.497	1.821	0.017	22

Source: Authors' calculation

Table 11 gives the overall statistics of perception indicators. It can be seen from the given table that the arithmetic mean of the perception indicator is 4.080, while the variance of the arithmetic mean of the perception indicator is 0.833.

Table 12. Reliability of expectations of the total test sample

Cronbach's alpha	Cronbach's alpha based on standardized indicators	Number of indicators
0.937	0.942	22

Source: Authors' calculation

For the reliability of the expectations of the total test sample, the value of Cronbach's alpha is 0.942. Based on the acceptability scale of the Cronbach's alpha coefficient, we can conclude that there is an excellent consistency of indicators within the expectation dimensions.

Table 13. Overall statistics of expectation indicators

	Arithmetic mean	Minimum	Maximum	Rank	Maximum/ Minimum	Variance	Number of items
Arithmetic mean of the indicators	4.471	3.952	4.754	0.802	1.203	0.034	22
Variance of indicators	0.606	0.318	1.336	1.018	4.200	0.042	22

Source: Authors' calculation

Table 13 gives the overall statistics of the expectation indicators. It can be seen from the given table that the arithmetic mean of the perception indicator is 4.471, while the variance of the arithmetic mean of the expectation indicator is 0.606.

Table 14. Cronbach's alpha reliability coefficients of indicators – SERVQUAL

	Cronbach's alpha indicator of perception	Cronbach's alpha indicator of expectations
By using my bank's electronic products and services, I save time and reduce costs.	0.955	0.936
Making transactions using my bank's electronic products and services is fast.	0.952	0.935
I find my bank's electronic products and services easy to use.	0.952	0.935
The use of my bank's electronic products and services is available in multiple languages.	0.956	0.943
I have high confidence in the reliability of my bank's electronic products and services.	0.953	0.933
My bank's electronic products and services channels are available 24 hours a day.	0.955	0.936
My bank's electronic products and services are executed correctly on the first try.	0.953	0.934
The content on my bank's website is accurate, reliable and regularly updated.	0.953	0.933
All links on my bank's website are correct and the pages load quickly.	0.953	0.933
My bank's electronic products and services immediately respond to my requests.	0.952	0.933
Help is immediately available if there are problems with the use of electronic products and services of my bank.	0.952	0.932
The interaction with the services of electronic products and services of my bank is clear and understandable.	0.952	0.934
My bank's electronic products and services provide instant answers to my questions.	0.952	0.933
My bank's electronic products and services provide a high degree of protection for my data and the details of my transaction.	0.952	0.934
My bank's electronic products and services are secure and protected from fraud and hackers.	0.953	0.934
My bank's electronic products and services do not allow anyone but me to access my account.	0.953	0.934
My bank's electronic products and services do not share my confidential personal information with third parties.	0.954	0.935
My bank provides me with individual attention when using electronic products and services.	0.953	0.935
My bank notifies me of all important changes and information	0.952	0.935
I am satisfied with the level of assistance provided by the help desk and call centre of my bank.	0.954	0.933
My bank understands the specific needs I have when using electronic products and services.	0.952	0.935
My bank responds quickly and kindly to my complaints regarding the operation of electronic products and services.	0.953	0.933

Source: Authors' calculation

Based on the data from Table 14, it can be seen that Cronbach's alpha indicators of perception and Cronbach's alpha indicators of expectations are higher than 0.9 for all examined indicators, that is, for all twenty-two indicators from the questionnaire. Thus, we can conclude that there is an excellent consistency of the dimensions of SERVQUAL by indicators.

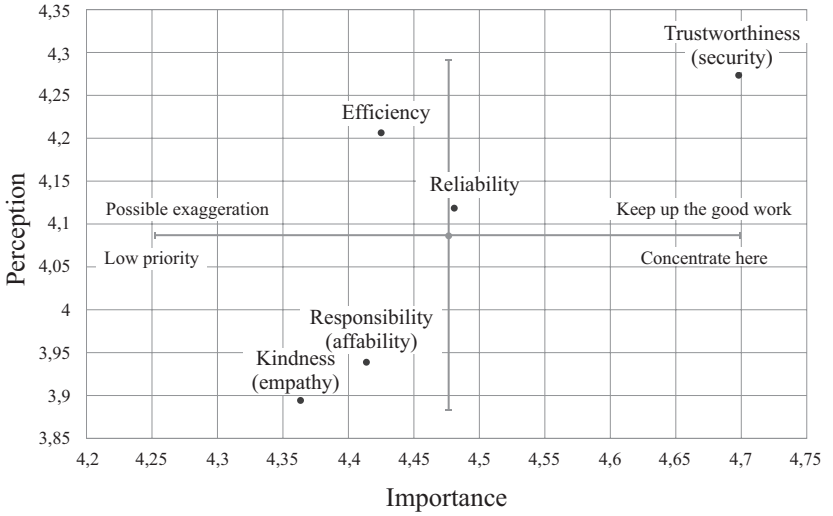
Table 15. SERVQUAL ratings by dimensions (value of Cronbach's alpha indicator)

Dimension	Perception	Expectation	Servqual assessment
Efficiency	0.707	0.716	-0.009
Reliability	0.714	0.673	0.041
Responsibility	0.705	0.689	0.016
Trustworthiness	0.780	0.817	-0.037
Kindness	0.712	0.713	-0.001

Source: Authors' calculation

Table 15 provides an overview of the reliability coefficients of perception and expectations for all five dimensions: efficiency, reliability, responsibility, trustworthiness, and kindness. For each dimension, a SERVQUAL score was calculated as the difference between perception and expectation coefficients. The SERVQUAL assessment is positive for the dimensions of reliability and responsibility, which shows that the respondents for these dimensions stated that the perception, i.e. performance according to these dimensions, exceeded their expectations. In this case, too, banks can invest in increasing customer satisfaction. However, according to current results, banks would have to engage much more resources than would benefit from that investment. For the other three dimensions - efficiency, trustworthiness and kindness, the SERVQUAL rating is negative, which means that in these dimensions there is room for improving the quality of the bank's electronic products and services. The largest negative SERVQUAL rating is for the trustworthiness dimension, and more bank resources should be devoted to it in order to reduce the difference between the perceived and expected rating of the respondents.

The following is an analysis of the importance - performance of the assessed dimensions.



Picture 2. Analysis of the importance - performance of the overall model

Source: Authors' calculation

According to the results of the importance-performance analysis of the overall model, none of the five studied dimensions is in the quadrant "concentrate here", so there is no dimension which banks should concentrate on. Banks should "continue doing a good job" with the dimensions of trustworthiness and reliability, and especially the dimension of trustworthiness, which showed the highest degree of importance and perception of respondents. For the efficiency dimension, the results of the analysis show that there is a "possible exaggeration" in the quadrant; namely, respondents have a high perception of efficiency, but it is not so important to them, therefore banks are potentially wasting resources on this dimension. For the dimensions of responsibility and kindness, the results of the survey place them in the "low priority" quadrant. For these two dimensions, the perception of performance is low, and the importance is low. Respondents believe that these two dimensions have a low degree of performance, although they believe that the importance of these dimensions is not high. Therefore, banks should make additional efforts to improve the performance of these dimensions.

The correlation matrix by dimensions is shown below.

Table 16. Correlation matrix of the overall satisfaction model by dimensions

Correlations						
Pearson Correlations	Efficiency	Reliability	Responsibility	Trustworthiness	Kindness	Satisfaction
K1: Efficiency	1	0.578**	0.498**	0.344**	0.427**	0.271**
K2: Reliability	0.578**	1	0.467**	0.394**	0.511**	0.257**
K3: Responsibility	0.498**	0.467**	1	0.362**	0.519**	0.280**
K4: Trustworthiness	0.344**	0.394**	0.362**	1	0.406**	0.270**
K5: Kindness	0.427**	0.511**	0.519**	0.406**	1	0.208**
S1: Satisfaction	0.271**	0.257**	0.280**	0.270**	0.208**	1

Note: ** The correlation is significant at 00.01 level (bilateral test).

Source: Authors' calculation

The correlation matrix of the dimensions of the overall satisfaction of the users of innovative banking products and services shows that all indicators of perception by dimensions are of positive value, i.e. they are positively correlated with customer satisfaction, and range in intensity from a weak to a high positive linear relationship. Observed at the data level within Table 16, the highest level of correlation in relation to overall satisfaction is shown by the dimension of responsibility, while the lowest level is shown by the dimension of kindness. The strongest correlation between the dimensions of the satisfaction components is between the dimensions efficiency and reliability and amounts to 0.578, while the weakest correlation between the dimensions efficiency and trustworthiness is 0.344.

In the continuation of this analysis, the regression model is presented, and the table below gives a summary of the regression of satisfaction with banking products and services.

Table 17. Summary of the regression model of satisfaction with banking products and services

Model summary[d]										
Model	R	R^2	Customized R^2	Standard estimation error	Statistics of change					Durbin-Watson
					R^2 change	F change	df1	df2	Sig. F change	
1	0.358[a]	0.128	0.104	19.589	0.128	5.307	5	181	0.000	
2	0.357[b]	0.128	0.109	19.537	0.000	0.022	1	181	0.881	
3	0.354[c]	0.125	0.111	19.514	-0.003	0.579	1	182	0.448	2.068

a. Predictors: (Constant), Kindness, Trustworthiness, Efficiency, Responsibility, Reliability

b. Predictors: (Constant), Trustworthiness, Efficiency, Responsibility, Reliability

c. Predictors: (Constant), Trustworthiness, Efficiency, Responsibility

d. Dependent variable: Satisfaction

Source: Authors' calculation

In the final, third model, the value of the Darbin-Watson test is 2.068. Relatively low rates of R^2 can be related to the specifics of the tested group.

Table 18. Summary of the significance of the regression model of satisfaction with banking products and services

ANOVA[a]						
Model		The sum of the squares	df	The arithmetic mean of squares	F	Sig.
1	Regression	10182.173	5	2036.435	5.307	0.000[b]
	Residual	69456.651	181	383.738		
	In total	79638.824	186			
2	Regression	10173.612	4	2543.403	6.664	0.000[c]
	Residual	69465.212	182	381.677		
	In total	79638.824	186			
3	Regression	9952.655	3	3317.552	8.712	0.000[d]
	Residual	69686.169	183	380.799		
	In total	79638.824	186			

a. Dependent variable: Satisfaction

b. Predictors: (Constant), Kindness, Trustworthiness, Efficiency, Responsibility, Reliability

c. Predictors: (Constant), Trustworthiness, Efficiency, Responsibility, Reliability

d. Predictors: (Constant), Trustworthiness, Efficiency, Responsibility

Source: Authors' calculation

F statistics in the ANOVA table test whether the regression model is good for the given values, i.e. whether the independent variables statistically predict the dependent variable. For the third final model F (3.183) = 8.712, $p < 0.05$, and the value of the parameter Sig. (Significance) = 0.000, we can say that the regression model is good.

Table 19. Initial model of regression of satisfaction with banking products and services

Coefficients[a]						
Model		Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
1	(Constant)	59.244	2.292		25.853	0.000
	C1: Efficiency	0.150	0.124	0.110	1.216	0.226
	C2: Reliability	0.174	0.225	0.072	0.772	0.441
	C3: Responsibility	0.248	0.155	0.142	1.604	0.111
	C4: Trustworthiness	0.178	0.089	0.158	2.001	0.047
	C5: Kindness	-0.027	0.181	-0.013	-0.149	0.881

a. Dependent variable: Satisfaction

Source: Authors' calculation

Table 19 shows the initial model of regression of satisfaction with banking products and services for all respondents. Given the very high value of the parameter p = 0.881 for the courtesy dimension, in the next step this variable will be omitted from the model.

Table 20. Regression model of satisfaction with banking products and services after excluding the kindness dimension

Coefficients[a]						
Model		Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
2	(Constant)	59.232	2.284		25.932	0.000
	C1: Efficiency	0.149	0.123	0.109	1.212	0.227
	C2: Reliability	0.165	0.217	0.068	0.761	0.448
	C3: Responsibility	0.241	0.147	0.138	1.640	0.103
	C4: Trustworthiness	0.175	0.087	0.156	2.015	0.045

a. Dependent variable: Satisfaction

Source: Authors' calculation

Table 20 shows the regression model of satisfaction with banking products and services for all respondents without the courtesy variable, since it was excluded from the regression model due to the high value of the parameter p. Now in this new model we still have a high value of the parameter p = 0.448 for the dimension reliability, and in the next step this variable will be omitted from the model.

Table 21. Final regression model of satisfaction with banking products and services after excluding the reliability dimension

Coefficients[a]						
Model		Non-standardized coefficients		Standardized coefficients	t.	Sig.
		B	Standard error	Beta		
3	(Constant)	59.358	2.275		26.086	0.000
	C1: Efficiency	0.189	0.112	0.138	1.690	0.093
	C2: Reliability	0.264	0.144	0.151	1.837	0.068
	C4: Trustworthiness	0.189	0.085	0.169	2.225	0.027

a. Dependent variable: Satisfaction

Source: Authors' calculation

After excluding the reliability dimension, the model remained with three independent variables: efficiency, accountability, and trustworthiness. For all three remaining variables, the value of the parameter p indicates that there is very little

possibility that these variables occurred as a result of chance, and this is now the final regression model.

Based on the results of the final regression model of satisfaction with banking products and services (Table 21), the following regression equation can be constructed:

Satisfaction = 59.358 + 0.189 * *Efficiency* + 0.264 * *Responsibility* + 0.189 * *Trustworthiness*

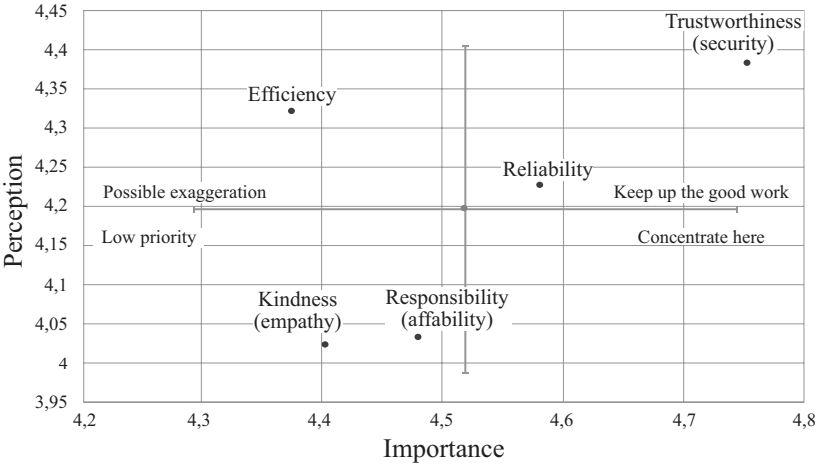
From the given equation, it is evident that according to this model, the greatest impact on consumer satisfaction has the dimension of responsibility with the value $b_{k3} = 0.264$, while the dimensions efficiency ($b_{k1} = 0.189$) and trustworthiness ($b_{k4} = 0.189$) have the same level of impact on consumer satisfaction.

The constant $b_0 = 59.358$ represents the magnitude of consumer satisfaction if the dimensions of efficiency, responsibility, and trustworthiness are zero. Although this statement sounds illogical, it needs to be viewed in terms of the overall relationships of all values in the model. The parameter $b_{k1} = 0.189$ (efficiency) shows the average change of the dependent variable (satisfaction) at the unit change of the independent variable efficiency, where the value of other independent variables does not change. In the present case for a unit increase in independent variable efficiency, consumer satisfaction will increase by 0.189. Observed by the same analogy, for the dimension of responsibility ($b_{k3} = 0.264$) and the unit increase of the independent variable responsibility, consumer satisfaction will increase by 0.264, without the other independent variables changing the value. The same is true for the confidence dimension ($b_{k4} = 0.189$) with a unit change of the independent confidence variable, where the consumer satisfaction will increase by 0.189.

The results of the analyses by banks A, B and C will be presented below. Since the explanations of the results are analogous to the overall model, we will omit them below.

SERVQUAL analysis of bank customer satisfaction A

The analysis for bank A will be presented below.



Picture 3. Analysis of importance - performance of bank A

Source: Authors' calculation

Table 22. Correlation matrix of dimension satisfaction model for bank A

Correlations						
Pearson Correlations	Efficiency	Reliability	Responsi-bility	Trustwor-thiness	Kindness	Satisfaction
C1:Efficiency	1	0.586**	0.683**	0.186	0.462**	0.441**
C2:Reliability	0.586**	1	0.358**	0.350**	0.441**	0.457**
C3:Responsibility	0.683**	0.358**	1	0.214	0.487**	0.426**
C4:Trustworthiness	0.186	0.350**	0.214	1	0.262*	0.411**
C5:Kindness	0.462**	0.441**	0.487**	0.262*	1	0.239
S1:Satisfaction	0.441**	0.457**	0.426**	0.411**	0.239	1

**. The correlation is significant at the 0.01 level (bilateral test).

*. The correlation is significant at the 0.05 level (bilateral test).

Source: Authors' calculation

Table 23. Final regression model of satisfaction with banking products and services of bank A after excluding the dimension of kindness

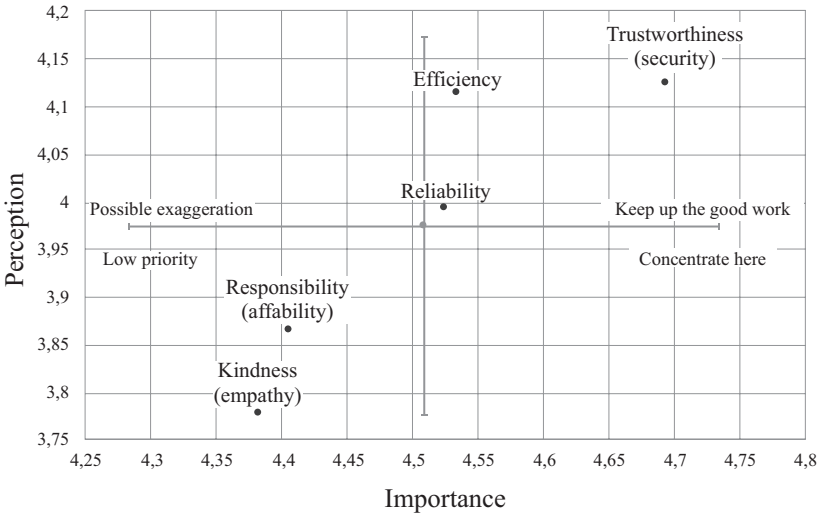
Coefficients[a]						
Model		Non-standardized coefficients		Standardized coefficients	t.	Sig.
		B	Standard error	Beta		
3	(Constant)	17.180	1.752		9.809	0.000
	C2: Reliability	1.173	0.514	0.268	2.284	0.026
	C3: Responsibility	0.650	0.266	0.275	2.442	0.018
	C4: Trustworthiness	0.360	0.156	0.259	2.308	0.024

a. Dependent variable: Satisfaction

Source: Authors' calculation

Based on the results of the final regression model of satisfaction with banking products and services (Table 23), the following regression equation can be constructed: *Satisfaction = 17,180 + 1,173 * Reliability + 0,650 * Responsibility + 0,360 * Trustworthiness*

SERVQUAL analysis of customer service satisfaction for bank B



Picture 4. Analysis of the importance - performance of the bank B

Source: Authors' calculation

Table 24. Correlation matrix of satisfaction model by dimensions for bank B

Correlations						
Pearson Correlations	Efficiency	Reliability	Responsi-bility	Trustwor-thiness	Kindness	Satisfaction
Efficiency	1	0.477**	0.492**	0.323**	0.289*	-0.101
Reliability	0.477**	1	0.587**	0.329**	0.360**	0.085
Responsibility	0.492**	0.587**	1	0.507**	0.492**	0.015
Trustworthiness	0.323**	0.329**	0.507**	1	0.518**	-0.071
Kindness	0.289*	0.360**	0.492**	0.518**	1	-0.266*
Satisfaction	-0.101	0.085	0.015	-0.071	-0.266*	1

**. The correlation is significant at the 0.01 level (bilateral test).

*. The correlation is significant at the 0.05 level (bilateral test).

Source: Authors' calculation

Table 25. Final regression model of satisfaction with banking products and services for bank B after excluding the dimension of efficiency

Coefficients[a]						
Model		Non-standardized coefficients		Standardized coefficients	t.	Sig.
		B	Standard error	Beta		
4	(Constant)	26.525	1.668		15.903	0.000
	C2:Reliability	0.649	0.380	0.208	1.709	0.092
	C5:Kindness	-0.907	0.324	-0.341	-2.799	0.007

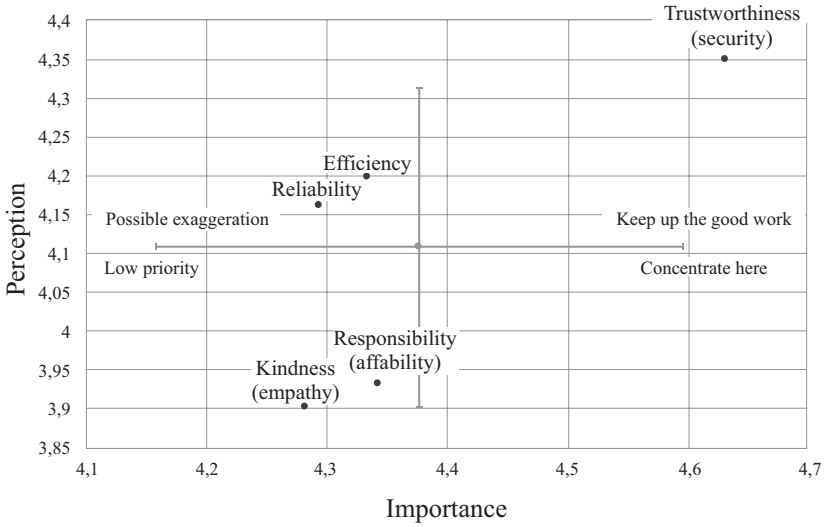
a. Dependent variable: Satisfaction

Source: Authors' calculation

Based on the results of the final regression model of satisfaction with banking products and services (Table 25), the following regression equation can be constructed:

$$Satisfaction = 26.525 + 0.649 * Reliability - 0.907 * \text{Kindness}$$

SERVQUAL analysis of customer service satisfaction for bank C



Picture 5. Analysis of the importance - performance of the bank C

Source: Authors' calculation

Table 26. Correlation matrix of satisfaction model by dimensions for bank C

Correlations						
Pearson Correlations	Efficiency	Reliability	Responsi-bility	Trustwor-thiness	Kindness	Satisfaction
Efficiency	1	0.598**	0.218	0.420**	0.365**	0.482**
Reliability	0.598**	1	0.328*	0.521**	0.556**	0.355*
Responsibility	0.218	0.328*	1	0.355*	0.473**	0.328*
Trustworthiness	0.420**	0.521**	0.355*	1	0.349*	0.411**
Kindness	0.365**	0.556**	0.473**	0.349*	1	0.301*
Satisfaction	0.482**	0.355*	0.328*	0.411**	0.301*	1

**. The correlation is significant at the 0.01 level (bilateral test).

*. The correlation is significant at the 0.05 level (bilateral test).

Source: Authors' calculation

Table 27. Final model of regression of satisfaction with banking products and services for bank C after excluding the dimension of liability

Coefficients[a]						
Model		Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
4	(Constant)	16.436	1.239		13.262	0.000
	C1:Efficiency	0.605	0.217	0.375	2.788	0.008
	C4:Trustworthiness	0.214	0.113	0.254	1.888	0.065

a. Dependent variable: Satisfaction

Source: Authors' calculation

Based on the results of the final regression model of satisfaction level with banking products and services (Table 27), the following regression equation can be constructed:

$$Satisfaction = 16.436 + 0.605 * Efficiency + 0.214 * Trustworthiness$$

4. CONCLUSIONS

Increasing competition between companies that provide services gives increasing importance to measuring the satisfaction of users of these services. In order to adequately examine the satisfaction of service users, the use of a custom SERVQUAL model is justified. Adaptation, and thus the development of the original SERVQUAL model is necessary, because the services are specific in relation to other objects of exchange. Namely, one of the important characteristics of services is immateriality.

In order to determine empirically the degree of customer satisfaction, this paper examines the level of customer satisfaction with innovative electronic products and services of banks. The results of the research using the SERVQUAL model, i.e. examining the service satisfaction in five dimensions - efficiency, reliability, responsibility, trustworthiness and kindness, clearly show that the chosen method is adequate for this purpose. The result of the research gave us a formula for the satisfaction of users of innovative services in banking, and it reads:

Satisfaction = 59.358 + 0.189 * *Efficiency* + 0.264 * *Responsibility* + 0.189 * *Trustworthiness*

Specifics of this type of service (innovative e-banking services) have conditioned the indication of the mentioned three factors (dimensions) in the regression analyses. The applied customized model of customer satisfaction survey can help decision makers in companies as an additional source of adequate and timely information in making decisions about creating a marketing mix that will be offered in a highly competitive services market.

It is desirable to explore possible application of this approach to other types of services in order to achieve results for comparison, which would provide additional possibilities for the application and development of this model.

Conflict of interests

The authors declare there is no conflict of interest.

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МОГУЋНОСТИ РАЗВОЈА МОДЕЛА ЗА МЈЕРЕЊЕ ЗАДОВОЉСТВА КОРИСНИКА УСЛУГА (SERVQUAL)

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САЖЕТАК

У овом раду истражиће се могућност прилагођавања оригиналног SERVQUAL модела за мјерење задовољства корисника услуга. Могућност развоја овог модела дата је кроз његово прилагођавање у практичној примјени. Када су у питању услуге, прилагођавање оригиналног модела је неопходно због његове нематеријалне природе. Емпиријски дио садржаће проведену емпиријску анализу нивоа задовољства корисника иновативних електронских производа и услуга банака кроз пет димензија прилагођеног SERVQUAL модела: ефикасност, поузданост, одговорност, повјерење и љубазност, гдје су испитане разлике између карактеристика изврсне банке

и перцепције потрошача о извршеним услугама банке коју су оцјењивали. Прикупљени подаци су статистички обрађени у IBM SPSS програму и укључивали су регресиону анализу, формирање корелационе матрице, те анализу важност - перформансе. Резултати овог истраживања могу дати додатне корисне информације доносиоцима одлука да идентификују које димензије задовољства услугама код потрошача изазивају осјећај среће и задовољства, а у којим димензијама постоји простор за побољшање нивоа услуга, како би се постигао циљ – срећан и задовољан корисник.

Кључне ријечи: *маркетинг, управљање, задовољство потрошача, регресиона и корелациона анализа, SERVQUAL.*

IMPACT OF CROP PRODUCTIVITY ON POVERTY AMONG FARM HOUSEHOLDS IN GHANA

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ABSTRACT

Ghana Poverty Reduction Strategy I & II sought to increase crop productivity to reduce high poverty incidence in farm sector, but the magnitude of impact of the productivity on poverty is not present in all agro-ecological zones in Ghana. The aim of the study is to estimate poverty headcount ratio, poverty gap and poverty severity, and link crop productivity to poverty according to agroecology subject to a two-step instrumental variable regression technique using Pseudo Panel data from the Ghana Living Standards Survey (GLSS rounds 5 & 6). Farmers' poverty headcount ratio, poverty gap, and poverty severity reduced from 57%, 25%, and 14% in 2005 to 37%, 14%, and 7% in 2013 respectively. The result further indicates that 1% growth in crop productivity reduces the probability of poverty headcount ratio, poverty gap and poverty severity by 0.28%, 0.38% and 0.75% respectively in all agro-ecological zones. Additionally, the paper shows that education, livestock and remittance income reduces poverty, while household size and great distance to access water increase poverty differently from agro-ecology. The study recommends rapid crop productivity growth by prioritizing technology adoption and institutional coordination to suit agro-ecological conditions among the poor, illiterate and non-partisan.

1. INTRODUCTION

Agricultural sector is the smallest among the sectors of the economy consisting of crops, cocoa, livestock, fishing, forestry and logging with a contribution to the economy of about 26%. It provided basic food, employment, and foreign exchange for economic growth and poverty reduction in Ghana between 2006 and 2017 (GSS, 2017). Ghana's agriculture is predominantly smallholder and rain-fed and about 60% of all farms in the country are less than 1.2 hectares in size and farming systems vary across agro-ecological zones of different cropping systems, the forest zone, where tree crops like cocoa, oil palm, coffee and rubber flourish. The food crops in this area include maize, plantain, cocoyam and cassava. Maize, millet, cowpeas, groundnuts, yam and rice are some of the main crops that are cultivated in the northern parts of Ghana of the savannah agro-ecological zone (ITA, 2020). Crop productivity is defined as the output per unit of input where maize, rice, cashew, and cocoa productivity are 1.92Mt/Ha, 2.75Mt/Ha, 0.50Mt/Ha, 0.50Mt/Ha against achievable yields of 5.5 Mt/Ha, 6Mt/Ha, 1.8Mt/Ha, 1Mt/Ha respectively (MoFA, 2015). In 2018, yields of targeted crops continued to record significant improvements over 2016 levels: maize yield increased by 89% from 1.8mt/ha to 3.4mt/ha; rice yield increased by 48% from 2.7mt/ha to 4.0mt/ha and soya yield increased by 200% from 1mt/ha to 3.0mt/ha (MTEF, 2020).

