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THE INNOVATION PARADOX IN THE SERBIAN ECONOMY: THE GRANGER CAUSALITY APPROACH

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ABSTRACT

Innovations, as the applications of new ideas, solutions and technological practices that improve goods, services and business processes, are the most important driver of economic progress. They lead to greater productivity and efficiency, and therefore to better economic results. The purpose of this article is to examine the state, interrelation and the impact of innovative activities on the economic growth of Serbia. The paper first uses standard multiple regression and concludes that in the period from 2004 to 2020, the number of registered patents did not contribute, while the gross expenditures for research and development (GERD) contributed positively and significantly to the growth of the Serbian GDP. Therefore, it can be said that Serbia is facing a kind of innovation paradox, since the growth of allocations coexists with a dramatic decrease in the number of registered patents. Its second part is based on the construction of the corresponding Vector autoregressive VAR(1) model that traces the causal relationship between GERD and the economic growth of Serbia in the period from 1997 to 2020. It follows that while GERD does not cause GDP in the Granger sense, the GDP causes GERD allocations for innovative activities in Serbia. The scientific research work in Serbia is not efficient and effective enough because it draws funds from the GDP, but does not meet expectations and does not produce tangible results, especially in the expected number of registered patents. Therefore, it is necessary to build an appropriate incentive environment that would stimulate more adequately and value new innovative ventures.

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1. INTRODUCTION

It is well known that innovations are a fundamental driver of economic progress that brings benefits to a society as a whole. Today, there is an almost axiomatic view that innovative activities are the only and most important component of long-term economic growth (Rosenberg, 2004, 1). In economic terms, innovation is a consequence of the use of new ideas and technologies that improve goods and services and make production and organizational processes more efficient and effective. Innovations contribute to economic growth through their impact on productivity growth, and thus on increasing the output, profits, competitiveness, living standards and quality of life (European Central Bank, 2017). Innovations and knowledge spillovers they generate contribute to improving the quality of business, competitiveness and market share of companies, industries and entire nations (Hashi & Stojičić, 2013, 7). In addition, innovation is one of the primary ways in which manufacturing and service companies can contribute to sustainable growth and development. They usually start on small scale, in the form of developing and applying new technologies and new ideas at the level of a given enterprise, and then they diffuse and spread to the whole economy, to companies of different sizes and from different economic sectors, benefiting the whole economy and society. The vast majority of contemporary literature (Fagerberg, Verspagen & Srholec, 2010, 4-5; Solow, 1957, 312; Fayomi, Adelakun & Babaremu, 2019, 1-9; OECD, 2007, 6; The World Bank, 2010, 1-2; Maradana et al., 2019, 268-269; Maradana et al., 2017; Galindo & Méndez, 2014, 825; Block, 2002, 1-2; Blach, 2011, 13) highlight the positive relationship between innovation, technological progress and knowledge, on the one hand, and competitiveness and economic growth, on the other. Finally, the knowledge itself appears as the basic leverage of society, while a society that is capable of creating new values represents the basis of economic growth (Jovičić, 2021, 355).

Back in 1934, Joseph A. Shumpeter pointed out the importance of entrepreneurship, technological progress and innovations for economic growth. Schumpeter was the first to connect the concept of innovation with entrepreneurship, as a source of pure entrepreneurial profit based on spiritual creation and intangible wealth (Borojević, 2006, 221). Shumpeter in his epochal book *The Theory of Economic Development – An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle* described innovations as the employment of new combinations of production factors that lead to (Shumpeter, 1934, 66): a) introducing a completely new product; b) developing and introducing a completely new production method; c) opening a completely new market; d) conquering new sources of raw materials and semi-final products; and e) establishing an entirely

new organization of industry. In a dynamic process of competition, these new products and new production methods compete with old ones, in unequal conditions, while in their decisive advantage the new products and production methods can lead to the disappearance of the old ones (Shumpeter, 1943, 32). However, innovations do not always bring the implied success. They are often followed by high research and development (R&D) costs, as well as financial risks arising from the fact that R&D activities do not always lead to new, market-valued products, services and processes. This process can end in failure also because the development of a new product, service or process may require a long period of expenditure on R&D, which could further make their implementation very expensive and unprofitable (Rosenberg, 2004, 1). This article is dedicated to the analysis of the state of innovative activities in the Republic of Serbia (RS), which seems to be facing the problems of insufficient recognition of the importance of adopting new technologies, a weak business environment, as well as limited capacities in designing and implementing the necessary supporting policies.

According to the Global Innovation Index (GII) for 2021, Serbia took a relatively modest 54th place out of 132 observed countries, meaning that it decreased by one place compared to 2020. Despite the fact that in 2020, the country was declared an innovation achiever (Dutta et al., 2020, 22-319), it still records a relatively low level of innovations compared to other countries. At the same time, in 2021, the country ranked eighth out of 34 upper middle-income countries in terms of innovation activities, as well as 34th out of 39 analysed European economies. Despite its significant potential in the science and R&D sector, Serbia has generally not provided a favourable, stimulating, safe and predictable environment for fostering and developing innovations yet. According to the latest data from the Statistical Office of the Republic of Serbia (SORS) for the period 2018-2020, the share of business entities with at least one type of innovation was 54.8%, while more than 69% of large companies, about 58% of medium enterprises, and around 54% of small firms implemented some kind of innovation. In this period, innovative activities were equally present in the manufacturing and service sectors in Serbia, and the region of Belgrade was in the lead (46.5%) in their introduction and development. The share of sales of innovative products and services, which are completely new to the observed company or to the market, was only around 14% in total sales (SORS, 2021). In the domestic economy, there is still a small number of highly innovative business entities with great potential for growth, as well as a large number of companies that do not introduce innovations sufficiently. In other words, most domestic companies do not base their competitiveness on the development of innovations,

as it is the practice in developed countries, and Serbia still has a low level of scientific R&D expenditures in its total spending for technological innovations. Finally, research of Mitrović and Mitrović (2020, 38) also pointed out that excessive costs, lack of financial resources, uncertainties in market demand for innovative products, as well as strong and unfair competition represent the most significant obstacles to the introduction and development of innovations in Serbia.

The purpose of this article is to determine the causal relationship between innovations, expressed in patent applications and gross domestic expenditures on research and development, and economic growth in Serbia, i.e. to examine whether innovations Granger cause its economic growth, as well as whether economic growth in Granger causality sense has a reciprocal effect on the country's innovation trends. The following section describes the sources of data used, the characteristics of the observed variables, and the methods applied in this research study. The third section is devoted to the description and discussion of the obtained results, while the last section provides conclusions, with concrete implications and recommendations for policy makers.

2. DATA, MATERIALS AND METHODS

As already mentioned, innovation is widely considered to be the main source of economic growth, which explains the need to explore the relationship among indicators of innovation, economic growth and economic performance of a society. This section analyses the diffusion of innovations and their trends in the case of Serbian economy. The innovations can be expressed in several different ways. Despite the fact that there are several indicators of innovations, this article considers the following two observed variables: a) the Total number of patent applications of residents and non-residents, and b) the Gross domestic expenditures for research and development in the Republic of Serbia, as well as their impact on economic growth. The paper also examines the possible reversible impact of economic growth on innovative activities in the country from the aspect of Granger causality approach.

Gross domestic expenditures on R&D (GERD) is considered in this article as total spending on R&D activities and R&D staff at the national level in the following four sectors: a) business enterprises, b) government, c) higher education, and d) private non-profit organizations. Eurostat (2022c) defines research and experimental development as creative and systematic work undertaken with the aim of increasing the scope of knowledge, including knowledge about

humankind, culture and society, as well as devising new ways of applying acquired knowledge. In its *Frascati Manual*, the OECD (2015, 111) defines GERD as the total intramural or internal expenditures on R&D activities that take place in a country's territory during the given reference period. GERD is the main aggregate statistical indicator used to describe a country's R&D activities, covering all R&D expenditures carried out in its territory. Therefore, this indicator also includes domestic R&D activities financed from abroad, i.e. from the rest of the world, but does not include financing R&D activities carried out abroad. The total number of patent applications (TPA) to the Serbian Intellectual Property Office (SIPO) includes the total number of patent protection applications of residents and non-residents in the observed reference year. The article uses this indicator because its data are far more reliable and comprehensive than the data on the number of patents granted to residents and non-residents. Table 1 provides a detailed description of all indicators used in this research, while the analysed data were derived from the Eurostat, World Intellectual Property Organization (WIPO) and the World Bank database.

Table 1: Description of Variables Used

Variable	Variable description
GDP	Gross domestic product: Expansion of the country's economy expressed as an annual change in GDP.
GERD in all sectors	Gross expenditure on R&D: Gross domestic investment in research and experimental development in all sectors on an annual basis. GERD includes expenditures for R&D and R&D staff activities in all four following observed sectors: a) business enterprise, i.e. non-financial institutions, b) government, c) higher education, and d) private non-profit organizations.
TPA	Total patent applications: Exclusive rights to patent the inventions of residents and non-residents on an annual basis. Total number of patent applications of residents and non-residents filed annually to the SIPO. Patents are mostly about a product or process that provides a new way of doing something or offers a new technological solution to a problem. A patent provides its owner with protection of his/her invention for a limited time, usually over a period of 20 years.

Source: The Author and Maradana et al., 2019, 270.

This paragraph points to the trends of innovations in Serbia in the period from 2004, when the innovations expressed in patents just started to be included in more detail in the county's statistics, to 2020. Table 1 from the Econometric Appendix indicates the absolute values of Gross domestic expenditures on research and development, the share of GERD in the country's GDP, the number of resident patent applications, the number of non-resident patent applications, the total number of resident and non-resident patent applications summed up, as

well as the values of Serbian real GDP in the observed period. Several important conclusions arise from this Table:

- First, in the examined period 2004-2020, the number of patent applications of both residents and non-residents decreased dramatically (a drop of about 3 and even about 87 times, respectively).
- Second, there were fewer patent applications of non-residents than patent applications of residents. Namely, the average number of patent applications filed by non-residents was almost twice lower than the number of patent applications filed by residents in the period concerned (from 2004 to 2020). At the same time, the number of non-resident patent applications began to decrease sharply from the very beginning of 2004, only to slow down its sharp fall starting from 2009.
- Third, the total number of patent applications filed by residents and non-residents gradually and persistently declined, decreasing at the end of the observed period by as much as impressive 86.6% compared to the beginning of 2004. Their average number was about 394 per year, while total patent applications reached their lowest value at the very end of the examined period (2020).
- Fourth, in the meantime, there was a huge and very rapid growth of GERD by a drastic 466.4%, and also an increase in GDP by a far more modest pace of 45.5%.

Based on the calculated Pearson correlation coefficients of the observed variables with GDP, it is concluded that there was an almost perfectly positive and statistically significant correlation between GERD and GDP, which indicates that when R&D expenditures grow, the country's GDP also grows. However, the same cannot be said for the Total patent applications of residents and non-residents, which showed a very strong negative and statistically significant correlation with the country's GDP. This further means that with the decrease in the number of patent applications, there is an increase in Serbian GDP. Above all, the Pearson correlation matrix points to the fact that innovations measured by GERD have a positive impact on economic growth, while those measured by total patent applications negatively affect economic growth. However, the main observation that this study intends to investigate is whether innovations in Serbia measured by GERD and Total patent applications actually determine economic growth and whether economic growth in turn causes the level and trends of innovations in the country. The following section presents an attempt to solve this research problem.

While in the first part of the research, Standard multiple regression analysis was applied, in its second part the application of Vector autoregressive (VAR) analysis was approached, as well as the development of an appropriate bivariate VAR(1) model. The VAR model enables investigating of one-way, as well as reverse causality between the dependent variable and independent regressors, using their own past values. Therefore, the used bivariate first-order VAR(1) model, after logarithmization of the variables of interest, could be represented by the following system of equations (Shrestha & Bhatta, 2018, 77):

$$\ln Y_t = \delta_1 + \theta_{11} \ln Y_{t-1} + \theta_{12} \ln X_{t-1} + \varepsilon_{1t} \quad (1)$$

$$\ln X_t = \delta_2 + \theta_{21} \ln Y_{t-1} + \theta_{22} \ln X_{t-1} + \varepsilon_{2t} \quad (2)$$

where ε_{1t} and ε_{2t} are mutually uncorrelated white noises, i.e. error terms. In the last step, the Granger causality test was conducted with the aim of determent the causal relationship between the observed variables. Granger causality test looks at short-term relationships between variables and is employed to determine whether one time series can be used to predict another series. This test is a bottom-up procedure, in which it is assumed that the considered time series are independent variables, while it reveals only predictive causality and temporal relations among the series, but not the causality per se (Granger, 1980, 329-352).

3. RESULTS AND DISCUSSIONS

Preliminary data from this analysis indicated that the basic preconditions (no large deviations from normality, no outliers and extreme points, no multicollinearity, homoscedasticity of variance, stationarity of residuals) for the use of Standard multiple linear regression were met, i.e. for assessing the impact of the Total number of annual patent applications and GERD annually on the annual level of GDP in Serbia. The objective limitation of this study refers to the fact that more reliable, detailed and comprehensive data on patent applications began to be included in Serbian statistics in 2004, which is the reason why the time horizon of this research was relatively short. In addition, this empirical research was strictly limited to examining the link between technological progress expressed by innovations and economic growth in Serbia. Therefore, it did not include other relevant factors such as labour, capital, education, infrastructure, entrepreneurship, available natural resources etc., the inclusion of which could change these research findings. A number of other authors, such as Maradana et al. (2017), Maradana et al. (2019) and Pece et al. (2015), had a similar approach

to this research problem, investigating only the relationship between different forms of innovations and GDP. They pointed out a positive nexus between innovative activities expressed in the number of patents, trademarks and R&D expenditures, and the economic growth. However, these issues could be the subject of some other further research.

Preliminary research also indicated that there was most likely no multicollinearity between the observed predictors, i.e. the TPA and GERD. Namely, although Pearson correlation coefficient between these independent variables was r = - 0.82, its value was still lower than the critical allowed value of r = ± 0.9 (Tabachnick & Fidell, 2013, 88-89). In addition, the values of Tolerance and Variance inflation factor (VIF) indicators were within their allowed limits (Tolerance = 0.327 > 0.1 and VIF = 3.058 < 10), also indicating that there was most likely no multicollinearity between the predictors. This finding is one of the key points of this analysis, suggesting that there is a kind of innovation paradox in the Serbian economy – the greater the statistically covered investments in R&D are and the more funds are allocated for GERD, there are fewer patent applications over time. This paradox is even the greater if we take into account the fact that patents represent a real materialization, as well as the concrete and most significant result of each country's innovation activities. The following sections of this article will focus specifically on this issue.

Standard multiple linear regression was applied to assess a possible impact of the TPA and GERD predictors on the Serbian GDP trend in the period from 2004 to 2020. The model as a whole explained the variance of GDP well and it was statistically significant, *Adjusted R Square* = 94.5%, F(2.14) = 138.118, and Sig. = p = 0.000 < 0.001. In the final model, GERD individually contributed most to the explanation of GDP (23.43% of GDP variance) and was statistically significant, β_2 = 29.375, Sig. = p = 0.000 < 0.001. On the other hand, the TPA explained only a slight 0.76% of the GDP variance, while it was not statistically significant, β_1 = -1.624, Sig. = p =0.159 > 0.05 (Table 3 from the Econometric Appendix). Therefore, based on the estimated parameters, the regression equation from the described model had the following form:

$$y = 25827.353 - 1.624x_1 + 29.375x_2 + \varepsilon \quad (3)$$

where

x_1 is the number of Total patent applications per year,

x_2 is the GERD indicator on annual basis, while

ε is an error term.

Thus the results of the Standard multiple linear regression model showed that the independent variable GERD made a significant unique contribution to the dependent variable GDP, which could not be said for the Total number of patent applications that, in the case of Serbia, explained the dependent variable far less. Based on this, it was concluded that it was possible to reject the null hypothesis H_0, and that it was not possible to reject the alternative hypothesis H_1 about the existence of the relation between innovations and economic growth in Serbia. It seems that in Serbia, investments in R&D do not give any tangible economic results in terms of patents as concrete and the most important materialization of innovative activities. This occurs, among other things, due to insufficiently stimulating environment that would encourage innovations, huge inflows of FDI that bring ready-made technological solutions, quite expensive procedures for patent applications and maintenance, a large number of unvalued patents on the market, as well as the widespread abuse of domestic innovators' licences (Milutinović, 2016). Despite that, the Serbian market has become more attractive for foreign innovators as well, because there is a growing demand for the extension of the European patents (Eurostat, 2022b). This innovation paradox in Serbia is especially sparked by the fact that today the number of patent applications per million inhabitants in Serbia (about 50) is almost five times lower than the European Union (EU) average (230). At the same time, the fact that the number of patent applications and protected patents of individual innovators significantly excides the patent activities of institutional innovators (universities, institutes and companies) means that the situation is particularly unfavourable. It is also remarked that many technological development projects and integral interdisciplinary research programs do not give the expected and sufficient contribution to the realization of new technical solutions and patents (NALED, 2021, 27-28). On the other hand, as far as GERD in Serbia is concerned, this indicator gave quite expected positive and statistically significant results. This finding is well consistent with the results of research by Kutlača, Stefanović Šestić, Jelić & Popović Pantić (2020, 23) which also highlighted the explicit contribution of investment in R&D to real GDP growth. They also found a strong interdependent link between R&D expenditures and economic performance at the national level in Serbia, studying some indicators for the period 1995-2015. These authors also concluded that with the growth of economic activities and the increase of growth rate, the spending on R&D must also increase in order for economic growth to be sustainable.

In view of the statistically significant influence of the GERD predictor on the state and trend of Serbian GDP, the second step of the analysis considered the dynamics of the relation, i.e. the causal relationship between GDP and GERD

in Granger causality sense. The intention of the author was to examine whether GERD Granger causes GDP, as well as whether GDP in Serbia has a recurrent impact on GERD in Granger causality sense. For this purpose, the analysis of data on GDP and GERD variables was first extended to the period from 1997 to 2020, while after that the Augmented Dickey-Fuller (ADF) test and the Breakpoint unite root test were applied in order to determine the stationarity of the variables used. Both tests confirmed that the variable GDP at the level was stationary, while the variable GERD at the level was not stationary. Therefore, logarithmization of these variables was performed, after which the procedure of testing them through these tests was repeated. The results of both, the ADF test and the Breakpoint unite root test on the logarithmic variables indicated the stationarity of these time series, as evidenced in more detail in Table 4 from the Econometric Appendix.

Preliminary research also indicated the normal distribution of logarithmic variables, i.e. the variable lnGDP (Jarque-Bera = 2.507, Prob. = p = 0.285 > 0.05) and the lnGERD (Jarque-Bera = 1.056, Prob. = p = 0.590 > 0.05) (Jarque & Bera, 1987, 163-172). After this step and determining the satisfaction of all needed initial assumptions, the application of Vector autoregressive (VAR) analysis was approached, as well as the development of an appropriate bivariate VAR(1) model. Based on the knowledge of theory and a common sense judgment, as well as the subsequent verification of autocorrelation, i.e. serial correlation of residuals in the VAR model, the optimal number of lags of 1 was chosen, especially since the data were annual. The following Table 2 presents the concrete results of the selected VAR(1) model.

Table 2: The Results of the Selected Bivariate VAR(1) Model

Variables	lnGDP	Statistical significance at 5%	lnGERD	Statistical significance at 5%
lnGDP(-1) Standard errors t-statistics	0.9790 0.0677 14.4582	Significant 14.4582 > 1.96	0.9768 0.3970 2.4602	Significant 2.4605 > 1.96
lnGERD (-1) Standard errors t-statistics	-0.0212 0.0317 -0.6684	Non-significant |-0.6684| < 1.96	0.4870 0.1856 2.6236	Significant 2.6236 > 1.96
Constant Standard errors t-statistics	0.3528 0.5935 0.5944	Non-significant 0.5944 < 1.96	-7.2788 3.4797 -2.0918	Significant |-2.0918| > 1.96

Source: Author's calculation

The results of the conducted VAR(1) analysis indicated the following system of equations that described the relationship between the considered variables lnGDP and lnGERD:

$$\ln GDP_t = 0.353 + 0.979 \ln GDP_{t-1} - 0.021 \ln GERD_{t-1} + \varepsilon_{1t} \quad (4)$$

$$\ln GERD_t = -7.279 + 0.977 \ln GDP_{t-1} + 0.487 \ln GERD_{t-1} + \varepsilon_{2t} \quad (5)$$

While the impact of the GERD from the previous period on the current GDP was even negative and statistically insignificant, the impact of the GDP from the previous period on the current GERD was positive and statistically significant. After this step, diagnostics of residuals was approached in order to determine the stability conditions of the constructed VAR(1) model. The values of the inverse roots of the AR characteristic polynomial remained within the cycle of the roots (Figure 1 from the Econometric Appendix), while the values of their modulus were less than 1 ($Modulus_1$ = 0.933 and $Modulus_2$ = 0.533) (Table 5 from the Econometric Appendix), all suggesting that this model was stable. In addition, the correlograms, i.e. the serial correlation coefficients of these time series, remained within their permitted boundaries of 2 standard errors (Figure 2 from the Econometric Appendix), which also indicated the stability of this model. Finally, the results of the Autocorrelation LM test (Table 6 from the Econometric Appendix) showed that there was no serial correlation on the order of 1, i.e. at a lag 1 (LM – stat = 6.894, Prob. = p = 0.142 > 0.05).

In the last step, the Granger causality test was conducted with the aim to determine the causal relationship between the observed variables. The basic prerequisite for the use of Granger causality test is the stationarity of the observed time series. Therefore, this test was conducted at the level of logarithmic values of the observed variables, which have already proved to be stationary. At this point, the article started from the following research hypotheses:

H_{0A}: lnGERD does not Granger cause lnGDP,

H_{1A}: lnGERD Granger causes lnGDP,

H_{0B}: lnGDP does not Granger cause lnGERD, and

H_{1B}: lnGDP Granger causes lnGERD.

The conducted Granger causality test led us to the conclusion that changes in the variable lnGERD did not Granger cause changes in the variable lnGDP, while changes in the variable lnGDP caused changes in the variable lnGERD in the

Granger causality sense. This further meant that the null hypotheses H_{1A} and H_{0B} could be rejected, while the initial hypotheses H_{0A} and H_{1B} could not be rejected ($\chi^2(1,22) = 0.447$, Prob. = p = 0.504 > 0.05 and $\chi^2(1,22) = 6.053$, Prob. = p = 0.014 < 0.05). Table 3 illustrates the results of the conducted Granger causality test in detail. Based on the obtained results of all implemented research procedures, it is concluded that the variable lnGDP Granger causes lnGERD, as well as that this one-way causal relation is statistically significant, helping to predict the trend of GERD variable.

Table 3: Results of the Granger Causality Test

	χ^2 test results	df	Prob.
Dependent variable: lnGDP			
Independent variable: lnGERD	0.4468	1	0.504 > 0.05
Dependent variable: lnGERD			
Independent variable: lnGDP	6.0527	1	0.014 < 0.05

Source: Author's calculation

At the very end of the conducted analysis, impulse response functions were constructed which indicated that the current growth of the lnGERD variable of one standard deviation is likely to have a gradual and slight negative impact on the lnGDP variable in the foreseeable future. On the other hand, the current growth of the lnGDP variable of one standard deviation is likely to have a gradual positive effect on the lnGERD variable in the next 10 years (Figure 3 from the Econometric Appendix).

The results of the conducted Granger causality test, and especially its part related to the fact that GERD does not Granger cause GDP in Serbia, fit well with the fact that Serbia still lags significantly behind other European countries in terms of investment in R&D, technology and innovation. This situation also leads to a low share of sophisticated value-added products and services in its total production and exports. In addition, there is still insufficient investment in R&D activities in the Serbian private sector, and there is also no adequate cooperation between the academic community, i.e. universities and research institutes and its business sector. In addition, experience tells us that the purpose of directing and spending funds is far more important than the growth of expenditures for R&D activities. Finally, the fact that in the last decade the country's development policy was based mainly on attracting labour and energy-intensive FDI, which generated cheap and mostly undignified jobs and low investment in physical and human capital, could have contributed to the poor state of R&D activities in Serbia. These trends also caused low average wages and the country's low

average productivity (Deutsche Zusammenarbeit et al., 2020, 51-52). The latest Report of the Serbian National Council for Scientific and Technological Development on the State of Science in 2019 also supports these claims. The Report states that only in 2019 the share of private sector allocations for science and technological development was 0.37% of GDP, pointing to the fact that the conditions for a significant change in innovation and scientific-research environment in the country almost do not exist. In addition, the relatively low level of GDP, the modest ten-year average growth rate of 1.5%, as well as the low rate of investment in R&D and science do not give any hope that the scientific environment in Serbia will significantly improve in the near future (National Council for Scientific and Technological Development, 2020, 15-16). This is also confirmed by the data of the Serbian National Alliance for Local Economic Development from the survey on the economy, stating that only one quarter of companies in Serbia are innovative and digitally transformed, that 40% of them have introduced innovations in their business without digital transformation, while about 40% of them have not introduced any innovation in the last five years. Representatives of the companies cited the lack of the need for innovation, the lack of perception of the benefits of innovation, as well as too many accompanying bureaucratic barriers as the main obstacles in domestic innovation activities (NALED, 2021, 12-13).

If so, this brings up a question of how the statistically significant impact of GERD from the results of the regression analysis on Serbia's economic growth could have occurred. One possible explanation for this phenomenon lies in the fact that in the period from 1997 to 2020, GERD in Serbia almost doubled, while the economy grew more slowly by about 87.02%. This trend could have contributed to the country's GDP growth, although the average share of R&D expenditures in the Serbian GDP in the given period remained very low and symbolic (0.72%). Another possible explanation for this phenomenon is that there is a possibility that most of the funded R&D projects were fictitious, as well as that they were initiated with the aim of obtaining and justifying the RS budget or some other funds, while failing in their expected outcomes and tangible results. It is also possible that the official growth of investments in R&D activities was also initiated by new tax incentives introduced with the aim of encouraging innovation activities in Serbia. These incentives above all encompass an increased R&D tax deduction. The Republic of Serbia has also approved a reduction in corporate income tax from 15% to 3% for all those companies that base their business on key forms of intellectual property such as patents and software. Serbian Government also approved tax loans for investments in innovative start-up companies. These tax incentives enable newly established companies to be

exempt from paying taxes, health insurance and social security contributions for their founders up to the amount of € 1,275 of their gross monthly salary in a period of 3 years (Digital Community, 2021). In addition, there are other tax incentives currently in force for domestic and foreign innovative companies aimed at tax, health insurance and social security contribution exemptions, easier employment, encouraging the participation of employees in equity capital and other very innovative supporting programs. Finally, in this process we should not neglect the role of FDI, which today in Serbia appears as the main bearer of contemporary technology, new scientific knowledge, technological experience, tangible and intangible resources and whose R&D activities could certainly significantly contribute to the economic growth of the country.

4. CONCLUSIONS

The conducted research indicated that with the growth of R&D expenditures, there was a surprising decline in the number of patent applications in the Serbian economy, leading the country to a kind of innovation paradox. In addition, the analysis indicated that the R&D allocations had a statistically significant impact on the growth of Serbia's GDP. The second part of this research also pointed out that allocations for R&D activities do not Granger cause GDP, while the Serbian GDP has an impact on R&D financing in Granger causality sense. However, given the fact that Serbia still lags far behind the European countries regarding the innovation ventures, that its investments in R&D in absolute and relative terms are still low and symbolic and that it has failed in the outcomes of R&D projects, from all of the above it can be concluded that there is a need for further encouragement of these activities. Besides, Serbia still has no appropriate environment for encouraging innovations, and a small number of domestic companies have introduced some innovation so far. In addition, innovators in Serbia primarily finance their business from their own funds and commercial loans, while most of them are not even aware of donors' community programs, co-financing opportunities and the possibility for receiving grants (NALED, 2021, 16). Therefore, there is a clear need to build a more favourable, safer, predictable and financially stimulating environment to encourage innovative ventures in the country.

It is also necessary to increase investments in R&D, contemporary technologies and innovations as the most important factors of accelerated growth, technological change and increasing sophistication of products and services. This is especially true when it is necessary to increase innovation capacity in the private sector, as well as in the domestic small and medium enterprises (SMEs) sector. There

is also a need for launching adequate and more comprehensive information campaigns that would make data on innovation incentives more accessible to small business owners and the public. If this information could encourage it to behave more innovatively, the sector of domestic SMEs could grow into the most efficient segment of Serbian economy, and become a bearer of innovations, growth and employment. It is also necessary to encourage further the economic environment for the development of innovations, patents and entrepreneurship as a basic prerequisite for sustainable economic growth and change of economic structure towards more technologically advanced sectors, products and services. The results of the analysis unequivocally indicate the fact that Serbia is facing a kind of innovation paradox, because with the growth of investments in R&D activities, there is a decline in the number of patent applications. On the other hand, scientific research is inefficient and ineffective because it draws funds from GDP, but fails in expectations and tangible results, especially when it comes to patents. In addition, the technological development projects and integrated interdisciplinary research programs also do not give sufficient and expected results. Therefore, when designing the appropriate macroeconomic environment, domestic policy makers should always keep in mind that the purpose of directing and the way of spending funds for R&D activities are far more important than the determined amounts and the growth of R&D expenditures.

Conflict of interests

The author declare there is no conflict of interest.

REFERENCES

Blach, J. (2011). Financial innovations and their role in the modern financial system-identification and systematization of the problem. *e-Finanse: Financial Internet Quarterly*, *7*(3), 13-26.

Block, T. H. (2002). *Financial Systems, Innovation and Economic Performance*. Maastricht, Netherlands: MERIT and International Institute of Infonomics.

Borojević, K. (2006). Knowledge based innovations in modern entrepreneurship. *Acta Economica, 4*(4), 221-246. Retrieved from: http://www.ae.ef.unibl.org/index.php/ae/article/view/285

Deutsche Zusammenarbeit, Swiss Agency for Development and Cooperation SDC, & Deutsche Gesellschaft für Internationale Zusammenarbeit. (2020). *Srbija 2030 Razvojni prioriteti: Izveštaj nedržavnog sektora*. Belgrade, Serbia: Deutsche Zusammenarbeit, SDC, & GIZ.

Digital Community. (2021). *Poreski podsticaji za novoosnovana inovaciona privredna društva*, Belgrade, Serbia: DC. Retrieved from: https://www.digitalnazajednica.

org/2021/07/01/poreske-olaksice-za-novoosnovana-inovaciona-privredna-drustva/

Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2020). *Global Innovation Index 2020: Who Will Finance Innovation?*. 13th ed. Cornell SC Johnson College of Business, Geneva, Switzerland: INSEAD & WIPO. Retrieved from: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2020.pdf

European Central Bank. (2017). *How does innovation lead to growth?* Frankfurt, Germany: ECB. Retrieved from: https://www.ecb.europa.eu/explainers/tell-me-more/html/growth.en.html

Eurostat. (2022a). *GDP and main components*. Retrieved from: https://ec.europa.eu/eurostat/databrowser/view/NAMA_10_GDP__custom_1844550/default/table?lang=en

Eurostat. (2022b). *Patent applications to the European Patent Office (source: EPO)*. Retrieved from: https://ec.europa.eu/eurostat/cache/metadata/en/sdg_09_40_esmsip2.htm

Eurostat. (2022c). *Research and development (R&D)*. Retrieved from: https://ec.europa.eu/eurostat/cache/metadata/en/rd_esms.htm

Fagerberg, J., Verspagen, B., & Srholec, M. (2010). Innovation and Economic Development. In: Hall. B., & Rosenberg. N. (eds.), *Handbook of the Economics of Innovation*. Amsterdam: North Holland, 1-62. Retrieved from: https://www.researchgate.net/publication/266265812_Innovation_and_Economic_Development

Galindo, M. A., & Méndez, M. T. (2014). Entrepreneurship, economic growth, and innovation: Are feedback effects at work? *Journal of Business Research*, *67*(5), 825-829. DOI: 10.1016/j.jbusres.2013.11.052

Granger, C. W. J. (1980). Testing for causality: A personal viewpoint. *Journal of Economic Dynamics and Control*, *2*, 329–352. DOI:10.1016%2F0165-1889%2880%2990069-X

Fayomi, O. S. I., Adelakun, J. O., & Babaremu, K. O. (2019). The Impact of Technological Innovation on Production. *Journal of Physics: Conference Series*, 1378 022014, 1-9. DOI:10.1088/1742-6596/1378/2/022014

Hashi, I., & Stojičić, N. (2013). Knowledge Spillovers, Innovation Activities, and Competitiveness of Industries in EU Member and Candidate Countries. *Economic Annals*, *58*(198), 7-34. DOI: 10.2298/EKA1398007H

Jarque, C. M., & Bera, A. K. (1987). A test for normality of observations and regression residuals. *International Statistical Review*, *55*(2), 163–172.

Jovičić, Ž. (2009). Investing into Scientific Research and Economic Growth. *Acta Economica*, *7*(10), 355-371. Retrieved from: http://www.ae.ef.unibl.org/index.php/ae/article/view/239/239

Kutlača, Đ., Stefanović Šestić, S., Jelić. S., & Popović Pantić, S. (2020). The Impact of investment in Research and Development on the Economic Growth in Serbia. *Industrija*, *48*(1), 23-46. DOI: 10.5937/industrija48-24949

Maradana, R. P., Pradhan, R. P., Dash, S., Gaurav, K., Jayakumar, M., & Chatterjee, D. (2017). Does innovation promote economic growth? Evidence from European

countries. *Journal of Innovation and Entrepreneurship*, *1*(2017), January 10. DOI: 10.1186/s13731-016-0061-9

Maradana, R. P., Pradhan, R. P., Dash, S., Zaki, D. B., Gaurav, K., Jayakumar, M., & Sarangi, A. K. (2019). Innovation and economic growth in European Economic Area countries: The Granger causality approach. *IIMB Management Review*, *31*(3), 268-282. DOI: 10.1016/j.iimb.2019.03.002

Milutinović, J. (2016). Inovatorima u Srbiji neisplativa registracija patenata. *Al Jazeera*, November 28, 2016. Retrieved from: https://balkans.aljazeera.net/news/balkan/2016/11/28/inovatorima-u-srbiji-neisplativa-registracija-patenata

Mitrović, V., & Mitrović, I. (2020). Politika inovacija poslovnih subjekata u industriji kao faktor održivog razvoja u tranzicionom okruženju. *Ekonomski signali*, *15*(2), 31-47. DOI: 10.5937/ekonsig2002031M

National Alliance for Local Development. (2021). *Analiza stanja inovacija i procesa digitalne transformacije u Republici Srbiji.* Belgrade, Serbia: Philip Morris Operations AD Niš, The Government of the Republic of Serbia & NALED.

National Council for Scientific and Technological Development. (2020). Izveštaj o stanju u nauci u 2019. godini, sa predlozima i sugestijama za narednu godinu. Belgrade, Serbia: NCSTD.

Organization for Economic Co-operation and Development. (2007). *Innovation and Growth: Rationale for an Innovation Strategy*. Paris, France: OECD.

Organization for Economic Co-operation and Development. (2015). *Frascati Manual: Guidelines for Collecting and Reporting Data on Research and Experimental Development*. Paris, France: OECD.

Pece, A. M., Oros, S. O. E., & Salisteanu, F. (2015). Innovation and economic growth: An empirical analysis for CEE countries. *Procedia Economics and Finance*, *26* (2015), 461-467. DOI: 10.1016/S2212-5671(15)00874-6

Rosenberg, N. (2004). Innovation and Economic Growth. Paris, France: OECD. Retrieved from: https://www.oecd.org/industry/tourism/34267902.pdf

Schumpeter, J. A. (1934). *The Theory of Economic Development – An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. New Brunswick & London, UK: Transaction Publishers.

Schumpeter, J. A. (1943). *Capitalism, Socialism and Democracy*. 1st ed. London, UK & New York, US: Routledge.

Shrestha, M. B., & Bhatta, G. R. (2018). Selecting appropriate methodological framework for time series data analysis. *The Journal of Finance and Data Science*, *4*(2018), 71-89. DOI: 10.1016/j.jfds.2017.11.001

Solow, R. M. (1957). Technical Change and the Aggregate Production Function. *The Review of Economics and Statistics*, *39*(3), 312-320.

Statistical Office of the Republic of Serbia. (2021). Indikatori inovativnih aktivnosti, 2018-2020. Belgrade, Serbia: SORS. Retrieved from: https://www.stat.gov.rs/sr-latn/vesti/20211203-indikatori-inovativnih-aktivnosti-2018-2020/

Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics*. 6th ed., Boston, US: Pearson.

The World Bank. (2010). Innovation Policy: A Guide for Developing Countries. Washington, D.C., US: The World Bank.

The World Bank. (2022). *Research and Development Expediture (% of GDP) – Serbia*. Retrieved from: https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=RS

World Intellectual Property Organization. (2022). *Statistical Country Profiles: Serbia*. Retrieved from: https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=RS

ИНОВАТИВНИ ПАРАДОКС У ПРИВРЕДИ СРБИЈЕ: ПРИСТУП ГРЕЈНЏЕРОВЕ УЗРОЧНОСТИ

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САЖЕТАК

Иновације, као примјена нових идеја, рјешења и технолошких пракси које унапређују робу, услуге и пословне процесе, представљају најважнији покретач привредног напретка сваке земље. Оне доприносе економском расту својим утицајем на раст продуктивности, а самим тим и на повећање производње, профита, конкурентности, животног стандарда и квалитета живота, доносећи користи друштву у цјелини. Циљ овог чланка јесте да утврди стање иновационих активности у Републици Србији (РС), као и да испита међусобни однос између иновација и привредног раста са аспекта Грејнџерове каузалности. Другим ријечима: овај чланак намјерава да утврди да ли иновације у Грејнџеровом смислу изазивају привредни раст у Србији, као и да ли сам привредни раст има реципрочан утицај на стање и трендове иновативних активности у земљи. У првом дијелу анализе примијењен је модел стандардне вишеструке линеарне регресије како би се испитао утицај броја патентних пријава и бруто домаћих расхода за истраживање и развој (ГЕРД) на бруто домаћи производ (БДП) Србије у периоду од 2004. до 2020. године. Док је ГЕРД показао статистички значајан допринос тренду БДП-а земље, то се не може рећи и за укупан број патентних пријава које су у посматраном периоду драстично опале за чак 86,6%. Дакле, Србија се суочава са својеврсним иновационим парадоксом, јер са растом издвајања за истраживање и развој (ИР) опада број патентних пријава. Ово се, између осталог, јавља као посљедица недовољно подстицајног амбијента за развој иновација, огромног прилива страних директних инвестиција (СДИ) које са собом носе готова технолошка рјешења, прилично скупих процедура за њихову примјену и одржавање, као и великог броја тржишно

невалоризованих патената домаћих иноватора. Други дио истраживања се заснива на изградњи одговарајућег векторског ауторегресионог – VAR(1) модела који прати узрочну везу између ГЕРД-а и привредног раста Србије у периоду од 1997. до 2020. године, као и на примјени Грејнџеровог теста каузалности на подацима о привредном расту и ГЕРД-у Србије. Из анализе произилази да док ГЕРД не узрокује БДП у Грејнџеровом смислу, сам БДП узрокује ГЕРД. Закључује се да научно-истраживачки рад у земљи није довољно ефикасан и дјелотворан јер црпи средства из БДП-а, док не испуњава очекивања и не даје опипљиве резултате, а посебно не у очекиваном броју пријављених патената. Осим тога, пројекти технолошког развоја и интердисциплинарни истраживачки програми такође не дају довољан и очекиван допринос. Стога је неопходно градити повољније макроекономско окружење и континуирано повећавати улагања у истраживање и развој, савремену технологију и иновације као најважније покретаче убрзаног раста, технолошких промјена и софистицираности производа и услуга.

Кључне ријечи: *Србија, иновације, патентне пријаве, бруто домаћи производ (БДП), бруто издвајања за истраживање и развој (ГЕРД), векторски ауторегресиони (VAR) модел, Грејнџеров тест узрочности, иновативни парадокс, пословно окружење.*

MACROECONOMIC STABILITY AND EUROPEAN UNION INVESTMENTS

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ABSTRACT

The quantity and quality of investments represent a condition for sustainable and long-term economic growth. Therefore, in economic theory, the rate of economic growth is a function of investment. This research includes an analysis of the impact of selected key macroeconomic indicators (independent variables) on the state and trend of investments in the European Union as a dependent variable. The research covers the period from 2012 to 2021. The following independent variables are chosen: GDP growth rate, interest rate, inflation, unemployment, income from indirect and direct taxes, public debt and budget deficit. The research shows the impact of these variables on the investments of the European Union, the dependent variable. The results of the regression analysis show that interest rates, unemployment, revenues from indirect taxes, as well as the public deficit and public debt have a negative and statistically significant direction in relation to investments. The GDP growth rates as well as direct tax revenues are statistically insignificant, but they have a positive regression coefficient on investments. Inflation rate is also an insignificant variable, but with negative impact on investments. The chosen model in the context of the joint action of all independent variables is statistically significant given that the coefficient of determination is 0.99. The results of the F test indicate statistical significance below 5%, so the model offers enough degrees of freedom (df) to vary the variables and statistically acceptable rating. Finally, the obtained results are significantly consistent with previous research and theoretical assumptions.

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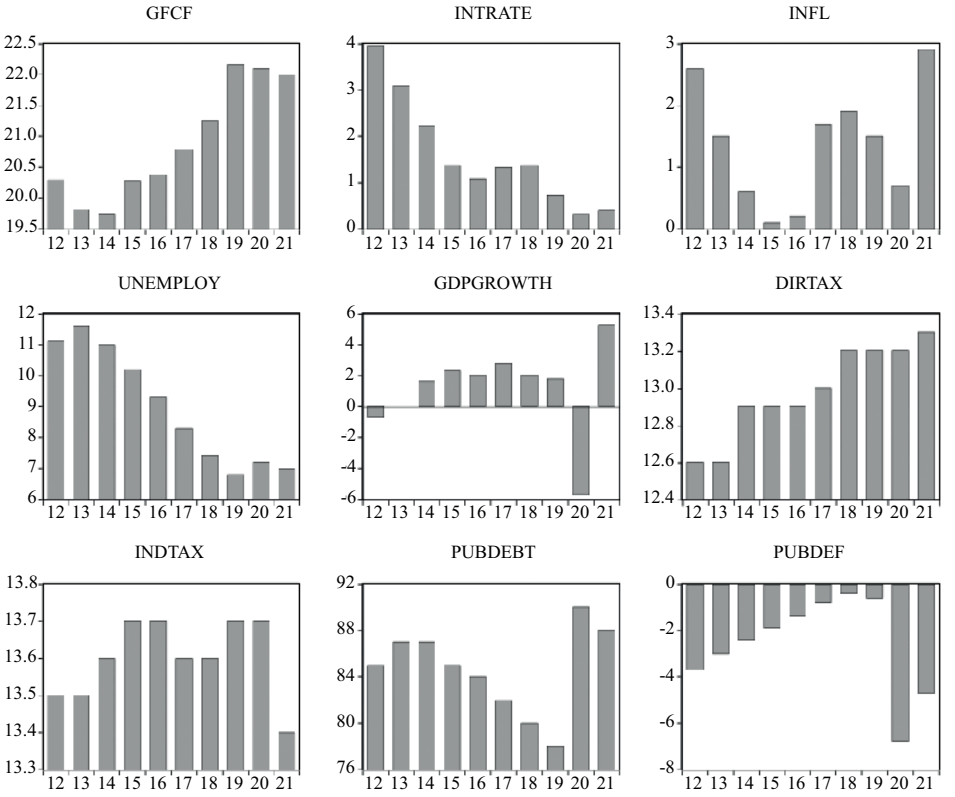
1. INTRODUCTION

Investments affect economic growth and physical capacities (aggregate supply). As part of investments, macroeconomics explores the so-called optimal stock of capital, without which the optimal ratio of output and capital cannot be determined, and thus the volume of investments. It is not possible to ensure the desired level of growth and development without continuous investment. Other economic variables should be included for the macroeconomic overview of investments. Therefore, this research is focused on the analysis of gross investments and other economic indicators with the aim of determining their interdependence. In addition to investments, the economic indicators analysed in this paper are: interest rates, inflation, unemployment, GDP growth, tax revenues, budget deficit and public debt. The subject of the research is the analysis of investments and the aforementioned macroeconomic variables on the example of the EU-27, for the period 2012-2021.

The European Union has been recording a uniform share of investments in GDP for a long time. Total investments in the EU amount to about 20% of GDP. This shows that the most developed European national economies are already in a mature development stage (Popović & Erić, 2021).

The following diagram (Diagram 1) shows data on investments and other economic indicators in the EU. Stable investments are observed, which is expected for this stage of development of the European economy. The diagram shows a downward trend in long-term interest rates and unemployment over a ten-year period, while the general price level fluctuated between 1.5 and 3%. GDP growth averaged around 2% annually, with minor fluctuations. A more significant deviation was recorded in 2020, when the drop in economic activity amounted to 5.7% due to the pandemic shock. The recovery of economic activity was already recorded in 2021, when GDP was recorded higher by 5.3% compared to the previous year. Economic recovery was a prelude to inflation, which in 2021 amounted to almost 3%. Due to difficulties with the growth in energy prices in the EU, inflation escalated during 2022 and amounted to about 12%. Price stability was maintained in the analysed period (2012-2021) through less expansive monetary measures. However, price stability implied weaker results of other economic indicators, primarily investments and GDP growth. The stability of fiscal revenues (based on direct and indirect taxation) was recorded in the analysed period. The growth of the budget deficit (over 4%) and public debt (over 85%) was noticeable, especially in the year of the pandemic and the first year after the pandemic, which indicates a significant average deviation from the convergence criteria at the Union level.



*Definition of coefficients: GFCF- Gross investments in fixed capital (% GDP), INTRATE - interest rate, INFL - inflation, UNEMPLOY - unemployment, GDPGROWTH - GDP growth, INDTAX - revenues from indirect taxes (% GDP), DIRTAX - revenues from direct taxes (%GDP), PUBDEBT - public debt (% GDP), PUBDEF. -budget deficit (% GDP)

Diagram 1: Analysed economic indicators*, 2012-2021, in %

Source: Eurostat, 2022; prepared by the authors in the Eviews software package.

The results in this paper are compared with theoretical assumptions and relevant research of economies with similar characteristics as the EU. In the following, the relevant previous research works in the field that is the subject of this paper are analysed.

Previous research. The recession after 2009 was characterized by non-expansionary measures that hindered development in most countries. Therefore, the data on growth and development were already unsatisfying in the years before the onset of the pandemic. Due to the lack of strong investment patterns, European countries were not fully prepared for the shock caused by COVID-19. Mazzanti et al. (2020) believe that convergence and sustainability policies should

have been given a greater role within the EU agenda, and their symbiosis would have effected macroeconomic stability and overall development. Marinescu et al. (2019) investigate the determinants of public investments in the countries of the European Union to evaluate the sufficiency of investments in EU. The authors state that EU investments have recorded a serious downward trend in the last three decades. The downward trend became more pronounced after the economic crisis at the end of the first decade of this century. They analyse the main determinants of public investment in the EU to find out which variables have a significant impact. They use panel data for EU countries in the period from 1995 to 2017, and regression models to study the impact of economic and fiscal factors on public investment. The result of the work shows that public investments are positively affected by the production gap, income of the population and the number of inhabitants, while GDP growth, net lending, expenditures, total debt, interest rate and active population have a negative impact. These authors finally conclude that fiscal policy decisions also play an important role in the commitment of public investment expenditures.

Research studies on the impact of interest rates on investments contribute to a proper understanding of these variables. Paradoxically, there are very few works and studies that link investments and interest rates of central banks in the Eurozone. Nevertheless, it is a significant macroeconomic relationship, especially in the context of the implementation of the monetary policy of the entire European Union. Thus, in a detailed macroeconomic research, Reichel (2022) investigates the relationship between interest rates and aggregate investments in the Eurozone. More precisely, he investigates the response of total investments to changes in interest rates. OLS, TSLS and GMM econometric methods were used in the research. The study did not confirm a significant impact of interest rates on investments in the Eurozone, although macroeconomic theory assumes an inverse relationship between these variables. However, some papers have confirmed the macroeconomic theory and the inverse relationship between interest rates and investments. The relationship between these variables in the Eurozone is investigated by Stawska and Miszczyńska (2017). They proved that in the period 1999-2016, the main interest rate of the ECB had a statistically significant and inversely proportional influence on investments in the Eurozone. Consequently, the authors believe that ECB had an impact on investments through the interest rate of the central bank. Thus, the hypothesis that lower interest rates encourage investments was confirmed, but also that there is an influence of the ECB on the investment sphere. In addition to these studies, some authors like Dufrénot and Khayat (2017), analyse the monetary policy of the Eurozone in the context of the lower limit of the nominal interest rate and liquidity.

Some former studies deal with the analysis of the relationship between interest, savings and investments. Thus, a study at the OECD level by Tease et al. (1991) showed the relationship between real interest rates and investment, as well as the context of the relationship in the area of savings at the global level. Nevertheless, the emphasis of this research study is on the real interest rate as a multivalent variable that has an impact on numerous economic variables. Earlier research conducted by Hubbard (2001) deals with analysis of capital market imperfections. Hubbard is one of the first authors to explore broader aspects of investing in relation to conventional theories. It is distinguished by the inclusion of financial restrictions when deciding on investments.

Khurshid (2015) investigated the effects of interest rates on investments on the example of Jiangsu province. The author studied the impact of interest rate on investments in that Chinese province. At the same time, Jiangsu had the largest investments in China. Using econometric methods in the period 2003-2012, the author proved that in the long term there is a statistically significant inverse relationship between interest and investments. In the short term, this relationship is positive. This confirmed the macroeconomic theory hypothesis that lower interest rates encourage investment growth (and vice versa). The author also gave recommendations as to how interest rate policy can influence economic growth in this province.

Some studies deepen the role of interest rates, like Belke and Klose (2018). The authors estimate real interest rates for the entire Eurozone as well as for its 9 members. Estimated real interest rates are slightly lower, but still higher than real interest rates. They conclude that real interest rates are set below (or not much above) the natural real rate. Ferrero, Gross, and Neri (2017) conducted research on interest rates for the ECB. They found a decline in nominal and real interest rates since the mid-1980s. For the past decade, panel analysis has shown a decline in real interest rates in the Eurozone. The authors predict slow economic growth and pressure to reduce real interest rates by 2025. Demertzis and Viegi (2021) also note the decline in long-term interest rates. They investigate interest rate trends in Europe and the USA. US interest rates have been falling for more than 15 years, with real interest rates being negative for most of that period. In Europe, the pressure to reduce interest rates is more pronounced. The authors see the lack of adequate capital for financing as an important factor in the pressure on interest rates in Europe. In his paper, Summers (2015) indicates stabilization of global financial indicators after the financial crisis of 2008-2009, although he believes that some segments in the industrial world are still lagging behind, which opens up space for different interest policies and their impact on investment. According to a research study by Sajedi and Thwaites (2016), real interest rates fell in the

industrialized world. Nominal investment rates also recorded a decline. At the same time, a decline in the relative prices of investment goods is observed. The model explains a small but economically important drop in interest rates, as well as the rise in real estate prices and household debt. Greater investment decline rate is particularly significant. Research on the example of OECD countries was conducted by Gruber & Kamin (2016). They see growth in net lending to non-financial corporations. They prove that this growth encourages the growth in savings and decline in investments. Panel analysis showed that investments in OECD members were aligned with GDP growth, interest rates and profits. The authors conclude that companies did not reduce investments, regardless of the problems.

Pinto and Tevlin (2014) investigated the perspectives and weaknesses of investing after the economic crisis of 2008-2009. They note that in 2012 and 2013, business fixed investments move at a modest average rate of about 4%, which, according to the authors, is an insufficient pace in the course of expansion. In a study done for the IMF, a group of authors investigate investments in the Eurozone. Barkbu et al. (2015) prove that investments in the Eurozone are below pre-crisis levels. They see part of the explanation in high capital costs (interest rates) but also in other financial limits. A study by Marx et al. (2021) indicates a decline in the labour force and growth in productivity with a limited decline in real interest rates.

Gootjes and De Haan (2022) examine whether the previous fiscal policy was pro or anti-cyclical. In doing so, they use a panel of 27 member states of the European Union (EU) in the period from 2000 to 2015. Additionally, they investigate whether governments improve fiscal rules and efficiency in the cyclical response of fiscal policy. The results suggest that EU member budgets have a pro-cyclical character. The results also show that fiscal rules reduce fiscal procyclicality. Further analysis reveals that fiscal policy tends to be more pro-cyclical in countries outside the Eurozone, and in periods of prosperity for all member countries.

Alesina (2018) emphasizes how the development of political economy contributes to the success of stabilization achieved through monetary and fiscal reforms. He discusses the role of rationality in political-economic models and related methodological issues. This paper generally deals with the timing of macroeconomic policy, and especially fiscal reforms, in relation to the time of elections. It focuses on how ideological and opportunistic considerations influence the choice of timing of policy implementation. In his paper, he emphasizes why suboptimal economic outcomes (e.g. hyperinflation and budget

deficits) are out of control and not corrected over a long period of time. Alesina et al. (2017) investigated the macroeconomic effects of fiscal consolidation based on reductions in government spending, reductions in transfers, and increases in taxes. In this paper, they extend the narrative dataset on fiscal consolidations, detailing more than 3,500 measures for 16 OECD countries. They argue and prove that cuts in government spending and cuts in transfers are much less harmful than tax increases, even though non-distortionary transfers are not classified as spending. They find that standard New Keynesian models are fully consistent with their results when fiscal shocks are permanent. The effects of wealth on aggregate demand moderate the effect of persistent reduction in consumption. Static distortions caused by tax increases cause larger shifts in aggregate supply under unstable prices.

Bonam, De Haan, & Soederhuizen (2022) estimate the effects of government spending shocks during long episodes of low interest rates, which they consider a proxy for the effective lower bound (ELB). Using a panel VAR model for 17 developed countries, they find that government spending and investment multipliers are significantly higher, and exceed the value of one, when interest rates are persistently low. While differentiating government investment in construction and equipment, they find that only the former increases output significantly more when the ELB is lower. They explain this result by existing New Keynesian models that include construction time constraints for government investment.

Bonatti et al. (2020) in their prediction that after the COVID-19 pandemic the ECB could face many additional risks that would be attached to the basic one, and that would undermine the stability of the prices of the euro area, they believe that most of these risks could be reduced by revising the framework management in the euro area, by creating a new mechanism for providing financial assistance and implementing a one-time intervention to reduce the Eurosystem's exposure to euro area sovereign debts.

In his work, Dumičić (2019) identifies the main channels through which fiscal policy is connected with financial stability. It investigates several characteristics of public debt related to financial stability (public debt management and sustainability, state financing costs and their impact on private sector financing costs, exposure of financial institutions to the state, etc.). Along with the tax policy, it elaborates its countercyclical capacity, the role of automatic stabilizers, tax incentives, and tax reliefs for systemic risks. This author analyzes the role of fiscal policy in periods of strong capital inflows from the perspective of financial stability, followed by an overview of fiscal and quasi-fiscal costs of financial

instability. He also points out that the different time horizon is a particular problem for economic policy makers. In this context, the problem of fiscal policy is associated with election cycles that negatively affect its countercyclical capacity. Considering the relevance of the identified channels for financial stability, the author assumes that the macro prudential capacity of fiscal policy will receive much more attention in future research.

Miao & Su (2021) present a New Keynesian model in which entrepreneurs face uninsured idiosyncratic investment risk and credit constraints. Government bonds provide liquidity services and increase net worth. Multiple steady states with positive values of public debt can be supported for a certain permanent ratio of deficit to output. They believe that interest rates in a stable state are lower than the rate of economic growth, and public debt contains a component of the so-called balloon payment. They find that a large set of monetary and fiscal policy parameters can achieve debt and inflation stability, with the condition of non-increasing fiscal deficits and zero interest rates.

2. MATERIALS AND METHODS

Regression analysis - methodological approach. The research is based on the interdependence of one variable with another, or several other variables. The dependent variable is the primary one, the variations thereof can be explained by changes in other independent (regressor) variables. A model of the stochastic relationship between the dependent and independent variables is a regression model. It is expressed by an equation in which the dependent variable Y is represented as a linear or non-linear function of the independent variables (x_1, x_2,...,x_k). The stochastic relationship Y and (x_1, x_2,....,x_k) is characterized by the fact that each vector of independent variables (x_1, x_2,....,x_k) has a distribution of the value of the dependent variable. By introducing a random variable into the model, we get:

$$Y = f(x_1, x_2, \ldots, x_k) + \varepsilon$$

(dependent variable Y can also be called regressand, endogenous or output variable, and independent variables can be called regressor, exogenous or input variables).

The formula for the estimated simple linear regression function reads:

$$\hat{Y}_i = b_0 + b_1 x_i$$

where: $\hat{Y}_i$ – is the value of the dependent variable (on the best-fit regression line); b_0 and b_1 – are unknown regression parameters (to be estimated).

Finally, the stochastic nature of the linear relationship between the dependent (Y) and the independent variable (x) is introduced into the simple linear regression model, so we get:

$$Y_i = \beta_0 + \beta_1 \cdot x_i + \varepsilon_i \quad (i = 1, \ldots, n)$$

where: Y_i – i-th dependent variable; x_i – i-th independent variable; β_0, β_1 – regression parameters; ε_i – stochastic term; n – the size of the basic set.

