

THE IMPACT OF ECONOMIC INDICATORS ON GROSS SAVINGS: THE CASE OF NORTH MACEDONIA

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Abstract: Structural policies play a crucial role in influencing savings whether is private or public. To properly examine the relationships between the structural indicators and savings level this study investigates their connections in the case of North Macedonian economy. Savings rates depending on the region they can be widely dispersed and the development of technology and innovation can be a driving force. Empirical studies have been suggesting that policy reforms by changing the macroeconomics conditions can influence savings. A particular importance in improving the savings ratios in medium and long term throughout the literature is shown to have had the policies that impacted productivity growth. This paper will start with a comparative method to present the evolution of gross saving as a percentage of GDP for the period 2000-2024 between North Macedonia and European Union. Savings is calculated as gross national income less total consumption, plus net transfers. At the start of the period in 2000 gross saving between two countries where at equal level, before starting to decrease for North Macedonia, reaching a minimum in 2002. From this low point, gross savings started to increase, surpassing that of the European countries in 2010 and reached a peak in 2017 around 30%. Afterwards, savings decreased and remained stable at 27 % level until 2024. In contrast to savings rates of European Union which remained stable at 23 % throughout the considered period, for North Macedonia this rate has a steady upward trend. An econometric model is constructed based on the works of Kerdrain et al (2010), especially in choosing of the independent variables that explains gross savings, notably real interest rate, total factor productivity, terms of trade, old-age dependency ratio and youth dependency ratio. The model is developed by using the ordinary least square method to study the relationship between the independent and dependent variables of savings. According to the results, for every increase of one percent of *real interest rate* the average expected increase of gross savings is 0.406 percent, meaning there is positive correlation between interest rate and saving, but this relationship is not significant at any level of significance. For one unit of increase of *terms of trade* there is an average expected decrease in gross savings by 4.73e-10 units and this decrease is significant at 1%. A rise in on percent of *young age dependency ratio* is associated with an increase of 1.372 percent of gross savings, a positive but non-significant impact of young age dependency. On the other hand, *old age dependency ratio* is significant at 1% level of significance, meaning one percent increase in old age dependency ratio rises savings by 5.737 percent. The independent variable, *total factor productivity* that focuses on the capital and labor employment to boost productivity has a positive correlation with gross savings and is significant at 5% level. According to the results, a one percent increase in total factor productivity will increase gross saving by 0.430 percent.

Keywords: Savings, Macroeconomics, Money, Growth

1. INTRODUCTION

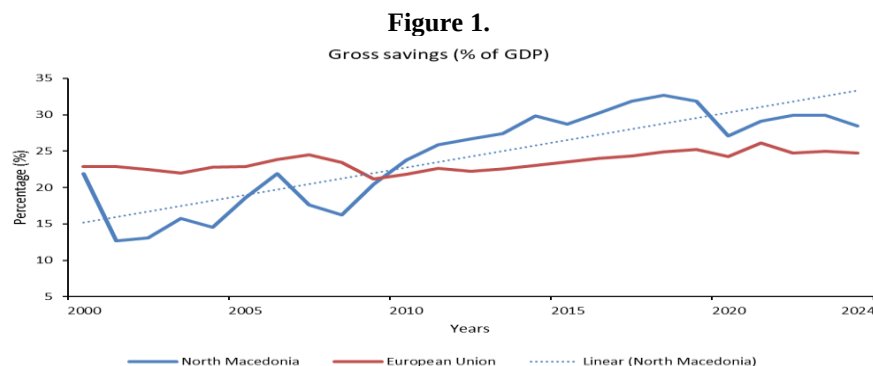
Structural policies play a crucial role in influencing savings whether is private or public. To properly examine the relationships between the structural indicators and savings level this study investigates their connections in the case of North Macedonian economy. Savings rates depending on the region they can be widely dispersed and the development of technology and innovation can be a driving force. Empirical studies have been suggesting that policy reforms by changing the macroeconomics conditions can influence savings. A particular importance in improving the savings ratios in medium and long term throughout the literature is shown to have had the policies that impacted productivity growth. As pointed by Modigliani, (1966) productivity that raises form the structural reforms may affect the savings rate through the composition effect meaning the rise in income that results from high productivity will benefit more the workers and they are likely to have higher marginal propensity to save. Policies that are associated with deregulation and efficiency of financial markets contribute in impacting growth and thus having an influence over the future the level of savings. According to Schwellnus, (2010) entrepreneurship and innovation are important determinants that could stimulate productivity by reallocating resources from firms with low productivity to those with high productivity if the management has innovative ideas that face low barriers for entry in the market. In these cases, productivity will raise through development of new products or the improvement of the existing ones. Individual household have different associations with savings, using the UK Family Expenditure Surveys to study the relationship between savings and age structure Demery and Duck (2006), found that household data exaggerate savings rate for the young adults and the elderly category whilst underestimating those of 45 to 60-year-old, although the savings rates of the elderly remained positive for some ages. Trying to