Over the years the government have rolled out programmes to boost productivity levels of agriculture to reduce poverty. These include Accelerated Agricultural Growth and Development Strategy (AAGDS), Food and Agriculture Sector Development Policy I & II (2002-2009), Medium-Term Agricultural Sector Investment Plan (2011-2015), etc. The poor who are employed in agriculture sub-sector need output growth by at least 6% to reduce poverty. Agricultural output has increased with improved weather variables, conventional inputs, rural infrastructure, institutional factors and poverty reduction policies (Thirtle et al., 2003). Barriers to the use of technology and market access should be overcome to improve productivity for poverty reduction (Schneider & Gugerty, 2011). In the 1990s projects which enhanced productivity growth were the Ghana Grains Development Project (GGDP) (Morris et al., 1998) and National Cocoa Diseases and Pest Control (CODAPEC) programme, to combat the Capsid/Mirid and the Black Pod disease on cocoa farms.

Poverty in economic terms is mainly defined as earning less than an estimated income to provide for basic needs such as food, clothing, and housing (GSS, 2018) and being deprived of education, health and living standards. Since 1990, income poverty has fallen in all regions of the world except SSA, where there

has been an increase both in the incidence and absolute number of people living in poverty of about 300 million people in SSA – almost half of the region's population – living on less than US$1 a day (Handley et al., 2009). In self-employed households in non-agricultural sub-sector the poverty rate decreased from 17% in 2005 to 8.9% in 2017. Crop farmers' poverty rate decreased from 45.1% in 2005 to 39.2% in 2013 but increased to 42.7% in 2017 in Ghana (GSS, 2014; GSS, 2018). With these reductions, Ghana surpassed the first Millennium Development Goal (MDG) of halving poverty by 2015 as opposed to crop farmers (GSS, 2014). Poverty reduction strategies include the Ghana Vision (2020), Ghana Poverty Reduction Strategy (2003-2005), the Growth and Poverty Reduction Strategy (2006-2009) and Ghana Shared Growth and Development Agenda (GSGDA 2010-2013).

Agricultural productivity increases to reduce poverty through income, lower food prices, increase in wages and rural multiplier effects (Bresciani & Valdes 2007; Christiansen et al., 2013). NGOs contribute to improving income, productivity and the use of basic social benefits to reduce poverty in northern Ghana (Adjei et al., 2012). Improved Chickpea pea varieties increased household income to reduce poverty in Ethiopia (Verkaart et al., 2017). Technology adoption increased crop output to reduce poverty by 5% in Kenya (Oehmke et al., 2010). Agricultural productivity increased farm output to reduce urban food prices, which increased consumption especially for the poor in Ghana and found that agricultural sector growth contributed to Ghana's non-agricultural sector growth with multiplier effects, but studies on the impact of crop productivity on poverty are limited in Ghana (Alhassan & Jatoe, 2007). Among few studies measuring the quantitative impacts of crop production on poverty reduction found that crop sales increased household expenditure and had positive and statistically significant impacts on poverty reduction for crop-growing households and the rural population in Vietnam (Cuong, 2009). The study found that an increase of 1 Viet Nam dong (VND) in rice revenues leads to an increase of 0.019 VND in per capita expenditure, and the corresponding figures for revenues from annual crops, perennial crops and fruits are 0.038, 0.040 and 0.036, respectively. Panda (2007) showed that 1% growth in agricultural income per capita reduced poverty headcount ratio by 0.22% in India and Dzanku (2015) showed that crop productivity reduced poverty by 0.14%, which failed to account for agro-ecological conditions in Ghana. In the coastal, forest and savannah agro-ecological zones have different farming systems on food and tree crops, with varying potential for agricultural growth, demographic and economic importance and potential for poverty reduction (Hall et al., 2001). The agro-ecologies are diverse in terms of farming systems, cereal-based, perennial-crop-based, and livestock based pas-

toral areas in Ethiopia. The results show that high poverty incidence and adoption of agricultural technologies, i.e. improved seeds with appropriate agronomic packages, would increase yields and incomes substantially, and reduce poverty in Ethiopia (Kotu & Admassie, 2016). Crop productivity provides food and income to reduce poverty among farm households in Ghana but few studies have revealed the magnitude of this relationship and presented the analysis in the agro-ecological zones of Ghana. Thus, the paper seeks to estimate crop farmers' poverty rate and examine the magnitude of the impact of crop productivity on poverty among farm households in Ghana (2005/06 and 2012/13).

2. MATERIALS AND METHODS

2.1. Conceptual framework

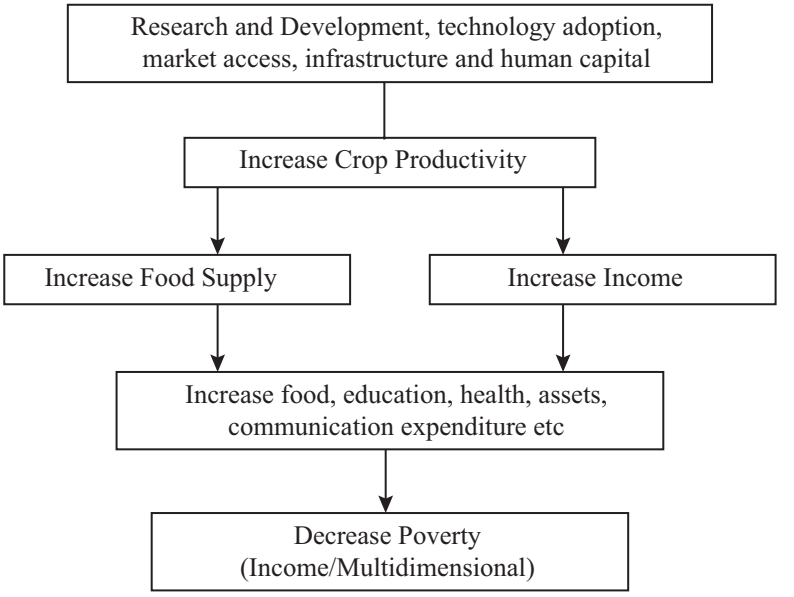

Figure 1. Conceptual framework: pathways to poverty
Adapted from Christiansen & Kuhl (2011)

Productivity enhancing factors such as infrastructure, human capital, research and development, and improved technology increase crop yields. The increased yield generates higher income to increase expenditures on food, education, health, water, electricity, clothing, transportation among others to decrease poverty as shown in Figure 1.

2.2. Materials and methods

We define y as farm and non-farm income in equation (1). Also, $fA(l,t,E)$ represents production function, l represents farm size, t is total labour supply, t_s is farm labour supply, t_n is non-farm labour supply, and w is wage rate for unskilled labour, p_j is price of output and E is agro-ecological conditions. A is productivity of the underlying technology.

$$y = y\left[p_j Af(l,t_s,E) + w(t_n) \mid E \right] \tag{1}$$

Income y is totally differentiated, dy below

$$dy = \frac{\partial y}{\partial p_j} dp_j * f(Q) + \frac{\partial y}{\partial Q} dQ * P_j + \frac{\partial y}{dw} dw * t_n + \frac{\partial y}{\partial t_n} dt_n * W \tag{2}$$

Equation (2) is expanded by $dp_j = \frac{\partial p_j}{\partial A} dA,\ dQ_j = \frac{\partial Q_j}{\partial A} dA,\ dw = \frac{\partial w}{\partial A} dA,\ dt_n = \frac{\partial t_n}{\partial A} dA$ due to productivity growth (dA) and simplified to get equation (3).

$$\frac{dy}{dA} = \frac{p_j * Q_j}{A} (\varepsilon_{Qj}, A + -\varepsilon_{pj}, A) + \frac{w * t_n}{A} (\varepsilon_w + \varepsilon_{tn}) \tag{3}$$

If output elasticity is greater than negative price elasticity at a given crop productivity growth, income increases for consumption of goods and services to reduce poverty (Minten & Barrett, 2008).

2.3. Estimation of poverty rate

The Foster-Greer-Thorbecke (1984) poverty indexes are shown below:

$$P_0 = \frac{q}{n} \rightarrow \text{ Poverty headcount ratio} \tag{4}$$

$$P_1 = \frac{1}{n} \sum_{i=1}^{q} \left[(z - y)/z \right]^1 \rightarrow \text{ Poverty gap} \tag{5}$$

$$P_2 = \frac{1}{n} \sum_{i=1}^{q} \left[(z - y)/z \right]^2 \rightarrow \text{ Poverty severity} \tag{6}$$

n = Number of households in a group, q *is* the number of poor households per group z *is* poverty Line, y *is* household expenditure per capita adult equivalent of i-th household in the specified group.

2.4. Crop productivity and poverty reduction

The impact of crop productivity on poverty is estimated using two stage instrumental variable panel fixed and random effects regression model in line with Dzanku (2015) as shown in equations (7) & (8). The model has been controlled for endogeneity of the error terms because of possible correlation of crop productivity and other explanatory variables. The double log model normalizes the standard errors and the error term ε_{it} is assumed to be independent and identically distributed from a normal distribution which is estimated with STATA.

Stage 1:

$$lcp = \alpha_0 + \alpha_1 \log k_{1it} + \alpha_2 \log k_{2it} \tag{7}$$

Stage 2:

$$\left(\frac{P_{0it}}{1-P_{0it}}\right) = \beta_0 + \sum_{j=1}^{7} \beta_j \log x_{jit} + \varepsilon_{it} \tag{8}$$

$$lP_1 = \beta_1 + \sum_{j=1}^{7} \beta_j \log x_{jit} + \varepsilon_{it} \tag{9}$$

$$lP_2 = \beta_1 + \sum_{j=1}^{7} \beta_j \log x_{jit} + \varepsilon_{it} \tag{10}$$

2.5. Description of variables with the expected impact on poverty

The dependent variables are poverty headcount ratio P_0, poverty gap P_1 and severity P_2. The independent variables are $x_1 - x_7$ which are assumed to be exogenous and influence poverty. x_1, is the logarithm of crop productivity measured as crop income per hectare of land to provide food and income for consumption to reduce poverty is instrumented by the cost of seed and labour inputs (k_1) and the cost of intermediate inputs (k_2). Relevant studies by Irz et al. (2001) and De Janvry and Sadoulet (2009) confirm that agricultural productivity provides income to reduce poverty significantly. x_2, is the logarithm of household size which is a

measure of the number of household members and it is associated with consumption negatively in increasing poverty (Iheke & Nwaru, 2013; Coppola & Laurea, 2016). x_3, is the logarithm of years of education which improves decision making skills of farmers to increase productivity to influence poverty (Anyanwu, 2005). x_4, is the logarithm of distance to water source in kilometres which is expected to increase poverty by delaying economic activities, x_5, is the logarithm of days of inactivity due to ill health, which is expected to reduce consumption to positively affect poverty (Grant, 2009). x_6, is the logarithm of the amount of remittances received by the farmer to provide additional household income to reduce poverty. x_7, is the logarithm of livestock income to positively increase household consumption especially during the lean season and crop failure.

2.6. Data and a sampling technique

The study employed Ghana Living Standards Survey in 2005/06 and 2012/13 when major agricultural policies were implemented and no current data was available. The data was collected from ten regions of Ghana by purposive and random sampling techniques to include 2910 and 8355 farm households respectively. Due to challenges with panel data, this study used repeated independent cross-sectional data which forms a Pseudo Panel data by age, sex, and agro-ecology. Finally, the cohort size is the result of a trade-off between bias and the cohort variance means that consistent and efficient estimates are generated (Guillerm, 2017).

3. RESULTS

3.1 Summary of statistics

Crop productivity (income/ha) provides food and income for poor and non-poor farmers to increase household consumption expenditure to reduce poverty. Musah et al. (2016) found that engagement in the farm sector provided income to increase consumption expenditures in three northern regions of Ghana. The study further finds that crop productivity (kg/ha) increases by 13% for poor farmers from the use of chemical, seed and labour inputs but reduced by 8.3% for non-poor farmers. Poor households are middle age, with a basic level of education as they have little capital and moderate access to additional livestock and remittance income to reduce poverty. Poor households have larger household size for increasing food and non-food demand in order to increase poverty (Table 1).

Table 1. Summary of statistics by poverty status

Variable description	Mean		Mean difference	Mean		Mean difference
	Poor	Non-poor		Poor	Non-poor	
	2005	2005		2013	2013	
Crop productivity ₵/ha	177.93	283.76	105.82***	682.97	894.46	211.49***
Crop productivity kg/ha	636.30	954.30	318.00**	720.27	874.92	154.65***
Consumption per adult ₵	727.50	2502.36	1774.85**	832.15	3083.84	2251.69***
Chemical cost ₵	20.94	54.66	33.71***	172.00	259.59	87.59***
Seed & labour cost ₵	27.43	82.98	55.55***	73.20	164.68	91.47***
Household head age	47.54	47.11	-.43	49.26	47.94	-1.32***
Household size number	6.06	3.68	-2.38***	6.44	4.40	-2.04***
Years of education	7.61	8.69	1.07***	6.97	8.56	1.58***
Remittance income ₵	28.68	59.69	31.00***	87.35	214.96	127.61***
Livestock income ₵	48.35	29.78	-16.24**	23.39	95.98	72.58*

Source: author's estimated output, 2018 *** ** * 1%, 5%, & 10% significant levels

3.2. Source of income

The pattern of income sources shows that agriculture is the major income source for farmers and that wage and income sources for non-farmers are significant.

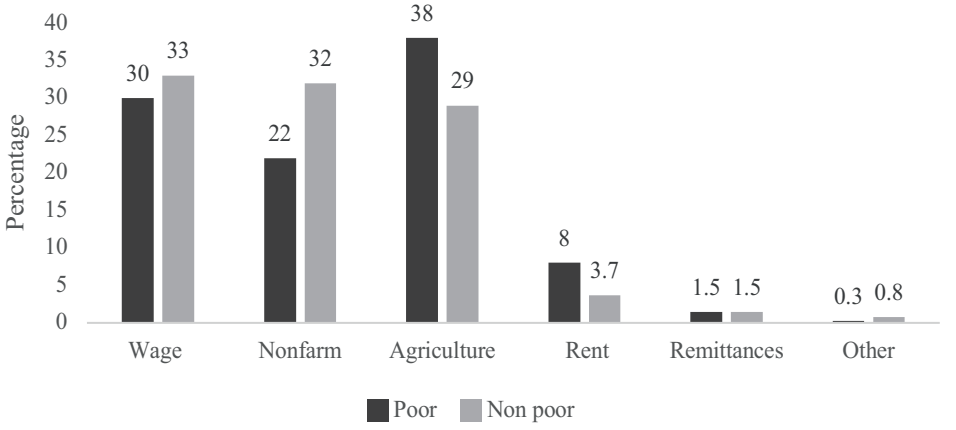

Figure 2. Sources of income from GLSS 6 Survey Data

3.3. Crop productivity

Maize, rice, beans, cashew and cotton output increased, but sorghum, cocoa, and coconut output decreased from 2005 to 2013. Farm size has been reduced for

beans but significantly increased for cashew. Maize, beans, cocoa and cashew yields increased, but rice, sorghum, and groundnut yields decreased. The study reveals low maize productivity of 0.95mt/ha compared to optimum maize yield 5.5mt/ha. Cocoa yield is 0.47mt/ha relative to optimum yield of 1mt/ha (Table 2).

Table 2. Crop productivity

Crop Type	Output (kg)		Farm size(ha)		Output kg /ha		Revenue ₵/ ha	
	2005	2013	2005	2013	2005	2013	2005	2013
Maize	572.58	952.14	1.16	1.17	867.23	951.93	275.64	796.98
Rice	372.71	572.18	1.04	.91	765.70	693.29	210.87	675.23
Sorghum	393.75	314.32	1.12	.93	506.01	461.10	126.18	413.43
Millet	263.47	315.88	1.14	.95	407.37	446.81	114.95	449.26
Groundnut	458.88	535.34	1.02	1.07	714.38	692.17	293.99	835.25
Beans	142.63	294.72	1.03	.85	336.82	504.90	121.07	536.70
Cocoa	895.94	757.76	2.76	2.55	306.22	472.77	315.02	1652.88
Cashew	128.87	789.00	1.34	2.31	128.85	572.41	71.37	873.66
Coconut	569.14	494.36	2.90	1.03	164.15	660.31	80.65	569.09
Cotton	630.43	1222.3	1.69	1.10	1326.0	1256.71	547.14	902.63
All Crops	1284.0	1603.6	3.32	3.35	763.81	811.59	257.24	806.82

Source: Authors' estimation, 2018 GLSS 5 & 6

3.4. Food and non-food expenditure

The study finds that average consumption ₵831.47 is below the poverty line ₵1314 among poor farmers and non-poor farmers whose average consumption ₵3091 is higher than the poverty line. The proportion of food expenditure increases significantly for poor farmers but the rich spend more on food than the poor in absolute terms, the latter allocate high proportions of their income to food consumption (Donkoh et al., 2014). Non-food expenditure constitutes health, education, transportation, remittances, clothing, etc. In a related study, the breakdown of costs indicated that 52% of the costs of living are for food, 13% are for housing, 30% are for other essential needs, and 5% are for sustainability (Sally & Sarpong, 2018). The Ghana Statistical Service requires GH₵792 for minimum food expenditure for 2900 calories intake and GH₵522 minimum non-food expenditure (Table 3).

Table 3. Food and non-food consumption expenditure per adult equivalent

2005/06	Mean		2005/06	Mean		2012/13
Expenditure	Poor	Non-poor	Difference	Poor	Non-poor	Difference
Food	397.78	1339.93	942.14***	516.96	1767.51	1250.54***
Non-food	275.13	972.84	697.71***	314.52	1323.80	1009.29***
Total	727.77	2497.60	1769.81***	831.47	3091.31	2259.83***

Source: Authors' estimated output, 2018

3.5. Poverty levels

The study found that farmers' consumption increased from ₵1486.16 to ₵2244.07 to reduce poverty headcount ratio from 57% in 2005 to 37% in 2013. Farmer's poverty rate has been reduced by 20 % with 9% less to achieve the MDG target of halving poverty by 2013. Crop producer's poverty rates decreased from 35%, 36%, and 76% in 2005 to 21%, 22%, and 51% in the coastal, forest and savannah zones respectively in 2013, while the poverty rates are higher in the savannah zone. The study found that crop producers' poverty gap decreased from 25% in 2005 to 14% in 2013 and poverty severity dropped from 14% in 2005 to 6.8% in 2013 (Table 4). Biam & Tavershima (2020) study showed that 49.7% of the rural farming households required 2100 kilocalories per capita per day to be classified as food secure while most of the rural farming households (50.3%) were unable to meet the recommended calorie intake of 2100 kilocalorie per capita per day in Nigeria. In a related study about 47.6% of households live below the poverty line (Birr 389) with a poverty gap index of 17.8% and a poverty severity index of 9.2% among pastoralist in Ethiopia (Teka et al., 2019).

Table 4. Poverty levels by agro-ecology

Crop categories	P_1		P_2		P_3		Consumption		Population	
All crops	2005	2013	2005	2013	2005	2013	2005	2013	2005	2013
Coastal zone	35	21	9.6	5.6	3.8	2	2121.18	3062.75	268	482
Forest zone	36	22	10	6.0	4	2.3	1975.51	2707.42	1,124	3,382
Savannah zone	76	51	39	20	24	11	1025.96	1806.97	1,565	4,488
National	57	37	25	14	14	6.8	1486.16	2244.07	2,957	8,352

Source: Authors' estimated output, 2018

3.6. Impact of crop productivity on poverty

The study results reveal that growth in crop productivity by 1% reduces poverty headcount ratio by 0.28% and by 0.23%, 0.29% and 0.29%, in the coastal, forest and savannah zones respectively similar to the national estimate. The study finds

that growth in crop productivity by 1% reduces poverty gap by 0.38% and by 0.27%, 0.39%, and 0.38% in the coastal, forest and savannah zones respectively. The study further finds that growth in crop productivity by 1% reduces poverty severity by 0.75% and by 0.55%, 0.78% and 0.75% in the coastal, forest and savannah zones (Table 5). Crop productivity provides food and income to increase household consumption on food and non-food items such as clothing, transportation, health, remittances, etc. to reduce the incidence and extent of poverty. The estimates of this study are larger than Dzanku's study (2015) which found that growth in crop productivity by 1% reduced probability of poverty headcount ratio by 0.14% in Ghana without accounting for agro-ecological conditions. But the estimates of this study are comparable to Panda's study (2007) which found that agricultural income per capita reduced poverty headcount ratio, poverty gap, and poverty severity by 0.22%, 0.39%, and 0.53% respectively in India.

The paper finds that increase in household size by 1% increases the probability of poverty headcount ratio, by 1.35% and by 1.78%, 1.48%, and 1.28% in the coastal, forest, and savannah zones respectively. The study reveals that increase in household size by 1% increases poverty gap by 0.33%, and by 0.63%, 0.29%, and 0.62% in the coastal, forest and savannah agro-ecological zones respectively. The study further reveals that increase in household size by 1% increases poverty severity by 0.66% and by 0.63%, 0.29%, and 0.62% in the coastal, forest and savannah zones respectively (Coppola & Laurea 2016). Molini & Paci (2015) found that larger households have 4% higher probability of being poor in Ghana. The findings of the study reveal that household size decreases food security by increasing household food requirements in Benue State, Nigeria (Biam & Tavershima 2020). The study further reveals that increase in years of education by 1% reduces probability of poverty headcount ratio, by 0.37% and by 0.37% and 0.41% significantly in the forest and savannah zones. The study finds that increase in years of education by 1% reduces poverty gap and poverty severity by 0.12% and 0.24% respectively in the savannah zone only by improving skills in literacy, and numeracy for proper decision making to increase household income and consumption in order to reduce poverty (Sen, 2014; Anyanwu, 2005). In Nigeria, the study found that educated heads of the household have 6% likelihood to be food secure because an educated head of the household is more sensitive to adopting technology to maximize farm and non-farm output, which contributes directly to household food security (Biam & Tavershima 2020). The determinants of poverty headcount ratio, poverty gap and severity were estimated by the random effects model as consistent and effective using the Hausman specification test.

Table 5. Crop productivity and poverty

Variables	Poverty headcount	Poverty gap	Poverty severity
Output value ha	-0.282***	-0.376***	-0.751***
	(0.0206)	(0.0375)	(0.0750)
Household size	1.353***	0.331***	0.663***
	(0.0430)	(0.0291)	(0.0581)
Years of education	-0.372***	-0.094***	-0.187***
	(0.0233)	(0.0163)	(0.0326)
Sick days	-0.105***	-0.071***	-0.143***
	(0.0389)	(0.0254)	(0.0508)
Distance from water source	0.0790***	0.0130	0.0259
	(0.0125)	(0.00870)	(0.0174)
Livestock sales	-0.148***	0.0135*	0.0270*
	(0.0102)	(0.00810)	(0.0162)
Remittance	-0.0384***	-0.017***	-0.035***
	(0.00953)	(0.00652)	(0.0130)
Forest zone	0.0868	0.137	0.273
	(0.110)	(0.0860)	(0.172)
Savannah zone	0.891***	0.436***	0.871***
	(0.111)	(0.0828)	(0.166)
Constant	-1.124***	-0.0205	-0.0410
	(0.172)	(0.221)	(0.443)

Source: Author's estimated output 2018 *** p<0.01, ** p<0.05, * p<0.1

The result of the study finds that increase in inactivity days due to ill health by 1% is negatively related to poverty headcount ratio, poverty gap, and poverty severity by 0.15%, 0.13%, and 0.26% respectively in the savannah zone only. Somi et al. (2009) reveal that households affected by Malaria reduced their consumption of drugs and food. The findings of the study show that increase in distance to water intake by 1% increases probability of poverty headcount ratio by 0.08% and by 0.07% and 0.09% in the forest and savannah zones due to the loss of productive water demand labour to negatively affect income and consumption. The study further shows that increase in livestock income by 1% reduces probability of poverty headcount ratio by 0.15% and by 0.09%, 0.13% and 0.16% in the coastal, forest and savannah zones respectively, while increase in livestock income by 1% increases poverty gap and severity by 0.014% and 0.03% and very poor farmers raise livestock, which is not effective in reducing poverty. Maltsoghou & Rapsomanikies (2005) found that income from pigs and chickens

reduces poverty, but an increase in the share of livestock income in total farm income is positively associated with the poverty incidence in Vietnam.

The study found that increase in remittance income by 1% reduces poverty headcount ratio by 0.04% and by 0.06% and 0.03% in the forest and savannah zone. The study finds that increase in remittance income reduces poverty gap by 0.02% and by 0.03% and 0.13% in the forest and savannah zone. The study found that increase in remittance income by 1% reduces poverty severity by 0.03% and by 0.06% and 0.03% respectively in the forest and savannah zones due to additional household income. Internal and external remittances reduce spending on food at the margin but increase spending on investment goods such as education, housing and health in order to reduce poverty in Ghana (Adams & Cuecuecha, 2013). The results of the study further show that agro-ecological condition in the savannah is positively related to the poverty headcount ratio, poverty gap and severity by 0.89%, 0.44%, and 0.87% respectively. The study found that poverty rates were higher among farmers especially in the savannah zone, and that in the Guinea savannah zone increases probability of poverty incidence by 0.29% but reduces it in the forest zone by 0.17% in Nigeria (Omobowale 2014).

Table 6. Impact of crop productivity on poverty by agro-ecology

Variables	Poverty headcount ratio			Poverty gap			Poverty severity		
	Coastal	Forest	Savannah	Coastal	Forest	Savannah	Coastal	Forest	Savannah
Output value ha	-0.23***	-0.29***	-0.29***	-0.27**	-0.39***	-0.38***	-0.55**	-0.78***	-0.75***
	(0.068)	(0.03)	(0.30)	(0.11)	(0.10)	(0.04)	(0.22)	(0.20)	(0.08)
Household size	1.74***	1.48***	1.28***	0.31*	0.40***	0.31***	0.63*	0.79***	0.62***
	(0.21)	(0.08)	(0.06)	(0.17)	(0.07)	(0.03)	(0.33)	(0.15)	(0.06)
Years of education	-0.03	-0.37***	-0.41***	-0.02	-0.05	-0.12***	-0.04	-0.09	-0.24***
	(0.10)	(0.04)	(0.03)	(0.08)	(0.03)	(0.02)	(0.17)	(0.07)	(0.04)
Sick days	-0.017	-0.087	-0.15***	0.06	0.02	-0.13***	0.12	0.04	-0.26***
	(0.15)	(0.06)	(0.05)	(0.11)	(0.05)	(0.03)	(0.23)	(0.10)	(0.06)
Distance from water	0.065	0.069***	0.09***	0.02	0.02	0.01	0.04	0.04	0.02
	(0.042)	(0.021)	(0.02)	(0.03)	(0.02)	(0.01)	(0.07)	(0.04)	(0.02)
Livestock sales	-0.09**	-0.13***	-0.16***	0.02	0.03	0.01	0.03	0.06	0.02
	(0.04)	(0.02)	(0.0128)	(0.04)	(0.02)	(0.01)	(0.08)	(0.04)	(0.02)
Remittance	0.03	-0.06***	-0.029**	-0.03	-0.03**	-0.01*	-0.06	-0.06**	-0.0250*
	(0.04)	(0.02)	(0.01)	(0.03)	(0.01)	(0.01)	(0.06)	(0.03)	(0.01)
Constant				-0.56	0.01	0.48**	-1.12	0.03	0.96**
				(0.637)	(0.557)	(0.236)	(1.28)	(1.11)	(0.47)

Source: Author's estimated output 2018 *** p<0.01, ** p<0.05, * p<0.1

4. CONCLUSIONS

The study estimated the impact of crop productivity on poverty to reveal that crop income per hectare of land increases consumption of food and non-food items leading to poverty reduction. The poverty rates are moderate in the costal and forest zones but higher in the savannah zone, and crop productivity reduces poverty moderately, and the results show that crop productivity reduces poverty significantly in the coastal, forest and savannah zones similar to the national estimate. The study further reveals that education, livestock and remittance income complements farmers' efforts to reduce poverty, but household size and distance to water increase farmers' poverty in Ghana's agro-ecological zones. The study recommends rapid crop productivity growth by prioritizing technology adoption and institutional coordination suitable to coastal, forest, and savannah agro-ecological conditions among the poor, illiterate and non-partisan to increase crop yields and revenue in order to reduce poverty effectively. Farmers' access to education, family planning, remittance and livestock income needs to be improved to help reduce poverty in the relevant agro-ecological zones in Ghana.

Conflict of interests

The authors declare there is no conflict of interest.

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УТИЦАЈ ПРОДУКТИВНОСТИ УСЈЕВА НА СИРОМАШТВО ФАРМЕРСКИХ ДОМАЋИНСТАВА У ГАНИ

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САЖЕТАК

Стратегије за смањење сиромаштва у Гани I и II су настојале да повећају продуктивност усјева како би се смањило велико сиромаштво у пољопривредном сектору, али ефекат продуктивности на сиромаштво изостаје у свим агроеколошким зонама Гане. Циљеви студије су да се процијени однос сиромаштва по глави становника, јаза сиромаштва и озбиљности сиромаштва, те да се повеже продуктивност усјева са сиромаштвом агроеколошког субјекта у двостепеној регресионој техници инструменталних варијабли помоћу података из псеудо-панела из Анкете о животном стандарду у Гани (ГЛСС серија 5 и 6). Однос сиромаштва по глави становника међу фармерима, јаза сиромаштва и озбиљност сиромаштва смањени су са 57%, 25% и 14% у 2005. години, на 37%, 14% и 7% у 2013. години. Резултати даље указује да раст продуктивности усјева од 1% смањује вјероватноћу односа сиромаштва по глави становника, јаза сиромаштва и озбиљности сиромаштва за 0,28%, 0,38% и 0,75% у свим агроеколошким зонама. Поред тога, рад показује да образовање, стока и приход од дознака смањују сиромаштво, док величина домаћинства и велика удаљеност до извора воде повећавају сиромаштво на различите начине у зависности од агроекологије. Студија препоручује брз раст продуктивности усјева давањем приорите-

та усвајању технологије и институционалне координације које би одговарале агроеколошким условима међу сиромашним, неписменим и политички непристрасним.