Definition of variables and statistical basis. The following variables are used in this work: European Union investments as a dependent variable, and interest rates, inflation, unemployment (%), economic growth, revenues from indirect and direct taxes, public debt and budget deficit as independent variables. The statistical basis consists of the relevant Eurostat source, which can be seen in the following table, while the definition of variables, the method of their collection and calculation is described in the rest of this chapter.

Table 1: Description and explanation of the variables in the model

	Denotation in model	Data source
A) Dependent variable		
1. EU Investment (%gdp)	GFCF	Eurostat, 2022
B) Explanatory variables		
2. Indirect tax revenue (%gdp)	Ind.tax	Eurostat, 2022
Direct tax revenue (%gdp)	Dir.tax	Eurostat, 2022
3. Public debt (%gdp)	Pub.debt	Eurostat, 2022
4. Budget deficit (%gdp)	Budg.def.	Eurostat, 2022
6. Interest rates	Int.rate	Eurostat, 2022
7. GDP growth (%)	gdpgrowth	Eurostat, 2022
8. Inflation (%)	Inf.	Eurostat, 2022
9. Unemployment	Unemp.	Eurostat, 2022

Source: Eurostat, 2022

Investments. Gross fixed capital formation (GFCF) is a macroeconomic concept used in official national accounts such as the United Nations System of National Accounts (UNSNA), National Income and Product Accounts (NIPA) and the European System of Accounts (ESA). The concept originates from the National Bureau of Economic Research (NBER) capital formation studies of Simon

Kuznets in the 1930s, and standard measures for it were adopted in the 1950s. Statistically, this indicator measures the value of acquisitions of new or existing fixed assets by the business sector, governments and households (excluding their non-corporate enterprises) minus the disposal of fixed assets. GFCF is a component of gross domestic product (GDP) expenditure and therefore shows something about how much new value added in the economy has been invested rather than consumed (Eurostat, 2022).

Tax revenues. They refer to detailed receipts from taxes and social contributions by type of tax or social contributions and by sub-sector of the general government, published by national authorities in accordance with table 0900 of the ESA transfer program 2010. The data are presented in two variants: euros/eki, units national currency (fixed to the euro if necessary) and as a % of GDP. Geographic coverage: EU and Eurozone, Iceland, Norway, Switzerland. Main data sources: National bodies (Eurostat, 2022).

Budget deficit (% GDP) and public debt (% GDP). When it comes to these data, the Government Financial Statistics (GFS) provide the basis for fiscal monitoring in the EU, especially for statistics related to the Excessive Deficit Procedure (EDP). The EDP was established in the Treaty on the Functioning of the European Union (TFEU) and referred to in the Stability and Growth Pact. Member States report data related to the EDP to the Commission (Eurostat), which in turn is responsible for providing the data to the Council of the EU. The EU GFS, including EDP statistics, is implemented in accordance with Regulation (EU) 549/2013 of the European Parliament and the Council on the European System of National and Regional Accounts (ESA 2010), the EU Manual of National Accounts, which replaced the previous version of the National Accounts of the ESA 95 framework from September 2014. It was supplemented by further interpretation and guidelines of Eurostat, especially the Handbook on Government Deficit and Debt.

Council Regulation (EC) no. 479/2009, as amended, requires Member States to report data on state deficit/surplus and debt related to the EDP twice a year: by April 1 and October 1 for the previous four calendar years and the forecast for the current year. Data are presented in harmonized tables. These tables are designed specifically to provide a consistent framework, with links to national budget aggregates and between deficit and debt changes. They should be fully consistent with the GFS data provided to Eurostat under the ESA 2010 transfer program (Eurostat, 2022).

Interest rates. One of the convergence criteria of the Maastricht EMU Treaty refers to interest rates for long-term government bonds denominated in national

currencies. The selection guidelines require the data to be based on secondary market yields of central government bonds, net of taxes, with remaining maturities of around 10 years. The bond or bonds in the basket must be changed regularly to avoid maturity drift. The legal basis is Article 121 of the Treaty establishing the European Union and the Protocol on Convergence Criteria. Currently, harmonized long-term interest rates are available for all member states. Since January 1999, the weights for the euro area have been based on the nominal balance of each country's government bonds with maturities of about 10 years. For EU aggregates and before 1999 for the euro area, the weights used are national GDP at current prices and purchasing power standards. The ECB calculates the EU aggregate series based on data from national central banks. In addition, for the euro area aggregates, the ECB collects daily data on representative long-term government bonds in the markets, used to calculate that aggregate. (Eurostat, 2022).

GDP growth. Gross domestic product (GDP) is a measure of economic activity, defined as the value of all goods and services produced minus the value of any goods or services used in their creation. The calculation of the annual GDP growth rate aims to enable a comparison of the dynamics of economic development over time, but between different economies. To measure the growth rate, GDP in current prices is evaluated in the prices of the previous year, and the changes calculated in this way are imposed at the level of the reference year, that is, the so-called chain linking. (Eurostat, 2022)

Inflation. Harmonized indices of consumer prices (HIPC) are intended for international comparisons of consumer price inflation. The European Central Bank, e.g. uses HIPC to monitor inflation in the Economic and Monetary Union and to assess inflation convergence in accordance with Article 121 of the Treaty of Amsterdam, while for the USA and Japan national consumer price indices are used (Eurostat, 2022)

Unemployment. The number of people unemployed as a percentage of the labour force. The labour force is the total number of employed and unemployed persons. Unemployed persons are persons aged 15 to 74 who are: a. not employed during the reference week, b. currently available for work, i.e. were available for paid employment or self-employment before the end of the two weeks following the reference week, c. actively seeking job, i.e. had either carried out activities in the four-week period ending with the reference week to seek for paid employment or self-employment or found a job to start later, i.e. within a period of three months from the end of the reference week (Eurostat, 2022).

3. RESULTS

Below are the results of the regression analysis, presented in three tables (sections). The analysed period is 2012-2021 for all observed variables. The first table of the regression model (Model Summary) shows a coefficient of determination (R Square) of 0.99, which means that 99% of gross investment variations are determined by the joint action of the selected independent variables. This result is sufficient in terms of statistical significance and quality of the model. It is quite logical, because the movement of gross investments in reality is influenced by numerous factors, which are largely taken into account in this model.

In the second section, the results of the regression analysis F test (analysis of variance-ANOVA) show large values and a probability below 5%, which means that the model has enough degrees of freedom (df) to vary among the analysed phenomena, which is statistically acceptable in terms of significance and statistical evaluation which is shown in the third section in the regression model.

Table 2: Summary Statistics

Regression Statistics	
Multiple R	0.99
R Square	0.99
Adjusted R Square	0.99
Standard Error	2.01
Observations	10.00

Source: Authors' calculation

Table 3: ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	8	1036942	129617.7	32035.02	0.0043
Residual	1	4.046126	4.046126		
Total	9	1036946			

Source: Authors' calculation

Coefficients of variables, as regression predictors, and the significance of each for the movement of gross investments are presented in the third section (Table 4). Interest rate (nitrate), unemployment (unemployed), income from indirect taxes (ind.tax), budget deficit (budg.def) and public debt (pub.debt) negatively and statistically significantly determine the trend of investments. An increase in interest rates (int.rate) by one percentage point leads to a statistically significant

decrease in the value of investments. The change in unemployment (unemploy) for one unit inversely determines the movement of investments for 63 units. From the above, it can be concluded that there is an inversely proportional trend of unemployment and investment in EU for the period 2012-2021. The results also have a theoretical basis for the inversely proportional relationship between investments and unemployment. The results on the inversely proportional impact of income from indirect taxes (ind.tax) also have a theoretical basis in this case, because the collection of indirect taxes is mainly directed to cover current expenditures (current consumption), and not to investments. The impact of the budget deficit and public debt on investments leads to a similar conclusion.

Inflation in the observed period has a negative impact on investments, but it is also statistically insignificant. The analysis determined (period 2012-2021) stagnant and low annual inflation values. The reasons for the lower intensity of the negative correlation between the observed variables can be explained by the active role of the ECB in performing the basic task, i.e. maintenance of price stability, which was at the expense of gross investments and lower economic growth. GDP growth (gdpgrowth) has a positive impact on investments, but statistically insignificant. The variable of income from direct taxation (dir.tax) shows the same direction and insignificant influence. Although they are in a proportional relationship, the insufficient values of reinvestment of income from direct taxes do not show a statistically significant impact.

Table 4: Value of coefficients and significance

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Ind.tax	-1257.46	35.49	-35.43	0.02
Dir.tax	21.28	13.76	1.55	0.36
Pub.debt.	-59.00	0.96	-61.71	0.01
Budg.def.	-93.07	1.89	-49.11	0.01
Int.rate	-156.52	7.43	-21.06	0.03
Infl.	-16.91	6.42	-2.66	0.23
GDPgrowth	5.95	1.14	5.25	0.12
Unemp.	-63.16	5.74	-11.01	0.05
Intercept	25081.97	611.31	41.03	0.02

Source: Authors' calculation

4. DISCUSSIONS AND CONCLUSIONS

Investments represent one of the key macroeconomic variables. First of all, their importance stems from the role they play in the theory of economic growth.

In economic theory, there is a well-known and generally accepted relationship: economic growth (that is, the rate of economic growth) depends on investments. Numerous economic indicators affect the state and dynamics of investments. Regardless of endogenous and exogenous influences, investments in most developed economies account for approximately 1/5 of GDP, and to a lesser extent, they are prone to significant oscillations.

In this research, a regression analysis of the influence of the relevant group of indicators on the movement and dynamics of investments in the European Union was performed. The selected group of macroeconomic variables represents independent variables that positively (proportionally) or negatively (inversely proportionally) influence the movement of investments. In this context, the following independent variables were analysed: economic growth rate, interest rate, inflation, unemployment, revenues from indirect and direct taxes, public debt and budget deficit, while European Union investments represent a dependent variable. The research covers the period from 2012 to 2021, i.e. the time after the global financial crisis of 2008/2009, which includes stable, but also less stable sub-periods (e.g. during the debt crisis in Greece and the Eurozone, or instability during the COVID-19 pandemic).

The chosen model is statistically significant because it enables a realistic and high-quality reading of the data. This is confirmed by the coefficient of determination (R Square) of 0.99. That is, as much as 99% of the variation of the dependent variable of gross investment is determined by the joint action of all independent variables. It should be emphasized that this result is logical and expected due to more than correct choice of variables that influence the movement of gross investments. The same is confirmed by the results of the F test with a probability below 5%. Thus, the selected model offers enough degrees of freedom (df) for mutual variation of the variables, which finally gives a high statistically acceptable and significant score.

The final results of the influence of the selected independent variables largely converge with the theoretical assumptions, but also with the results of previous research. In this context, it is obvious that interest rate, unemployment, indirect taxes revenues as variables, as well as the budget deficit and public debt have negative and statistically significant direction in relation to investments as a dependent variable.

Therefore, the direction of these variables in relation to investments is inversely proportional.

There is a logical explanation for these results because an increase in interest rates (int.rate) by 1% affects a statistically significant decrease in investments. This is a logical reaction, because any increase in the price of capital disincentivizes investors and slows down the investment process.

The situation is similar with unemployment. For the observed period in the European Union, there is an inversely proportional trend of unemployment and investment, which corresponds to theoretical knowledge and previous research. These variables have a negative coefficient because an increase in investment leads to a decrease in the unemployment rate, which is a generally accepted theoretical position.

Also, the obtained results of the impact of income from indirect taxes are theoretically based on scientific knowledge because collected indirect taxes are mainly used for current expenditures, not investments. Therefore, higher tax rates and higher collected taxes disincentivize investments. It is similar with the relationship between the budget deficit, public debt and investments. Macro-economic and fiscal instability, which is reflected in the growth of the deficit and public debt, certainly discourages investors from making new investments.

Although the GDP growth rate is statistically insignificant, it has a positive correlation coefficient in relation to investments. Income from direct taxes, having positive direction in relation to investments, is also insignificant.

Low inflation rates are observed in the observed period, but this variable is insignificant and has a negative impact on investments. The low inflation can be explained by the consistent application of common monetary and fiscal policy in the European Union and the Eurozone, as well as by the ECB's measures to preserve price stability and even slow down in investment.

The final conclusion is that in the period from 2012 to 2021, the influence of the selected independent variables of the economic growth rate, the level of the interest rate, inflation, unemployment, income from indirect and direct taxes, public debt and the budget deficit, correlates to a large extent with the European Union investments.

As a result of the regression analysis, it is possible to give realistic assessments of the influence of independent variables on the dependent variable, and to confirm that the observed tendencies are aligned with earlier research and theoretical knowledge in the field of investments. That is, based on the research results, it is possible to make various relevant judgments or create economic policies in the context of the impact of investments on long-term economic development.

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Conflict of interests

The authors declare there is no conflict of interest.

REFERENCES

Alesina, A. (2018). Political models of macroeconomic policy and fiscal reforms. In *Modern Political Economy and Latin America,* 44-58. London, UK: Routledge. eBook ISBN9780429498893.

Alesina, A., Barbiero, O., Favero, C., Giavazzi, F., & Paradisi, M. (2017). *The effects of fiscal consolidations: Theory and evidence* (No. w23385). Cambridge, Massachusetts, US: National Bureau of Economic Research. Retrieved from: https://www.nber.org/system/files/working_papers/w23385/w23385.pdf?sy=385

Barkbu, B. B., Berkmen, S. P., Lukyantsau, P., Saksonovs, S., Schoelermann, H., & Brooks, P. K. (2015). *Investment in the Euro Area: Why Has It Been Weak?* IMF Working Papers. 2015(032). Washington, D.C., US: IMF. Retrieved from: https://www.imf.org/~/media/Websites/IMF/imported-full-text-pdf/external/pubs/ft/wp/2015/_wp1532.ashx

Belke, A., & Klose, J. (2018). *Equilibrium real interest rates, secular stagnation, and the financial cycle: Empirical evidence for euro-area member countries* (No. 743). Ruhr Economic Papers. RWI - Leibniz-Institut für Wirtschaftsforschung, Ruhr-University Bochum, TU Dortmund University, University of Duisburg-Essen.

Bonam, D., De Haan, J., & Soederhuizen, B. (2022). The effects of fiscal policy at the effective lower bound. *Macroeconomic Dynamics, 26*(1), 149-185. DOI: 10.1017/S1365100520000097

Bonatti, L., Fracasso, A., & Tamborini, R. (2020). *Rethinking monetary and fiscal policy in the post-COVID Euro Area*. Monetary Dialogue Papers. EU: European Paliament. DOI:10.13140/RG.2.2.29247.33448

Dean, W. T. A., Elmeskov, J., & Hoeller, P. (1991). Real Interest Rate Trends: The Influence of Saving. Investment and Other Factors. *OECD Economic Studies No.17*. Retrieved from: https://www.researchgate.net/profile/Peter-Hoeller/publication/253614953_Real_Interest_Rate_Trends_The_Influence_Of_Saving_Investment_and_Other_Factors/links/0a85e533c13d860747000000/Real-Interest-Rate-Trends-The-Influence-Of-Saving-Investment-and-Other-Factors.pdf

Demertzis, M., & Viegi, N. (2021). *Low interest rates in Europe and the US: one trend, two stories* (No. 07/2021). Bruegel Policy Contribution. Retrieved from: https://fondazionecerm.it/wp-content/uploads/2021/03/Bruegel-Low-interest-rates-in-Europe-and-the-US.pdf

Dufrénot, G., & Khayat, G. A. (2017). Monetary policy switching in the euro area and multiple steady states: An empirical investigation. *Macroeconomic Dynamics, 21*(5), 1175-1188. DOI: 10.1017/S1365100515000280_

Dumičić, M. (2019). Linkages between Fiscal Policy and Financial (In) Stability. *Journal of central banking theory and practice, 8*(1), 97-109. DOI:10.2478/jcbtp-2019-0005

Eurostat. (2022, 10 21). *Government Consolidated Gross Debt (Government deficit/surplus, debt and associated data.* Retrieved from: https://ec.europa.eu/eurostat/databrowser/view/GOV_10DD_EDPT1__custom_3467249/default/table Online data code: GOV_10DD_EDPT1.

Eurostat. (2022, 9 20). *Government Deficit and Debt (gov_10dd)*. Retrieved from: https://ec.europa.eu/eurostat/cache/metadata/en/gov_10dd_esms.htm , https://ec.europa.eu/eurostat/databrowser/view/GOV_10DD_EDPT1__custom_3461373/default/table

Eurostat. (2022, 10 26). *HICP - Inflation Rate*. Retrieved from: https://ec.europa.eu/eurostat/databrowser/view/tec00118/default/table?lang=en. Online data code: TEC00118 last update: 19/10/2022 11:00.

Eurostat. (2022, 10 22). *Interest rate: EMU convergence criterion bond yields; EMU convergence criterion series - annual data*. Retrieved from: https://ec.europa.eu/eurostat/databrowser/view/IRT_LT_MCBY_A$DEFAULTVIEW/default/table. Online data code: IRT_LT_MCBY_A$DEFAULTVIEW:

Eurostat. (2022, 10 25). Main national accounts tax aggregates. Retrieved from: https://ec.europa.eu/eurostat/databrowser/view/gov_10a_taxag/default/table?lang=en ; https://ec.europa.eu/eurostat/cache/metadata/en/gov_10a_taxag_esms.htm. Online data code: GOV_10A_TAXAG:

Eurostat. (2022, 10 1). Total unemployment rate. Retrieved from: https://ec.europa.eu/eurostat/databrowser/view/TPS00203/default/table

Ferrero, G., Gross, M., & Neri, S. (2017). On secular stagnation and low interest rates: demography matters. *International Finance, 22*(3), 262-278. DOI: 10.2866/48753

Gootjes, B., & de Haan, J. (2022). Procyclicality of fiscal policy in European Union countries. *Journal of International Money and Finance*, *120*, 102276. DOI: 10.1016/j.jimonfin.2020.102276

Gruber, J. W., & Kamin, S. B. (2016). The corporate saving glut and falloff of investment spending in OECD economies. *IMF Economic Review, 64(*4), 777-799. Retrived from: http://www.jstor.org/stable/45212128

Hubbard, R.G. (2001). Capital-Market Imperfections, Investment, and the Monetary Transmission Mechanism. In: Bundesbank, D. (Eds.) *Investing Today for the World of Tomorrow.* Berlin, Heidelberg: Springer. DOI: 10.1007/978-3-642-56601-1_13

Khurshid, A. (2015). The effect of interest rate on investment; Empirical evidence of Jiangsu Province, China. *Journal of International Studies Vol, 8*(1). DOI: 10.14254/2071-8330.2015/8-1/7

Marinescu, A. C., Spanulescu, G. A., Craiu, M. A., & Noica, R. (2019). Determinants of Public Investment in European Union Countries. *Economic Computation & Economic Cybernetics Studies & Research, 53*(4). DOI: 10.24818/18423264/53.4.19.02

Marx, M., Mojon, B., & Velde, F. R. (2021). Why have interest rates fallen far below the return on capital?. *Journal of Monetary Economics*, *124*, S57-S76. Retrieved from: DOI: 10.1016/j.jmoneco.2021.09.008

Mazzanti, M., Mazzarano, M., Pronti, A., & Quatrosi, M. 2020. Fiscal policies, public investments and wellbeing: mapping the evolution of the EU. *Insights into Regional Development 2*(4), 725-749. DOI:10.9770/IRD.2020.2.4(1)

Miao, J., & Su, D. (2021). *Fiscal and monetary policy interactions in a model with low interest rates*. Unpublished Working Paper. Retrieved from: https://people.bu.edu/miaoj/MiaoSuN08.pdf

Pinto, E., & Tevlin, S. (2014). *Perspectives on the Recent Weakness in Investment* (No. 2014-05-21). US: Board of Governors of the Federal Reserve System. DOI:10.17016/2380-7172.0018

Popović, G., & Erić, O. (2021). *Evropska ekonomska integracija*. Banja Luka, Bosna i Hercegovina: Univerzitet u Banjoj Luci, Ekonomski fakultet

Reichel, R. (2022). On the Interest Rate Sensitivity of Aggregate Investment in the Euro Zone. *Asian Journal of Economic Modelling, 10*(4), 226-235. DOI: 10.55493/5009.v10i4.4603

Roszko-Wójtowicz, E., & Grzelak, M. M. (2020). Macroeconomic stability and the level of competitiveness in EU member states: a comparative dynamic approach. *Oeconomia Copernicana, 11*(4), 657–688. DOI: 10.24136/oc.2020.027

Sajedi, R., & Thwaites, G. (2016). Why are real interest rates so low? The role of the relative price of investment goods. *IMF Economic Review, 64*(4), 635-659. DOI: 10.1057/s41308-016-0016-y

Stawska, J., & Miszczyńska, K. (2017). Wpływ stóp procentowych banku centralnego na inwestycje w strefie euro. Gospodarka Narodowa. *The Polish Journal of Economics*, *291*(5), 51-72. DOI:10.33119/GN/100736

Summers, L. H. (2015). Have we entered an age of secular stagnation? IMF fourteenth annual research conference in honor of Stanley Fischer. Washington, D.C. US. *IMF Economic Review, 63*(1), 277-280. DOI: 10.1057/imfer.2015.6

Tease, W., Dean, A., Elmeskov, J., & Hoeller, P. (1991). Real Interest Rate Trends: The Influence of Saving. Investment and Other Factors. *OECD Economic Studies No. 17.* Retrieved from: https://www.oecd.org/economy/outlook/34258550.pdf

МАКРОЕКОНОМСКА СТАБИЛНОСТ И ИНВЕСТИЦИЈЕ ЕВРОПСКЕ УНИЈЕ

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САЖЕТАК

Квантитет и квалитет инвестиција представљају услов за одрживи и дугорочни економски раст. Стога је у економској теорији стопа економског раста функција инвестиција. Ово истраживање обухвата анализу утицаја изабраних кључних макроекономских показатеља (независних варијабли) на стање и кретање инвестиција у Европској унији као зависне варијабле. У истраживању је обухваћен период од 2012. године до 2021. године. Као независне варијабле изабране су: стопа раста ГДП, висина каматне стопе, инфлација, незапосленост, приходи од индиректних и директних пореза, јавни дуг и буџетски дефицит. Истраживање је показало утицај ових варијабли на инвестиције Европске уније које представљају зависну варијаблу. Резултати регресионе анализе показују да каматне стопе, незапосленост, приходи од индиректних пореза, као и варијабле буџетски дефицит и јавни дуг имају негативан и статистички значајан смјер у односу на инвестиције. Стопа раста БДП-а, као и приходи од директних пореза, нису статистички значајни, али имају позитиван регресиони коефицијент у односу на инвестиције. И стопа инфлације је несигнификантна варијабла, али са негативним утицајем на инвестиције. Изабрани модел у контексту заједничког дјеловања свих независних варијабли је статистички значајан јер је коефицијент детерминације 0,99, резултати Ф теста указују на статистичку значајност испод 5%, модел нуди довољно степени слободе за варирање варијабли и статистички прихватљиву оцјену. Коначно, добијени резултати су значајно усаглашени са досадашњим истраживањима и теоријским поставкама.

Кључне ријечи: *Европска унија, инвестиције, БДП, јавни дуг, буџетски дефицит, каматне стопе, инфлација, незапосленост, порески приходи.*

REMITTANCE INFLOWS, POVERTY AND ECONOMIC GROWTH IN TANZANIA: A MULTIVARIATE CAUSALITY MODEL

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ABSTRACT

Purpose: This study examined the causal flow between economic growth, poverty, and remittances for Tanzania, using annual data from 1990 to 2020. Tanzania is working to achieve the policy targets set in its Vision 2025, and the findings of this study will add value to policy effectiveness and timing. The study uses household consumption expenditure per capita (HCE) as a measure of poverty, the rate of change in GDP as a measure of economic growth, and remittance inflows as a percentage of GDP as a measure of remittances.
Methodology: The study used autoregressive distributed lag (ARDL) approach to cointegration and ECM-based Granger causality.
Results: The study found a bidirectional causality between remittances and poverty in the short run and a unidirectional causal flow from remittances to poverty in the long run. No causality was found between remittances and economic growth, and between economic growth and household consumption expenditure per capita.
Conclusions: The findings of this study point to the importance of remittances in poverty reduction and sustainable development in Tanzania.
Recommendations: Tanzania is encouraged to continue implementing policies that support remittance inflows to positively influence poverty reduction.

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1. INTRODUCTION

The resilience of remittance inflows, even during major economic disruptions such as the Covid-19 pandemic, has prompted interest in how this source of external funding can be harnessed to put economies back on the pre-pandemic track. 'Righting the ship' will help them achieve the targets of the United Nations' Sustainable Development Goals (SDGs) (United Nations [UN], 2022). Remittance inflows to low-and middle-income countries were projected to reach US$589 billion in 2021 (World Bank, 2021). Remittances in low-and middle-income countries are now three times more than the official development assistance (excluding China) and 50 percent higher than foreign direct investment (World Bank, 2021). The top five remittance recipients in 2021 were China, India, Mexico, the Philippines, and Egypt (World Bank Group, 2021). Sub-Saharan Africa is anticipated to register a recovery from the 14.1 percent slump in 2020 (World Bank, 2021). Although some downsides are associated with strong remittance inflows (e.g., high remittance costs, the high cost of migrant recruitment, and the dissipation of the fiscal stimulus put in place to relieve the economic disruptions caused by Covid-19), remittances are expected to firm in 2022 (World Bank, 2021). On the back of a positive outlook on remittance inflows and concerted government efforts to steer their economies from the negative effects of the pandemic, can remittances be the panacea governments are looking for?

There is a vast body of literature on the impact of remittances on poverty (see: Musakwa & Odhiambo, 2019, 2020a and 2020b; Azam, Haseeb & Samsudin, 2016); the causality between the two (see: Azam Haseeb & Samsudin, 2016; Yasmin, Hussain, Akram & Yasmin, 2015; Gaaliche & Gaaliche, 2014); and the impact of, and causality between, remittances and economic growth (see, e.g. Depken, Niksic Radic & Paleka, 2021; Jouini, Mabrouk & Mim, 2021; Nyasha & Odhiambo, 2020). However, most studies have examined these three factors separately, while very few have examined the causality between the three, yet it is important in formulating policies that aim to fully exploit the benefits of remittances in terms of poverty alleviation and economic growth**.** Moreover, the findings from different investigations into the causality between remittances, poverty, and economic growth are inconclusive. Some point to the benefits of remittances to households through the smoothening of consumption. The extent to which remittances benefit the poor at a national level is, however, subject to social institutions structures (Ratha, 2013; Chami, Dalia & Montiel, 2009) and the development of the financial sector (see: Giuliano & Ruiz-Arranz, 2005), thus indirectly linking remittances to economic development as a source of financing investment and other social services. This points to a need for additional research,

as each country has stylised factors that make this seemingly obvious relationship debatable, even in Tanzania. The main objective of this study, therefore, is to have a fresh look at the causal relationship between remittances, poverty and economic growth in Tanzania.

The current study, therefore, aims to examine the causality between remittance Inflows, Poverty, and Economic Growth in Tanzania using the household consumption expenditure per capita (HCE) as a measure of poverty. Household consumption expenditure per capita captures income poverty. To minimise the omission of variables, trade openness, education and financial development have been added as intermittent variables, leading to a multivariate Granger causality framework. An autoregressive distributed lag (ARDL) approach to cointegration and the ECM-based Granger causality test have been employed to explore the relationship. The ARDL approach has been selected because of its multiple advantages. For example, it is robust in small samples. In addition, it provides results in short- and long-run timeframes, thereby making the policy more effective.

Tanzania was selected for this study because it is among the African countries that have received modest remittance inflows, on average below one percent of gross domestic product (GDP) (World Bank, 2022a). Therefore, this study seeks to answer one critical question: Should Tanzania roll out policies to support remittance inflows to advance its national policy**,** focusing on poverty alleviation and economic growth? Further, given the national policy, Vision 2025, and its poverty alleviation policy thrust, this study will add value to policy formulation, which is aligned to the realisation of economic growth and poverty reduction, whilst harnessing remittances to achieve these goals.

The remainder of this article is structured as follows: the next section outlines country-based and related literature. Thereafter, estimation techniques and variable definitions are provided in section 3. Section 4 presents and discusses the results. The final section, Section 5 concludes the study.

2. LITERATURE REVIEW

2.1 Country-based sources

Poverty dynamics in Tanzania

Poverty reduction in Tanzania is engraved in the National Strategy for Growth and Reduction of Poverty (NSGRP II), also known as Mkukuta, starting with Mkukuta I, which was rolled out in 2005/06–2009/2010, and continuing

with Mkukuta II, from 2010/11–2014/15 (Ministry of Finance and Economic Affairs [MFEA], 2010). Under Mkukuta I, Tanzania made positive strides in economic growth**,** while in terms of poverty alleviation, progress was achieved in the provision of social services**,** such as education and health (MFEA, 2010). Notably, all the areas that did not perform as expected were replicated in Mkukuta II, emphasising aligning ministries' strategic plans with Mkukuta, strengthening government implementation capacity, establishing private sector partnerships, and evidence-based planning and resource allocation (MFEA, 2010). Mkukuta II provided a framework for rallying national efforts and accelerating poverty reduction through intentional pro-poor interventions (MFEA, 2010). This has become a medium-term mechanism for achieving Tanzania's Vision 2025. The First National Five-Year Development Plan (2011/12–2015/16) was implemented concurrently with Mkukuta II (Ministry of Finance and Planning [MFP], 2021). Currently, Tanzania is implementing the third National Five-Year Development Plan (2021/22–2025/26) (MFP, 2021). Mkukuta I and II shared the same policy focus on accelerating growth through pro-poor interventions and building an economy that facilitates private-public partnership and a shared vision among all Tanzanians (MFP, 2021). It is envisaged that economic growth will provide the resources needed to support the flagship projects of Vision 2025, moving Tanzania into a middle-income country, and serving to alleviate poverty in that country.

Tanzania has made progress in reducing poverty in respect of both income and non-income dimensions, with improvements in education, health, and general access to services. Although progress has been made in reducing income poverty, the rural population remains worst affected (MFP, 2021). There are increasing calls for intentional government policy on development to include the poor. Poverty, as measured by a poverty headcount of US$1.90 a day, declined from 72.3 percent in 1990 to 49.4 percent in 2018, while the poverty gap/severity decreased from 30.8 percent in 1990 to 15.6 percent in 2011 before increasing by 0.3 percent in 2018 (World Bank, 2022a). Thus, poverty severity in Tanzania worsened during the period 2011–2018 (World Bank, 2022). When the poverty headcount at US$5.50 a day, Tanzania registered a decline from 98.2 percent in 1991 to 91.8 percent in 2018 (World Bank, 2022a). Despite a decline being recorded, poverty levels remain very high (World Bank, 2022a).

Economic growth dynamics in Tanzania

Over the past two decades, Tanzania has achieved sustained growth, culminating in the country graduating from a low-income to a lower-middle-income status (African Development Bank [AFDB], 2022). Economic policies are backed by

the broad Tanzania Development Vision 2025, implemented through the Long-term Perspective Plan (2011/12–2025/26), which is subdivided into three five-year national development plans (MFP, 2021). The country is amid the third five-year development plan, which envisages establishing high-quality livelihoods; good governance; peace, stability, and unity**;** a well-educated and learning society; and a competitive economy capable of supporting sustainable growth and sharing the accrued benefits (MFP, 2021). The third five-year national plan focuses on addressing poverty levels, building the country's production capacity, increasing competitiveness in trade and investments, fostering human development, boosting foreign investment, and facilitating public-private partnerships (MFP, 2021). Tanzania has witnessed an increased inflow of foreign direct investment (FDI) in the mining sector, finance and insurance, food and accommodation, manufacturing, and agriculture (MFP, 2021). In 2016, Tanzania received US$755.4 million in FDI, and this figure has grown consistently to register US$990.6 in 2019 (MFP, 2021).

Growth slowed in 2020 to 2.1 percent – a drop from the 6.8 percent realised in 2019 (Africa Development Bank [AFDB], 2021). Inflation also declined from 3.5 percent recorded in 2019 to 3.3 percent in 2020 (AFDB, 2021). However, according to the AFDB (2021), the economic outlook is positive, with a 4.1 percent growth rate for 2021 and 5.8 percent for 2022, mainly due to the reopening of trade corridors and the tourism sector. These projected economic milestones come at a time when the country has received modest remittance inflows that are anticipated to become stronger in the near future.

Remittances dynamics in Tanzania

Migration has become increasingly common, as people move around seeking greener pastures in other economies or migrate to settle in politically stable countries. The United Nations' Universal Declaration of Human Rights under Article 13 spells out the right to freedom of movement and residence within a border and the right to leave any country – including one's own – and return to it (Shitundu, 2006). Migrants have both a positive and a negative impact on the destination and origin countries alike (Shitundu, 2006), but this study will focus on the positive impact of **r**emittances on the country of origin. Migration facilitates the transfer of skills and contributes to cultural enrichment (Shitundu, 2006). According to Migration Data Portal [(MDP], 2022), Tanzanians' main destination countries between 2005 and 2010 were Burundi, the Democratic Republic of the Congo (DRC), Sudan, Uganda, and Rwanda, with 51 percent of migrants being female. Tanzania is a signatory to the SDGs, which compels it to work towards achieving the 17 identified goals (United Nations [UN], 2022).

Tanzania has an obligation to work towards creating a conducive environment for remittance inflows by reducing remittance charges, indirectly encouraging the use of formal channels, and reducing recruitment costs, among other remittance-promoting goals. Like any African country, Tanzania still faces the challenge of using formal channels to remit. Remittance costs declined from 24.31 percent in 2011 to 19.73 percent in 2020 – a marked contrast to other African countries, which registered a decline over the same period (World Bank, 2022b). Although progress has been made in reducing related costs, this rate is still high when compared to the SDG target of three percent and the current average cost in sub-Saharan African countries of eight percent (World Bank, 2022b). From 1990 to 2020, Tanzania recorded a depressed remittance inflows as a percentage of GDP of 0.4 percent (World Bank, 2022b). The country only recorded remittances slightly above one percent of GDP in 2010 and 2011, which was around the time when it rolled out Vision 2025 and Mkukuta II.

2.2 Review of relevant literature

The theoretical link between poverty, remittances, and economic growth is derived from remittance as an external source of development finance. A surge in remittance inflows has led developing countries to ponder how they can harness this source of finance to boost economic growth and meet the targets set in the SDGs. According to Adam and Page (2005), remittances stimulate consumption among remittance-receiving households. Lucas and Stark (1985) identify the reasons for migrants remitting back home as coinsurance, savings, and altruistic motives. Migrants tend to remit more resources back home in times of difficulty, such as during the Covid-19 pandemic, which gives this process a countercyclical nature (Ratha, 2013). De Vries (2011) explains that investments in education, health, and business are additional benefits of remittances, augmenting household resources and allowing poor households to access social services that would otherwise have been beyond their reach. Ratha (2013) points out that, on a national level, remittances serve as a source of balance of payment inflow and boost economic growth through the multiplier effect. Although the positive impact of remittances on poverty reduction has received much attention, there seems to be no clear empirical contribution on remittances at a national level. The same can be said for the relationship between remittances and economic growth, which has elicited mixed views: one positive contribution of remittances to economic growth channels is in the form of additional foreign currency, which has a positive impact on the balance of payments; physical capital investments; the opening of new enterprises; the multiplier effect of an increase in household consumption and investment; an increase in access to social services, health

and education; financial development; and human capital development (Jouini, Mabrouk & Mim, 2021). Negative channels include the "Dutch Disease" -when a large influx of foreign currency paradoxically harms a country's economy through exchange rate appreciation and creates dependence syndrome, which negatively affects productive activities in the remittance-receiving country.

Studies examining the impact of remittances on poverty and economic growth have received much attention since the surge in remittance inflows, especially in low- and middle-income countries, albeit the findings on the causality between remittances and poverty are inconclusive: some confirm a unidirectional causal relationship between the two (see: Azam, Haseeb & Samsudin, 2016) others found a bidirectional causal relationship (Azam, Haseeb & Samsudin, 2016; Yasmin et al., 2015; Gaaliche & Gaaliche, 2014; Hatemi-j & Uddin, 2014), while yet others found no causality (Azam, Haseeb & Samsudin, 2016). The same applies to studies that investigated the causality between remittances and economic growth (Depken, Niksic Radic & Paleka, 2021; Jouini, Mabrouk & Mim, 2021; Nyasha & Odhiambo, 2020). Some researchers have taken a step further and investigated the causal relationship between remittances, economic growth, and poverty in the same study (Abduvaliev & Bustillo, 2020). Given the dearth of research on the causal relationship between remittances, poverty, and economic growth, studies that examined the impact of all three variables, the impact of remittance on poverty and the impact of remittances on economic growth will also be reviewed.

Poverty and remittances

Musakwa and Odhiambo (2020a) examined the impact of remittances on poverty in South Africa, using annual data from 1980 to 2017 and the ARDL bounds approach. The study used household consumption expenditure and infant mortality rate as proxies for poverty. Remittances were found to have a negative impact on poverty, irrespective of the timeframe considered when household consumption expenditure was used as a proxy; no impact was confirmed when infant mortality rate was used as a proxy for poverty (Musakwa & Odhiambo, 2020b). The findings revealed variations in the results, depending on the poverty measure used. Musakwa and Odhiambo (2020b) also investigated the causality between poverty and remittances for Botswana, using data from 1980 to 2017, and employing two poverty proxies, namely the infant mortality rate, and household consumption expenditure. Using the ARDL approach and the ECM-based causality test, the study found a bidirectional causality between the two variables in the long and the short run when household consumption expenditure was used as a proxy (Musakwa & Odhiambo, 2020b). When the infant mortality

rate was used as a proxy, the study found a unidirectional causal flow from poverty to remittances in the long and the short run (Musakwa & Odhiambo, 2020b). In a separate study, Musakwa and Odhiambo (2019) investigated the impact of remittances on poverty in Botswana, using annual data from 1980 to 2017. Household consumption expenditure and the infant mortality rate were used as proxies for poverty. Employing the ARDL approach and ECM-based causality test, the study found that remittances reduced poverty in Botswana in the long and short run, when the infant mortality rate was used as a proxy, while no impact was confirmed in the long or short run when poverty was measured by household consumption expenditure (Musakwa & Odhiambo, 2019).

Azam, Haseeb and Samsudin (2016) examined the impact and causality between poverty and remittances for 39 countries from high-income countries, upper idle income countries, and lower-middle income countries using annual data covering the 1990-2014 period. The study used the Pane Fully Modified Least Squares (FMOLS) and Engle-Granger two-step test to examine the relationship between the two, while poverty headcount was used as a measure of poverty. Azam, Haseeb and Samsudin (2016) reported that foreign remittances had a positive impact on poverty alleviation, but only for upper-income countries. A unidirectional causal flow from poverty to remittances was found in the long run for lower- and upper-middle-income countries, while no causality was confirmed in high-income countries (Azam, Haseeb & Samsudin, 2016), showing the inappropriateness of generalising results from one study to another reinforcing the importance of a new study on the nature of this relationship.

Yasmin et al. (2015) investigated the causality between poverty and remittances in Pakistan using data from 1973 to 2006 and employed the ARDL bound approach and vector error correction (VECM). The study used poverty headcount and remittances to GDP as measures of poverty and remittances, respectively. The study found remittances and poverty to be inversely related in the long and the short run (Yasmin et al., 2015). A one percent increase in remittances was found to lead to a 0.03 percent reduction in poverty in the long run and 0.003 percent in the short run (Yasmin et al., 2015). The same study found a bidirectional causality between poverty and remittances in the long run but not in the short run (Yasmin et al., 2015). In the same spirit, Gaaliche and Gaaliche (2014) examined the causal relationship between remittances and poverty in 14 emerging and developing nations, using data from 1980 to 2012**.** Using non-stationary dynamic panel data, the study found a bidirectional causality between remittances and poverty, and the impact of poverty reduction on remittances was found to be stronger (Gaaliche & Gaaliche, 2014). Hatemi-j and Uddin (2014) found the same results in a separate study in Bangladesh, using annual time series data

from 1976 to 2010. The study found a bidirectional causality between the two variables**.** However, the impact of poverty reduction on remittances was found to be stronger, while a positive relationship between remittances and poverty reduction was also confirmed (Hatemi-j & Uddin, 2014).

Ekanayake and Moslares (2020) investigated the impact of remittances on poverty in 21 Latin-American countries using the panel least squares and panel FMOLS method. The study further estimated the short- and long-run effects of remittances on poverty using autoregressive distributed lag (ARDL-ECM) and found that remittances lowered poverty levels in Latin America (Ekanayake and Moslares, 2020).

Remittances and economic growth

Jouini, Mabrouk and Mim (2021) examined the causality between economic growth and remittances in two Maghreb countries, Algeria and Morocco, using data from 1970 to 2009. The study identified two channels through which remittances stimulated economic growth, namely human capital and financial development (Jouini, Mabrouk & Mim, 2021). In Morocco, a unidirectional causality was found from remittances to economic growth only in the long run, while an indirect causality was established between remittances and economic growth through a unidirectional causality between human capital and financial development (Jouini, Mabrouk & Mim, 2021). Depken, Niksic Radic & Radeka (2021) investigated the causality between remittances and poverty in Croatia, using quarterly data from 2000 to 2020 (second quarter). Using vector autoregressive models and Granger causality test, the study found a unidirectional causal link between remittances and economic growth (Depken, Niksic Radic & Radeka, 2021). In the same spirit, Nyasha and Odhiambo (2020) analysed the causal relationship between remittances and economic growth using data from 1970 to 2017. Employing an ARDL approach within a multivariate Granger causality framework, the study found no causal relationship between the two (Nyasha & Odhiambo, 2020). Those findings show that the causal relationship between remittances and economic growth is not supported in empirical studies but rather varies from one country to another.

Lacheheb and Ismail (2020) examined the relationship between remittances and economic growth using a panel of 93 low- and middle-income countries, employing annual data from 2009 to 2017 and the Generalised Method of Moments (GMM) (SYS-GMM). The study found that remittances had no significant impact on economic growth after adjusting for outliers and that remittances led to the deterioration of the economy. This finding indicated a

negative link between remittances and economic growth, highlighting stagnation and dependence or the so-called remittance trap.

Olayungbo and Quadri (2019) investigated the relationship between remittances and economic growth using panel data from 20 sub-Saharan African countries over the period 2000–2015. Employing Pooled Mean and Mean Group ARDL estimates, the study found remittances to have a positive effect on economic growth in both the short and the long run (Olayungbo and Quadri, 2019). The results of the causal relationship confirmed a unidirectional causal flow between economic growth and remittances. Morton, Panday, and Kula (2012) found the same impact results as Olayungbo and Quadri (2019) in a study of the top 20 remittance-receiving countries, using descriptive analysis where remittances, together with physical capital, human capital, and governance, were found to positively impact economic growth. Jouini (2015) examined the causality between remittances and economic growth for Tunisia, using data from 1970 to 2010. Employing the ARDL approach, the Jouini (2015) study found a bidirectional causal relationship between the two variables in the short run.

Remittances, poverty and economic growth

Abduvaliev and Bustillo (2020) examined the effects of remittances on economic growth and poverty reduction among ten post-Soviet states. Using poverty headcount and poverty severity as measures of poverty, the study found a one percent increase in remittances resulting in a 0.25 percent increase in GDP per capita and a **t**wo percent decline in poverty (Abduvaliev & Bustillo, 2020). Remittances contributed to poverty reduction through increased income and the smoothening of consumption (Abduvaliev and Bustillo, 2020).

Zaman, Wang and Zaman (2021) investigated the relationship between remittance inflows, education, expenditure, energy use, income, poverty, and economic growth, in a panel of nine countries – Bangladesh, China, Egypt, India, Indonesia, Mexico, Nigeria, Pakistan, and the Philippines. Employing data from 1990 to 2014 and the ARDL approach, the study found remittances to have a positive impact on economic growth in the long run, while poverty was found to have a negative effect on economic growth in the long run.

Studies investigating the causality between remittances and poverty and between remittances and economic growth reported inconclusive results. This points to the importance of another study on Tanzania to establish the direction of causality among the three variables. Further, the dearth of studies that investigated the causality between poverty, remittances, and economic growth, makes this study both timely and crucial. The findings will allow policy makers in Tanzania to

determine which factor(s) to influence first to achieve positive developments in the other variables. Economic growth and poverty reduction have been the national policy in Tanzania for a long time, recurring in related policies.

3. MATERIALS AND METHODS

An ARDL approach to cointegration and an ECM-Granger causality test were employed to investigate the causality between remittances, poverty, and economic growth. The ARDL approach, expanded by Pesaran, Shin and Smith (2001), was selected for its numerous advantages, which include robustness in small samples and the ability to use a combination of variables integrated on order zero and one in the same model. In addition, the results from the ARDL approach apply in the short and the long run, thus adding insights that policy makers will find useful when designing policy and linking policy impact to timeframes.

3.1. Variables and Model

The main variables of interest were poverty (proxied by household consumption expenditure per capita), economic growth (proxied by GDP growth), and remittances (measured as a percentage of GDP). Household consumption expenditure per capita captures income poverty (World Bank, 2001; Meyer and Sullivan, 2003). Several studies have also used this proxy to measure poverty (see: Ravallion, 2001; Rehman & Shahbaz, 2014; Magombeyi & Odhiambo, 2018; Musakwa, Odhiambo & Nyasha, 2021). In addition, trade openness, financial development, and education were added to the model to form a multivariate causality framework. Table 1 provides a summary of the description of the variables and the sources of the data used in the study.

Table 1: Variable Definition

Variable	Description	Notation	Source
Poverty	Household consumption expenditure per capita	HCE	World Development Indicators
Remittances	Remittance inflows	REM	World Development Indicators
Education	Primary school gross enrolment	EDU	World Development Indicators
Economic growth	GDP growth rate	EG	World Development Indicators
Financial development	Domestic credit to private sector by banks as a percentage of GDP	FD	World Development Indicators
Trade openness	Exports and imports as a percentage of GDP	TOP	World Development Indicators

Source: Authors' own compilation

The ARDL model specifications are given in equations 1–6.

ARDL model specification to cointegration (HCE, REM, EG, EDU, TOP, FD):

$$\Delta HEC_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HEC_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{1t} \quad (1)$$

$$\Delta REM_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HCE_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{2t} \quad (2)$$

$$EG_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HEC_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{3t} \quad (3)$$

$$EDU_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HEC_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{4t} \quad (4)$$

$$TOP_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HCE_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{5t} \quad (5)$$

$$FD_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HCE_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{6t} \quad (6)$$

HCE = poverty proxy, REM = remittances inflows as a percentage of GDP; EC = economic growth measured by rate of change of GDP; EDU = education measured by gross primary enrolment; TOP = trade openness measured by exports plus imports as a percentage of GDP; and FD = financial development measured by domestic credit to the private sector by bank as a percentage of GDP, φ_0 is a constant; $\varphi_1 - \varphi_6$; $\beta_1 - \beta_6$ are coefficients; and $\gamma_1 - \gamma_6$ are error terms.

ECM-based Granger causality model specifications for equations 1–6 are given in equations 7–12.

$$HCE_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_1 ECM_{t-1} + \mu_{1t} \quad (7)$$

$$REM_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_2 ECM_{t-1} + \mu_{1t} \quad (8)$$

$$EG_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_3 ECM_{t-1} + \mu_{1t} \quad (9)$$

$$EDU_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_4 ECM_{t-1} + \mu_{1t} \quad (10)$$

$$TOP_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_5 ECM_{t-1} + \mu_{1t} \quad (11)$$

$$FD_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_6 ECM_{t-1} + \mu_{1t} \quad (12)$$

Table 2: Variable Definition

Variable	Description	Notation	Source
Poverty	Household consumption expenditure	HCE	World Development Indicators
Remittances	Remittance inflows	REM	World Development Indicators
Education	Primary school gross enrolment	EDU	World Development Indicators
Economic growth	GDP growth rate	EG	World Development Indicators
Financial development	Domestic credit to private sector by banks as a percentage of GDP	FD	World Development Indicators
Trade openness	Exports and imports as a percentage of GDP	TOP	World Development Indicators

Source: Authors' own calculation

The ARDL model specifications are given in equations 1–6.

ARDL model specification to cointegration (HCE, REM, EG, EDU, TOP, FD):

$$\Delta HEC_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HEC_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{1t} \quad (1)$$

$$\Delta REM_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HCE_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{2t} \quad (2)$$

$$EG_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HEC_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{3t} \quad (3)$$

$$EDU_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HEC_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{4t} \quad (4)$$

$$TOP_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=0}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HCE_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{5t} \quad (5)$$

$$FD_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta TOPu_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \beta_1 HCE_{t-1} + \beta_2 REM_{t-1} + \beta_3 EG + \beta_4 EDU_{t-1} + \beta_5 TOP_{t-1} + \beta_6 FD_{t-1} + \gamma_{6t} \quad (6)$$

HCE = poverty proxy, REM = remittances inflows as a percentage of GDP; EC = economic growth measured by rate of change of GDP; EDU = education measured by gross primary enrolment; TOP = trade openness measured by exports plus imports as a percentage of GDP; and FD = financial development

measured by domestic credit to the private sector by bank as a percentage of GDP, φ_0 is a constant; $\varphi_1 - \varphi_6$; $\beta_1 - \beta_6$ are coefficients; and $\gamma_1 - \gamma_6$ are error terms.

ECM-based Granger causality model specifications for equations 1–6 are given in equations 7–12.

$$HCE_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_1 ECM_{t-1} + \mu_{1t} \quad (7)$$

$$REM_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_2 ECM_{t-1} + \mu_{1t} \quad (8)$$

$$EG_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_3 ECM_{t-1} + \mu_{1t} \quad (9)$$

$$EDU_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_4 ECM_{t-1} + \mu_{1t} \quad (10)$$

$$TOP_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_5 ECM_{t-1} + \mu_{1t} \quad (11)$$

$$FD_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta HCE_{t-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta REM_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta EG_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta EDU_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{6i} \Delta FD_{t-i} + \mu_6 ECM_{t-1} + \mu_{1t} \quad (12)$$

ECM = Error term

$\mu_1 - \mu_6$ are the error correction term coefficients.

3.2 Data sources

This study examined the causality between economic growth, poverty, and remittances, using data from 1990 to 2020. Remittances (REM), household consumption expenditure per capita (HCE), economic growth (EG), trade openness (TOP), and education (EDU) were extracted from the World Bank Development Indicators database. Financial development indices were retrieved from IMF financial database.

4. RESULTS AND DISCUSSIONS

The ARDL model does not require a test for stationarity. However, stationarity tests have been conducted to ascertain that the variables in the model were integrated of order 0 or 1. If any variables had a higher order of integration than 1, the ARDL model specification fell away. To test for stationarity, the Dickey-Filler Generalised Least Squares (DF-GLS) and Phillip Perron (PP) root tests were used. The results of the tests are presented in Table 2.

Table 3: Unit Root Test Results

Dickey-Fuller Generalised Least Square (DF-GLS)				
Variable	Stationarity of all variables in levels		Stationarity of all variables in first difference	
	Without trend	With trend	Without trend	With trend
HCE	-0.004	-1.874	-4.325***	-5.199***
REM	-1.362	-2.225	-5.083***	-5.130***
EG	-1.220	-1.819	-1.833*	-3.108*
EDU	-1.852	-2.604	-2.109**	-2.904*
TOP	-1.075	-2.470	-3.265***	-3.442**
FD	-1.688	-2.129	-6.501***	-6.996***
Phillip Perron (PP) Test				
HCE	-0.318	-2,798	-6.047***	5,922***
REM	-2.134	-1.509	-4.949***	-5.040***
EG	-2.148	-2.566	-8.092***	-7.460***
EDU	-1.384	-1.387	4.889***	4,902***
TOP	-2.431	-1.085	-3.478**	-3.425*
FD	-1.603	-2.545	-6.505***	-6.807***

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels, respectively.
Source: Authors' own calculation

The unit root test reported in Table 2 shows that all the variables included in the model are stationary at the first difference, irrespective of the unit root test used. To proceed with the analysis, a cointegration test was conducted to confirm long-run relationships among the variables in different functions. The results of the cointegration test are presented in Table 3.

Table 4: Cointegration results

Dependent variable	Function	F-statistic	Cointegration status
Panel A: Model			
HCE	F (HCE|REM,EG,EDU,TOP, FD)	4.604**	Cointegrated
REM	F (REM|HCE,EG,EDU,TOP, FD)	2.116	Not cointegrated
EG	F (EG|REM,HCE,EDU,TOP, FD)	5.461***	Cointegrated
EDU	F (EDU|REM,EG,HCE,TOP, FD)	3.399*	Cointegrated
TOP	F (TOP|HCE,REM,EG,EDU, FD)	7.937***	Cointegrated
FD	F (FD|REM,EG,EDU,TOP, HCE)	3.080	Not cointegrated

Asymptotic critical values (unrestricted intercept and no trend)						
	1%		5%		10%	
Critical values	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
	3.41	4.68	2.62	3.79	2.26	3.35

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels, respectively.
Source: Authors' own calculation

The cointegration results presented in Table 3 indicate that four of the six functions have variables with a long-run relationship. This is confirmed by the F-statistics on the HCE, EG, EDU, and TOP functions, which are significant at 1%, 5% and 10% level of significance. To proceed with the analysis, for those functions where no cointegration was confirmed, short-term causality was estimated, while for those functions with cointegration, both short- and long-run causality were analysed. The causality results are reported in Table 4.

Table 5: ECM-based causality results for Model 1 (HCE as a poverty proxy)

Dependent variable	HCE as a measure of poverty						
	F-statistic [probability value]						ECM t-statistics
	DHCE	DREM	DEG	DEDU	DTOP	DFD	
DHCE	-	4.054** [0.065]	0.556 [0.584]	4.574** [0.044]	3.759* [0.066]	0.949 [0.402]	-0.336*** [-6.021]
DREM	8,316*** [0.002]	-	1.132 [0.230]	3.022* [0.097]	3.308* [0.083]	1.193 [0.323]	-
DEG	0.480 [0.539]	0.940 [0.343]	-	1.388 [0.251]	0.057 [0.814]	9.595*** [0.005]	-0.694*** [-5.883]
EDU	0.384 [0.542]	3.965* [0.060]	3.684* [0.054]	-	3.498* [0.050]	0.020 [0.889]	-0.171*** [-6.783]
DTOP	4.002** [0.038]	5.280** [0.027]	7.607*** [0.003]	5.757** [0.026]	-	6.789*** [0.014]	-0.476*** [-5.705]
DFD	8.316*** [0.002]	0.276 [0.604]	1.132 [0.300]	3.021* [0.097]	3.308* [0.083]	-	-

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels, respectively.
Source: Authors' own calculation

The results reported in Table 4 confirm a bidirectional causality between poverty measured by household consumption expenditure per capita and remittances in the short run and a unidirectional causal flow from remittances to household consumption expenditure per capita in the long run. This finding supports the mutually reinforcing effects of poverty and remittances in the short, confirming the United Nations' support for remittances as a source of developmental finance. This finding is not unique to Tanzania alone; other studies found the same results (see, Yasmin et al., 2015; Gaaliche and Gaaliche, 2014). A unidirectional causal flow from HCE to remittances confirmed in the long run is consistent with the proposition that migrants tend to remit back home due to altruistic motives (see Ratha, 2013; Lucas and Stark, 1985). When they leave behind their struggling families, migrants are likely to remit more frequently and in significant amounts, to alleviate the hardships of their loved ones. The study found no causal relationship between remittances and economic growth in the short run and the long run. Previous studies have shown that if remittances are used in non-productive consumption, the impact of remittances on the economy could be minimal. No causality was also confirmed between economic growth and household consumption expenditure per capita, regardless of the time frame considered.

Other results reported in Table 4 confirm no causality between remittances and financial development. The study also found a unidirectional causal flow from financial development to economic growth in the short run and in the long run. This finding confirms a supply-led hypothesis for Tanzania. A unidirectional causal flow was confirmed from household consumption expenditure per capita to financial development in the short run. Thus, the level of poverty has a direct influence on the level of financial development in Tanzania. The higher the level of poverty, the lower the level of financial development due to limited demand for sophisticated financial services. Another unidirectional causal flow was found from financial development to trade openness in both the short and the long. This finding supports the ability of financial development to support more advanced financial transactions that involve Tanzania and other countries. The study found a unidirectional causal flow from education to financial development in the short run. This finding points to the fact that the level of education plays an instrumental role in the transactions that Tanzanians execute and the level of demand for new and improved financial services and products. A bidirectional causality between trade openness and remittances in the short run and a unidirectional causal flow from remittances to trade openness in the long run was confirmed. The results confirmed a mutually reinforcing effect between the two, pointing to the importance of trade openness to remittances level in Tanzania. The more open the economy is to international transactions, the more favourable remitting

channels are created, which in turn encourages emigrants to remit more as the process is made cheaper and more convenient. The study found a bidirectional causality between remittances and education in the short run and a unidirectional causal flow from remittances to education in the long run. This finding supports the positive role that remittances play in increasing the ability of remittance-receiving countries to increase consumption and investment expenditure, which would not be possible if the families did not receive remittances (see Ratha, 2013). A unidirectional causal flow from economic growth to trade openness in the short run and in the long run was also found. Another unidirectional causal flow was confirmed from economic growth to education in the short run and in the long run. This supports the notion that high economic growth levels allow the government to set more funds to support education and enables households to finance education requirements. A bidirectional causality was confirmed between household consumption expenditure per capita and trade openness and between education and trade openness in the short and long run. The study found a unidirectional causal flow from education to poverty in the short run and in the long run. Thus, the study confirmed the important role that education plays in reducing poverty by enabling households to improve their educational level. This also allows them to get better-paying jobs resulting in high income levels that increase their ability to access social services, among other important needs, thereby reducing poverty.

The results from this study confirmed the reinforcing effect between remittances and poverty in Tanzania. This points to the importance of remittances in achieving poverty reduction and the important role that high poverty levels play in attracting more remittances, which confirms the altruism motive of remittance (see also Ratha, 2013; Lucas and Stark, 1985). Thus, policies that support remittances will go a long way in alleviating poverty as emigrants send more money back home. However, the study failed to find any causal link between remittances and economic growth, which could reflect the predominant use of informal channels of remitting and lack of knowledge on other uses of remittance besides consumption. These channels result in most of the remittance received remining in the informal sector. The lack of causality between economic growth and poverty in Tanzania suggests a weak link between economic growth and poverty.

5. CONCLUSIONS

In this study, the causality between poverty, remittances, and economic growth was examined for Tanzania, using annual data from 1990 to 2020. To fully

specify the model, intermittent variables such as trade openness, education, and financial development, were added to form a multivariate framework. The household consumption expenditure per capita was used as a proxy for poverty. Using the ARDL bounds approach to cointegration and the ECM-based Granger causality test, the study found a bidirectional causality between remittances and poverty in the short run and a unidirectional causal flow from remittances to poverty in the long run. The study found that remittances play an important role in poverty reduction and the reinforcing effect poverty has in encouraging more remittances. No causality was confirmed between remittances and economic growth and between economic growth and poverty. Therefore, it can be concluded that remittances play a pertinent role in poverty reduction in Tanzania. Based on the finding of this study, it is recommended that Tanzania continues with policies that support remittances to increase remittance inflows, which are essential in reducing poverty. Given that no causality was found between remittance and economic growth, it is recommended that Tanzania continue to make remittance channels more accessible and cheaper to ensure more remittances are received using the formal channels. It is further recommended that the Tanzania government complements Vision 2026 with policies that address inequality and economic empowerment of the poor so that the poor can benefit from economic growth.

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CONFLICT OF INTERESTS

The authors declare there is no conflict of interest.

REFERENCES

Abduvaliev, M., & Bustillo, R. (2020). Impact of remittances on economic growth and poverty reduction amongst CIS countries. *Post-Communist Economies 32*(4), 525–546. DOI:10.1080/14631377.2019.1678094

Adam, R. H. Jr., & Page, J. (2005). Do international migration and remittance reduce poverty in developing countries? *World Development* 33(10), 1645–1669. DOI: 10.1016/j.worlddev.2005.05.004

AFDB. (May, 2022). *East African Regional Overview*. Retrieved from https://www.afdb.org/en/countries/east-africa/east-africa-overview.

Africa Development Bank (AFDB). (2021). *African economic outlook: From debt resolution to growth – the road ahead for Africa*. Retrieved from https://www.afdb.org/en/countries-east-africa-tanzania/tanzania-economic-outlook

Azam, M., Haseeb, M., & Samsudin, S. S. (2016). The impact of foreign remittances on poverty alleviation: Global evidence. *Economics and Sociology 9*(1), 264–281. DOI:10.14254/2071-789X.2016/9-1/18

Chami, R., Hakura, D. S., & Montiel, P., J. (2019). *Remittances: An automatic output stabiliser*. Retrieved from https://www.elibrary.imf.org/view/journals.

De Vries, S. (2011). *UNCTAD single-year expert meeting on maximising the development impact of remittances*. Mobilising the use of remittances towards poverty reduction and economic and social development through government initiatives: The Philippine experience. Geneva, Switzerland: UNCTAD

Depken, C. A. II, Niksic Radic M., & Paleka, H. (2021). Causality between foreign remittances and economic growth: Empirical evidence from Croatia. *Sustainability*, *13*(21), 12201. DOI: 10.3390/su132112201

Ekanayake, E. M., & Moslares, C. (2020). Do remittances promote economic growth and reduce poverty? Evidence from Latin American countries. *Economies, 2020, 8*(2), 35. DOI:10.3390/economies8020035

Gaaliche, M. G., & Gaaliche, M. (2014). The causal relationship between remittance and poverty reduction in developing countries using non-stationary dynamic panel data. *Atlantic Review of Economics: Revista atlantica de Economia 1*(1), 1–2.

Giuliano, P., & Ruiz-Arranz. (2015). *Remittances, financial development and growth*. IMF eLibrary. Retrieved from https://www.elibrary.imf.org/view/journals/001/2005/234/article-A001-en.xml.

Hatemi-j, A., & Uddin, G. S. (2014). On the causal nexus of remittances and poverty reduction in Bangladesh. *Applied Economics, 46*(4), 374–382. DOI: 10.1080/00036846.2013.844331

Jouini, J. (2015). Economic growth and remittances in Tunisia: Bi-directional causal links. *Journal of Policy Modelling, 37*, 353–373. DOI: 10.1016/j.jpolmod.2015.01.015

Jouini, J., Mabrouk, F., & Mim, S. B. (2021). Causality between economic growth and remittances in two Maghreb countries: An ARDL approach. *Sustainability, 13*(21), 12201. DOI:10.3390/su132112201

Lacheheb, Z., & Ismail, N. W. (2020). The impact of remittance on economic growth in low- and middle-income countries. *International Journal of Academic Research in Economics and Management, 9*(2), 61–70. DOI: 10.6007/IJAREMS/v9-i2/7503

Lucas, R. E., & Stark, O. (1985). Motivations to remit: Evidence from Botswana. *Journal of Political Economy and Management 9*(2), 61–70.

Magombeyi, M. T., & Odhiambo, N. M. (2018). FDI inflows and poverty reduction in Botswana: an empirical investigation. *Cogent Economics & Finance*. *6*, 1480302. DOI: 10.1080/23322039.2018.1480302.

Meyer, B. D., & Sullivan, J. X. (2003). Measuring the well-being of the poor using income and consumption. *The Journal of Human Resources, XXXVIII,* 1880-1220. Retrieved from: https://harris.uchicago.edu/files/measuringthewellbeing.pdf

Migration Data Portal (MDP). (2022). *Migration statistics*. Retrieved from: https://www.migrationdataportal.org.

Ministry of Finance and Economic Affairs (MFEA). (2010). *National Strategy for Growth and Reduction of Poverty II.* Retrieved from https://mail.google.com/mail/u/0/#inbox/FMfcgzGpFgqlkrHFTmkptFtcdKhXrSNx.

Ministry of Finance and Planning (MFP). (2021). *National Five-Year Development Plan, 2021/22–2025/26*. Retrieved from https://mof.go.tz/docs/news/FYDP%20III%20English.pdf.

Morton, J., Panday, P., & Kula, M. (2012). Remittances, poverty, and economic growth. *International Journal of Arts and Science, 3*(7), 390–399.

Musakwa, M. T., & Odhiambo, N. M. (2019). The impact of remittance inflows on poverty in Botswana: An ARDL approach. *Economic Structures, 8*, 42. DOI: 10.1186/s40008-019-0175-x

Musakwa, M. T., & Odhiambo, N. M. (2020a). Remittance inflows and poverty dynamics in South Africa: An empirical investigation. *SAGE Open*, 1–10. DOI: 10.1177/215824402098331

Musakwa, M. T., & Odhiambo, N. M. (2020b). Remittance inflows and poverty nexus in Botswana: A multivariate approach. *Journal of Sustainable Finance and Investment*, *12*(2), 475-489. DOI:10.1080/20430795.2020.1777786

Musakwa, M. T., Odhiambo, N. M., & Nyasha, S. (2021). The impact of foreign capital inflows on poverty in Vietnam: An empirical investigation. *Croatian Review of Economic, Business and Social Statistics, 7(*2), 31-49. DOI: 10.2478/crebss-2021-0008

Nyasha, S., & Odhiambo, N. M. (2020). Does remittance inflow Granger cause economic growth in South Africa? A dynamic multivariate causality test. *Review of Black Political Economy, 47*(1), 86–103. DOI:10.1177/003464461988534

Olayungbo, D. O., & Quadri, A. (2019). Remittances, financial development and economic growth in sub-Saharan African countries: Evidence from a PMG-ARDL approach. *Financial Innovation, 5*(9). DOI:10.1186/s40854-019-0122-8

Pesaran, M. H., Shin, Y., & Smith, R. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 174–189. DOI: 10.1002/jae.616

Ratha, D. (2013). *The impact of remittances on economic growth and poverty reduction*. Policy Brief No 8. Washington, D.C., US: Migration Policy Institute.

Ravallion, M. (2001). Growth, inequality and poverty: Looking beyond averages. *World Development, 29*(11), 1803-1815. Retrieved from: https://openknowledge.worldbank.org/handle/10986/19704

Rehman, IU. & Shahbaz, M. (2014). Multivariate-based Granger causality between financial deepening and poverty: the case of Pakistan. *Quality and Quantity, 48*(6), 3221-3241.

Shitundu, J. M. (2006). *A study on labour migration data and statistics in East Africa – International Migration Programme*. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---migrant/documents/publication/wcms_201464.pdf

UN. (2022). *The 17 Goals*. Retrieved from: https://0-sdgs-un-org.

World Bank. (2021). *Recovery Covid-19 crisis through a migration lens: Migration and Development Brief 35*. Retrieved from: https://www.knomad.org/sites/default/files/2021-11/Migration_Brief%2035_1.pdf.

World Bank. (2001). *World Development Report 2000/2001: Attacking Poverty*. Washington, D.C., US: The World Bank.

World Bank. (2022a). *World Bank development indicators*. Retrieved from https://databank.worldbank.org/source/world-development-indicators.

World Bank. (2022b). *Average transaction cost of sending remittances from specific country – Tanzania*. Retrieved from https://data.worldbank.org/indicator/SI.RMT.COST.OB.ZS?locations=TZ.

Yasmin, I., Hussain, Z., Akram, W., & Yasmin, N. (2015). Bi-directional causality between remittances and poverty: Empirical evidence from Pakistan. *Journal of Economics and Sustainable Development, 6*(24), 176–183. Retrieved from: https://iiste.org/Journals/index.php/JEDS/article/view/27918/28633

Zaman, S., Wang, Z., & Zaman, Q. (2021). Exploring the relationship between remittances received, education expenditure, energy use, income, poverty, and economic growth: Fresh empirical evidence in the context of selected remittances receiving countries. *Environmental Science and Pollution Research, 28*, 17865–17877. DOI:10.1007/s11356-020-11943-1.

ПРИЛИВИ ДОЗНАКА, СИРОМАШТВО И ЕКОНОМСКИ РАСТ У ТАНЗАНИЈИ: МУЛТИВАРИЈАТНИ МОДЕЛ УЗРОЧНОСТИ

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САЖЕТАК

Сврха: Ова студија је испитала узрочни ток између економског раста, сиромаштва и дознака за Танзанију, користећи годишње податке од 1990. до 2020. Танзанија ради на постизању циљева политике постављених у својој Визији 2025, а налази ове студије ће додати вриједност тајмингу и ефективности ове политике. Студија користи потрошњу домаћинстава по глави становника (HCE) као мјеру сиромаштва, стопу промјене БДП-а као мјеру економског раста и приливе дознака као проценат БДП-а као мјеру дознака.

Методологија: Студија је користила ауторегресивно дистрибуирано кашњење (ARDL) приступ коинтеграцији и Грејнџерову каузалност засновану на ECM-у.

Резултати: Студија је открила двосмјерну узрочно-посљедичну везу између дознака и сиромаштва на кратак рок и једносмјерни узрочно-посљедични ток од дознака ка сиромаштву на дуги рок. Није пронађена узрочна веза између дознака и економског раста, као ни између економског раста и потрошње домаћинстава по глави становника.

Закључци: Налази ове студије указују на значај дознака у смањењу сиромаштва и одрживом развоју у Танзанији.

Препоруке: Танзанију се подстиче да настави са спровођењем политика које подржавају прилив дознака како би позитивно утицале на смањење сиромаштва.

Кључне ријечи: *Ауторегресивно дистрибуирано кашњење (ARDL), економски раст, сиромаштво, дознаке, Танзанија*

DISCOUNT RATE AS A MEASURE OF MONETARY POLICY FOR MARKET STABILIZATION: AN EXAMPLE OF THE NATIONAL BANK OF SERBIA

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ABSTRACT

The increase in interest rate is related to the efforts of monetary authorities to neutralize inflationary pressures; while the rate reduction can be interpreted as an invitation to business sector to access more favorable lending conditions. The effectiveness of these changes largely depends on the development level of financial system, the role of the central bank as a creditor and current economic situation. In this research an econometric regression double-logarithmic model was applied, with the main goal of examining the relationship between discount rate and its influence on interest rates and money supply on the example of the National Bank of Serbia. The results show the correlation between the NBS discount rate and interest rates of commercial banks and the amount of money in circulation, indicating their influence on market stability.

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1. INTRODUCTION

Regulating the interest rate at which the Central Bank gives loans to commercial banks, and the interest rate at which commercial banks give loans to their clients, make a direct influence to the size of credit demand and money circulation. When a certain discount rate is established, the Central Bank exercises its powers by changing the rate or other conditions for discounting. The discount rate is the cost of borrowing from the Central Bank. Changes in the discount rate play a significant role in internal movements, affecting the availability of money and the price of credit, thus affecting the country's international position. The increase in the rate will lead to a general increase in other interest rates, including

those paid on deposits, and therefore, monetary authorities can expect an inflow of international funds. A rate decrease will have the opposite effect.

The subject of this paper is the analysis of the impact of discount rate on the interest rate and the amount of money in circulation by using the example of change in the discount rate of the National Bank of Serbia (NBS). The National Bank of Serbia is an independent and unique institution of the monetary system, responsible for monetary policy, currency stability, and financial discipline. In searching for an adequate strategy to achieve market stability, the National Bank of Serbia followed the example of other countries, especially in Central and Eastern Europe. Taking into account the specifics of each country, ensuring the security and efficiency of payment transactions, the Central Bank strives to fulfill the goal of financial stability and achieve sustainable development. Long-term strategic goals are aimed at development, which is reflected in achieving the optimal rate of economic growth, employment, and stability of the value of money. Monetary policy is considered expansionary if it is aimed at increasing the money supply, and restrictive if it is aimed at reducing the money supply. Monetary policy is most closely related to credit policy since the regulation of money circulation cannot be limited only to the control of cash, but also to the control and regulation of deposits (Sovtić, Ilić & Maksimović, 2012). Other instruments of monetary policy, such as operations in the open market of securities with longer maturities or required reserves, have a secondary role in achieving the goals of stability because of chronic inflation.

In previous years, the National Bank of Serbia has consistently applied a restrictive monetary policy. The goal of this policy was to maintain price stability by reducing the money supply, so that aggregate demand is in line with aggregate supply.

If the monetary authority assesses that the amount of money and credit in the economy have reached the level that threatens economic stability by monitoring the material-financial flows and inflationary changes, the Central Bank will increase the discount rate, which would result in the increase in the cost of credit, causing a general increase in the interest rates in the country (Komazec, 2006).

The subject investigated in this paper is whether and in which way the National Bank of Serbia affects market stability. Actually, the subject of the research is the impact of the discount rate on the interest rate and the money supply. Hypothesis states that there is an influence of the discount rate of the National Bank of Serbia on the interest rates of commercial banks and the amount of money in circulation.

The secondary hypothesis reads: The discount rate of the National Bank of Serbia has a more significant influence and a strong correlation on the interest rate of commercial banks than on the amount of money in circulation.

The paper is designed to contain five parts. The second part, which follows the introductory part provides insight into the previous research and the theoretical framework of the observed topic. In the third part the applied research methodology is presented along with the draft of the research. The econometric regression double-logarithmic model was used in the paper. The fourth part presents the analysis and empirical results of research, based on collected data suitable for research. Dependent and independent variables are defined, and the outcome of the measurement will clearly show the relation between the discount rate, the interest rate of commercial banks, and the money supply. Discussion and concluding remarks are described in the last chapter.

2. LITERATURE OVERVIEW

Monetary policy is one of the most important policies in every modern state. With its goals and instruments, it affects prices, investments, the amount of money in circulation, interest rates, etc. The National Bank of Serbia implements an expansive monetary policy and a policy of maintaining the stability of dinar against euro, which is the main prerequisite for maintaining financial stability.

Observing the dilemma of selecting the monetary policy model and the exchange rate regime, numerous classifications of the regime can be found. This subject is of particular relevance for small and open economies in which the existing political, economic and social specificities should be taken into account when choosing a monetary policy model. According to the definition of Frenkel (2003), there are nine arrangements, ranging from rigid to arrangements with increasing flexibility. Rigid currency arrangements include monetary union, dollarization, and currency boards. Monetary system is the bloodstream of every country since its goal is to provide each segment with the optimal amount of money in circulation in order to make the system function smoothly. If there is too much money in circulation, inflation occurs. If it is the other way around and there is too little money in circulation, deflation and recession occur, which are undesirable situations in the market (Bordo & Filardo, 2005).

Srithilat and Sun (2017) conclude that changes in the money supply can have negative consequences for the economic development of a country. Based on research conducted on Nigeria's example, Adaramola and Dada (2020) show that inflation and the exchange rate have a negative impact on domestic product movements, while money supply and interest rates have a positive impact.

Monetary-credit policy presents a set of rules, regulations, measures, instruments in the monetary-credit sphere of social reproduction, which regulate the level, structure and dynamics of the money supply, monetary circulation, structure and dynamics of credit, liquidity of the economy, and the economic stability. The national economy achieves numerous tasks and goals by using the monetary-credit policy as an instrument of economic policy: employment increase, price stability, stable rate of economic growth, balance of payments, etc. In this way, the necessary amount of money in circulation is ensured for the smooth development of production and transport, as well as liquidity of the national economy and the country's external liquidity, together with harmonization of supply and demand for money and credit, etc. (Benazić & Tomić, 2014).

In the new Keynesian models, as well as in earlier theories of natural rates, the presence of positive or negative gaps in real rates are directly linked to changes in price levels. This has led to suggestions that inflation itself could serve as a good proxy for the real rate gap. Other variables, such as the production gap, should also be good indicators of the movement of the gap in the real interest rate. This has led to a large number of the latest literature on the rules of interest rates, which has increased alongside the development of New Keynesian models. The most famous example is the Taylor (1993) rule, which says that the Central Bank set its interest rate in response to the deviations of inflation from the target inflation, the production gap, and an estimate of the long-term natural interest rate.

Certainly, the suggestion that the Central Bank should follow such rule for the purpose of eliminating real interest rate gaps has a long-term history (Kasman, 1992). By changing the discount rate, the Central Bank tries to influence the supply and demand of money on the money market and the conditions prevailing in the field of interest rate policy in the entire credit system. An increase in the discount rate should automatically lead to a decrease in the demand for bank loans. On the contrary, the decrease in the discount rate should lead to an increase in the demand for bank loans. Therefore, when the loan price becomes higher and credit more expensive, there should occur a credit contraction, and vice versa, when the loan price becomes lower and credit cheaper, credit expansion occurs (Ilić, 2006).

There is an extensive literature on evaluation of Central Bank reaction functions evidencing that Central Banks indeed controlled interest rates in this way (Judd & Rudebusch, 1998; Amato & Laubach, 1999; Gerlach & Schnabel, 2000). Theoretically speaking, while some studies (Taylor, 1999) confirmed the importance of the Central Bank responding not only to inflation but also to

production fluctuations, Woodford (2003) argues that it may be better for Central Bank to follow the rule with respect to observable variables since the natural rates of production are of inconspicuous levels. In fact, some authors showed that interest rate rules specified exclusively in terms of inflation represent a good approximation to optimal monetary policy in various spin-offs of the basic New Keynesian model (Amato & Laubach 2003; Giannoni, 2012; Giannoni & Woodford, 2003).

With the discount policy, the Central Bank determines the price of the loans it grants to commercial banks, either through rediscount loans or other forms of loans. It is the 'official' price of money in the economy, which further determines the interest rate at which commercial banks will grant loans to their clients. Increasing the discount rate creates unfavorable conditions for rediscount loans, which affects the general interest rate and the demand for loans. An increase in the interest rate is applied when there is greater amount of money in the market and inflationary disturbances. On the contrary, the decrease in the interest rate should lead to the increase in monetary demand and increase in economic activity: when its decline is a consequence of deflation, i.e. lack of money in the economy.

The operation of the Central Bank cannot be carried out according to a uniform way for all countries of a market economy. The following has to be taken into account: the level of economic development, and the structure of the financial system in the specific country. The methods of the Central Bank interventions on the money market determine the capacities and scope of monetary policy. The Central Bank controls the operation of the money market through discount rates and open market operations. With these instruments, the Central Bank keeps the necessary balance of supply and demand on the money market, regulating the performance of transactions by the level of the interest rate, i.e. the purchase and sales of securities. In addition to influencing the credit potential and liquidity of banks, the Central Bank uses these instruments to influence interest rates in the financial market, as well as to maintain the economic motives of holders of free funds for investing in securities (Zivković & Kozetinac, 2012).

The literature on transition economies also focuses on the exchange rate as a shock absorber and group of authors (Fetai, Koku, Caushi & Fetai, 2016) empirically examine the relationship between exchange rates and inflation in the Western Balkans. In order to evaluate the effect of exchange rate changes on inflation in Western Balkan countries they analyzed whether fixed exchange rates play an important role in inflation developments or whether flexible exchange rates are a better instrument for shock absorption. The result shows that the exchange rate is still the main source of inflationary pressure in the Western Balkans. The

decision to adopt a particular exchange rate regime depends on the costs and benefits associated with abandoning an exchange rate instrument.

The main goal of most central banks is to maintain price stability, which in practice means using conventional monetary policy instruments to support low and stable inflation. Conventional monetary policy instruments are used to keep inflation in line with the objective and policies of the country's monetary authorities. Ayuso & Repullo (2003) identified CB open market operations as a standard tool which the CB should use to manage the liquidity target. Blanchard, Dell'Ariccia and Mauro (2014) believe that managing short-term interest rates is the best operational objective for central banks. However, under the exceptional circumstances that led to a rapid decline in key economic parameters around the world, central banks opted for unconventional monetary policy measures.

The general conclusions from previous research are that the inflation rate is close to being a sufficient statistic for monetary policies even in the monetary policy theories that are based on natural rates. The conclusion that Central Banks should move interest rates in response to changes in the aggregate price level or price inflation rests on the assumption that the mismatch in the prices of goods and services is the main cause of incomplete nominal adjustment. Finally, as it was noted in the previous section, the existence of financial market imperfections implies that there may not be a clear link between the real rate gap and the cost of financing household and business consumption. The financial accelerator model of Bernanke, Gertler, and Gilchrist (1999) says that shocks have an enhanced and lasting effect on investment spending because of countercyclical movements in risk premiums (Laurens, 1994). The foregoing suggests that credit spreads or growth in credit aggregates can provide valuable information on margins, far beyond the aggregate price movements alone.

3. RESEARCH METHODOLOGY

The research methodology is based on the econometric model of multiple regression analysis, i.e., the double logarithmic function that will measure the impact of the discount rate. The objective is to examine the dependence between the discount rate and the impact on both interest rate and the money supply.

$$\hat{Y} = \beta_0 X^{\beta}$$

where Y is a dependent variable, X is independent variable, β_0 is a segment on the ordinate and β_1 is an inclination.

The following formulas give parameter ratings:

$$\beta_1 = \frac{\sum x_i^* \cdot y_i^*}{\sum x_i^{*2}}; \quad \beta_0 = \overline{Y} - \beta_1 X^*$$

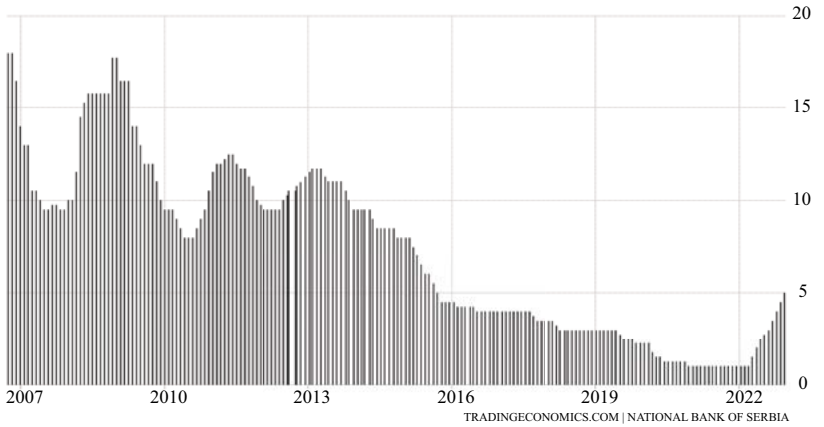
A non-linear function can be converted to a linear form by logarithm:

$$\ln \hat{Y} = \ln \beta_0 + \beta_1 \ln X_i$$

Evaluating a multiple regression model means finding the value of parameters β_0, β_1, β_2 = regression parameters that need to be evaluated, i = stochastic term (random deviation, error or residual), i.e. find the estimated value of the model that looks like:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_i$$

The following graph represents the trend and size of the discount rate of the National Bank of Serbia of the observed variables for the period 2007-2021.



Graph 1: Trend of the discount rate of the National Bank of Serbia from 2007 to 2022

Source: Trading economics, https://tradingeconomics.com/

As it can be seen on the Graph 1, since 2010, there has been a noticeable growth in the discount rate of the National Bank of Serbia. Under the influence of the worldwide market crisis, a significant growth was recorded and a maximum rate of 11% was reached. After 2014, the growth trend did not continue, and a significant drop in the discount rate was noted, i.e. it reached 1% in 2021,

likewise in the Central Banks of developed countries. In the following chapter, the regression analysis method will be applied and consequently the obtained results will be presented.

4. RESULTS

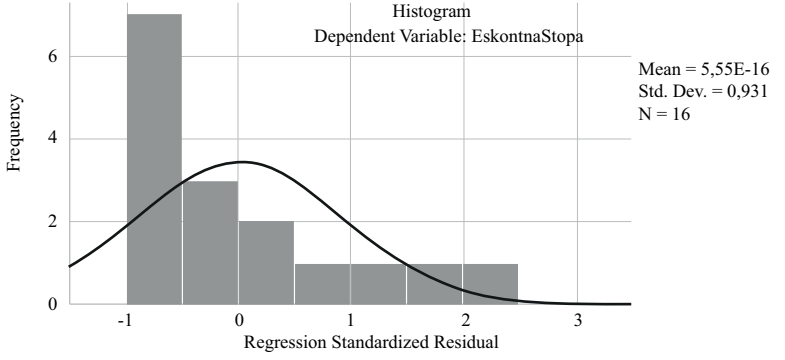
The research used the secondary data of the National Bank of Serbia published on the official website. A universal and original model will be presented based on the downloaded data and the application of a multiple regression model. There will be a correlation presented in order to have the comprehensiveness of the model, before presenting the model itself.

The model is presented in a form of a function, with the value of parameters based on which the influence of independent variables on dependent variables will be determined.

The subject of this paper is the analysis of the impact of the discount rate on the interest rate and the money supply.

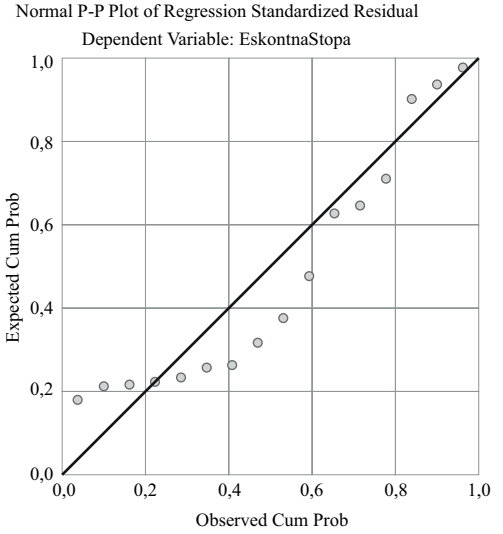
Taking these indicators into account, the thesis as to whether there is a relationship between the discount rate, the interest rate and the amount of money in circulation will be proven or disproved.

For this purpose, the dependent variable (regressor, explained, exogenous) is the discount rate of the agency during the observed years, while the independent variables (regressor, explained, explanatory, endogenous) are the interest rates and the amount of money in circulation. The paper will present correlation, regression, determination, T test on the significance of parameters, and F test on the significance of the model.



Graph 2. Histogram

Source: Authors' calculation in the SPSS program26



Graph 3. Scattering plot

Source: Authors' calculation in the SPSS program26

In order to estimate/calculate a multiple regression model, the value of parameters βo, β1, β2= regression parameters that need to be calculated/estimated, with i=stochastic term (random deviation, error or residual) have to be found.

Finding the rated value of the model as presented:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_i$$

The money supply is taken as a dependent variable in the model, and the influence of the discount rate and interest rate on the amount of money in circulation is examined. This is multiple and reliable method (for example, it mutually excludes positive and negative errors). For the needs and purposes of calculation, the best way to present the observed variables is to use the average linear relation.

The linear dependence can be evaluated based on the following model:

$$\hat{Y}_i = b_0 + b_1 X_{1i} + b_2 X_{2i},\ i = 1,\ldots,16$$

The statistical program analysis showed that $b_0 = 10{,}085$; $b_1 = 0{,}158$ i $b_2 = -3{,}501e\text{-}5$

Therefore, the regression equation reads:

$$Y = 10{,}085 + 0{,}158X_1 - 3{,}501\text{e}-5X_2$$

If there are no interest rates and money in circulation, the discount rate will be 10.0849%. If the discount rate increases by 1 unit (by 1%), the interest rate will increase by 0.1577 units. If the money in circulation increases by 1 unit (expressed in millions), the discount rate will decrease by 3.501 units (%).

R2 dependence of the interest rate and money in circulation on the discount rate is 74.3%, which represents a high interdependence of the parameters. The F statistic is 18.778, and the theoretical value of the t-statistic is smaller, so it can be said that the evaluated model is of high quality according to the criteria of the t and F statistics. This also means that the hypothesis about the statistically significant impact of the discount rate on the amount of money in circulation and the interest rate is accepted.

Table 1: Results of multiple regression analysis

Variable	Coefficient	Std. error
b_0	10,085	3,868
b_1	0,158	0,173
b_2	-3,501	
R^2	74,3%	
$\overline{R}^2$	70,3%	
F^2	18,778	
F'	4,26	
T	0,9126	
T'	2,160	
Durbin-Watson	0,549	
Pearson	0,792	

Source: Author's calculation

The Durbin-Watson value is less than 2 and it is 0.549, indicating positive serial autocorrelation between the residuals. The interest rate increase by 1% leads to the increase in the discount rate by 0.15%, while the decrease in the discount rate by 3.5% leads to the increase in the amount of money in circulation by 1%. Also, it can be seen from the analysis that the decrease in the discount rate of the National Bank of Serbia leads to the decrease in the interest rates of commercial banks that they offer to citizens and the increase in the amount of

money in circulation. The coefficient of determination is 0.743%, which shows that variations in the discount rate are determined by variations in interest rates and the amount of money in circulation with 74.3%.

Based on the obtained results, it can be said that hypothesis H1 is accepted.

$$t = \left|(b_1 - \beta_2) / Sb_2\right| = 0{,}9126$$

$$t' = 2{,}160$$

$t' > t$ with risk of 5% and probability of 95%, hypothesis H1 is accepted. Actually, the claim that the parameter β_2 is statistically significant is accepted, i.e. the claim that there is a relationship between the discount rate and the interest rate is accepted.

The Pearson correlation coefficient for the interest rate as per strength level 1[1] is 0.792, which can be characterized as a strong correlation level. It also shows that there is a linear linkage and a continuous normal distribution. The Pearson's coefficient is -0.852 for the amount of money in circulation, i.e. there is a strong correlation level. The sign of the correlation is determined by the regression trend.

The histogram shows that there is standard deviation of 0.931 and that the graph is of a normal distribution, i.e. the curve has a so-called bell shape. The scatter diagram shows a direct positive linear relation amongst the discount rate, interest rate and the amount of money in circulation.

5. DISCUSSIONS

There has been a significant change in the role of the Central Bank in regulating money flows. Collection and development of deposits in the banking system, coupled with liquidity assets of non-banking sectors (especially households) occupies a greater attention of banks. The role and function of the Central Bank in the monetary system strongly determines the operations of the financial and economic system as a whole. This fact further leads to the conclusion that the Central Bank, within its scope of work, should ensure the rational operations

1 Strength levels:
$0 < |p| \leq 0{,}5$ – low correlation level;
$0{,}5 < |p| \leq 0{,}7$ – significant correlation level;
$0{,}7 < |p| \leq 0{,}9$ – strong correlation level;
$0{,}9 \leq |p| < 1$ – very strong correlation level.

of financial and monetary system, and in this context determine a clear and economically consistent modern policy. The operation of a whole economic system requires this kind of approach in order to determine a realistic economic policy with precisely projected economic expectations.

Kantur and Özcan (2021) pointed out that in an environment of uncertainty, policymakers, especially monetary authorities have doubts about the policy models they routinely use. The policy is tailored to insure against the worst-case outcomes. They show that model ambiguity on the financial side requires a passive monetary policy stance. However, if the uncertainty originates from the supply side of the economy, an aggressive response of interest rate is required.

Today, in the economic literature, the prevailing understanding is that increase in the official discount rate and price of loans resulting out of it, do not cause a lower demand for loans from commercial banks. It is considered that the reduction in discount rate, i.e., lowering the costs of loans, without the influence of other factors, cannot have such an impact and sufficiency for the revival of the economy by itself (Komazec & Ristić, 2010). This especially applies to the small and medium enterprises, where the inflation rate is significantly above the Central Bank's cost of money, thus creating conditions for regular occurrence of a negative real interest rate, which really represents a "premium" for taking a loan (Gerlach & Schnabel, 2000).

The discount policy must be conducted in close coordination with other segments of macroeconomic regulation, and above all with the various policies such as - market and price policy, income policy, fiscal policy, foreign trade policy, foreign exchange policy, general interest policy in the banking system, etc. The measures must be taken simultaneously and with a change in the positive and negative effects of these measures, as well as their mutual effects, especially when the economy is in a deep crisis and high inflation. In this case, many instruments are opposed to each other, actually, they are contraindicated (Barjaktarovic, 2010). The stability of monetary aggregates is of great importance for central banks of developed economies, where special attention is paid to the stability of the discount rate. First of all, this is a sign that there has been a need for a turnaround of monetary policy and conjuncture, but also in the behavior of all subjects in the economy. Monetary basis and other elementary aggregates are observed in the closest connection with the economy trends (especially the trends of prices, stability of money, level of employment, real social product, investments, budget spending, etc.).

The discount rate is considered as an efficient part of the state instruments of macroeconomic policy, but also it is the most closely related to the economic and monetary trends.

6. CONCLUSIONS

The results of the research proved the hypothesis of the influence of the discount rate on the interest rate at which banks provide finances to the economy and population, and thus the influence on the amount of money in circulation. Moreover, the analysis shows that the decrease in the discount rate of the National Bank of Serbia leads to the decrease in the interest rate offered by commercial banks to citizens and increases the amount of money in circulation. The coefficient of determination is 0.743%, which shows that variations in the discount rate are determined by variations in interest rates and the amount of money in circulation with 74.3%.

It is known that the discount rate of the Central Bank affects individual commercial banks differently within the entire banking system. Also, general operations of the central bank actually act as a weight of a large number of different influences on individual commercial banks. The greater the share of Central Bank loans in the structure of the total assets of a commercial bank, the greater will be the impact of the discount rate on the interest rate policy of that bank, and vice versa. The efficiency of the discount rate in financially developed countries as well as countries with developed money and credit market, is significantly higher than in the economies that do not have such characteristics.

The discount rate of the Central Bank in economies with a developed financial market is one of the most effective quantitative instruments of monetary policy. There are large differences in the movement of central banks' discount rates, as well as their changes. Changes are more common in developed than in underdeveloped countries. In developed countries, operations in the money market through changes in the discount rate are far more frequent because there is a greater sensitivity to even minor changes in this rate compared to underdeveloped countries.

It can be said that the Central Bank is mainly responsible for money and monetary policy. Therefore it must have the absolute insight into the mutual linkages and factors together with all other elements of the economic system if it wants to achieve the desired results with its monetary policy. The Central Bank regulates the amounts of reserves as well as the size of loans to commercial banks. However, it cannot influence other flows of money and factors determining the

various forms of assets. Therefore, the most important role of the Central Bank is to regulate the amount of money in circulation, credit volume in the country and thereby maintain financial and market stability.

Conflict of interests

The authors declare there is no conflict of interest.

REFERENCES

Adaramola, A. O., & Dada, O. (2020). Impact of inflation on economic growth: evidence from Nigeria. *Investment Management and Financial Innovations, 17*(2), 1-13. DOI:10.21511/imfi.17(2).2020.01

Amato, J., D. & Laubach, T. (1999). The value of interest rate smoothing: how the private sector helps the Federal Reserve. *Economic Review, 84*(Q III), 47-64.

Amato, J. D., & Laubach, T. (2003). Rule-of-thumb behavior and monetary policy. *European Economic Review, 47*(5), 791-831

Ayuso, J., & Repullo, R. (2003). A Model of the Open Market Operations of the ECB. *Economic Journal, 113*(490), 883-902. DOI: 10.1111/1468-0297.t01-1-00160

Barjaktarovic, L. (2010). *Monetary-credit and foreign exchange system*. Podgorica, Montenegro: Faculty of Economics.

Bernanke, B. S., Gertler, M., & Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. Handbook of Macroeconomics. In: J. B. Taylor & M. Woodford (EdS.), *Handbook of Macroeconomics*, Edition 1, Vol 1, chapter 21, 1341-1393. Amsterdam, Netherlands: Elsevier. DOI:10.1016/S1574-0048(99)10034

Benazić, M., & Tomić, D. (2014). The evaluation of fiscal and monetary policy in Croatia over a business cycle. *Zbornik radova Ekonomskog fakulteta u Rijeci: časopis za ekonomsku teoriju i praksu, 32*(1), 75-99.

Blanchard, O., Dell'Ariccia, G., & Mauro, P. (2014). Rethinking Monetary Policy. *IMF Staff Position Note SBP/10/03*. Retrieved from: https://www.imf.org/external/pubs/ft/ spn/2010/spn1003.pdf

Bordo, M., & Filardo, A. (2005). *Deflation in a historical perspective*. BIS Working Papers No 186. New Jersey, US: Rutgers University and Bank for International Settlements.

Fetai, B., Koku, P.,S., Caushi, A. & Fetai, A. (2016). The relationship between exchange rate and inflation: The case of Western Balkans countries. *Journal of Business, Economics and Finance (JBEF), 5*(4), 360-364. DOI: 10.17261/Pressacademia.2017.358

Frenkel, J. (2003). *Experience of and lessons from exchange rate regimes in emerging economies*. The National Bureau of Economic Research. Retrieved from: http://www.papers. nber.org/papers/w10032

Gerlach, S. & Schnabel, G. (2000). The Taylor rule and interest rates in the EMU area. *Economics Letters, Elsevier, 67*(2), 165-171. Retrieved from: http://directory.umm.ac.id/Data%20Elmu/jurnal/E/Economics%20Letters/Vol67.Issue2.May2000/1708.pdf

Giannoni, M. (2012). *Optimal Interest Rate Rules and Inflation Stabilization versus Price-Level Stabilization*, Staff Report no. 546. New York, US: Federal Reserve Bank of New York. DOI 10.2139/ssrn.2002284.

Giannoni, M., & Woodford, M. (2003). *Optimal Interest-Rate Rules: I. General Theory*. NBER Working Papers 9419. Cambridge, Massachusetts, US: National Bureau of Economic Research, Inc. DOI 10.3386/w9419.

Ilić, B. (2006). *Macroeconomics*. Belgrade, Serbia: Higher Business School,

Judd, J. P., & Rudebusch, G. D. (1998). *Describing Fed behavior*. FRBSF Economic Letter, issue dec 25. San Francisco, US: Federal Reserve Bank of San Francisco.

Kantur, Z., & Özcan, G.. (2021). Model Uncertainty and Financial Frictions: Implications for Optimal Monetary Policy. *The Singapore Economic Review*, 1-20. DOI 10.1142/s0217590822410016.

Kasman, B. (1992). A comparison of monetary policy operating procedures in six industrial countries. Federal Reserve Bank of New York, Quarterly Review.

Komazec, S. (2006). *Monetary economy and banking management*. Belgrade, Serbia: Higher School of Business.

Laurens, B. (1994). *Refinance instruments: lessons from their use in some industrialized countries*. IMF Working paper. No. 51. Washington, D.C., US: IMF

Komazec, S., & Ristić, Ž. (2010). *International banking and institutional investors*. Belgrade, Serbia: EthnoStyle.

National Bank of Serbia (n.d.). Retrived from: https://nbs.rs/sr_RS/indeks/

Sovtić, K., Ilić, B., & Maksimović, M. (2012). Monetary strategy and basic objectives of the monetary policy of the Central Bank of Serbia. *Economics, 58*(4), 129-137. DOI: 10.22004/ag.econ.289617

Srithilat, K., & Sun, G.. (2017). The Impact of Monetary Policy on Economic Development: Evidence from Lao PDR. *Global Journal of Management and Business Research, 17*(2), 9-15.

Taylor, J. B. (1993). Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy 39*, 195-214, North-Holland. Retrieved from: https://web.stanford.edu/~johntayl/Onlinepaperscombinedbyyear/1993/Discretion_versus_Policy_Rules_in_Practice.pdf

Taylor, J. B. (1999). *A Historical Analysis of Monetary Policy Rules*. University of Chicago Press, 319 – 348. Retrieved from: https://www.nber.org/system/files/chapters/c7419/c7419.pdf

Woodford, M. (2003). Optimal Interest-Rate Smoothing. *The Review of Economic Studies, 70*(4), 861–886. http://www.jstor.org/stable/3648627

Zivković, A. & G., Kozetinac, G. (2012). *Monetary Economy*. Belgrade, Serbia: Center for Publishing of the Faculty of Economics in Belgrade.

Appendix

Worksheet

Years	Y	X1	X2	X1Y1	X1Y	X2Y	Y²
2006	8,50	16,50	68,461	1.129,606	104,25	581.91	72,25
2007	8,50	16	77,000	1.179,836,	136	654.5	72,25
2008	8,50	18	90,075	1.232,000	153	765.63	72,25
2009	8,50	21	95,519	1.621,350	178,5	811.91	72,25
2010	9,50	12	91,750	2.005,899	114	871.62	90,25
2011	11,75	11	114,190	1.101,000	129,25	1.341.73	1,380,625
2012	10,95	14	110,547	1.256,090	153,3	1.210.48	1,199,025
2013	11,00	14	122,439	1.547,658	154	5	121
2014	8,50	12	130,468	1.714,146	102	1346.82	72,25
2015	6,00	11	139,818	1.565,616	66	1.108	36
2016	4	6,2	156,265	1.537,998	24,8	838.908	16
2017	3,75	5,9	163,931	987,443	22,115	637.06	140,625
2018	3,25	5	182,615	967,192	16,25	614.74	105,625
2019	2,75	3,9	209,568	913,075	10,725	593.49	75,625
2020	1,25	3,9	266,725	817,315	4,875	576.32	15,625
2021	1	3,9	295,311	1.040,227	3,9	333.40	1
		134	2,314,682	3,685,025	38440	4930.243	2,917,324

Source: Authors' calculation

ДИСКОНТНА СТОПА КАО МЈЕРА МОНЕТАРНЕ ПОЛИТИКЕ У СТАБИЛИЗАЦИЈИ ТРЖИШТА - ПРИМЈЕР НАРОДНЕ БАНКЕ СРБИЈЕ

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САЖЕТАК

Повећање каматне стопе повезано је са настојањем монетарних власти да неутралишу инфлаторне притиске; док се смањење стопе може тумачити као позив пословном сектору да приступи повољнијим условима кредитирања. Ефикасност ових промјена у великој мјери зависи од развијености финансијског система, улоге централне банке као кредитора и тренутне економске ситуације. У овом истраживању примијењен је економетријски регресиони двологаритамски модел, са основним циљем да се испита однос дисконтне стопе и њеног утицаја на каматне стопе и новчану масу

на примјеру Народне банке Србије. Резултати показују корелацију између дисконтне стопе НБС и каматних стопа пословних банака и количине новца у оптицају, што указује на њихов утицај на стабилизацију тржишта.

Кључне ријечи: *монетарна политика, централна банка, каматна стопа, стабилност тржишта, комерцијалне банке.*

MACROECONOMIC DETERMINANTS OF COMPETITIVENESS: EVIDENCE FROM FACTOR EFFICIENCY AND INNOVATION-DRIVEN COUNTRIES

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ABSTRACT

The investigation of factors that increase or hinder competitiveness has been one of the core tenets of theoretical and empirical researchers, but so far there has been no consensus. This study responds to this issue by exploring how different facets of the macroeconomic environment influence competitiveness in the three Global Entrepreneurship Monitor (GEM) types of economy (factor-driven economy, efficiency-driven economy, innovation-driven economy). Using Porter's classification, we divided countries based on factor, efficiency and innovation. Additionally, the generalized method of moments (GMM) was used to capture endogeneity and unobserved heterogeneity of data in an unbalanced panel data for 81 countries (2002-2018). The results show that the variations of competitiveness across countries are mainly determined by variations in the stage of economic development. Firstly, GDP growth, low start-up costs and higher R&D expenditure play a key role in explaining the variation in competitiveness in three country clusters. Secondly, as regards Stage 1 countries, we find that trade openness, tax rate, GDP growth, start-up costs, real effective exchange rate, R&D expenditures and labor productivity are particularly vital for competitiveness. Concerning Stage 2 countries, we may observe that trade openness, tax rate, GDP growth, inflation, start-up costs, financial development, real effective exchange rate, R&D expenditures and labor productivity had a statistically significant impact on competitiveness. When it comes to Stage 3 countries, factors such as trade openness, FDI, tax rate, GDP growth rate, inflation, tax rate, start-up costs, financial development, R&D expenditures, and labor productivity have an impact on competitiveness.

This article presents some essential features, such as the macroeconomic index to determine competitiveness. These features can be used as guidelines for decision makers because they identify areas where taking further actions can improve competitiveness. Finally, our obtained results are highly consistent across a series of robustness tests and robustness checks covering alternative samples and alternative variable groups.

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1. INTRODUCTION

1.1. General approach

Recently, the competitiveness of nations in the modern world has drawn a lot of attention and research literature has shown that when increasing competitiveness and interdependence, national economies are more influenced by the global business environment and its development (Dobrovic et al., 2018; Bacik, Kloudova, Gonos & Ivankova, 2019; Roszko-Wójtowicz & Grzelak, 2020; Marian, 2019). Thus, integration and globalization processes in the world economy force one to search for sources and factors determining the competitiveness of economies (Pérez-Moreno, Rodríguez & Luque, 2016; Petricevic & Teece, 2019).

However, there is no unified approach in the literature on the concept of national competitiveness. Extensive literature also shows that the approach to the assessment and measurement of competitiveness has varied over time, indicating the need for further research to present the complexity of this economic phenomenon from various perspectives. Competitiveness has been the subject of economic research and analysis since the second half of the 20th century among scientists, economic politicians, and representatives of businesses. Hence, as a complex phenomenon its discussion requires various criteria and methods of measurement (Gu & Yan, 2017). For example, Porter (1998) defines competitiveness in terms of economic development in three different phases: (1) factor-driven, (2) efficiency- driven, and (3) innovation-driven, as well as two transition phases between these steps (Momaya, 2019). Factor-driven countries compete for cost efficiency in the production of raw materials or products with low added value (Urbaniec, 2019). These economies are based on non-agricultural independence (necessity entrepreneurship). Taking advantage of economies of scale in large markets, efficiency-driven countries need to increase

productivity and skills to adapt to technological developments. At this stage, the increase in foreign direct investment (FDI) occurs along with the declining trend of imperative entrepreneurship (Schwab, 2018). Innovation-driven economies need to expand the business environment to create entrepreneurship based on information and communication technologies. At this point, many SMEs that focus on innovation factors characterized by strong growth potential have emerged in service sectors. Furthermore, the dynamics of competitiveness can be vastly different depending on the macroeconomic environment and level of economic development (Alomari, Marashdeh & Bashayreh, 2019; Gallo & Tomčíková, 2019). Likewise, there is a paucity of research on analyzing the international competitiveness of economies from the point of view of various macroeconomic indices.

Although there is a lot of research on the determinants of competitiveness in the current literature (Ehigiamusoe & Samsurijan, 2020; Boikova, Zeverte-Rivza, Rivza & Rivza, 2021), the existing literature shows that few empirical studies formally theorize and examine the effects of macroeconomic indicators on national competitiveness. Our study, therefore, attempts to clarify the understudied but important relationship between these macroeconomic determinants of competitiveness in three different GEM economies and fill this gap by offering an integrated conceptual model to examine the macroeconomic determinants of competitiveness. Specifically, this study focuses on global sample of countries in different stages of development because of increasing competition due to global integration pressure. Thus, authors realize that it is necessary to have intensive research on how to enhance countries' competitiveness in a sustainability manner. This paper will be of important contribution to the current literature of competitiveness and this will differentiate the study findings from previous ones. Firstly, it provides a comprehensive understanding of competitiveness concept and proper practices for countries. Secondly, it defines a mechanism of how macroeconomic variables, namely GDP growth, total tax rate, inflation, trade openness, foreign direct investment and cost required to start a new business improve competitiveness of countries in different stages of development. Thirdly, this paper effectively considers the issues of endogeneity by using a two-step system generalized method of moments (GMM). Lastly, this paper can provide a deep insight into the comparative analysis between the three types of GEM economies. To address the objectives, this study has conducted a 17-year extended analysis of 81 countries (grouped by the stage of development) and considered six economic indicators that have potential impacts on international competitiveness to contribute to the expansion of knowledge in this field.

Our analysis is in a sense close to Mohammadi Khyareh and Rostami (2021), who also analyze the macroeconomic factors that encourage the competitiveness of emerging countries. However, differences from Mohammadi Khyareh and Rostami (2021) and some related studies can be outlined. First, we contribute to the literature by addressing the macroeconomic determinants of competitiveness in a completely different way. Second, our sample is larger than that considered by Mohammadi Khyareh and Rostami (2021). The sample covers more countries (81 countries instead of 16), a longer period (17 years instead of 9), and more importantly, our analysis is less biased towards emerging countries (instead, we consider the WEF distinction on factor-driven, efficiency-driven, and innovation-driven countries). Finally, the data is analyzed globally and in three economic stages (factor-driven economy, efficiency-driven economy, innovation-driven economy).

The structure of this research begins with the introduction, followed by different parts such as literature review, research model and hypothesis, research method, results and discussion, and conclusion.

1.2. Literature review

The concept of competitiveness. Different organizations offer different approaches to understanding the concept and defining competitiveness (Farinha, Ferreira, & Nunes, 2018; Falciola, Jansen & Rollo, 2020). One of the pioneers in the past 30 years is Michael Porter (1998) whose groundbreaking work is "The Competitiveness of Nations" which focuses on national productivity as a primary measure of success. Fagerberg & Srholec (2017) stated that competitiveness determines the ability to conquer new markets, to outplay other actors in the market, to attract investment and to grow. On the macro level, we can use a much more general concept of competitiveness, used by OECD, which says that "Competitiveness is a measure of a country's advantage or disadvantage in selling its products in international markets" (OECD, 2020). Other studies in this area define competitiveness as a set of hard and soft factors influencing a country's productivity, and consequently, its ability to grow over time (Rusu & Roman, 2018; Schwab & Sala-i-Martin, 2017). The world economic forum (WEF, 2016, p. 4) defines competitiveness as "a series of institutions, policies and factors that determine the level of economic productivity, which in turn determines the level of prosperity that the country can achieve." Since 2005, the WEF has assessed the level of competitiveness of countries using a comprehensive index, which consists of twelve pillars to measure competitiveness at macro as well as microeconomic levels. The global competitiveness index (GCI), based on

'the 12 pillars of competitiveness', compares economies worldwide. The GCI includes 2 types of data: statistics (from the IMF, UN and other international agencies) and surveys (conducted annually by WEF itself to obtain respondents' perceptions of their countries and to fill gaps in statistics). The use of not only statistics but also survey data has been widely criticized by economists (Zinnes, Eilat & Sachs, 2001), who argue that opinions are subjective and depend on countries' cultures and attitudes. The GCI is influenced by the theory of stages of development. It assumes that countries in different stages of development show different characteristics for competitiveness and require different factors for being competitive. The 12 pillars of competitiveness as shown in Table 1 are restructured into 3 clusters corresponding to three stages of development for economies: factor-driven, efficiency-driven, and innovation-driven. The 12 pillars are divided into these three stages and correspond to the specific factors required at each stage to be competitive. The World Economic Forum has chosen GDP per capita as a criterion for classifying regions into stages of economic development by defining precise ranges for this indicator for each stage (Schwab & Sala-i- Martin, 2017) (see Table 1).

Table 1: Classification of competitiveness factors based on the WEF methodology

Global Competitiveness Index					
Basic factors		Efficiency enhancers		Innovation and sophistication factors	
Institutions Infrastructure Macroeconomic environment Health protection and primary education		Higher education and training Labor market efficiency Financial market development		Business sophistication innovativeness	
Factor-driven economy		Efficiency-driven economy		Innovation-driven economy	
Stages of competitiveness development	Stage 1	Transition from stage 1 to stage 2	Stage 2	Transition from stage 2 to stage 3	Stage 3
GDP per capita (US$) thresholds	<2,000	2,000–2,999	3,000–8,999	9,000–17,000	>17,000
Weight for basic factors	60%	40-60%	40%	20-40%	20%
Weight for efficiency enhancers	35%	35-50%	50%	50%	50%
Weight for innovativeness and sophistication factors	5%	5-10%	10%	10-30%	30%

Source: Schwab & Sala-i-Martin, 2017

Table 1 shows that for the countries at the lowest stage of production, the most important factor to improve competitiveness is the fundamental factor (60%), followed by the factors of efficiency improvement (35%), and only 5% is allocated

to the factors of innovation and specialization. At the same time, for countries in the innovation stage, foundational factors (20%) and efficiency improvement factors (50%) are still quite significant, while innovation and specialization factors are much more important - 30%, which means that in the highest stage of competitiveness, innovation and specialization factors have the greatest impact on competitiveness. This paper aims to further clarify this issue and analyze potential differences between competitiveness dimensions and economic types. From the above literature, we expect that the competitiveness of countries based on three economic stages differ depending on various macroeconomic conditions.

1.3. Determinants of competitiveness

The competitiveness literature has identified several determinants of competitiveness (Mentel & Hajduk-Stelmachowicz, 2021; Fagerberg & Srholec, 2017; Braja & Gemzik-Salwach, 2019). In this regard, Porter (2004) distinguished two categories: macro and microeconomic dimensions. The microeconomic foundation traditionally ignored by policymakers is the foundation of macroeconomic reforms to achieve sustainable economic prosperity. Furthermore, other studies focused on other competitiveness determinants such as financial economic performance (Sigue & Barry, 2020), basic requirements, efficiency enhancers, innovation, sophistication factors (Roy, 2018), institutions (Ibragimov, Vasylieva & Lyulyov, 2019) and innovation (Ferreira, Fernandes & Ratten, 2017). Moreover, several studies cover economic aspects determining sustainability and competitiveness of countries, some others use multi-criteria indices (Kiseľáková, Šofranková, Onuferová & Čabinová, 2019), such as: the global competitiveness index (Roy, 2018; Marčeta & Bojnec, 2020), the economic freedom index (Mushtaq, Ejaz & Khan, 2018), the global innovation index (Jankowska, Matysek-Jędrych & Mroczek-Dąbrowska, 2017), and the human development index (Khan, Ju & Hassan, 2018). It is worth mentioning that the COVID-19 epidemic has had many impacts on the development of countries and their competitiveness (Dziembała, 2021). However, of all factors affecting competitiveness, the macroeconomic environment is vital (Alomari, Marashdeh & Bashayreh, 2019; Musyoka & Ocharo, 2018). In response, what follows addresses the main macroeconomic determinants of competitiveness:

Trade Openness (TP). The development literature shows that a country's trade policy has a significant impact on its competitiveness (Rakhmanova, & Kryukov, 2019). Therefore, just like being exposed to international competition, more domestic competition will also stimulate the improvement of resource allocation and industrial efficiency (Coulibaly, 2021). The existing literature provides a sufficiently comprehensive view of the impact of trade openness on the country's

economic growth and competitiveness (Simionescu, Pelinescu, Khouri & Bilan, 2021). As pointed out by Mohammadi Khyareh & Zivari, (2019), more open countries can catch up with leading technologies. Coulibaly (2021) proposed that open trade helps allocate resources more effectively and can take advantage of the country's competitive advantages. However, research on the linkage between trade openness and competitiveness shows that the influence of trade openness is irregular and depends on general economic theory (neoclassicism, Keynesianism, etc.). Marčeta & Bojnec (2020) found the negative impact of trade openness on the competitiveness of countries. Other studies (Syromyatnikov, Konev, Popov & Sultanova, 2021) also analyzed the relationship between international trade and national competitiveness. It has been proven that as trade improves country's access to global resources and broadens market access, a country's business performance depends on its competitiveness (Reyes & Useche, 2019). Considering the previous arguments, our first research hypothesis is:

H1: At the national level, trade openness is positively associated with competitiveness of countries.