Кључне ријечи: *мјере политике, технологија, продуктивност, приход, благостање, агроекологија.*

Прегледни научни чланци
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INTERDEPENDENCE OF FISCAL CONSOLIDATION AND ECONOMIC GROWTH IN EU COUNTRIES WITH DIFFERENT LEVELS OF DEVELOPMENT

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ABSTRACT

The concept of fiscal consolidation is most often mentioned during major economic crises, which are usually the result of economic shocks caused by crises such as the one in 2008, but also the last crisis caused by the COVID-19 pandemic. In such circumstances, as a rule, high deficit and/or enormous growth of public debt occur. Therefore, many countries need to consolidate fiscally their public finances. In this paper, the focus of the analysis is on the impact of fiscal consolidation on the economic growth of the European Union with different levels of development. It is assumed that countries with low incomes and less developed economies have a special obligation and a need for stable public finances. The same refers to the small and open economies that are largely exposed to the stability/instability of the surrounding countries. Therefore, it is very important that countries with a low level of development pay special attention to the fiscal stability of the country's public finances.

1. INTRODUCTION

Fiscal policy is one of three key pillars of economic policy. Fiscal policy can be considered successful if it ensures fiscal stability and fiscal responsibility of the country. The other two pillars are the foreign trade and monetary pillars.

When the government spends more in one year than it receives from taxes and other revenues, there is a budget deficit that is usually called a fiscal deficit. This situation requires the consolidation of the country's public finances, i.e. the development of certain fiscal consolidation program. There are many reasons why a deficit occurs. If it reduces taxes and at the same time does not reduce expenditures, the deficit will inevitably increase. Uncontrolled growth of the deficit can affect the country's fiscal stability.

The basic precondition for economic growth is balancing public finances and a sustainable level of public debt. Balancing public finances and maintaining a sustainable level of public debt are some of the conditions for mitigating economic shocks resulting from occasional cyclical oscillations. The above refers especially to economies with a lower level of development, which differ in basic macroeconomic characteristics and fiscal capacities of the country.

The approach to fiscal consolidation also includes determining the period of consolidation. In that sense, there are one-year, also referred to as "cold showers", and multi-year or gradual consolidations. The period of fiscal consolidation is the period of the year in which the cyclically-adjusted primary budget balance improves by at least 1.5% of GDP or the period of 3 consecutive years in which the cyclically-adjusted primary deficit does not worsen by more than 0.5% of GDP (Alesina & Ardagana, 1998; Mirdala 2013).

The consequences of global economic trends have the greatest impact on small open economies. Due to their capacities, they cannot significantly influence the movement of the world economy, but they strongly feel the negative consequences. The best example can be the impact of the 2008 crisis and its consequences on the Western Balkans countries and on certain individual members of the European Union. These consequences can be observed most easily if there is a significant deterioration in the primary budget balance in the years after the crisis. Also, the period of crisis is characterized by a significant increase in public debt. Due to the above-mentioned reasons, the countries decide to initiate the process of fiscal consolidation. However, initiating a fiscal consolidation process does not always guarantee positive results. Different methods of consolidation also give different effects of consolidation.

Ultimately, fiscal consolidation can have a different impact on economic growth. It largely depends on the state of the country's economy, the type of instruments used in the implementation as well as the economic and political circumstances in which it is implemented.

Analyses of fiscal consolidation in some European Union countries show a long-term positive impact of fiscal consolidation on economic growth (case studies in Portugal, Spain, and the United Kingdom). However, there are also case studies (Austria and Belgium) that show the negative effects of fiscal consolidation (Kleis & Moessinger, 2016).

Some research has shown that fiscal consolidations based on the expenditure side of the budget are much more efficient than those that rely on the revenue side. Consolidations carried out by increasing revenues can be successful if the

initial share of tax revenues in GDP is relatively low and if the increase occurs gradually (Tsibouris et al., 2006). Measures to limit long-term spending send a signal to financial markets about the sustainability of public spending (Cottarelli & Vinals, 2009).

The results of the research also differ when it comes to the economic conditions for the implementation of consolidation. Experience shows that fiscal adjustments are more successful if they are implemented during or immediately after the recession period (Drazen & Grilli, 1993).

Most research suggests that the right time for consolidation is the time of expansion (Von Hagen & Strauch, 2001).

To reduce business cycle fluctuations, the so-called automatic stabilizers can be used. Automatic stabilizers represent the first line of defense, but as such they are not sufficient to maintain complete stability. However, automatic stabilizers cannot completely eliminate the caused disturbances. Only monetary and fiscal policy instruments can fully influence the overall reduction of disturbances. When all the possibilities of monetary and fiscal policy are exhausted in a certain integration and when a certain country within the framework of integration has a problem with increased debt or deficit, then comprehensive fiscal consolidation is needed.

The results of fiscal consolidation are largely determined by the choice of instruments (increase in special taxes or decrease in certain areas of spending). Fiscal consolidation instruments can be ranked according to effects (short-term and long-term growth) and income distribution. Based on these basic rankings, individual instrument packages, which aim at the successful fiscal consolidation of each country, can be defined. The choice of fiscal consolidation instruments will most often depend on the basic macroeconomic indicators of each country.

To adequately assess the application of the necessary instruments for fiscal consolidation, it is necessary to assess the size of short-term fiscal multipliers. Many studies show that the size of the fiscal multiplier depends on the country, its business cycle, time period, as well as special circumstances. The above includes monetary and foreign exchange regimes, the degree of integration and the level of openness, as well as the methodology used to assess them. In addition, current impacts and individual cumulative effects of fiscal shocks may vary. Multipliers can even be negative - a phenomenon called “contraction of fiscal expansions” (Estevao & Samake, 2013). Accordingly, fiscal rules and fiscal institutions can be helpful in increasing credibility. In the long run, better institutional frameworks can help ensure that fiscal policy stays on track (Sutherland, Hoeller & Merola, 2012).

A stable fiscal policy requires tools that can be managed by the fiscal policy. These tools are most often taxes, expenditures and public debt. These tools can, by their application, stimulate or limit certain economic developments, depending on the need. Changes in tax rates can have a significant impact on fiscal consolidation. In order to consolidate public finances, limiting the growth of certain expenditures is also a significant instrument for changing the course of fiscal policy. Public debt management in most countries is an important instrument in conducting fiscal policy. If the public debt does not pretend to jeopardize the functioning of the state, it is used as an important instrument in ensuring the liquidity of funds at a certain moment. Adequate management of budget policy is a basic condition for a stable fiscal policy. Therefore, an important role is played by the countercyclical budget policy, which is also called unbalanced budget policy. An unbalanced budget during a depression implies an increase in the deficit. If deemed necessary, the state can finance the resulting deficit through borrowing. Conversely, if the fiscal year ended with a surplus, in ideal circumstances a debt reduction would be expected. The results of some fiscal consolidations show that budget surpluses have a deflationary effect on national income, while budget deficits tend to increase prices. In this way, it is made clear that the budget offers many opportunities in creating and conducting fiscal policy. However, it is very difficult to fully predict a recession or inflationary shock in a timely manner.

A very important segment of fiscal policy is tax policy. One of the instruments for conducting fiscal policy is adjusting the structure of tax rates, since these taxes define the amount of disposable income. Expectations of tax policy during the depression are that tax policy encourages private consumption and investment, while during inflation it would be necessary to reduce consumption and investment. Finally, several additional instruments are needed to pursue a stable long-term policy.

One of the important instruments used to create fiscal policy in addition to the deficit is certainly borrowing. The effects of fiscal consolidation will depend on the form of borrowing (loans, bonds and other securities). Borrowing through the issue of bonds and other securities reduces consumption and private investment.

If banks buy government bonds, then the available credit potential for other purposes (consumer loans, lending to private investments, etc.) decreases. This is especially the case when government bonds are issued to meet current budget commitments, and not for public investment. The most efficient borrowing in the banking system is borrowing if banks have a surplus of cash reserves.

As a measure that would provide a guarantee of public spending, some economists emphasise the strengthening of social security measures (pensions, unemployment and insurance subsidies, etc.). This would increase consumption during depression.

We can never predict with certainty how and in what way the chosen instrument for fiscal consolidation will manifest itself and ultimately what effects it will have. In this regard, the problem now is the given choice of tools for flexible and efficient use.

One of the instruments for efficient and immediate action for fiscal consolidation is the introduction of "automatic stabilizers". These stabilizers are used in a way to act on certain economic shocks in the short term. One example of this is the case of falling employment. If there is a decline in employment, the state as a stabilizer includes an increase in unemployment benefits and thus increases disposable income. However, these stabilizers do not have the power to fully determine fiscal policy, but in some circumstances, they can stop abrupt processes.

Depending on the circumstances in which a particular country or integration finds itself, fiscal policy has several objectives for successful fiscal consolidation. The following are some of the most important fiscal targets.

Optimal allocation of economic resources, as one of the fiscal goals, aims to shape fiscal policy to increase the overall efficiency of natural resources. In order to do that, it is necessary to invest in something that will ensure the maximum number of employees on the territory to which the consolidation refers. In addition, for stable public finances it is necessary to establish or at least strive for the proper distribution of wealth and income.

For a stable fiscal policy, it is necessary to ensure price stability. However, the most important goal of fiscal policy is generally to achieve and maintain full employment. In this way, it is possible to achieve all other goals that have an impact on fiscal policy in general. Full employment ensures a positive direction of the tax structure. A high level of employment increases the level of disposable income and aggregate demand. The above leads to an increase in revenues from indirect taxes, primarily value added taxes.

As a result of the response to the great economic crisis in 2008, the countries of the European Union and CEFTA countries had a problem with excessive deficits and public debt. In addition to the countries of the European Union and CEFTA, the whole world faced a fiscal imbalance of varying proportions. Therefore, they carried out fiscal consolidation using different consolidation methods.

Based on the final results that fiscal consolidation can have on the budget balance and public debt, it can be declared successful or unsuccessful. If a positive effect on GDP is achieved, it can be said that fiscal consolidation has been expansive.

In general, successful fiscal consolidation is one that provides:

1. If, in the three-year period following consolidation, the cyclically-adjusted primary deficit decreases on average by at least 2% points of the balance/ GDP below its value in the years of consolidation, or
2. If, three years after consolidation, the ratio of public debt to GDP is at least 5% lower than the ratio in the year of consolidation.

Ultimately, fiscal consolidation is expansive if the average GDP growth rate in the consolidation period and two years after that period is higher than the average growth rate at the beginning of the fiscal consolidation period (Alesina & Ardagana, 1998; Mirdala 2013).

There are many ways to implement successful and expansive fiscal consolidation. Fiscal consolidation carried out by a permanent reduction in public spending ultimately increases private consumption, but under certain conditions. The first condition is the amount of public debt at the beginning of the consolidation period, compared to the three-year period before consolidation. As a rule, the higher the growth of public debt in the period before consolidation, the higher the probability of success of fiscal consolidation based on the stated criterion (Alesina & Ardagana, 1998).

Greater effects of fiscal consolidation based on debt reduction are more realistic if the share of public debt in GDP is relatively high in the period before consolidation. In general, the effects of the fiscal consolidation process are greater if the imbalance is greater.

There are different understandings of certain criteria with reducing debt and deficit to a realistic framework. When making decisions about starting the process of fiscal consolidation, one can appreciate which is the better recipe: reducing taxes or increasing spending!?

Wage rigidity in the labor market leads to two effects (Alesina & Ardagna, 2012). The first effect indicates an increase in employment rate, and thus income and consumption, and the second shows a decrease in the wealth of the private sector that occurs due to an increase in the tax discounted to present value. However, if expenditures do not have a tendency to increase, the stated increase in taxes ensures a reduction in taxes in the following period.

This model explains the positive correlation between the public spending shock and the change in private consumption when public debt is not high and the

negative correlation when there is a problem of high public debt. However, tax increases also have two different effects on private consumption. Tax growth reduces disposable income, and therefore the consumption. More precisely, if expenditures do not have a tendency to grow, the stated increase in taxes ensures a reduction in taxes in the following period. Some authors argue that in times of crisis it is necessary to pursue an expansive fiscal policy that should be financed from debt. This would have a positive effect on economic growth.

In contrast, authors such as Cochrane (2011) or Reinhart & Rogoff (2010) suggest, among other things, that higher levels of public debt significantly reduce economic performance. It is for this reason that they believe that austerity policies should be given priority. But research also shows different results when it comes to the austerity argument as a criterion for fiscal consolidation.

In addition to the introduction, the paper consists of 3 parts. The first part presents the data used in the research and research methods. The second part shows the results of empirical research. The third part includes discussion and conclusions.

2. MATERIALS AND METHODS

The following research analyzes the impact of fiscal stability as a result of fiscal consolidation on the economic growth of countries with different levels of development. The sample of the European Union member states is divided into two groups; countries with a higher level of development and countries with a lower level of development (measured by the level of GDP per capita, the period of 2000-2020). In the analysis, more developed countries have GDP per capita between € 21,000 and € 102,000. Less developed countries have GDP per capita between € 21,000 and € 9,000.

The fiscal stability is measured by the level of the structural budget balance (surplus/deficit), while the economic growth is measured by the percentage change in GDP. The subsample of more developed countries consists of the following countries: Ireland, Italy, Luxembourg, Netherlands, Spain, Denmark, Sweden, Cyprus, Malta, Slovenia, The Czech Republic, Austria, Belgium, Finland, France and Germany. IMF data were used in the paper. The years in which fiscal consolidation was carried out were analyzed. The analysis was done individually in the countries of the European Union.

The deficit-related data represent the average percentage of the deficit share of GDP in the period from the beginning to the end of the country's fiscal consolidation period. Data related to GDP represent the average growth/decline rates of

GDP in the period from the beginning to the end of the country's fiscal consolidation.

Among the less developed countries in this analysis, the remaining countries of the European Union with lower GDP per capita are included, namely: Estonia, Latvia, Lithuania, Poland, Slovakia, Portugal, Bulgaria, Croatia, Greece, Hungary, and Romania.

Table 1. Fiscal stability and GDP growth of the EU member states

More developed EU countries (GDP per capita)	Primary balance %	GDP rate of change	Less developed EU countries (GDP per capita)	Primary balance%	GDP rate of change
Ireland	-1.83	14.20	Estonia	0.81	2.62
Italy	-0.93	0.11	Latvia	-1.48	7.18
Luxembourg	1.18	5.55	Lithuania	-4.36	1.15
Netherlands	-1.29	1.49	Poland	-3.90	1.49
Spain	-4.81	-1.16	Slovakia	-2.87	2.88
Denmark	0.62	3.04	Portugal	-2.26	-0.89
Sweden	1.25	4.80	Bulgaria	0.82	7.36
Cyprus	-0.52	2.61	Croatia	-0.31	3.69
Malta	1.32	7.59	Greece	-6.59	-5.68
Slovenia	-0.96	4.22	Hungary	-0.72	5.25
Czech Republic	-1.75	-0.99	Romania	-2.77	4.64
Austria	-1.08	2.65			
Belgium	-2.72	2.61			
Finland	0.07	3.09			
France	-3.59	1.88			
Germany	0.09	3.37			

Source: IMF data and author's calculations

Establishing mutual connections and relations between two or more observed phenomena is the subject of regression and correlation analysis, with the aim of quantitatively expressing the average regular relationship of observed phenomena by the regression equation if in reality such a relationship exists. In addition, the degree and direction of their mutual connection is expressed. If we observe only two phenomena, then this analysis is reduced to a simple regression and correlation analysis (Lovrić et al., 2006). The connection between fiscal consolidation and economic growth will be determined using a simple linear regression analysis. To this end, fiscal consolidation will be explanatory variable, while GDP will be a dependent variable:

$$Y = f(PB, X) \tag{1}$$

To establish the average regular relationship between the two observed phenomena, it is necessary to calculate the parameters of simple linear regression. A simple linear regression model can be written as:

$$Y_i = \beta_0 + \beta_1 x_i + \varepsilon_i \; i = 1, 2, ..., N \tag{2}$$

Where:

- Y_i means dependent variable is GDP,
- x_i means independent variable is primary balance,
- β_0 and β_1 are unknown constants or regression parameters,
- ε_i is the random error component, and
- N is the size of the basic set.

The analysis will use the estimated simple linear regression function based on the sample, which is defined as follows:

Since the analysis is done on a sample, and not on the whole basic set, because the available data do not allow it, the estimated simple linear regression function will be used, based on the sample:

$$\widehat{Y}_i = b_0 + b_1 x_i \tag{3}$$

In this relation, $\widehat{Y}_i$ denotes the value of the dependent variable which is exactly on the best adjusted regression line, while b_0 and b_1 are the estimates of the unknown regression parameters of the basic set.

The estimates of the parameters in the regression equation are obtained on the basis of the least squares method, which implies minimizing the squares of the vertical linear deviations of the original data from the regression line. In this way, a system of normal equations for determining parameters in the regression equation is obtained (Lovrić et al., 2006). The solution of the above system of equations enables direct calculation of parameter values in the regression equation:

$$b_1 = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - \left(\sum x\right)^2} \quad (4) \text{ and}$$

$$b_0 = \overline{y} - b_1\overline{x}. \quad (5)$$

The parameter b_0 shows the expected value of the dependent variable Y, if the independent variable X has a value of 0, while the parameter b_1 shows the average change of the dependent variable, with a unit increase of the independent variable.

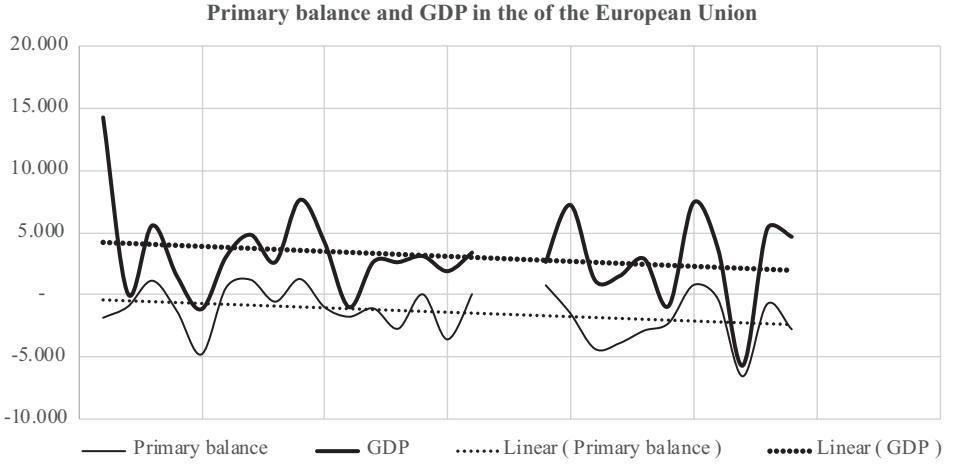
For this analysis we used the econometric program Eviews, applying the least squares method. This method is simple and reliable because it mutually excludes positive and negative errors. The analysis also contains the standard deviation, mean, maximum and minimum value, distribution asymmetry and measure of serial distribution tendency. Regression analysis provides an estimate of the significance of the following variables: probability (p), t-statistics, standard estimation error, and coefficient of determination R-square.

3. RESULTS

Fiscal consolidation is a process for stabilizing public finances. This procedure is most often conducted in countries with a high level of deficit and public debt. Countries with lower levels of development have a greater need for fiscal consolidation. A more significant need for fiscal consolidation refers to countries with a lower level of development because countries with a higher level of development find it easier to bear the high level of deficit and public debt. As a rule, countries with a higher level of development find it easier to get out of the crisis.

In countries with a lower level of development, managing stable public finances is much more demanding because in times of crisis they have fewer instruments for the fiscal consolidation process. Based on the analysis of the movement of

the fiscal deficit/surplus and the growth and decline rates of GDP of different EU member states, it can be concluded that there is a connection between fiscal stability and economic growth. Fiscal consolidation is particularly important for countries with a lower level of development as they do not have the fiscal capacity for consolidation such as countries with a higher level of development.



Graph 1. Trends in primary balance and GDP in the European Union countries
Source: Author's analysis

The chart shows the primary balance and GDP ratio according to the level of development of the European Union countries. Until the cross-section, the chart shows the countries with a higher level of development, while after the cross-section, the countries of the European Union with a lower level of development are listed. Countries with a lower level of development generally have a greater problem with deficits and with the success and effects of fiscal consolidation.

The analysis shows that less developed countries have higher variations and a higher degree of correlation between fiscal stability and economic growth, especially in times of recession.

The greater need for fiscal consolidation of countries with a lower level of development is also demonstrated in the following tables, which are the results of the statistical software Eviews 9.

Regression analysis of the European Union countries with a higher level of development shows that there is a correlation between fiscal consolidation and economic growth because the correlation coefficient is r = 0.35.

Table 2. Impact of fiscal consolidation of the European Union countries with lower and higher levels of development

Dependent Variable: GDP per capita
(More developed EU countries)
Method: Least Squares
Date: 10/11/21 Time: 10:09
Sample: 1 16
Included observations: 16

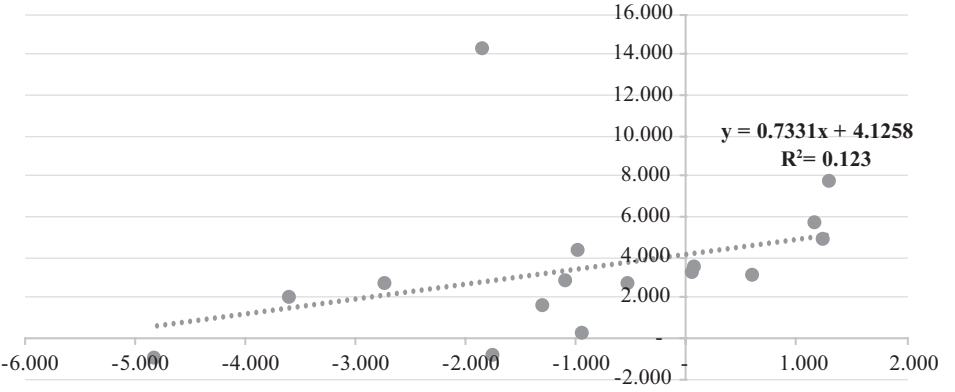
Dependent Variable: GDP per capita
(Less developed EU countries)
Method: Least Squares
Date: 10/11/21 Time: 14:23
Sample: 1 11
Included observations: 11

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.125.772	1.011.510	4.078.826	0.0011	C	5.336.917	1.109.514	4.810.139	0.0010
PB	0.733138	0.523228	1.401.182	0.1829	PB	1.227.920	0.362971	3.382.975	0.0081
R-squared	0.122989	Mean dependent var		3.440.712	R-squared	0.559784	Mean dependent var		2.699.539
Adjusted R-squared	0.060345	S.D. dependent var		3.653.972	Adjusted R-squared	0.510871	S.D. dependent var		3.743.801
S.E. of regression	3.542.007	Akaike info criterion		5.483.733	S.E. of regression	2.618.329	Akaike info criterion		4.925.916
Sum squared resid	1.756.414	Schwarz criterion		5.580.306	Sum squared resid	6.170.083	Schwarz criterion		4.998.260
Log likelihood	-4.186.986	Hannan-Quinn criter.		5.488.678	Log likelihood	-2.509.254	Hannan-Quinn criter.		4.880.312
F-statistic	1.963.312	Durbin-Watson stat		1.679.945	F-statistic	1.144.452	Durbin-Watson stat		2.051.722
Prob(F-statistic)	0.182936				Prob(F-statistic)	0.008089			

Source: Author's analysis

The analysis also shows that the coefficient of determination in more developed EU countries is 0.12, more precisely that the changes in GDP are determined by variations in the fiscal balance with 12%. In less developed EU countries, the coefficient of determination is 0.5. This shows that the GDP growth rate in less developed EU countries is determined by fiscal stability with 55%. The results of the analysis show that the impact of fiscal consolidation on GDP trends is much higher, i.e. there is much higher conditionality of stable public finances in countries with a lower level of development (55%) compared to countries with a higher level of development (12%).

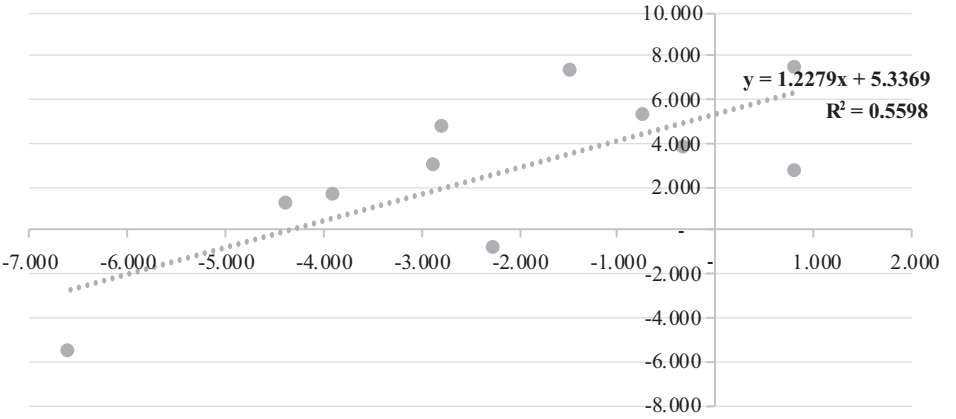
The results of the analysis show that there is a direct link between fiscal consolidation and economic growth of the European Union countries. This can be seen especially in countries with a lower level of development. Based on the analysis of both groups of countries, the significance of fiscal consolidation and economic growth of the EU member states, both countries with higher and lower level of development, were confirmed.



Graph 2. Graph of regression of primary balance and GDP in the more developed EU countries.

Source: Graphic presentation of the analysis by the author.

Finally, the analysis shows that there is a significantly higher correlation between fiscal consolidation and economic growth in the European Union countries with a lower level of development because the correlation coefficient is much higher and amounts to r = 0.75.



Graph 3. Graph of regression of primary balance and GDP in the European Union countries with a lower level of development.

Source: Graphic presentation of the analysis by the author.

The regression equation in the countries of the European Union with a higher degree of development Y = 4.12 + 0.73 * (PB) shows that any successful fiscal consolidation that results in an increase in the share of the surplus in GDP by 1% leads to an increase in GDP by 0. 73%, and in the case of an equable fiscal balance, the average GDP growth rate would be 4.12%

The regression equation in the European Union countries with a lower level of development Y = 5.34 + 1.23 * (PB) shows that fiscal consolidation resulting in an improvement in the fiscal balance measured by the share of GDP by 1% leads to an increase in GDP by 1.23%.

4. DISCUSSIONS AND CONCLUSIONS

The results of the analysis of the relationship between fiscal stability and the GDP growth rate show that countries with a lower level of development measured in terms of GDP per capita have a greater need for stable public finances.

The analysis shows the importance of fiscal consolidation and stable public finances, both in developed countries with a higher level of development, and especially in countries with a lower level of development. This is particularly important in times of major economic shocks caused by economic crises and recessions.

Based on the research on long-term application of fiscal rules in the EU countries and the impact of fiscal stability on economic growth it can be concluded that

the same fiscal rules and their implementation do not provide the same level of fiscal stability and equal opportunities to overcome fiscal difficulties in the EU member states with different levels of development.

The conclusion of this analysis indicates the need to establish certain principles of limiting public debt and deficits. Stable public finances are the basis for the development of any economy.

The analysis in this paper also indicates the need to redefine the fiscal rules of the European Union. It is necessary to apply differentiated fiscal rules for countries with different levels of economic development.

New principles are necessary in order to limit the public debt and deficit, i.e. redefine the fiscal rules of the European Union. The results of the analysis indicate that the future of stable public finances in the countries with a lower level of development is the introduction of differentiated fiscal rules. In order to obtain stable public finances, it is necessary to apply differentiated fiscal rules in all countries with a lower level of development, since stable public finances are the basis for the development of any economy.

Conflict of interests

The author declares there is no conflict of interest.

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МЕЂУЗАВИСНОСТ ФИСКАЛНЕ КОНСОЛИДАЦИЈЕ И ЕКОНОМСКОГ РАСТА У ЗЕМЉАМА ЕВРОПСКЕ УНИЈЕ СА РАЗЛИЧИТИМ СТЕПЕНОМ РАЗВОЈА

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САЖЕТАК

Појам фискалне консолидације најчешће се помиње у вријеме великих економских криза који су, по правилу, резултат економских шокова изазваних кризама каква је била 2008. године, али и последња криза изазвана пандемијом вируса корона. Тада, по правилу, долази до високог дефицита и/или енормног раста јавног дуга. У таквим околностима многе земље имају потребу за фискалном консолидацијом јавних финансија.

У овом раду анализа је посебно усмјерена на утицај фискалне консолидације на економски раст земаља Европске уније са различитим степеном развоја. Претпоставља се да земље са ниским дохоцима и слабије развијеном економијом имају посебну обавезу и потребу за стабилним јавним финансијама. Исти случај је и са малим и отвореним економијама које су, у великој мјери, изложене стабилности, односно нестабилности земаља у окружењу. Због тога је веома важно да земље са ниским степеном развоја посебно воде рачуна о фискалној стабилности јавних финансија земље.