Foreign Direct Investment (FDI). In the process of world economic globalization, foreign direct investment has a significant impact on the economic growth and development of the national economy (Raeskyesa & Suryandaru, 2020; Syromyatnikov et al., 2021). Thus, to fully promote the development of competitiveness, these countries usually intervene through tax policy measures. Considering that this is one of the ways to ensure more capital inflows, one of the main tasks of developing countries is to create an enabling environment for investors (Domazet & Marjanović, 2018). However, the relationship between foreign direct investment and trade and export competitiveness is more complex. Foreign direct investment has been questioned due to reducing employment in the home country, as well as increasing employment, promoting technology transfer, and encouraging growth and exports in the host country. Foreign direct investment (FDI) through increased capital inflows leads to more employment, more innovation, and development of national industry and higher exports, which in turn improves national competitiveness (Owczarczuk, 2020; Avioutskii & Tensaout, 2020). Furthermore, based on some empirical literature, the impact of foreign direct investment on national competitiveness and entrepreneurship depends on the level of development of the countries (Rusu & Roman, 2018). Aiming to explore, through real data, how FDI influences the competitiveness of countries, our second research hypothesis is:

H2: At the national level, foreign direct investment significantly influences the competitiveness of countries.

GDP Growth (GDPG). Past research findings suggest that higher economic growth through the creation of new jobs also has a positive impact on GC (Yerbanga, 2017). In the past various authors mentioned the importance of GDP and confirmed that if the goal of policymakers is to increase competitiveness, then the key task is to increase GDP growth (Dagilienė, Bruneckienė, Jucevičius & Lukauskas, 2020; Nogueira & Madaleno, 2021). Therefore, our third hypothesis attempts to explore the impact of GDP growth on competitiveness.

H3: At the national level, high GDP growth is positively associated with competitiveness of countries.

Total Tax Rate (TR). Tax rates play an important role in international competitiveness (Dezhina, Nafikova, Gareev & Ponomarev, 2020; Lyon & McBride, 2018). A generally supported attitude is that fiscal policy is an effective tool to attract investment, meaning that tax competition is one of the most important indicators of comprehensive competitiveness (Marjanović, 2018). In addition, competitive tax laws can minimize the impact of tax rates on the decisions of workers and companies. In today's globalized world, companies can choose to invest in any number of countries to find the highest rate of return. If a country's tax rate is too high, it will promote investment and employment in other places, leading to a slowdown in economic growth (Bunn, Pomerleau & Hodge, 2018). Furthermore, excessive taxation on foreign trade is an important factor in the poor performance of the international industry and high corporate tax rates weaken a country's international competitiveness (Rusu & Dornean, 2019). Lowering corporate tax rates can be a way to attract more investment, increasing business productivity and encouraging more investment (Kiseľáková et al, 2019). Conversely, Shafiq, Hua, Bhatti & Gillani (2021) argue that tax measures which attract foreign capital can be an important factor in increasing the real exchange rate while reducing the international competitiveness of national industries. Therefore, we aim to explore how changing tax rate influences the competitiveness of countries, and thus, the fourth research hypothesis is:

H4: At the national level, tax rate significantly influences the competitiveness of countries.

Inflation (INF). The relationship between inflation and competitiveness can also be analyzed from two perspectives. The improvement in employment opportunities resulting from rising inflation can be due to the premise that higher price levels lead to higher expectations of entrepreneurs' income and stimulate business development and implicitly increase competitiveness (Rusu & Roman, 2018; Yanar & Celik, 2021). However, rising inflation increases the cost of starting a business that can adversely affect entrepreneurs (Roman, Bilan, &

Ciumaş, 2018). Company-related regulations, often expressed as higher start-up costs, can adversely affect entrepreneurship, and affect competitiveness (Kusnarno & Suratman, 2021; Roszko-Wójtowicz & Grzelak, 2020). Thereby, our aim is to verify the impact of inflation on the competitiveness of countries. Thus, the fifth research hypothesis is:

H5: At the national level, inflation significantly influences the competitiveness of countries.

Cost of Starting a Business (CSB). In today's complex and competitive business environment, adjusting an appropriate strategy is a particularly important effort to promote the development of the companies. Tan et al. (2018) in a survey study confirmed that eliminating barriers to business is a prerequisite for improving domestic and foreign investment and national competitiveness. Likewise, one of the fundamental prerequisites for the successful operation and development of all enterprises is to create a good business environment. Thus, the society's positive view of business conditions may mean greater interest in entrepreneurship, which can further lead to higher GDP rates and higher employment rates (Dobeš, Kot, Kramoliš & Sopkova, 2017; Rusu & Dornean, 2019). Some studies like Roszko-Wójtowicz & Grzelak (2020) showed that more labor market regulations and business regulations bring more cost and competitiveness. Regulations on doing business often expressed by the higher level of costs for starting and running a business, negatively influence the entrepreneurial activity and lower competitiveness (Hossain, Hassan, Shafiq & Basit, 2018) which mainly focuses on investigating the positive impact of ease of doing business on competitiveness. Therefore, our aim is to understand how the cost of doing business influences the competitiveness of countries.

H6: At the national level, high cost of starting a business is negatively associated with competitiveness of countries.

Financial Development (FD). Developed financial systems are characterized by access to credit, deep financial markets and efficient banking networks. A strong financial system ensures that businesses are financed for innovation, productivity, growth and competitiveness (Alomari, Marashdeh & Bashayreh, 2019). Countries with better functioning banking and financial markets expand faster and are therefore more competitive (Zanella & Oyelere, 2021). Few studies investigated the impact of financial market development on economic growth as a strong indicator of competitiveness and found a positive relationship between the two (Jungo, Madaleno & Botelho, 2022; Postula & Raczkowski, 2020). According to the literature, financial development is assumed to have a positive impact on competitiveness.

H7: At the national level, higher financial development is positively associated with competitiveness of countries.

Real Effective Exchange Rate (REER). Several authors consider that depreciation of a national currency would help boost export marketing activities, and appreciation would damage exporters (Dhiman, Kumar & Rana, 2020). Some studies established a significant relationship between competitiveness and REER (Mensah & Quaye, 2017). On the other hand, another set of studies highlights that REER does not have a significant impact on exports (Paul & Dhiman, 2021). Therefore, from the literature, a mixed impact of RER on GC is found ((Bostan, Toderaşcu & Firtescu, 2018; Dhiman and Sharma, 2020). In other words, the appreciation of REER means less competitiveness and the depreciation of REER means more competitiveness. So, we propose the following hypothesis:

H8: At the national level, the real effective exchange rate significantly influences the competitiveness of countries.

R&D Expenditure (RD). R&D spending (that is, government spending on R&D initiatives) has been shown to positively impact innovation in recent decades and is seen as a key driver of national competitiveness and economic growth. R&D investment is undoubtedly regarded as a basic condition for global economic growth (Ivanová & Čepel, 2018). It contributes to rapid growth in production and wages, creates new jobs and strengthens international competition. The literature has widely acknowledged that R&D plays an important role in sustainability and acceleration of not only the business of the enterprise, but also its economic growth and competitiveness (Kiselakova et al., 2018; Caballero-Morales, Cordero-Guridi, Alvarez-Tamayo & Cuautle-Gutiérrez, 2020; Širá, Vavrek, Kravčáková Vozárová & Kotulič, 2020). Due to the importance of R&D in the economy and the large amount of money that companies and government departments spend on R&D activities, R&D investment is one of the main topics discussed by researchers and doctors.

H9: At the national level, higher R&D expenditure is positively associated with competitiveness of countries.

Labor productivity (LP). Labor productivity (LP) is not only a key factor in determining the competitiveness and long-term survival of an enterprise, but also the basis for increasing income and creating a good working environment for employees. Arguably, the most important factor in improving competitiveness is increasing productivity. In other words, the primary indicator of the competitiveness of any economic activity is its productivity, which shows the ability of the activity to generate income and generate returns for factors of

production over the long term (Dhiman, Kumar & Rana, 2020). The development of LP often leads to innovation and thus to international competition (Dhiman & Sharma, 2019). Therefore, we propose the following hypothesis:

H10: At the national level, a higher level of labor productivity is positively associated with competitiveness of countries.

2. MATERIALS AND METHODS

Estimation procedure. The general econometric equation is estimated for the entire sample and for each of the three economic phases (factor-driven, efficiency-driven, and innovation-driven economies) as follows:

$$GCI_{it} = \alpha + \beta \cdot Macro_{it} + \eta \cdot X_{it} + \mu_{it} \quad (1)$$

Where *GCI* is an indicator of competitiveness for country *i* at time *t*, *Macro* is macroeconomic indicators for country i at time t, and X_{it} is a vector of control variables for country *i* at time *t*. The variables and η are coefficients of *Macro* and *X*, respectively, is a constant, and μ is the error term. The parameter of interest is β, which is the response of competitiveness to macroeconomic indicators. The composition of the control vector *X* is important because it controls other factors that influence competitiveness, allowing neutralizing the effect of macroeconomic indicators on competitiveness much more effectively. Variables included in *X* are selected to control for as many other factors as possible while guarding against too much multicollinearity among the regressors. The control variables included were business factors (business sophistication and degree of innovation), structural factors (quality of institutions, the quality of the financial system, availability of advanced technology) and systemic factors (infrastructure, basic education, and health), all of which were taken from the World Economic Forum's (WEF) Global Competitiveness Report.

Business, structural and systemic factors are included because they are essential in competitiveness and can improve the competitive advantages of countries. Here, they act as proxies by the competitiveness sub-index scores of the WEF Global Competitiveness Report. Finally, we also include year and country dummies to control for regional differences as well as time differences, which allows us to perform longitudinal analyses of the data. The list of all variables used in this paper, including their resources is mentioned in Table 2.

Table 2: The variables of the model, their measurement and source

Variable	Units	Source	Authors
Global Competitiveness Index (GCI)	1–7 (best)	World Economic Forum	Van Stel, Carree & Thurik (2005)
GDP Growth (GDPG)	Annual %	World Bank	Hooy, Law & Chan (2015)
Labor Productivity (LP)	GDP per employed person	World Bank	Dhiman and Sharma (2019)
Financial Development (FD)	Domestic credit to private sector by banks (% of GDP)	World Bank	Zanella & Oyelere (2021)
Inflation (INF)	Annual %	World Bank	Kusnarno & Suratman (2021)
Total Tax Rate (TAX)	% Of commercial profits	World Bank	Dezhina et al., (2020)
Foreign Direct Investment (FDI)	% Of GDP	World Bank	Syromyatnikov et al., (2021)
Cost of Starting a Business (CSB)	% Of GNI per capita	World Bank	Rusu & Dornean (2019)
Trade Openness (TO)	% Of GDP	World Bank	Simionescu et al., (2021)
Real Effective Exchange Rate (REER)	Real effective exchange rate index (2010 = 100)	International Monetary Fund	Dhiman, Kumar & Rana (2020)
R&D Expenditure (RD)	% Of GDP	World Bank	Kiselakova et al. (2018)
Business sophistication (BS)	1–7 (best)	World Economic Forum	WEF
Degree of innovation (INO)	1–7 (best)	World Economic Forum	WEF
Quality of institutions (INS)	1–7 (best)	World Economic Forum	WEF
Quality of the financial system (FIN)	1–7 (best)	World Economic Forum	WEF
Infrastructure (INFRA)	1–7 (best)	World Economic Forum	WEF
Basic education and health (EDU)	1–7 (best)	World Economic Forum	WEF

Source: Authors' compilation

This paper uses panel data taken from more than 81 countries from 2002 to 2018. We select countries based on the data availability of the variables considered in the analysis. To ensure that the primary purpose of this article is met, we separate countries at different stages of development (24 factor-driven1, 27 efficiency-driven2 and 30 innovation-driven3) based on the global competitiveness report (WEF, 2018).

Theoretically, the explanatory variable on the right side of equation (1) should not be related to the error term. Therefore, the Durbin-Wu-Hausman test was used to detect the endogeneity in equation (1). The Durbin-Wu-Hausman test

statistics shows that the GDP growth in Model 1 is determined endogenously. If only one variable in the regression model is an endogenous variable, the results reported by OLS are inconsistent. In addition, in the model (1), under the assumption of strict exogeneity, fixed effects estimation techniques can potentially control unobservable heterogeneity (Wintoki, Linck & Netter, 2012). However, this strictly exogenous assumption is violated because the past/current macroeconomic conditions of a country may affect the current/ future competitiveness of a country. In addition, the relationship between our explanatory variables and competitiveness is dynamic - past realization of dependent variables may also affect current year competitiveness. With the above rationale, we carried out a final check with the system generalized moment method (GMM) technique (Blundell and Bond, 1998). By adding a lagged dependent variable to the regression variable, equation (1) can be modified to make it a dynamic panel, i.e.

$$GCI_{it} = \alpha + \theta \cdot GCI_{it-1} + \beta \cdot Macro_{it} + \eta \cdot X_{it} + \mu_{it} \quad (2)$$
$$\text{where } \mu_{it} = \varepsilon_{it} + \nu_{it}$$

Where ε_i is an unobserved fixed effect; when the time period is small, the main problem of equation (2) is that the lagging dependent variable is correlated with the fixed effect, and it thus correlates with the error term (Roodman, 2009), resulting in what Nickel (1981) describes it as dynamic panel bias. One solution here is to convert variables through first-order differentials to eliminate fixed effects. So, equation (2) becomes:

$$GCI_{it} - GCI_{i,t-1} = \alpha + \theta \cdot (GCI_{i,t-1} - GCI_{i,t-2}) + \beta \cdot (Macro_{it} - Macro_{i,t-1}) + \\ + \eta \cdot (\mathrm{X}_{it} - X_{i,t-1}) + (\varepsilon_i - \varepsilon_{i-1}) + (\nu_{it} - \nu_{i,t-1}) \quad (3)$$

Although the fixed effects have been removed, the difference lagged dependent variable may still be endogenous because GCI i,t-1 is related to vi,t-1 (Roodman, 2009). The variable ν is an idiosyncratic component of the error term, that is, it is composed of time-varying unobserved heterogeneity or time-varying factors that affect competitiveness. This problem can be solved by instrumenting the differenced endogenous regressors with their lagged levels (Arellano and Bond 1991). Overall, four reasons motivate us to adopt the sys-GMM method. The first reason one consists of conditions for adopting the sys-GMM method, while the next three reasons present its advantages. First, the number of countries (N = 81) is higher than the number of years (T = 17), which in turn leads to control for dynamic panel bias (Baltagi, 2021). The N > T condition for adopting the

GMM method is, therefore, satisfied. Second, compared to the different GMM (DGMM) methods, sys-GMM produces more efficient estimates by reducing the finite sample bias (Baltagi, 2021). Third, since this method is consistent with a panel data structure, cross-country variations are not excluded in the regressions. Fourth, the estimation method also addresses the reserve causality and endogeneity issues in some regressors.

3. RESULTS AND DISCUSSIONS

The estimation results for overall sample of countries are reported in Table 3. As discussed in the methodology section, the appropriate lags to be used as instruments are determined using the results of the Hansen J test and the autocorrelation test. As discussed earlier, the econometric model was estimated using three different groups of countries based on Porter's (1998) classification. In addition, WEF classifies countries' levels of development into three categories based on per capita income and share of industrial exports: resource-based economies, efficiency-based economies and innovation-based economies. The econometric results are reported in Table 4, Table 5 and Table 6. The results provide the sys-GMM findings linked to the empirical association among macroeconomic indicators and competitiveness in factor-driven (Table 4), efficiency-driven (Table 5) and innovation-driven (Table 6) countries. For each regression, four types of information criteria are employed to evaluate these estimated models. First, the absence of second-order Arellano and Bond autocorrelation test (AR (2)) in residuals must be checked while a presence of first-order autocorrelation (AR (1)) must be detected. Second, the set of instrumental variables must be uncorrelated with the error terms. This second hypothesis is confirmed by employing Sargan and Hansen OIR tests, which should be insignificant.

Table 3: Estimation results for overall sample

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log GCI (-1)	0.051*** (0.013)	0.054*** (0.015)	0.052*** (0.014)
Log (TO)	0.029 (0.017)	0.026 (0.019)	0.031 (0.022)
Log (TAX)	0.041 (0.028)	0.043 (0.031)	0.049 (0.033)
Log (FDI)	0.037 (0.027)	0.033 (0.025)	0.039 (0.031)
Log (GDP)	0.036** (0.016)	0.039** (0.018)	0.034** (0.015)
Log (INF)	0.039 (0.024)	-0.044 (0.028)	0.035 (0.022)
Log (CBS)	-0.048** (0.017)	-0.059** (0.022)	-0.065*** (0.019)
Log (FD)	0.038 (0.025)	0.033 (0.024)	0.036 (0.026)
Log (RD)	0.056** (0.024)	0.053** (0.022)	0.051** (0.021)
Log (REER)	-0.022 (0.014)	-0.027 (0.017)	0.024 (0.016)

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log (LP)	0.031 (0.022)	0.035 (0.021)	0.029 (0.018)
Business sophistication	0.044 (0.029)	0.047 (0.031)	0.042 (0.030)
Degree of innovation	0.037* (0.021)	0.031* (0.018)	0.039** (0.018)
Quality of institutions	-	-0.025* (0.011)	-0.021* (0.012)
Quality of the financial system	-	0.033 (0.024)	0.037 (0.025)
Infrastructure	-	-	0.041 (0.032)
Basic education and health	-	-	0.036 (0.025)
Ar (1)	(0.031)	(0.069)	(0.041)
Ar (2)	(0.169)	(0.336)	(0.410)
Hansen OIR test	(0.223)	(0.171)	(0.487)
Sargan OIR test	(0.644)	(0.582)	(0.733)

Source: Authors' calculation

Note: AR (1) is the first-order autocorrelation of residuals. AR (2) is the second order autocorrelation of residuals. *** Shows the significance at 1%. ** Shows the significance at 5%. * Shows the significance at 10%, respectively

Table 4: Estimation results for factor-driven countries

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log GCI (-1)	0.044*** (0.010)	0.047*** (0.016)	0.049*** (0.012)
Log (TO)	-0.039** (0.014)	-0.037** (0.011)	-0.036** (0.016)
Log (FDI)	0.042 (0.027)	0.058 (0.035)	0.065 (0.043)
Log (GDP)	0.044*** (0.011)	0.049*** (0.013)	0.055*** (0.010)
Log (TAX)	0.053*** (0.019)	0.052** (0.021)	0.055** (0.023)
Log (INF)	-0.065 (0.036)	-0.061 (0.043)	-0.069 (0.031)
Log (CBS)	-0.055*** (0.010)	-0.062*** (0.011)	-0.059*** (0.009)
Log (FD)	0.034 (0.025)	0.036 (0.022)	0.039 (0.026)
Log (REER)	0.039** (0.016)	0.036** (0.013)	0.035** (0.013)
Log (RD)	0.049** (0.021)	0.047** (0.022)	0.043** (0.019)
Log (LP)	0.029* (0.017)	0.031** (0.012)	0.038* (0.018)
Business sophistication	0.057 (0.041)	0.055 (0.035)	0.054 (0.036)
Degree of innovation	0.046** (0.023)	0.044* (0.024)	0.049** (0.022)
Quality of institutions	-	0.038*** (0.011)	0.032** (0.012)
Quality of the financial system	-	0.028 (0.019)	0.031 (0.021)
Infrastructure	-	-	0.052** (0.031)
Basic education and health	-	-	0.054*** (0.016)
Ar (1)	(0.035)	(0.077)	(0.048)
Ar (2)	(0.189)	(0.393)	(0.426)
Hansen OIR test	(0.261)	(0.198)	(0.465)

Source: Authors' calculation

Table 5: Estimation results for efficiency-driven countries

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log GCI (-1)	0.047*** (0.010)	0.054*** (0.011)	0.052*** (0.006)
Log (TO)	0.029*** (0.008)	0.032*** (0.010)	0.034*** (0.009)
Log (FDI)	-0.046 (0.033)	-0.049 (0.037)	-0.054 (0.036)
Log (GDP)	0.048*** (0.013)	0.042*** (0.012)	0.052*** (0.018)
Log (TAX)	-0.041** (0.016)	-0.048** (0.018)	-0.053** (0.025)
Log (INF)	0.039*** (0.011)	0.049*** (0.015)	0.047*** (0.013)
Log (CBS)	-0.052*** 0.011)	-0.055*** (0.013)	-0.059*** (0.014)
Log (FD)	0.036**(0.013)	0.033**(0.015)	0.039**(0.014)
Log (REER)	0.041** (0.016)	0.047** (0.023)	0.046** (0.021)
Log (RD)	0.045*** (0.013)	0.046*** (0.012)	0.051*** (0.011)
Log (LP)	0.059*** (0.010)	0.071*** (0.011)	0.068*** (0.009)
Business sophistication	0.053*** (0.019)	0.062*** (0.017)	0.069*** (0.019)
Degree of innovation	0.081** (0.032)	0.076** (0.029)	0.072** (0.027)
Quality of institutions	-	0.082* (0.043)	0.068 (0.044)
Quality of the financial system	-	0.042** (0.019)	0.039* 0.021)
Infrastructure	-	-	0.073 (0.054)
Basic education and health	-	-	0.046 (0.038)
AR (1)	(0.036)	(0.065)	(0.039)
AR (2)	(0.216)	(0.349)	(0.411)
Hansen OIR test	(0.219)	(0.179)	(0.445)
Sargan OIR test	(0.716)	(0.595)	(0.763)

Source: Authors' calculation

Table 6: Estimation results for innovation-driven countries

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Log GCI (-1)	0.043*** (0.011)	0.048*** (0.013)	0.052*** (0.016)
Log (TO)	0.031** (0.012)	0.033*** (0.009)	0.038*** (0.008)
Log (FDI)	0.045*** (0.013)	0.048*** (0.015)	0.041*** (0.012)
Log (GDP)	0.049*** (0.015)	0.042*** (0.013)	0.055*** (0.014)
Log (TAX)	0.056** (0.024)	0.061** (0.026)	0.066** (0.025)
Log (GDP)	0.049*** (0.015)	0.042*** (0.013)	0.055*** (0.014)
Log (INF)	0.042*** (0.011)	0.045*** (0.012)	0.054*** (0.016)
Log (CBS)	-0.046** (0.017)	-0.049** (0.014)	-0.042*** (0.012)
Log (FD)	0.038** (0.015)	0.044** (0.018)	0.041** (0.014)
Log (REER)	0.52 (0.032)	0.059 (0.033)	0.049 (0.031)
Log (RD)	0.041*** (0.011)	0.039*** (0.012)	0.043*** (0.012)
Log (LP)	0.052*** (0.013)	0.056*** (0.016)	0.058*** (0.019)
Business sophistication	0.072** (0.025)	0.071** (0.024)	0.069** (0.025)
Degree of innovation	0.068*** (0.022)	0.055*** (0.018)	0.057** (0.022)

Dependent variable: competitiveness	Model 1	Model 2	Model 3
Quality of institutions	-	0.057*	0.063**
		(0.032)	(0.022)
Quality of the financial system	-	0.082** (0.029)	0.096** (0.041)
Infrastructure	-	-	0.049* (0.025)
Basic education and health	-	-	0.057** (0.021)
Ar (1)	(0.033)	(0.077)	(0.046)
Ar (2)	(0.174)	(0.329)	(0.473)
Hansen OIR test	(0.245)	(0.177)	(0.468)
Sargan OIR test	(0.681)	(0.531)	(0.704)

Source: Authors' calculation

Analysis and Implications. Our results provide statistical support for non-empirical claims in existing literature (Roszko-Wójtowicz & Grzelak, 2020; Rusu & Dornean, 2019) arguing that a stable macroeconomic environment fosters the competitiveness of countries, albeit having a different impact based on the development stages of countries. Results demonstrate that countries with the highest levels of competitiveness feature are of low inflation rate, a higher growth of GDP, higher degree of trade openness, minimal cost to start a new business, lower rates of tax rate, and higher inflow of foreign direct investment. Findings also show that the lagged value of competitiveness has a positive coefficient, implying that a country with higher competitiveness in the past will continue to have more competitiveness in the present.

Concerning trade openness, it has a negative impact on the overall competitiveness in factor-driven economies. This result can be understood as follows: openness has exposed national companies to fierce competition led by multinational companies that are more armed than them. Therefore, they cannot enter the local market and reach the mature stage and will soon disappear. This result theoretically supports this view to prove the necessity of protecting the economy at a certain stage of economic development. While in the case of efficiency and innovation-driven countries, trade openness has a statistically significant positive effect on the overall competitiveness. Thus, H1 could be verified in the case of efficiency and innovation-driven countries. In line with our expectations, such a result can be explained by the fact that the increasing trade openness improves countries' access to global resources, broadens market access and improves international competitiveness. The same result was found by Rusu & Roman (2018), Avioutskii & Tensaout (2020), who documented that an increase in trade determines an increase in countries' access to global resources and extends market reach, thus, enhancing international competitiveness.

With regards to GDP growth, there are statistical evidences to validate hypothesis H2 in overall sample and sub-samples. The positive contribution of GDP growth is also supported by Khyareh & Rostami (2021) regarding emerging countries and confirmed the positive and statistically significant effect of economic growth on global competitiveness. In addition, Nogueira & Madaleno (2021) documented that economic growth boosts competitiveness, suggesting that economic growth performance leads to a higher level of competitiveness (Boikova, et al., 2021). Moreover, this positive effect, especially in innovation-driven countries is probably due to many economic reforms in these countries, and good political stability, which affects the capital accumulation and, finally economic growth (Rostami, Khyareh & Mazhari, 2019; Dagilienė et al., 2020). Regarding the tax rates, results show that the taxes imposed by factor-driven countries have a positive and significant impact on their overall competitiveness. With similar findings, Marjanović (2018), Rusu & Dornean (2019) also highlight the impact of alternative tax reforms on international competitiveness. In the case of efficiency-driven countries, the tax rate has a negative statistical coefficient. This can be explained by the fact that lowering corporate tax rates can be a way to attract more investment and increase business productivity. In addition, in innovation-driven countries, the relationship between a country's tax rate and competitiveness is positive. This has allowed verifying H3 in the case of factor and innovation-driven countries. Surprisingly, we did not find any statistical support for the impact of FDI in the case of factor and efficiency-driven countries. It is probably because weakness in absorbing foreign direct investment and the activities of foreign companies have played an essential role in the industrialization and modernization process of many developing countries, and have had a significant impact on some of their productive transformations. However, we find a positive relationship between foreign direct investment and economic competitiveness in innovation-driven countries. Thus, H4 could be verified in the case of innovation-driven countries. The same result was also found by FABUS and Suryandaru (2020) in ASEAN countries. They document that most of ASEAN countries have a strong and positive association between competitiveness and the FDI inflow. Therefore, an increase in investments in and out of one country stimulates the competitiveness of the countries.

Regarding inflation, the estimated results indicate that it has had a positive and significant impact on the overall competitiveness in efficiency and innovation-driven economies; thus, H5 could be verified in these countries. The results are consistent with those of Rusu & Roman (2018), Yanar & Celik (2021), Musyoka & Ocharo (2018). Thus, an increase in the inflation rate will determine an increase in business opportunities because the higher level of prices for products and services can lead to increased expectations of the earnings of entrepreneurs,

business development and sustaining the competitiveness (Kusnarno & Suratman, 2021).

We also find that the cost of starting a business significantly decreases competitiveness in our full sample and sub-samples. Thus, there is statistical evidence to validate the hypothesis H6. These results are also supported by Ernst & Haar (2019) and Fabus (2018) who documented that more labor market regulations and regulations about doing business, will have higher costs and lower competitiveness. Thus, lowering business costs increases the competitiveness of company goods and services and boosts the country's international competitiveness.

Arguably, we find no evidence that the financial development influences competitiveness in both overall sample and factor-driven economies. This may be due to the underdevelopment of the financial sector and weak financial institutions in factor-driven countries. Therefore, successful development of the financial system could be expected to lead to competitiveness in these countries (Haini, 2020). However, the effect of FD is positive in the case of efficiency- and innovation-driven countries, thus confirming the H7 in these countries.

Our findings also provide strong evidence that the impact of REER on competitiveness is not uniform across country clusters, as documented by Paul & Dhiman (2021) and Dhiman & Sharma (2020). The results show that in factor- and efficiency-driven countries, a depreciation of the REER leads to a depreciation of the real effective exchange rate, thereby becoming more trade-competitive. Thus, in factor-driven and efficiency-driven countries, H8 is supported.

Findings also show that high R&D expenditure is the most important factor to increase competitiveness among countries globally, thus confirming the H9. This result is in line with Kiselakova et al. (2018) who documented that growth of R&D expenditure can significantly contribute to increasing the countries' competitiveness levels.

Across the country clusters used, the evidence for labor productivity appears to be significantly positive, confirming H10. In exploring the link between competitiveness and labor productivity, it is assumed that countries with higher labor productivity are expected to be more successful in competitive international markets (Paul & Dhiman, 2020).

Robustness check. As a robustness check, several combinations of control variables were tested, adding them on a staggered basis. At first, only the business factors (business sophistication and degree of innovation) were controlled. Next, structural factors (quality of institutions, the quality of the financial system, and

availability of advanced technology) were included. Finally, the systemic factors (infrastructure, basic education, and health) were included (the results are report in Tables 3-6). Furthermore, we categorized countries into low-income, middle income and high-income in the period from 2001-2018 and analyzed it by using 2 step GMM system. We observed similar results which are not reported here for sake of brevity. Finally, we cast another look at the heterogeneity across countries by dividing countries into different continents. Then, we augment the baseline model with interaction terms between fiscal variables and transfer dependency. In this case, we define transfer dependency as the difference in relation to the average transfer in each federation. Table 7 summarizes findings from our analysis in relation to the hypotheses postulated for the overall sample and sub-samples.

Table 7: Summary of findings

Hypothesis	Overall sample	Factor driven	Efficiency driven	Innovation driven
H1: At the national level, trade openness is positively associated with competitiveness of countries.	No support	Yes support	Yes support	Yes support
H2: At the national level, foreign direct investment significantly influences the competitiveness of countries.	No support	No support	No support	Yes support
H3: At the national level, high GDP growth is positively associated with competitiveness of countries.	Yes support	Yes support	Yes support	Yes support
H4: At the national level, tax rate significantly influences the competitiveness of countries.	No support	Yes support	Yes support	Yes support
H5: At the national level, inflation significantly influences the competitiveness of countries.	No support	No support	Yes support	Yes support
H6: At the national level, high cost of starting a business is negatively associated with competitiveness of countries.	Yes support	Yes support	Yes support	Yes support
H7: At the national level, higher financial development is positively associated with competitiveness of countries.	No support	No support	Yes support	Yes support
H8: At the national level, the real effective exchange rate significantly influences the competitiveness of countries.	No support	Yes support	Yes support	No support
H9: At the national level, higher R&D expenditure is positively associated with competitiveness of countries.	Yes support	Yes support	Yes support	Yes support
H10: At the national level, a higher level of labor productivity is positively associated with competitiveness of countries.	No support	Yes support	Yes support	Yes support

Source: Authors' compilation

4. CONCLUSIONS

This study represents an attempt to assess the impact of the main macroeconomic determinants of competitiveness at the country level, stage of economic development and a specific period of 2002-2018. Our framework allows us to study how macroeconomic conditions in countries affect competitiveness. However, our findings might vary upon a country's stage of economic development. The study analysis yielded three main results. First, considering the results of the global model, we can report that most macroeconomic variables have a statistically significant effect on the global competitiveness index. The model reports that both GDP growth and R&D expenditures have a positive effect on competitiveness, while higher costs of starting a business have a negative effect.

Secondly, by deepening the analysis on the economic development stage, as regards Stage 1 countries (Table 4), we find that trade openness, tax rate, GDP growth, start-up costs, real effective exchange rate, R&D expenditures and labor productivity are particularly vital for competitiveness. Concerning Stage 2 countries (Table 5), we may observe that trade openness, tax rate, GDP growth, inflation, start-up costs, financial development, real effective exchange rate, R&D expenditures and labor productivity had a statistically significant impact on competitiveness. When it comes to Stage 3 countries (Table 6), factors such as trade openness, FDI, tax rate, GDP growth rate, inflation, tax rate, start-up costs, financial development, R&D expenditures, and labor productivity have an impact on competitiveness.

This study contains several contributions to the theoretical and empirical literature on competitiveness. First, from a theoretical viewpoint, it addresses the relevant gaps in the literature. Also, in research literature, fewer indicators, or fewer countries (sometimes just a specific country) have been studied to determine competitiveness. Likewise, there is no comparative analysis on the global scale. Second, prior empirical studies only focused on individual variables and did not consider all these variables together. Third, to the best of our knowledge, no empirical study has considered the combined impacts of these variables on competitiveness. Determining the macroeconomic determinants of international competitiveness (according to the country's development stage) will help policymakers to decide which economic issues should be intervened to enhance their country's international competitiveness.

This study has some important implications for policy-makers concerned with boosting competitiveness in the situation of macroeconomic instability. It seems vital for governments to enhance policies to promote the business environment

and create new business opportunities by stimulating the conditions for raising the degree of competitiveness of countries. In addition, results may also spell out new insights for scholars, practitioners, and policymakers. Public policies and private endeavors whose aim is to foster competitiveness could become more efficient by drawing more attention to the mechanisms proposed here to describe how macroeconomic stability may interact with countries' competitiveness.

While our study contributes to an enhanced understanding of competitiveness and may have beneficial implications for policymakers and researchers, there are inherent limitations. We use secondary data to analyze the impact of eight macroeconomic indicators on competitiveness. Further, although the existing literature confirms the linear relationship between macroeconomic indicators and competitiveness, it is still necessary to improve the potential nonlinear relationship between some macroeconomic indicators (such as inflation, taxation, and GDP growth) and competitiveness. Finally, the COVID-19 epidemic has affected the specific determinant of competitiveness, such as international trade, foreign direct investment flows, global production and employment. Therefore, it is interesting to study the resilience to instability and change in the external environment caused by the epidemic, especially in developing countries. The main conclusions of the study may be presented in a short Conclusions section, which may be a separate section or form a subsection of a *Discussion* or *Results and Discussion* section. Conclusions should provide a summary of important findings and their implications for the area of research.

Conflict of interests

The authors declare there is no conflict of interest.

REFERENCES

Alomari, M. W., Marashdeh, Z., & Bashayreh, A. G. (2019). Contribution of financial market development in competitiveness growth. *Cogent Economics & Finance, 7*(1), 1-19. DOI: 10.1080/23322039.2019.1622483

Avioutskii, V., & Tensaout, M. (2020). Comparative analysis of FDI by Indian and Chinese MNEs in Europe. *European Business Review, 32*(5), 893-907.

Bacik, R., Kloudova, J., Gonos, J., & Ivankova, V. (2019). Management of Competitiveness and Economic Performance Based in the V4 countries. *ARMG Publishing*. DOI: 10.21272/mmi.2019.3-06

Baltagi, B. H. (2021). *Econometric analysis of panel data*. 6th edn. Switzerland: Springer. Retrived from: https://link.springer.com/content/pdf/bfm:978-3-030-53953-5/1.pdf

Birnie, E., Johnston, R., Heery, L., & Ramsey, E. (2019). A critical review of competitiveness measurement in Northern Ireland. *Regional Studies, 53*(10), 1494-1504. DOI: 10.1080/00343404.2019.1569757

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115-143. DOI: 10.1016/S0304-4076(98)00009-8.

Boikova, T., Zeverte-Rivza, S., Rivza, P., & Rivza, B. (2021). The Determinants and Effects of Competitiveness: The Role of Digitalization in the European Economies. *Sustainability, 13*(21), 11689. DOI: 10.3390/su132111689

Bostan, I., Toderaşcu, C., & Firtescu, B. N. (2018). Exchange rate effects on international commercial trade competitiveness. *Journal of Risk and Financial Management, 11*(2), 19. DOI: 10.3390/jrfm11020019

Braja, M., & Gemzik-Salwach, A. (2019). Competitiveness of high-tech sectors in the European Union: A comparative study. *Journal of International Studies, 12*(2), 213-227. DOI: 10.14254/2071-8330.2019/12-2

Buitrago R, R. E., & Barbosa Camargo, M. I. (2021). Institutions, institutional quality, and international competitiveness: Review and examination of future research directions. *Journal of Business Research, 128*(C), 423-435. DOI: 10.1016/j.jbusres.2021.02.024

Bunn D., Pomerleau K., & Hodge S. (2018). *International Tax Competitiveness Index 2018*. Tax Foundation. Retrieved from: https://files.taxfoundation.org/20190213134207/ITCI_2018.pdf

Caballero-Morales, S.O., Cordero-Guridi, J.J., Alvarez-Tamayo, R.I., & Cuautle-Gutiérrez, L.(2020). Education 4.0 to Support Entrepreneurship, Social Development and Education in Emerging Economies. *International Journal of Entrepreneurial Knowledge, 8*(2), 89-100. DOI: 10.37335/ijek.v8i2.119

Coulibaly, R.G. (2021). International trade and economic growth: The role of institutional factors and ethnic diversity in sub-Saharan Africa. *Int. J. Finance Econ*. DOI: 10.1002/ijfe.2424

Dagilienė, L., Bruneckienė, J., Jucevičius, R., & Lukauskas, M. (2020). Exploring smart economic development and competitiveness in Central and Eastern European countries. *Competitiveness Review: An International Business Journal incorporating Journal of Global Competitiveness, 30*(5), 485-505.

Dezhina, I., Nafikova, T., Gareev, T., & Ponomarev, A. (2020). Tax Incentives for Supporting Competitiveness of Telecommunication Manufacturers. *Форсайт, 14*(2 (eng), 51-62.

Dhiman, R., Kumar, V., & Rana, S. (2020). Why export competitiveness differs within Indian textile industry? Determinants and empirical evidence. *Review of International Business and Strategy, 39*(3), 375-397. DOI:10.1108/RIBS-03-2020-0021

Dhiman, R., & Sharma, M. (2019). Relation between labour productivity and export competitiveness of Indian textile industry: Co-integration and causality approach. *Vision, 23*(1), 22-30. DOI: 10.1177/0972262918821230

Dobeš, K., Kot, S., Kramoliš, J., & Sopkova, G. (2017). The perception of governmental support in the context of competitiveness of SMEs in the Czech Republic. *Journal of Competitiveness*. Retrieved from: https://www.cjournal.cz/files/256.pdf

Dobrovic, J., Gallo, P., Mihalcova, B., Stofova, L., & Szaryszova, P. (2018). Competitiveness measurement in terms of the Europe 2020 strategy. *Journal of competitiveness, 10*(4), 21-37. DOI: 10.7441/joc.2018.04.02

Domazet, I. S., & Marjanović, D. M. (2018). FDI as a Factor of Improving the Competitiveness of Developing Countries: FDI and Competitiveness. *In Foreign direct investments (FDIs) and opportunities for developing economies in the world market* (pp. 82-104). Business Science Reference, Hershey, PA, USA.

Doni, F., Drago, C., & Paoloni, P. (2018). Interval-based gender diversity composite indicators in gender studies. In *Gender Issues in Business and Economics* (pp. 175-184). Springer, Cham.

Dziembała, M. (2021). The Enhancement of Sustainable Competitiveness of the CEE Regions at the Time of the COVID-19 Pandemic Instability. *Sustainability, 13*(23), 12958. DOI: 10.3390/su132312958

Ehigiamusoe, K. U., & Samsurijan, M. S. (2020). What matters for finance-growth nexus? A critical survey of macroeconomic stability, institutions, financial and economic development. *International Journal of Finance & Economics*. DOI: 10.1002/ijfe.2066

Ekici, Ş. Ö., Kabak, Ö., & Ülengin, F. (2019). Improving logistics performance by reforming the pillars of Global Competitiveness Index. *Transport Policy, 81*(C), 197-207. DOI: 10.1016/j.tranpol.2019.06.014

Ernst, R., & Haar, J. (2019). Competitiveness. In *Globalization, Competitiveness and Governability* (pp. 47-67). London, UK: Palgrave Macmillan, Cham, 41-67.

Fabus, M. (2018). Business environment analysis based on the global competitiveness index (GCI) and Doing Business (DB): case study Slovakia. *Journal of Security & Sustainability, 7*(4), 831-839 DOI: 10.9770/jssi.2018.7.4(18)

Fagerberg, J., & Srholec, M. (2017). Capabilities, economic development, sustainability. *Cambridge Journal of Economics, 41*(3), 905-926. DOI: 10.1093/cje/bew061

Falciola, J., Jansen, M., & Rollo, V. (2020). Defining firm competitiveness: A multidimensional framework. *World Development, Elsevier, 129*(C), 104857. DOI: 10.1016/j.worlddev.2019.104857

Farinha, L., Ferreira, J. J., & Nunes, S. (2018). Linking innovation and entrepreneurship to economic growth. *Competitiveness Review: An International Business Journal incorporating Journal of Global Competitiveness, 18*(4), 451-475. DOI: 10.1108/CR-07-2016-0045

Ferreira, J. J., Fernandes, C. I., & Ratten, V. (2017). Entrepreneurship, innovation, and competitiveness: what is the connection? *International Journal of Business and Globalisation, 18*(1), 73-95.

Gallo, P., & Tomčíková, Ľ. (2019). The analytical view of the methods of strategy creation and involvement of managers of individual control levels in the production of strategies in strategic management in manufacturing companies in the conditions of the Slovak Republic. *Calitatea, 20*(170), 3-8.

Gu, W., & Yan, B. (2017). Productivity growth and international competitiveness. *Review of Income and Wealth, 63*, S113-S133. DOI: 10.1111/roiw.12254

Haini, H. (2020). Examining the relationship between finance, institutions, and economic growth: evidence from the ASEAN economies. *Economic Change and Restructuring, 53*(4), 519-542. DOI: 10.1007/s10644-019-09257-5

Hooy, C.-W., & Law, S. & Chan, T.-H. (2015). The impact of the Renminbi real exchange rate on ASEAN disaggregated exports to China. *Economic Modelling, 47*. DOI: 10.1016/j.econmod.2015.02.025.

Hossain, M. T., Hassan, Z., Shafiq, S., & Basit, A. (2018). Ease of Doing Business and Its Impact on Inward FDI. *Indonesian Journal of Management and Business Economics, 1*(1), 52–65. Retrieved from: https://ssrn.com/abstract=3219641

Hosseini, S., Ivanov, D., & Dolgui, A. (2019). Review of quantitative methods for supply chain resilience analysis. *Transportation Research Part E: Logistics and Transportation Review, 125*, 285-307. DOI: 10.1016/j.tre.2019.03.001

Ibragimov, Z., Vasylieva, T., & Lyulyov, O. (2019). The national economy competitiveness: effect of macroeconomic stability, renewable energy on economic growth. *Economic and Social Development: Book of Proceedings*, 877-886.

Ivanová E., & Čepel M. (2018). The Impact Of Innovation Performance On The Competitiveness Of The Visegrad 4 Countries. *Journal of Competitiveness, 10*(1), 54 - 72. DOI: 10.7441/joc.2018.01.04

Jankowska, B., Matysek-Jędrych, A., & Mroczek-Dąbrowska, K. (2017). Efficiency of national innovation systems–Poland and Bulgaria in the context of the Global Innovation Index. *Comparative Economic Research, 20*(3), 77-94. DOI: 10.1515/cer-2017-0021

Jungo, J., Madaleno, M., & Botelho, A. (2022). The Effect of Financial Inclusion and Competitiveness on Financial Stability: Why Financial Regulation Matters in Developing Countries? *Journal of Risk and Financial Management, 15*(3), 122. DOI: 10.3390/jrfm15030122

Kiselakova, D., Sofrankova, B., Cabinova, V., Onuferova, E., & Soltesova, J. (2018). The impact of R&D expenditure on the development of global competitiveness within the CEE EU countries. *Journal of competitiveness, 10*(3), 34-50. DOI: 10.7441/joc.2018.03.03

Khan, N. H., Ju, Y., & Hassan, S. T. (2018). Modeling the impact of economic growth and terrorism on the human development index: collecting evidence from Pakistan. *Environmental Science and Pollution Research, 25*(34), 34661-34673. DOI: 10.1007/s11356-018-3275-5

Khyareh, M. M., & Rostami, N. (2021). Macroeconomic Conditions, Innovation and Competitiveness. *Journal of the Knowledge Economy, 13*(2), 1321-1340. DOI: 10.1007/s13132-021-00752-7

Kiseľáková, D., Šofranková, B., Onuferová, E., & Čabinová, V. (2019). The evaluation of competitive position of EU-28 economies with using global multi-criteria indices. *Equilibrium. Quarterly Journal of Economics and Economic Policy, 14*(3), 441-462. DOI: 10.24136/eq.2019.021

Kusnarno, T., & Suratman, E. (2021). Analysis of the Factors Affecting the Competitiveness of ASEAN-5 Countries. *Asian Journal of Social Science Studies, 6*(1), 1. DOI: 10.20849/ajsss.v6i1.884

Linsi, L. (2020). The discourse of competitiveness and the dis-embedding of the national economy. *Review of International Political Economy, 27*(4), 855-879. DOI: 10.1080/09692290.2019.1687557

Lyon, A. B., & McBride, W. A. (2018). Assessing US Global Tax Competitiveness after Tax Reform. *National Tax Journal, 71*(4), 751-788. Retrieved from: https://www.journals.uchicago.edu/doi/abs/10.17310/ntj.2018.4.08

Marčeta, M., & Bojnec, Š. (2020). Drivers of global competitiveness in the european union countries in 2014 and 2017. *Organizacija, 53*(1), 37-52. DOI: 10.2478/orga-2020-0003

Marian, G. (2019). Competition and globalisation in economic sciences. Selected aspects. *Economics and Business Review, 5*(3), 118-133. DOI: 10.18559/ebr.2019.3.7

Marjanović, D. (2018). Competitiveness of the Serbian Economy Through the Prism of Tax Incentives for Foreign Investors. *Economic Analysis, 51*(3-4), 95-104. DOI: 10.28934/ea.18.51.34.pp95-104

Mensah, I. & Quaye, D. (2017). Industrial cluster and competitive advantage of micro-firms: Insight from wood industry in Ghana. *Journal of Creativity and Business Innovation, 3*, 170-196.

Mentel, U., & Hajduk-Stelmachowicz, M. (2021). Does standardization have an impact on innovation activity in different countries? *Problems and Perspectives in Management, 18*(4), 486-503. DOI: 10.21511/ppm.18(4).2020.39

Mohammadi Khyareh, M., & Zivari, A. (2019). The Impact of Entrepreneurship on Economic Competitiveness in the Member States of the World Economic Forum: Generalized Method of Moments (GMM) Approach. *Quaterly Journal of New economy and Trade, 14*(4), 107-145.

Mohammadi Khyareh, M., & Rostami, N. (2021). The Impact of Macroeconomic Variables on Entrepreneurship: Generalized Method of Moments (GMM). *Macroeconomic Research Letter (MRL), 15*(30), 34-61. DOI: 10.22080/IEJM.2021.17792.1728

Momaya, K. S. (2019). The Past and the Future of Competitiveness Research: A Review in an Emerging Context of Innovation and EMNEs. *International Journal of Global Business and Competitiveness, 14*(1), 1-10. DOI: 10.1007/s42943-019-00002-3

Mushtaq, S., Ejaz, R. & Khan, A. (2018). Economic freedom and sustainable development: A Panel Data Analysis. *The Pakistan Journal of Social Issues. Special Issue*, 89-97.

Musyoka, N., & Ocharo, K. N. (2018). Real interest rate, inflation, exchange rate, competitiveness, and foreign direct investment in Kenya. *American journal of economics, 3*(1), 1-18. DOI: 10.47672/aje.330

Nickell, S. (1981). Biases in Dynamic Models with Fixed Effects. *Econometrica*, *49*(6), 1417–1426. DOI: 10.2307/1911408

Nogueira, M., & Madaleno, M. (2021). New evidence of Competitiveness based on the global competitiveness index. *Econ. Bull, 41*(2), 788-797. Retrieved from: http://www.accessecon.com/Pubs/EB/2021/Volume41/EB-21-V41-I2-P72.pdf

OECD. (2020). Competitiveness (in international trade). Retrieved from: https://stats.oecd.org/glossary/detail.asp?ID=399

Owczarczuk, M. (2020). Institutional competitiveness of Central and Eastern European countries and the inflow of foreign direct investments. *Catallaxy, 5*(2), 87-96. DOI: 10.24136/cxy.2020.008

Paul, J., & Dhiman, R. (2021). Three decades of export competitiveness literature: systematic review, synthesis and future research agenda. *International Marketing Review, 38*(5), 1082-1111. DOI: 10.1108/IMR-12-2020-0295/full/html

Pérez-Moreno, S., Rodríguez, B., & Luque, M. (2016). Assessing global competitiveness under multi- criteria perspective. *Economic Modelling, 53*(C), 398-408. DOI: 10.1016/j.econmod.2015.10.030

Petricevic, O., & Teece, D. J. (2019). The structural reshaping of globalization: Implications for strategic sectors, profiting from innovation, and the multinational enterprise. *Journal of International Business Studies, 50*(9), 1487-1512. DOI: 10.1057/s41267-019-00269-x

Porter, M. E. (1998). Clusters and the new economics of competition. *Harvard Business Review, 76*(6), 77-90.

Porter, M. E. (2004). *Building the microeconomic foundations of prosperity: findings from the microeconomic competitiveness index*. London, UK: Palgrave Macmillan.

Postula, M., & Raczkowski, K. (2020). The impact of public finance management on sustainable development and competitiveness in EU member states. *Journal of Competitiveness, 12*(1), 125-144. DOI: 10.7441/joc.2020.01.08

Raeskyesa, D. G. S., & Suryandaru, R. A. (2020). Competitiveness and FDI Inflows in ASEAN Member Countries. *International Journal of Business & Economic Sciences Applied Research, 13*(1), 14-20. DOI: 10.25103/ijbesar.131.02

Rakhmanova, M. S., & Kryukov, V. V. (2019). Trade enterprise competitiveness estimation model by key success factor determination. *Amazonia Investiga, 8*(21), 177-186.

Roman, A., Bilan, I., & Ciumaș, C. (2018). What drives the creation of new businesses? A panel-data analysis for EU countries. *Emerging Markets Finance and Trade, 54*(3), 508-536. DOI: 10.1080/1540496X.2017.1412304

Roodman, D. (2009). A note on the theme of too many instruments. *Oxford Bulletin of Economics and Statistics, 71*, 135–158. DOI: 10.1111/j.1468-0084.2008.00542.x

Rostami, N., Khyareh, M. M., & Mazhari, R. (2019). Competitiveness, entrepreneurship, and economic performance: Evidence from factor-, efficiency-, and innovation-driven countries. *Economic Annals, 64*(221), 33-64.

Roszko-Wójtowicz, E., & Grzelak, M. M. (2020). Macroeconomic stability and the level of competitiveness in EU member states: a comparative dynamic approach. *Oeconomia Copernicana, 11*(4), 657-688. DOI: 10.24136/oc.2020.027

Roy, S. (2018). Impact of competitiveness drivers on global competitiveness index. *Pacific Business Review International, 11*(2), 17-29.

Rusu, V. D., & Dornean, A. (2019). The quality of entrepreneurial activity and economic competitiveness in European Union countries: a panel data approach. *Administrative sciences, 9*(2), 35. DOI: 10.3390/admsci9020035

Rusu, V. D., & Roman, A. (2018). An empirical analysis of factors affecting competitiveness of CEE countries. *Economic Research-Ekonomska Istraživanja, 31*(1), 2044-2059. DOI: 10.1080/1331677X.2018.1480969

Schwab, K. (2018). The global competitiveness report 2018. World Economic Forum (Vol. 671). Retrived from: https://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf

Schwab, K. & Sala-i-Martin, X. et al. (2017). *Key Findings of the Global Competitiveness Index*. The Global Competitiveness Report 2016-2017. Retrived from: https://www3.weforum.org/docs/GCR2016-2017/05FullReport/TheGlobalCompetitivenessReport2016-2017_FINAL.pdf

Shafiq, M. N., Hua, L., Bhatti, M. A., & Gillani, S. (2021). Impact of Taxation on Foreign Direct Investment: Empirical Evidence from Pakistan. *Pakistan Journal of Humanities and Social Sciences, 9*(1), 10-18. DOI: https://doi.org/10.52131/pjhss.2021.0901.0108

Sigue, M., & Barry, S. (2020). The effects of financial development on the external performance of WAEMU countries: an ARDL approach. *Research Journal of Finance and Accounting, 11*(12), 185-193.

Simionescu, M., Pelinescu, E., Khouri, S., & Bilan, S. (2021). The Main Drivers of Competitiveness in the EU-28 Countries. *Journal of Competitiveness, 13*(1), 129-145. DOI: 10.7441/joc.2021.01.08

Syromyatnikov, D., Konev, P., Popov, M., & Sultanova, N. (2021). Practical strategies to improve national competitiveness. *Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration, 29*(2), 1315.

Širá, E., Vavrek, R., Kravčáková Vozárová, I., & Kotulič, R. (2020). Knowledge economy indicators and their impact on the sustainable competitiveness of the EU countries. *Sustainability, 12*(10), 4172. DOI: 10.3390/su12104172

Tan, K. G., Nguyen, W., & Gopalan, S. (2018). Measuring ease of doing business in India's sub-national economies: a novel index. *South Asian Journal of Business Studies, 7*(3), 242-264. DOI: 10.1108/SAJBS-02-2018-0010

Urbaniec, M. (2019). Competitiveness of innovation-driven economies: Insights from selected European countries. *International Entrepreneurship Review, 5*(3), 113-127. DOI: 10.15678/IER.2019.0503.08

van Stel, A., Carree, M., & Thurik, R. (2005). The Effect of Entrepreneurial Activity on National Economic Growth. *Small Business Economics, 24*, 311-321. DOI: 10.1007/s11187-005-1996-6

Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of financial economics, 105*(3), 581-606. DOI: 10.1016/j.jfineco.2012.03.005

World Economic Forum (WEF). (2016). *Annual Meeting 2016. Mastering the Fourth Industrial Revolution*. Davos-Klosters, Switzerland. Retrieved from: https://www3.weforum.org/docs/WEF_AM16_Report.pdf

World Economic Forum (WEF). (2018). *The Global Competitiveness Report 2018*. Retrieved from: https://www.weforum.org/reports/the-global-competitveness-report-2018/

Yanar, R., & Celik, H. (2021). Determinants of International Competitiveness: Evidence from Selected OECD Countries. *Journal of Financial Economics and Banking, 2*(1), 1-10.

Yerbanga, A. (2017). Déterminants des exportations intra-UEMOA du Burkina Faso. *Revue d'Economie Théorique et Appliquée ISSN*, 1840, 7277.

Zanella, F., & Oyelere, P. (2021). Is financial development crucial for all economies? *Cogent Economics & Finance, 9*(1), 1923883. DOI: 10.1080/23322039.2021.1923883

Zinnes, C., Eilat, Y., & Sachs, J. (2001). Benchmarking Competitiveness In Transition Economies. *The Economics of Transition. 9*, 315-353. DOI: 10.1111/1468-0351.00078.

МАКРОЕКОНОМСКЕ ДЕТЕРМИНАНТЕ КОНКУРЕНТНОСТИ: ДОКАЗИ ИЗ ФАКТОРСКЕ ЕФИКАСНОСТИ И ЗЕМАЉА КОЈЕ СЕ ВОДЕ ИНОВАЦИЈАМА

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САЖЕТАК

Истраживање фактора који повећавају или ометају конкурентност једно је од основних начела теоријских и емпиријских истраживача, али до сада није постигнут консензус. Ова студија одговара на ово питање истражујући утицај различитих аспеката макроекономског окружења на конкурентност у три типа економије према глобалном предузетничком монитору (ГЕМ) (економија вођена факторима, економија вођена ефикасношћу, економија вођена иновацијама). Користећи Портерову класификацију, подијелили смо земље на основу фактора, ефикасности и иновација. Поред тога, генерализована метода момената (ГММ) коришћена је за идентификовање ендогености и неопажене хетерогености података у неуравнотеженим панел подацима за 81 земљу (2002-2018). Резултати показују да су варијације конкурентности међу земљама углавном одређене варијацијама у степену економског развоја. Прво, раст БДП-а, ниски почетни трошкови и већи издаци за истраживање и развој играју кључну улогу у објашњавању варијација конкурентности у три кластера земаља. Друго, што се тиче земаља у фази

1, налазимо да су отвореност трговине, пореска стопа, раст БДП-а, почетни трошкови, реални ефективни курс, расходи за истраживање и развој и продуктивност рада од посебног значаја за конкурентност. Када су у питању земље из фазе 2, можемо примијетити да су отвореност трговине, пореска стопа, раст БДП-а, инфлација, почетни трошкови, финансијски развој, реални ефективни курс, расходи за истраживање и развој и продуктивност рада имали статистички значајан утицај на конкурентност. Када је ријеч о земљама из фазе 3, фактори као што су отвореност трговине, стране директне инвестиције, пореска стопа, стопа раста БДП-а, инфлација, пореска стопа, почетни трошкови, финансијски развој, издаци за истраживање и развој и продуктивност рада имају утицај на конкурентност. Овај рад презентује неке битне карактеристике, као што је макроекономски индекс за одређивање конкурентности. Ове карактеристике се могу користити као смјернице за доносиоце одлука, јер идентификују области у којима предузимање даљих акција може побољшати конкурентност. Напосљетку, добијени резултати су високо конзистентни у низу тестова робусности и провјера робусности који покривају алтернативне узорке и алтернативне групе варијабли.