Кључне ријечи: *јавне финансије, фискална консолидација, дефицит, јавни дуг.*

HARMONIZATION OF THE MARKETING AND ACCOUNTING ACTIVITIES IN THE IMPLEMENTATION OF THE GROWTH STRATEGY

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JEL Classification: M41, M31.

ABSTRACT

This research is an attempt to emphasize the interdependence of the accounting and marketing functions in the segment of the growth strategy implementation with an attempt to increase the market share. In this process, activity-based management and activity-based costing were used as recommended instruments, with analytical activities and implementation (operational) activities in the application of the mentioned strategy considered separately. In both cases, the analysis was performed from the standpoint of the need to identify activities and costs of non-production departments, such as marketing and accounting, by individual cost objects, which are, in this case, target markets where the growth strategy will be applied. In this way, it will be possible to concretize the target character of such costs and an objective approach when linking them to cost objects, because the cost of such activities is pooled out from the costs of marketing department whose costs are mostly budgeted as a unique whole. In operational terms, this will enable a number of decisions, such as: whether to outsource the analysis of the effects of entering new markets or to do it within the company, whether and how to standardize time and costs of non-production activities; whether there is an economic justification for entering new markets based on planned results that include the consumption of resources of identified non-production activities that are commonly "hidden" in the aggregate cost values of these and other functions.

1. INTRODUCTION

Companies that base their own market survival on market share growth strategies face serious challenges posed by growing competition. This type of business challenge implies an appropriate marketing response. The subject of research in this paper is related to identifying the activities of previous analyses within such marketing response, as well as identifying relevant accounting information in measuring the financial and non-financial effects of marketing activities undertaken to enter new markets. Given the complexity of this task, the questions of expediency and the scope of such analysis are always relevant, as well as arguments for confirmation of envisioned effectiveness of the growth strategy and investment which such project implies. The basic goal of this research is to promote cooperation between marketing and accounting department activities, since these parts of overall company's information system are crucial in implementing any kind of strategy. Specifically, this research has been conducted with an aim of proving that harmonizing marketing and accounting activities can contribute to selecting an adequate growth strategy.

What particularly complicates the whole analysis is the fact that the activities of non-production departments (such as marketing and accounting) in the vast majority of companies are financed according to the budget principle, with projected total funds available on an annual basis. Therefore, it is a specific challenge to "pool" the costs of the effect analysis of a certain strategy implementation, from the costs that are only known as a total without omitting them in a specific business decision.

The first step, after a precisely defined growth strategy to increase a market share, is to adequately classify and value the marketing activities, which then need to be implemented. Before and during the implementation of these activities, the management approach implies a symbiosis of marketing and accounting departments. In this particular case, this symbiosis is offered in the form of activity-based management, as universal management concept and activity-based costing, as an accounting concept. This interdependent relationship is just one of many possible examples of why the management accounting is given a strategic importance and its conditionality defined by marketing point of view (Li, 2018, p. 4), especially in still insufficient emphasis on marketing costs (Lewis, 1991, p. 108).

2. LITERATURE REVIEW

It is known that the improvement of business results can be achieved:

- through rationalization – by reducing the consumption of available resources (reducing costs), by reducing investment in fixed and current assets and by increasing revenues based on increased sales prices, and
- through market share growth – by selling more to the existing customers or by expanding the customer base.

Although the literature (Doyle, 2008, p. 110) states that rationalization is a concept of value creation based on accounting assumptions, and that sales growth is a market-based or marketing-based concept, the connection between accounting and marketing approach is caused by both in both cases. Any form of rationalization is not possible without market acceptance or marketing confirmation. This primarily refers to the obligation to preserve the characteristics of the product and services and the way the needs are met in relation to the situation before the "rationalization". Also, the increase in sales prices, as a basis for rationalization, should enable redefining the method or eliminating cooperation with unprofitable customers, which can also affect the increase in business results (Gajic, 2017a), but must be jointly analyzed and implemented in cooperation with marketing department (Macura, 2009, p. 284).

On the other hand, finding the source for increasing business results in market share growth strategies must be supported by appropriate accounting evidence of economic viability before the implementation of such strategy is started, through the planning process (Phillips & Vaux Halliday, 2008), but also after the results of such strategic option have been identified and measured (Rust et al., 2004).

2.1. Application of the growth strategy in the conditions of a globalized market

It is the intertwining of accounting and marketing analysis of the possibility of increasing business results that predominantly motivated the choice of the subject of this research, with the aim of eliminating possible inconsistencies (and sometimes conflicts) between the attitudes of these two functions (Hilton, 1997, p. 212).

The growth of market share, in the conditions of a globalized market, is becoming an increasing challenge for companies (Kotler et al., 2007, pp. 27-29). On the one hand, following the appropriate standards in business will enable easier formal access to markets and customers. On the other hand, the globalization will increase the competitive pressure on the market position of the analyzed com-

pany, because markets and customers are also more easily accessible to them as well. Therefore, companies will be forced to achieve their own economic goals by looking for ways to maintain and strengthen their market position. In this effort, there will be a need for additional spending of resources (additional costs), which will also affect the emergence of additional business risks. Considering that the subject of the research is defined by market share growth strategy, Figure 1 presents its basic options.

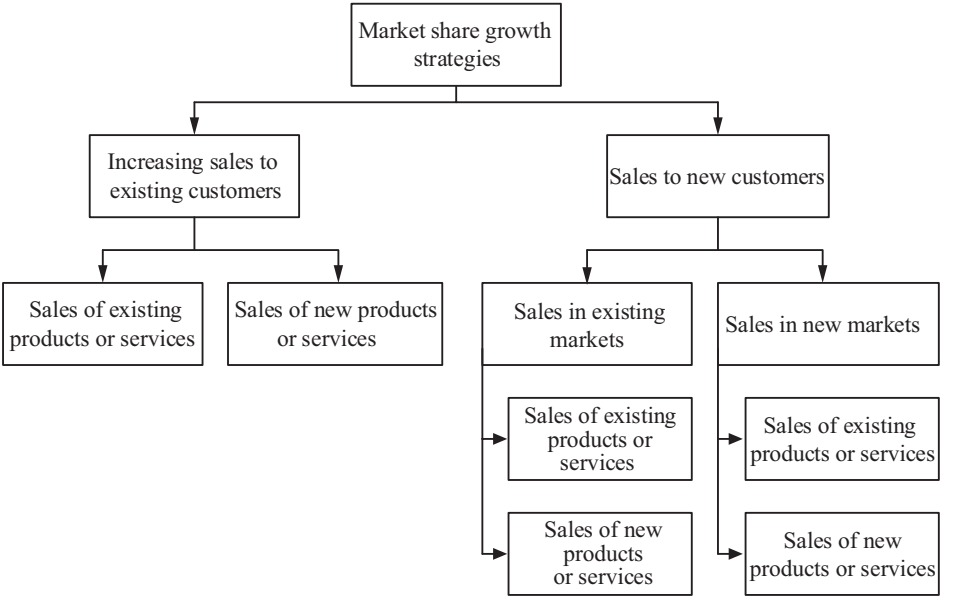

Figure 1. Market share growth strategies

Source: Authors

Increasing sales to existing customers by selling existing products or services entails working to increase their loyalty, with the goal of experimenting less with other companies, either by using the same products or services, or by using substitutes. Another option assumes simply increasing sales to existing customers who are expected to buy more because of a greater need to consume a particular product or because of a greater need to use a particular service.

If a new product or service is offered to the market, and the existing ways of satisfying different customer needs are supplemented, the growth strategy will be based on innovative characteristics or contents of the products or services to meet customer needs.

If the growth of market share and its application to sales to new customers are considered, there are also two possibilities. In the first, new customers are sought in the existing market, and in the second, new customers are sought in the new market.

Such distinctions are very important from the perspective of marketing instruments that will be used in the planned sales growth, which will have an impact on different consumption of resources.

2.2. Identifying analytical activities in the implementation of the growth strategy with the aim of increasing market share

Analytical activities in the implementation of the growth strategy with the aim of increasing market share are given in Figure 2 (note that the presented activities are not listed in details, but grouped in order to simplify and reduce the model due to spatial constraints). Within all three groups of activities, there is a need for their identification and appropriate decisions in regard to the way in which they will be implemented.

a) Activities in target market research, i.e. demand and competition analysis

1) activities on identifying the target market (from the geographical prospective),
2) data collection activities in the target market (technical prospective of the research),
3) analysis of available data, collected in the previous phase, and
4) report preparation on the scope and nature of demand and competition in the target market.

It goes without saying that researching the domestic market is simpler and cheaper. However, if the initial assumptions are that increasing market share in the domestic market is not realistically feasible, it is necessary to examine the possibility of increasing market share in the foreign markets. The selection of the foreign market is a decision made by the management on the basis of defined goals that are in line with the company's "ambitions".

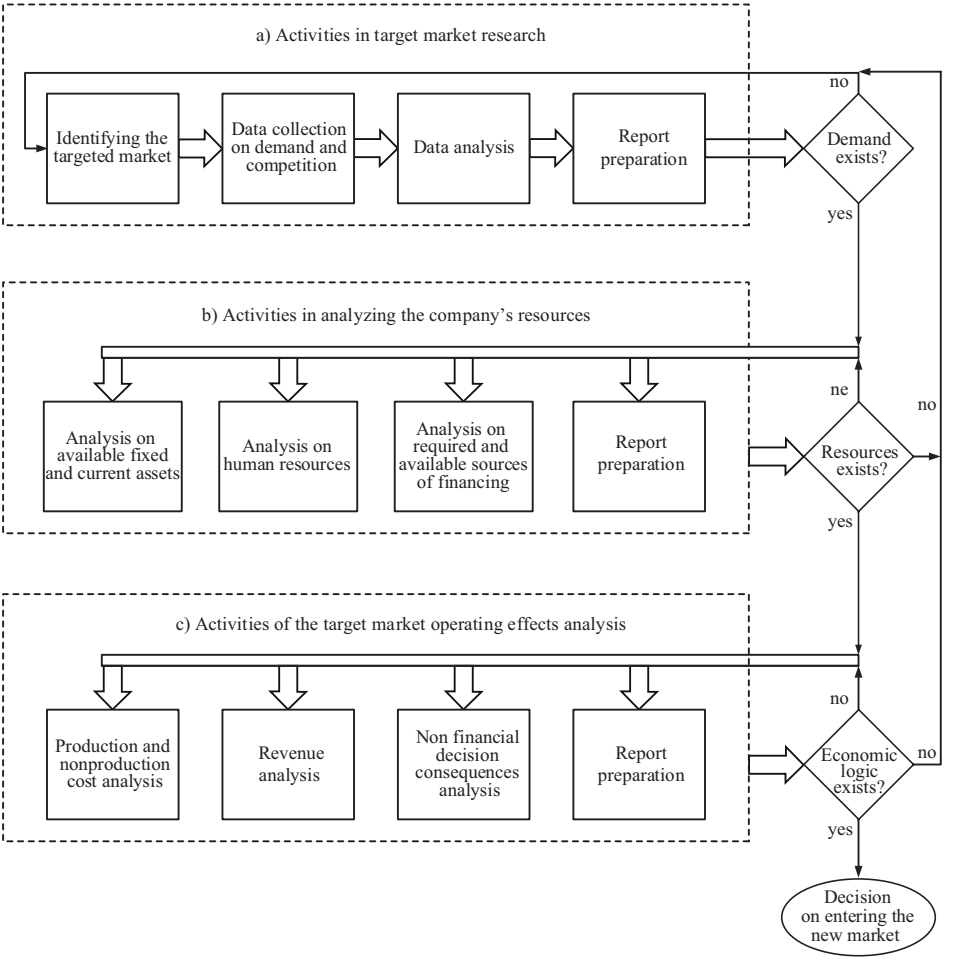

Figure 2. Identifying analytical activities in the implementation of the growth strategy with the aim of increasing market share

Source: Authors

After the decision in respect to the target market has been made, it is necessary to decide on the method of data collection on demand and competition. The division into primary and secondary data sources, in the process, is common. Primary data sources are provided on the basis of research conducted by the company, provided that it has available resources. These resources are, first of all, presented by educated human resources within the appropriate department, which will be engaged in research, and monetary resources. This concept of their own research enables managing the entire market research process from both the

time and content prospective, as well as ensuring a greater credibility during the process of data collection and it reduces the risk of possible external contractors (either individuals or legal entities) misusing the research findings. At this stage, it is necessary to decide how big the sample should be and what the content of input that should be obtained from potential customers in the target market is.

The dominant responsibility for carrying out this activity is on the market research department or, if such a responsibility center does not exist as a separate organizational unit, it may be a part of marketing department. In case the company does not have adequate resources to independently perform the analysis of demand potential, the company can hire specialized agencies or individuals to conduct this type of research. However, regardless of the capability to independently collect data from primary sources, the data from secondary research sources should not be neglected, if they are usable from the standpoint of comparative analysis, but also in order to obtain a more complete picture of the target market. In doing so, such secondary data sources should be carefully assessed, in terms of goals the researchers had in mind, the sample used, and the time when such research was conducted.

Within the activity of obtained data analysis, it is necessary to classify and process the data, first according to the content, and then on the basis of appropriate mathematical and statistical methods, in order to obtain credible arguments for recommendations and conclusions that should follow from such analysis.

In the last phase, the phase in which the appropriate management report is prepared, it is necessary to express a clear statement on whether, under envisioned assumptions, there are adequate demand potentials in the target market. This especially refers to identifying the existing scope and ways of meeting the needs of customers and their satisfaction with this process, which will enable the strength assessment of the existing competition. Also, understanding the need to adjust the existing supply is especially interesting, considering that this type of demand would imply a special calculation on the components of production and perhaps non-production costs as well.

b) Activities in the analysis of the company's resources required to meet the needs of the target market

Unlike the activities of target market research, which have a successive character, the activities of analyzing the company resources and capabilities can be performed simultaneously. Within these activities, analyses are done regarding the requested and available resources in: fixed assets, current assets, human potentials and financial resources.

Based on the identified demand volume and characteristics of the products or services that are demanded, and the current use of existing resources, it is necessary to determine the possible needs for material, human and financial resources in volume, time and quality. These needs are dictated by the scope and content of the stated demand within the previous phase of the analysis.

In case there are enough available resources to meet the identified demand, it is possible to immediately move on to the activities of analyzing the effects of participation in the target market. However, if these resources are not available in sufficient quantities, it is necessary, first of all, to consider the possibilities to finance their procurement. If the financial resources are insufficient, for financing fixed and current assets and additional engagement of human resources, it is necessary to look for external financing opportunities.

The dominant role in conducting this group of activities is played by the accounting department, primarily in the process of preparing planned (pro forma) financial statements, which will provide answers to previously raised questions. The results of the previous phase should be taken into account as they will provide answers to the questions: whether the identified demand can be met by existing products or services or the new ones must be created, and whether the identified demand, at the time of the analysis, is covered by competitors and in what way.

c) Activities in the analysis of the business effects in the target market

If it was previously stated that the demand exists and that there are sufficient resources to meet the demand in the target market, the remaining group of activities refers to determining the business effects in the target market. In this segment, the accounting analysis of additional revenues and additional costs incurred by engaging in the target market is crucial. In doing so, the projection of additional revenues will imply the prior knowledge of whether the usual products or services of the company are sold in the target market or, based on the identified demand from the first phase of the overall analysis, the adjusted products or services. In the case of the same products or services, the production costs would be the same as the costs incurred by the existing products or services. Otherwise, production costs would be different in structure and scope, according to the specification of resource consumption identified in the second phase of the overall analysis. Naturally, the distribution costs would be specific in relation to the existing ones, as well as the costs generated by sales and promotion activities, which would certainly cause different sales prices.[1]

[1] In practice, there are cases in which companies try to offer their products and services at the same prices regardless of the market where they are offered, thus building their own image and

In addition to these financial effects, it is necessary to consider the non-financial consequences of such decision. Among such information, relevant are:

- existence of resources (including employees) which, in the case of maintaining the existing status (without applying the growth strategy), should be reduced to usable measure, by reducing investments or laying off employees,
- endeavor to extend the sales life cycle of their products or services, by offering them to new markets,
- striving to enter certain markets, with a willingness to "endure" short-term modest results or even losses, due to a long-term positive financial expectations,
- available technology and know-how available to customers and similar information.

The dominant role in achieving this group of activities is played by the accounting department, primarily in the process of preparation of pro forma financial statements, especially with planned income statement. The report from this phase of the process implies knowledge of the structure of existing and expected costs after the growth strategy is implemented.

3. RESEARCH RESULTS RELATED TO ACCOUNTING SUPPORT FOR THE IMPLEMENTATION OF THE GROWTH STRATEGY

The basic premise of performing a particular business activity implies that customers are provided with products and services that will meet their needs. From the point of view of the company that carries out such activities, there is an indisputable need for each of them to have the necessary purpose, i.e. to positively contribute to business results. This general statement is valid not only for the implementation activities on the basis of which material resources are consumed, but also for analytical activities that precede or follow the implementation activities, and cause the consumption of intangible resources.

Performing all individual activities: target market research (analysis of demand and competition), analysis of the company's ability to meet the needs of the target market (analysis of the company's potential) and the analysis of the effects of the target market that will certainly cause resource consumption (costs). Their planning, recording, analyzing, measuring and reporting on their effects belong

branding the offer as a unique value that is offered at the same prices anywhere in the world, but there are not many such companies.

to the accounting tasks domain, but it will not be possible without the appropriate support from the marketing department.

The key prerequisite for efficient management of activities relates to accounting records, and analysis and reporting on the results of such individual activities. A specific problem in performing these accounting tasks is related to connecting resource consumption and the results of that consumption in research and analytical activities, and the fact that these results are not tangible, although the results of such activities can cause significant "tangible" consequences.

3.1. Accounting prerequisites for the implementation of the growth strategy with the aim of increasing market share

Unlike the results of activities of creating and realizing the products and services that can easily be related to customer satisfaction, which would further easily determine their target character, activities aimed at analytical activities, such as those on the possibilities and consequences of implementing a growth strategy to increase market share, require special attention when identifying their expediency. From an accounting point of view, each individual activity involves defining relevant financial and non-financial information about the activity, in order to manage them better. Before paying more attention to them, we will say a few words about the general and individual accounting assumptions that support the growth strategy implementation activities.

General accounting prerequisites

In the segment of general prerequisites for accounting engagement, it is necessary to identify the answers on the basis of which the analyzed activities will be performed. In this regard, it is necessary to have answers to the following questions:

- Are planned marketing activities performed internally or they are outsourced to specialized providers of such services?
  In this sense, the key accounting tasks will relate to the analysis and identification of the costs of obtaining such information, and the subject of comparison is the expected costs of payment to the supplier and the costs of their own acquisition of the necessary information.
- Is financing planned marketing activities performed according to the project type, or it will be necessary to use resources from the "general" budget of the organizational part accountable for the activities analyzed?
  Depending on the answer to this question, accounting tasks will vary. Thus, in case that financing is performed on the basis of the obtained funds by

project type, the allocation of such funds is not required, because it is clear which products or services caused such cost. In case of financing from the general budget of the organizational part of the company that deals with such activities, it would be necessary to allocate the resources.

– Is the subject of research the possibility of offering an existing or a new customized product or service for the target market?
The production costs of the existing range of products or services are known, while in the case of an offer of a new product or service, the costs of such an offer have to be calculated and it has to be done in advance.

The estimated value of the information obtained, defined through the results of future decisions, must be higher than the costs incurred in obtaining it. Regardless of whether the planned activities are performed internally or outsourced, it is clear that the expenditure of resources for these purposes must be compensated by the value of the information obtained.

Given that the activities on the implementation of the growth strategy with the aim of increasing market share have been previously identified, it is possible that in the process of accounting support in the implementation of this strategy, the activity based costing is used. According to this concept, the process of producing products (or providing services) is divided into activities to be performed, which, for the purpose of this research, was done in the previous section. In doing so, an activity, as a basic accounting unit, is defined as "any individual task that an organization undertakes to make or deliver a product (i.e. place an order)" (Maher, 2005, p. 218).

Undoubtedly, any activity will cause consumption of resources. In that sense, analytical activities are no exception. However, identifying the appropriateness of resources spending for the purposes of implementing the growth strategy to increase market share is a specific managerial challenge and a need, given that any spending of resources must be linked to the goal of creating and delivering products or services. In this sense, previously defined concept of activities necessary to "create and deliver products and services" to customers should not be taken too narrowly. Thus, for example, market research activities, before starting to "create effects" should not be left out from the accounting analysis, because through the process of accounting analysis such activities will confirm their target character, regardless of the conclusion that result from such a research (whether entry and sale in the target market is justified or not). This is especially important, due to the fact that the key accounting challenge in the cost calculation by cost objects is based on the ability to calculate the costs as accurately as possible. Accurate costing by cost objects, among other things, will allow an ad-

equate condition for two basic marketing decisions: what prices and what sales mix should be used in the target market.

After the activities of the analysis of market share increase in the target market are adequately identified, the costs of individual activities are determined, the cost allocation bases are determined, and then, based on the determined total costs and total usage of the allocation base by specific activity, cost rate per unit is determined. After that, the allocation of costs caused by the specific activity is done. Thus, the general assumption of applying this costing concept is that products or services cause activities, and that activities cause costs. At the same time, if we start from the assumption that the research of customer needs in the target market causes the content of the offer, then the connection between the accounting and marketing functions must be constant and strong.

Methodologically, the calculation of costs on the basis of activities implies the use of a hierarchy of performed activities and costs incurred by those activities, in order to more easily determine the degree and character of the relationship with cost objects, and the cost allocation basis that will allow the best cause-and-effect relationship between cost and its cost objects.

In the mentioned hierarchy, the costs of researching the possibility of implementation of the growth strategy with an aim to enter target markets belong to the costs of sustainability of business and operational readiness of the entire company. They are caused by activities that support business processes or enable the general functioning of the company, and are necessary to maintain the business capacity of the company and do not depend on the number of units, batches or product models. This group of costs includes administrative costs, salaries of company management, depreciation and lease of office buildings, security, maintenance, insurance and the like.[2]

[2] Typically, the activities and costs that occur because of these activities are divided into four hierarchical levels (more details: Gajić, 2017b, p. 346). In addition to already explained fourth level, the following levels are used:

1. Output unit level costs - incurred as a result of activities performed at least once for each unit of product (for example, compiling subassemblies and parts). Common examples of these costs are electricity costs for operating machines, direct material and labor costs, and depreciation of equipment used in a specific activity.
2. Batch level costs - arise as a result of activities performed each time a new batch of products is started, regardless of the number of units in it (for example, adjusting equipment for a batch of products or checking the quality of an individual batch of products).
3. Product sustainability costs - incurred by performing activities related to the production of a particular type or model of product and regardless of the number of batches or units in them (for example, technical support for process modification or product performance improvement activities, product design costs, customer record keeping, customer services, etc.).

In order to successfully apply activity-based costing, the following conditions need to be met:

- The application of the concept is possible from the point of view of general, organizational, technological and financial assumptions.
- Accountants should be familiar with the individual activities performed in the company, in order to identify more easily the bases for cost allocation. This means working closely with technologists and engineers to understand the technological processes, the types of input for individual processes, and the required skills of the workforce.
- In relation to the traditional costing system, within which only indirect production costs are subject to allocation by cost objects, activity based costing allocates all costs, therefore it is necessary to identify all costs that will be subject to allocation by cost objects. For these purposes, the analytical accounting records must be adjusted.
- Within the identified costs by activities, it is necessary to recognize the cost hierarchy. This will make it easier to identify the causes of costs, determine the basis for cost allocation more precisely, and, ultimately, enable more accurate calculation of costs.

Individual accounting prerequisites

The specific accounting tasks depend on the purpose for which the reports are prepared and on their users. External users of financial statements do not have the possibility to understand the relationship between the consumption of resources by the analyzed activities and the results of such spending. Namely, the fact that accounting standards prescribe strict treatment of research costs of the target market, and the costs of analyzing the possibilities of the company's offer and the results of operating on the target market as the costs of the accounting period, does not allow sufficient assumptions to know their expediency. On the other hand, internal users of financial statements may request customized reports with a more precise determination of the cause-and-effect relationship between incurred costs and their results and the type of resource spent, in order to make decisions on an adequate information basis.

a) Accounting support for target market research activities

The identification of the target market will be done relatively quickly on the basis of preliminary general knowledge and assumptions about the potential of the market. Such assumptions are provided by the management of the company (based on defined goals and "ambitions" of the company) in cooperation with the managers of organizational parts dealing with market research, marketing

and sales employees. Accordingly, neither the volume of costs nor the assumed time spent to identify the target market is usually large. In the part related to the remaining research activities of the target market, the key starting question is whether the collection and analysis of data and preparation of reports are done with own resources, within the research and development or marketing department, or whether these activities are outsourced. Relevant financial and non-financial information are given in Table 1.

Table 1. Relevant information when performing target market research activities

Financial information	Nonfinancial information
Costs of researching the target market (own costs or outsourcing costs)	The readiness of the company to obtain the necessary information on the basis of its own resources; Availability of secondary sources of information; Quality (credibility) of collected information; Ability to control the usage of collected information.

Source: Authors

The choice of analyzed options of possible actions (in the segment of non-financial information) is also influenced by the possibilities of performing the remaining activities within the organizational segment responsible for the target market research. It is possible to separate the responsibility for data collection, its analysis and report preparation, and also to entrust to the same organizational part within the company or to outsource.

Non-financial information is primarily outside the scope of accounting tasks, but should certainly be identified and analyzed, before making a final decision on whom to entrust with the task of the target market research.

The determination of the value of previously defined relevant information should be based on the size of the investment required to enter the target market and the estimated risk of failure in the target market due to poorly assessed assumptions when deciding to enter the target market, or due to unexpected changes in these assumptions when starting with the application of the decision. Also, errors that occur due to the abandonment of a particular target market resulting from incorrectly collected data, their incorrect analysis or inadequate reporting can have serious financial consequences, which are expressed in "lost" markets, financially represented with opportunity costs in lost additional profits.

b) Accounting support for the activities in company resource analysis

The activities in company resource analysis (also presented in Figure 2) to meet the requirements of the target market are carried out after the type and volume of

demand in the target market have been identified in the previous phase. Accounting activities in this segment are mainly related to the preparation of planned financial statements: income statement, balance sheet and cash flow statement.

In case that identified needs of the target market can be met on the basis of available resources - fixed and current resources, human resources and financial resources, the management has to consider the expected results of participating in the target market. Otherwise, the possibilities of procuring the needed resources should be explored. At this stage, the relevant financial and non-financial information is presented in Table 2.

Table 2. Relevant information when performing activities to obtain needed resources

Financial information	Nonfinancial information
The cost of procuring the necessary resources, including the cost of financing the procurement	Availability of resources on the market, in the required time, scope and quality; Availability of substitutes of required inputs; Ability to conduct additional trainings for employees.

Source: Authors

c) Accounting support for the activities of the target market operating effects analysis

Previously identified activities generate costs which according to accounting standards cannot be capitalized by their inclusion in tangible assets i.e. inventories, nor can they be part of intangible assets shown in the balanced sheet. Accordingly, the costs of the analyzed activities must be treated as expenses for the period in which they were incurred. Nevertheless, it is necessary to have an accounting confirmation of the previously emphasized importance of the economic justification of the activities related to research of ability to apply the growth strategy. In that sense, all the incurred costs of research activities on possible appearance in the target market must be part of a standard cost-benefit analysis resulting from such a decision.

The effects of the presumed appearance in the new market must be identified in advance, in order to prepare an adequate information basis for the decision, and the relevant information at this stage are presented in Table 3.

Table 3. Relevant information when performing activities to analyze the effects of participation in the target market

Financial information	Nonfinancial information
Additional revenues and additional costs, including all costs of activities related to research of the ability to implement the growth strategy	The impact of the decision on current business results; Opportunities for further growth in the target market; Increasing the market share.

Source: Authors

By implementing and coordinating the activities given in Figure 2, one of the tasks of the accounting and marketing department is to provide sufficient input to decide whether a company can increase business results by applying a growth strategy of entering new target markets.

In order to illustrate the presented accounting activities, let us consider an example, according to which the analyzed company with its own resources is trying to identify the ability to implement the growth strategy in order to increase a market share. These own resources are organized and financed through marketing and accounting department. All activities organized within the marketing department are financed on the basis of the budget principle and the allocated total annual amount of 546,920 BAM. Also, the part of the accounting department, which is in charge of supporting the management activities, is financed on the basis of the budget principle, and the budgeted amount for this department is 239,200 BAM. It should also be noted that the company is engaged in mass production of products that have relatively low sale value.

In the first phase, the subjects of the analysis are three target markets: market "A", market "B" and market "C". In the implementation of the procedure, universal activities (by types) have been defined, and those will be performed in the analysis of all markets: data collection, their analysis and preparation of an appropriate report. The data collection process was performed by using a customized questionnaire for each market, and their preparation required approximately the same time. However, the sample of customers covered by the survey is different due to the size of the market. Thus, in the market "A", the research covered 12,000 respondents, in the market "B" 8,000, while in the market "C" the number of respondents is 5,000. Also, the implementation of the procedure was somewhat different and involved different spending of resources. The stated costs of activities also include the income of employees in these jobs.

In Table 4, all activities performed within the marketing function, costs incurred in these activities, bases for their allocation, as well as the corresponding allocation rates for the annual period are given.

Table 4. Overview of relevant data for the marketing function

Activity	Cost of an activity	Cost allocation base	Usage of cost allocation base	Allocation rate for the costs of an activity
(1)	(2)	(3)	(4)	(5) = (2) / (4)
Managing activities in the department	46,920 BAM	management hours	2.040[3] m.h.	23 BAM/m.h.
Identifying the target market	11,640 BAM	working hours on identifying the target market	120[4] i.h.	97 BAM/ i.h.
Demand and competition data collection	210,560 BAM	working hours on data collection	7.520[5] d.c.h.	28 BAM/d.c.h.
Data analysis	29,280 BAM	working hours on data analysis	480[6] d.a.h.	61 BAM/d.a.h.
Report preparation	17,760 BAM	working hours on report preparation	240[7] r.p.h.	74 BAM/ r.p.h.
Promotion in electronic media	180,000 BAM	average minutes per promotion	360[8] min.	500 BAM/min.
Promotional samples	19,800 BAM	number of finished goods	6.000 f.g.	3.3 BAM/ f.g.
Participation in fairs	20,960 BAM	number of visited fairs	4 fairs	5,240 BAM/f.
Printed promotional materials	10,000 BAM	number of promotional materials	10.000 pcs.	1 BAM/pc.
Total	546,920 BAM	-	-	-

Source: Authors' calculation

The first accounting task relates to the calculation of the associated costs caused by target market research activities. One should first separate the costs of these activities from other activities of the marketing function, and then calculate them by target markets. For these purposes, it is necessary to take into account additional assumptions (used in Table 5):

[3] Number of employees (1) x number of days spent on performing the activity (255) x average number of hours per day spent on a particular activity (8).

[4] Number of employees (3) x number of days spent on performing the activity (5) x average number of hours per day spent on a particular activity (8).

[5] Number of employees (4) x number of days spent on performing the activity (235) x average number of hours per day spent on a particular activity (8).

[6] Number of employees (2) x number of days spent on performing the activity (30) x average number of hours per day spent on a particular activity (8).

[7] Number of employees (2) x number of days spent on performing the activity (15) x average number of hours per day spent on a particular activity (8).

[8] Average number of minutes per promotion (0.2) x number of promotions (1.800).

- the activity of identifying the target market, performed related to three markets where the analysis was conducted, was done within 30 hours, and such costs can be divided into equal amounts by markets (containing mainly only the costs of persons engaged in these activities), because the number of hours spent is approximately the same;
- data collection activity refers to various jobs, where the number of hours spent on data collection by target markets is as follows: market "A" - 553 hours, market "B" - 369 hours and market "C" - 230 hours. In total, 1,152 hours, with 4 workers hired for 8 hours and 36 working days;
- data analysis activities related to target markets are performed according to the following time consumption: market "A" - 46 hours, market "B" - 31 hours and market "C" - 19 hours. In total, 96 hours, with 2 employees hired for 8 hours and 6 working days;
- report preparation is done in a total of 48 hours for all three target markets, and since it is done in a standardized form, it is possible to prepare them in the same way and at the same time (2 employees for 8 hours and 3 working days).

Table 5. Allocation of target market research costs by markets

Cost allocation activities	Market "A"	Market "B"	Market "C"	Total
Target market identification 97 BAM/ i.h. x (10 i.h., 10 i.h., 10 i.h.)	970 BAM	970 BAM	970 BAM	2,910 BAM
Data collection 28 BAM/d.c.h. x (553 d.c.h., 369 d.c.h., 230 d.c.h.)	15,484 BAM	10,332 BAM	6,440 BAM	32,256 BAM
Data analysis 61 BAM/d.a.h. x (46 d.a.h., 31 d.a.h., 19 d.a.h.)	2,806 BAM	1,891 BAM	1,159 BAM	5,856 BAM
Report preparation 74 BAM/ r.p.h. x (16 r.p.h.,16 r.p.h., 16 r.p.h..)	1,184 BAM	1,184 BAM	1,184 BAM	3,552 BAM
Total	**20,444** BAM	**14,377** BAM	**9,753** BAM	**44,574** BAM

Source: Authors' calculation

Based on the given data, it is possible to conclude that 8.15% of the total costs of the marketing function are incurred for research of target markets potential and type of demand. At the same time, it is very important that within the non-production functions (such as marketing, in this example) the scope of spending resources is clearly identified in order to accomplish specific tasks within that

organizational segment and show them separately in relation to the total costs of that organizational segment.

The effect of such costs and the ability of covering them with positive cash flows in the future, depend on the results of the research. Namely, it is possible to conclude that a certain market does not have the assumed demand on the basis of which a decision is made to initiate activities in order to analyze the potential of the company and the sales results in the target market. However, it should not be concluded that the activity of target market research is an activity that does not contribute the value added for the company, and that it should therefore be omitted in the future. As previously stated, such costs are incurred in order to ensure the functionality of the company and avoid wrong decisions, the consequences of which can be much more severe for the financial position of the company.

Another important reason for identifying such costs relates to the need to verify the initial assumption that it is more favorable for the company to conduct its own research on target markets, rather than to outsource them. In this case, if these activities could be outsourced at a price less than 44,574 BAM the financial indicators would suggest that such an action would be reasonable.

Suppose further, within the analyzed example, that the result of "C" market research led to the conclusion that there is not enough demand for the products or services of the company. This would mean that, in relation to this market, no remaining activities will be carried out to support the implementation of the increasing market share strategy, because the strategy itself will not be implemented.

The conclusion for the remaining two target markets may be that sufficient demand for existing products has been identified in the market "A", while sales in the market "B" would mean that the offer has to be adjusted to the specifics of that market. Such conclusion would imply that the analysis of the company's potential should be approached. Also, the identified needs of the market "A" can be met on the basis of available resources, while additional fixed assets should be engaged in order to meet the needs of the demand in the market "B", which would cause an increase in fixed costs by 300,000 BAM.

Let us assume that this is the task of the accounting information system, where the planned cost allocation rate within this department is identified at the level of 115 BAM/hour.[9] Suppose that when analyzing the company's potential and ability to meet identified demand, the planned consumption of 40 working hours is

[9] Unlike the marketing department, due to space constraints, the activities in the accounting department are not broken down, nor are separate rates calculated to allocate the costs of such activities.

planned to collect data and analyze the ability to meet demand in the market "A". To analyze the potential and ability to meet the identified demand in the market "B" the use of 100 working hours is planned. The calculation of the associated costs for these activities is presented in Table 6.

Table 6. Company resource research activity costs allocation

	Market "A"	Market "B"	Total
Allocation of research activity costs to company resource 115 BAM/hour x (40 hours, 100 hours)	4,600 BAM	11,500 BAM	16,100 BAM

Source: Authors' calculation

Also, the task of the management accounting is to identify and analyze the effects of sales in target markets, where the demand and the ability of meeting the demand with company resources have been identified. Suppose that, when analyzing the effects of operating in the market "A" and "B", it takes 10 working hours each. The associated costs of these activities, calculated at the same planned cost calculation rate (115 BAM/hour) for the accounting department are shown in Table 7.

Table 7. Cost allocation of researching operating effects in the target markets

	Market "A"	Market "B"	Total
Cost allocation of researching operating effects in the target markets 115 BAM/hour x (10 hours; 10 hours)	1,150 BAM	1,150 BAM	2,300 BAM

Source: Authors' calculation

An overview of the total costs of researching the ability to implement a growth strategy with the aim of increasing market share, in the example used, is given in Table 8.

Table 8. Summary of costs of the analysis of the ability to implement a growth strategy

Costs by group of activities	Market "A"	Market "B"	Market "C"	Total
Target market research activity	20,444 BAM	14,377 BAM	9,753 BAM	44,574 BAM
Company resource research activity	4,600 BAM	11,500 BAM	-	16,100 BAM
Activity of researching operating effects in the target markets	1,150 BAM	1,150 BAM	-	2,300 BAM
Total	26,194 BAM	27,027 BAM	9,753 BAM	62,974 BAM

Source: Authors' calculation

These costs will reduce the result of the current period when the analysis was performed, but they should not be forgotten while calculating the net effect when considering the final contribution of the "new" markets to overall business results.

It is possible to use the same example to present the effects of sales (based on strategy implementation activities) in the target markets. In this sense, the following should be assumed:

- availability of data on the structure of own costs, according to: types, cost pools and the impact of the scope of activities on their size (division into fixed and variable costs),
- availability of data on prices, as part of the results of research activities of the target market from phase 1 (for markets where the existence of demand has been identified - for the market "A" the selling price would be 4 BAM, and for the market "B" the selling price would be 6 BAM),
- the produced and sold quantities of products will be the same, i.e. the company (due to simplification of presentation and explanation) operates without stocks of unfinished and finished products (for the market "A" the predicted production and sales would be 250,000 units, and for the market "B" 400,000 units,
- unit production variable costs for the market "A" are 3.3 BAM, and for the market "B" predicted unit production variable costs are 4.8 BAM (they are higher due to the necessary corrections in the characteristics of products),
- unit non-production variable costs of promotion in electronic media are predicted on the basis of the planned time of 80 minutes for the market "A" and 90 minutes for the market "B", and promotional samples for the market "A" are planned in 800 units, and for the market "B" in 400 units,
- for the needs of participation in the fair, the costs of 12,000 BAM are planned on the market "A", and for the needs of participation in the fair the costs of 7,000 BAM are planned on the market "B",
- quantity of printed promotional materials for the market "A" is 5,000 pieces, and for the market "B" it is 2,500 pieces.

The planned income statement could have the content given in Table 9.

Based on identified expected annual operating results in the analyzed markets, it is possible to conclude that the profitability rate for the market "A" might be acceptable, while such conclusion for the market "B" cannot be made. Namely, profitability rate of 3.86%, with the expected risk of entering a new market is not a basis for a positive decision. In addition to market risk, one should not forget the production risk that is evident in the situation when it is necessary to make

adjustments to the existing product range. In addition, there are costs of analyzing the possibility to implement the growth strategy from the previous phase (Table 8), which have been successfully identified and can be allocated to the analyzed markets, which will further reduce their operating results. In a similar way, one can think about the costs of products distribution to target markets, so the example could get more complicated in that direction.

Table 9. Planned operating results based on sales in target markets

Elements of the analysis (in BAM)	Market "A"	Market "B"
1. Additional revenues: (250,000 units x 4 BAM/unit); (400,000 units x 6 BAM/unit);	1,000,000	2,400,000
2. Additional variable costs:	875,640	1,997,820
2.1. Variable production costs: (250,000 units x 3.3 BAM/unit); (400,000 units x 4.8 BAM/unit)	825,000	1,920,000
2.2. Variable non production costs**:**	50,640	77,820
2.2.1. Promotion in electronic media: (80 min. x 600 BAM/min.); (90 min. x 850 BAM/min.)	48,000	76,500
2.2.2. Promotional samples (800 units x 3,3 BAM/unit) (400 units x 3,3 BAM/unit)	2,640	1,320
3. Contribution margin (1-2)	124,360	402,180
4. Fixed costs:	17,000	309,500
4.1. Fixed production costs	-	300,000
4.2. Fixed non-production costs:	17,000	9,500
4.2.1. Participation in fairs	12,000	7,000
4.2.2. Printed promotional material (5,000 units x 1 BAM/unit) (2,500 units x 1 BAM/unit)	5,000	2,500
5. Additional operating income (3-4)	107,360	92,680
6. Profitability rate (5 / 1)	10.74%	3.86%

Source: Authors' calculation

Certainly, the whole analysis should be supplemented by non-financially relevant information, which was previously discussed.

4. DISCUSSIONS AND CONLUSIONS

Identification of activities and expected effects caused by those activities when deciding on the implementation of the growth strategy in order to increase the market share will provide adequate information support for making a number of decisions, which must be made in this process. In this way, it will be possible to reduce the production and market risk when deciding to enter new markets. The key decisions related to marketing activists are: whether to conduct own research and analyze the results of research on performance in the target market or to outsource this kind of activity, what research techniques to apply and to what extent, whether to accept correction of existing offers, what prices and what sales mix to use and the like. In parallel and in correlation with these decisions, accounting decisions are needed to be made on the following: how to calculate the costs of such analytical activities, whether to allocate such costs by target markets, and what relevant financial and non-financial information for implementing decisions within the chosen strategy are.

At the same time, the effects of the undertaken research activities exist and they are different for both options of possible decisions that caused those effects. With the first option, in case the decision to enter the target market is made, the subject of accounting comparison will be the expected additional revenues and costs based on sales in that market, with the mandatory inclusion of all costs of analyzing the possibility of implementing a growth strategy. Also, having in mind that the cost of research was incurred at a certain moment of time, and that the revenues will be effective over a longer period of time, it is possible to discount them on the day of investing in the research. With the second option, in case the research led to the rejection of the possibility to enter the target market due to lack of adequate economic justification, the costs of the analysis should not be considered as if they appeared in vain or treated as if they were a sunk costs, because on the basis of research and costs of that research, unprofitable resource use has been avoided.

The impact of the results of the overall process of verifying the ability to implement a growth strategy on how the activity and costs will be defined in terms of cost hierarchy and decisions on whether certain costs will be allocated to cost objects or not, may be crucial regarding the choice to enter a target market. In this way, the effects of research also influence accounting decisions and procedures. In doing so, the measurability of individual activities, regarding the cost-benefit analysis, is a serious accounting challenge. Possible answer to that is presented on the previous pages. In any case, it is clear that the decision must be based on

information, regardless of whether there is a cost object and regardless of the ability to "store" that cost.

There is another aspect of the whole analysis, which should be mentioned. It is a pure marketing concept, according to which entering a certain market or cooperating with certain customers with a relatively small or even a negative financial result can be justified by the expected results in the future, achieved with those or some other customers. In such case investments in new markets are considered more as investments in promotional activities reflected in an increase of the market image, and the effect of which can be expected in the long run on the basis of additional growth of market share on a more profitable bases, even in other markets and not only in the analyzed target market.

Although the goals of this research was to prove the necessity of harmonizing marketing and accounting activities in the application of a growth strategy, further research should show the possibilities of unifying cooperation between these two functions while implementing any kind of strategy, through specific model that would acknowledge all segments of information systems management: collection, processing, analysis, interpretation and reporting relevant information for managing purposes. Also, another direction of further research could provide empirical evidence on the extent to which such strategic decisions are based on accounting information.

Conflict of interests

The authors declare there is no conflict of interest.

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УСАГЛАШАВАЊЕ АКТИВНОСТИ МАРКЕТИНШКЕ И РАЧУНОВОДСТВЕНЕ ФУНКЦИЈЕ У ПРИМЈЕНИ СТРАТЕГИЈЕ РАСТА

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САЖЕТАК

Овим истраживањем је учињен покушај да се међусобна условљеност рачуноводствене и маркетиншке функције нагласи у сегменту примјене стратегије раста при настојању да се повећа тржишно учешће. У том процесу, као препоручени инструменти коришћени су управљање на бази активности и обрачун трошкова на бази активности, при чему су одвојено посматране аналитичке активности и проведбене (оперативне) активности у примјени поменуте стратегије. У оба случаја, анализа је обављена са становишта потребе да се активности и трошкови непроизводних функционалних подручја, каква су маркетинг и рачуноводство, идентификују по појединачним носиоцима, што су у конкретном случају циљна тржишта на којима ће се стратегија раста примјењивати. На овај начин биће омогућена конкретизација циљног карактера таквих трошкова и објективан приступ приликом њиховог везивања за носиоце трошкова, јер је трошак таквих активности „извучен“ из трошкова маркетиншког функционалних подручја чији се трошкови углавном буџетирају као јединствена цјелина. У

оперативном смислу, то ће омогућити бројне одлуке, попут оних о томе: да ли анализу ефеката уласка на нова тржишта повјерити неком ван предузећа или је самостално радити, да ли и на који начин нормирати вријеме и трошкове обављања активности непроизводног карактера, да ли постоји економска оправданост уласка на нова тржишта на бази претпостављених резултата који укључују и трошење ресурса идентификованих непроизводних активности који су уобичајено „сакривени“ у збирним вриједностима трошкова тих и других функција.

Кључне ријечи: *стратегија раста, тржишно учешће, активност, управљање на бази активности, алокација трошкова, обрачун трошкова на бази активности, релевантне рачуноводствене информације.*

POVERTY REDUCTION, INSTITUTIONS AND THE NIGERIAN ECONOMY

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ABSTRACT

The prime goal of the United Nations is to reduce poverty to the barest minimum in all economies of the world. Africa seem to be worst hit by poverty. Nigeria, has also experienced the consequences of poverty in the forms of kidnapping for money, extortion and so on. Although Nigeria has recorded growth in the economy over time, such growth has not succeeded in transforming the economy. This study therefore sets out to examine the relationship between poverty reduction and economic growth through the channel of institutional quality. Trickle-down theory formed the basis for the study which covered the period 1990-2019. Correlation analysis, Granger-causality as well as the Autoregressive Distributed Lag model were used. The study found that an inverse but weak relationship exists between poverty reduction and economic growth. Also, a unidirectional flow exists from voice and accountability (an indicator of institutional quality) to poverty reduction. Moreover, the study found a strong but negative influence of the rule of law on poverty reduction. Therefore, enforcement of law and order is crucial to poverty reduction in Nigeria. In addition, government expenditure on health has had positive impact on poverty reduction, while government expenditure on education has had negative impact on poverty reduction. Hence, government investment in providing more health facilities will help to reduce poverty in Nigeria. However, government should reconsider public spending on education in Nigeria. Government intervention in education should be limited to regulation and the provision of those educational facilities that face the free-rider problem.

1. INTRODUCTION

From the outset of the Sustainable Development Goals (SDGs) in 2015, developed and developing countries alike have been making concerted efforts to achieve sustainable national development. Developing countries have directed their resources towards improving national welfare by generating employment and reducing poverty level. Poverty is relative as defined by the standard of the society in which an individual finds himself. Poverty is absolute when an individual lacks enough resources to get the basic necessities for life. Poverty reflects on the state of well-being of the citizens of a country through low per-capita income and high degree of inequality in income distribution (Kahsu & Nagaraja, 2017).

Poverty exists in both developed and developing countries of the world. In developed countries, poverty manifests in the form of homelessness. However, not every homelessness in developed economies is due to poverty. Poverty in developed economies can be relative or absolute. In developing economies, poverty reflects in the failure of the entire economic systems and as such there are experiences of high unemployment, inequality in income distribution, low per-capita income, high mortality rate, poor infrastructure, weak institutions and political instability to mention a few. Thus, poverty can simply be defined as the inability of the economic system to redistribute the resources of a country in a fair and equitable manner.

Poverty reduction has been a major concern of government in all economies. However, the incidence of poverty seems to be higher in developing economies. World development indicators of the World Bank (2020) revealed that in developing regions like East Asia and Pacific, poverty headcount ratio at $1.9 a day fell from an average value of 28% in the 1980s to 16% in the 1990s, 6% in the 2000s and 1% in the last decade. In Latin America and Caribbean, poverty headcount ratio at $1.9 a day fell from an average value of 6% in the 1980s and 1990s to 4% in the 2000s and 2% in the 2010s. In Europe and Central Asia, the ratio of poverty to the population increased slightly from an average value of 1.5% in the 1980s to 1.9% in the 1990s. Thereafter, the ratio fell to 1.4% in the 2000s and to 0.4% in the last decade. In the case of sub-Sahara Africa (SSA), the ratio of poverty to the population rose from 54.7% in 1990 to 58.47% in the 1990s. Subsequently, poverty headcount in SSA fell to 52% in the 2000s and to 40% in the 2010s. Evidently, the ratio of poverty to the population in SSA region where Nigeria belongs is on the high side compared to other regions of the world.

Generally, the incidence of poverty in Africa (Nigeria inclusive) seems to be greater than in any other part of the world. It was noted that in Africa, real dis-

posable income has been declining, human conditions have greatly deteriorated, food security crisis has been on the increase, malnutrition rate has risen, and quality of health and educational facilities has deteriorated (Okosun, Siwar, Hadi & Nor, 2012). The aim of the SDGs is to achieve sustainable development in the social, economic and environmental spheres by 2030. The prime goal is to eradicate poverty in the world [United Nations (UN), 2015]. However, the above statistics point to the fact that majority of people in Africa are still living in abject poverty.

In Nigeria, though poverty headcount ratio fell from 62% in the 1990s to 53% in the 2000s, the ratio has increased to 59% in the last decade. This upswing in the incidence of poverty in Nigeria has given rise to several ills in the country like ritual killings, rape, robbery, extortion, kidnapping for money, gambling, smuggling of goods, to mention a few. Several government programmes on poverty reduction were floated such as Structural Adjustment Programme (SAP) in 1986, Agricultural Development Programme (ADP) in 1999, Poverty Alleviation Programme (PAP) in 2000, National Poverty Eradication Programme (NAPEP) in 2001, National Economic Empowerment and Development Strategy (NEEDS) in 2004, Vision 20:2020 in 2007, Subsidy Reinvestment and Empowerment Programme (SURE-P) in 2012 and Economic Recovery and Growth Plan (ERGP) in 2017. Also, the Nigerian government have been making efforts to reduce the poverty level through minimum wage laws, empowerment programmes for citizens and other macroeconomic policies. However, the impact of these programmes has not been much felt by a large population of Nigerians. Therefore, the research problem is that despite the efforts to reduce poverty in Nigeria and stimulate economic growth through institutions, the desired structural change seems unattainable.

Scholars have posited that sustained growth in the economy is germane in alleviating poverty. The positive experiences of some countries confirm empirical evidence in the literature that sustainable economic growth reduces poverty (Devangi & Lee, 2013, Dollar & Kraay, 2002). However, other authors hold contrary view with regards to the association between poverty level and growth. The trickle-down theory supports the view that economic growth is instrumental and a key in reducing poverty in a country (Dollar & Kraay, 2002, Ravallion & Chen, 2003). On the other hand, the trickle-up theory strongly opposes such view, claiming that the benefits from the growth process accrue only to the middle class and the rich (Todaro & Smith, 2011). The proponents of the trickle-up theory argue that focus only on higher economic growth has promoted inequality in income distribution. This controversy in the literature has not been unresolved yet.

In Nigeria, the growth process has not had a trickle-down effect on the common man. Though the country has been experiencing economic growth (with the exception of the recession in recent times caused by the lockdown due to corona virus disease pandemic), living standards have not improved and poverty index is still very high. Much empirical work has been done to investigate the reasons for this experience in Nigeria. Empirical literature provides evidence that factors responsible for the superficial growth experience in Nigeria include institutional weakness (Kilishi, Mobolaji, Yaru & Yakubu, 2013), corruption (Atanda, Akanni & Philomina, 2013, Fabayo, Posu & Obisanya, 2011), as well as weak macroeconomic policies (Ijaiya, Ijaiya, Bello & Ajayi, 2011). Previous authors examined the link between economic growth and poverty (Agbasi, Edoko & Ezeanolue, 2018, Bakare & Ilemobayo, 2013, Ijaiya et al., 2011, Okoroafor & Chinweoke, 2013). Others investigated the relationship between institutions and economic growth (Devangi & Lee, 2013, Kilishi, Mobolaji, Yaru & Yakubu, 2013). Also, there are a few studies on the relationship between institutions and poverty (Kilishi, Mobolaji, Yaru & Yakubu, 2013, Atanda, Akanni & Philomina, 2013).

Oyeyinka (2017) examined the link between economic growth and poverty through the channel of institutions (using corruption index). The study found that both corruption and economic growth have significant positive influence on poverty level in Nigeria. Therefore, the study concluded that corruption plays a negative role in enhancing poverty level despite the increasing level of economic growth in Nigeria. Therefore, the current study differs in institutional and governance indicators that were included in the model of the study. This provided a robust outlook on the influence of poor institutional quality on growth-poverty nexus in Nigeria. This study is imperative because Nigeria is currently ranked 146 amidst 180 countries of the world. Furthermore, five years into the commencement of the SDG drive, there is need for a follow-up on the country's performance in order to examine the possibility of achievement of the set goals. Therefore this study aims at:

i. ascertaining the relationship between poverty level and economic growth;
ii. establishing the directional link between poverty level and institutional quality;
iii. investigating the interactive effect of institutional quality and economic growth on poverty level.

The study covered a period of thirty years; from 1990 to 2009. The study period covers the period of various fiscal policies to eradicate poverty in Nigeria. The study is structured to include the following sections. Section Two presents the review of the literature on the relationship between the variables of the study.

Section Three deals with the methodology of the study. Section Four presents and discusses the findings of the study. Section Five concludes the study and provides policy recommendations.

2. REVIEW OF LITERATURE

Literature has proven the importance of economic growth in achieving poverty reduction (Cheema, Magbol & Sial, 2012, Bakare & Ilemobayo, 2013). However, some scholars argued that economic growth is a necessary but insufficient condition for poverty reduction (Mulok, Kogid, Asid & Lily, 2012, Skare, Prziklas & Druzeta, 2016). Dahlquist (2013) argued that well-designed policies as well as investment in education is inevitable for poverty reduction. Furthermore, Agbasi, Edoko & Ezeanolue (2018) using ordinary least square method to investigate the relationship between growth and poverty concluded that improvement in social infrastructure and health should be paramount in the drive towards poverty reduction. The study also noted that poverty reduction programmes should be measurable. Ijaiya, Ijaiya, Bello & Ajayi (2011) using difference-in-difference estimator, corroborated the need for infrastructure development in achieving poverty reduction. The study also noted that huge investment in agriculture, good governance as well as stable macroeconomic policies should be pursued.

With regard to the causal link between poverty and economic growth, some scholars found a causal flow from poverty to economic growth (Nindi & Odhiambo, 2015). Others found no association between poverty and economic growth (Okoroafor & Chinweoke, 2013, Odhiambo, 2011). This conflicting view presents a gap in empirical literature which this current study has tried to fill.

In addition, Kilishi, Mobolaji, Yaru & Yakubu (2013) used Arellano and Bond first difference and Blundell-Bond System Generalized Method of Moment (GMM) to study the relationship between institutions and growth in SSA. The study concluded that institutional quality was the key to SSA's economic performance. Another study by Atanda, Akanni & Philomina (2013) on the relationship between institutions and economic growth used the Dynamic panel regression analytical technique. The study found that the gross domestic product per-capita of SSA citizens (Nigeria inclusive) can be explained by corruption through institutional weakness.

Finally, regarding the relationship between institutional quality and poverty reduction, Tebaldi & Mohan (2010) stated that regulatory quality, the rule of law and voice, and accountability are inversely related to poverty. In addition, corruption, ineffective government and political instability are capable of accelerat-

ing poverty incidence through increased income inequality. Furthermore, Sirajo, Umar, Musa & Haruna (2018) noted that corruption, poor management and supervision, political instability, inadequate infrastructure and lack of transparency and accountability have hindered the effectiveness of previous poverty reduction programmes of the Nigerian government.

In the review of literature, divergent views were presented on the relationship between poverty and economic growth. Therefore, there is a need to establish the causal link between poverty and economic growth. Also, an important role of institutions in the problem of poverty has been identified in literature. Hence, this study has included several indicators of institutional quality in the model, distinguishing it from previous studies in this area.

3. METHODOLOGY

The Trickle-down theory is adopted as a basis for this study. The Trickle-down theory states that the living standard of the poor is positively influenced by economic growth. According to the theory, reduction in tax rate in an economy leaves more money in the hands of the rich, who spend their accumulated wealth in purchasing consumer goods. So, wealth flows downward in the economy so that both rich and poor benefit.

The study follows and adapts the growth-poverty model of Dollar & Kraay (2002). The model specifies poverty as being functionally dependent on economic growth and other determinants of poverty.

$$pov = f(gdp, v) \tag{3.1}$$

Where pov represents poverty level for which household final consumption expenditure (% of GDP) is proxy. In addition, gdp stands for gross domestic product, v represents other variables determining poverty level. Government expenditure on education and health has been identified by Gomanee, Morissey & Verschoor (2003) as social spending that directly influences poverty level. Ellis (2012) noted that corruption increases poverty level by reducing the quantity and quality of public services (for example, health and education) that benefit the poor. By incorporating these other determinants of poverty as well as other control variables in the model, we have:

$$pov = f(gdp, gee, geh, soc, inv, inf, inst) \tag{3.2}$$

Where gee and geh represent government expenditure on education and health respectively, while soc represents social and community services. On the other

hand, inv stands for gross domestic investment, proxy by gross capital formation and inf represents inflation, measured by consumer price index. Finally, inst stands for institutional quality, measured by corruption control, voice and accountability, the rule of law, bureaucratic quality and political stability. Thus, the model can be expressed as:

$$pov_t = f(gdp, geh, gee, inv, inf, cor, voa, rol, buq, pol) \quad 3.3$$

The model can further be specified in econometric form with variables in logarithm form, except for the indices of institutional quality and inflation.

$$lpov_t = \alpha_0 + \alpha_1 lgdp + \alpha_2 lgeh + \alpha_3 lgee + \alpha_4 linv + \alpha_5 inf + \alpha_6 cor + \alpha_7 voa + \\ + \alpha_8 rol + \alpha_9 buq + \alpha_{10} pol + \mu \quad 3.4$$

Where α_0 is the intercept, α_1–α_{10} represent the elasticities of the explanatory variables and μ is the stochastic error term. The a priori expectation is that all the explanatory variables will have positive association with poverty reduction except for inflation. This is based on the conclusion of previous authors like Dahlquist (2013), Bakare & Ilemobayo (2013), Agbasi, Edoko & Ezeanolue (2018) and Atanda, Akanni & Philomina (2013).