Кључне ријечи: *конкурентност, глобални индекс конкурентности, економски раст, ГММ*

ANALYSIS OF THE INFLUENCE OF SPECIFIC FACTORS ON REAL ESTATE PRICES IN THE REPUBLIC OF SRPSKA

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ABSTRACT

The work deals with the analysis of the real estate market and the specificities of the formation of real estate prices in the Republic of Srpska. The specificity is reflected, among other things, in the definition of the market value of real estate if the prices are known from the sales contracts entered in the Real Estate Price Register (formed on the basis of supply and demand for apartments), the formation of value zones (location factor), the value tables (relational tables and value levels), the additional factors of influence (factor of the position of the apartment in the building) and equations for estimating the value of the real estate. The analysis was done using the CAMA algorithm. The research results show that real estate prices from the Real Estate Price Register and real estate prices calculated according to the CAMA algorithm are 70% accurate, i.e. they are within the permitted deviation interval of +,- 10 %, which means that the CAMA algorithm can also be used for real estates that have not been registered in the Real Estate Price Register yet.

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1. INTRODUCTION

The real estate market is an important area of activity in the market-oriented economies. The same rules apply to the real estate markets as to other markets (goods, services, capital). Greater disruptions in demand or greater offer of real estate automatically lead to a drop in prices and vice versa. Problems and crisis situations are promptly reflected on the real estate market; crises have the greatest impact on real estate prices. The fiscal moment is also important, because national and local fiscal revenues depend on turnover on the real estate market. The market value of immovable property can be considered as one of the four characteristics of immovable property which the basic paradigm of the geodetic-cadastral information system and real estate cadaster are based on (Miladinović, 2013, p.10), in addition to the location of the immovable property (plot number

and its location), rights (and the holders of rights) on the immovable property and method of use. The most important indicator of the stability of the real estate market is real estate prices. Real estate prices are largely influenced by the well-being of the nation and the individual, the demand for real estate, the offer of real estates, as well as the tax policy. Because of all this, it is extremely important to stabilize real estate prices and reach their real values. In general, there are certain (common) factors that affect real estate prices. These factors can be viewed as the offer of real estates, the demand for real estates, and external effects on the real estate market.

Real estate offer. The owner of real estate (apartment, house, business premises, etc.) will sell real estate to the buyer who offers the highest price for the given real estate. In addition to the price of real estate, as a key factor in the offer, there are a large number of factors that lead to changes in the offer. Let us state some of them (Begović, 1995, p. 40): prices of production factors (wage prices, construction costs), changes in technology (application of new technologies), as well as motives of producers (maximization of profits, state and private enterprises). The offer of real estate is specific because real estate is a special resource that differs from goods and services. One of the important differences is that real estate is a heterogeneous resource in terms of quality and quantity, and especially according to purpose. So, for example, the characteristics of the location of each real estate are different.

Demand for real estate. In addition to the price of real estate, as the most important factor affecting the demand for real estate, we can also define the following factors:

1. The growth of economic well-being affects the growth of production capacities and business premises, and accelerates the development of urban and industrial infrastructure. These tendencies increase the demand for real estate.
2. Population growth affects the demand for all types of real estate.
3. Traffic accessibility affects the demand for all types of real estate.
4. Favorable tax policy stimulates the growth of demand for real estate. Lowering tax rates on various forms of property increases demand for real estate, while increasing taxes discourages purchases and reduces demand for real estate.
5. Improving the financial situation of buyers (which stems from economic well-being, but also an organized and liquid financial sector for financing the purchase of real estate) affects the growth of demand for real estate. Therefore, the choice of more and better ways of financing will increase the demand for real estate.

6. Restructuring of the economy affects the change in demand for real estate. During the restructuring process, industrial production may increase or decrease. In this sense, the macro examples of shutting down the coal industry in Great Britain, the industrial development of large regions in China, but also local examples of the transformation of industrial cities of Central European countries into urbanized tourist centers, the development of rural and urban areas and cities, as well as hundreds of micro cases of the transformation of traditional industrial areas into urbanized land (or vice versa, turning free spaces into industrial zones and complexes) are characteristic.
7. The activities of institutional investors greatly influence the demand for real estate in which national or global economic tendencies are significant. Thus for an example, the economic instability "forces" investors to invest in real estate to protect their capital. Global economic instability and external shocks can disrupt the demand for real estate with various consequences. In periods of global crises, the prices of representative real estate may rise, while the prices of cheaper real estate may fall due to a lack of demand from some target groups. The conclusion is that global economic trends or economic instability have a strong impact on the real estate market.

All these, as well as other factors determine the demand for real estate.

External effects on the real estate market. The real estate market operates in an environment that is influenced by numerous and powerful external effects. Both positive and negative external effects are particularly intense in urban areas. Negative external effects such as air pollution, car noise or traffic congestion have become symbols of big cities, but they have a positive effect on real estate prices in those areas. Namely, the real estate in the city center, which is exposed to those negative external effects, is more expensive than the real estate on the outskirts of the city. The existence of external factors conditions the creation and expansion of cities. In the course of that a special group of external factors is especially important - agglomeration effects (Begović, 1995).

The larger the city is, that is, the greater the spatial concentration of population and activities is, the agglomeration effects are more intense. Positive agglomeration effects in consumption are reflected in the fact that a change in the size of a city leads to a change in convenience in consumption (specialized health services, education services, culture services, sports services, etc. are found in large cities and they have the highest quality of these services). The presence of these institutions (services) significantly affects the real estate market.

These market relations inherent in the relations in the markets of all other goods and services represent the foundation for the formation of the real estate market in every national economy. In that context, the study of supply and demand for real estate is extremely important for the formation of an organized market for these goods, both in Bosnia and Herzegovina and in the Republic of Srpska. In this paper, we also deal with the specificities of the formation of real estate prices in the Republic of Srpska in addition to these factors, i.e. relationships.

2. LITERATURE REVIEW

Recently, the question of the influence of factors on the real estate prices has attracted a lot of researchers and economic policy makers' attention and interest in the world. Let us state some authors and studies that dealt with the issue of the influence of factors on real estate prices.

Advanced information and communication technologies, such as statistical modeling and searching large amounts of data (data mining) are extremely important for determining the impact of factors on real estate prices. Thus, the authors (Ersoz, Ersoz & Soydan, 2018) using data mining techniques (CHAID and C&RT algorithms) believe that the size of the real estate, the distance from the city center, the popularity of the environment in which the property is located and the year of construction have the biggest influence on the price of real estate.

Ćetković et al. (2018) dealt with the prediction of the real estate prices. The authors tried to obtain accurate output data showing price predictions on the real estate markets of the observed EU member states. Through an artificial neural network, they see the possibility for precision of input data and determining the dependence of prices on variable inputs. Such forecasts can be used for the purpose of accounting, sales, but also for the feasibility of construction facilities in order to predict the sales price. Therefore, the goal of this research is to build a forecast model of real estate market values in the EU countries, depending on the influence of macroeconomic indicators.

All factors that determine the price of real estate can be divided into two groups (Hill, 2011). The first group consists of internal or physical characteristics such as: area, number of rooms, number of bathrooms and similar characteristics. The second group consists of locational characteristics, such as: the distance of the property from the city center, the distance from some nearby facilities (main road, shopping center, park, stadium, hall, etc.), as well as belonging of the real estate to a certain part of the city.

Analyzing the factors that influence the real estate prices McDonald & McMillen (2007) came to the conclusion that we can single out nine factors

that most determine real estate prices, and they are: the real estate area, the land area, the year of construction of real estate, the number of rooms, the number of bathrooms, as well as whether the property has a garage, swimming pool, fireplace and air conditioning.

From all of the above, we can conclude that there is no single set of factors that describe the impact and importance they have on real estate prices.

3. RESEARCH METHODOLOGY

In this research, 525 high-quality (processed) transactions (with no observed "outlayers") were selected from the Real Estate Price Register, for the period from the first quarter of 2018 to the third quarter of 2021, which represents about 4.5% of the Housing Fund. Each transaction from the Real Estate Price Register has assigned coordinates based on which it can be visually represented in GIS tools. The analysis was done by using the CAMA (Computer Assisted Mass Appraisal) algorithm. CAMA is a computer algorithm for mass and individual calculation of the real estate values. Mass appraisal or mass appraisal by a computer (eng. Computer Asissted Mass Appraisal-CAMA) are terms that are commonly used to assess the value of the real estate for the purpose of defining property tax.

The real estate price formation process starts in the Real Estate Price Register and ends with quality control and model calibration and it is an iterative process. The process of forming the real estate price can be shown in several steps (they do not have to be conditioned in the specified order):

1. Downloading the market data, the real estate market analysis and selection of quality transactions (Real Estate Price Register),
2. Time adjustment of transaction prices,
3. Downloading the real estate data (cadastral records) and data analysis,
4. Determining the ambition of the model (defining the value levels)
5. Creating value zones and assigning value levels to each zone,
6. Creating relational tables,
7. Creating value tables,
8. Determining (modeling) the influence of other factors,
9. Quality control (zone, level, uniformity of assessment) - model calibration (first iteration)
10. Second, third ..nth iteration (repetition of the previous procedure).

The CAMA algorithm for apartments is used to calculate the price of apartments in a building that is fully used for housing and has more than two apartments, a multi-purpose apartments in a building, service apartments or special purpose

apartments, accommodation and other similar units used for housing. The model is based on the market comparison method. The model consists of layers of value zones and value levels, value tables, points, point classes and factors (renovation factor, etc.), properties of the parts of the buildings, the location of the apartment in the building, the total area of additional rooms of the apartment (such as terrace, loggia and/or balcony) as well as a distance from the economic infrastructure facilities. The values in the table of value levels are expressed for the reference unit for valuation (value assessment). The structure of the real estate price formation model is based on: value zones (location parameter), value tables (value levels and relational tables), additional factors of influence or quality (floor, elevator, distance from significant infrastructure facilities, etc.) and equations for estimating the value of real estate. The model should contain those data (attributes, characteristics) that are in the cadastre or real estate register and in transactions (Real Estate Price Register). It is desirable that the Real Estate Price Register has more real estate characteristics than the model and as many as there are in the cadastre. At the same time, care should be taken to match the types and values of the surfaces according to the records.

Analysis of the specific factors that influence the real estate prices (location, area of the apartment, year of construction, number of floors of the apartment and having an elevator).

Each real estate is geo-located. Residential and residential-business buildings with the associated special parts are represented with the coordinates of the entrance of the buildings. The entrance coordinates are determined based on the street and house number coordinates from the Address Register. The real estate address is an integral part of the real estate data. The most influential factors, which are, in addition to the location, the area of the apartment, the year the building was built, the floor where the apartment is and the presence of an elevator, are determined by the correlation analysis (Table 1).

Table 1: Results of the correlation analysis for the most influential factors

Correlation	AREA	PRICE	YEAR OF CONSTRUCTION	FLOOR	ELEVATOR
AREA	1	- 0.30	- 0.03	0.08	- 0.06
PRICE	- 0.30	1	0.53	- 0.18	0.21
YEAR OF CONSTRUCTION	- 0.03	0.53	1	- 0.08	0.32
FLOOR	0.08	- 0.18	- 0.08	1	0.34
ELEVATOR	- 0.06	0.21	0.32	0.34	1

Source: author's compilation

The mentioned factors were used in the model for the formation of the real estate price. Other factors (variables, corrective factors) can also be modeled and used: the distance from the important infrastructure facilities, the total number of the apartments in the building, renovation, building quality, etc. The impact of the location on the real estate value can vary, from 40% in rural areas to 80% in urban areas. It is necessary to perform a time adjustment of the data.

Time adjustment of data

Time adjustment of data starts from defining the analytical areas. Analytical areas are spatial (geographical) zones created on the basis of a spatial (market) analysis of certain real estate and are most often common to real estate of similar purpose or use, such as apartments, houses and residential (construction) lands. Value zones are related to the model while analytical areas are related to the market. For separate transactions (525), time-comparative adjustment is made on the selected date (September 30, 2021). Through time adjustment, the prices of market transactions are adjusted to the date of September 30, 2021 in relation to the area and the date of the transaction. The time-adjusted (C_{VP}) price is obtained by multiplying the price index (I) and the transaction price (C).

The price index is determined from a linear regression depending on the surface class. Four surface classes were created (Table 2) and each transaction was assigned a surface class label.

Table 2: Surface classes

Surface class label	Surface[m^2]	Number of transactions
P1	< 44	131
P2	45 - 60	180
P3	61 - 75	118
P4	> 75	95

Source: author's compilation

Creation of the value zones

A zone is a geographical area where the subject (similar) real estates have approximately the same market value. It represents a location parameter in the model. When modelling in the phase of time adjustment of transactions, it always starts with preliminary zones that are created based on the knowledge of the market, the fund and the geographical boundaries. When determining zones, the certain principles should be followed: the knowledge of the market and the height of the average value of the apartments, the location (distance from the centre), the similarity of the structure of the fund of the buildings and

geographical (physical) boundaries. It will not be possible to fully comply with all the principles due to the state of the market and the fund of the buildings (e.g. residential buildings of recent construction in a neighbourhood which is dominated by the buildings of older construction, etc.). In order to comply with all the principles, a more reliable market is needed[1], the exclusion of certain transactions that "spoil" neighbouring transactions, several smaller micro-zones and other.

Creation of the value tables (value levels and relational tables)

First, the value levels and relational tables are defined. The basic unit for forming the real estate price is the reference real estate (norm property, norm object). Reference immovable property is the most common immovable property of certain characteristics in the cadastral records or on the market (most often they match). For example, for the apartments, the basic characteristics are the area and the year of construction, while for the houses, the basic characteristics are the area of the building and the area and degree of development of the accompanying land. In our example, the reference apartment is a 57 m^2 apartment, built in the period of 1970-1980. Based on the prices of the reference apartment, the difference between the highest and lowest price, the number of value levels and thus the smallest number of zones is determined. Each zone has its own value level. The level for each zone reflects the value of the reference apartment in that zone. The lowest price of the reference apartment is 75. 000 BAM while the highest is 130,000 BAM (the difference is 55,000 BAM). A total of seven (7) value levels were determined. In the lower value levels, the prices of apartments are lower, while in the higher value levels, the prices of apartments are higher. Table 3 shows the value levels.

Table 3: Illustration of the value levels

Mark of value level	Price of the reference apartment [BAM]	Difference between levels [%]
1	75,000	
2	82,500	10.0
3	90,750	10.0
4	99,800	10.0
5	109,500	9.7
6	120,000	9.6
7	130,000	8.3

Source: author's compilation

1 Good perception of the market by the buyer and seller, the prices in the contracts are as close as possible to the real (theoretical) prices in relation to the location and characteristics of the apartment.

The relational table (RT) defines the influence (relationship) of the area and the year of construction on the price (C) or value (V) of the real estate. Influence theory, market data and influence functions based on sales analysis and influence theory are used to create the relational table. Relational tables are determined for individual value levels. It represents a 2D matrix (table) defined by surface classes (rows) and time periods (columns). The ultimate goal is to determine the value tables (Basic RT) which are part of the model for the formation of the real estate price. Value tables can be reached in four steps: determination of relational tables by value levels; normalization of relational tables by value levels; aggregation of normalized relational tables of all value levels into one relational table (Basic RT) and normalization of relational table coefficients, for the purposes of creating value tables. Each transaction is assigned a surface class label and a construction period label which it belongs to. Six more detailed surface classes (labeled[2] 1-6) and nine (9) construction periods (labeled 10-19) were used. The first step is to determine the number of transactions (N), average price (AVG_PRICE [KM]) and average apartment area (AVG_SIZE [m^2]) by defined surface classes and construction periods. Table 4 illustrates the relational table for the first value level.

Table 4: Illustration of the relational table for the first value level / VN = 1, V = 75 000 BAM

		COLUMNS =>		10	11	12	13	14	15	16	17	18	19	
	ROWS	Surface classes / Period of construction 1944		- 1954	1945 1964	1955 1974	1965 1984	1975 1994	1985 2004	1995 2009	2005 2014	2010 -	2015 control:	
N	1	0	29	0	0	0	0	0	0	0	0	0	0	0
AVG(PRICE)				0	0	0	0	0	0	0	0	0	0	
AVG(SIZE)				0	0	0	0	0	0	0	0	0	0	
N	2	30	49	0	0	1	0	5	1	1	0	0	0	8
AVG(PRICE)				0	0	52734	0	74438	82342	58214	0	0	0	
AVG(SIZE)				0	0	39	0	45	45	46	0	0	0	
N	3	50	74	0	0	0	0	7	1	0	0	0	0	8
AVG(PRICE)				0	0	0	0	114418	122299	0	0	0	0	
AVG(SIZE)				0	0	0	0	65	67	0	0	0	0	
N	4	75	99	0	0	0	0	1	0	1	0	0	0	2
AVG(PRICE)				0	0	0	0	135363	0	170831	0	0	0	
AVG(SIZE)				0	0	0	0	78	0	92	0	0	0	
N	5	100	129	0	0	0	0	0	0	0	0	0	0	0
AVG(PRICE)				0	0	0	0	0	0	0	0	0	0	
AVG(SIZE)				0	0	0	0	0	0	0	0	0	0	
N	6	130	-	0	0	0	0	0	0	0	0	0	0	0
AVG(PRICE)				0	0	0	0	0	0	0	0	0	0	
AVG(SIZE)				0	0	0	0	0	0	0	0	0	0	
													control:	18

Source: author's compilation

2 Arbitrary marks, surface classes and periods of construction.

The second step is the normalization of the value table. Normalization of the value table implies that the average price in the relational table is divided by the value of the value level. For example (picture above) the average price of 74,438 BAM for five (5) transactions in the surface class from 30 m^2 to 49 m^2 and the construction period from 1975-1984 is divided by 75,000 BAM and the normalized value of the table field of 0.99 is obtained (Table 5).

Table 5: Illustration of the normalized relation table for the first value level

Normalization of the value table for VN1

		COLUMNS =>		10	11	12	13	14	15	16	17	18	19
		Surface classes /		-	1945	1955	1965	1975	1985	1995	2005	2010	2015
	ROWS	Period of construction		1944	1954	1964	1974	1984	1994	2004	2009	2014	-
F_RT_1	1	0	29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F_RT_1	2	30	49	0.00	0.00	0.70	0.00	0.99	1.10	0.78	0.00	0.00	0.00
F_RT_1	3	50	74	0.00	0.00	0.00	0.00	1.53	1.63	0.00	0.00	0.00	0.00
F_RT_1	4	75	99	0.00	0.00	0.00	0.00	1.80	0.00	2.28	0.00	0.00	0.00
F_RT_1	5	100	129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F_RT_1	6	130	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Author's compilation

After determining the relational table, the value table by levels is determined. The coefficients of the relational table are normalized for the reference apartment (e.g. if the coefficient in the cell is different from 1). In view of that, the model is based on the reference apartment whose coefficient is emphasized, the normalization of the coefficients is performed in a way that all coefficients are divided by the value of the coefficient for the reference apartment (0.9) and the table (Table 6) of the normalized coefficients for the influence of area and the year of construction is obtained based on the price of real estate.

Table 6: Table of the normalized coefficients

Base of surface class [m^2]/ construction period	30	50	75	100	130
before 1944	0.50	0.91	1.45	2.02	2.74
1945-1954	0.57	0.96	1.45	1.96	2.57
1955-1964	0.70	1.06	1.47	1.85	2.29
1965-1974	0.64	1.00	1.42	1.81	2.27
1975-1984	0.71	1.10	1.54	1.97	2.45
1985-1994	0.63	1.09	1.67	2.27	2.99
1995-2004	0.70	1.11	1.61	2.09	2.66
2005-2009	0.77	1.20	1.71	2.19	2.75
2010-2014	0.68	1.20	1.87	2.57	3.43
after 2015	0.78	1.20	1.70	2.17	2.72

Source: Author's compilation

The values in the value table are calculated by multiplying the normalized coefficients from the previous table with the value of the reference apartment in the value level by the surface classes and construction periods. The reference apartment is placed in the surface class of 50m^2 - 74m^2 and was built in the construction period of 1965-1974 and for the first value level (75,000 BAM) is multiplied by a coefficient of 1.0.

Table 7: Value table with bases

Surface [m^2] from	to	Construction period	- 1944	1945 1954	1955 1964	1965 1974	1975 1984	1985 1994	1995 2004	2005 2009	2010 2014	2015 -
-	29	basis	0	0	0	0	0	0	0	0	0	0
		additional m^2										
30	49	basis	37624	42394	52526	48363	53620	47485	52510	57777	51003	58308
		additional m^2										
50	74	basis	67950	71806	79333	75000	82382	81572	83572	90029	89638	90178
		additional m^2										
75	99	basis	108634	109098	110051	106244	115844	125331	120851	128022	140242	127471
		additional m^2										
100	129	basis	151546	146793	138817	136024	147540	169978	157002	164350	192663	162952
		additional m^2										
130	-	basis	205305	192419	171561	170405	183951	224430	199324	206398	257383	203855
		additional m^2										

Source: Author's compilation

For example, for a base of 30m^2 in the first value level for a building built after 2015, a coefficient of 0.78 is used (Table 6) and it is multiplied by the value of the reference apartment of 75,000 BAM. In this way, the base value of 58,308 BAM is obtained (previous table). How is the value of 35m^2 apartment determined? It is determined by determining the value of an additional square meter in the observed surface class. The value multiplied by the coefficient from the relational table for additional square meters is linearized so that there is no "breakthrough" of prices between surface classes. The value of the additional square meter is determined by dividing the difference in the base values of two adjacent surface classes by the difference in the base surfaces of the adjacent classes. For an example, if the additional square meter is calculated for the previous example, the value of the base of 30m^2 is subtracted from the value of the base of 50m^2 (90,178 BAM - 58,308 BAM = 31,870 BAM), and then it is divided by the difference in the area of the base (50m^2 - 30m^2 = 20m^2). A value of 1,593 BAM is

obtained for an additional square meter in the second surface class for the period after 2015. Other values for an additional square meter are shown in Table 7.

Table 8: Value table with bases and additional square meters

Surface [m²]		Construction period	-	1945	1955	1965	1975	1985	1995	2005	2010	2015
from	to		1944	1954	1964	1974	1984	1994	2004	2009	2014	-
-	29	basis	0	0	0	0	0	0	0	0	0	0
		additional m²	1254	1413	1751	1612	1787	1583	1750	1926	1700	1944
30	49	basis	37624	42394	52526	48363	53620	47485	52510	57777	51003	58308
		additional m²	1516	1471	1340	1332	1438	1704	1553	1613	1932	1593
50	74	basis	67950	71806	79333	75000	82382	81572	83572	90029	89638	90178
		additional m²	1627	1492	1229	1250	1338	1750	1491	1520	2024	1492
75	99	basis	108634	109098	110051	106244	115844	125331	120851	128022	140242	127471
		additional m²	1716	1508	1151	1191	1268	1786	1446	1453	2097	1419
100	129	basis	151546	146793	138817	136024	147540	169978	157002	164350	192663	162952
		additional m²	1792	1521	1091	1146	1214	1815	1411	1402	2157	1363
130	-	basis	205305	192419	171561	170405	183951	224430	199324	206398	257383	203855
		additional m²	1964	1557	860	984	1014	1892	1294	1220	2306	1162

Source: Author's compilation

Modeling the influence of other factors

Additional factors have a corrective effect on the real estate price and are multiplied (or added) to the estimated transaction price, in such a way that the factor with the greatest impact is multiplied (or added) first, followed by other factors of less impact. Additional influential parameters used in the formation of the real estate price are the floor of the apartment and the existence of an elevator in the building. The mentioned parameters are integrated into one factor - the factor of the location of the apartment in the building, and they can be used separately as well. Also, some other factors can be added (e.g. the total number of the apartments in the building, the orientation of the apartment, a renovated staircase in older buildings, the existence of a parking lot/basement in the building, and similar). The value of the factor of the location of the apartment in the building is determined based on the score table by classes (Table 8 and Table 9), based on the defined criteria (score). These values are determined empirically.

Table 9: Scoreboard of criteria

Description	Scores
Not in the basement and has an elevator	
The apartment is located on the ground floor, on the first, second or third floor and has an elevator	10
The apartment is located on the 4th and higher floors and is not in the attic and has an elevator	8
The apartment is located in the attic and has an elevator	7
Lower floors and without an elevator	
The apartment is located on the ground floor up to the fourth floor, there is no elevator and there is no information about an elevator	9
Higher floors and without an elevator	
The apartment is located on the 4th and higher floors, not in the attic and there is no elevator	6
The apartment is in the attic and there is no elevator	4
Basement apartment or in the basement	
The aparment is in the cellar or basement	2

Source: author's compilation

Table 10: Determination of factors

Class	Scores		Factors value
	from	to	
1	0	3	0.9
2	4	7	0.95
3	8	10	1

Source: author's compilation

From the above table, it can be seen that for the apartments from the ground floor to the attic (excluding the attic) in a building with an elevator and apartments located up to the fourth floor (excluding the attic) in a building without an elevator or without information about an elevator, the factor 1 is assigned and does not affect to the previously determined estimated price (value) of the apartment from the value table. For the apartments located in the cellar or basement, the lowest factor (0.9) is assigned, which reduces the estimated price (value) of the apartment from the value table by 10%. For the other apartments of other characteristics, a factor of 0.95 is assigned. Regarding the mentioned, factors are determined empirically, in accordance with knowledge about the impact on the price of the apartment, other divisions (classes and scores) are also possible. For an example, a higher factor than 1 can be used for the first group of apartments, for example 1.05 (an additional 5% on the estimated price of the apartment).

Based on the value table (the influence of location, surface and the year of construction) and the factors of the location of the apartment (floor and the existence of an elevator), the market price of the apartment is calculated using the equation:

$$V_P = V_T \cdot F_{\text{of the location of the apartment in the building}}$$

where:

V – is the market price of the apartment,

V_T – is the price (value) of the apartment from the value table and

F – is the influence factor of the position of the apartment in the building.

Using the previous formula, we can calculate the market price of all analyzed apartments (Table 10).

The results of the research show that real estate prices from the Real Estate Price Register maintained by RUGIPP (column: Price from contract) and real estate prices calculated according to the CAMA algorithm are 70% accurate, i.e. they are within the permitted deviation interval of +,- 10%, which means that the CAMA algorithm can also be used for real estates that have not been registered in the Real Estate Price Register yet.

4. CONCLUSIONS

Offer and demand for real estate largely depends on real estate prices. These market relations inherent in the relations in the markets of all other goods and services represent the foundation for the formation of the real estate market in every national economy. In that context, the study of offer and demand for real estate is extremely important for the formation of the organized market of these goods, both in Bosnia and Herzegovina and in the Republic of Srpska.

The specificity of the real estate price formation is reflected in the definition of the market value of real estate if prices are known from sales contracts entered in the Real Estate Price Register (formed on the basis of supply and demand for apartments), the formation of value zones (location factor), the value tables (relational tables and value levels), the additional factors of influence (factor of the location of the apartment in the building) and the equation for estimating the value of real estate.

Table 11: The process of forming real estate prices using the CAMA algorithm

Date of contract	Quarter of the year	Useful area [m^2]	Price from contract [KM]	Year of construction	Floors from SPR	Floor number from SPR	Elevator ([Yes/ No])	Average price from contract [KM/m^2]	Time adjusted price by CAMA method) C_{VP} [KM]	Assessed price [KM]	k' (C_{vp}/C_{pr})	Assessed price C_{PR}, V_{PR} [KM]	k'' (C_{vp}/C_{pr})	e (C_{vp}/C_{pr}-1)	k_i-Me_k	ABS (k_i-Me_k)
1/24/2018	Q01	35	85750	2018	П6	П5	Yes	2450	100300	114878	0.87	114878	0.87	0.15	0.0279	0.0279
1/31/2018	Q01	44	76500	1972	12	П7	Yes	1739	89481	81081	1.10	81081	1.10	-0.10	0.0796	0.0796
2/8/2018	Q01	38	60000	1976	П10	ПР	Yes	1579	70181	78801	0.89	78801	0.89	0.12	-0.0101	0.0101
2/13/2018	Q01	41	75600	1973	П4	П1	No	1844	88428	83850	1.05	83850	1.05	-0.05	0.1538	0.1538
2/28/2018	Q01	33	65000	1980	П4	П1	No	1970	76029	77091	0.99	77091	0.99	0.01	0.0855	0.0855
3/8/2018	Q01	26	66000	2013	П3	П1	No	2538	77199	70723	1.09	70723	1.09	-0.09	0.2820	0.2820
3/13/2018	Q01	34	75000	1982	П4	П3	No	2206	87726	86683	1.01	86683	1.01	-0.01	0.1113	0.1113
3/23/2018	Q01	41	64000	1981	П4	П3	No	1561	74860	76383	0.98	76383	0.98	0.02	-0.0439	0.0439
3/28/2018	Q01	26	62500	2015	П7	П5	Yes	2404	73105	87592	0.83	87592	0.83	0.20	-0.0106	0.0106
4/12/2018	Q02	44	98000	2007	П5	П3	Yes	2227	113255	139280	0.81	139280	0.81	0.23	-0.0321	0.0321
4/18/2018	Q02	35	73000	1960	П3	П2	No	2086	84363	86472	0.98	86472	0.98	0.02	0.1660	0.1660
4/18/2018	Q02	25	42500	2007	П6	ПК	Yes	1700	49116	64068	0.77	60865	0.81	0.24	-0.1166	0.1166
4/19/2018	Q02	41	60000	1972	П8	ПР	Yes	1463	69340	76246	0.91	76246	0.91	0.10	-0.1145	0.1145
4/19/2018	Q02	44	55243.35	1980	П5	ПР	Yes	1256	63843	98141	0.65	98141	0.65	0.54	-0.2502	0.2502
5/25/2018	Q02	41	94627	2007	П6	П2	Yes	2325	110163	120825	0.91	120825	0.91	0.10	0.1022	0.1022
5/31/2018	Q02	31	80000	2005	П5	П4	Yes	2581	92453	95023	0.97	95023	0.97	0.03	0.1634	0.1634
6/14/2018	Q02	42	80000	1970	П8	ПР	Yes	1905	92453	85622	1.08	85622	1.08	-0.08	0.1790	0.1790
6/19/2018	Q02	40	84000	1974	П10	П2	Yes	2100	97076	82078	1.18	82078	1.18	-0.18	0.2591	0.2591
6/26/2018	Q02	40	60000	1970	П4	П2	No	1500	69340	82078	0.84	82078	0.84	0.18	-0.0559	0.0559
7/17/2018	Q03	36	62600	1970	П4	П3	No	1739	71479	74989	0.95	74989	0.95	0.05	0.0524	0.0524
7/20/2018	Q03	40	97500	2012	П4	ПН	Yes	2438	111328	121888	0.91	115794	0.96	0.04	0.1162	0.1162
7/30/2018	Q03	28	36400	1969	П2	П1	No	1300	41563	72222	0.58	72222	0.58	0.74	-0.2341	0.2341
7/30/2018	Q03	39	63564.47	1975	П6	П2	Yes	1630	72580	80541	0.90	80541	0.90	0.11	-0.1228	0.1228
8/1/2018	Q03	15	29900	1961	П3	П1	No	1993	34141	42021	0.81	42021	0.81	0.23	0.0029	0.0029

Source: author's compilation

Bosnia and Herzegovina and Republika Srpska are making efforts to modernize the situation on the real estate market, but due to the influence of historical, developmental, political and other factors, the process has slowed down.

The academic community should not only use this model of the real estate price formation, but also continue to develop it, i.e. adapt its to specific cases (problems). This was exactly the case with our research. The software was adapted to this particular research.

Conflict of interests

The author declares there is no conflict of interest.

REFERENCES

Begović, B. (1995). *Economics of urban planning*. Belgrade, Serbia: CES

Botrić, V., & Kordej de Vila, Ž. (2005). Determinants of regional housing market in Croatia. *45th Congress of the European Regional Science Association*. ERSA conference papers ersa05p289. Netherlands, Amsterdam: European Regional Science Association.

Cavalleri, M.C., Cournède, B., & Özsöğüt, E. (2019). *How Responsive are Housing Markets in the OECD? National Level Estimates*. OECD Economics Department Working Papers 1589, OECD Publishing. DOI: 10.1787/4777e29a-en

Ćetković, J., Lakić, S., Lazarevska, M., Žarković, M., Vujošević, S., Cvijović, J. and Gogić, M. (2018). Assessment of the Real Estate Market Value in the European Market by Artificial Neural Networks Application. *Complexity. Hindawi, 2018*, 1-10. DOI: 10.1155/2018/1472957.

Ersoz, F., Ersoz, T., & Soydan, M. (2018). Research on Factors Affecting Real Estate values by Data Mining. *Baltic Journal of Real Estate Economics and Construction Management*, *6*(1), 220-239. DOI:10.2478/bjreecm-2018-0017

Hill, R. (2011). *Hedonic Price Indexes for Housing*. OECD Statistics Working Papers, OECD Publishing. DOI: 10.1787/5kghzxpt6g6f-en.

Jordà, Ò., Schularick, M., & and Taylor, A.M. (2016). The Great Mortgaging: Housing Finance, Crises and Business Cycles. *Economic Policy, 31*(85), 107-152. DOI: 10.1093/epolic/eiv017

Kunovac, D., & Žilić, I. (2020). *Home sweet home: The effects of housing loan subsidies on the housing market in Croatia.* Croatian National Bank Working Papers W60. Zagreb, Croatia: HNB. Retrieved from: https://www.hnb.hr/documents/20182/3596318/w-060.pdf/955d2e9e76d7-8b3e-3c1a-8a8732ff326e.

McDonald, J. F., & McMillen, D. P. (2007). *Urban Economics and Real Estate: Theory and Policy*. Oxford, UK: Blackwell Publishing.

Miladinović, M. (2013). Real Estate Cadastre, Faculty of Architecture, Civil Engineering and Geodesy, University of Banja Luka, Banja Luka.

Pjanić, Z. (1986). *Theory of prices.* Belgrade, Serbia: Contemporary Administration

Wooldridge, J. M. (2013). *Introductory Econometrics: A Modern Approach*. Mason, Ohio, US: South-Western College Publishing.

АНАЛИЗА УТИЦАЈА СПЕЦИФИЧНИХ ФАКТОРА НА ЦИЈЕНЕ НЕПОКРЕТНОСТИ У РЕПУБЛИЦИ СРПСКОЈ

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САЖЕТАК

Рад се бави анализом тржишта непокретности и специфичностима формирања цијена непокретности у Републици Српској. Специфичност се, између осталог, огледа у дефинисању тржишне вриједности непокретности ако су познате цијене из купопродајних уговора који се уписују у Регистар цијена непокретности (формиране на основу понуде и тражње за становима), формирању вриједносних зона (локацијски фактор), вриједносних табела (релационе табеле и вриједносни нивои), додатним факторима утицаја (фактор положаја стана у згради) и једначине за процјену вриједности непокретности. Анализа је урађена коришћењем ЦАМА алгоритма. Резултати истраживања показују да су цијене непокретности из Регистра цијена непокретности и цијене непокретности израчунате према ЦАМА алгоритму у 70% тачне, тј. налазе се у дозвољеном интервалу одступања од +,- 10%, што значи да се ЦАМА алгоритам може користити и за непокретности које још нису евидентиране у Регистру цијена непокретности.

Кључне ријечи: *цијене непокретности, вриједносни нивои и табеле, релациона табела, ЦАМА алгоритам.*

Прегледни научни чланци
Review Scientific Papers

TOURISM POLICY DEVELOPMENT AND IMPLEMENTATION IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA: DOES LOCAL STAKEHOLDER INVOLVEMENT COUNT?

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ABSTRACT

Municipalities are at the lowest level of Government, and it is where the actual implementation of tourism policies takes place. District municipalities and communities globally often face poorly planned development projects resulting from inefficient and ineffective policy and planning implementation. One of the reasons for this is that there is, at times, a lack of participation by key stakeholders. The success of tourism development policies and their implementation rests on the involvement of all relevant stakeholders. This study adopted a qualitative research approach whereby purposive and snowball sampling methods were used to identify the research sample from the research population. The research population included the district municipality staff, regional and local tourism organisations, also known as tourism forums, tourism development agencies, and the rural planning and economic development departments. Consequently, fourteen (14) semi-structured interviews were conducted with key stakeholders from the district municipality, local municipalities, tourism organisations and Eastern Cape Parks Tourism Agency. A thematic analysis technique was used to analyse the data. This study focused on stakeholder involvement in the development and implementation of tourism policies in the O.R Tambo District Municipality (ORTDM). The key findings from the study revealed that there is a lack of stakeholder collaboration in development and the implementation of tourism-related policies in ORTDM.

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1. INTRODUCTION

Despite the novel coronavirus (COVID-19), which led the world to a standstill in the first quarter of 2020, Gössling, *Scott & Hall* (2020) state that tourism has been the fastest-growing sector worldwide for decades and its growth can be traced back after the end of the Second World War. Sharpley and Telfer (2015) state that several publications from governments and statistics show a growth of tourism's contribution to the global economy. The growing curiosity and eagerness to learn may be one of the many reasons tourism has become one of the fastest-growing sectors globally. Earle (2008) describes tourism as an economic activity whose aim is to find ways to reduce poverty, create employment and entrepreneurship opportunities in communities. Apart from the classifications associated with the term "tourism", the most widely recognised definition is by the United Nations World Tourism Organisation (UNWTO), which states that tourism is "the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes" (UNWTO, 2008, p. 9). President Cyril Ramaphosa revealed that tourism is growing, creating more than 700 000 employment opportunities (State of the Nation Address [SONA], 2018). Therefore, a plan of action is required to ensure that the tourism industry is properly sustainable and kept for future generations. Policies play an essential role in the tourism industry, and they have an influence on industry operations and how legislation is drafted.

Hatipoglu *Alvarez & Ertuna* (2016, p. 308) state that several stakeholders are involved in tourism, including communities, tourists as leisure seekers, and destinations. With the mandate of developing, implementing, and regulating policies, the government is also among the significant tourism stakeholders. Tourism development policies play a fundamental role in the tourism realm as they serve as a blueprint for developing the tourism industry for national, regional, district and local municipalities. Furthermore, a proper tourism development policy is vital to provide the relevant tourism stakeholders and authorities with guidance on implementing and monitoring the policy. Additionally, Birendra, Dhungana and Dangi (2021), state that destinations without an appropriate tourism policy can struggle to develop the area to attract more visitors as there is no road map to follow. However, creating a policy alone does not yield results for the tourism industry because the policy should be successfully implemented. The policy's applicability needs to be monitored, and evaluation also put in place to create room for possible changes. A good policy should never be inflexible for example; the National Tourism Sector Strategy (NTSS), the National Development Plan (NDP) and the New Growth Path (NGP), to mention a few,

are flexible policies, and they have a direct and indirect role in the development of tourism in South Africa.

Earlier researchers such as Pebane (2016), Solomons (2016), Bassadien (2017), Bhandari (2019) and Odounga Othy (2020) stressed the significance of stakeholders' involvement in the development and implementation of tourism policies. But, Waligo, Clarke & Hawkins (2013, p. 343) acknowledged that stakeholders play an important role through their involvement in facilitating the implementation of sustainable tourism. Hence several scholars (Freeman, 1984; Waligo, Clarke & Hawkins, 2013; Ntloko, 2016) discussed the importance of the stakeholder theory and multi-stakeholder framework in tourism planning. Bhandary (2019) cited the significance of policy development in the tourism industry, and highlighted the role of development discourse in a country's tourism policy. What is unknown from the earlier studies is the impact of involving local tourism stakeholders in the development and implementation of tourism-related policies. This study, therefore, aimed at ascertaining the significance of involving different stakeholders in tourism policy development and implementation in the ORTDM.

2. THEORATICAL FRAMEWORK

According to Lester (2005, p. 459), theoretical frameworks are essential in assisting the researcher in structuring the research problem, theorizing and planning research studies. Theoretical framework helped to guide the entire study. The perspective on the current paper framework is based on planning concepts (basic steps and levels of planning) and stakeholder process in planning (stakeholder involvement and roles in tourism planning and development context). Tourism development may be a complex matter, and it requires the participation of various stakeholders in tourism policy planning. Therefore, a stakeholder theory was used in the context of this research.

The stakeholder theory can be traced back from Freeman (1984), who stated that the stakeholder theory argues that organisations should create value for all players, not only for shareholders. Working together and producing value is at the heart of business and the stakeholder theory. The stakeholder theory is a business perspective that stresses the interconnected relationships that exist between the organisation and its customers, staff, suppliers, investors, and stakeholders and communities (Freeman, 1984; Friedman & Miles, 2006; Freeman, 2010; Baah et al., 2021). The stakeholder is used in this study because the tourism planning process in district municipalities requires input from different stakeholders. These

stakeholders include all those that will be directly and indirectly affected by the development and implementation of tourism policies. According to stakeholder theory, the objective of a firm is to create value for all stakeholders, not just shareholders (Stakeholder Map, n.d.). Figure 1 shows the different organisations that make up the stakeholder theory.

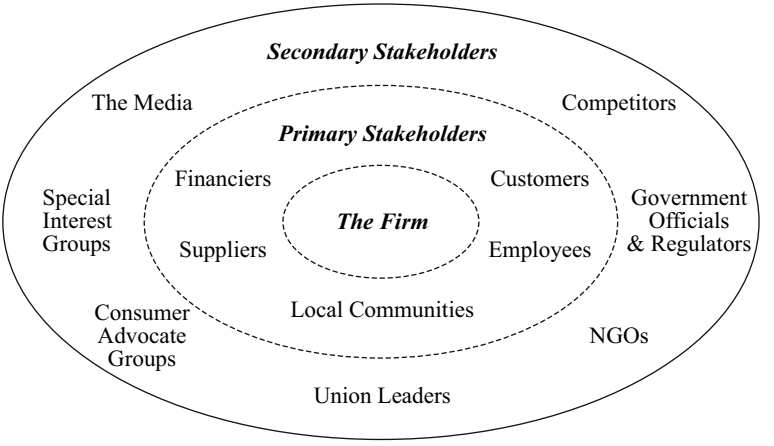

Figure 1: Stakeholder theory
Source: Freeman et al. (2018, p. 24)

The stakeholder theory is made up of primary and secondary stakeholders. Fassin (2012), seconded by Todd, Leask & Ensor (2017, p. 500), states that primary stakeholders are those that may affect or be affected by the organisation. Figure 1 above shows that investors, employees, customers, suppliers and communities are typical examples of primary stakeholders. Therefore, in the context of this study, primary stakeholders would be ORTDM itself and the Local Municipalities under the District Municipalities. There are also secondary stakeholders involved in development and implementation of tourism policies in ORTDM. Secondary stakeholders are the individuals or organisations who are not directly affected by company activities (Aaltonen & Kujala, 2010). Taking it further, Fliaster & Kolloch (2017), define secondary stakeholders as people or entities that do not engage in direct business transactions with the company or organisations. So, in this research study, secondary stakeholders would be the District Tourism Organisation (DTO), Local Tourism Organisations and Eastern Cape Parks Tourism Agency (ECPTA). Tourism planning requires different stakeholders to participate in the development and implementation process.

2.1. Tourism planning in district municipalities

There is a broad literature on public sector intervention in the tourism sector, and scholars should also direct attention towards a better understanding of the rationality, roles, and activities of this engagement in the tourism sector, particularly at the local government level (Shone, Simmons & Dalziel, 2016, p.2). This study notes this knowledge gap, and it aims to ascertain the involvement of different stakeholders in tourism policy development and implementation in the ORTDM.

The Municipal Structures Act No. 117 of 1998 provided a legislative framework for the joining and validation of municipalities under the constitution of South Africa (South African Local Government Association (SALGA, 2011, p. 4; Hofstetter, Bolding & van Koppen, 2020, p. 860). Pretorius and Schurink (2007, p. 25) credit the Municipal Systems Act No. 32 of 2000 for specifying the roles of district municipalities. These roles are well-defined and explained in the South African Constitution. South African Constitution (South Africa, 1996) endorsed by Al'Afghani, Kohlitz & Willetts (2019), states that municipalities have a right to rule, own their programs or initiatives, and manage local government affairs. However, all these must be subject to national and provincial legislation. Sperling, Hvelplund & Mathiesen (2011, p.1341) argued that the implementation of national policies and strategies are mainly distributed to municipalities. Thornhill (2008, p. 503) states that district municipalities are allowed to make and administer by-laws for effective administration. However, these by-laws must be aligned with national and provincial regulations. Section 151 (4) of the Constitution of the Republic of South Africa warns that a by-law that is inconsistent with national or provincial legislation is void (South African Constitution, Local Government, 1996).

Districts and local municipalities are government spheres in their own right. However, it is recommended that they apply cooperative governance principles (Morçöl & Wolf, 2010, p. 908; Herbig, 2019). Also, tourism planners in district municipalities should develop regulations that stand to the mandate of the municipality act, the republic constitution, and provincial tourism plans when undertaking local tourism planning and execution interventions (Irazábal, 2018, p. 88). Therefore, Bramwell (2011, p. 63) recommends coordinated efforts and stakeholder involvement in planning to avoid inconsistencies between tourism policies. The local government should make tourism plans and policies in collaboration with other local tourism stakeholders. Timothy (1999, p. 388) advocates local stakeholder involvement because it helps develop tourism policies relevant to local conditions. Liu and Wall (2006, p.168) and Bichler

(2021) state that local tourism authorities have a better understanding of available tourism resources, workforce, and financial resources.

Rural municipalities, like the ORTDM, are well-known for their shortcomings in tourism development. Unlike urban metros with big budgets allocated to economic development, rural municipalities have limited funds (Nel & Rogerson, 2007, p. 9; Kulaba, 2019). Available resources only cater to service delivery and other basic needs (Jili & Mthethwa, 2016, p. 103). Therefore, district municipalities should plan and implement strategies that are key to the growth and development of the tourism sector (Reed, 1997, p. 568; Timothy, 1999; Kontsiwe & Visser, 2019, p. 1340). The key priority areas in district tourism policy that should be addressed are infrastructure development, crime prevention, zoning, community and local economic development. The general considerations on improving infrastructure should promote the improvement of telecommunications capacity to ensure connectivity in rural tourist destinations (Thacker et al., 2019, p. 27). Tourist signage is an essential part of tourism planning in district municipalities. Taking it further, Tirachini and Cats (2020, p.9) propose that there must be a link between both private and public transportation. Districts and local municipalities should develop regulations that govern the tourism sector, including the licensing of businesses to support independent tourist movements (De la Calle-Vaquero, Garcia-Hernandez & Mendoza de Miguel, 2021, p. 21). Safety is a precedent in destination planning at the district level. Therefore, to reduce arguments around safety and security, district municipalities should invest in building tourism safety programs (Imbeah & Bujdoso, 2018).

3. RESEARCH METHODS

In a theoretical position, qualitative studies are based on beliefs about the nature of reality or knowledge (Twining et al., 2017, p. 2). Ormston et al. (2014, p. 4) believe that qualitative research can be conducted to study individual experience and make sense of their shared reality. According to Maree (2016, p. 52) qualitative research is a naturalist system that focuses on natural settings where interactions occur. The qualitative research method is suitable for this study because this study seeks to find the answers to the involvement of tourism stakeholders in development and implementation of tourism-related policies in the area under investigation. The researcher included various tourism stakeholders who are part of tourism planning and policy development at the ORTDM. These individuals also participated as crucial informants for data collection.

3.1. Research participants

The research population in this study included the district municipality staff, regional and local tourism organisations, also known as tourism forums, tourism development agencies, rural planning, and economic development departments. According to Fox, Bayat & Ferreira (2007, p. 52), the research population is a group of individuals from whom the samples are taken for measurement. The Department of Cooperative Governance and Traditional Affairs (COGTA) was also part of the research population in this study. To sum up, Explorable (n.d.) describes the research population as an extensive collection of individuals who focus on a scientific query (Explorable, n.d.) and the sample (participants) of this study was selected from the research population. There are two types of sampling methods, namely, probability and non-probability techniques.

The probability technique uses its theory to generalise the research population. Maree (2016, p.197) mentions that the non-probability sampling technique does not make random selection of the research population. Due to limited financial resources and time constraints, the researcher chose a non-probability sampling method as a suitable technique for this study. Researchers should limit the use of a non-probability method, but when financial resources are limited and results are needed urgently, Maree (2016, p.197) recommends the non-probability sampling method. Due to limited budget and time constraints the researcher chose a non-probability method for this study. Purposive sampling and snowball sampling methods were used in this study to identify the research sample from the research population.

According to Etikan, Alkassim & Abubakar (2016, p.55), the snowball sampling method is a non-random technique that does not need underlying theories or a set number of participants. The starting point to apply this method was to contact the district tourism manager who helped to identify people in charge of tourism-related policies. This practice allowed the researcher to decide who should participate and what needs to be known. Welman and Kruger (1999, p.197) state that the technique, as mentioned above, helps identify individuals with the necessary expertise and information different to other groups. In addition to the previous statement, Maree (2016, p.198) notes that snowball sampling is proper when the research interest is interconnected. The above sampling methods serve as a direction to data collection and related groups such as local and district tourism officers, municipality tourism managers, Eastern Cape Tourism Agency (ECPTA), and district and local tourism organisations formed the study sample.

3.2. Data collection and analysis

One of the main characteristics to consider when conducting a qualitative study is that the researcher serves as a data collection instrument. In the context of this study, Maree (2016, p.311) notes that quantitative and qualitative approaches may differ in their research questions and data collection, but they can be applied to study the same research problem. This study only used the qualitative research method as the main problem that was investigated is stakeholder involvement in the development and implementation of tourism-related policies in ORTDM. The researcher viewed an in-depth understanding of the participants' individual experiences about the matter under investigation. Therefore, interview guides were used as data collection instruments for this study. Wellman and Kruger (1999, p. 197) note that qualitative studies usually use interviews to identify important research variables.

Fourteen (14) semi-structured interviews were conducted on this study. Wengraf (2013, p.5) recommends semi-structured interviews because they help to guide the discussion and cover everything that needs to be covered. These interviews have helped the researcher understand opinions and emotions of respondents concerning their involvement in the development process and their concerns about the implementation of tourism related policies in the study area. Maree (2016, p. 205) further mentions that interviews are completed based on what the interviewee says. Due to COVID-19 pandemic, the semi-structured interviews were conducted through online platforms such as "Zoom" and "Microsoft teams". The online platforms were merely used to adhere to health and safety protocols. The thematic analysis technique was used to analyse the data. The researcher used thematic analysis because it was recommended by Odounga Othy (2020, p.8), as the researcher describes it as "an independent qualitative descriptive approach". This technique helped to identify and explore research themes from data collected from the participants (Braun & Clarke, 2006, p. 79). In this study, the researcher used thematic analysis to analyse data. The thematic analysis technique recognised the patterns within data, and themes emerged from the collected data and it became a set category for analysis (Fereday & MuirCochrane, 2006). Taking it further, Guest, MacQueen & Namey (2012) state that this analysis technique consists of reading through transcribed data, identifying common themes in the data, coding the themes, and interpreting their structure and content.

4. RESULTS AND DISCUSSIONS

There are different stakeholders involved in development and in the implementation of tourism policies. This study, therefore, aimed at ascertaining the significance of involving different stakeholders in tourism policy development and implementation in the ORTDM. Therefore, Table 1 below depicts the demographic profile of those who participated in this study as respondents from different organisations which they represented:

Table 1: Participants' demographic profile

Organisation	Position	Years in service	Education	Name of qualification	Gender
Tourism Organisation (R1)	Chairperson	5	Matric	Matric	Male
Local Municipality (R2)	Manager	5	Diploma and National Certificates	Diploma in Public Administration, Certificate in Small Business Management and Certificate in LED	Male
Local Municipality (R3)	Deputy Director	5	Honors Degree	Development Studies	Male
Tourism Organisation (R4)	Chairperson	3	Degree	Business management	Female
Local Municipality (R6)	Officer	1	Diploma	Tourism Management	Male
Local Municipality (R6)	Manager	5	Master's Degree	Tourism Management	Female
Tourism Organisation (R7)	Tourist Guide	6	Diploma and a National Certificate	National Diploma in Marketing Management and a Certificate in Food & Beverage Management	Male
Tourism Organisation (R8)	Chairperson	5	Degree	Business Management	Male
Local Municipality (R9)	Officer	5	Degree	Tourism Management	Female
Tourism Agency (R10)	Manager	5	Degree	Tourism Management	Female
Local Municipality (R11)	Officer	5	Degree	Tourism Management	Female
Tourism Organisation (R12)	Chairperson	3	Bachelor's degree	Association of Chartered Certified Accountant	Female
District Municipality (R13)	Officer	3	Diploma	Tourism Management	Female
District Municipality (R14)	Manager	3	Diploma	Tourism Management	Female

Source: Researcher's creation

Tourism planning and development requires a combined effort from different stakeholders who represent the private and public sectors (Jamal & Getz, 1995, p. 188). Wan (2013, p. 165) further suggests that tourism planning and development requires a census consultation, and all tourism stakeholders should be informed about development decisions. Table 1 above shows a wide variety of stakeholders that participated in this study. The number of years in their respective roles (policy development and implementation), the level of education, and the different positions that they hold in their organisations are shown on the above table. It is also important to note that all participants hold some form of education from matric to degrees in tourism and other related fields. The fact that thirteen of the fourteen participants have experience of at least three years may mean that they have sufficient knowledge about how policy is developed and implemented within the organisations.

It is important to note that there are different stakeholders involved in tourism development and the implementation of tourism policies. Therefore, the following section discusses findings related to the involvement of stakeholder in tourism development and implementation of tourism policies.

4.1. Stakeholder involvement in tourism policy development and implementation

According to Makuzva (2018, p.1) tourism is a multifaceted industry with many elements combined to offer saleable tourism products. Consequently, there are many issues that tourism stakeholders need to consider in the development process and prior in policy decisions (Yuksel, Bramwell & Yuksel, 1999, p. 354; Thetsane, 2019). Both internal and external factors are most likely to impact negatively or positively when policies are implemented (Somers & Nelson, 2001, p. 5; Saint Akadiri, Alola & Akadiri, 2019, p. 428). Boukas and Ziakas (2016, p. 48), state that internal matters such as coordination among tourism stakeholders play an essential part in tourism policy development. Socio-economic and political environment are external factors that should be considered when drafting tourism policies. Participants have concerns about lack of stakeholder engagement and poor implementation of tourism policies from the research findings.

4.2. Lack of stakeholder collaboration

The view of participants regarding stakeholders and the collaboration between the tourism agency, district, and local municipalities as well as tourism organisations to build solid relationships to the ORTDM tourism policy development shows

how this concept is widely misunderstood or simply unknown. Seven participants (R1, R4, R7, R8, R10, R12 and R14), mentioned that there is a need for tourism organisations to collaborate with local municipalities. The aforementioned participants suggested that politicians and municipality must support the Small Micro Medium Enterprise (SMME) in order to improve and uplift the tourism standards in the ORTDM. The success in tourism planning and stakeholder collaboration will undoubtedly positively impact the development of the tourism and hospitality sectors for the district municipality (ORTDM) and South Africa. However, the view is contradicted in the response that was received from participant one (R1) who claimed that the "Eastern Cape the adventure province" slogan was developed by people who did not come from the province and they kept mentioning bungee jumping, located in Western Cape in Bloukrans River Bridge (Tsitsikamma National Park) as a referencing point of adventure tourism. Members of the tourism organisation, like R1 and R2, mentioned that people did not know what adventure was, and tourism planners used only bungee jumping as a reference point, which raises a question about stakeholder collaboration and engagement of stakeholders in the planning of tourism strategies. Swarbrooke et al. (2003:4), define adventure tourism as means of exploring, and it involves experiencing tourist destinations by participating in physical activities such as hiking, bungee jumping, snorkelling, skydiving, and much more. Shahi (2017, p. 3), further states that adventure tourism attracts adrenaline junkies and those who seek thrills.

There is nothing wrong with tourism destination-planners being inspired and studying what other provinces or destinations are doing in destination-marketing. However, when developing a marketing strategy, comprehensive consulting with others is required to ensure that they understand the marketing strategy. All 14 participants agreed that stakeholder collaboration empowers the tourism industry, tourism organisations, tourism associations and local municipalities, together with the involvement of the district tourism department. The views of respondents R1 and R8 were that the provincial government and the ECPTA invite people from outside to develop tourism marketing strategies without collaborating with local tourism stakeholders. R8 further mentioned the following:

> …so basically, the strategy was developed by visitors, people who did not come from here, as a matter of fact, it was never taken off and people do not buy into it here. Not involving role-players in tourism planning and expecting them to act is like going to a battleground with a squad that has never trained together.

Planning is not an island; it is essential to involve every stakeholder in planning as they are affected by tourism plans and policies. If all parties are involved in planning and are consulted prior to making policy decisions, they are most likely to support tourism development initiatives. The lack of buy-in on the "Eastern Cape, the adventure province" results from a lack of consultation; otherwise, everyone in ORTDM would have understood the strategic direction and supported the marketing initiative. Additionally, marketing strategies should be developed based on features and available tourism products at the destination. Tour operators are essential to destination development and marketing, therefore, the DTO needs to establish an operator to create tourism packages for the ORTDM region.

Municipalities are political institutions and all fund allocations related to tourism development need council (political structure) approval (Roberts, 2008:527). Haughton and Rybář (2008:240) further mention that all policy directions are derived from political manifestos or resolutions of a particular political party. With political support from the district municipality and provincial government, tourism can thrive in the ORTDM. Respondents R1, R5 and R8 mentioned that there is still tension in political structures in the EC, hence slow progress in tourism for the ORTDM region in question. R1 further mentioned that:

> The Eastern Cape was broken into two parts (Ciskei and Transkei) by the apartheid government. That political rift hasn't been healed yet. Up until we get people who look beyond that…and until we use the Constitution and make this a selfless exercise, we are not going to move beyond that…

Party politics was one of the issues that participants (R1, R2, R3, R4, R7, R8, R10, R12 and R14) were concerned about. Whether one likes it or not, politics has an impact on tourism that is developed and planned. Politics is part of the external environment but it somehow influences the way tourism policies are drafted. Before the new South African political dispensation in 1994, the Eastern Cape Province consisted of the Transkei, which forms part of the wild coast, the ORTDM on the eastern part and Ciskei. When considered from a tourism development perspective, the Ciskei has always had better infrastructure compared to the former Transkei. The Tourism Grading Council and the ECPTA head offices are in East London, while the provincial legislature resides in King Williams Town. Some participants feel that they should have their own grading facilities instead of having someone from East London to grade their facilities. They also mentioned that they do not feel important enough to have better resources and facilities like other regions.