Data for this study was sourced from World Bank development indicators (2020), International Country Risk Guide (2019) and Central Bank of Nigeria Statistical Bulletin (2020). The technique of estimation included preliminary analysis like the test for unit roots as well as descriptive statistics of the variables. In order to capture the first objective, correlation analysis was used to ascertain the nature and strength of the relationship between poverty level and economic growth. Thereafter, the second objective on the directional link between poverty level and institutional quality was achieved using Granger-Causality test. The third objective aimed at investigating the interactive effect of institutional quality and economic growth on poverty level was achieved by using the Autoregressive distributed lag (ARDL) model.

ARDL model proposed by Pesaran, Shin & Smith (2001) was adopted for this study. ARDL approach is most suitable for estimating the extent of association between variables with a combination of integration of order zero and one. Also, ARDL allows for different optimal lags for each variable, hence reducing the problem of serial correlation in the explanatory variables. In addition, ARDL is capable of capturing both the short-run and long-run properties of the explanatory variables. Finally, the ARDL Bound test is an easier analytical process compared to other multivariate regression techniques.

In order to examine the extent of influence of economic growth on poverty reduction through the transmission channel of institutions, the ARDL model is specified as follows:

$$\Delta lpov_t = \alpha_0 + \sum_{i=1}^{x} \alpha_1 \Delta pov_{t-1} + \sum_{i=1}^{x} \alpha_2 \Delta gdp + \sum_{i=1}^{x} \alpha_3 \Delta \lg eh + \sum_{i=1}^{x} \alpha_4 \Delta \lg ee + \sum_{i=1}^{x} \alpha_5 \Delta linv$$
$$+ \sum_{i=1}^{x} \alpha_6 \Delta \inf + \sum_{i=1}^{x} \alpha_7 \Delta cor + \sum_{i=1}^{x} \alpha_8 \Delta voa + \sum_{i=1}^{x} \alpha_9 \Delta rol + \sum_{i=1}^{x} \alpha_{10} \Delta buq + \sum_{i=1}^{x} \alpha_{11} \Delta pol$$
$$+ \sum_{i=1}^{x} \alpha_{12} \Delta cor * gdp + \sum_{i=1}^{x} \alpha_{13} \Delta voa * gdp + \sum_{i=1}^{x} \alpha_{14} \Delta rol * gdp + \sum_{i=1}^{x} \alpha_{15} \Delta buq * gdp$$
$$+ \sum_{i=1}^{x} \alpha_{16} \Delta pol * gdp + \gamma_1 lpov_{t-1} + \gamma_2 gdp_{t-1} + \gamma_3 \lg eh_{t-1} + \gamma_4 \lg ee_{t-1} + \gamma_5 linv_{t-1}$$
$$+ \gamma_6 \inf_{t-1} + \gamma_7 cor_{t-1} + \gamma_8 voa_{t-1} + \gamma_9 rol_{t-1} + \gamma_{10} buq + \gamma_{11} pol_{t-1} + \mu_t \qquad 3.5$$

Equation 3.5 is the unrestricted version of the ARDL model, where $\alpha_1 - \alpha_{15}$ are the elasticities of the corresponding explanatory variables, Δ is the difference operator, $\gamma_1 - \gamma_{15}$ are the long-run multipliers of the explanatory variables. Finally, post-estimation tests were carried out to determine the validity of the results obtained.

4. RESULTS AND DISCUSSIONS OF FINDINGS

The first step was to carry out preliminary tests on the variables to determine their levels of stationarity. This was done by using Phillips-Peron (1988) test with intercept alone. The result of stationarity test is presented in Table 1.

Table 1. Results of Unit roots test

Variable	PP statistic	Level	First Difference	Order of Integration
buq	2.97	1.89	4.56	I(1)
cor	2.97	1.72	3.20	I(1)
gee	2.97	1.70	5.11	I(1)
geh	2.97	0.76	3.11	I(1)
inf	2.97	31.37	-	I(0)
gcf	2.97	0.25	5.41	I(1)
gdp	2.97	3.60	-	I(0)
pol	2.97	2.32	3.72	I(1)
pov	2.97	1.50	17.10	I(1)
rol	2.97	2.78	4.01	I(1)
soc	2.97	1.30	7.67	I(1)
voa	2.97	1.12	6.21	I(1)

Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

The results of the unit roots test show that all variables were integrated of the first order except for inflation and GDP which were stationary at level. Literature has established the fact that most macroeconomic variables are usually non-stationary at level. The implication of non-stationarity at level is that the ordinary least square technique of estimation will yield misleading results about the direction and magnitude of the coefficients. The study proceeded to carry out the descriptive analysis of the variables. The results of the descriptive statistics are presented in Table 2.

Table 2. Descriptive Statistics on Variables

	POV	BUQ	COR	POL	ROL	VOA	GCF	GDP	GEE	GEH	SOC	INF
Mean	61.36	1.19	1.53	7.43	2.22	3.10	29.16	4.55	0.02	0.01	23.70	92.49
Median	60.26	1.00	1.50	7.38	2.00	3.29	28.88	4.82	0.01	0.01	23.67	63.88
Maximum	85.63	2.00	2.00	10.50	3.00	5.63	30.05	15.33	0.02	0.01	26.36	301.77
Minimum	34.57	0.00	1.00	4.75	1.00	0.50	28.33	-2.03	0.01	0.01	20.01	6.67
Std. Dev.	13.37	0.50	0.35	1.26	0.58	1.21	0.64	3.98	0.00	0.00	2.24	82.74

Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

Table 2 shows that the mean values of some of the variables are very low, while the mean values of poverty reduction and inflation are quite high. The indicators of institutional quality have very low mean values but they are still higher than the mean values of government expenditure on education (0.02) and health (0.01). Also, the maximum and minimum values of the proxies for institutional quality are higher than those of the maximum and minimum values of government expenditure on education and health. This clearly shows that, on the average, government expenditure on education and health fell below the level of institutional quality for the period under review. However, the maximum and minimum values of other social and community services are higher than those of the indicators of institutional quality. In addition, high maximum (301.77) and very low minimum (6.67) values of inflation show that over the time period, there were great fluctuations in the value of inflation. This is also corroborated by the high value of standard deviation (82.74). The maximum (15.03) and minimum (-2.33) values of GDP shows that there were fluctuations in national output. Notwithstanding, the mean value shows that, on the average, GDP was low (4.55). The study therefore proceeded to investigate the nature and strength of the relationship between poverty reduction and the independent variables of the study as presented in Table 3.

Table 3. Result of Correlation Analysis

	POV	BUQ	COR	INF	GCF	GEE	GEH	POL	ROL	SOC	VOA	GDP
POV	1.00											
BUQ	-0.51	1.00										
COR	-0.31	0.73	1.00									
INF	0.87	-0.36	-0.17	1.00								
GCF	0.78	-0.34	-0.11	0.88	1.00							
GEE	0.78	-0.22	0.03	0.94	0.82	1.00						
GEH	0.40	0.06	0.37	0.59	0.46	0.81	1.00					
POL	0.02	-0.69	-0.44	-0.06	-0.16	-0.12	-0.12	1.00				
ROL	-0.29	0.16	0.31	-0.34	-0.41	-0.16	0.32	0.11	1.00			
SOC	0.82	-0.61	-0.47	0.82	0.88	0.69	0.28	0.09	-0.40	1.00		
VOA	0.77	-0.34	-0.41	0.85	0.76	0.71	0.29	-0.13	-0.33	0.80	1.00	
GDP	-0.06	-0.19	-0.41	-0.17	-0.04	-0.36	-0.63	0.13	-0.61	0.14	-0.05	1.00

Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

Table 3 shows that an inverse relationship holds between poverty reduction and GDP as well as some indicators of institutional quality (bureaucratic quality, corruption control and rule of law), while other variables have positive relationship. Therefore, the hypothesis of no correlation between poverty reduction and GDP with other indicators of institutional quality is rejected. The strength of relationship between bureaucratic quality (-0.51) and poverty reduction is moderate, while that of corruption control (-0.31), rule of law (-0.29) and GDP (-0.06) are weak. This result contradicts Okoroafor & Chinweoke (2013), who hold the view that there is no relationship between poverty level and GDP. The implication of this result is that there is no direct relationship between poverty reduction and GDP. Voice and accountability (0.77), social and community services, government expenditure on education (0.78), gross capital formation (0.78) and inflation (0.87) have positive and strong relationship with poverty reduction. This suggests that there is a co-movement between poverty reduction and these variables. Although government expenditure on health (0.40) and political stability (0.02) have positive relationship with poverty reduction, it is weak. The result of the directional relationship between poverty reduction and the independent variables are presented in Table 4.

Table 4. Result of Granger Causality test

Null Hypothesis:	Obs	F-Statistic	Prob.	Remark
BUQ does not Granger Cause POV	28	0.73	0.49	No causality
POV does not Granger Cause BUQ		1.04	0.37	
COR does not Granger Cause POV	28	2.33	0.12	No causality
POV does not Granger Cause COR		0.13	0.88	
POL does not Granger Cause POV	28	1.92	0.17	No causality
POV does not Granger Cause POL		1.26	0.30	
ROL does not Granger Cause POV	28	0.02	0.98	No causality
POV does not Granger Cause ROL		0.76	0.48	
VOA does not Granger Cause POV	28	7.96	0.00**	Unidirectional
POV does not Granger Cause VOA		2.06	0.15	Causality
GEE does not Granger Cause POV	28	5.16	0.01***	Unidirectional
POV does not Granger Cause GEE		1.59	0.23	Causality
GEH does not Granger Cause POV	28	1.24	0.31	No causality
POV does not Granger Cause GEH		1.39	0.27	
SOC does not Granger Cause POV	28	1.96	0.16	No causality
POV does not Granger Cause SOC		0.16	0.85	
GDP does not Granger Cause POV	28	0.57	0.57	No causality
POV does not Granger Cause GDP		0.41	0.67	
GCF does not Granger Cause POV	28	2.73	0.09*	Unidirectional
POV does not Granger Cause GCF		0.29	0.75	Causality
INF does not Granger Cause POV	28	5.08	0.01***	Unidirectional
POV does not Granger Cause INF		1.84	0.18	Causality

Note: *, ** and *** indicate 10%, 5% and 1% level of significance respectively

Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

Table 4 shows that voice and accountability, government expenditure on education, and inflation granger-cause poverty reduction at 1% level of significance (lsf). Therefore, the null hypotheses of no causality between poverty reduction and these explanatory variables are rejected. Unidirectional relationship exists flowing from the variables to poverty reduction and not the other way round. Gross capital formation also granger-causes poverty reduction at 10% lsf. Therefore, the hypothesis of no causality between poverty reduction and gross capital formation is rejected. Gross capital formation has unidirectional relationship with poverty reduction. The result further suggests that the flow is from gross capital formation to poverty reduction and cannot be the other way round. Also, the result reveals that there exists no relationship between poverty reduction and economic growth. Hence, we accept the null hypothesis of no causal relationship between poverty reduction and economic growth. This aligns with Odhiambo (2011) and Okoroafor & Chinweoke (2013). The result of Bounds test is presented in Table 5.

Table 5. Results of Bounds Test

Test Statistic	Value	k
F-statistic	13.21	9
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	1.63	2.75
5%	1.86	3.05
2.5%	2.08	3.33
1%	2.37	3.68

Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

From Table 5, the ARDL Bounds test provides evidence to the existence of long-run relationship among the variables with the F-statistics greater than k-value. Therefore, the hypothesis of no long-run relationship among the variables is rejected. Also, F-statistics is greater than the lower and upper bounds; even at 1%. The Akaike information criteria graph (Appendix I) shows that the model is well-fitted, with the dependent variable at lag one. The last regressor is captured at the static level, while other regressors have a lag of one. Therefore, the study proceeded to examine the interactive effect of institutional quality and economic growth on poverty level. Table 6 shows the results of the short-run cointegrating equations as well as the long-run form.

Table 6. ARDL Results

Dependent Variable: POV				
Selected Model: ARDL(1, 1, 1, 1, 1, 1, 1, 1, 1, 0)				
Short-run Estimates				
Variable	Coefficient	Std. Error	t-Statistics	Prob.
D(BGD)	2.99	5.84	0.51	0.63
D(CGD)	4.99	4.35	1.15	0.30
D(PGD)	0.51	0.75	0.68	0.53
D(RGD)	-3.36	1.06	-3.18	0.02**
D(VGD)	-1.80	1.83	-0.98	0.37
D(GEE)	-6571.21	3513.53	-1.87	0.12
D(GEH)	61620.65	16589.17	3.71	0.01***
D(SOC)	2.57	2.59	0.99	0.37
D(INF)	0.12	0.15	0.81	0.45
D(BUQ)	-46.61	26.21	-1.78	0.14
D(COR)	1.14	17.06	0.07	0.95
D(POL)	-5.08	5.23	-0.97	0.38
D(ROL)	-40.45	9.70	-4.17	0.01***
D(VOA)	9.46	7.53	1.26	0.26
D(GDP)	-2.06	9.99	-0.21	0.84
CointEq(-1)	-1.68	0.19	-8.69	0.00***
Long-run Estimates				
Variable	Coefficient	Std. Error	t-Statistics	Prob.
BGD	4.79	4.22	1.14	0.30
CGD	-0.36	2.84	-0.13	0.90
PGD	0.00	0.64	0.00	0.99
RGD	-2.44	0.81	-3.01	0.03**
VGD	0.33	1.32	0.25	0.81
GEE	-8027.52	2501.20	-3.21	0.02**
GEH	49451.69	10874.03	4.55	0.01***
SOC	-1.43	1.46	-0.98	0.37
INF	0.07	0.08	0.85	0.43
BUQ	-27.68	15.64	-1.77	0.14
COR	0.67	10.12	0.07	0.95
POL	-3.01	3.24	-0.93	0.39
ROL	-24.03	5.91	-4.07	0.01***
VOA	5.62	4.77	1.18	0.29
GDP	-1.22	5.95	-0.21	0.85

Note: *, ** and *** indicate 10%, 5% and 1% level of significance respectively
Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

The ARDL results show that at least one cointegrating equation exists and the model is significant at 1%. The results of the static form of the model show that in the short-run, the rule of law explains the variation in poverty level at 1% lsf. There exists an inverse relationship between the quality of the rule of law and poverty reduction. A unit deficiency in law and order will lead to about 40 units increase in household final consumption expenditure (proxy for poverty reduction). This implies that the quality of the rule of law impacts negatively the poverty reduction effort in Nigeria. Similarly, in the long-run, rule of law was statistically significant in explaining variations in poverty reduction at 1% lsf. Rule of law had a negative coefficient of approximately 24 units. The implication of this finding is that compromises in the enforcement of law and order will aid poverty reduction drive. In another view, the result may mean that the enforcement of law and order will aggravate poverty level in Nigeria. This contradicts popular view and the position of Tebaldi & Mohan (2010). This finding may be peculiar to Nigeria, where injustice thrives. The poor are usually severely punished by law, while the rich pay their way through to obtain unfair judgement.

In addition, it was found that RGD has a negative coefficient of approximately 3.3 at 5% lsf. The implication of this result is that the interaction between the rule of law and economic growth negatively impacts the poverty reduction. Also, in the long-run, the interaction of the rule of law with economic growth was again found to be inversely related to poverty reduction at 5% lsf. By implication, a unit deficiency in law and order will lead to approximately 2 units improvement in poverty reduction effort. Even though unpopular, this finding may be representative of the Nigerian situation, where the poor suffer unjustly and sometimes have to go against the law in order to earn a livelihood.

The results further show that in the short-run, government expenditure on education was found to be statistically insignificant in explaining variations in poverty level. This implies that the effort of the Nigerian government in funding education may not contribute to the poverty reduction drive. This contradicts Dahlquist (2013), who argued that improvement in the level of education enhances poverty reduction. In the long-run, government expenditure on education was statistically significant in explaining variations in poverty reduction at 5% lsf. A unit increase in government expenditure on education will lead to 8,028 units failure in poverty reduction effort. This finding in a way supports the view that the responsibility of expenditure on education should not be totally that of the government. Government could regulate the operation of stakeholders in the educational sector but should not solely fund education. For example, the feeding of primary school pupils embarked upon by the Federal government of Nigeria has not yielded any remarkable success. However, if the parents of the pupils

were empowered and enjoy good health, physically and mentally, they would be able to provide good food for their children.

Furthermore, in the short-run, government expenditure on health has a positive impact on poverty reduction, which is significant at 1% lsf. A unit increase in government expenditure on health will result in approximately 61,621 units increase in household final consumption expenditure. This finding is in line with that of Agbasi, Edoko & Ezeanolue (2018). Also, in the long-run, government expenditure on health was found to be statistically significant in explaining variations in poverty reduction at 1% lsf. Government expenditure on health has a positive relationship with poverty reduction. The implication of the result is that a unit increase in the expenditure of government on health facilities will bring about approximately 49,451.69 units increase in poverty reduction. Other regressors were found to be insignificant in explaining variations in poverty reduction in Nigeria. However, these variables might have some indirect influence on poverty reduction. For instance, out of the proxies for institutional quality, only the rule of law was statistically significant in explaining variations in poverty reduction. This shows how fundamental the judicial system is to the successful running of the Nigerian state.

Diagnostic tests (Appendix II-V) were carried out to validate the findings of the study. Breusch-Godfrey serial correlation LM test provide evidence to the absence of serial correlation among the variables. The p-value of the F-statistic was insignificant. The insignificance of the p-value of F-statistic in Breusch-Pagan-Godfrey result also shows no evidence of heteroscedasticity among the variables. Furthermore, the insignificant p-value of the F-statistics in the result of Ramsey reset test shows that there is no functional misspecification error. The model is consistent with the data. In addition, the model passed the normality test. With the bell-shaped histogram and the insignificance of Jarque-Bera statistic, it can be concluded that the residual is normally distributed.

5. CONLUSIONS AND RECOMMENTATIONS

The study explored the influence of economic growth on poverty reduction in Nigeria through the channel of institutional quality. Trickle-down theory, which supports the view that poverty reduction can be achieved via economic growth, forms the basis for this study. The techniques of estimation included correlation analysis, granger-causality test and ARDL Bound test. The study found that there exists an indirect relationship between poverty reduction and economic growth. The channel through which poverty impacts economic growth or vice-versa is

yet to be determined. Furthermore, it was found that growth in the Nigerian economy has no directional relationship with poverty reduction. This opposes Oyeyinka (2017) and clearly depicts the situation of superficial growth experience in Nigeria. Also, regarding the directional relationship between institutional quality and poverty, only voice and accountability showed a unidirectional relationship with poverty reduction. Therefore, the study concluded that voice and accountability granger-causes poverty reduction. Holding public officers and politicians accountable in the discharge of their duties, will lead to improvement in poverty reduction efforts in Nigeria.

Finally, an indirect and inverse relationship was found between poverty reduction and economic growth. By implication, as the Nigerian economy grows, there is a loophole that gives way to increase in poverty. This study has identified disregard for the rule of law as the channel through which economic growth impacts poverty in Nigeria. The study found a strong but negative influence of the rule of law on poverty reduction. This finding points to the fact that law and order is often compromised by Nigerian citizens, even the poor, in order to earn a living. This has to be addressed by improving the judicial system. Justice must be fulfilled no matter who is who. The interests of the poor should also be well protected in order to reduce the inequality in income distribution. Government expenditure on health should be improved because it has a positive impact on poverty reduction in Nigeria. Even though education is a public good, government expenditure on education should be strategically directed at providing those facilities that face the free-rider problem so as to avoid the current negative impact that government expenditure on education poses on poverty reduction. These include the building of schools, well equipped libraries and laboratories, as well as the maintenance of the same.

Conflict of interests

The author declares there is no conflict of interest.

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СМАЊЕЊЕ СИРОМАШТВА, ИНСТИТУЦИЈЕ И НИГЕРИЈСКА ПРИВРЕДА

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САЖЕТАК

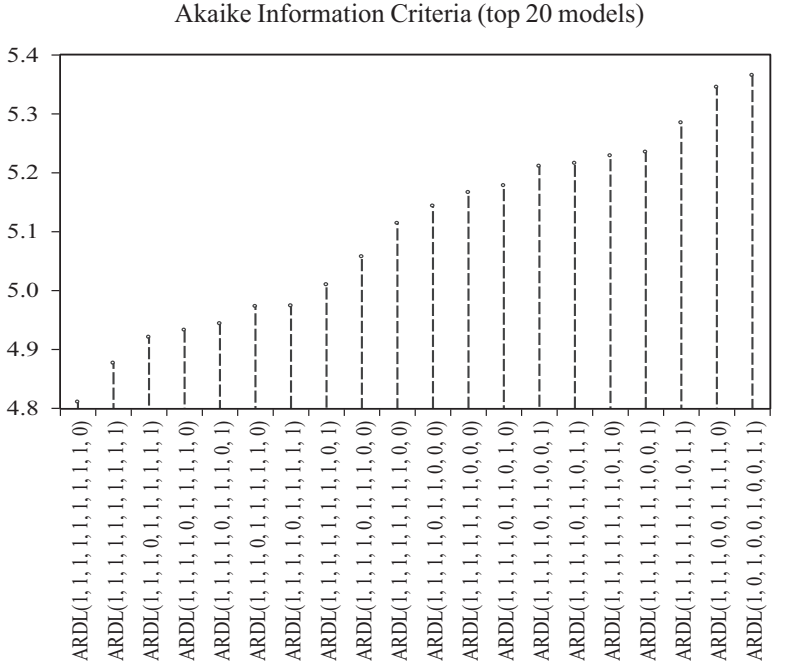
Главни циљ Уједињених нација јесте смањење сиромаштва на најмањи ниво у свим економијама свијета. Чини се да је Африка најгоре погођена сиромаштвом. Нигерија је такође искусила посљедице сиромаштва у виду отмица за новац, изнуда итд. Иако је Нигерија током времена биљежила раст економије, такав раст није успио да трансформише економију. Ова студија стога настоји испитати однос између смањења сиромаштва и економског раста кроз квалитет институција. Теорија прелијевања је била основа студије која је обухватила период 1990-2019. Коришћене су корелациона анализа, Гренџерови узрочно-посљедични односи, као и модел ауторегресивног дистрибуираног заостајања. Студија је открила да постоји обрнута, али слаба веза између смањења сиромаштва и економског раста. Такође, постоји индиректан ток од гласа и одговорности (показатељ институционалног квалитета)

до смањења сиромаштва. Штавише, студија је открила снажан, али негативан утицај владавине права на смањење сиромаштва. Стога је спровођење закона и реда кључно за смањење сиромаштва у Нигерији. Додатно, државни расходи за здравство позитивно су утицали на смањење сиромаштва, док су државни расходи за образовање негативно утицали на смањење сиромаштва. Стога ће владина улагања у пружање више здравствених услуга помоћи у смањењу сиромаштва у Нигерији. Међутим, влада би требало да преиспита јавне расходе за образовање у Нигерији. Владина интервенција у образовању треба бити ограничена на регулацију и пружање оних образовних услуга које су оптерећене са проблемом „бесплатне вожње.

Кључне ријечи: *смањење сиромаштва, институционални квалитет, економски раст, закон и ред.*

APPENDICES

Appendix I: Akaike Information Criteria Graph



Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

Appendix II: Test for Serial Correlation

Breusch-Godfrey Serial Correlation LM Test:			
F-statistics	75.98	Prob. F(2,3)	0.56
Obs*R-squared	28.44	Prob. Chi-Square(2)	0.52

Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

Appendix III: Test for Heteroscedasticity

Breusch-Pagan-Godfrey Heteroscedasticity Test

F-statistics	0.88	Prob. F(24,4)	0.64
Obs*R-squared	24.37	Prob. Chi-Square(24)	0.44
Scaled explained SS	0.82	Prob. Chi-Square(24)	1.00

Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

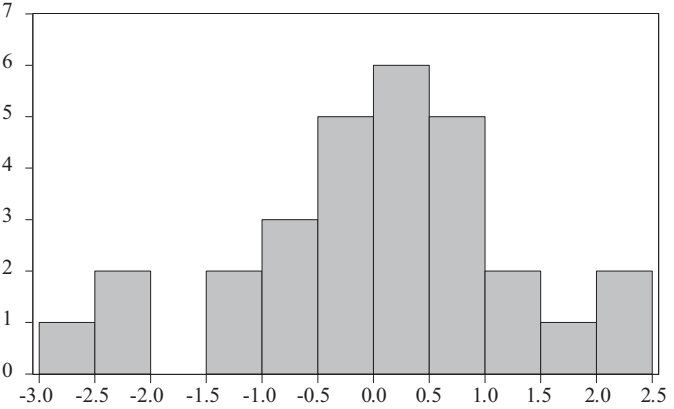
Appendix IV: Test for Specification Error

Ramsey RESET Test

	Value	df	Probability
t-statistics	0.07	4	0.95
F-statistics	0.01	(1, 4)	0.95

Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

Appendix V: Normality Test



Series: Residuals	
Sample 1991 2019	
Observations 29	
Mean	0.000962
Median	0.107541
Maximum	2.192698
Minimum	-2.999003
Std. Dev.	1.192705
Skewness	-0.463563
Kurtosis	3.258435
Jarque-Bera	1.119340
Probability	0.571398

Source: Computed by author (2021) [underlying data from CBN statistical bulletin (2020), International Country Risk Guide (2019) and WDI (2020)]

BORROWING OF THE REAL SECTOR IN THE FUNCTION OF ECONOMIC DEVELOPMENT OF THE REPUBLIC OF SRPSKA

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ABSTRACT

The availability of funds for lending in the economy under favourable conditions is the fundamental and most important function provided by the banking sector, even though its role is crucial in executing payment transactions as well as in providing security in savings products. As per expectations, quantitative analysis shows a very high level of correlation between the changes in the volume of bank loans and the changes in the gross domestic product in the Republic of Srpska. The research of the indebtedness of the real sector in the function of economic development of the Republic of Srpska was conducted on the basis of a representative sample comprising of 188 large companies out of 343 in total. By using the data obtained from the financial statements of the companies, we investigated the extent to which the channeling of bank credit funds affects the financial stability and operations of companies in the Republic of Srpska. The results obtained indicate a high level of use of bank loans for the purpose of ensuring current liquidity and maintaining fixed assets necessary for regular operations. Companies that are more indebted to banks fail to operate more successfully even to the slightest extent. The conducted research indicates a significant volume of loans placed with the aim of providing current liquidity and maintenance of fixed assets and equipment. However, it is particularly significant to alter the credit policy of banks, which would direct a larger volume of bank credit funds to investments.

1. INTRODUCTION

Unadjusted credit policy, as an important part of the real sector borrowing process, is a limiting factor that hinders the banking sector from stimulating investments and development of economic entities. In addition, an important element is the capability of the banking sector to provide sources of financing under the most favourable conditions. The interest of the economy is to have the banks acting in the direction of increasing competitiveness and adapting the credit policy to the needs of business entities.

This paper is based on the empirical research performed on a representative sample of large enterprises operating in the Republic of Srpska. The data required for the analysis of financial indicators have been generated from the financial statements, more precisely - from the balance sheets and income statements of the companies assessed. Statistical data processing was performed by using the SPSS statistical software suite. In the course of data processing and for the purpose of testing the given hypothesis, the statistical methods of regression analysis and correlation were applied.

Given the vast importance of bank loans for the companies' business operations, the fundamental research problem to be considered in this paper relates to the effects of real sector borrowing on the business performance of the companies. This issue is assessed in the context of the analysis of the relationship between the volume of use of bank loans and certain financial performance indicators in large business organizations in the Republic of Srpska.

The purpose of this paper and the research conducted is to obtain new knowledge about the intensity and nature of the connection between the borrowing of the real sector of the Republic of Srpska and certain financial performance indicators of the development of economic entities. Likewise, this paper shall attempt to point out the effects of borrowing of the real sector of the economy in the conditions of the existing credit policy of banks.

1.1. The Role of Banks Credit Policy in Real Sector Borrowing

Credit policy is usually defined as a set of principles followed by the bank's managerial structures in the course of deciding on credit placements (Muratović, 2013). It is "a segment and the most important part of the bank's business policy, aimed at achieving the expected profit rate with an acceptable risk level". The credit polices of banks represent an important foundation both for the indebtedness of enterprises and the economy on the one hand, and for the operations of banks on the other. Banks obtain the highest revenues from the active interest

rates and through defining an adequate credit policy with respect to the conditions existing in the economic environment, which can make their operations more secure and profitable. Such policy should be based on the assumption that at the time of approving a loan, a bank should respect the market criteria in the process of classifying clients to the ones able and capable of doing business and those without a healthy business perspective.

The credit policy should be viewed not only from the perspective of obtaining short-term benefits, but also from a considerably broader standpoint, i.e. it is necessary to establish long-term goals (Jurman, 2007). From the aspect of banking operations, it is necessary to adapt the bank's credit policy to the capabilities of its own credit potential and liquidity (Miletić & Bingulac, 2016). The research (Hamid, 2012) found that banks with a lower "capital adequacy ratio", poor liquidity, higher active interest rates (which indicated a more liberal credit policy) and a higher "loans placed to assets ratio" failed to overcome the conditions of the crisis. Likewise, the liberal policy of lending to the clients with poor credit standing proved to be profitable in the short term, but in the long run, highly unfavourable for the banking and overall financial system. The research (Okirika, 2011) suggested that such practice is common in developing countries and that it particularly involves medium-sized and small banks.