Perhaps when too many tourism stakeholders are at the local and regional level, tourism planners tend to waste time and effort consulting before anything is done (Devine et al., 2011:527). Tourism stakeholders should find a common interest to develop and grow tourism, then communicate with all departments involved in running tourism. All stakeholders should work towards a common purpose while aiming to attain their objectives. It is the government's role to ensure that they manage tourism effectively and support small businesses to ensure that their strategic goals are attained. However, this understanding is contrary to the response received from a representative (R1) who claimed that there are business opportunities that could lead to tourism growth. Still, they do not receive financial support from the municipality:

> The municipality has been taught to milk cows, not to feed cows. Local tourism operators need the approval of the law and funding to take advantage of business opportunities.

The respondent's view was that the district municipality did not create an enabling policy environment for tourism businesses to operate, which results from poor tourism planning. Also, the statement mentioned earlier by the respondent (R1) indicates that the municipality cannot assist the private sector with financial support (funding) to capitalise on business opportunities. In response to the above claim, a respondent (R3) from the district municipality mentioned that tourism receives partial political support and has a limited budget to implement tourism policies. Therefore, the district municipality needs to collaborate with members of the DTO and the communities to lobby for political support in tourism.

There are issues surrounding tourism awareness and experiencing tourism consultancy was a hot topic amongst participants. Some participants (R4, R7 & R8) believe that there is an issue of hiring people with limited experience in tourism development at the district municipality. Many of the participants (R1, R4, R7, R8 & R12) from the tourism organisations stressed the issue of inexperienced tourism personnel who attend travel and trade shows just to take pictures. There is a need for the municipality to invite some of the members of the tourism organisations to attend travel shows to showcase their offerings and learn from other destinations. Some issues need urgent attention; for example, a participant (R14) from the district municipality highlighted the following matters with regards to relations between tourism stakeholders (government and tourism organisations) in the ORTDM:

> There is little or no integration between government spheres. There is competition between members of the forum that hinder tourism development. Some of the members of the association are

> competing for tenders. The private sector usually participates in the Tourism fora because of the length of the meetings.

There is a need to establish good relationships between municipality employees and the members of the tourism associations. Tourism policy development and planning is not an island; therefore, collaboration amongst role-players is necessary to ensure that each stakeholder understands their role in tourism. Good relations build trust and trust is a solid foundation for a healthier working relationship between tourism stakeholders. When everyone is happy about their role, they work even harder to achieve both team and individual goals to ensure the implementation of tourism policies in the ORTDM.

4.3. Poor implementation of tourism policies

There is a perception that the district and its local municipalities are not effective in implementing tourism policies. Poor implementation of tourism plans negatively impacts destination development and growth (Ashley et al., 2001; Kebete & Wondirad, 2019). For example, if there is a delay in the installation of electricity, the accommodation hospitality sector is most likely to suffer from the consequences. Brokaj (2014, p. 105) recommends that the existing gap between ideology and practice is a significant step to converting the concept of tourism plans into daily practice. The issue of poor implementation of tourism strategies is one of the essential themes predominantly emphasised by most (R1, R2, R3, R5, R6, R9 &R11, R12 & R14) participants.

Poor implementation of tourism strategies can be perceived as a stumbling block to tourism development, which is why the above respondent (R5) calls for each stakeholder to perform their individual organisational tasks. Tourism policy is as good as it sounds but without execution or implementation, it is futile (Whitford & Ruhanen, 2010, p. 476). However, R12 believes that there is a lack of implementation and the respondent further made the following remarks:

> There was a strategy about commercialisation that was developed in 2016 and launched in 2017. The tourism agency has been sitting on this strategy since 2017, they cannot deal with the workload so they must call on private operators to come and assist… There is a vast amount of land where the government has built tourism facilities but they are not working. Since then, they have allocated only three facilities to the private sector… and we have about ten reserves laying down, the government is not playing enough role to improve the tourism sector.

Based on the above claims, the commercialisation strategy was developed without a proper implementation plan. Inskeep (1991, p. 429) opined that tourism strategies must be prepared realistically to be implementable. There has been no coordination between the district municipality and the private sector. R8 further mentioned that there is still work on the relations between the district municipality and other tourism stakeholders. Tourism policy and implementation go hand in hand. Rodriguez et al. (2014, p. 79) further state that policy and implementation are two sides of the same coin. It is important to note that there are not enough resources to ensure that the desired plans are implemented and there are growing concerns and fears from the tourism organisation. Respondent R7 mentioned that:

> …we have to constantly knock at the government doors and remind them about what they are supposed to do. But then again, if you keep pushing, you somehow become the enemy of the state and end up not getting invited when there are meetings and workshops relating to tourism businesses.

Once again, the statement above clearly indicates that some stakeholders are not satisfied with the way the government manages things in the ORTDM. All participants throughout the interviews kept mentioning that there are issues that make it difficult for the district municipality to implement tourism policies. Delays on land claims and allocations were also a dominant factor amongst participants. One respondent (R8) mentioned that the district municipality maks deals with foreign companies rather than local businesses. On the other hand, R5 claims that the Marine Protection Act (MPA) No. 27 of 2000 was designed to exclude black communities close to the coastline because:

> The only act they are focusing on is the Marine Protection Act… which states that we are not allowed to build close to the coastline and houses must be located 5 km away from the coastline. However, white people build houses close to the coastline because they do EIA's and build private cottages.

The ECPTA and the ORTDM should try to teach people who are in these remote areas about the value of the tourism sector. Transforming the tourism and hospitality industry is one of the pillars in the National Tourism Sector Strategy. Therefore, the ECPTA should encourage and help people to get the EIA so that they can remain on the coastline and have their own private establishments to employ other community members. One participant (R7) further makes the following assertions about corrupt activities between traditional leaders and the ECPTA:

> To get land, people bribe traditional leaders and get a piece of land, then go to ECPTA for EIA assessment approvals to build these private cottages. We are fighting big wars when it comes to corruption and implementation of policies and acts. The municipality has failed dismally. It is surprising that they are constantly developing new strategies but failing to implement what they have.

There is no substantive evidence to back the above claims, but if there are any wrongdoings, law enforcement agencies need to get involved and prevent this from happening. Some authors state that corruption is a criminal offence; whoever is involved in any illegal dealings should be arrested. South Africa has been rooted in corruption over the last couple of decades and citizens suffer from wrongdoings.

5. CONCLUSIONS

Participants were very optimistic about the tourism workshops organised by the ORTDM and other tourism role players. However, some were critical and unimpressed with how the district municipality facilitates and manages the tourism industry. Participants believe that tourism is not planned in an integrated manner; consequently, they fail to implement their policies. Therefore, the district municipality should lead the development process, and apply the stakeholder theory when it engages with different stakeholders (multi-stakeholder approach) involved in development, implementation and monitoring of tourism policies.

The multi-stakeholder model or approach is essential in the case of this study because Kannan (2018) states that it allows all stakeholders to be responsible and present in the tourism policy decision-making process. The multi-stakeholder approach can be defined as a policy objective of creating a culture of collaboration and inclusion in the tourism industry (George et al., 2007:1). These authors suggested that all role players should share knowledge that relates to the tourism sector so as to scatter the long-held perception that tourism is an exploiter of wealth where only the rich can benefit. The stakeholder theory can be achieved through representation from all tourism stakeholders and discussing their interests and pronouncing on policy decisions (for example, the tourism development process at the local level uses tourism forums and workshops to foster collaborations, networking and to improve business relationships between tourism stakeholders).

Furthermore, benefits can be achieved by collaborating with the district municipality, local municipalities, and tourism organisations to build solid

relations for tourism policy development. Stakeholder collaboration has a positive impact on the development of tourism and hospitality as an economic sector. In the light of the recent announcements such as the Tourism Sector Recovery Plan (TSRP) of 2020 by South African National Department of Tourism, there appears to be the need for a broader analysis of a multi-stakeholder approach in the tourism policy development process. Such investigation would allow the unpacking of the challenges involved and provide a continuous implementation basis for policy development at the lowest level of governance. In this way, a more integrated and sustainable tourism sector could be constructed in the ORTDM and the Eastern Cape more broadly. Future studies collaboratively focusing on tourism policy development would be beneficial to both economic development and the tourism industry.

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Conflict of interests

Authors declare that the content of this paper represents their own unaided work and that this article has not previously been submitted to any publication for a review. Authors declare there is no conflict of interest.

REFERENCES

Aaltonen, K., & Kujala, J. (2010). A project lifecycle perspective on stakeholder influence strategies in global projects. *Scandinavian journal of management, 26*(4), 381-397. DOI:10.1016/j.scaman.2010.09.001

Al'Afghani, M. M., Kohlitz, J., & Willetts, J. (2019). Not built to last: Improving legal and institutional arrangements for community-based water and sanitation service delivery in Indonesia. *Water Altern, 12*(1), 285-303. Retrieved from: https://www.water-alternatives.org/index.php/alldoc/articles/volume-12/v12issue1/490-a12-1-16/file

Altinay, L., Paraskevas, A., & Jang, S. S. (2015). *Planning research in hospitality and tourism*. London, UK: Routledge. DOI: 10.4324/9781315723662

Ashley, C., Ashley, C., Goodwin, H., & Roe, D. (2001). *Pro-poor tourism strategies: Expanding opportunities for the poor.* London, UK: ODI.

Baah, C., Opoku-Agyeman, D., Acquah, I. S. K., Agyabeng-Mensah, Y., Afum, E., Faibil, D., & Abdoulaye, F. A. M. (2021). Examining the correlations between stakeholder pressures, green production practices, firm reputation, environmental and financial performance: evidence from manufacturing SMEs. *Sustainable Production and Consumption, 27*, 100-114, DOI:10.1016/j.spc.2020.10.015

Bassadien, M. (2017). *The effects of gentrification and sustainable cultural tourism development in the Bo-Kaap*. Doctoral dissertation. Cape Town, South Africa: Cape Peninsula University of Technology

Bhandari, K. (2019). International development ideology and two tourism policies of Nepal. *Environment and Planning C: Politics and Space, 37*(3), 558-576, DOI: 10.1177/2399654418788865

Bichler, B. F. (2021). Designing tourism governance: The role of local residents. *Journal of Destination Marketing & Management, 19*, 100389, DOI:10.1016/j.jdmm.2019.100389

Birendra, K. C., Dhungana, A., & Dangi, T. B. (2021). Tourism and the sustainable development goals: Stakeholders' perspectives from Nepal. *Tourism Management Perspectives, 38*, 100822. DOI: 10.1016/j.tmp.2021.100822

Bless, C., Higson-Smith, C., & Kagee, A. (2006). *Fundamentals of social research methods: An African perspective.* South Africa: Juta and Company Ltd.

Bohlmann, H. R., & van Heerden, J. H. (2005). The impact of hosting a major sport event on the South African economy. *Journal of Tourism, 26*(4), 595-603. Retrieved from: http://www.up.ac.za/up/web/en/academic/economics/index.html

Boukas, N., & Ziakas, V. (2016). Tourism policy and residents' well-being in Cyprus: Opportunities and challenges for developing an inside-out destination management approach. *Journal of Destination Marketing & Management, 5*(1), 44-54. DOI:10.1016/j.jdmm.2015.12.004

Bramwell, B. (2011). Governance, the state and sustainable tourism: A political economy approach. In *Tourism governance* (pp. 59-78). London, UK: Routledge. DOI: 10.4324/9780203721025

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology, 3*(2), 77-101. Retrieved from: https://www.tandfonline.com/doi/abs/10.1191/1478088706QP063OA

Britton, S. (1991). Tourism, capital, and place: towards a critical geography of tourism. *Environment and planning D: society and space, 9*(4), 451-478, DOI:10.1068/d090451

Brokaj, R. (2014). Local Governments role in the sustainable tourism development of a destination. *European scientific journal, 10*(31). Retrieved from: https://core.ac.uk/reader/328024630

De la Calle-Vaquero, M., Garcia-Hernandez, M., & Mendoza de Miguel, S. (2021). Urban planning regulations for tourism in the context of overtourism. Applications in historic centres. *Sustainability, 13*(1), 70, DOI:10.3390/su13010070

Earle, N. (2008). *South Africa Department of Labour (SA.DOL) Sector Studies:* Tourism. Pretoria, South Africa: Human Sciences Research Council (HSRC). Retrieved from: https://www.labour.gov.za/DocumentCenter/Research%20

Documents/2001-2009/Tourism,%20Sector%20studies%20research%20project.pdf

Etikan, I., Alkassim, R., & Abubakar, S. (2016). Comparision of snowball sampling and sequential sampling technique. *Biometrics and Biostatistics International Journal, 3*(1), 55. DOI: 10.15406/bbij.2015.03.00055

Explorable. (n.d.). *Research Population.* Retrieved from: https://explorable.com/research-population.

Ezebilo, E. E., & Mattsson, L. (2010). Socio-Economic Benefits of Protected Areas As Perceived By Local People around Cross River National Park, Nigeria. *Forest Policy and Economics, 12*(3), 189-193, DOI:10.1016/j.forpol.2009.09.019

Fassin, Y. (2012). Stakeholder management, reciprocity and stakeholder responsibility. *Journal of business ethics, 109*(1), 83-96. DOI: 10.1007/s10551-012-1381-8

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International journal of qualitative methods, 5*(1), 80-92, DOI: 10.1177/160940690600500107

Fliaster, A., & Kolloch, M. (2017). Implementation of green innovations–The impact of stakeholders and their network relations. *R&D Management, 47*(5), 689-700. DOI:10.1111/radm.12257

Fox, W., Bayat, S., & Ferreira, N. (Eds.). (2007). *A guide to managing public policy.* South Africa: Juta and Company Ltd.

Freeman, R.E. (1984). *Strategic Management: A Stakeholder Approach.* Massachusetts: Pitman.

Freeman, R. E. (2010). *Strategic management: A stakeholder approach.* Cambridge, UK: Cambridge University Press.

Freeman, R., Harrison, J., & Zyglidopoulos, S. (2018). *Stakeholder Theory: Concepts and Strategies (Elements in Organization Theory)*. Cambridge: Cambridge University Press. DOI:10.1017/9781108539500

Friedman, A., & Miles, S. (2006). *Stakeholders: Theory and Practice.* New York, US: Oxford University Press.

Gössling, S., Scott, D. & Hall, C. (2020). Pandemics, Tourism and Global Change: A Rapid Assessment of COVID-19. *Journal of Sustainable Tourism, 29*(1), 1-20. DOI:10.1080/09669582.2020.1758708

Guest, G., MacQueen, K. M., & Namey, E. E. (2012). *Applied Thematic Analysis*. Thousand Oaks, California, US: Sage Publication. DOI: 10.4135/9781483384436

Hatipoglu, B., Alvarez, M., & Ertuna, B. (2016). Barriers to Stakeholder Involvement in the Planning Of Sustainable Tourism: The Case of the Thrace Region in Turkey. *Journal of Cleaner Production, 111*, 306-317, DOI:10.1016/j.jclepro.2014.11.059

Herbig, F. (2019). Talking Dirty-Effluent and Sewage Irreverence In South Africa: A Conservation Crime Perspective. *Cogent Social Sciences, 5*(1), 1701359. DOI: 10.1080/23311886.2019.1701359

Hofstetter, M., Bolding, A., & van Koppen, B. 2020. Addressing Failed Water Infrastructure Delivery through Increased Accountability and End-user Agency: The Case of the Sekhukhune District, South Africa. *Water Alternatives, 13*(3),

843-863. Retrieved from: https://www.water-alternatives.org/index.php/alldoc/articles/vol13/v13issue3/595-a13-3-13/file

Imbeah, N., & Bujdoso, Z. (2018). Tourist safety and security in the Central Region of Ghana-Overview and Case study. *Ecocycles, 4*(2), 33-45, DOI:10.19040/ecocycles.v4i2.113

Inskeep, E. (1991). *Tourism Planning: An Integrated and development approach.* Toronto, Canada: John Wiley & Sons, Inc.

Irazábal, C. (2018). Coastal urban planning in the 'Green Republic': Tourism development and the nature–infrastructure paradox in Costa Rica. *International Journal of Urban and Regional Research, 42*(5), 882-913. DOI:10.1111/1468-2427.12654

Jamal, T., & Getz, D. (1995). Collaboration Theory and Community Tourism Planning. *Annals of Tourism Research, 22*(1), 186-204. DOI:10.1016/0160-7383(94)00067-3

Jili, N., & Mthethwa, R. (2016). Challenges in Implementing Ionitoring and Evaluation (M&E): The case of the Mfolozi Municipality. *African Journal of Public Affairs, 9*(4), 101-113. Retrieved from: http://hdl.handle.net/2263/59021

Kebete, Y., & Wondirad, A. (2019). Visitor management and sustainable destination management nexus in Zegie Peninsula, Northern Ethiopia. *Journal of Destination Marketing & Management*, *13*, 83-98. DOI:10.1016/j.jdmm.2019.03.006

Kontsiwe, N., & Visser, G. (2019). Tourism as a Vehicle for Local Economic Development in Small Towns? When Things Go Wrong: The Case of Aliwal North, South Africa. *GeoJournal of Tourism and Geosites, 27*(4), 1334–1346. DOI:10.30892/gtg.27418-437

Kulaba, S. (2019). *Local Government and the Management of Urban Services in Tanzania*. In African cities in crisis. New York,US: Routledge. DOI:10.4324/9780429048227

Lester, F. (2005). On the Theoretical, Conceptual, and Philosophical Foundations for Research in Mathematics education. *Zdm, 37*(6), 457-467. Retrieved from: https://link.springer.com/article/10.1007/BF02655854

Liu, A., & Wall, G. (2006). Planning Tourism Employment: A Developing Country Perspective. *Tourism Management, 27*(1), 159-170, DOI:10.1016/j.tourman.2004.08.004

Makuzva, W. (2018). *Tourists' Perspectives of a Tourism Product in a Selected Zimbabwean Town.* Unpublished Master's Thesis. Cape Town, South Africa: Cape Peninsula University of Technology

Maree, K. (2016). *First Steps in Research.* 2nd Ed. Pretoria, South Africa: Van Schaik. Retrieved from: http://hdl.handle.net/20.500.11838/2847

Morçöl, G., & Wolf, J. (2010). Understanding Business Improvement Districts: A New Governance Framework. *Public Administration Review, 70*(6), 906-913. DOI:10.1111/j.1540-6210.2010.02222.x

Nel, E., & Rogerson, C. (2007). Evolving Local Economic Development Policy and Practice in South Africa with Special Reference to Smaller Urban Centres. In *Urban Forum, 18*(2) (pp. 1-11). Netherlands: Springer. DOI: 10.1007/s12132-007-9003-8

Ntloko, N.J. (2016). *Multi-Stakeholder Approach To Planning Into 2010 FIFA World Cup Initiatives: A Case Of A Non-Host Area In South Africa.* Unpublished Doctoral Dissertation. Cape Town, South Africa: Cape Peninsula University of Technology.

Odounga Othy, J.D.O. (2020). *Sport Events as Catalysts for Tourism and Hospitality Development in Libreville, Gabon.* Unpublished Master Thesis. Cape Town, South Africa: Cape Peninsula University of Technology.

Ormston, R., Spencer, L., Barnard, M., & Snape, D. (2014). The Foundations of Qualitative Research. *Qualitative Research Practice: A Guide for Social Science Students and Researchers, 2*, 52-55.

Osanloo, A., & Grant, C. (2016). Understanding, Selecting, and Integrating a Theoretical Framework in Dissertation Research: Creating the Blueprint For Your "House". *Administrative Issues Journal: Connecting Education, Practice and Research, 4*(2), 7. DOI: 10.5929/2014.4.2.9

Pebane, M.A. (2016). *An audit of public funded capital investment in tourism projects in the Eastern Cape Province.* Unpublished Master Thesis. Cape Town, South Africa: Cape Peninsula University of Technology.

Pretorius, D., & Schurink, W. (2007). Enhancing Service Delivery in Local Government: The Case of a District Municipality. *SA Journal of Human Resource Management, 5*(3), 19-29. Retrieved from: https://hdl.handle.net/10520/EJC95864

Reed, M. (1997). Power Relations and Community-Based Tourism Planning. *Annals of Tourism Research, 24*(3), 566-591. DOI:10.1016/S0160-7383(97)00023-6

Saint Akadiri, S., Alola, A., & Akadiri, A. (2019). The Role of Globalization, Real Income, Tourism in Environmental Sustainability Target. Evidence from Turkey. *Science of the Total Environment, 687*, 423-432, DOI: 10.1016/j.scitotenv.2019.06.139

Shahi, A. (2017). *Thrill Tourism in Pokhara*. Unpublished Doctoral Thesis. Kathmandu, Nepal: Tribhuvan University.

Sharpley, R., & Telfer, D. (2015). *Tourism and development in the Developing World*. London, UK: Routledge, DOI:10.4324/9781315686196

Shone, M. C., Simmons, D. G., & Dalziel, P. (2016). Evolving Roles for Local Government in Tourism Development: A Political Economy Perspective. *Journal of Sustainable Tourism*, 24(12), 1674-1690, DOI:10.1080/09669582.2016.1184672

Simangunsong, F., & Arifin, A. (2019). The performance of public works and spatial planning agencies in the acceleration of road infrastructure development in the district Banggai province of central Sulawesi. *International Journal of Kybernology, 4*(2), 136-153, DOI:10.33701/ijok.v4i2.802

Solomons, G. (2016). *Measuring the performance of the Integrated Development Plan in a selected metropolitan council in the Western Cape, South Africa.* Unpublished Master Thesis. Cape Town, South Africa: Cape Peninsula University of Technology.

Somers, T., & Nelson, K. (2001), January. The Impact of Critical Success Factors Across the Stages Of Enterprise Resource Planning Implementations. In *Proceedings of*

the 34th Annual Hawaii International Conference on System Sciences (pp. 1-10). Maui: IEEE Xplore. DOI:10.1109/HICSS.2001.927129

South Africa. (1996). *Constitution of the Republic of South Africa, Chapter 7.* Local Government. Retrieved from: https://www.gov.za/documents/constitution-republic-south-africa-1996-chapter-7-local-government#153

South African Local Government Association (SALGA). (2011). *Guideline document on the roles and responsibilities of councillors, political structures and officials.* Pretoria, South Africa: Ultra Litho (Pty) Ltd.

Sperling, K., Hvelplund, F., & Mathiesen, B. (2011). Centralisation and Decentralisation in Strategic Municipal Energy Planning in Denmark. *Energy Policy, 39*(3), 338-1351. DOI:10.1016/j.enpol.2010.12.006

Stakeholder Map. (n.d.). *Stakeholder Theory.* Retrieved from: https://www.stakeholdermap.com/stakeholder-theory.html.

State of the Nation Address (SONA). (2018). *Cape Town.* Retrieved from: https://www.youtube.com/watch?v=FWDLtFZUrso SABC.

Swarbrooke, J., Beard, C., Leckie, S., & Pomfret, G. (2003). *Adventure Tourism: The New Frontier.* Burlington, Canada: Routledge.

Thacker, S., Adshead, D., Fay, M., Hallegatte, S., Harvey, M., Meller, H., O'Regan, N., Rozenberg, J., Watkins, G., & Hall, J. (2019). Infrastructure for sustainable development. *Nature Sustainability*, *2*(4), 324-331. Retrieved from: https://www.nature.com/articles/s41893-019-0256-8

Thetsane, R. (2019). Local community participation in tourism development: The case of Katse villages in Lesotho. *Athens Journal of Tourism, 6*(2),123-140. DOI:10.30958/ajt.6-2-4

Thornhill, C. (2008). The transformed local government system: Some lessons. *Journal of Public Administration, 43*(2), 492-511. Retrieved from: https://hdl.handle.net/10520/EJC51649

Timothy, D. (1999). Participatory Planning: A View of Tourism in Indonesia. *Annals of Tourism Research, 26*(2), 371-391. DOI:10.1016/S0160-7383(98)00104-2

Timothy, D., & Tosun, C. (2003). *Appropriate Planning For Tourism in Destination Communities: Participation, Incremental Growth and Collaboration. Tourism in Destination Communities.* Wallingford, UK: CABI International. DOI:10.1079/9780851996110.0181

Tirachini, A. & Cats, O. (2020). COVID-19 and Public Transportation: Current Assessment, Prospects, and Research Needs. *Journal of Public Transportation, 22*(1),1-21. DOI: 10.5038/2375-0901.22.1.1

Todd, L., Leask, A., & Ensor, J. (2017). Understanding Primary Stakeholders' Multiple Roles in Hallmark Event Tourism Management. *Tourism Management, 59*, 494-509. DOI:10.1016/j.tourman.2016.09.010

Twining, P., Heller, R., Nussbaum, M., & Tsai, C. (2017). Some Guidance on Conducting and Reporting Qualitative Studies. *Computers & Education, 106,* A1- A9. DOI:10.1016/j.compedu.2016.12.002

United Nations World Tourism Organisation. (2008). *International Recommendations for Tourism Statistics*. Retrieved from: https://unstats.un.org/unsd/publication/seriesm/seriesm_83rev1e.pdf

Waligo, V., Clarke, J., & Hawkins, R. (2013). Implementing Sustainable Tourism: A Multi-Stakeholder Involvement Management Framework. *Tourism Management, 36*, 342-353. DOI:10.1016/j.tourman.2012.10.008

Wan, Y. (2013). A Comparison of the Governance of Tourism Planning In the Two Special Administrative Regions (SARs) of China–Hong Kong and Macao. *Tourism Management, 36*, 164-177. DOI:10.1016/j.tourman.2012.12.005

Welman, J., & Kruger, S. (1999). *Research Methodology for the Business and Administrative Sciences*. Johannesburg, South Africa: International Thompson

Wengraf, T. (2013). *Qualitative research interviewing: Biographic narrative and semi structured methods*. London, UK: SAGE.

Whitford, M. & Ruhanen, L. (2010). Australian indigenous tourism policy: Practical and sustainable policies? *Journal of Sustainable Tourism, 18*(4), 475-496. DOI: 10.1080/09669581003602325

Yuksel, F., Bramwell, B., & Yuksel, A. (1999). Stakeholder Interviews and Tourism Planning at Pamukkale, Turkey. *Tourism Management, 20*(3), 351-360. DOI:10.1016/S0261-5177(98)00117-4

РАЗВОЈ И ИМПЛЕМЕНТАЦИЈА ТУРИСТИЧКЕ ПОЛИТИКЕ У ПРОВИНЦИЈИ ИСТОЧНИ КЕЈП, ЈУЖНОАФРИЧКА РЕПУБЛИКА: ДА ЛИ СЕ РАЧУНА УКЉУЧИВАЊЕ ЛОКАЛНИХ СТЕЈКХОЛДЕРА?

1 Монвабиси Силвана, Одсјек за туризам и менаџмент догађаја, Факултет за бизнис и менаџмент, Технолошки универзитет у Кејптауну, Кејптаун, Јужноафричка Република
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САЖЕТАК

Општине су на најнижем нивоу власти и ту се одвија стварна имплементација туристичке политике. Општине и заједнице у дистрикту на глобалном нивоу често се суочавају са лоше планираним развојним пројектима који су резултат и неефикасне имплементације политике и планирања. Један од разлога јесте и то што повремено постоји недостатак учешћа кључних стејкхолдера. Успјех политика развоја туризма и њихова имплементација почива на укључивању свих релевантних учесника. Ова студија усвојила је квалитативни истраживачки приступ у којем су коришћене методе намјере и методе узорковања „сњежних грудви“ за идентификацију истраживачког узорка из истраживачке популације. Истраживачка популација укључивала

је особље општине у дистрикту, регионалне и локалне туристичке организације, познате и као туристички форуми, агенције за развој туризма и одјељења за рурално планирање и економски развој. Сходно томе, обављено је 14 полуструктурираних интервјуа са стејкхолдерима из општине дистрикта, локалних општина, туристичких организација и туристичке агенције Паркови Источног Кејпа. За анализу података кориштена је техника тематске анализе. Ова студија се фокусирала на укљученост стејкхолдера у развој и имплементацију туристичких политика у општини ОР Тамбо (ОРТДМ). Кључни налази из студије су открили да постоји недостатак сарадње стејкхолдера у развоју и имплементацији политика везаних за туризам у ОРТДМ-у.

Кључне ријечи: *стејкхолдери, политике, теорија стејкхолдера, планирање туризма*

FOOD INFLATION AND CHILD HEALTH IN AFRICA: EVIDENCE FROM COUNTRIES WITH HIGH MISERY INDEX

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ABSTRACT

This paper investigates the effect of food price inflation on the public health improvement as measured in terms of life expectancy, infant mortality rate, under five mortality rate and neonatal mortality rate in six selected African countries with high misery index for the period from 2000 to 2020. The Augmented Mean Group and Common Correlated Estimation Mean Group were used to determine the effect, as well as Westerlund Cointegration tests. Our findings revealed that rising food prices have a significant detrimental effect on nourishment and consequently lead to higher levels of infant under five and neonatal mortality while reducing the expected life expectancy in the African countries. High food price inflation also has a long run effect on public health. The implication of the result shows that with high rate of food prices coupled with poor child health, the Sustainable Development Goals target of ending preventable deaths of newborns and children under age of 5, and the aim of having a neonatal mortality rate of 12 or fewer deaths per 1,000 live births, and an under-five mortality rate of 25 or fewer deaths per 1,000 live births, by 2030 may not be realistic. Therefore, African Governments should gear up efforts towards reducing food price inflation, improving health expenditure, per capita income and enabling environment for safe sanitation, especially for pregnant women and little children. Also, Governments should create enabling environment for sanitation and access to safe drinking water.

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1. INTRODUCTION

Since the dawn of humanity, ensuring healthy lives, promoting well-being at all ages and reduction of child mortality have been at the center of health debate in literature. Governments both in the developed, emerging and developing economy, health care professionals, and policymakers all over the world have expressed a strong desire to reduce the global occurrence of childhood mortality and improve public health of its citizens. This attention has not only spread to the international level but has also resulted in the development of effective interventions to reduce child mortality among children under the age of five, before the first 28 days and infant between 1990 and 2015, as well as between 2015 and 2030, as outlined in the United Nations' Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs), respectively (Bao, Tao, Afzal & Dördüncü, 2022; Fadnes, Økland, Haaland & Johansson, 2022). Understanding the importance of child health therefore led the United Nation in 2015 to include it as one of its important targets, Goal 3.2 of the Sustainable Development Goals, calls for an end to preventable deaths of newborns and children under age 5, with all countries aiming to have a neonatal mortality rate of 12 or fewer deaths per 1,000 live births, and an under-five mortality rate of 25 or fewer deaths per 1,000 live births, by 2030.

However, after a historic low level in the early 2000s, global food prices surged upwards to bring about the global food crisis of 2008 (Woldemichael, Kidane & Shimeles, 2017). As a result, Usman, Mekonnen, Kornher, and Braun (2021) opined that high and increasing food prices can generate an immediate threat to the security of a household's food supply, thereby undermining population health. In Africa, for example, interstate policies are dragging some countries into further food price increase and economic discomfort. For example, in the recent time, the World Bank has advised the Nigerian economy to increase tax and remove fuel subsidy at the expense of the mass poor who do not have enough resources to feed their households.

Inflation is rising around the world. In sub-Saharan Africa, one item is driving the trend more than others: food prices. Food accounts for roughly 40 percent of the region's consumption to correct measure of goods and services used to measure consumer price index (CPI) inflation. Food inflation increased throughout 2019, on average, across 20 countries in the region where monthly food price data are available. On a global scale, the recent increase in food inflation is attributed to rising oil prices (which raise fertilizer prices and transportation costs), droughts and export restrictions imposed by some major food exporters and stockpiling in some countries. In addition, pandemic containment measures disrupted production and imports of seeds and fertilizers and caused labor shortages during planting seasons (Eng. et al, 2022; Cassidy-Vu, Way & Spangler, 2022).

The continuous increase in inflation coupled with high rate of unemployment has placed some African countries among miserable countries in the world. The

misery index is intended to evaluate the level of economic pain experienced by ordinary people because of the threat of (or actual) joblessness paired with rising living costs. However, since unemployment and inflation are both considered detrimental to one's economic well-being, their combined value is useful as an indicator of overall economic health. In Africa, the Hapkins misery index, an economic indicator that helps determine how the average citizen is doing economically, ranked Nigeria first with high rate of unemployment leading to their misery, followed by South Africa and then Egypt as the third. Rising inflation and unemployment have a detrimental effect on children's outcomes (Kessler & Hevenstone, 2022).

It is a pity that despite efforts put in place by government of most African countries to ensure healthy life, Africa still recorded the poorest in terms of life expectancy at birth with average life expectancy of 63 years for male, and 66 years for female as compared to the world expected life expectancy of 71 years and 75 years. However, for Asia, Europe, North America, South America, Oceania, and Antarctica, the life expectancy is 72 years for men and 76 for women, 75 years for men and 81 for women, 75 years for men and 81 for women, 73 years for men and 79 for women, 76 years for men and 80 for women, and 73 years for men and 79 for women, respectively. The average life expectancy for each of these continents is bigger than the global average. Also, African continent has the highest mortality rate in terms of infant, under-five and neonatal with declining infant, under-five and neonatal mortality rates and increased the life expectancy (WDI, 2022).

High and increasing food prices can generate an immediate threat to the security of a household's food supply, thereby undermining population health, slowing down human development, and lowering labor productivity for the economy in the long term. Understanding the effect of a food crisis on nutrition and health is therefore critical for the development of public policies and social programs to help vulnerable groups of individuals, households, and countries alike. Therefore, this paper investigates the effects of food price inflation on public health improvement in Africa using top six African countries with high misery index. The paper contributes to the literature in the following areas. First, the application of second-generation econometrics techniques (Augmented Mean Group (AMG), Common Correlated Mean Group (CCEMG) and the Westerlund cointegration test to estimate the relationship between food price inflation and public health improvement in Africa. Second, among African nations with high misery indices, this study adds to existing literature on food inflation and child health.

Aside from the introduction, the rest of the paper is structured as follows: The data and methodology employed is presented in section 2, Empirical results are discussed in section 3, while conclusion and policy implication are addressed in section 4.

2. MATERIALS AND METHODS

2.1. Data

The study sample is made up of the top six African countries with high misery index, namely, Nigeria, South Africa, Egypt, Angola, Mauritius, and Mali. The study period is from 2000 to 2020. The variables of interest include food price inflation, under-five mortality, infant mortality, neonatal mortality, access to safe sanitation, life expectancy, GDP per capita and government health expenditure. The World Bank's cross-country data-base of inflation was used to obtain information on food consumer price inflation. The World Bank's database of global development indicators was used to obtain information on under-five mortality, infant mortality, neonatal mortality, access to safe sanitation, life expectancy, GDP per capita, and government health spending.

2.2. Methodology

The model by Lee, Lee, Lim & Park (2016) is adopted for this study with a slight modification. Therefore, to examine the effect of food price inflation on public health improvement in Africa we specify the following functional form model:

$$CH = f\left(FCPI, PKY, ASA,, GHE\right) \quad (1)$$

Where: CH represents child health measured by under-five mortality, infant mortality, neonatal mortality, and life expectancy, FCPI, represents food consumer price inflation, PKY stands for GDP per capita, ASA means access to sanitation, while GHE represents government health expenditure. Although, the paper seeks to investigate the effect of food price inflation on child health, per capita income, access to sanitation and government health expenditure are added as control variables as supported by Lee et al, (2016). Equation (1) is transformed into an econometric log form as specified bellow:

$$CH_t = \alpha_0 + \alpha_1 FCPI_{it} + \alpha_2 PKY_{it} + \alpha_3 ASA_{it} + \alpha_4 GHE_{it} + \varepsilon_{it} \quad (2)$$

In logarithm form, equation 2 is re-specified as:

$$logCH_t = \alpha_0 + \alpha_1 logFCPI_{it} + \alpha_2 logPKY_{it} + \alpha_3 logASA_{it} + \alpha_4 logGHE_{it} + \varepsilon_{it} \quad (3)$$

A priori, we expect food price to have positive effect on infant mortality rate, under five mortality and neonatal mortality while the relationship should be negative with life expectancy at birth. All variables are logged to reduce the standard error.

2.3. Estimation Techniques

2.3.1. Preliminary Estimation and Cross-Sectional Dependence

The theoretical literature on panel data time series econometrics began with the first generation econometric methods consisting of unit root tests, cointegration tests, and empirical estimations, which assume that panel members are cross sectionally independent (Im, Pesaran & Shin, 2003; Maddala & Wu, 1998; Pedroni, 1999, 2004) However, Panel-data models tend to have substantial cross-sectional dependence in the errors, which can also arise owing to the presence of common shocks and non-observable components that eventually become component of the error term, spatial dependence, and idiosyncratic pairwise dependence in the interruptions with no particular pattern of common components or spatial dependence, according to the growing panel-data literature. (De Hoyos & Sarafidis, 2006). Hence, we employed the Breusch and Pagan (1980) LM test, Pesaran (2004) scaled LM test, Pesaran (2004) CD test, and Baltagi, Feng and Kao (2012) bias-corrected scaled LM test for testing the presence or absence of cross-section in this paper. The four tests were used to compare the null hypothesis of no cross-sectional dependence to the alternative hypothesis, presented in equations 4 and 5.

$$H_0 : \hat{\gamma}_{ij} = \text{cor}\left(\forall_{it}, \forall_{jt}\right) = 0 \text{ for } i \neq j \quad (4)$$

$$H_1 : \hat{\gamma}_{ij} = \text{cor}\left(\forall_{it}, \forall_{jt}\right) \neq 0 \text{ for } i \neq j \quad (5)$$

2.3.2. Slope Homogeneity Test

The presence of slope homogeneity among the variables employed is another essential consideration. Failure to test for the presence or absence of something could lead to a false result. We use the Pesaran and Yamagata (2008) slope heterogeneity test to avoid the unwarranted conclusion that large economic

shocks identified in one country's variable do not immediately imply the existence of heterogeneity of slopes in the variables of another country based on the standardized version of the Swamy (1970) homogeneity test. The modification test is calculated as follows:

$$\hat{S}_{ht} = \sum_{i=1}^{N} \left(\hat{\rho}_i - \hat{\rho}_{sw}\right)' Z_I' \frac{G_T' Z_i}{\rho_i^2} \left(\hat{\rho}_i - \hat{\rho}_{sw}\right) \quad (6)$$

Where. is the pooled estimated ordinary least square estimate, represents pooled estimator for weighted fixed effect and is the estimator symbol in the equation.

Calculating the regular variance and bias statistics of the adjusted version of the specified equation in 6 is calculated using equations 7 and 8.

$$\hat{\Delta} = N^{\frac{1}{2}} = \left(\frac{N^{-1}\hat{S}_{ht} - \kappa}{2\kappa} \right) \quad (7)$$

$$\hat{\Delta}_{adj} = N^{\frac{1}{2}} \left(\frac{N^{-1}\hat{S}_{ht} - E\left(\tilde{X}_{it}\right)}{\text{var}^{\frac{1}{2}}\left(\tilde{X}_{it}\right)} \right) \quad (8)$$

Panel Unit Root Test

In order to avoid spurious regression arising from regressing a non-stationary series on another non-stationary series, we employ the cross-sectionally augmented Dickey-Fuller (CADF) panel unit root test of Pesaran (2007) and the cross-sectionally augmented of Im, Pesaran and Shin (2003) (CIPS) panel unit root test in determining the stationarity property of the variables employed in this study. The test statistics for CADF based on Pesaran (2007) is derived from an error correction model as:

$$\Delta h_{it} = \beta_i + a_i h_{i,t-1} + b_i \overline{h}_{t-1} + c_i \Delta \overline{h}_t + e_{it} \quad (9)$$

Where is the cross-sectional average of lagged levels is the first difference at period T for the entire panel. Following Pesaran (2007), the CADF is computed as:

$$CADF_i = t_i(N,T) = \frac{\Delta h_i' \overline{G}_w h_{i,-1}}{\hat{\pi}_i \left(h_{i,-1}' \overline{G}_w h_{i,-1}\right)^{\frac{1}{2}}} \quad (10)$$

The CIPS statistics is calculated from equation 14 and specified as:

$$CIPS = \frac{1}{N}\sum_{i=1}^{N} CADF_i \quad (11)$$

Westerlund Cointegration Test

We further test for the existence of a long-run relationship among the variables. To achieve this, we employ Westerlund (2007) panel cointegration test that is robust to challenges associated with cross-sectionally dependent panel data collections. The test is conducted under the null hypothesis of no long run relationship between food price inflation and public health improvement. This study carried out a total of two panel tests (p-tau and p-alpha) and two group-mean tests (g-tau, g-alpha respectively. The test is computed from error correction model as:

$$\Delta Z_{it} = \varphi_i^{'} m_t + n_i\left(Z_{i,t-1} - \alpha_i^{'} y_{i,t-1}\right) + \sum_{j=1}^{pi} n_{ij}\Delta Z_{i,t-j} + \sum_{qi}^{pi} \gamma_{ij}\Delta y_{i,t-j} + \varepsilon_{it} \quad (12)$$

Where, represents the deterministic component of the equation, whereas pi and qi are the lag lengths and lead orders in the equation which vary among the different cross-sections in the panel. The panel statistics and mean group test statistics are calculated using equation 13 and 14 respectively as follows:

$$g_{-\tau} = \frac{1}{N}\sum_{i=1}^{N} \frac{\hat{e}_i}{SE(\hat{e}_i)} \quad (13)$$

$$g_{-\alpha} = \frac{1}{N}\sum_{i=1}^{N} \frac{T\hat{e}_i}{\hat{\hat{e}}_i(1)} \quad (14)$$

Where we assume as the error correction estimates, and means the standard error associated with .

The panel statistics are obtained through equation 15 and 16:

$$p_{-\tau} = \frac{\hat{e}}{SE(\hat{e})} \quad (15)$$

$$p_{-\alpha} = T\hat{e} \quad (16)$$

3. RESULTS

3.1. Descriptive Analysis

Table 1 presents the summary statistics of all the variables used. The average life expectancy in Nigeria, South Africa, Egypt, Algeria, Mauritius, and Mali is 50.71 years, 58.46 years, 70.37 years, 74.48 years, 73.23 years, 54.66 years, and 63.66 years, respectively. Algeria has the longest average life expectancy of 77.07 years, followed by Mauritius 74 years and 9 months and South Africa 72.68 years. Nigeria has the shortest average life expectancy of 55.06 years. This was expected given that the nation is one of the poorest nations with adequate access to healthcare and is ranked low in terms of health outcomes.

The under-five mortality rate (the likelihood that a child born in a certain year or period would pass away before turning five) has a mean value for Nigeria, South Africa, Egypt, Algeria, Mauritius, and Mali of 87.69, 39.75, 25.01, 25.24, 15.53, 77.93, and 44.69, as shown in Table 1 below. Nigeria has the highest average rate of under-five mortality (87.69 per 1000 live births). Then comes Mali (77.93). Nigeria also has the greatest maximum value, 110.00, with Mali coming in second with 101.50. Mauritius, out of the chosen nations, has the lowest rate of under-five mortality (18.80 per 1000 live births).

Surprisingly, Mali and Nigeria continue to lead the list of nations with a high infant mortality rate, with a respective infant death rate of 187.20 for Mali and 183.10 for Nigeria. The highest average infant mortality rate, however, of 141.86, was found in Nigeria. With 16.60, Mauritius has the lowest number, nevertheless. In terms of neonatal mortality, which is defined as passing away during the first 28 days of life, Mali has the highest mean of infant deaths occurring before the age of 28, with 39.42, followed by Nigeria with 39.20. The highest number of neonatal deaths was likewise noted in Mali (50.70), followed by Nigeria (46.30). With 12.40 and 14.90 respectively, Mauritius and South Africa have the lowest scores.

In most African countries, government health spending continues to have a significant impact on health outcomes and the economy. As seen, Nigeria, South Africa, Egypt, Algeria, Mauritius, and Mali have the average health expenditures of $3.56 billion, $8.37 billion, $4.91 billion, $5.07 billion, $4.45 billion, and $4.54 billion, respectively. The greatest mean value is $8.37 billion, recorded in South Africa. The country with the highest government health spending is South Africa, with $9.12 billion, followed by Algeria ($7.10 billion) and Mauritius ($6.25 billion). Nigeria recorded the lowest amount ($5.05 billion) for public

health spending. This represents one of the factors contributing to the nation's poor performance in terms of health outcomes.

During the study period, Mali had the highest mean value for access to safe sanitation (40.83), followed by Nigeria (22.16). Egypt and Mauritius had the lowest mean values for access to safe sanitation (3.62 and 4.98, respectively). The highest value was again found in Mali at 49.18, followed by Nigeria at 24.12, while the lowest value was recorded in Egypt and Mauritius at 6.00 and 7.18, respectively. South Africa ($6112.63), Mauritius ($7681.81 billion), and Mali ($654.08 billion) have the highest mean GDP per capita values, respectively. Mauritius had the highest GDP per capita at ($11208.34 billion), followed by South Africa ($8810.25) and Algeria ($5592.22). Among the nations with high misery indices that were chosen, Mali had the lowest maximum GDP per capita ($894.80).

Table 1: Descriptive analysis of variables

Country	Mean	Std. Dev	Min	Max
Life Expectancy				
Nigeria	50.71	2.83	46.27	55.06
South Africa	58.46	4.15	53.44	64.48
Egypt	70.37	1.12	68.60	72.16
Algeria	74.48	1.99	70.64	77.07
Mauritius	73.23	1.05	71.66	74.88
Mali	54.66	3.59	48.07	59.74
Panel	63.66	9.80	46.27	77.07
Under-five mortality rates				
Nigeria	87.69	11.13	72.63	110.00
South Africa	39.75	8.82	27.30	48.30
Egypt	25.01	6.18	16.70	37.20
Algeria	25.24	4.68	18.53	33.90
Mauritius	15.53	1.10	14.50	18.80
Mali	77.93	13.29	58.53	101.50
Panel	44.69	29.13	14.30	110.00
Infant Mortality Rate				
Nigeria	141.86	20.48	114.40	183.10
South Africa	55.30	18.57	33.90	79.40
Egypt	30.19	8.16	19.60	48.60
Algeria	29.44	5.49	22.80	39.70
Mauritius	13.53	1.04	12.50	16.60
Mali	133.47	30.00	90.40	187.20
Panel	67.29	54.16	12.50	187.20

Country	Mean	Std. Dev	Min	Max
Neonatal Mortality				
Nigeria	39.20	3.13	35.60	46.30
South Africa	11.94	1.30	10.15	14.90
Egypt	15.98	3.69	10.02	22.30
Algeria	17.85	2.20	14.43	21.00
Mauritius	9.86	0.81	8.89	12.40
Mali	39.42	5.05	30.07	50.70
Panel	22.38	12.71	8.89	50.70
Food Consumer Price Inflation				
Nigeria	12.89	6.24	2.13	28.58
South Africa	6.96	4.04	1.37	17.39
Egypt	11.62	8.76	-0.20	38.66
Algeria	4.05	3.27	-2.10	12.95
Mauritius	5.18	4.09	0.72	15.84
Mali	2.13	5.52	-7.00	13.01
Panel	7.14	6.77	-7.00	38.66
Government Health Expenditure				
Nigeria	3.56	0.63	2.49	5.05
South Africa	8.37	0.54	7.46	9.11
Egypt	4.91	0.40	4.13	5.63
Algeria	5.07	1.36	3.23	7.10
Mauritius	4.45	1.13	2.89	6.25
Mali	4.54	0.65	3.67	5.47
Panel	5.15	1.74	2.49	9.12
Access to Safe Sanitation				
Nigeria	22.16	1.43	19.54	24.12
South Africa	10.44	2.34	6.54	14.27
Egypt	3.62	1.36	1.62	6.00
Algeria	8.45	0.90	7.78	10.51
Mauritius	4.98	1.43	2.71	7.14
Mali	40.83	5.23	32.35	49.18
Panel	15.11	13.25	1.62	49.18
GDP Per Capita				
Nigeria	1877.21	775.31	567.93	3098.99
South Africa	6112.63	1633.72	2797.09	8810.93
Egypt	2322.55	918.81	1062.16	3569.21
Algeria	3787.82	1253.83	1740.61	5592.22
Mauritius	7691.81	2461.46	3856.63	11208.54
Mali	654.08	206.69	270.54	894.80
Panel	3741.02	2824.21	270.54	11208.34

Source: Authors' calculation

3.2. Test For Cross Sectional Dependence and Slope Homogeneity

Before estimating panel data, two important conditions must be verified. First, the existence of cross-sectional dependence among the variables. This is to ensure whether shock in one country's data is not affected by another country's data. Second is the presence of slope homogeneity. This is important because the failure to do so can lead to incorrect assessment techniques. These tests were conducted and reported in Table 2 and Table 3, respectively. Based on the test statistics for the four different tests for the presence of cross-sectional dependence among the series, the outcome shows that all test statistics were significant at 1% and 5%, respectively. Consequently, the null hypothesis of no cross-sectional dependence among the series was rejected. Also, in Table 3, the delta tests for all the variables were significant indicating the rejection of the null hypothesis of no presence of slope homogeneity among the variables. The presence of cross-sectional dependence and slope homogeneity among the variables support the use of a second-generation econometric techniques that can capture the presence of cross-sectional dependence and slope homogeneity.

Table 2: Test for Cross-sectional dependence results

	Test Statistics and Probability							
	LE	U5M	IFM	NNM	FCPI	PKY	GHE	ASA
Breusch - Pagan LM	290.72***	235.21***	212.58***	257.91***	22.24**	220.07***	112.22***	281.13***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)
Pesaran Scaled LM	49.24***	39.12***	34.97***	43.25***	0.22	36.35***	16.65***	47.49***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.81)	(0.00)	(0.00)	(0.00)
Bias-Corrected Scaled LM	49.09***	38.96***	34.83***	43.10***	0.08	36.19***	16.90***	47.34***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.93)	(0.00)	(0.00)	(0.00)
Pesaran CD	17.04***	15.03***	13.88***	16.01***	3.37***	14.74***	-0.94	6.72***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.35)	(0.00)

*Note: (i) ***and**denote rejection of the null hypothesis at the 1% and 5% levels, respectively. (2) The Schwarz Information Criterion (SIC) is the optimal lags used. (3) The probability values are reported in parentheses.*

Source: Authors' calculation

Table 3: Test for Slope homogeneity

Delta Tests	Test Statistics and Probability							
	LE	U5M	IFM	NNM	FCPI	PKY	GHE	ASA
Delta tilde	2.36***	3.02***	2.68***	3.04***	2.27***	6.43***	5.90***	2.18***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Delta tilde adj	2.26***	1.67**	3.24***	2.82***	1.93**	4.39***	4.11***	2.32**
	(0.00)	(0.04)	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)	(0.02)

*Note: (i) ***and** mean rejection of the null hypothesis at 1% and 5%, respectively of no presence slope homogeneity.*
Source: Authors' calculation

3.3. Unit Root Test

After verifying the existence of cross-sectional dependency and slope homogeneity across all the variables used, we move on to determining the stationarity features of each one. However, several panel unit root tests are used to identify the stationarity characteristics of variables where there is cross-sectional dependency. In our analysis we have used the second generation of unit root tests, CIPS cross-section Im, Pesaran, and Shin (2003), and cross-sectionally augmented Dickey Fuller (CADF) unit root test, proposed by Pesaran (2007). We present results of unit root tests in Table 4, and Table 5.

Table 4: Panel unit root test - CIPS cross-section Im, Pesaran, and Shin (H0: homogenous non-stationary; bi=0 for all i)

Variable	Exogenous variables	Test statistics	Critical values at		
			1%	5%	10%
LE	Constant and trend	-1.56	-3.15	-2.86	-2.71
Δ LE	Constant and trend	-3.59	-3.15	-2.86	-2.71
U5M	Constant and trend	-1.67	-3.15	-2.86	-2.71
Δ U5M	Constant and trend	-3.44	-3.15	-2.86	-2.71
IFM	Constant and trend	-1.54	-3.15	-2.86	-2.71
Δ IFM	Constant and trend	-3.2	-3.15	-2.86	-2.71
NNM	Constant and trend	-2.3	-3.15	-2.86	-2.71
Δ NNM	Constant and trend	-3.74	-3.15	-2.86	-2.71
FCPI	Constant and trend	-2.23	-3.15	-2.86	-2.71
Δ FCPI	Constant and trend	-3.85	-3.15	-2.86	-2.71
PKY	Constant and trend	-1.85	-3.15	-2.86	-2.71
Δ PKY	Constant and trend	-3.25	-3.15	-2.86	-2.71
GHE	Constant and trend	-2.38	-3.15	-2.86	-2.71
Δ GHE	Constant and trend	-3.77	-3.15	-2.86	-2.71
ASA	Constant and trend	-2.51	-3.15	-2.86	-2.71
Δ ASA	Constant and trend	-3.61	-3.15	-2.86	-2.71

Source: Authors' calculation

Table 5: Panel unit root test – CADF (H0: All panels contain unit roots; Ha: Some panels are stationary)

Variable	Exogenous variables	P value	Stationarity
LE	Constant and trend	0.998	I(1)
Δ LE	Constant and trend	0.000	I(0)
U5M	Constant and trend	0.785	I(1)
Δ U5M	Constant and trend	0.002	I(0)
IFM	Constant and trend	0.889	I(1)
Δ IFM	Constant and trend	0.001	I(0)
NNM	Constant and trend	0.784	I(1)
Δ NNM	Constant and trend	0.000	I(0)
FCPI	Constant and trend	0.551	I(1)
Δ FCPI	Constant and trend	0.000	I(0)
PKY	Constant and trend	0.473	I(1)
Δ PKY	Constant and trend	0.002	I(0)
GHE	Constant and trend	0.341	I(1)
Δ GHE	Constant and trend	0.000	I(0)
ASA	Constant and trend	0.481	I(1)
Δ ASA	Constant and trend	0.001	I(0)

Source: Authors' calculation

Our analysis confirms that all variables are I(1) and all variables are non-stationary at the level. In the next iteration we will apply the cointegration test.

3.4. Cointegration Test

We analyze the existence of a long period in the variables under discussion after confirming that the series are stationary. Although there are other tests for cointegration, we used the Westerlund (2007) Cointegration test in this paper since it can accept cross-section dependence and slope homogeneity. Table 6 shows the results of the cointegration test, which showed that the statistics values for all four tests were significant. These findings suggest that there is a long-term association between food price inflation and public health improvement in Africa. We therefore reject the null hypothesis that there is no long-term relationship between food price inflation and public health improvement in the countries studied.

Table 6: Test for cointegration (Westerlund, 2007)

Test Stat	Coefficient	asym.ρ-value	bootstrap ρ-value
g-tau	-3.857***	0.03	0.041
g-alpha	-4.462**	0.00	0.00
p-tau	-5.239**	0.02	0.04
p-alpha	-4.345***	0.00	0.01

*Note: ***, and ** mean rejection of the null hypothesis of no cointegration at 1%, and 5%..*
Source: Authors' calculation

4. DISCUSSIONS

Within the panel unit root-testing framework, there are two generations of tests. The first generation of tests assumes that cross-section units are cross-sectionally independent and the second generation of panel unit root tests that relaxes this assumption and allows for cross-sectional dependence (Jain et al, 2021). The second-generation econometric technique was used. The results of the Augmented Mean Group (AMG) by Eberhardt and Teal (2010) and the Common Correlated Mean Group (CCEMG) by Pesaran (2007) are presented together in the table.

Table 7: Regression Results

	AMG Techniques				CCEMG Techniques			
	logLE	logIFM	logU5M	logNNM	logLE	logIFM	logU5M	logNNM
logFCPI	-0.005**	0.031*	0.101**	0.023**	-0.008**	0.002**	0.012**	0.014**
	(0.04)	(0.08)	(0.03)	(0.01)	(0.02)	(0.01)	(0.01)	(0.00)
logPKY	0.074***	-0.201***	-0.195***	-0.214***	0.057**	-0.095**	-0.243***	-0.203***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.03)	(0.02)	(0.00)	(0.00)
logGHE	0.237**	-0.196*	-0.076**	-0.048***	0.212***	-0.271***	-0.042***	-0.139***
	(0.02)	(0.05)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
logASA	0.087**	-0.047***	-0.083***	-0.059***	0.162***	-0.085***	-0.091***	-0.038***
	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

*Note: ***,** and * denote significance at 1%, 5% and 10%, respectively.*
Source: Authors' calculation

The effect of food price inflation on life expectancy was negative and significant. Specifically, as reported, a percentage increase in food price inflation reduces life expectancy between (0.005% - 0.008%), respectively. The result was significant for both methods employed at 5%. This implies that food price inflation stands

as a major determinant of longevity of both males and females life expectancy in Africa. The findings are supported by Worldernichael, Kidane and Shimeles (2017), and Bao et al. (2022) who found that increase in food prices positively affects infant mortality rate and negatively affects life expectancy in developed and developing countries.

Inflationary food prices raise infant, under-five, and neonatal mortality rates. Table 7 reveals that 1% increase in food prices increases newborn mortality, under-five mortality, and neonatal death rates by (0.002 percent - 0.031 percent), (0.012% - 0.101%), and (0,014% - 0.023%) accordingly. The results were statistically significant at 1% and 5%, respectively. In the literature, the findings corroborated the theoretical foundation that an increase in food prices promotes malnutrition, particularly among the poor, and so impairs child nutrition, leading to early death. The effect shows that constant food price increase stands as a detriment to health outcome in Africa. Studies by Arndt, Hussain, Salvucci, & Østerdal (2016), and Lee et al. (2016), concluded that continuous food price increase is detrimental to child health and therefore causes a high rate of poor child health improvement in Africa.

Per capita income enhances average life expectancy at birth and reduces infant, under-five, and neonatal mortality in Africa, according to both assessment approaches. According to reports, an increase in per capita income boosts an individual's predicted life expectancy in Africa by 0.057 percent to 0.074 percent. The work by Guzel, Arslan & Acaravci (2021), Fadnes et al. (2022), and Miladinov (2020), confirmed that per capital income improves wellbeing and ensures longevity in the average life span of individual. Our findings demonstrated that per capita income lessens the burden of continuous death in Africa for infant, under-five, and neonatal mortality. In particular, 1% increase in per capita income lowers mortality rates between (0.095% to 0.201 %). Newborn mortality rates range from 0.195%t to 0.243%, and neonatal mortality rates range from 0.203% to 0.214%. Our findings support the outcomes by Cardona et al. (2022), and Shapira de Walque & Friedman (2021). The result was also significant at 1% and 5%, respectively. These show that income per capita is an important factor that determines child health in Africa.

With theoretical expectations, government health spending produces an acceptable result. The results suggest that government health spending helps to reduce infant, under-five, and neonatal mortality while also increases average life expectancy at birth in Africa. As reported, a percentage increase in government health expenditure raises the life expectancy of individuals in Africa between 0.237% and 0.212%, respectively. The work by Rahman, Khanam &

Rahman (2018), and Rancic & Jakovljevic (2016), supported that government health expenditure raises the average life expectancy at birth in Africa. For infant mortality, under-five and neonatal mortality, our findings revealed that a negative and significant relationship exists between government health expenditure and mortality rate. Specifically, a percentage increase in government health expenditure reduces mortality rate (0.196% - 0.271%. 0.042% - 0.076% and 0.139% - 0.048%), respectively for infant, under-five and neonatal in the selected African region. The findings support the outcomes by Owusu, Sarkodie & Pedersen (2021). The result was also significant at 1% and 5%, respectively. These show that in Africa, government health expenditure plays a major role in terms of child health especially among countries with high misery index.

A priori expectation concerning access to safe sanitation and public health improvement was confirmed. As reported from the empirical analysis carried out, access to safe sanitation impacted positively on life expectancy and helped in reducing the rate of infant, under-five and neonatal mortality in Africa. Specifically, the provision of safe sanitation by 1% increases average life expectancy by approximately from 0.087% to 0.162%. This result was not surprising as the SDGs 6 calls for clean water and sanitation, seeing the importance of a good environment. The effect was also significant indicating that safe sanitation plays an important role in the average life expectancy in Africa. Our findings are in line with studies by Rahman, Rana & Khanam (2022), and Prüss-Ustün et al. (2019). As regards child health, the result revealed that access to safe sanitation reduces infant, under-five and neonatal mortality by approximately (0.047% - 0.085%, 0.083% - 0.091%, and 0.038% - 0.059%, respectively. The result was significant for all the variables indicating that access to safe sanitation plays an important role in child health. Our findings supported the outcome by Prüss-Ustün et al. (2019), and Revilla & Ram (2021).

5. CONCLUSIONS

The issue of growing food prices has posed a substantial danger to global health development in recent years. While SDG 3.2 calls for increased life expectancy and lower rates of newborn, under-five, and neonatal mortality, the cost of calories and food continues to rise, creating a barrier to individual well-being in Africa. This study evaluates the influence of continuous food price increase on public health improvement from 2000 to 2020 in six African countries with high misery indexes. Second-generation econometrics approaches were used to analyze the data. According to our results, increase in food prices reduces life expectancy and increases infant, under-five, and neonatal mortality. Government

health spending, income per capita and access to adequate sanitation promote public health by reducing the rate of infant, under-five and neonatal mortality, and extends the life expectancy of the African's citizen. In addition, there is a long-term cointegration between food price inflation and public health improvement in Africa. Continuous food price inflation therefore stands as a detriment towards achieving good health in Africa. As a result, African governments should develop a policy to stabilize or reduce food prices to the bare minimum, ensuring that households have access to and can afford food. This will contribute to a reduction in malnutrition rates and provide parents with hope for their children. Safe sanitation should be provided as part of effective environmental sanitation activities. Because health is regarded as a source of prosperity, the government should invest more in the health industry. Households should be provided with wages that are adequate for their jobs, allowing them to meet the demands of their families with their take-home pay. If African countries are to meet the SDGs' aim of decreasing mortality rates to the bare minimum and improving the life expectancy by 2030, these recommendations must be implemented. Otherwise, higher food inflation would aggravate the situation in countries already experiencing food insecurity and shortages, disproportionately affecting poor households and hence reduce life expectancy and increase mortality rate of children.

Implications

The outlook is highly uncertain. Food inflation and CPI inflation could ease if commodity prices ease, and pandemic-induced global supply chain disruptions resolve. However, high food inflation could persist if inflation expectations become de-anchored or supply chain disruptions continue. Average inflation across the region is expected to edge up in 2021 before easing next year depending on commodity prices and the resolution of supply-demand mismatches. Higher food inflation would worsen the situation for the countries already facing food insecurity and shortages with a disproportional impact on poor households. The number of undernourished persons in the region is projected to increase by 20 percent in 2020, to 264 million people.

Conflict of interests

The authors declare there is no conflict of interest.

REFERENCES

Arndt, C., Hussain, M. A., Salvucci, V., & Østerdal, L. P. (2016). Effects of food price shocks on child malnutrition: The Mozambican experience 2008/2009. *Economics & Human Biology, 22*, 1-13. DOI: 10.1016/j.ehb.2016.03.003

Baltagi, B. H., Feng, Q., & Kao, C. (2012). A Lagrange Multiplier test for cross-sectional dependence in a fixed effects panel data model. *Journal of Econometrics, 170*(1), 164-177. DOI: 10.1016/j.jeconom.2012.04.004

Bao, W., Tao, R., Afzal, A., & Dördüncü, H. (2022). Real Estate Prices, Inflation, and Health Outcomes: Evidence From Developed Economies. *Frontiers in Public Health, 10*. DOI: 10.3389/fpubh.2022.851388

Breusch, T. S., & Pagan, A. R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies, 47*(1), 239-253.

Cardona, M., Millward, J., Gemmill, A., Jison Yoo, K., & Bishai, D. M. (2022). Estimated impact of the 2020 economic downturn on under-5 mortality for 129 countries. *Plos one, 17*(2), DOI:10.1371/journal.pone.0263245

De Hoyos, R. E., & Sarafidis, V. (2006). Testing for cross-sectional dependence in panel-data models. *The stata journal, 6*(4), 482-496. DOI:10.1177/1536867X0600600403

Eberhardt, M., & Teal, F. (2010). Productivity analysis in global manufacturing production. *Econometrics 142*(1), 50-93. Economics Series Working Papers 515. Oxford, UK: University of Oxford, Department of Economics.

Eng, C. W., Lim, S. C., Ngongo, C., Sham, Z. H., Kataria, I., Chandran, A., & Mustapha, F. I. (2022). Dietary practices, food purchasing, and perceptions about healthy food availability and affordability: a cross-sectional study of low-income Malaysian adults. *BMC Public Health, 22*(1), 1-9. DOI:10.1186/s12889-022-12598-y

Fadnes, L. T., Økland, J. M., Haaland, Ø. A., & Johansson, K. A. (2022). Estimating affect of meals selections on life expectancy: A modeling research. *PLoS Med, 19*(2). DOI: 10.1371/journal.pmed.1003889

Guzel, A. E., Arslan, U., & Acaravci, A. (2021). The impact of economic, social, and political globalization and democracy on life expectancy in low-income countries: are sustainable development goals contradictory? *Environment, Development and Sustainability, 23*(9), 13508-13525. DOI: 10.1007/s10668-021-01225-2

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneouspanels. *Journal of Econometrics, 115*(1), 53–74. DOI:10.1016/S0304-4076(03)00092-7

Jain, M., Sharma, G. D., Goyal, M., Kaushal, R., & Sethi, M. (2021). Econometric analysis of COVID-19 cases, deaths, and meteorological factors in South Asia. *Environmental Scienceand Pollution Research*, *28*(22), 28518-28534. DOI: 10.1007/s11356-021-12613-6

Kessler, D., & Hevenstone, D. (2022). The impact of unemployment benefits on birth outcomes: Quasi-experimental evidence from European linked register data. *PloS one, 17*(3). DOI:10.1371/journal.pone.0264544

Lee, H. H., Lee, S. A., Lim, J. Y., & Park, C. Y. (2016). Effects of food price inflation on infant and child mortality in developing countries. *The European journal of health economics, 17*(5), 535-551. DOI: 10.1007/s10198-015-0697-6.

Maddala, G.S., & Wu, S (1999). A comparative study of unit root test with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics, 61*, 631-652. DOI: 10.1111/1468-0084.61.s1.13

Miladinov, G. (2020). Socioeconomic development and life expectancy relationship: evidence from the EU accession candidate countries. *Genus, 76*(1), 1-20. DOI: 10.1186/s41118-019-0071-0

Morakinyo, O. M., & Fagbamigbe, A. F. (2017). Neonatal, infant and under-five mortalities in Nigeria: an examination of trends and drivers (2003-2013). *PLoS One, 12*(8). DOI:10.1371/journal.pone.0182990

Owusu, P. A., Sarkodie, S. A., & Pedersen, P. A. (2021). Relationship between mortality and health care expenditure: Sustainable assessment of health care system. *PloS one, 16*(2). DOI: 10.1371/journal.pone.0247413. eCollection 2021.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics, 61*, 653-670.

Pedroni, P. 2004. Panel cointegration: Asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. Econometric Theory 20(3), 597–625. DOI:10.1017/S0266466604203073

Pesaran, M. H. (2004). *General diagnostic tests for cross section dependence in panels*. Cambridge Working Paper in Economics No. 0435. DOI:10.17863/CAM.5113

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics, 22*(2), 265-312. DOI:10.1002/jae.951

Pesaran, M. H., & Yamagata, T. (2008): Testing slope homogeneity in large panels. *Journal of Econometrics, 142*(1), 50-93. DOI: 10.1016/j.jeconom.2007.05.010

Prüss-Ustün, et al. (2019). Burden of disease from inadequate water, sanitation and hygiene for selected adverse health outcomes: an updated analysis with a focus on low-and middle-income countries. *International journal of hygiene and environmental health, 222*(5), 765-777. DOI: 10.1016/j.ijheh.2019.05.004

Rahman, M. M., Khanam, R., & Rahman, M. (2018). Health care expenditure and health outcome nexus: new evidence from the SAARC-ASEAN region. *Globalization and health, 14*(1), 113. DOI: 10.1186/s12992-018-0430-1

Rahman, M. M., Rana, R., & Khanam, R. (2022). Determinants of life expectancy in most polluted countries: Exploring the effect of environmental degradation. *PloS one, 17*(1). DOI: 10.1371/journal.pone.0262802

Rancic, N., & Jakovljevic, M. M. (2016). Long term health spending alongside population aging in N-11 emerging nations. *Eastern European Business and Economics Journal, 2*(1), 2 26.

Revilla, M. L. D., & Ram, K. S. (2021). *Impacts of Sanitation on Child Mortality and School Enrollment:* A Country-Level Analysis. Asian Development Bank. Retrieved from: https://think-asia.org/bitstream/handle/11540/13833/adbi-pb2021-4.pdf?sequence=1

Shapira, G., de Walque, D., & Friedman, J. (2021). How many infants may have died in low income and middle-income countries in 2020 due to the economic contraction accompanying the COVID-19 pandemic? Mortality projections based on forecasted declines in economic growth. *BMJ open, 11*(8), e050551.

Swamy, P. A. (1970): Efficient inference in a random coefficient regression model. *Econometrica: Journal of the Econometric Society 38*(2),311-323.

Usman, M. A., Mekonnen, D. A., Kornher, L., & Braun, J. V. (2021, August). Effects of short-term food price movements on child mortality: Evidence from low- and middle-income countries. *Proceedings of the International Association of Agricultural Economists 2021 Conference*, Virtual 315112. DOI: 10.22004/ag.econ.315112

Westerlund, J. (2007). Testing for error correction in panel data. *Oxford Bulletin of Economics and Statistics, 69*(6), 709-748. DOI: 10.1111/j.1468-0084.2007.00477.x

Woldemichael, A., Kidane, D., & Shimeles, A. (2017). *A Tax on Children? Food Price Inflation and Health*. Working Paper Series No. 276. African Development Bank. Retrieved from: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/WPS_No_276__A_Tax_on_Children__Food_Price_Inflation_and_Health_A.pdf

ИНФЛАЦИЈА ХРАНЕ И ЗДРАВЉЕ ДЈЕЦЕ У АФРИЦИ: ДОКАЗИ ИЗ ЗЕМАЉА СА ВИСОКИМ ИНДЕКСОМ БИЈЕДЕ

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САЖЕТАК

Овај рад истражује утицај инфлације цијена хране на побољшање јавног здравља мјерено у погледу очекиваног животног вијека, стопе морталитета новорођенчади, стопе морталитета дјеце млађе од пет година и стопе неонаталне смртности у шест одабраних афричких земаља са високим индексом биједе за период од 2000. до 2020. године. Да би се одредио утицај, коришћена је група повећане средње вриједности и средња група заједничке корелиране процјене, као и Вестерлунд тестови коинтеграције. Наши резултати су открили да све веће цијене хране имају веома штетан утицај на исхрану и посљедично доводе до виших нивоа смртности дјеце млађе од пет година и новорођенчади, док истовремено смањују очекивани животни вијек у афричким земљама. Висока инфлација цијена хране такође има дугорочни ефекат на јавно здравље. Импликација резултата показује

да уз високу стопу цијена хране у комбинацији са лошим здрављем дјеце, циљеви одрживог развоја који треба да зауставе смртност новорођенчади која може да се спријечи и дјеце млађе од 5 година, као и постизање стопе неонаталне смртности 12 или мање умрлих на 1.000 живорођених и стопе смртности дјеце млађе од пет година 25 или мање смртних случајева на 1.000 живорођених до 2030. године, можда нису реални. Стога, афричке владе треба да усмјере напоре ка смањењу инфлације цијена хране, побољшању здравствене потрошње, прихода по глави становника и стварању окружења за добре санитарне услове, посебно за труднице и малу децу. Такође, владе треба да створе повољно окружење за санитарне услове и приступ чистој води за пиће.

Кључне ријечи: *Инфлација цијена хране, очекивани животни вијек, морталитет новорођенчади, смртност млађих од пет година, неонатална смртност.*

FOREIGN TRADE AS A DETERMINANT OF ECONOMIC GROWTH OF THE REPUBLIC OF SRPSKA: AN EMPIRICAL ANALYSIS

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ABSTRACT

Most studies that investigate the relationship between foreign trade and economic growth analyze it through the interpretation of various indicators. This paper seeks to investigate the relationship between coverage of imports by exports and the openness to foreign trade on one hand and the gross domestic product of the Republic of Srpska on other hand. The research relates to the period from 2001 to 2020. By applying the ARDL model we confirmed the initial hypothesis that an increase in the coverage of imports by exports increases the domestic product. The paper confirms the long-term relationship between independent and dependent variables, expressed through the existence of the cointegration equation. Results based on the applied ARDL method show negative, but insignificant relationship between openness and gross domestic product in the Republic of Srpska in long run, and statistically significant positive relationship between coverage of imports by exports and gross domestic product in long run. Value of coefficient shows that 1% increase in coverage of imports by exports increases gross domestic product by 0.80% in long run.

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1. INTRODUCTION

The relationship between foreign trade openness and economic growth is a particularly interesting topic for researches in the 21st century. There are a large number of empirical studies from the 90s of the last century that considered the impact of foreign exchange on economic growth, and the effects of international

exchange on the economies of countries. The reason for the increased interest of economists and researchers in the advantages, disadvantages and effects of international exchange is the growth, i.e. the significant growth of the world trade from the 80s of the last century until today. During this period, the international trade grew faster than production (Krugman & Obstfeld, 2009). The accelerated process of globalization and integration of the world economy undoubtedly contributed to this. With the creation of the global market firms are in position to compete with other competitors around the world, and to place their products and services without legitime borders. The ongoing process of globalization has greatly contributed to the growing importance of international trade for economic growth. Because of that the attention of researchers is largely turned to examining the impact that international trade has on economic growth. Among numerous studies and researches, we can find different attitudes towards the direction of the influence of international trade on economic growth. However, the prevailing attitudes say that international trade positively determines growth. According to some of the most important studies in this field, trade has proven to affect the economic growth of a country and the growth of an economy that adopts liberalized trade regimes more than in closed economies (Grossman & Helpman, 1991; Edwards, 1993; Frankel & Romer, 1999; van den Berg & Schmidt, 1994; Chang, Kaltani & Loayza, 2009).

The theoretical development of the direction of free international exchange was preceded by a period that advocated the protection of domestic production. This theoretical direction is a continuation of the Hamilton and List's thinking. This theoretical direction is also known under the term of import substitution, where the assertion that the domestic production of an imported product leads to the employment of domestic resources and the creation of a larger domestic output is taken as a basic postulate. The failure in the development of countries that applied such postulates in conducting economic policy, as well as the evidence of the East Asian countries that based the economic development on the international exchange, led the economists to think that economic growth can be achieved without relying only on the domestic market. Based on the East Asian experience, many countries, guided by that example, began to adopt policies of opening their national economies to the world market. All this is done in order to use the resources provided by globalization and the movement towards the creation of a unified world market.

The experiences of the East Asian countries undoubtedly highlight that industrialization can be achieved without relying on the domestic market (Krueger, 1997). This contributed to the popularization of the direction known as export orientation. This direction also has its theoretical support in reference

works (Balassa, 1978; Krueger, 1978; Bhagwati, 1978). External orientation and good export performances can significantly contribute to economic growth (Ram, 1987). The more open the economy is, the lower the importance of the domestic market as a factor in economic growth is (Alesina & Spolaore, 2003).

Following the example of the East Asian countries, but also policies aimed at liberalizing economies and opening to the world, many former socialist countries have accepted inclusion in free international trade. In this way, the former socialist countries aimed at increasing the welfare of society and production. In the process of transition and adaptation to the capitalist mode of economy with openness to the world, some countries have successfully used these processes and raised the level of their development to a large extent compared to the previous state. Looking at European countries, we can refer to the examples of Poland, the Czech Republic, Slovakia, and even Hungary and Belarus, which have largely experienced the flourishing of their national economies in the last 30 years. On other hand, there are countries that are still struggling to find the right policies and practices in order to participate equally in the world trade, and derive benefits that would ultimately be reflected in the increase in the welfare of the population, significantly higher GDP, and its better structure. Countries like Bosnia and Herzegovina, Albania, Serbia, and even Croatia and Bulgaria, which are members of the European Union, are far below the European average in terms of their level of development.

The aim of this paper is to investigate the impact of the openness of the Republic of Srpska economy towards foreign exchange on economic growth. The research was conducted on the available time series on foreign exchange and GDP of the Republic of Srpska from the database of the Republic of Srpska Institute of Statistics for the period from 2001 to 2020. Therefore, the basic hypothesis in this research is as follows: Increase in the coverage of imports by exports increases the gross domestic product of the Republic of Srpska in the long term. The paper applies the ARDL methodology to obtain results that confirm the initial hypothesis.

2. LITERATURE REVIEW

Vogiatzoglou & Nguyen (2016) investigated the impact of openness, viewed through three variables - foreign investment, export and import - on the economic growth of ASEAN group member countries through the period from 1998 to 2014. Research conducted for each of the five member countries shows that there is a long-term equilibrium between openness and economic growth for each country individually. Their results show that export-oriented growth is the most important growth factor in most countries.

Abendin & Duan (2021) investigated the impact of foreign trade on economic growth in African countries using panel analysis. The research was conducted on a sample of 53 countries in the period from 2000 to 2018. The research showed that trade has positive effects on economic growth only if there is an interaction with the digital economy. Therefore, the authors suggest that the development of the digital economy should be supported so that the benefits of trade are greater.

Gries & Riedlin (2012) conducted a research on a sample of 158 countries in the period from 1970 to 2009, investigating the long-term and short-term dynamics between trade and economic growth. The statistical analysis showed that the coefficients with the variables that testify to the existence of a long-term relationship between trade and growth are positive, therefore their conclusion is that the strategy of trade integration is justified when talking about the creation of economic growth.

Kong et al. (2021) investigated the impact of the international trade on the quality of economic growth in China. Their research showed that there is a stable long-term cointegration relationship between openness to trade and the quality of economic growth. Tang (2020) investigated the combined effects of export structure and economic growth in European Union member countries from Central and Eastern Europe. The research showed that the export of agricultural products does not contribute to economic growth, while transport equipment, textiles, steel and chemical products accelerate the economic growth of the observed countries. Huchet-Bourdon, Le Mouël and Vijil (2018) point out that trade can have a negative impact on economic growth if countries specialize in the production of lower quality products, while trade has a positive effect on economic growth if countries specialize in the production of high-quality products.

Trivić (2018) conducted a research on a sample of 23 small transition countries examining the relationship between openness and economic growth of these countries. The conclusion of the research is that orientation towards the outside has no alternative in the case of small transition countries, and when considering the impact of openness on economic growth, it is necessary to separate the flows of foreign trade into import and export ones.

Iyke (2017) investigated the importance of openness to foreign trade for the economic growth of Central and Eastern European (CEE) countries. Using panel data for 17 countries in the period from 1994 to 2014, he reveals in his paper that trade openness is important for growth. The paper concluded that the growth of the share of foreign trade in GDP is positively correlated with GDP per capita growth.

Bojat, Kovačević and Kurušić (2021) analyzed the interdependence of the movement of the real growth rate as a dependent variable, and the movement of the share of exports and imports in GDP as explanatory variables on the example of Serbia. The research was conducted for the period from 2000 to 2019 with the help of the VAR methodology. The results showed that economic openness, primarily through export-oriented policies, contributes to real GDP growth in the long term, while the impact of the share of imports in the domestic product is negatively correlated with GDP.

Krajišnik, Gojković, Josipović and Popović (2020) investigated the impact of export structure on the economic growth of Bosnia and Herzegovina. This research showed that there is a bad structure of foreign trade production, and that it is necessary to improve the export performances of the economy of Bosnia and Herzegovina in order to reduce the foreign trade deficit. Also, the research confirmed the importance of exports for the economic growth of Bosnia and Herzegovina.

Krajišnik and Tomaš (2014) investigated the importance of foreign trade on the economic growth of the Republic of Srpska. The research showed that foreign trade is very important for the economic growth of the Republic of Srpska, but it is necessary to work on reduction of the foreign trade deficit, primarily through increasing exports and changing the commodity structure of exports. Erić, Popović and Popović (2019) investigated the impact of trade liberalization on the economic growth of the Republic of Srpska. Applying regression analysis, it was determined that the share of foreign trade and exports in GDP has a positive impact on the economic growth of the Republic of Srpska, while the movement of the trade deficit is negatively correlated with the economic growth. Bjelić, Erić and Vujnić (2020) examined the relationship between foreign trade, economic and industrial growth of the Republic of Srpska in the period from 2001 to 2018. In this research, the absolute values of GDP were taken as indicators along with the dependent variable, while the value of total exports in absolute values was observed as the independent variable. The results showed that each change in the unit of the independent variable leads to an increase in GDP by 1.27 billion BAM.

3. THE STATE OF THE ECONOMY OF THE REPUBLIC OF SRPSKA AND THE STRUCTURE OF FOREIGN TRADE

The economy of the Republic of Srpska, as well as the whole of Bosnia and Herzegovina, structurally does not differ in many ways from the economies of other transition countries. The dependence of small economies on international

exchange is to a large extent noticeable by observing the state and structure of the economy in the Republic of Srpska. In contrast to large developed countries, for which the postulate "that they are self-sufficient" is valid, small economies of the world depend to a large extent on foreign trade. The importance of foreign trade for small economies can be seen through the participation of foreign trade in the domestic product. The large participation of foreign trade in the domestic product of small economies testifies to the dependence of these economies on foreign trade exchange.

The following table shows the trends in the GDP and foreign trade of the Republic of Srpska from 2001 to 2020:

Table 1: Gross domestic product and foreign trade in the Republic of Srpska from 2001 to 2020

Year	GDP in BAM	GDP per capita in BAM	Export in 000 BAM	Import in 000 BAM	Foreign trade in 000 BAM	Openness to foreign trade in % of GDP	The coverage of imports by exports
1	2	3	4	5	6 = 4 + 5	7 = (6/2)*100	8 = (4/5)*100
2001	3682694	3081	598829	1697455	2296284	62%	35%
2002	4226010	3539	565647	2164367	2730014	65%	26%
2003	4591976	3850	610668	2277608	2888276	63%	27%
2004	5141035	4318	842920	2702771	3545691	69%	31%
2005	5712724	4809	1130518	2953177	4083695	71%	38%
2006	6560196	5535	1540236	2760163	4300399	66%	56%
2007	7377530	6240	1671601	3347925	5019526	68%	50%
2008	8524483	7226	1921837	4146519	6068356	71%	46%
2009	8272973	7023	1672915	3567879	5240794	63%	47%
2010	8357415	7104	2177809	4053084	6230893	75%	54%
2011	8720039	7425	2560808	4577526	7138334	82%	56%
2012	8638111	7363	2374737	4487548	6862285	79%	53%
2013	8814459	7526	2604090	4557635	7161725	81%	57%
2014	8910201	7635	2692013	4946061	7638074	86%	54%
2015	9224129	7937	2613924	4369179	6983103	76%	60%
2016	9650962	8338	2869101	4426945	7296046	76%	65%
2017	10099280	8759	3476093	4899081	8375174	83%	71%
2018	10701007	9322	3741823	5222270	8964093	84%	72%
2019	11251324	9848	3610386	4782190	8392576	75%	75%
2020	11131849	9797	3393236	4472288	7865524	71%	76%

Source: Agency for Statistics of the Republic of Srpska, 2021 and author' calculations

The previous table gives an insight into the movement of GDP through the observed period when the value of domestic product and domestic product per capita tripled. In 2001, the GDP was about 3.8 billion BAM, while in 2020, the value of the GDP in the Republic of Srpska was about 11.1 billion BAM. It is similar to the movement of the value of the GDP per capita. In 2001 the GDP per capita amounted to 3 000 BAM, while the value of the GDP per capita in 2020 reached the level of 9 700 BAM. In the observed period, a significant growth in foreign trade exchange is recorded, namely the total volume of foreign trade exchange starting from 2001, when it amounted to about 2.2 billion BAM, reached the level of 8.9 billion BAM in 2018, while in the last two years of the observed series, this volume fell to the level of below 8 billion BAM.

The dependence of the economy of the Republic of Srpska on foreign trade can be seen through its participation in the domestic product. Throughout the observed period, the share of foreign trade (calculated as [export + import]/GDP) in the domestic product of the Republic of Srpska did not go below the level of 60% of the share in GDP. In 2001, the share of foreign trade in GDP was 62%, which is the minimum value through the given period. The increase in the share of trade in GDP throughout the observed period can be noticed. This growth had cyclical oscillations, but it reached the level of 86% of the share in 2014, which represents the maximum registered value. After 2014, the participation of foreign trade decreased to the level of 76% in the next two years. In 2018 and 2019, the participation reached the level of 83% and 84%, respectively. In the last two years of the observed series, the level of foreign trade decreased to the level of 75% and 71% in 2019 and in 2020, respectively. The coverage of imports by exports in 2001 was 35%, and in the following two years it continued to fall below 30%. From 2004 until the end of the observed period, the coverage increased rapidly, except for 2008, when it fell below 50%. From 2017, the coverage of imports by exports in the Republic of Srpska was measured at a level of over 70%, and the growth of this indicator increased by 2020, when it amounted to 76%.

In addition to observing the total values we indicated in the previous part of the paper, it is also important to observe the structure of foreign trade. What is common to all developing economies is the unfavorable structure of foreign trade. If we look at exports in the Republic of Srpska through the structure of exports according to the economic purpose on E - Energy, AI - Intermediate products, except energy, B - Capital products, CD - Durable products for mass consumption and CN - Non-durable products for mass consumption, we come to a more detailed insight into the very structure and "quality" of the exports in the Republic of Srpska. The following table shows the structure of the exports in the Republic of Srpska according to economic purpose:

Table 2: Structure of exports in the Republic of Srpska according to economic purpose from 2008 to 2020

Year	Energy	Intermediate products	Capital goods	Durable consumer goods	Non-durable consumer goods	Undisposed
2008	8.59%	49.79%	11.58%	4.74%	22.46%	2.82%
2009	20.25%	37.69%	9.80%	5.24%	23.22%	3.79%
2010	23.67%	41.62%	7.43%	4.77%	18.27%	4.24%
2011	23.55%	38.69%	7.08%	4.80%	17.87%	8.02%
2012	17.00%	40.73%	6.83%	6.19%	20.94%	8.31%
2013	18.38%	37.07%	7.07%	6.90%	21.74%	8.84%
2014	15.33%	38.90%	7.45%	7.12%	23.65%	7.55%
2015	8.67%	43.09%	8.46%	8.03%	24.35%	7.40%
2016	7.23%	43.60%	8.80%	8.44%	24.01%	7.92%
2017	11.50%	44.65%	8.28%	7.59%	21.51%	6.48%
2018	12.29%	44.23%	8.94%	7.43%	21.19%	5.91%
2019	8.74%	44.33%	11.10%	7.27%	23.14%	5.42%
2020	7.96%	42.50%	11.96%	8.07%	24.05%	5.45%

Source: Agency for Statistics of the Republic of Srpska, 2021 and author' calculations

The structure of exports from the Republic of Srpska in the last 13 years shows that the largest percentage of the total exports was related to the export of intermediate products. It was around 40% of the total exports throughout the observed period. Then, in the export structure, non-durable consumer products follow, which participated in exports at the level of about 20% throughout the observed period. From 2009 to 2014, energy export participated in exports at the level of 15% to 23%, and after 2014, its participation decreased to the level of about 8%, to the same amount in 2008. Exceptions are 2017 and 2018, when the share of energy in total exports again reached double-digit values. The export of capital goods moved at the level of 7-9% throughout the observed period, with the exception of 2008, 2019 and 2020, when it amounted to over 11%. Non-durable consumer products and other products, whose share during the observed period did not exceed the level of 9%, are the ones with the smallest share in total exports.

The structure of imports in the Republic of Srpska, according to the economic purpose, deviates less than the structure of exports. The following table shows the structure of imports in the Republic of Srpska according to economic purpose for the period from 2008 to 2013.

Table 3: Structure of imports in the Republic of Srpska according to economic purpose from 2008 to 2020

Year	Energy	Intermediate products	Capital goods	Durable consumer goods	Non-durable consumer goods	Undisposed
2008	14.07%	33.90%	16.89%	6.18%	23.28%	5.69%
2009	22.24%	29.08%	15.04%	2.72%	25.78%	5.13%
2010	28.29%	29.64%	11.97%	2.51%	22.51%	5.08%
2011	31.98%	29.46%	10.88%	1.98%	20.20%	5.50%
2012	30.00%	30.22%	10.97%	1.96%	21.50%	5.36%
2013	28.93%	30.07%	12.05%	1.94%	21.65%	5.35%
2014	23.47%	31.05%	16.61%	2.02%	21.91%	4.94%
2015	17.12%	34.75%	14.49%	2.31%	25.39%	5.93%
2016	15.37%	36.51%	13.97%	2.53%	25.47%	6.15%
2017	16.32%	36.79%	15.07%	2.35%	24.03%	5.45%
2018	15.71%	37.32%	16.06%	2.35%	23.96%	4.58%
2019	7.30%	39.83%	17.30%	2.75%	28.27%	4.55%
2020	6.70%	38.64%	16.94%	2.68%	30.21%	4.83%

Source: Agency for Statistics of the Republic of Srpska, 2021 and author' calculations

If we look at the structure of imports, we can see that intermediate products participate in total imports at a level of over 30%. Also, there is a noticeable increase in the share of intermediate products in the last years towards the level of 40% of share. The share of non-durable consumer goods in total imports increased from the level of 23% in 2008 to the level of 30% in 2020, while a slightly lower percentage of non-durable products can be observed from 2010 until 2014. The share of energy in total imports showed growth from 2008 to 2013, when it stood at the level of about 30% of total imports, followed by a decline to the level of 7.3% and 6.7% in 2019 and 2020, respectively. The share of capital goods in total imports ranged from 10% to 17% throughout the observed period, while from 2010 to 2013, the share was expressed as a smaller percentage, at the level between 10 and 12%. The share of durable consumer goods was around 2.5%, while the share of other products did not exceed the level of 7% throughout the observed period.

4. MATERIALS AND METHODS

We continue to analyze the impact of foreign trade on the economic growth of the Republic of Srpska using statistical methods. The research is designed in such a way to analyze the relationship between foreign trade participation and import-export coverage as independent variables and GDP as a dependent

variable. Therefore, starting from the goal of quantifying the influence of the independent variable on the dependent variable, the basic research model in the paper can be written as:

$$GDP = f(OPEN, COV) \quad (1)$$

where *GDP* is an independent variable, that is, a logarithmically given value of GDP, *OPEN* is the share of external goods in the domestic product and *COV* is a percentage indicator of the coverage of imports by exports. The description and specification of variables in the research is given in the following table:

Table 4: Specification of research variables

Variable	Type	Label	Capital goods	Undisposed
Gross Domestic Product	Dependent	GDP	Agency for Statistics of the Republic of Srpska	The variable GDP is the GDP value given in levels in BAM
Openness to foreign trade	Independent	OPEN	Agency for Statistics of the Republic of Srpska	Openness to foreign trade is calculated as the share of total exchange in GDP
Coverage of imports by exports	Independent	COV	Agency for Statistics of the Republic of Srpska	Coverage of imports by exports is given as a percentage of the share of exports in imports

Source: Authors' presentation

We evaluate the quantification of the influence of the independent variables on the dependent variable using the Autoregressive Distributed Lag (ARDL) approach. ARDL approach presented by Pesaran, Shin and Smith (2001) is best method when variables are of mixed order of integration (I(0) and I(1), and not integrated of order I(2). This method is useful when we have small sample time series for estimating long-term and short-term coefficients based on OLS method of estimation (Duasa, 2007). By applying the ARDL method we start with conducting the following model which uses logarithmic transformation of research variables:

$$\log GDP_t = \alpha_0 + \alpha_1 \log OPEN_t + \alpha_2 \log COV_t + \varepsilon_t \quad (2)$$

where α_0 is constant, α_1 and α_2 are coefficients for independent variables OPEN and COV, respectively and ε_t is error term. ARDL approach is based on lags of observed variables, so previous equation in ARDL form is given as:

$$\Delta \log GDP_t = \alpha_0 + \sum_{k=1}^{n} \Delta\alpha_1 \log GDP_{t-k} + \sum_{k=1}^{n} \Delta\alpha_2 \log OPEN_{t-k} + \sum_{k=1}^{n} \Delta\alpha_3 \log COV_{t-k} + \lambda_1 \log GDP_{t-1} + \lambda_2 \log OPEN_{t-1} + \lambda_3 \log COV_{t-1} + \varepsilon_t \quad (3)$$

Study uses the Akaike information criterion (AIC) for choosing the lag length. After finding the long-run association existing between variables, the ARDL approach uses the error correction model (ECM) to find the short-run dynamics. The ECM general form is formulated as:

$$\Delta \log GDP_t = \alpha_0 + \sum_{k=1}^{n} \Delta\alpha_1 \log GDP_{t-k} + \sum_{k=1}^{n} \Delta\alpha_2 \log OPEN_{t-k} + \sum_{k=1}^{n} \Delta\alpha_3 \log COV_{t-k} + \phi \log ECT_{t-1} + \varepsilon_t \quad (3)$$

where ϕ is parameter of speed of adjustment in the long-run equilibrium after a shock in the short run. The existence of cointegration between the observed variables is confirmed based on F-bounds with calculated F-statistics. Decision on the existence of cointegration between variables is confirmed by comparing F-statistics value to lower and bound values (Pesaran & Shin, 1999). If F-statistics value is larger than the lower and upper bound, then we can conclude that cointegration between variables exists. By confirming that the long-run associations exist between variables, the study applies the cumulative sum (CUSUM) and cumulative sum of square (CUSUMSQ) tests (Brown, Durbin and Evans, 1975). Previous studies (Pesaran & Shin, 1999; Pesaran, Shin and Smith, 2001) suggested that these tests portray the good fit of the ARDL model. These tests are used to plot the residual of ECM. If the statistics in the plot fall in critical bounds at a 5% significant value, the results suggest that the coefficients of the ARDL model are stable.

5. RESULTS AND DISCUSSIONS

The empirical study uses the time series data to explain the long-term effects of openness and coverage of import by export on gross domestic product in the Republic of Srpska. The descriptive statistics of the important variables is stated in Table 5. All variables in Table 5 are given in levels:

Table 5: Descriptive statistics

Variable	GDP	OPEN	COV
Mean	7979420	0.732257	0.524715
Median	8581297	0.730197	0.540798
Maximum	11251324	0.857228	0.758725
Minimum	3682694	0.623534	0.261345
Std. Dev.	2289048	0.075009	0.152544
Skewness	-0.466886	0.099855	-0.187242
Kurtosis	2.153015	1.782978	2.158876
Jarque-Bera	1.32443	1.267522	0.706439
Probability	0.515708	0.530592	0.702423
Sum	1.60E+08	14.64513	10.4943
Sum Sq. Dev.	9.96E+13	0.1069	0.442126
Observations	20	20	20

Source: Authors' calculations

In the paper, we first test the stationarity of the variables included in the model. Namely, as mentioned earlier, the condition for adopting the ARDL approach is that the series must be mix order of integration, I(0) and I(1). If the time series are stationary or non-stationary in levels, and stationary after the first derivative, i.e. if they are integrated of order I (1), then we can test the existence of a cointegration relationship, which can be interpreted as a long-term relationship between the observed variables, and apply the model with error correction. Therefore, the following table shows the results of the ADF test of stationarity of time series in levels and after differentiating the time series:

Table 6: Results of the ADF stationarity test

Series		Critical values of the ADF test	p-value
GDP	Levels	-4.136718	0.0053
	The first difference	-2.335948	0.1722
OPEN	Levels	-2.107396	0.2440
	The first difference	-4.947605	0.0012
COV	Levels	-0.471514	0.8768
	The first difference	-3.780477	0.0131

Source: Authors' calculations

In the ADF stationarity test, the null hypothesis assumes the existence of a unit root in the time series, which confirms that the observed series is non-stationary. Contrary to the null hypothesis, the alternative hypothesis assumes that the time series does not have a unit root, so it is stationary. If the value of the obtained test

statistic is smaller than the critical value, then we accept the alternative hypothesis of the absence of a unit root, while otherwise we discard the alternative and accept the null hypothesis. From the previous table, we can see that the GDP variable is integrated of order I (0), which means that this time series is stationary in levels, which is confirmed at the 1% significance level. Also, the results of the ADF stationarity test testify to the non-stationarity of the OPEN and COV variables when observing these series in their levels. However, after differentiating these time series, both variables become stationary. In addition to the ADF stationarity test, the PP stationarity test is also used in the paper with identical results, which are shown in the Appendix.

Before calculating long- and short-run coefficient between the observed variables, it is important to calculate F-bounds test for confirmation of cointegration (Pesaran, Shin and Smith, 2001). The decision of existence of cointegration is made by comparing F-statistic with upper and lower bound:

Table 7: Results of cointegration in ARDL

Equation	Model	F-statistics		p-value
$GDP = f(OPEN, COV)$	$ARDL(1,3,2)$	30.883		0.000
	Significance			
Critical value	10.0%	5.0%	2.5%	1.0%
Lower bound I(0)	3.17	3.79	4.41	5.15
Upper bound I(1)	4.14	4.85	5.52	6.36

Source: Authors' calculations

Decision of existence of cointegration based on F-Bounds test follows the rule: if F-statistics value is larger than the lower and upper bound then we can conclude that cointegration between variables is confirmed. The value of F-statistics is 30.883 and by comparing with upper and lower bounds we are able to confirm cointegration between the observed variables statistically significant at 1%. The upper bound of test is 6.36 which is smaller than calculated F-statistic of 30.883.

Based on previous results we will present long- and short-run ARDL model with coefficients to determine the direction of relationship between these three variables. After verifying the existence of a long- and short-run association between variables from the ARDL bound test, the study finds the short- and long-run parameters of the variables. As we can see in Table 8 coverage of imports by exports in long rung increases GDP in the Republic of Srpska, namely 1% of rise of COV in long-term increases GDP by 0.80%. This coefficient is statistically significant at 1% level. On the other hand, calculated long-run coefficient for

variable OPEN is negative, but statistically insignificant. Table 8 presents results for long-run parameters of *ARDL (1,3,2)* calculated as:

Table 8: Long-run estimation of parameters from ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
log *OPEN*	-0.0930	0.1303	-0.7134	0.4960
log *COV*	0.8025	0.0476	16.8757	0.0000
C	12.4957	1.4837	8.4221	0.0000

Source: Authors' calculations

Short-term coefficients show that coverage of import by export has a positive effect on GDP in the first lag and negative in the second lag. Both coefficients are statistically significant at 1% level of significance. Short-term coefficients for variable OPEN have positive effects on GDP in the first and second lag, and negative in the third lag. However, these coefficients are not statistically significant. Table 10 presents short-run coefficients of ARDL model:

Table 9: Short-run estimation of parameters from ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Δlog *OPEN*	0.0078	0.0579	0.1345	0.8963
Δlog $OPEN_{t-1}$	0.0522	0.0530	0.9838	0.3540
Δlog $OPEN_{t-2}$	-0.0952	0.0646	-1.4732	0.1789
Δlog *COV*	0.2130	0.0359	5.9279	0.0004
Δlog COV_{t-1}	-0.3079	0.0563	-5.4678	0.0006
ϕ	-0.7583	0.0705	-10.7617	0.0000

Source: Authors' calculations

As we can see from the calculated parameters in short-term model coefficient ϕ or the speed of adjustment parameter is -0.7583. This means that the speed of adjustment of long-term equilibrium on short-term fluctuations is 0.76% per year.

Numerous diagnostic tests are used to find potential errors in the model. Diagnostic tests applied are R-square and Adjusted R-square tests for model fit, Durbin-Watson statistics for autocorrelation, Ramsey RESET test for stability of model, ARCH and Breusch-Pagan-Godfrey test for heteroscedasticity, Breusch-Godfrey Serial Correlation LM Test and Jarque-Bera test for normality of residuals. Table 11 presents results of these tests:

Table 10: Results of diagnostic tests

Test	Statistics	Prob.
R-square	0.943137	0.000
Adjusted R-square	0.90902	0.000
Durbin–Watson statistics	2.452189	-
Ramsey RESET	0.004181	0.9503
ARCH	0.682783	0.4225
Breusch-Pagan-Godfrey	1.236919	0.3854
Breusch-Godfrey Serial Correlation LM Test	1.542216	0.2881
Jarque–Bera	0.435824	0.8042

Source: Authors' calculations

As we can see from Table 10 R-square and Adjusted R-square are 0.9431 and 0.9090 and this implies good fit of the estimated model. Durbin-Watson statistics of autocorrelation is 2.45 which suggests that model is free from autocorrelation. Durbin-Watson statistics uses values from 0 to 4 and optimal values, which confirms there is no autocorrelation in the range from 1.50 to 2.50. Based on Ramsey RESET test we conclude that model is stable because p-value is greater than 0.05. Also, ARCH and Breusch-Pagan-Godfrey test for heteroscedasticity show that there is no heteroscedasticity in the estimated model. Based on p-value we can conclude that model is free of autocorrelation, and based on Jarque-Bera test for normality of residuals we can conclude that residuals are normally distributed.

6. CONCLUSIONS

The export orientation of developing countries is one of the key determinants when creating the economic growth of these countries. Due to the deviation of all other theories about the protection of domestic production through protectionist policies, the forcing of an export-oriented economy through the adoption of export-oriented policy of growth and development, can be an important generator of the country's economic growth.

The main goal of this paper was to determine the relationship between foreign trade openness and coverage of imports by exports, on one hand, and nominal GDP as measure of economic growth in the Republic of Srpska on other hand. We tried to confirm the main hypothesis that an increase in the coverage of imports by exports increases the gross domestic product in the Republic of Srpska in the long term.

Descriptive statistics showed that the foreign trade in the Republic of Srpska achieved a deficit of foreign trade through the entire period from 2001 to 2020. Also, the trade openness rose through this period, from 62 % of GDP in 2001 to 84% of GDP in 2018, i.e. by 22 percentage points, but significantly decreased in last two year and ended at the level of 71% of GDP in 2021 due to COVID-19 pandemic. A positive trend in indicator coverage of imports by exports was also recorded during the observed period. It grew significantly from 35% in 2001 to 76 % in 2021, which means that foreign trade deficit was relatively smaller in 2020 compared to 2001. As the deficit of foreign trade is constantly achieved through the observed period with a negative impact on GDP according to the economic theory, coverage of imports by exports became the main variable with a positive impact on GDP.

The econometric analysis confirms the long-term relationship between the economic growth and coverage of import by export, which is reflected in the existence of one cointegration equation. Using the ARDL approach, we came to the result that the long-term increase in the coverage of imports by exports has statistically significant and positive impact on the economic growth, while the openness has is a negative but statistically insignificant impact on the economic growth.

As foreign trade of the Republic of Srpska is mainly oriented towards the trade in intermediate goods we suggest that this is the reason why foreign trade does not produce higher effects on economic growth as Huchet-Bourdon, Le Mouël and Vijil (2018) explained. Also, the results we obtained are in line with Abendin & Duan's (2021) results which imply that foreign trade is significant for economic growth only if there is interaction between foreign trade and digital economy. Trivić (2018) showed that it is important to divide the flows of foreign trade into import and export ones. And considering this statement we conclude that an increase in export and an increase in coverage of imports by exports are strongly correlated with the economic growth. This conclusion is in accordance with results of Bojat, Kovačević and Kurušić (2021) who showed that economic openness, primarily through export-oriented policies, contributes to real GDP growth in the long term, while the impact of the share of imports in the domestic product is negatively correlated with GDP. Also, our results are in line with the results showed in Krajišnik et al. (2020) who emphasized the importance of export structure for the economic growth.

The final conclusion is that the adoption of export-oriented economic policies towards higher value-added products, along with the reduction of the balance of payments deficit should be one of the goals of the policymakers in the Republic

of Srpska. Authors are aware of limitations of this research due to lack of data and short time series for reliable econometric analysis. Also, due to the specifics of BiH organization some variables were not possible to calculate at the entire level, so we included available variables for the analysis. The possible directions of further research indicate that they can be directed towards researching the relationship between the structures of foreign trade, both export and import, and the domestic product in the Republic of Srpska.

Conflict of interests

The authors declare there is no conflict of interest.

REFERENCES

Abendin, S., & Duan, P. (2021). International trade and economic growth in Africa: The role of the digital economy. *Cogent Economics & Finance, 9*(1). DOI:10.1080/23322039.2021.1911767

Alesina, A., & Spolaore, E. (2003). *The Size of Nations.* Cambridge, Massachusetts, US: MIT Press.

Balassa, B. (1971). Regional Integration and Trade Liberalization. *Journal of Common Market Studies, 10*(1), 58-77. DOI:10.1111/j.1468-5965.1971.tb00644.x

Balassa, B. (1978). Exports and economic growth: Further evidence. *Journal of Development Economics, 5*(2), 181-189. DOI:10.1016/0304-3878(78)90006-8

Bhagwati, J. N. (1978). *Foreign Trade Regimes and Economic Development: Anatomy and Consequences of Exchange Control Regimes.* Cambridge, Massachusetts, US: NBER.

Bjelić, J., Erić, O., & Vujnić, S. (2020). Trade, Economic and Industrial Growth of the Republic of Srpska. *Ekonomski vidici, 1*(2), 93-111. DOI:https://ssrn.com/abstract=3647983

Bojat, M., Kovačević, S., & Kurušić, D. (2021). Interdependence of foreign trade and economic growth of Serbia. *Proceedings of the Faculty of Economics in East Sarajevo, 23*, 21-42. DOI:10.7251/ZREFIS2123021B

Brown, R. L., Durbin, J., & Evans, M. (1975). Techniques for Testing the Constancy of Regression Relationships Over Time. *Journal of the Royal Statistical Society: Series B (Methodological), 37*(2), 149-192. DOI: 10.1111/j.2517-6161.1975.tb01532.x

Chang, R., Kaltani, L., & Loayza, N. V. (2009). Openness can be good for growth: The role of policy complementarities. *Journal of Development Economics, 90*(1), 33-49. DOI:10.1016/j.jdeveco.2008.06.011

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series With a Unit Root. *Journal of the American Statistical Association, 74*(366), 427-431.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica, 49*(4), 1059-1072.

Duasa, J. (2007). Determinants of Malaysian Trade Balance: An ARDL Bound Testing Approach. *Global Economic Review, 36*(1), 89-102. DOI: 10.1080/12265080701217405

Edwards, S. (1993). Openness, Trade Liberalization, and Growth in Developing Countries. *Journal of Economic Literature, 31*(3), 1358-1393. Retrieved from: https://www.jstor.org/stable/2728244

Erić, O., Popović, G., & Popović, S. (2019). Foreign Trade Liberalisation and Economic Growth: The Case of the Republic of Srpska. *Economics, 7*(2), 99-108. DOI:10.2478/eoik-2019-0020

Frankel, J. A., & Romer, D. (1999). Does Trade Cause Growth? *The American Economic Review, 89*(3), 379-399. DOI:10.1257/aer.89.3.379

Gries, T., & Redlin, M. (2012). *Trade Openness and Economic Growth: A Panel Causality Analysis*. *Working Paper CIE 52*. Paderborn, Germany: Paderborn University, CIE Center for International Economics.

Grossman, G. H., & Helpman, E. (1991). *Innovation and Growth in the Global Economy.* Cambridge, Massachusetts, US: MIT Press.

Huchet-Bourdon, M., Le Mouël, C., & Vijil, M. (2018). The relationship between trade openness and economic growth: Some new insights on the openness measurement issue. *The World Economy, 41*(1), 59-76. DOI:10.1111/twec.12586

Iyke, B. N. (2017). Does Trade Openness Matter for Economic Growth in the CEE Countries? *Review of Economic Perspectives, 17*(1), 3-24. DOI:10.1515/revecp-2017-0001

Kong, Q., Peng, D., Ni, Y., Jiang, X., & Wang, Z. (2021). Trade openness and economic growth quality of China: Empirical analysis using ARDL model. *Finance Research Letters, 38*, 1-10. DOI:10.1016/j.frl.2020.101488

Krajišnik, M., & Tomaš, D. (2014). Uticaj spoljne trgovine na privredni rast Republike Srpske. *Acta Economica, 12*(20), 125-154. DOI:10.7251/ace1420125k

Krajišnik, M., Gojković, B., Josipović, S., & Popović, S. (2020). Impact of Exports on Economic Growth in Bosnia and Herzegovina. *Acta Economica, 18*(32), 59-84. DOI:10.7251/ACE2032059K

Krueger, A. (1978). *Liberalization Attempts and Consequences*. Cambridge, Massachusetts, US: Ballinger.

Krueger, A. O. (1997). *Trade Policy and Economic Development: How We Learn*. *NBER Working Paper Series, WP 5896*. Cambridge, Massachusetts, US: National Bureau of Economic Research, Inc.

Krugman, P. R., & Obstfeld, M. (2009). *International economics: Theory and policy.* Boston, Massachusetts, US: Pearson Addison-Wesley.

Pesaran, M. H., & Shin, Y. (1999). *An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis, Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium.* Cambridge: Cambridge University Press. DOI:10.12691/jfe-4-6-4

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289-326. DOI:10.1002/jae.616

Ram, R. (1987). Exports and Economic Growth in Developing Countries: Evidence from Time-Series and Cross-Section Data. *Economic Development and Cultural Change, 36*(1), 51-70. DOI:10.1086/451636

Romer, P. M. (1994). New goods, old theory, and the welfare costs of trade restrictions. *Journal of Development Economics, 43*(1), 5-38. DOI:10.1016/0304-3878(94)90021-3

Tang, D. (2020). Have Export Compositions Influenced Economic Growth of the European Union Countries in Central and Eastern Europe. *The European Journal of Applied Economics, 17*(1), 80-103. DOI:10.5937/EJAE17-23638

Trivić, J. (2018). Otvorenost malih tranzicionih privreda - postkrizna revidirana analiza. *Acta Economica, 16*(28), 55-71. DOI:10.7251/ACE1828055T

van den Berg, H., & Schmidt, J. R. (1994). Foreign trade and economic growth: time series evidence from Latin America. *The Journal of International Trade & Economic Development, 3*(3), 249-268. DOI:10.1080/09638199400000016

Vogiatzoglou, K., & Nguyen, P. N. (2016). Economic Openness and Economic Growth: A Cointegration Analysis for Asean-5 Countries. *The European Journal of Applied Economics, 13*(2), 10-20. DOI:10.5937/ejae13-11311

APPENDICES

Appendix 1. Results of Philips-Peron stationarity test

Table 11: Results of the PP stationarity test

Series		Critical values of the ADF test	p-value
GDP	Levels	-4.136718	0.0053
	The first difference	-2.335948	0.1722
OPEN	Levels	-2.107396	0.2440
	The first difference	-4.947605	0.0012
COV	Levels	-0.471514	0.8768
	The first difference	-3.780477	0.0131

Source: Authors' calculations

Appendix 2. Normality of residuals

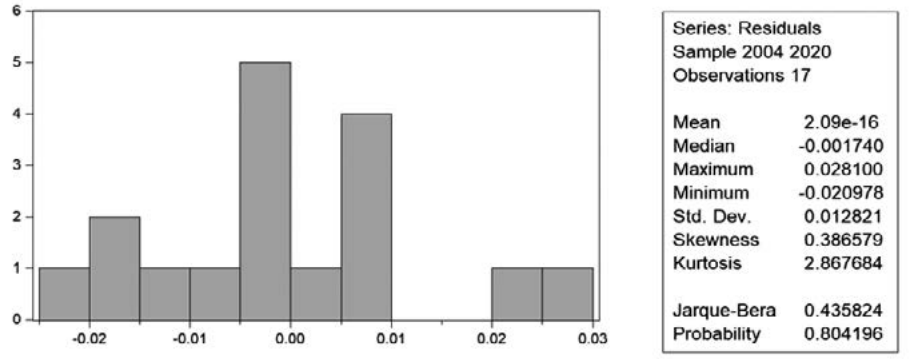
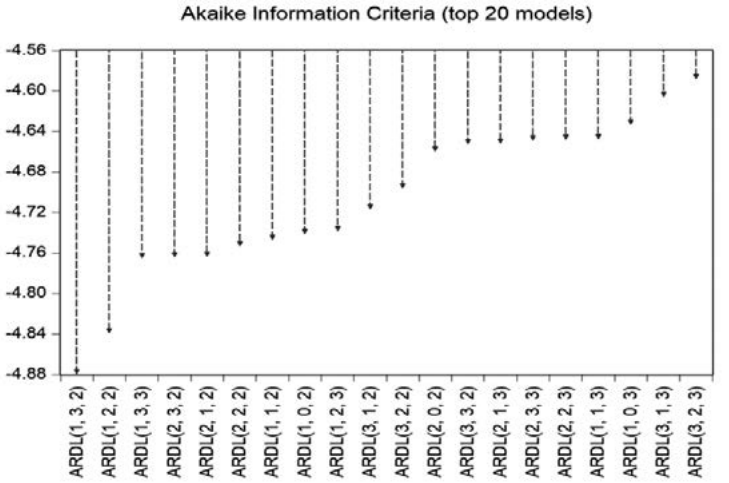


Figure 1: Results of the normality tests

Source: Authors' calculation

Appendix 3. Akaike Information Criterion selection of the model

For determining optimal number of lags, we used Akaike information criterion (AIC). As AIC shows optimal ARDL model is given by ARDL (1,3,2). This result suggests that optimal number of lags for variable GDP is one, for variable OPEN is three, and for variable COV is two. In the next figure we can see results of this selection process:

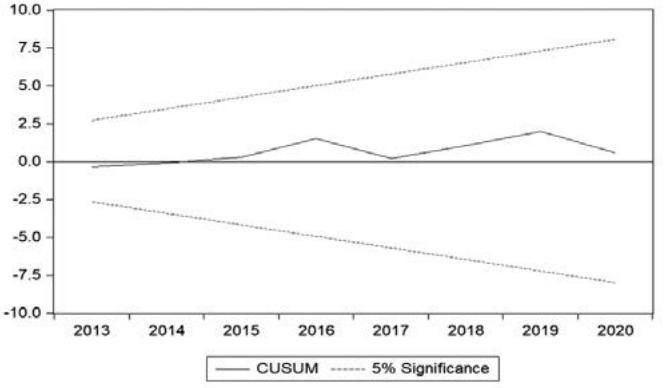


Graph 1: AIC selection process

Source: Authors' calculations

Appendix 4. CUSUM test for stability

The study uses cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests for checking stability in the short-run and long-run coefficients proposed by Brown, Durbin and Evans (1975). The CUSUM and CUSUMSQ are at the 5% significance level over time, confirming the stability and good fit of the ARDL model. CUSUM test for stability of coefficients of model shows that cumulative sum of GDP lies within 5% significance boundaries. Next figure presents the results of CUSUM test of stability:

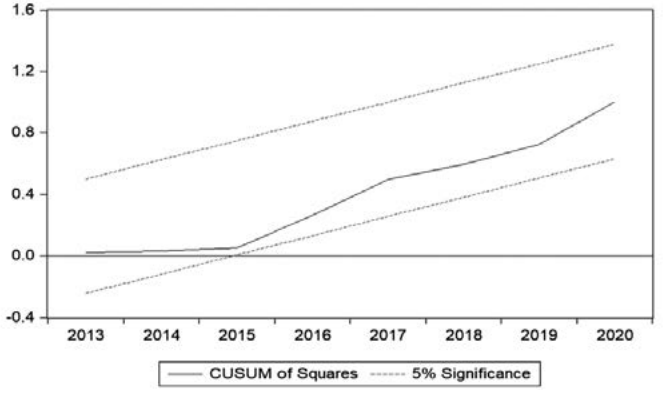


Graph 2: CUSUM stability test results

Source: Authors' calculations

Appendix 5. CUSUMQ test for stability

Based on CUSUMQ test as we can see from next figure, we conclude that our model is stable. Next figure presents the results of CUSUMQ test of stability:



Graph 3: CUSUMQ stability test results

Source: Authors' calculations

СПОЉНА ТРГОВИНА КАО ДЕТЕРМИНАНТА ЕКОНОМСКОГ РАСТА РЕПУБЛИКЕ СРПСКЕ: ЕМПИРИЈСКА АНАЛИЗА

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САЖЕТАК

Већина студија које истражују везу између спољне трговине и економског раста анализирају везу кроз интерпретирање различитих индикатора. Овај рад настоји истражити везу између покривености увоза извозом и отворености према спољној трговини, с једне стране, и бруто домаћег производа Републике Српске, с друге стране. Истраживање се односи на период од 2001. до 2020. године. Примјеном ARDL модела потврдили смо почетну хипотезу да повећање покривености увоза извозом повећава домаћи производ. Рад је потврдио дугорочну везу између независних и зависне варијабле, што је изражено кроз постојање коинтеграционе једначине. Резултати базирани на примијењеном ARDL методу показују негативну, занемариву везу између отворености и бруто домаћег производа у Републици Српској у дугом року, као и позитивну статистички значајну везу између покривености увоза извозом и бруто домаћег производа у дугом року. Вриједност коефицијента каже да 1% повећања покривености увоза извозом повећава бруто домаћи производ за 0,80% у дугом року.