It is evident that credit policy must be based on numerous aspects that affect the business of a company, since most financial and accounting information is subject to a certain risk of actually being less than a credible presentation of what they claim to represent (Jahić, 2008). A superior and more comprehensive assessment of the client's financial situation and the risks to which he/she is exposed to is obtained through the International harmonization of banking control and supervision aimed at introducing a unique set of accounting standards for the purpose of improving the transparency and mutual comparability of financial information in order to ensure their quality, sufficiency and timely deliverance (Bašić, 2012).

The research (Emuwa, 2015) found that the introduction of specific credit analysis methods that emphasize factors of the business environment, specialized staff, specific organizational units and more detailed monitoring which includes regular visits to clients, may significantly increase the bank's loan portfolio and income.

1.2. Properties of the Banking Sector of the Republic of Srpska

The ownership structure of the capital of banks operating in the Republic of Srpska is dominated by the participation of foreign private ownership, includ-

ing foreign state ownership. A high level of legal and regulatory compliance has been established, whereby the banking sector of the Republic of Srpska can be classified as conservative banking with deposits as the main source of business and loans as their fundamental product. All the banks have a certificate of membership in the Deposit Insurance Program of Bosnia and Herzegovina.

Fundamental indicators of banking sector operations as of 31 December 2018 are (Banking Agency of the Republic of Srpska, 2019, pp. 2-4):

- The banking sector of the Republic of Srpska consists of 8 banks with a total of 2,965 employees which operate in the territory of the Republic of Srpska through a network of 132 branches and 160 other organizational units;
- Total assets of the banking sector as of 31 December 2018 amounts to 8,781.8 million BAM with a growth rate of 9% compared to the end of 2017, and consists of balance sheet assets in the amount of 7,760.1 million BAM with a growth rate of 10% compared to the year before and off-balance sheet assets in the total amount of 1,021.7 million BAM with a decrease of 2% compared to the end of 2017;
- Cash assets (2,023.8 million BAM) accounted for 25% of total balance sheet assets with a growth rate of 29% compared to the end of the year before (significant impact of growth of deposits, especially household deposits, as well as deposits of private companies and corporations). In the cash assets structure, the largest share belongs to the funds of the reserve account with the Central Bank of Bosnia and Herzegovina in the amount of 1,413.6 million BAM or 70% of the total cash assets with a growth rate of 25%;
- Investments in securities for trading amount to 762.5 million BAM, which is 9% of total assets and compared to the end of 2017, an increase of 145.5 million BAM or 24% was achieved, which for the significant part includes bonds of the Republic of Srpska;
- Total gross loans (5,005.9 million BAM) accounted for 61% of gross balance sheet assets with a growth rate of 3% compared to the end of 2017 (4,869.9 million BAM), whereby their share in gross assets decreased by 4 percentage points. Lending activities of the banking sector of the Republic of Srpska in 2018 were mainly focused on the retail sector and the sector of private enterprises and companies, which together have a share of 83% in total loans. The share of loans of individual sectors in total loans did not change significantly compared to the situation from 31 December 2017, so the most significant share is still comprised of personal loans (46% of total loans), followed by the private enterprises and companies sector

(37% of total loans), government and government institutions (11%) and public and state enterprises (5% of total loans);

- Non-performing loans (loans classified in several risk categories as "C", "D" and "E") amounted to 477.5 million BAM and were lower by 11% or 61.8 million BAM compared to the end of 2017. The share of non-performing loans in total loans (9.54%) recorded a decreasing trend (by 1.53 percentage points) compared to the end of 2017 (which then amounted to 11.07%). The share of non-performing corporate loans in total corporate loans was 11.39% (as of 31 December 2017 it was 13.35%), while the share of non-performing retail loans in total retail loans was 7.36% (on 31 December 2017 it was 8.27%);
- The coverage rate of total non-performing loans with reserves, according to the regulatory requirement was 69% and was improved compared to 31 December 2017, when it amounted to 65.73%, while the coverage rate of non-performing loans with value adjustments amounted to 69.39% and also increased;
- Deposits, as the main source of financing operations of banks, with a share in the structure of liabilities of banks' balance sheets of 78%, amount to 6,050 million BAM and are higher by 668.8 million BAM, thus recording a growth rate of 12%. According to the sectoral structure, retail deposits have a share of 56% with a growth of 310.8 million BAM or at a rate of 10%, and deposits of private enterprises and companies have a share of 15% with a growth of 201 million BAM or at a rate of 27%. Likewise, there was an increase in deposits of government and its institutions by 18%, public and state enterprises by 13%, and non-profit organizations by 15%;
- The growth trend of total savings of citizens, including current accounts of citizens, continued during this reporting period (as of 31 December 2018 they amounted to 3,207.7 million BAM) at a growth rate of 10% compared to the end of 2017 (2,908.6 million BAM);
- The total balance sheet capital of banks amounted to 965.5 million BAM and accounted for 12% of total liabilities and recorded an increase of 1% compared to 31 December 2017, while the regulatory capital as of 31 December 2018 amounted to 879.4 million BAM and is higher by 96.2 million BAM, thus registering a growth of 12% compared to 2017;
- Regulatory capital rate of the banking sector of the Republic of Srpska as of 31 December 2018 amounted to 17.66% and is higher by 5.66 percentage points compared to the specified regulatory capital minimum rate of 12%. Other capital ratios (core capital ratio and regular core capital ratio) are also significantly higher than the specified minimum;

- The banking sector of the Republic of Srpska met the predefined conditions for maintaining liquidity in the period from January to December 2018;
- The total average effective interest rate on loans for 2018 was 5.66% and it was lower by 0.38 percentage points compared to 2017;
- The weighted average effective interest rate on deposits of banks in the Republic of Srpska in 2018 amounted to 0.63% and it was lower by 0.26 percentage points compared to the average in 2017 (0.89%);
- At the level of the banking sector of the Republic of Srpska in 2018, the net profit (seven banks) in the total amount of 85 million BAM was reported and was lower by 12% compared to 2017, when all eight banks reported a net profit in the amount of 96.2 million BAM. In 2018, one of the banks reported a loss of 10.8 million BAM;
- There are 51 organizational units operating in the Republic of Srpska, which are part of 7 banks headquartered in the Federation of Bosnia and Herzegovina, and they placed loans in the amount of 1,372.6 million BAM or 22% of total loans placed in the Republic of Srpska with a growth rate of 10% compared to the end of 2017. These organizational units collected a total of deposits in the Republic of Srpska in the amount of 768.8 million BAM or 11% of total deposits with a growth rate of 7%.

Taking into account the above indicators on the banks' operations, it can be stated that the banking system of the Republic of Srpska maintained its stability, adequate capitalization, satisfactory liquidity and profitability.

2. MATERIALS AND METHODS

Given that the banking sector has a multidimensional impact on the development of a national economy and that it played a very unpredictable and significant role during the global economic crisis, the interest in studying and elucidating the nature of the relationship between bank credit policy indebtedness and financial parameters of loan users within the national economy has grown. Quantitative analysis showed that in the Republic of Srpska, as expected, there is a very high level of correlation between the change in the volume of bank loans and the change in gross domestic product. One of the issues of the research conducted in this paper is the question of the impact of the purpose and scope of borrowing of the banking sector on the national economy performance. The subject of the research are large enterprises in the Republic of Srpska, assessment of the theoretically defined relations between lending policies within the banking sector, financial indicators of economic performance, as well as determining the nature of

the relationship between corporate borrowing and financial performance of economic entities. The aim of the research is to determine the cause-and-effect relationship and the intensity of the relationship between the credit borrowing and the efficiency of the financial performance of the economy. The basic hypothesis is directly derived from the problem the research is focused on and, therefore, it reads: "Adequate volume and structure of borrowing of economic entities contribute to the financial stability of the economy of the Republic of Srpska." On the basis of the amount and manner of borrowing in the banking sector and its impact on the financial performance of the economy, we shall explain the necessity to adjust credit policy to the economic environment in order to increase financial stability and competitiveness of the domestic economic system.

The research of the volume and structure of indebtedness of economic entities in the Republic of Srpska was performed on the basis of a representative sample which includes 188 large companies, 343 of them in total. The provisions of the Law on Accounting and Auditing of the Republic of Srpska (Official Gazette of the Republic of Srpska, no. 94/15) were used as sorting criteria on the basis of volume. Using the data from the financial statements, we investigated the extent to which the direction of bank credit funds affects the financial stability and operations of companies in the Republic of Srpska.

3. RESULTS

The analysis of the financial statements of the companies from the representative sample indicates that a large portion of the companies does not feature satisfactory financial indicators. The amounts of certain balance sheet items in these companies are outside of the scope of the reference values that would indicate a stable and successful operation of the company. We classified financial indicators into five groups: liquidity, leverage, activity, efficiency and profitability indicators (or ratios). The results of the analysis are shown in the following table.

Table 1. Financial Indicators Analysis Results

	Number of companies for which the financial indicator meets and does not meet the reference value			
	Meets the value	%	Does not meet the value	%
Liquidity Indicators				
Current Liquidity Ratio	130	69.15	58	30.85
Quick Liquidity Ratio	75	39.89	113	60.11
Cash Ratio	62	32.98	126	67.02
Financial Stability Ratio	126	67.02	62	32.98

	Number of companies for which the financial indicator meets and does not meet the reference value			
	Meets the value	%	Does not meet the value	%
Leverage indicators				
Debt to Assets Ratio	91	48.40	97	51.60
Equity to Assets Ratio	81	43.09	107	56.91
Debt to Equity Ratio	85	45.21	103	54.79
Times-Interest-Earned Ratio	172	91.49	16	8.51
Coverage Ratio I	86	45.74	102	54.26
Coverage Ratio II	127	67.55	61	32.45
Activity Indicators				
Total Assets Turnover Ratio	103	54.79	85	45.21
Current Assets Turnover Ratio	175	93.09	13	6.91
Fixed Assets Turnover Ratio	141	75.00	47	25.00
Accounts Receivables Turnover Ratio	39	20.74	149	79.26
Days Sales Outstanding (DSO)	39	20.74	149	79.26
Efficiency Indicators				
Total Activity Ratio	172	91.49	16	8.51
Operating Activity Ratio	171	90.96	17	9.04
Financial Activity Ratio	64	34.04	124	65.96
Extraordinary Activity Ratio	79	42.02	109	57.98
Profitability Indicators				
Net Profit Margin Ratio	29	15.43	159	84.57
Gross Profit Margin Ratio	16	8.51	172	91.49
ROA (Return on (total*) Assets)	108	57.45	80	42.55
ROE (Return on (total*) Equity)	91	48.40	97	51.60
Average number of companies	98.35	52.31	89.65	47.69

Source: Data processing performed by the authors

By using regression and correlation analysis, we strived to assess, on the basis of the data from the financial statements, the extent to which the use of short-term and long-term loans contributes to the improvement of financial indicators of companies from the representative sample. As an independent variable, we used the relative share of short-term and long-term loans in short-term and long-term liabilities, respectively. As dependent variables, we used financial indicators obtained by analyzing the companies' balance sheets. The following table contains the results obtained.

Table 2. Correlation Analysis Results of Financial Indicators

Independent variable	Dependent variable	Correlation coefficient
Share of total loans in total liabilities	Net profit margin	0.06262
Share of total loans in total liabilities	ROA (Return on (total*) Assets)	-0.07021
Share of total loans in total liabilities	ROE (Return on (total*) Equity)	0.04748
Share of short-term loans in short-term liabilities	Current Liquidity Ratio	-0.09736
Share of short-term loans in short-term liabilities	Quick Liquidity Ratio	-0.08850
Share of short-term loans in short-term liabilities	Cash Ratio	-0.08117
Share of long-term loans in long-term liabilities	Financial Stability Ratio	-0.05300
Share of total loans in total liabilities	Total Assets Turnover Ratio	-0.05110
Share of total loans in total liabilities	Current Assets Turnover Ratio	0.02233
Share of total loans in total liabilities	Fixed Assets Turnover Ratio	-0.11385
Share of total loans in total liabilities	Accounts Receivables Turnover Ratio	0.09803
Share of total loans in total liabilities	Days Sales Outstanding (DSO)	-0.01492
Share of total loans in total liabilities	Total Activity Ratio	-0.06569

Source: Data processing performed by the authors

In the analysis of financial indicators from the table above, we individually assessed three independent variables, i.e. in addition to the share of total loans in total liabilities, we singled out the share of short-term loans in short-term liabilities and the share of long-term loans in long-term liabilities. The values of each of the independent variables were then analyzed together with the corresponding financial indicators. In this section, the important role of the analysis of financial statements is particularly emphasized, as their fundamental task is to provide the information basis necessary for making decisions that ensure more successful and secure operations. As in the case of independent variables, we also separated the dependent variables depending on their sensitivity to certain types of sources of funding, i.e. to the maturity of the provided sources of financing. Thus, we analyzed the use of short-term loans with liquidity indicators, the use of long-term loans with financial stability indicators, while the total credit indebtedness of companies was analyzed using the efficiency and profitability indicators. In each of these three cases, very low values of correlation coefficients were obtained, amounting to approximately 0. On that basis, it was found that the results of correlation analysis of financial indicators did not indicate the interconnectedness and conditionality of bank loans, on the one hand, and the quality of business operations of sampled companies, on the other hand.

In addition to the above, a correlation model was formed in which the coefficient of participation of total loans in total liabilities of the companies was used as an independent variable, while the number of financial indicators of the companies

that fall within acceptable reference values was used as a dependent variable. Similar to the previous model, in doing so we attempted to establish a link between the volume of use of bank loans and the financial performance of the companies. The results of the correlation analysis are shown in the following table.

Table 3. Results of Correlation Analysis of the Sampled Companies (188 companies)

Independent variable	Dependent variable	Correlation coefficient
Share of total loans in total liabilities	Financial indicators that meet the reference criteria	-0.22508

Source: Data processing performed by the authors

The results obtained in this case indicate a very weak negative conditionality between the volume of use of bank loans and the number of financial indicators with values that are within satisfactory reference limits. The negative value of the ratio, which amounts to -0.22508, indicates the conclusion that companies that are more indebted to banks have, in all aspects of the financial indicators analysis, a lower operational quality and less successful business than less indebted companies.

Previously obtained results are confirmed by regression analysis of the indicators used. Regression analysis results are shown in the following charts.

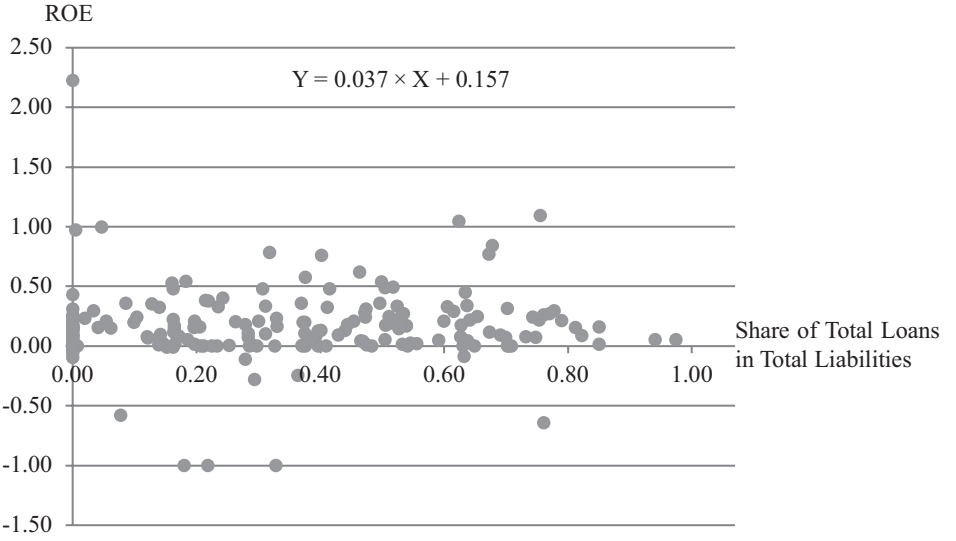

Chart 1. Results of Regression Analysis of Loan Share in Liabilities and ROE

Source: Data processing performed by the authors

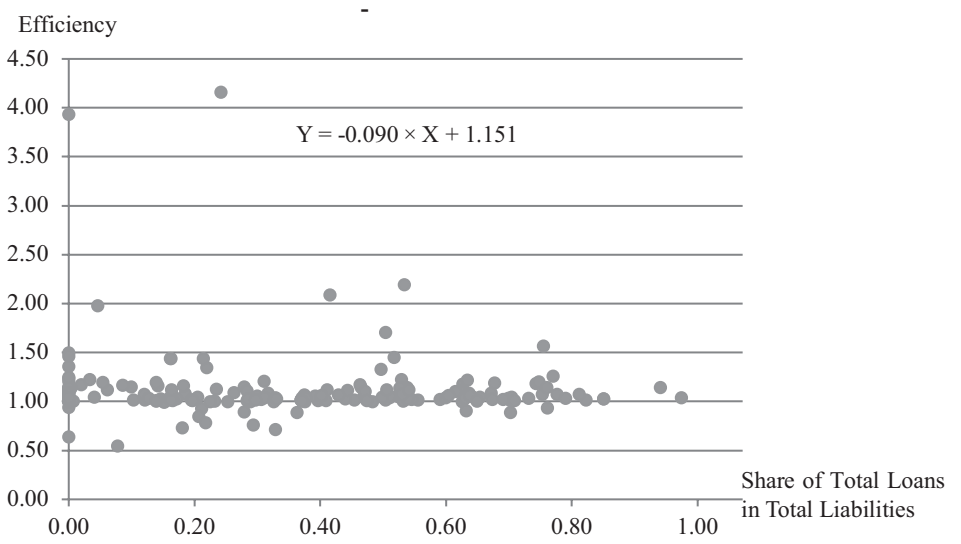

Chart 2. Results of Regression Analysis of Loan Share in Liabilities and Total Activity

Source: Data processing performed by the authors

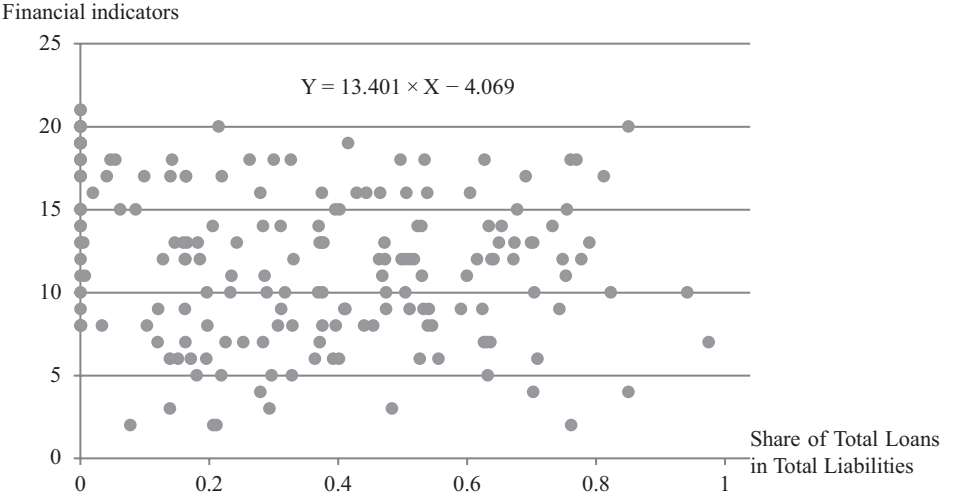

Chart 3. Results of Regression Analysis of Loan Share in Liabilities and Financial Indicators

Source: Data processing performed by the authors

The results obtained from the regression and correlation analysis indicate a high level of use of bank loans for the purpose of ensuring current liquidity and maintaining fixed assets necessary for regular operations. Companies that are more

indebted to banks fail to operate more successfully even to the slightest extent. In addition, in the case of the analysis in which the share of total loans in total liabilities and the number of financial indicators with satisfactory values were observed, the result indicated a very weak negative conditionality of the stated values. This indicates that most companies use bank loans only when they run into financial difficulties, i.e. when having an insufficient level of liquidity and solvency to settle current business liabilities.

If we were to observe the companies' operations from a long-term aspect, the results obtained indicate a lack of special-purpose loans approved by the banks whose purpose is to finance projects that enable more successful business operations. Unlike loans intended for settling current business liabilities and maintaining fixed assets, the existence of investment loans approved on the basis of good quality project documentation creates greater preconditions for improving the value of all financial indicators of the companies (Aralica, Račić, & Šišinački, 2007). The results of the financial analysis indicate an insufficient number of such loans, i.e. a lack of project financing of companies.

4. DISCUSSIONS

Credit borrowing is an important element in the operations of large enterprises and their financing, particularly if we take into account demanding development projects where the emphasis is on ensuring market viability and sustainability. On the other hand, the credit policy of banks needs to be adjusted as much as possible to the economic environment, whereby special attention should be paid no only to project financing, but also to other forms of corporate financing. In doing so, banks would create preconditions for the development of the real sector, as well as a greater degree of harmonization between the real and financial sectors, which is one of the key factors of financial stability of the national economy (Krnić & Radošević, 2014).

Insufficient financial discipline within the entire economic system of the Republic of Srpska is the reason why banks are more exposed to credit risk. The missing funds in the budget of the Republic of Srpska, as well as in the budgets of local self-government units, have been compensated for many years by borrowing from commercial banks. There are situations where cities and municipalities find it difficult to meet their obligations to commercial banks since their expenditures are significantly higher than budget revenues (Supreme Office for Public Sector Auditing of the Republic of Srpska, 2015). Loans to the Government and government institutions in 2016 amounted to 576 million BAM, which

is 18% less than in 2015 when they amounted to 706 million BAM. Similarly, the decline in 2015 compared to 2014 (when the loans amounted to 765 million BAM) was 8%. The decline in lending to public and state-owned enterprises in 2016 is also evident (10% compared to 2015). This trend is the reason why banks in the Republic of Srpska, when creating their own credit policy, place less and less emphasis on lending to the government and government institutions, which additionally emphasizes the role of the real sector in increasing the volume of credit placements and increasing the quality of the loan portfolio.

It is necessary for banks to make a greater effort to manage credit risk by a more detailed analysis of project documentation and the overall business of an enterprise, as well as by macroeconomic research of the industry within which the enterprise operates. As for the project financing model, the related project development is financed by a loan that is to be repaid from the revenues generated by the project, while assets whose value increases with the level of project implementation are used as a collateral to secure collection. The credit policy of banks, within which an adequate analysis of project documentation and an appropriate financing structure of large companies would allow the stimulation of project financing to a greater extent, should further create preconditions for increasing the volume of investment loans, on the one hand, and for enterprise and real sector development, on the other. A quantitative study (Yang, 2016) indicates the possibilities of applying the credit risk assessment model to the assessment of other types of risks in other sectors of the economy. Similarly, the study (Falangis, 2013) focused on the creation of mathematical models aimed at assessing the eligibility of clients for funding and it was successfully comparatively tested with other selection methods. Through a quality selection of development projects and favorable sources of financing, the banks direct economic flows in the area of the economy in which it remains most competitive. This further creates the preconditions for new investments and development opportunities.

A greater focus of banks' credit funds on investments is of particular importance. The conducted research indicates a significant volume of loans placed with the aim of providing current liquidity and maintenance of fixed assets and equipment. Such placements do not enable the growth and development of companies and do not lead to the improvement of the companies' business performance. If we were to take into account the relationship between the financial and real sectors within the national economy, we can conclude that the development and volume of investments in the real sector represents an important factor for the functioning of banks and the basis for the placement of their credit potential.

The development of the real sector generates a feedback effect that further creates preconditions for the banking sector for more efficient placement of credit potential, as well as for increasing the volume and quality of the loan portfolio. By analyzing the financial indicators of the companies from the representative sample, we did not establish that the companies' credit indebtedness has any positive effects on their growth and development, but only on fulfilling the conditions regarding current liquidity and maintenance of equipment and fixed assets. By directing credit indebtedness of companies towards a larger share of investment loans approved on the basis of project documentation, the conditions would be created for a higher level of justification of using bank loans, i.e. more indebted companies would have higher presumptions for better financial indicators compared to the companies not using bank loans. In addition, opportunities would be created for the positive effects of the feedback that would be generated as a result of investment effects within the real sector to stimulate further development and improvement of operations in the banking sector.

5. CONCLUSIONS

Nowadays, loans are emerging as one of the most important instruments for the development of the overall economic activities of any country. It is precisely the banking sector that plays a key role in the process of securing sources of financing for the purpose of economic growth and social development. Quantitative analysis has shown that the Republic of Srpska is expected to achieve a very strong positive link between the changes in the volume of bank loans and the change in the gross domestic product. In addition, quantitative analysis also indicates a significant correlation between production volumes and the volume of indebtedness by certain industries.

Insufficient financial discipline within the entire economic system of the Republic of Srpska is the reason why banks are more exposed to credit risk. The missing funds in the budget of the Republic of Srpska, as well as in the budgets of local self-government units, have been compensated for many years by borrowing from commercial banks. This trend is the reason why banks in the Republic of Srpska, when creating their own credit policy, place less and less emphasis on lending to the government and government institutions, which additionally emphasizes the role of the real sector in increasing the volume of credit placements and increasing the quality of the loan portfolio.

The analysis of the financial statements of the companies from the representative sample indicates that a large portion of the companies does not feature satisfac-

tory financial indicators. The amounts of certain balance sheet items in these companies are outside the scope of the reference values that would indicate a stable and successful operation of the company. The results of correlation analysis of financial indicators do not indicate the interconnectedness and conditionality of bank loans, on the one hand, and the quality of business operations of sampled companies, on the other hand. In other words, corporate borrowing and utilization of short-term and long-term loans do not contribute to the improvement of financial indicators of companies from the representative sample. This indicates that most companies use bank loans only when they run into financial difficulties, i.e. when they have an insufficient level of liquidity and solvency to settle current business liabilities.

The conducted research indicates a significant volume of loans placed with the aim of providing current liquidity and maintenance of fixed assets and equipment. If we were to observe the operations of companies from a long-term aspect, the results obtained indicate a lack of special-purpose loans approved by the banks whose purpose is to finance projects that enable more successful business operations. Borrowing is an important element in the operations of large enterprises and their financing, particularly if we take into account demanding development projects where the emphasis is on ensuring market viability and sustainability. On the other hand, it is necessary for banks to make a greater effort to manage credit risk by a more detailed analysis of project documentation and the overall business of an enterprise, as well as by macroeconomic research of the industry within which the enterprise operates. The credit policy of banks, within which an adequate analysis of project documentation and an appropriate financing structure of large companies would allow the stimulation of project financing to a greater extent, should further create preconditions for increasing the volume of investment loans, on the one hand, and for enterprise and real sector development, on the other.

Conflict of Interest

The authors declare there is no conflict of interest.

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ЗАДУЖИВАЊЕ РЕАЛНОГ СЕКТОРА У ФУНКЦИЈИ РАЗВОЈА ПРИВРЕДЕ РЕПУБЛИКЕ СРПСКЕ

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САЖЕТАК

Расположивост фондова за кредитирање привреде по повољним условима јесте основна и најважнија функција коју осигурава банкарски сектор, иако је његова улога важна и у обављању функције платног промета, као и у пружању сигурности у штедне производе. Квантитативна анализа показује да се у Републици Српској очекивано остварује веома висок степен корелације између промјене обима банкарских кредита и промјене бруто домаћег производа. Истраживање задужености реалног сектора у функцији развоја привреде Републике Српске обављено је на основу репрезентативног узорка који обухвата 188 великих предузећа од њих укупно 343. Користећи се подацима из финансијских извјештаја предузећа, истражили смо у којој мјери усмјеравање кредитних фондова банака утиче на финансијску стабилност и пословање предузећа у Републици Српској. Добијени резултати упућују на висок ниво коришћења банкарских кредита у сврху обезбјеђивања текуће ликвидности и одржавања основних средстава неопходних за редовно пословање. Предузећа која су задуженија код банака не биљеже успјешније пословање ни у најмањој мјери. Спроведено истраживање указује на значајан обим кредита пласираних са циљем обезбјеђења текуће ликвидности и одржавања основних средстава и опреме. Међутим, од посебног је значаја измјена кредитне политике банака којом би се већи обим кредитних фондова банака усмјеравао у инвестиције.

Кључне ријечи: *банкарски сектор, задуженост, кредитна политика, финансијски показатељи, анализа биланса, кредитни ризик.*

Претходна саопштења
Preliminary Announcements

ENERGY GENERATION AND AGGREGATE OUTPUT IN NIGERIA: EVIDENCE FROM NARDL

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ABSTRACT

Energy generation has received a little or no attention over a period of time. Most scholars are focused on energy consumption and economic growth. This study empirically examined the asymmetric impact of energy generation on aggregate output in Nigeria between 1980 and 2019 using Nonlinear Autoregressive Distributed Lag (NARDL) Model. The stationarity test was conducted on the variables employed to avoid spurious regression. The result revealed that the variables were mixed at level and the first difference. The bound test result revealed that the variables are not cointegrated in the long run. Also, Wald test indicates that energy generation has short run impact on aggregate output in Nigeria. As revealed from the empirical results, from all sources of significant energy generation in Nigeria, gas generation brings the desired result to aggregate output in Nigeria. The study therefore suggests that action should refocus on the gas production subsector. This subsector needs to be developed carefully to avoid wasting this energy source by incineration. Also, the government should redirect those subsidies for petroleum products to the gas generation subsector.