Кључне ријечи: *спољна трговина, економски раст, трговинска отвореност, бруто домаћи производ*.

THE INFLUENCE OF THE COVID-19 PANDEMIC ON THE FINANCIAL PERFORMANCE OF LISTED RETAIL FIRMS IN SOUTH AFRICA

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ABSTRACT

The objective of the study was to analyse the influence of the COVID-19 pandemic on the financial performance of selected listed retail firms in South Africa. The COVID-19 pandemic had a negative effect on economic growth and resulted in a severe decline in the financial performance of companies. In addition, it disrupted many business and economic development opportunities in South Africa. The study was conducted to investigate the influence of the COVID-19 pandemic on the financial performance of selected retail firms listed on the Johannesburg Stock Exchange (JSE). Panel data analysis was adopted as a methodology to achieve the study objectives. The COVID-19 pandemic was found to have exerted a statistically significant negative impact on financial performance. Positive significant relationships emerged between financial leverage, firm size, financial liquidity and financial performance of selected JSE-listed retail firms. Lastly, growth in sales was found to be positive but exerted a weak significance on financial performance. The study contributes to the existing literature on the influence of the COVID-19 pandemic on the financial performance of listed retail entities in South Africa.

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1. INTRODUCTION

The world continues to adjust to the effects of the COVID-19 pandemic, which has resulted in tremendous economic losses for thousands of businesses worldwide as a consequence of government directives to shut down their

operations (Tashanova et al., 2020). In addition to a significant loss of life, the COVID-19 pandemic resulted in increased joblessness, significant financial liabilities, and compromised financial market efficiency **(**Al-Awachi, Alsaifi, Al-Awadhi & Alhammadi, 2020; Milašinović, Jovković & Dragičević, 2022).

In South Africa, one of the outcomes of the COVID-19 pandemic was the disruption of economic activities as a result of the social distancing imposed as a precaution to curb the spread of the virus. The social distancing and lockdown measures imposed by the government restricted the transportation of goods and other outputs, which dramatically slowed economic growth (Omaliko & Okpala, 2020). Additionally, investor confidence plummeted. The majority of South Africans live below the poverty line in cramped, multi-generational households in an economically diverse country (Naidu & Sri, 2020). It was envisaged that the financial and non-financial performance of private enterprises could suffer due to the restrictions imposed by the government. The ensuing shutdown of commercial activities and rapid drop in revenue would result in inadequate cash flow to sustain various activities, financing, and capital investments (Aifuwa, Saidu & Aifuwa, 2020).

The study reported in the present article was conducted to examine the influence of the COVID-19 health crisis on the financial performance of selected retail firms listed on the Johannesburg Stock Exchange (JSE) by examining financial performance over the period from 2015 to 2021. The COVID-19 pandemic negatively affected economic growth and caused a severe decline in the financial performance of several companies. It disrupted many business opportunities and economic development in South Africa. Financial performance analysis is concerned primarily with financial ratios derived from a company's financial statements. These measurements include profitability, liquidity, and debt ratios (Mabandla & Makoni, 2019). The study used return on assets (ROA) to gauge financial performance, which is net income divided by a company's total assets.

An economic downturn will understandably affect company product sales (Wijayangka, 2014), and the financial performance of any retail company will undoubtedly suffer if total sales drop. The pharmaceutical sub-sector experienced no more than a minor reduction in the average value and quick ratio of the current ratio. In South Africa, the legal tobacco/cigarette industry was almost brought to its knees during the pandemic, although the illicit trade flourished. The same was true for the cigarette sub-sector, which did not appreciably reduce the average value of the current ratio. The capacity of a company to satisfy its short-term maturing commitments within a single year is referred to as liquidity. A company's liquidity resources can be maintained in various ways, including

cash on hand and cash at the bank in current assets, reserve drawing capacity under a cash credit or overdraft arrangement, and short-term deposits. Current account cash levels offer the most significant level of liquidity. A company can keep liquidity if it has assets that can be moved or sold swiftly with minimal trading costs and annual values.

The ability of a firm to satisfy its cash obligations in a timely manner and to capitalise on market possibilities is the liquidity test. When one speaks of a company's liquidity, one attempts to quantify its ability to meet planned and unforeseen cash needs, expand its assets, lower its obligations, or cover operating losses (Abubakar, Sulaiman & Haruna, 2018). The amount of borrowings that corporations employ to boost profitability is referred to as leverage (Alkhatib, 2012). High leverage can inspire financial managers to improve their firm's performance while increasing agency charges. As a result, because leverage multiplies profits and risks, it can influence a firm's value either positively or negatively (Ivo & Anyanwaokoro, 2019). According to the definition, firm size relates to how big or small a firm is, measured by its fair value. As a result, company size can be defined as the size of a company as measured by its total assets, revenue, or enterprise value (Brown & Huang 2020). Companies with growth potential will seek external funding because internal financing may not be sufficient to support these opportunities (Acedo-Ramirez, Ayala-Calvo & Navarrette-Martinez, 2017).

The COVID-19 pandemic started in December 2019 in Wuhan, Hubei Province in China (McKibbin & Fernando, 2020). However, the present of COVID-19 pandemic in South Africa is therefore limited particularly in retail industry. As South Africa's economic engine moved from the primary mining and manufacturing to the tertiary wholesale trade and retail trade sectors, the South African economy has witnessed a structural transformation (Mandipa & Sibindi, 2022). Compared with other industries, the retail sector is on the increase, and as a result, a critical appraisal is essential to promote economic growth. The wholesale and retail sector employs an estimated 22% of the workforce. This establishes the retail industry as a significant component of the South African economy (Stats SA, 2021). As a result, there is a greater need to perform additional research in this area. Therefore, the study aimed to examine the nexus between return on assets (ROA) as the dependent variable and financial leverage (FL), liquidity (LIQ), firm size (SZ), sales growth (GRS) and the COVID-19 pandemic as explanatory variables in the context of selected listed retail companies in South Africa. Precisely, we wished to examine the relationship between COVID-19 and financial performance, as well as assess the extent of

the relationship between COVID-19 and the financial performance of retail firms listed on the Johannesburg Stock Exchange (JSE).

The work-from-home (WFH) and social distancing policy implemented during the COVID-19 pandemic reduced the number of planes. However, sales of retail, food and beverage industry's products and home appliances in the manufacturing industry increased throughout the three months from February to April 2020 in South Africa (National Treasury, 2020). As a result, food and beverage sales rose during the COVID-19 pandemic. Shen et al. (2020) indicate that the COVID-19 outbreak had a considerable negative influence on the performance of listed Chinese enterprises in the form of a decrease in total sales value, which dramatically impacted ROA. The tourism, catering, and transportation industries were severely negatively affected during the first quarter of 2020 (Shen, Fu, Pan, Yu, & Chen, 2020). The COVID-19 outbreak had a negative impact on the output, operations, and revenue of companies. During the COVID-19 outbreak, the managers of companies had to pay close attention to changes in the environment, make changes to the company, develop approaches, and carry out operational operations that met the purchasing habits of the time to aid company restoration**.**

The COVID-19 pandemic was a health disaster that disrupted many people's lives and caused innumerable deaths. To limit the spread of the pandemic, the governments of numerous countries imposed lockdowns, bringing normal commercial operations to a complete shutdown. Following the disruption caused by the COVID-19 pandemic, the World Trade Organization (WTO) predicted a significant drop in trade from 13% to 32% in 2020. The pandemic led to a considerable sales revenue reduction, which slowed financial performance and financing operations (Aifuwa, Saidu & Aifuwa, 2020). In light of the global economic downturn and financial instabilities and risks occasioned by the COVID-19 pandemic, the study examined the impact of COVID-19 on the financial performance of selected retail companies listed on the Johannesburg Stock Exchange in South Africa. The findings contribute to the existing literature on the impact of the COVID-19 pandemic, and it is hoped that they will help company managers and investors better understand its effect on the growth of retail enterprises in South Africa. The retail companies selected for the study were chosen due to their importance in encouraging economic growth.

2. THEORETICAL BACKGROUND

This provides the theoretical background on the influence of the COVID-19 pandemic on financial performance.

2.1 Trade-off theory

Kraus and Literzenberger (1973) are linked to the trade-off theory. They proposed that companies seek optimal leverage owing to a trade-off between debt tax benefits and the deadweight losses of insolvency. Myers and Majluf (1984) developed this theory further in their static trade-off model, arguing that companies set a goal debt-to-value ratio and slowly work towards it, similar to how companies modify dividends to advance toward a target dividend pay-out ratio. In essence, a company has two funding options at its fingertips: debt and equity. In a trade-off context, the company will take on additional debt to benefit from the debt interest tax shield until the bankruptcy costs exceed the current value of the interest tax shield. It is indeed advisable for the company to finance equity after this stage.

2.2 Pecking order theory

The pecking order theory, developed by Donaldson (1961) and amended by Myers and Majluf (1984), postulates that companies prefer internal finances, debt, and equity share issuance in that order. Financial managers' choice of pecking order financing can be explained by asymmetric information (Myers & Majluf, 1984). According to this hypothesis, a company optimises its financing decisions. Its benefit is widely accessible finance, such as retained earnings, before moving over to other funding sources, such as debt and equity, if needed. The advantage of debt financing over equity capital is that debt provides a tax incentive and provides a level of discipline to the company (Chaklader & Chawla, 2016, p. 268). Managers tend to raise securities once they are overpriced because it is considered that they will have more company information than some other shareholders. Existing investors' shareholding and earnings per share are reduced because of this. As a result, issuing equity capital is less favoured than issuing debt.

2.3. Agency cost theory

Jensen and Mackling (1976) proposed the agency cost hypothesis, claiming that the optimal capital structure demands a debt value that reduces disputes between shareholders and managers. A company can decrease the moral hazard problem

linked with its managers by providing credit instead of equity. According to this hypothesis, agency expenses rise in proportion to the free cash flow within management's influence. In capital structure theory, this is referred to as free cash flow theory. Managers will be punished and required to take on investment projects that are consistent with the interests of shareholders in this manner (Jensen, 1986).

3. THE EMPIRICAL RESEARCH AND DEVELOPMENT OF RESEARCH HYPOTHESIS

The emergence of the COVID-19 pandemic affects not only human health but also the economy (Salsabilla et al., 2021). The previous studies conducted revealed a positive relationship between COVID-19 pandemic and financial performance (Davi, Warasniasih, Masdiantini & Musmini, 2020). In contrast, Shen et al. (2020) and Aifuwa, Saidu & Aifuwa (2020) reported that COVID-19 pandemic decreases financial performance of firms. Consequently, the findings remain inconclusive on the impact of COVID-19 pandemic on the profitability. The firm size has potential to be profitable despite the presence of COVID-19 pandemic due to high retained earnings.

Mohsin, Hongzhen and Hossain (2021) investigated the impact of COVID-19 pandemic on the SMEs in Pakistan. Through descriptive statistics, the results showed that COVID-19 pandemic affected SMEs and business, and experienced several issues such as access to finance, supply chain disruption and decrease in profits and sales. Protecting workers and information accuracy, boosting the economy, income and employment of SMEs, planning, building resilience and positive social relationships were recommended.

Aifuwa, Saidu & Aifuwa (2020) examined the impact of COVID-19 pandemic on liquidity and profitability of Nigerian firms using the quantitative and panel data analysis. The outcomes revealed that COVID-19 pandemic severely affected the liquidity and profitability of Nigerian firms. In addition, social distancing imposed by government decreased the economic growth resulting in limited export. Based on this, the study recommended for the government to increase its support for the local supply of raw materials since the outbreak of COVID-19 has strongly imported raw materials necessary for production from China in particular and other countries in general impaired. Thus, the resource input required for production could be made available, allowing the companies to maintain optimal liquidity and in turn improve the profitability of the companies.

Mehrothra, Rahimian and Barah (2020) examined the influence of COVID-19 pandemic on Small medium enterprise (SMEs) in India using mixed method of 152 respondents and 15 qualitative interviews. The study revealed that selling products during the COVID-19 pandemic was negatively affected by the pandemic. Hence the study recommends that government should put measures to reduce the high expenditure concerning SMEs in India. Additionally, the findings were limited to Indians only and cannot be generalised.

3.1 Research hypothesis

The hypothesis was based on the five explanatory variables identified above since the primary study objective was to investigate the relationship between COVID-19 and the financial performance of the listed retail firms in South Africa.

Leverage is the source of borrowed funds that the firm uses to fund its assets beyond the source of capital or equity. The higher the leverage ratio, the higher the company's debt value (Andriyani & Khafid, 2014). The company's borrowing policy can affect the extent to which firm assets can be financed with debt. The financial leverage decreases the cash flow, potentially negatively affecting profitability – hence the following hypothesis:

> H_1: There is a negative relationship between financial leverage and the financial performance of listed retail firms.

Liquidity is a firm's ability to fund increases in assets and meet obligations as they come due without incurring unacceptable losses. In contrast, effective liquidity risk management helps ensure the firm's ability to meet uncertain cash flow obligations because they are influenced by external events and further agent behaviour (Amnim, Aipma & Obiora 2021). It remains essential for firms to manage liquidity to monitor cash flow and ensure that they can meet their obligations on time. Therefore, the study hypothesised that:

> H_2: There is a positive relationship between liquidity and the financial performance of listed retail firms.

Effective oversight by major shareholders reduces the possibility of management opportunism, thereby enhancing shareholder value. Maditinos, Chatzoudes, Tsairidis & Theriou (2011) and Matar and Eneizan (2018) state that a firm's financial performance can be measured by growth revenue, which also indicates a firm's growth. The sales growth can enhance profitability (Tazvivinga, Mouton and Pelcher, 2021).

H_3: There is a positive relationship between the growth in sales and the financial performance of listed retail firms.

The COVID-19 pandemic has exerted an influence on every sphere of human endeavour. Just as the coronavirus affected public health services globally, it also affected the global economy. As early as 2020, Aifuwa, Saidu and Aifuwa (2020) cautioned that the pandemic would inevitably lead to a worldwide economic recession. The following hypothesis was therefore formulated:

H_4: There is a negative relationship between COVID-19 and the financial performance of listed retail firms.

It is accepted that company size refers to how big or small a firm is, based on its market value. Therefore, company size can be inferred from how large company reflects its total assets, revenue, or market capitalisation (Brown & Gørgens, 2009). Abubakar, Sulaiman & Haruna (2018) found a positive relationship between market value and the firm size of listed firms in Nigeria. Hence, the following hypothesis was put forward:

H_5: There is a positive relationship between the firm size and the financial performance of listed retail firms.

4. MATERIALS AND METHODS

The published financial reports of retail companies listed on the Johannesburg Stock Exchange for the period from 2015 to 2021 were used for the study. Thereafter, we took the annual financial information based on the period 2015-2021 as a sample to examine the effects of the COVID-19 pandemic on the financial performance of selected South African listed retail companies. The data was extracted from the Iress database of listed retail companies. The yearly audited financial reports of 22 firms were collected from the Iress database and used to calculate the financial ratios.

Table 1 below shows the measurement of the dependent and independent variables. Financial performance is the dependent variable, measured by return on assets (ROA). It is an accounting measure indicating how effectively a firm uses its assets to generate profits (Oktasari, 2020; Curry & Banjarnahor, 2018; Ehiedu, 2014). The independent variables in this study were revenue growth in sales (GRS), financial leverage (FL), financial liquidity (LIQ), growth in sales GRS), firm size (SZ) and COVID-19. A binary dummy variable was used to account for the COVID-19 period equal to 1 for the post-WHO pandemic announcement (11 March 2020) and 0 otherwise. Table 1 presents the operationalisation of the variables used in this study.

Table 1: Operationalisation and measurement of variables

Variables	Measurement	Authors
ROA	Net profit/Total assets	Chavali & Rosario (2018)
LIQ (financial liquidity)	Current liabilities/Current assets	Rashid & Mehmood (2017)
FL (financial leverage)	Liabilities/Equity	Abubakar, Sulaiman & Haruna (2018)
SZ (firm size)	Log total assets	Rubab et al. (2022)
COVID-19	Dummy variable of 1 if during the COVID-19 pandemic and 0 otherwise	Amnim, Aipma & Obiora (2021)
GRS (sales growth)	(Previous sales-current sales)/Current sales	Thiele & Wendt (2017)

Source: Authors' own compilation

Regression Model

To examine the impact of firm size (SZ), financial leverage (FL), current ratio (CR), sales growth (GRS) and COVID-19 pandemic period on the financial performance (ROA) of JSE-listed retail firms, panel regression analysis was used based on the following regression model:

Model

$$ROA_{i,t} = \beta_0 + \beta_1 FL_{i,t} + GRS_{i,t} + LIQ_{i,t} + \beta_2 SZ_{i,t} + Covid_{i,t} + \varepsilon_{i,t}$$

5. RESULTS

The descriptive statistics are reported in Table 2 below; these consisted of the mean, standard deviation, median and minimum and maximum value of the variables.

Table 2: Descriptive statistics

	ROA	GRS	FL	LIQ	SZ	COVID-19
Mean	0.094	0.116	2.071	0.859	6.733	0.155
Median	0.088	0.077	1.301	0.769	6.865	0.000
Maximum	0.331	9.864	7.369	9.409	7.918	1.000
Minimum	-0.956	-0.917	0.106	0.136	4.875	0.000
Std.Dev.	0.112	0.707	1.582	0.874	0.670	0.362

Source: EViews

Based on Table 2, ROA, which represents the dependent variable, reflected a mean value of 0,094 with a standard deviation of 0,112. The variable had minimum and maximum values between -0,956 and 0,331 and a median of 0,088. GRS reflected a mean value of 0,116 with a standard deviation of 0,707, and ranged between -0,917 and 9,864, with a median of 0,077. FL reflected a mean value of 2,071 and standard deviation of 1,582, with a maximum value of 7,369 and minimum value of 0,106. As for LIQ, the mean value was 0,859 and the standard deviation was 0,874. The maximum value was 9,409, and the minimum value 0,136. SZ presents the firm size and reflects a mean value of 6.733 and a standard deviation of 0,670. The minimum and maximum values were 4,875 and 7,918, respectively, with a median of 6.865. Lastly, the COVID-19 pandemic had a mean value of 0,155 and a standard deviation of 0.362. The minimum and maximum were 0,000 and 1,000, respectively.

Table 3: Correlation matrix

	VIF	ROA	FL	GRS	LIQ	SZ	COVID_19
ROA	DP	1.00					
FL	1.625	0.19**	1.00				
GRS	1.037	0.010	-0.034	1.00			
LIQ	1.554	-0.115	-0.54***	-0.07	1.00		
SZ	1.164	0.26***	-0.22***	-0.086	-0.100	1.00	
COVID-19	1.068	-0.23***	-0.22**	0.080	0.177*	0.084	1.00

Source: Author's compilation

The results of the correlation matrix present the correlation relationship with other dependent and independent variables. Financial leverage, sales growth and firm size positively influenced financial performance (19%, 1% and 26%, respectively). Conversely, financial liquidity and the COVID-19 pandemic negatively affected financial performance (-12% and 23%, respectively). All the correlation coefficients of all variables ranged between 0,084 and 0,26, which meant a multicollinearity problem. In addition, the value of VIF shows that all independent variables had values of less than 5, confirming that no multicollinearity problems arose.

Table 4: Hausman test

17 retail firms on No: observation 118	Cross-section Chi-square statistics	Decision
	25.592414	Fixed effect model
Hypothesis testing	H_0: Random effect is appropriate H_1: Fixed effect model is appropriate	

*;** and *** indicate significance at 10%, 5% and 1% respectively.

Source: Authors' compilation

Based on the Hausman test above, the fixed-effect model was found to be appropriate, so the panel regression result was based on the fixed-effect model. This test showed a chi-square of 25.592414 and a p-value of 1%. As a result, the null hypothesis was rejected, in which the random effect model was appropriate.

Table 5: Fixed effect regression analysis

Variables	Dependent variable Financial performance (ROA)	
FL	0.033488**	(0.0157)
GRS	0.0109	(0.009)
LIQ	0.0617***	(0.0139)
SZ	0.436***	(0.069)
COVID-19	-0.1224***	(0.023)
C	-3.005***	(0.481)
R-squared	0.650327	
Adjusted R-squared	0.573835	
DW test	1.996	
Prob (F-statistic)	0.0000	

*, ** and *** indicate significance at 10%, 5% and 1% respectively.

Source: Eviews

In terms of the fixed effect regression results recommended by the Hausman test, the robust parameters showed that the COVID-19 pandemic negatively influenced the financial performance of the selected retail firms listed on the JSE at 1% level of significance. Liquidity (LIQ) and firm size (SZ) positively influenced financial performance at 1% level of significance and financial leverage positively and significantly influenced financial performance at 5% level of significance. Lastly, growth in sales had a positive but insignificant effect on financial performance. An R-squared value of 0.6503 is an indication that the roughly 65% variation in the financial performance of the selected listed retail

firms in South Africa was explained by sales growth (GRS), liquidity (LIQ), financial leverage (FL), firm size (SZ) and COVID-19 pandemic. The F-statistic was significant at 1% level, which is evidence of the adequacy of the model to explain the relationship between the variables.

Table 6: Summary of research hypothesis

Hypothesis	Description	Decision
H_1	Financial leverage has a significant negative influence on financial performance.	Rejected
H_2	Financial liquidity has a significant positive influence on the financial performance of retail listed firms.	Accepted
H_3	Firm size has a significant positive influence on the financial performance of listed retail firms.	Accepted
H_4	Growth in sales has a significant influence on financial performance.	Accepted
H_5	COVID-19 pandemic has a significant negative influence on financial performance.	Accepted

Source: Authors' own compilation

6. DISCUSSIONS

The findings suggest that financial liquidity and firm size are positively and significantly associated with financial performance (β=0,06 and 0,44, respectively; p<0,01). The findings are in line with the results of Ramlan and Nodin (2018) and Fraser and Ormiston (2016), who found that financial liquidity makes a positive and significant contribution to financial performance. However, the findings are not in line with the results of Zimon and Tarighi (2021). Despite mixed findings from other studies, the study reported in the present article suggested that cash available for short-term liability increased the financial performance of the selected retail firms. In addition, most retail firms are large enough in terms of assets compared to small firms. Hence their size increases their financial performance. This bears out Abubakar Sulaiman & Haruna (2018) findings that the firm size influences financial performance. The results imply that usage of liquidity and the large firm size contribute to the profitability of South African retail firms.

There was a positive but not significant (β=0,01; insignificant) relationship between growth in sales and financial performance. The results are in line with the findings of Tazvivinga, Mouton & Pelcher (2021). It makes sense that growth in sales improves the firm's profitability, particularly in the case of retail firms. The financial leverage of the selected retail firms was found to be positively and significantly associated with financial performance (β=0,03; p<0,05). However,

these results were not consistent with the findings of Mohammed, Puat, Amirrudin and Hashim (2020), who found leverage to have a significant negative relationship with the profitability of certain listed oil and gas firms. However, Sudaryo et al. (2021) found a positive relationship between financial leverage and financial performance. Therefore, the findings remain inconclusive, with no universal agreement. In accordance with this study, the more funds provided by creditors, the greater the likelihood of financial success. Conversely, the findings suggest that the COVID-19 pandemic negatively influenced financial performance (β=-0,12; $p<0,01$).

Meanwhile, Aifuwa, Saidu and Aifuwa (2020) indicated that COVID-19 hurt financial performance. Therefore, it is recommended that government should include retail firms among the recipients of stimulus packages to sustain their business activities or operation during difficult times. Therefore, the results cannot be generalised for other sectors of the economy. Hence, future research is recommended in the different sectors of the economy, such as construction, the agricultural industry, banking, insurance, manufacturing and the food and beverage sector.

7. CONCLUSIONS

The findings of this study suggest that the emergence of the COVID-19 pandemic decreased the financial performance of retail firms listed on the JSE in South Africa. The results contribute to the existing literature on the influence of the COVID-19 pandemic and practically make firm managers and investors aware of the disruption caused by the COVID-19 pandemic on the growth of retail firms in South Africa. The study contributes to expanding the literature on the impact of the COVID-19 pandemic on financial performance in South Africa. Hence, the study's findings inform and advise managers and investors on how best to implement reactionary measures in the context of the pandemic-induced disruptions.

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Conflict of interests

The authors declare that there is no conflict of interest.

REFERENCES

Abubakar, A., Sulaiman, I., & Haruna, U. (2018). Effect of firm's characteristics on the financial performance of listed insurance companies in Nigeria. *African Journal of History and Archaeology*, *3*(1), 1–9.

Acedo-Ramirez, M. A., Ayala-Calvo, J. C., & Navarrete-Martinez, E. (2017). Determinants of Capital Structure: Family Businesses versus Non-Family Firms. *Finance a Uver: Czech Journal of Economics & Finance*, *67*(2), 80-103.

Aifuwa, H. O., Saidu, M., & Aifuwa, S. A. (2020). Coronavirus pandemic outbreak and firms performance in Nigeria. *Management and Human Resources Research*, *9*(4), 1-25. Retrieved from https://ssrn.com/abstract=3593361

Al-Awachi, A.M., Alsaifi, K., Al-Awadhi, A. & Alhammadi, S. (2020). Death and contagious infectious diseases: impact of COVID-19 virus on stock market returns. *Journal of Behavioral and Experimental Finance*, *27*, 2–5. DOI: 10.1016/j.jbef.2020.100326

Alkhatib, K. (2012). The determinants of leverage of listed companies. *International Journal of Business and Social Science*, *3*(24), 78-83.

Amnim, O. E. L., Aipma, O. P. C., & Obiora, C. F. (2021). Impact of a COVID-19 pandemic on liquidity and profitability of firms in Nigeria. *International Journal of Academic Research in Business and Social Sciences*, *11*(3), 1331-1344. DOI: 10.6007/IJARBSS/v11-i3/9229

Andriyani, R., & Khafid, M. (2014). Analisis Pengaruh Leverage, Ukuran Perusahaan Dan Voluntary Disclosure Terhadap Manipulasi Aktivitas Riil. *Accounting Analysis Journal*, *3*(3), 273-281. DOI: 10.15294/aaj.v3i3.4191

Brown, J. R., & Huang, J. (2020). All the president's friends: Political access and firm value. *Journal of Financial Economics*, *138*(2), 415-431. DOI: 10.1016/j.jfineco.2020.05.004

Brown, R., & Gørgens, T. (2009). *Corporate governance and financial performance in an Australian context* (No. 2009-02). The Treasury, Australian Government. Retrieved from: https://ideas.repec.org/p/tsy/wpaper/wpaper_tsy_wp_2009_2.html

Chaklader, B., & Chawla, D. (2016). A study of determinants of capital structure through panel data analysis of firms listed in NSE CNX 500. *Vision*, *20*(4), 267-277. DOI: 10.1177/09722629166687

Chavali, K., & Rosario, S. (2018). Relationship between capital structure and profitability: A study of Non-Banking Finance Companies in India. *Academy of Accounting and Financial Studies Journal*, *22*(1), 1–8.

Curry, K., & Banjarnahor, E. (2018, March). Financial Distress Pada Perusahaan Sektor Properti Go Public di Indonesia. In *Prosiding Seminar Nasional Pakar* (pp. 207–221).

Donaldson Jr, R. J. (1961). Radar reflectivity profiles in thunderstorms. *Journal of Atmospheric Sciences*, *18*(3), 292-305. DOI: 10.1175/1520-0469(1961)018<0292:RRPIT>2.0.CO;2

Ehiedu, V. C. (2014). The impact of liquidity on the profitability of some selected companies: The financial statement analysis (FSA) approach. *Research Journal of Finance and Accounting*, *5*(5), 81–90.

Fraser, L. M., & Ormiston, A. (2016). *Understanding financial statements*, 11th edition. London, UK: Pearson.

Ivo, M. S., & Anyanwaokoro, M. (2019). Relating financial leverage to corporate performance: A case of cement manufacturing firms in Nigeria. *South Asian Journal of Social Studies and Economics*, *3*(4), 1-14. DOI: 10.9734/sajsse/2019/v3i430114

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, *76*(2), 323-329. Retrieved from: http://0-www.jstor.org.oasis.unisa.ac.za//stable/1818789

Kraus, A., & Litzenerger, R. H. (1973). A state-preference model of optimal financial leverage. *The Journal of Finance, 28*, 911-922. DOI: 10.2307/2978343

Mabandla, N. Z., & Makoni, P. L. (2019). Working capital management and financial performance: evidence from listed food and beverage companies in South Africa. *Academy of Accounting and Financial Studies Journal*, *23*(2), 1–10.

Maditinos, D., Chatzoudes, D., Tsairidis, C., & Theriou, G. (2011). The impact of intellectual capital on firms' market value and financial performance. *Journal of Intellectual Capital*, *12*(1),132-151. DOI: 10.1108/14691931111097944

Mandipa, G., & Sibindi, A. B. (2022) Financial performance and working capital management practices in the retail sector: empirical evidence from South Africa. *Risks 10* (63), 1–17. DOI: 10.3390/risks10030063

Matar, A., & Eneizan, B. M. (2018). Determinants of financial performance in the industrial firms: Evidence from Jordan. *Asian Journal of Agricultural Extension, Economics & Sociology*, *22*(1), 1-10. Retrieved from http://www.sciencedomain.org/review-history/22655

McKibbin, W. J., & Fernando, R. (2020). Global macroeconomic scenarios of the COVID-19 pandemic. *CAMA Working Paper 62/2020*. Australian National University: CAMA. DOI: 10.2139/ssrn.3635103

Mehrotra, S., Rahimian, H., Barah, M., Luo, F., & Schantz, K. (2020). A model of supply-chain decisions for resource sharing with an application to ventilator allocation to combat COVID-19. *Naval Research Logistics (NRL)*, *67*(5), 303-320. DOI: 10.1002/nav.21905

Milašinović, M., Jovković, B., & Dragičević, P. (2022). COVID-19 pandemic and fraudulent actions in the financial statements: the case of hotel companies in the Republic of Serbia. *Acta Economica*, *20*(36), 133–154. DOI: 10.7251/ACE2236133M

Mohammed, N. F., Puat, S. A., Amirrudin, M. S., & Hashim, A. (2020). Leverage, liquidity and profitability ratios: Accountability of Malaysian listed oil and gas firms. *Humanities & Social Sciences Reviews*, *8*(2), 941–947. DOI: 10.18510/hssr.2020.82104

Mohsin, A. K. M., Hongzhen, L., & Hossain, S. F. A. (2021). Impact of COVID-19 pandemic on consumer economy: Countermeasure's analysis. *Sage Open*, *11*(2). DOI: 10.1177/21582440211008 doi.org/10.1177/21582440211008

Mohsin, A. K. M., Hongzhen, L., Sume, A. H., & Hussain, M. H. (2020). Analysis of the causes of moral injury in the outbreak of 2019-nCoV. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*(S1), S162–S164. DOI: 10.1037/tra0000720

Muftiasa, A., & Wibowo, L. A. (2021). Hedging Policy Determinants on the Company: A Comparative Analysis. *Review of International Geographical Education Online*, *11*(7), 4069-4079.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*, 187–221: DOI: 10.3386/w0884

Naidu, G. T., & Sri, S. S. S. (2020). Effect of cash management practices on the financial performance of small and medium enterprises in Visakhapatnam and Vizianagaram Districts of Andhra Pradesh, India. *European Journal of Social Sciences Studies*, *5*(6), 142-151. DOI: 10.46827/ejsss.v5i6.951

National Treasury SA. (2020). *Briefing by the National Treasury on Financial Implications of COVID-19 on Both the Economy and Budget*. Department of National Treasury South Africa. Retrieved from: https://www.treasury.gov.za/comm_media/press/2020/JT%20SCoF%20and%20SCoA%20briefing%20COV19.pdf

Oktasari, D. P. (2020). The effect of liquidity, leverage and firm size on financial distress. *East African Scholars Multidisciplinary Bulletin*, *3*(9), 293–297. DOI: 10.36349/easmb.2020.v03i09.002

Omaliko, E., & Okpala, N. (2020). Effect of TSA on solvency of listed deposit money banks in Nigeria. *World Journal of Finance and Investment Research*, *5*(1), 32-47.

Ramlan, H., & Nodin, M. (2018). The effect of leverage, liquidity and profitability on the companies performance. *Journal of Humanities, Language, Culture and Business*, *2*(7), 9–15.

Rashid, A., & Mehmood, H. (2017). Liquidity and capital structure: The case of Pakistani non-financial firms. *Economics Bulletin*, *37*(2), 675–685.

Rubab, S. T., Hanif, N., Fatima, A., Munir, U., & Kamran, M. (2022). The Impact of Financial Distress on Financial Performance of Manufacturing Firms Listed at Pakistan Stock Exchange. *Bulletin of Business and Economics, 11*(2), 382–391. Retrieved from https://www.bbejournal.com/index.php/BBE/article/view/397

Salsabilla, A., Azhari, A. R., Wahyudi, R., Pambudi, D. S., & Riduwan, R. (2021, August). Impact of the COVID 19 Pandemic on The Profitability of Islamic Banks in Indonesia. In *Annual Conference of Ihtifaz: Islamic Economics, Finance, and Banking*, *2*(2), 61-69.

Shen, H., Fu, M., Pan, H., Yu, Z., & Chen, Y. (2020). The impact of the COVID-19 pandemic on firm performance. *Emerging Markets Finance and Trade*, *56*(10), 2213-2230. DOI: 10.1080/1540496X.2020.1785863

Stats SA (Statistics South Africa). (2021). Retail Trade Statistics: First Quarter 2021. Retrieved from: www.statssa.gov.az

Sudaryo, Y., Sofiat, N. A., Kumaratih, I., Kusumawardani, A., & Hadiana, A. (2021). Financial Distress Dampak Profitabilitas, Rasio Likuiditas Dan Rasio Leverage Terhadap Financial Distress Pada Perusahaan Jasa Sub Sektor Property Dan Real Estate Di Indonesia: Financial Distress In Indonesia. *Jurnal Teknologi dan Bisnis*, *3*(2), 119-136.

Tashanova, D., Sekerbay, A., Chen, D., Luo, Y., Zhao, S., & Zhang, T. (2020). *Investment opportunities and strategies in an era of Coronavirus pandemic.* Retrieved from: https://ssrn.com/abstract=3567445 or http://dx.doi.org/10.2139/ssrn.3567445

Tazvivinga, J. E., Mouton, M. M., & Pelcher, L. (2021). Determinants of Capital Structure for Listed Retailing Firms on the JSE. *The Retail and Marketing Review*, *17*(1), 1–15. Retrieved from: https://hdl.handle.net/10520/ejc-irmr1-v17-n1-a2

Thiele, F.K., & Wendt, M. (2017). Family firm identity and capital structure decisions. *Journal of Family Business Management, 7*(2) 221-239. DOI: 10.1108/JFBM-05-2017-0012

Wijayangka, C. (2014). Analisis kinerja keuangan perusahaan sektor manufaktur akibat krisis keuangan amerika. *Jurnal Manajemen Indonesia*, *14*(2). 172–180. DOI: 10.25124/jmi.v14i2.361

Zimon, G., & Tarighi, H. (2021). Effects of the COVID-19 global crisis on the working capital management policy: Evidence from Poland. *Journal of Risk and Financial Management*, *14*(4), 1-17. DOI: 10.3390/jrfm14040169

УТИЦАЈ ПАНДЕМИЈЕ КОВИД-19 НА ФИНАНСИЈСКЕ ПЕРФОРМАНСЕ КОТИРАНИХ МАЛОПРОДАЈНИХ КОМПАНИЈА У ЈУЖНОАФРИЧКОЈ РЕПУБЛИЦИ

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САЖЕТАК

Циљ студије је био да се анализира утицај пандемије изазване вирусом корона на финансијске перформансе одабраних компанија малопродаје у Јужноафричкој Републици. Пандемија изазвана вирусом корона негативно је утицала на привредни раст и резултирала озбиљним падом финансијских перформанси компанија. Поред тога, то је пореметило многе пословне и економске могућности развоја у Јужноафричкој Републици. Студија је спроведена да би се истражио утицај пандемије изазване вирусом корона на финансијске перформансе одабраних компаније малопродаје које котирају на Јоханесбуршкој берзи (JCE). Као методологија за постизање циљева

студије усвојена је анализа панел података. Утврђено је да је пандемија изазвана вирусом корона имала статистички значајан негативан утицај на финансијске перформансе. Позитивне значајне везе су се појавиле између финансијског левериџа, величине предузећа, финансијске ликвидности и финансијских перформанси одабраних предузећа која котирају на JCE. Коначно, утврђено је да је раст продаје позитиван, али је имао слаб утицај на финансијске перформансе. Студија доприноси постојећој литератури о утицају пандемије изазване вирусом корона на финансијске резултате котираних компанија малопродаје у Јужноафричкој Републици.

Кључне ријечи: *Пандемија изазвана вирусом корона, финансијске перформансе, компаније малопродаје, Јужноафричка Република.*

Прикази књига
Book Reviews

BOOK REVIEW: NIKOLA NJEGOVAN (2022) FRIEDMAN'S CHALLENGE

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ABSTRACT

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I

The initiators of the "marginalist revolution", Jevons, Menger and Walras, had no idea how much intellectual energy their ideas would trigger in the decades and centuries to come and what implications they would leave for the development of economic theory and methodology. From their time, it was unforeseeable that the "golden age of economic theory" of the 40s and 50s of the twentieth century would follow, as evidenced by the "marginalist controversy" and Friedman's (1953) *"The methodology of positive economics"*. The "golden age of economic theory" enabled the emergence of Samuelson's "neoclassical synthesis" and the constitution of modern microeconomic theory. It was even less predictable that the history, methodological controversies, and literature related to the "marginalist revolution", "marginalist controversy", "Methodology of positive economics", and "neoclassical synthesis" would arouse so much interest at the Faculty of Economics in Belgrade. It is worth reminding that the professors at this Faculty have written significant works dedicated to topics whose comprehensiveness, method of analysis and attitudes do not lag behind the level of similar papers at other universities in the world. These papers undoubtedly include "Contemporary bourgeois theories of value and prices" by Zoran Pjanić (1965), "Austrian theory of capital" by Milić Milovanović (1986), "Fundamentals of Austrian theory" by Božo Stojanović (2008, 2021), and we hope that the list will soon include "Friedman's Challenge" by Nikola Njegovan, which was recently published by the Publishing Centre of the Faculty of Economics, Belgrade.

Dr Nikola Njegovan's book is evaluated by the public at a time when economic science, as well as economics as a whole, is in a long-term serious crisis. Empiricism and normativism, supported by the rapid growth of corporate profits in the conditions of accelerated globalization, relegated methodological research of economic theories to the background, often reducing economic science to the mere verification of the properties of a certain phenomenon by applying a suitable mathematical model. Empiricism has gone to such proportions that today, even in academic circles, we talk about the "visual economy", "digital economy", "green economy", etc. In modern times the voice of marketing agencies and the sector of large companies are heard more than the voice of economic science. Fortunately, in the time of the "marginalist revolution" and "marginalist controversy", there was no such approach in economic science. Otherwise, we would have had "steam economy", "diesel economy", "electric economy", etc. Normativism has reduced the objective importance of economic science around the world, and often, through various international agreements and directives, it has imposed itself as a set of desirable features of the economy, so that, in such a system, economic science aims to prove that these features are actually realized. Bearing in mind such tendencies and not forgetting Hammond's remark (1992) that economic theory and methodology live separate lives, the idea of Nikola Njegovan to seriously engage in the analysis of one of the most significant works in the field of positive economics methodology seems quite logical. He thereby calls for strengthening the objective side of economic science and the need to determine its relationship to empiricism and normative economics.

II

Although aware of the fact that the choice of the book's title, "Friedman's Challenge," may cause associations among some readers that it deals with monetary problems or issues of the price system weakness at the time of the Great Depression, the author consciously opted for it precisely because the subject of analysis in this book "represents a challenge to arguments about the necessity of building theories on realistic assumptions" (p. xii). In Friedman's works, one can find several places that represent a real challenge to everything that has been said about the given topic in economic science, so the author's decision to give the book a chosen title is quite justified because Friedman's "*Methodology of positive economics*" in the real sense, is a challenge to the "marginalist controversy" and the theory of monopolistic competition. At first glance, the book has an unusual content, as its first part is a translation (a good translation!) of the original version of Friedman's work into Serbian, followed by three more parts containing

an overview of different interpretations of Friedman's views, the historical context from the aspect of the marginalist controversy and Chamberlin's theory of monopolistic competition, and a summary of his own views and findings of the analysis. However, when one approaches a more detailed reading, one comes to the conclusion that the author organized the structure of the book very functionally, enabling the reader to follow the views of different authors and schools of thought regarding the topics that Friedman offers as a challenge in the methodology of economic science. The author believes "that the translation of Friedman's text at the beginning of the book, as well as the discussions that follow, will be useful to students and economists who want to delve deeper into this topic, but also to those who just want to gain an insight into the work that should be an essential reading for anyone interested in not only economics but science in general" (p. xiii).

With a rich selection of literature (161 references), which includes almost all important works of a significant epoch in the development of economic science, the author tried to build his own view on the subject of analysis but also to show the circumstances and the way the modern microeconomic theory is constituted. Using a variation of Emmett's "historical reconstruction" principle, the author performs a reconstruction of Friedman's work, but also that of other authors who participated in the great debates of the time – the marginalist controversy and the theory of monopolistic competition. The author starts from Friedman's position that the validity of economic theory should not be judged solely on its tautological completeness, which is not unimportant, but rests primarily on the possibility and simplicity of prediction, at least as much as the alternative theory but with less information, and based on efficiency, comprehensiveness and accuracy of forecasting and encouraging new research. Thus, in a methodological sense, the author engages in the analysis of extensive literature and different attitudes that are inspired either by the acceptance or rejection of Friedman's opinion about the impossibility of testing a theory by the realism of its assumptions (p. 31. and 36.). Friedman himself defined the methodological framework in which the entire analysis takes place, with the opinion that the realism of the underlying assumptions is not important for the evaluation of the theory but the quality of its predictions. A hypothesis is only an instrument of prediction, and as such, it can never be proven. Numerous comparisons of the predictions that follow from the hypothesis with experience provide the basis for accepting or rejecting the hypothesis (p. 85). Predictions based on a hypothesis that are not disconfirmed by experience give the possibility of tentatively accepting the hypothesis. In general, the author accepts the point of view that economic theories should be accepted if they result in good predictions (Caldwell, 1980,

1992), not based on the belief that they are correct, and that they should be rejected if they give bad predictions, not if we believe they are incorrect (p. 94). A number of economists reproached Friedman for including falsehoods in his theory because he advocates explaining only phenomena of special interest for forecasting. Samuelson called this the F-Twist, a warning that such an approach could lead to an unscientific selection of results (Samuelson, 1963, "Problems of Methodology: Discussion"). By losing the ability to predict, the theory's validity decreases, so the Friedman's conclusion that "every theory is of a temporary character" (p. 53-54) becomes a logical outcome of the author's chosen methodological approach to analysis. Accordingly, the author's dealing with the "*Methodology of positive economics*" is not only a review of the great debates about the fundamental problems of microeconomics or a presentation of the historical emergence of modern microeconomics, but at the same time, it is a way of building one's own methodological approach to the analysis of economic phenomena. Building one's own methodological approach on the literature of the "golden age of economic science" represents a difficult but dignified path of development of a serious researcher.

III

The marginalist controversy from the 40s of the last century occupied a special place in the analysis conducted by the author in the book "Friedman's Challenge". Although in the Chicago school, there are differences in the assessment of Friedman's work, starting from his acceptance as a manifesto of the Chicago school, supported by the majority of followers of this school, to individual opinions (Ronald Coase and James M. Buchanan) that the validity of economic theory lies in its intuitive appeal, and not in the alignment of its predictions and empirical features, as stated by Melvin Reder (1987), most economists accept that Friedman's work played a crucial role in resolving the marginalist controversy and strongly encouraged the development of modern microeconomic theory. The author of "Friedman's challenge" tries to bring to the public, the methodological side of solving controversial situations in one of the crucial periods of the development of economic thought, from today's time when a lot of literature on Friedman's methodological challenge has been accumulated. Perhaps this is a hint that the development of contemporary economic thought, when empiricism and normativism reach global proportions, needs a new methodological challenge such as Friedman gave in his time!? The author sees Friedman as a marginalist who defends Marshall's approach and who is aware that it would be "extremely desirable to have a more general

theory than Marshall's" (p. 50). Thus, Friedman wants a more general theory but is firm in the opinion that the marginalist controversy and the theory of monopolistic competition do not offer such a theory. The enthusiasm with which the author of "Friedman's Challenge" performs the analysis of literature and positions, starting from Lester to Samuelson, shows that he is driven by the desire to enter into the smallest details of the arguments "for" and "against" in the discussions regarding the marginalist controversy. Such an approach shows that he tries to master the essence of Friedman's views, but it is, at the same time, the best way to master the essence of economic theory, which the author proved through the interpretation of the implications of the marginalist controversy. He observes that the marginalist controversy has a much broader context in terms of a more consistent constitution of the theory of prices and the theory of the firm and concludes that it came as a kind of attack on marginalism and ended up strengthening it and that Friedman's *Positive Economics* is a strong response to the tendency to replace the theory with history (p. 135). Therein lies the full justification of "Friedman's challenge" because the author's reconstruction of the methods of defence of orthodox economic thought showed that this process contributed to its development.

Analysing the extensive literature created on the occasion of the debate on the validity of Chamberlin's theory of monopolistic competition, the author tries to provide answers to two questions: 1. Why does Friedman talk about the unrealism of the theory of monopolistic competition if it is unimportant? 2. Does he defend the Marshallian theory or attack monopolistic competition in this way? (p. 176). Asking such questions makes sense, especially because the author places Friedman's work in a broader context of the development of economic thought and its methodology. Relying on the views expressed in the debate by Archibald, Friedman and Stigler, he observes that *The Methodology of Positive Economics* gives two possible interpretations of the unrealistic assumptions: (1) irrelevance and (2) unreality as a virtue, with the first interpretation referring to the marginalist controversy, and the second to the critique of monopolistic competition (p. 177-178). The author observes that Friedman does not favour predictions based on the theory of perfect competition, nor does he criticize the assumptions of the theory of monopolistic competition, but starts from the assumption that monopolistic competition, as an alternative theory, is based on the idea of using realistic assumptions, in which he sees the virtue of unreality of assumptions (p. 178). Such an approach is an authentic example of the application of Friedman's methodological views on the constitution of a consistent theory. After presenting Friedman's debate with Archibald (1961, 1963) and Mäki (2009), the author concludes that we are not interested in how

business people actually behave and what the real elasticity of the demand curve that the company is facing is (p. 179). The principle of "as if" maximization in the behaviour of business people and the justification of using a horizontal demand curve, i.e. the principle of "as if" perfect competition, will be supported by predictions (p. 179). The use of a horizontal or downward-sloping demand curve is not a matter of choice because the number of substitutes determines the elasticity of the demand curve (Kaldor, 1938). The author, looking at all the pros and cons of Chamberlin's theory, concludes in line with Mises (1998) that what Chamberlin (1933, 1966) talks about "just describes the competitive process so that monopolistic competition represents a mythology" (p. 171). The author does not want to place himself in the position of an arbiter between opposing views, and it could be concluded that he is close to Williamson's opinion "that restoring confidence in the validity of neoclassical theory was high among Friedman's goals" (p. 182). Through "Friedman's challenge", he tries to single out and analytically present the important positions that contributed to the constitution of the modern microeconomic theory. This is to be expected from the author who, almost at the beginning of his career, tries to draw attention to the key principle in science, according to which there are no good results without good methodology. The author clearly observes that Friedman's views should be interpreted in the light of his answers to the prevailing questions of the time when the basis for *The Methodology of Positive Economics* was created. At the same time, the author bears in mind Emmet's reminder of the possibility of a subjective measure of scientific value, that is subjectively assigning importance to a text and avoiding exclusivity in the analysis and assessment of opposing views. He does not enter polemics with opposing views of the authors he cites and mainly observes them in the relationship which the authors have set and thus reconstructs the debate.

IV

The book by Nikola Njegovan, PhD, entitled "Friedman's Challenge" brings a complex view of the general methodology of positive economics, the marginalist controversy and the theory of monopolistic competition, synthesizing different views on the debates that marked the development of economic thought during the "golden age of economic science". At the time when the author decided to write this book, all the positions it talks about were already known in the literature. However, this did not sway the author to engage in the analysis of details and comparison of views, creating a new perspective, brighter and more extensive, on the most significant period in the development of microeconomic theory. The great value of this book is that it shows that economic theories with no

methodological foundation are unsustainable. The author showed that Friedman interprets the theory's validity through the ability to predict. However, in the end, referring to Sen, Last, Quirk (1986) and Gonzalez, he concludes that it would be a big "mistake to think that only predictions can represent the central issue of economic science", as well as that "science cannot be based exclusively on prediction and that the enterprise of searching for truth should not be abandoned" (pp. 188-9). Furthermore, the author did not miss the views of Mäki (2009), Hirsch and De Marchio (1984, 1990), according to which we cannot claim "that Friedman in his dealings with economics was consistent with the views expressed in the Methodology of Positive Economics" (p. 187). Although the book was created as a kind of "return to the past", i.e. by refreshing and reconstructing ideas, it represents an extensively documented study on the methodology of positive economics and its application in defence of the positions of orthodox economic science. In the true sense, it represents a scientific monograph that our scientific public needs, especially in the conditions of the invasion of empiricism and normativism. The book will be useful to doctoral students in economics, postgraduate students, methodologists and scientific workers in the field of economics. It is written in a simple and comprehensible style, so it is also acceptable for those who do not have a high degree in economics.

REFERENCES

Archibald, G. C. (1961). Chamberlin Versus Chicago. *The Review of Economic Studies, 29*(1), 2-28. DOI: 10.2307/2296178

Archibald, G. C. (1963). Reply to Chicago. *The Review of Economic Studies, 30*(1), 68-71. DOI: 10.2307/2296034

Buchanan, J. M. (1999). *Cost and Choice.* Indianapolis, Indiana, US: Liberty Fund, Inc.

Caldwell, B. J. (1980). A Critique of Friedman's Methodological Instrumentalism. *Southern Economic Journal, 47*(2), 366-374.

Caldwell, B. J. (1992). Friedman's Predictivist Instrumentalism - A Modification. In W. J. Samuels, & J. Biddle (Eds), *Research in The History of Economic Thought Methodology* (T. 10, pp. 119-128). Greenwich, Connecticut, US: JAI Press Inc.

Chamberlin, E. H. (1933, 1966). *The Theory of Monopolistic Competition: A Re-orientation of the Theory of Value.* Cambridge, Mass., USA: Harvard university press.

Coase, R. (1955). A Comment on Full Costs, Cost Changes, and Prices. In U. N. Bureau, *Business Concentration and Price Policy* (pp. 392-394). New Jersey, US: Princeton University Press

Emmett, R. B. (2003). Exegesis, Hermeneutics, and Interpretation. In W. J. Samuels, J. E. Biddle, & J. B. Davis (Eds), *A Companion to the History of Economic Thought* (pp. 523-537). Malden, Massachusetts, US: Blackwell Publishing Ltd

Friedman, M. (1953). The methodology of positive economics. In M. Friedman, *Essays in positive economics* (pp. 3-43). Chicago, Illinois, US: University of Chicago Press.

Friedman, M. (1963). More on Archibald Versus Chicago. *The Review of Economic Studies, 30*(1), 65-67. DOI: 10.2307/2296033

Hammond, D. J. (1992). The Problem of Context for Friedman's Methodology. In W. J.Samuels, & J. Biddle (Eds), *Research in the History of Economic Thought and Methodology* (pp. 129-147). Greenwich, Connecticut, US: JAI Press Inc.

Hirsch, A., & De Marchi, N. (1984). Methodology: A Comment on Frazer and Boland, I. *The American Economic Review, 74*(4), 782-788.

Hirsch, A., & De Marchi, N. (1990). *Milton Friedman: Economics in Theory and Practic*e. Michigan, US: The University of Michigan Press.

Kaldor, N. (1938). Professor Chamberlin on Monopolistic and Imperfect Competition. *The Quarterly Journal of Economics, 52*(3), 513-529. DOI: 10.2307/1884087

Lester, R. A. (1946). Shortcomings of Marginal Analysis for Wage-Employment Problems. *The American Economic Review, 36*(1), 63-82.

Lester, R. A. (1947). Marginalism, Minimum Wages, and Labor Markets. *The American Economic Review, 37*(1), 135-148.

Lester, R. A. (1949). Equilibrium of the Firm. *The American Economic Review, 39*(2), 478-484.

Mäki, U. (2009). Unrealistic assumptions and unnecessary confusions: rereading and rewriting F53 as a realist statement. In U. Mäki (Ed.), *The Methodology of Positive Economics - Reflections on the Milton Friedman legacy* (pp. 90-116). Cambridge, UK: Cambridge University Press.

Milovanović, M. (1986). Kapital i minuli rad: austrijska teorija kapitala kao osnov nagrađivanja minulog rada. Beograd, Srbija: Savremena administracija.

Mises, L. (1998). Monopoly Prices. *The Quarterly Journal of Austrian Economics, 1*(2), 1-28.

Njegovan, N. (2022). *Fridmanov izazov*. Beograd, Srbija: Centar za izdavačku delatnost, Ekonomski fakultet Univerziteta u Beogradu.

Pjanić, Z. (1965). *Savremene buržoaske teorije vrednosti i cena*. Beograd, Srbija: Institut društvenih nauka.

Reder, M. W. and Hogarth, R. M., (Eds.). (1987). *Rational choice: The contrast between economics and psychology.* Chicago, Illinois, US: University of Chicago Press.

Samuelson, A. P. (1963). Problems of Methodology: Discussion. *American Economic Review, 53*(2), 231–33.

Samuelson, P. A. (1965). *Foundations of Economic Analysis.* New York, US: Atheneum.

Samuelson, P. A. (1967). The Monopolistic Competition Revolution. In R. E. Kuenne (Ed.), *Monopolistic Competition Theory: Studies in Impact - Essays in Honor of Edward H. Chamberlin* (pp. 105-138). New York, US: John Wiley & Sons, Inc.

Sen, A. K, Last, A.G.M., & Quirk, R. (1986). *Prediction and Economic Theory*. Proceedings of the Royal Society of London. Series A, Mathematical and Physical Sciences, Vol. 407, No. 1832, *Predictability in Science and Society* (Sep. 8, 1986), 3-23. London, UK.

Stigler, G. J. (1963). Archibald Versus Chicago. *The Review of Economic Studies, 30*(1), 63-64.

Stojanović, B. (2008). *Osnove austrijske teorije*. Beograd, Srbija: Centar za izdavačku delatnost, Ekonomski fakultet Univerziteta u Beogradu.

Stojanović, B. (2021). *Osnove austrijske teorije*. Beograd, Srbija: Centar za izdavačku delatnost, Ekonomski fakultet Univerziteta u Beogradu.

Williamson, O. E. (2009). Friedman (1953) and the theory of the firm. In U. Mäki (Ed.), *The Methodology of Positive Economics: Reflections on the Milton Friedman Legacy* (pp. 241-256). Cambridge, UK: Cambridge University Press.

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