1. INTRODUCTION

Energy is a significant variable for the economic growth of any country. Energy outputs smooth the progress of economic development by increasing productivity and income as well as creating employment. Efficient energy production aims to provide energy commodities to power the industrial, transport, household and service sectors of the economy (Rapu et al., 2015). Hence, energy remains the most vital lubricant of sustainable economic growth of any economy.

The poor performance of the subsector has sparked a great debate. With the profusion and potentials of energy resources, there is no reason for Nigeria to import energy in order to achieve a sustainable production capacity for optimal economic growth. Furthermore, Nigeria has managed to follow the collapse of its industrial sector, small and medium enterprises and economic downturn to the inadequate and erratic state of electricity market in the country (Ozoegwu, & Akpan, 2021)

The literature on energy economics examined short-run and long-run relationships between energy consumption and economic growth (Ha & Ngoc, 2020). Simultaneously, the literature on energy consumption and economic growth was also extensively examined (Chen, Pinar & Stengos, 2020; Shahbaz, Raghutla, Chittedi, Jiao & Vo, 2020). The debate is whether or not energy consumption exerts influence on the total output of the economy. However, similar to Azlina (2012), Oyeleke & Akinlo (2019), these studies observed that little or no attention is paid to examining the relationship between energy generation and aggregate output in Nigeria. Most of the reviews are focused on the demand side and neglect the supply side. Also, it is evident from the literature that several studies which examined the relationship between energy and economic growth in Nigeria are mostly focused on investigating the direction of causality between energy consumption and economic development, and linear short-term and long-term relationships between energy production and economic growth (Oyeleke & Akinlo (2019). Also, this study is different as it focuses on the four sources of energy generation (coal, hydropower, oil and gas power) in Nigeria and their effects on aggregate output. Based on the assessment of the empirical literature, it is observed that the contribution of these four sources of energy to total productivity has not been specifically investigated.

Some methodological gaps also exist in the previous literature because most studies used only trend analysis or simple OLS regression to make conclusions. However, using time series data, the relationship can be examined in both the long- and short-run, which is undertaken in this study. Specifically, the paper explores the link between energy generation and aggregate output in a Nonlinear Autoregressive Distributed Lag (NARDL) framework. Shin et al. (2014) suggested a method for modelling asymmetric cointegration and dynamic multipliers in a NARDL framework. Through positive and negative partial sum decompositions of the explanatory variables, the approach introduces short-run and long-run nonlinearities. Shin et al. (2014) extend the work in this area and develop a flexible and straightforward non-linear dynamic framework capable of simultaneously and coherently modelling asymmetries both in the underlying long-run relationship and in the patterns of dynamic adjustment. They have the

representation of complex error correction of the long-range asymmetric cointegration regression, leading to the NARDL model.

They follow Pesaran et al. (2001) and use a bound test approach to test for the existence of a stable long-run relationship, which is valid regardless of whether the underlying regressors are I(0), I(1), or mutually cointegrated. They also derive asymmetric cumulative dynamic multipliers that permit the display of the asymmetric adjustment patterns following positive and negative shocks to the explanatory variables. Prior to the development of this flexible approach suggested by Shin et al. (2014), there were a few other studies that employed a NARDL framework: Lin & Ankrah, (2019) investigated the economic impact of renewable energy and also examined the output and substitution elasticity for the two energy types (renewable and non-renewable) in Nigeria using ARDL. Awodumi & Adewuyi (2020) investigated the role of non-renewable energy in economic growth and carbon emissions among the top oil-producing economies in Africa between 1980 and 2015 using NARDL. Also, Sharma & Kautish (2020) examined the impact of coal-fired and oil-fired electrical power generation on CO2 emissions in India between 1976 and 2016 using NARDL. This study applies a NARDL analysis of cointegration between the energy generation and aggregate output in Nigeria between 1970 and 2019.

1.1. Energy supply in Nigeria

Since 2014 Nigeria's crude oil exports have averaged about 1.50 million barrels per day (mbd), with the United States being a major importer. However, since 2010, demand for oil from the United States has decreased as the economy has gradually attained self–sufficiency in oil production. The dynamics of supply and the possibility of the United States contending for the same export market with cheaper oil do not necessarily indicate that the supply market is narrowing, especially for Nigerian crude. As demand remains strong in the non-member countries of the Organization for Economic Co-operation and Development, such as China and India, it is expected that Nigeria will take advantage and seek new markets outside the United States. This is vital given that Nigeria's oil sector accounts for 80.1 percent of Nigeria's export earnings at the end of 2014.

Available information depicted that Nigeria exported over 28.27 million standard cubic meters (SCM) of gas in 2013, making Nigeria the 5th largest exporting country globally. Europe is Nigeria's biggest export market and the largest exporter in the Atlantic basin. However, the risk for Nigeria lies in the potential of the United States to export its shale gas to the global market. With its proven gas reserves of approximately 187 TCF (trillion cubic feet), as such, Nigeria can

best be described as a gas province. Despite Nigeria's abundant gas wealth, none of this has been used, with the country's primary goal of crude oil production and the nation's primary focus on crude oil production. The domestic gas market is generally underdeveloped, with a high gas combustion record and a significant percentage of available natural gas exported as liquefied natural gas. Nigeria needs to develop clear regulatory and competition policies to open its market and focus on being a competitive, low cost and highly reliable supplier to the global market.

The sustained effort to generate electricity in Nigeria over the years has revealed the richness of energy resources in addition to oil and gas resources. These include hydro, tidal wave, sun, wind, coal gas, and some elements of uranium for nuclear power. These energy forms for electricity power generation abound in sizeable commercial quantities in the best natural form across the country to support a vibrant electricity market. Studies conducted by the NNPC, the Ministry of Mines and Steel Development, and the Nigeria Export Promotion Council showed that Nigeria is endowed with various natural energy resources. The Federal Government under the Ministry of Mines and Steel Development (FMMSD) in 2012 discovered supplementary quantities of coal situated in Nassarawa, Kogi and Benue States, in addition to the reserves in Enugu State.

1.2. Energy and aggregate output: an empirical review

Oyeleke & Akinlo (2019) have specifically focused on two sources of energy production and looked at the effect of energy generation on economic development in Nigeria. The study covered the period 1980–2017 and used the Error Correction Model (ECM) as a technique of estimation. The results indicated the existence of cointegration among the variables and also found that gas energy, physical capital, and interest rates are crucial to the determinant of economic growth in the long run. However, hydropower contributed to economic growth in the short run. Hence, the two sources of energy generation need massive investment and upgrading as the current generation is not sufficient for economic expansion in Nigeria. The productivity of gas fire plants is hindered by the lack of gas, while the productivity of hydropower is hampered by the lack of modern technology and old installations.

Lin & Ankrah (2019) investigated the economic impact of renewable energy and also examined the output and substitution elasticities for the two energy types (renewable and non-renewable) in Nigeria. The study takes into consideration the problem of multicollinearity among the variables employed; the ridge regression was employed as the estimation strategy. The empirical results, based on

the application of a yearly observation of the input factors over the period 1980-2015, within the framework of the translog production function model, show that capital and labour are the main drivers of output in Nigeria. However, the economic impact of both energy types (renewable and non-renewable) is insignificant, even though positive. With positive output and substitution elasticities, this study confirms the feasibility of transitioning to renewable energy generation but also highlights the limitations associated with such a transition, citing inherent issues such as power density and size, expense, and location. Based on Nigeria's economic and industrialization policy, this study agrees with the respective policies contained in the Renewable Energy Program, but advises that its adoption be incremental and in line with Nigeria's economic priorities.

Pal & Mitra (2019) examined the responses of the purchasing power of the US dollar asymmetric to crude oil price fluctuations using a multiple threshold Non-Linear Autoregressive Distributed Lag model (MTNARDL). The study employed monthly data between January 1990 and June 2019, and it revealed a short-run asymmetric transmission of oil price fluctuations into the purchasing power of the US dollar. The results of the MTNARDL model showed the magnitude of variations in purchasing power in response to a minor or to a major change in the oil price. It also found corroborative evidence for a more rapid response of the purchasing power to the upward oil price shocks than to the downward movement in the oil price. This entails that the purchasing power of the US dollar experiences a sharp reduction with the rise in the oil price; nonetheless, the advantage of a drop in the oil price is not entirely transmitted to the purchasing power as its correction takes a much longer period than expected.

Benli, Altintaş & Kaplan (2019) investigated the impact of changes in oil prices on the real economic activity in Turkey. For this purpose, the study employed the Non-Linear Autoregressive Distributed Lags (NARDL) model, which allows both short-run and long-run asymmetries to be examine and the appropriate response of economic growth to changes in its regressors to be measured. The results confirm the asymmetric effect of oil price changes on economic growth. An increase in oil prices has an inverse influence on economic growth in the long run, and this impact has a larger magnitude relative to decline in oil prices which is found to be statistically insignificant. In other words, the increase in production does not respond to oil price decline, but to oil prices rise.

Ogunjimi (2020) examined the asymmetric effects of oil price on sectoral output in Nigeria using time series data between 1981 and 2017. It employs the Non-Linear Autoregressive Distributed Lag (NARDL) model developed by Shin et al. (2014) that introduced short-run and long-run nonlinearities via positive and

negative partial sum decompositions of oil price. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root test results show that the variables used in the study are mixed at the first difference(I(1)) and level (I(0))series, hence the bounds test approach is employed to measure the long-run relationship whose results were affirmative. Also, the results of the short-run and long-run NARDL models revealed that oil price has asymmetric effects on the performance of the oil and non-oil sector of the Nigerian economy in the short-run and only long-run asymmetric effects on the non-oil sector. In addition, the result revealed that oil price shocks (positive and negative) have positive effects on non-oil output while a positive and negative oil price shocks have corresponding effects on oil output in the short run. Furthermore, oil price shocks have more effects on the oil sector than on the non-oil sector.

Awodumi & Adewuyi (2020) examined the role of non-renewable energy in economic growth and carbon emissions among the top oil-producing economies in Africa between 1980 and 2015. The study examined nonlinearity and structural break in unit root test and cointegration analysis and it employed the Non-Linear Autoregressive Distributed Lag (NARDL) technique. The study revealed the evidence of the asymmetric effect of per capita consumption of both petroleum and natural gas consumption on economic growth and carbon emission per capita in all the selected countries except Algeria. Nigeria's carbon emission has decreased while the non-renewable energy use delays have changed positively. In the case of Gabon, an increase in energy demand stimulates development and improves efficiency of the climate. Such energy consumption has a minimal effect on the emissions of the climate in Egypt, as it promotes industrial development. While a positive change in the non-renewable energy consumption facilitates economic growth in Angola, the effect on carbon emission is mixed across time and energy types. Also, the impact of negative changes in petroleum and natural gas use is comparable to that of positive changes in Egypt and Nigeria.

Sharma & Kautish (2020) examined the impact of coal-fired and oil-fired electrical power generation on CO2 emissions in India for the period of 1976−2016 using NARDL. The simulation results revealed that the upside shocks in coal-fired electricity would contribute considerably to the increase in the pollution level in the long run. Conversely, the effect of downside variations was found to be negative and significant.

2. MATERIALS AND METHODS

Method, data and model specification

The primary motive of this study is to investigate systematically the relationship between energy generation and aggregate output in Nigeria, using annual data from the period 1980-2018. The data comprise aggregate output proxied by GDP per capita and electricity generation using the four sources (hydro, oil, coal, and gas sources) in Nigeria. This study uses the neoclassical Solow growth model as adopted by Oyeleke & Akinlo (2019). In line with Solow's formulation, an aggregate economic output depends on capital accumulation, technological progress, and labour. This can be expressed as:

$$y = Ak^{\alpha} L^{\beta} \tag{1}$$

NB: $\alpha + \beta = 1$

Where K is the capital accumulation, L represents the size of the labour force in the economy, Y is the aggregate output level, and A denotes technological progress. According to the hypothesis, expanding technological acquisition boosts economic development in emerging open economies. However, it should be noted that in the production process, capital accumulation and labour depend on energy to be efficiently and effectively utilized. Through the transformation of Equation 1 into the intensive form, it becomes:

$$y = Ak^{\alpha} \tag{2}$$

Where $y = \frac{Y}{L}$, $k = \frac{K}{L}$

By taking the logarithm of both sides of Equation 2 and differencing it,

$$\Delta \log(y) = \log A + \alpha \Delta \log(k) \tag{3}$$

To incorporate electricity production (a proxy for energy generation) into Equation 3, we divide technology (log A) into two parts. This is based on the argument that electricity is a part of technology. Therefore, we divide technology into two parts:

$$\log A = \Delta \log \gamma + \Delta \log EG \tag{4}$$

By substituting Equation 4 into Equation 3, it becomes:

$$\Delta \log y = \Delta \log \gamma + \Delta \log EG + \alpha \Delta \log k \tag{5}$$

However, since we have four types of electricity production in Nigeria, different policies are formulated by the government for each source to boost its generation. These include hydro source, oil, coal and gas source. Given the variant policy to improve on generation from each source, we decompose energy generation (EG) into Hydro (HYD), Coal (CO), Oil (OIL) and gas (GAS). Thus, we substitute them for (EG) in Equation 5. By including the control variables and error term, Equation 5 then becomes:

$$\begin{aligned}\Delta \log y = {} & \Delta \log \gamma + \Delta \log HYD + \Delta \log CO + \Delta \log OIL + \Delta \log GAS + \\ & + \alpha \Delta \log k + \Delta \log INF + \Delta \log EXHR + \Delta \log INTR + \varepsilon\end{aligned} \tag{6}$$

Where: HYD represents hydropower, CO denotes Coal power, OIL indicates Oil sources power, GAS indicates Natural gas power, INF denotes inflation, EXHR indicates Real Exchange Rate, and INT represents real interest rates.

Nonlinear Autoregressive Distributive Lag Model (NARDL approach)

Shin et al. (2014) suggest a NARDL approach where the regressor is divided into its negative and positive partial sums. For capturing the asymmetric impact, Energy generation is decomposed into the positive and negative partial sum:

Y = f(HYD_POS, HYD_NEG, CO_POS, CO_NEG, OIL_POS, OIL_NEG, GAS_POS, GAS_NEG)

3. RESULTS AND DISCUSSIONS

This section presents and analyses the results obtained from the analysis based on the time series data and collected from different publications. This section is sub-divided into the following: Unit Root Test, regression result and discussion of the findings.

The results of the unit root test based on the Augmented Dickey-Fuller (ADF) and Phillip Perron methods are presented in Table 1 below:

Table 1. Time Series Unit Root Test Results

Variables	Augmented Dickey-Fuller (ADF) Test		Phillip Perron (PP) Test		Conclusion on the Order of Integration	
	Levels	1st Diff.	Levels	1st Diff.	Levels I(0)	1st Diff. I(1)
GDPGR	-5.431369 (0.0000)	-8.242572 (0.0000)	-5.444357 (0.0000)	-11.29854 (0.0000)	Yes	Yes
OIL	-2.226515 (0.2001)	-8.352858 (0.0000)	-2.233289 (0.1978)	-9.623275 (0.0000)	No	Yes
COAL	-3.190935 (0.0271)	-8.109199 (0.0000)	-3.315426 (0.0200)	-8.109199 (0.0000)	Yes	Yes
GAS	-1.923924 (0.3187)	-7.698248 (0.0000)	-1.923924 (0.3187)	-7.719423 (0.0000)	No	Yes
GFC	-5.677704 (0.0000)	-12.63644 (0.0000)	-5.313392 (0.0001)	-26.69607 (0.0001)	Yes	Yes
EXCHR	2.479215 (1.0000)	-4.661466 (0.0004)	2.228211 (0.9999)	-4.665879 (0.0004)	No	Yes
INF	-3.946190 (0.0036)	-7.087763 (0.0000)	-3.249099 (0.0231)	-14.30655 (0.0000)	Yes	Yes
INTR	-1.821068 (0.3661)	-7.786409 (0.0000)	-1.773417 (0.3889)	-7.805243 (0.0000)	No	Yes

Source: Author's computation, 2021.

ARDL Bound test

In view of the unit root test result, some empirical investigation on the long-run relationship in the model can be examined. Though the unit root test does not strictly satisfy the condition for embarking on a bound test, doing this will help establish if any of the set of variables may be cointegrated. The most prominent and widely used technique for ARDL model in the literature was that developed by Pesarant (2011).

Table 2. ARDL Bound Test Result

ARDL Bound Test		
Date: 03/31/21 Time: 23:53		
Sample: 1972 2015		
Included observations: 44		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	4.605979	12
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	4.78	4.94
5%	5.73	5.77
2.5%	6.68	6.84
1%	7.84	5.59

Source: Author's computation, 2021.

From the result, the F statistic value is lower than the bound values at different significance levels. Hence, we fail to reject the null hypothesis of no cointegration among variables in the long run. With this result, Short run NARDL model was employed for general estimation of this model.

Serial Correlation Test

Table 3. Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.195875	Prob. F(1,30)	0.2829
Obs*R-squared	1.725048	Prob. Chi-Square(1)	0.1890

Source: Author's computation, 2021.

The result revealed that the model is free from the problem of serial correlation since F-statistic probability is greater than 5% level of significance.

Normality Test

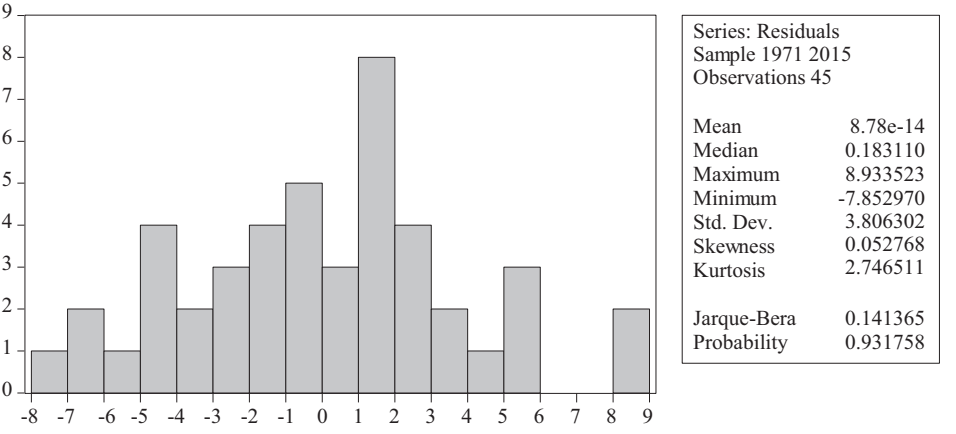

Figure 1. Normality Test of the Model

Source: Author's computation (2021)

The figure 4.2 above depicts the normality of the model over the period of investigation. From the result, the model mean value is 8.78, Jarque Bera value of 0.14 with probability value of 0.93. The null hypothesis states that the model is normally distributed. From the result, the probability value is greater than 5% level of significance, hence we fail to reject null hypothesis. Therefore, we conclude that the model is normally distributed over the period of investigation.

Stability Test

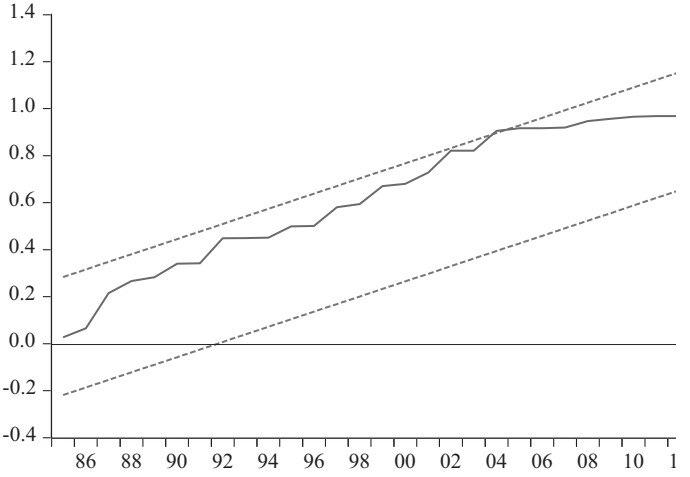

Figure 2. Cusum of Square Stability Test

Source: Author's computation, (2021)

The above graph depicts the stability of the model over the period of investigation. From the result, the model is stable for the period of investigation since the stability trend falls within acceptance region of 5% level of significance. Hence, the model does not suffer from any structural break.

Asymmetric Test

The study proceeds to examine the short run asymmetric among the various energy generations using Wald test and the result is presented below:

Table 4. Asymmetric Test

Wald Test:			
Equation: NARDL01			
Test Statistic	Value	Df	Probability
t-statistic	0.877054	30	0.3874
F-statistic	0.769223	(1, 30)	0.3874
Chi-square	0.769223	1	0.3805
Null Hypothesis: C(3)/C(2)=C(4)/C(2)			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(3)/C(2) - C(4)/C(2)		0.133957	0.152735
Delta method computed using analytic derivatives.			

Source: Author's computation (2021).

As can be seen from the above result, we fail to reject the null hypothesis of equality as p value is greater than 5%. Wald test indicates there is asymmetric in the short run impact of energy generation and aggregate output in Nigeria.

NARDL Estimate

Having established the fact that some of the explanatory variables in the model do have short-run relationship with the dependent variable it will pertinent to also examine the direction of and magnitude impact of the relationship between aggregate output and the set of explanatory variables captured in the model. In this sense the aim is to obtain empirical estimates measuring the impact of regressors of on the dependent variable.

For this purpose the Non Linear Autoregressive Distributed Lag (NARDL) is employed for the estimation.

The result for the regression analysis is shown in Table 4. The table contains the parameter estimates obtained from the NARDL estimation approach.

In the table the values in the brackets are the probability values of the parameter estimates of the model. The significance of the estimated coefficients is tested from the probability value of the estimated coefficients. If the probability value of the estimated coefficient is less than 5% then the explanatory variable has a significant impact on the dependent variable. Hence the research hypothesis cannot be upheld.

There exists an inverse relationship between the current aggregate output and previous output in Nigeria but the result is not significant at 5% since the probability value of 0.4949 is greater than 0.05. Hence, previous aggregate output is not an important determinant of aggregate out in Nigeria.

There is a direct relationship between positive changes in Coal generation and aggregate output. From the result, 1% positive increase in Coal generation will bring 6.69% increase in aggregate output. However, the result is not significant since the probability value is greater than 5%. Also, 1% decrease in coal generation will bring 6.23% increase in aggregate output in Nigeria and the result is significant at 5% level of significant. Hence, it becomes clear that reduction in Coal generation in Nigeria will increase the aggregate output and it is an important variable determining aggregate output. This result is not surprising because of environmental pollution associated with the production of coal which can cause havoc to productivity of labour and entire population at large.

Table 5. Non Linear Autoregressive Distributed Lag Estimate

Dependent Variable: GDPGR
Method: ARDL
Date: 04/04/21 Time: 21:17
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Dynamic regressors (0 lag, automatic): COAL_POS COAL_NEG HYDRO_POS HYDRO_NEG GAS_POS GAS_NEG OIL_POS OIL_NEG GFC INF EXCR INTR
Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDPGR(-1)	-0.154825	0.222237	-0.696670	0.4949
COAL_POS	6.692852	4.267419	1.568361	0.1342
COAL_NEG	-6.230162	2.202112	-2.829176	0.0111**
HYDRO_POS	4.746650	3.591416	1.321665	0.2028
HYDRO_NEG	6.353523	3.237758	1.962322	0.0654*
GAS_POS	6.494254	3.109137	2.088764	0.0512*
GAS_NEG	4.364868	3.515049	1.241766	0.2303
OIL_POS	5.305880	3.338414	1.589342	0.1294
OIL_NEG	6.474012	3.123066	2.072967	0.0528*
GFC	0.017670	0.036899	0.478864	0.6378
INF	0.043310	0.075506	0.573596	0.5733
EXCR	0.102600	0.053695	1.910814	0.0721*
INTR	-0.433605	0.331270	-1.308916	0.2070
R-squared	0.819857	Mean dependent var		3.510990
Adjusted R-squared	0.569658	S.D. dependent var		5.655993
S.E. of regression	3.710355	Akaike info criterion		5.748133
Sum squared resid	247.8013	Schwarz criterion		6.802427
Log likelihood	-100.4589	Hannan-Quinn criter.		6.139116
F-statistic	3.276825	Durbin-Watson stat		2.579196
Prob(F-statistic)	0.005979**			

*Note: p-values and any subsequent tests do not account for model selection.

Source: Author's computation, (2021).

Hydro-electric power generation is another important determinant of aggregate output in Nigeria. From the result, 1% positive increase in hydro-electric power generation will bring 4.75% increase in aggregate output in Nigeria but the result is not significant at 5%. Also, 1% decrease in hydro-electric power generation will lead to 6.35% reduction in aggregate output and the result is significant at 10% level of significance. Hence, any reduction in hydro-electric power generation in Nigeria will significantly influence aggregate output.

Gas is also principal energy source that has significantly affected the aggregate output in Nigeria. From the result, 1% increase in Gas generation will lead to 6.49% increase in aggregate output in Nigeria and the result is also significant at

10%. Also, 1% decrease in Gas generation will lead to about 4.36% decrease in aggregate output within the period of investigation but the result is not significant since the probability value is greater than 10% level of significance.

Oil generation is another important energy source in Nigeria. From the result, 1% increase in oil generation will lead to about 5.31% increase in aggregate output. Also, 1% reduction in oil generation will lead to about 6.47% decrease in aggregate output and the result is significant at 10% significance level.

Gross fixed capital (GFC) and Inflation (INF) depict direct relationship with aggregate output but the relationship is not significant.

Exchange Rate (EXCR) is also an important determinant of aggregate output in Nigeria. Exactly 1% increase in exchange rate will lead to 0.10% increase in aggregate output and the result is significant at 10% level of significance. The result is not surprising because the economy is highly depended on other economy for its aggregate output expansion.

Interest rate shows an inverse relation with aggregate output but the result is not significant. However, the higher the interest rate is, the lower the aggregate output is in Nigeria.

The R square of the model shows that the exogenous variables account for about 82% variation of the aggregate output in Nigeria. The F-statistic value of 3.28 with probability value of 0.0060 shows that the overall model is significant. Durbin Waston value of 2.6 depicts the absence of serial correlation in the model.

4. CONCLUSIONS AND POLICY IMPLICATIONS

In this study, the relationship between energy generation and aggregate output is empirically examined. For this purpose, the study adopts nonlinear autoregressive distributed lags (NARDL) model. The model allows us to test the short-run and long-run asymmetries simultaneously and enables us to measure the appropriate response of aggregate output to changes in its regressors. As revealed from the results, of all the source of observed energy generation in Nigeria, Gas generation brings desirable result to aggregate output in Nigeria. Coal, oil and hydro-electric energy generation brings increase in aggregate output. However, decrease in the generation of above stated sources of energy generation leads to significant increase in aggregate output. Implicitly, if Nigeria wants to expand its aggregate output, concise efforts must be made to reduce these source of energy in order to curb their environmental hazard. In Nigeria, action should be refocused on the gas production subsector. The outcome is consistent with the recent increase in demand for domestic gas by households and businesses in Nigeria as

an alternative energy source. This subsector needs to be developed carefully to avoid wasting this energy source by incineration. In order to improve the general well-being of people and to quell the heated debate among those in charge of petroleum product subsidies, the government should redirect those subsidies to the gas generation subsector.

Conflict of interests

The authors declare there is no conflict of interest.

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Appendix

Data Bank. Source: World Development Index, 2020

ПРОИЗВОДЊА ЕНЕРГИЈЕ И АГРЕГАТНИ ПРОИЗВОД У НИГЕРИЈИ: ДОКАЗИ ИЗ НАРДЛ-а

1 Мусибау Ојо Адејумо, Економски факултет Универзитета у Лагосу, Лагос, Нигерија
2 Расак Адетуњи Адефаби, Емануел Алејанде, Образовни факултет, Одсјек за економију, Ојо, Нигерија

САЖЕТАК

Производњи енергије се током времена посвећивало мало, или нимало пажње. Већина научника се фокусира на потрошњу енергије и економски раст. Ова студија је емпиријски испитала асиметрични утицај производње енергије на агрегатни производ у Нигерији између 1980. и 2019. користећи модел нелинеарног ауторегресивног дистрибуираног заостајања (НАРДЛ). Тест стационарности је спроведен на коришћеним варијаблама да би се избјегла лажна регресија. Резултат је открио да су варијабле помијешане на нивоу и првој разлици. Резултат боунд теста је открио да варијабле нису коинтегрисане на дужи рок. Такође, Валд тест показује да производња енергије има краткорочни утицај на агрегатни производ у Нигерији. Као што је откривено из емпиријских резултата, од свих извора значајне производње енергије у Нигерији, производња гаса позитивно доприноси укупном производу у Нигерији. Студија стога сугерише да би се акција требала поново фокусирати на подсектор производње гаса. Овај подсектор треба развијати пажљиво како би се избјегло расипање овог извора енергије изненадним изгарањем; такође, влада би требала да преусмјери субвенције за нафтне деривате у подсектор производње гаса.

Кључне ријечи: *приступ енергији, агрегатни производ, НАРДЛ, снадбијевање енергијом, економски раст, производња енергије*

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ACKNOWLEDGEMENTS

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Serial number of components	The actual characteristic values of PCA	Values obtained by parallel analysis	Decision
1	5,716	1.5595	Accept
2	1,913	1.4326	Accept
3	1,107	1.3287	Reject
4	0,967	1.2433	Reject

Source: Author's calculation

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