identify the socio-demographic variables that influence the savings behavior of families together with their motives and attitudes, Lopez (1998) concluded that industrialized countries have experienced a fall in savings rate, in particular in family savings. As reasons he stated that when people are facing with uncertainty for employment, their savings declines, the other reason is the loss of family values, characterized by divorces, having less children, increasing children dependence etc. that can contribute significantly in reducing savings. Weighing in on the debate whether saving is important for economic growth Fombang and Wanzala (2024), studied their relationship for the South African case. Using an ARDL model for co-integration, they investigated how domestic savings affect economic growth and concluded that growth is influenced by various types of savings namely, household, government and corporate savings. The authors empathized the fact that lower government spending has a positive impact in increasing savings at a national level which in turn raises the investment level in the private sector. Xu (2023), focused on studying the relationship among policy uncertainty and household savings for the purpose of understanding how policy making alter savings. Applying quarterly data for 21 emerging countries for the period 1987-2021 they found that policy uncertainty and household saving have a positive relationship, even when endogeneity and business cycle is considered. Govdeli (2021), investigated the long-term relationship between gross domestic savings and economic growth for Caucasian and central Asian countries. The author used an VECM panel Granger causality analysis to estimate the cointegration and causality relationship between savings and growth, to conclude that domestic savings causes economic growth meaning an increase of savings will result in an increase of economic growth. Liking savings with fiscal policy in a euro area perspective and using, Arellano-Bond GMM estimator, to reduce the endogeneity of fiscal variables, Westphal and Stechert (2021), adopted a modelling approach containing large number of specifications in a dynamic panel setting. Their results showed that fiscal expansion is related with the rise in household savings in the euro area. The authors performed various robustness checks to verify the results of their model. From all the variable tested disposable income, real short-term interest rate, GDP deflator and household debt where the variables that mostly determine household savings. Chakraborty (2023), investigated the relation between domestic savings and economic growth for the BRICS countries using panel granger causality test, in a goal to see if a rapid growth can be explained by savings. The author concluded that there is a bidirectional causality between economic growth and savings. Furthermore, in the case of BRICS countries, pro savings policies should be implemented in order to reach the developed countries status and to be able to respond more aggressively to a potential financial crisis.

A comparative analysis of gross savings as a percentage of gross domestic product is presented, accompanied with a model for savings analysis of North Macedonia economy based on an OLS regression with multiple explanatory variables to estimate their impact on savings. This introduction section is followed by several sections, as materials and methods, results and discussions.

2. MATERIALS AND METHODS

As stated previously a materials and methods section will start with a comparative method to present the evolution of gross saving as a percentage of GDP for the period 2000-2024 between North Macedonia and European Union. Savings shown in figure 1, is calculated as gross national income less total consumption, plus net transfers. At the start of the period in 2000 gross saving between two countries where at equal level, before starting to decrease for North Macedonia, reaching a minimum in 2002. From this low point, gross savings started to increase, surpassing that of the European countries in 2010 and reached a peak in 2017 around 30%. Afterwards, savings decreased and remained stable at 27 % level until 2024. In contrast to savings rates of European Union which remained stable at 23 % throughout the considered period, for North Macedonia this rate has a steady upward trend.



Source: Data World Bank, author calculations

The estimation model is based on the works of Kerdrain et al (2010), especially in choosing of the independent variables that explains gross savings, notably real interest rate, total factor productivity, terms of trade, old-age dependency ratio and youth dependency ratio. The mathematical representation of the model is given by the following equation:

$$S_t = \beta_0 + \beta_1 r + \beta_2 tot + \beta_3 agy + \beta_4 ago + \beta_5 tfp + \varepsilon_6 \quad (1)$$

Descriptions of the variables used in the econometric model are presented in table 1.

Table 1. Variables of the model

Variable	Theory	Description	Source
S_t	gross savings	Gross savings are calculated as gross national income less total consumption, plus net transfers. This indicator is expressed as a percentage of Gross Domestic Product (GDP) which is the total income earned through the production of goods and services in an economic territory during an accounting period.	World Bank
r	real interest rate	The real interest rate, expressed as a percentage, is the lending interest rate adjusted for inflation as measured by the GDP deflator.	World Bank
tot	terms of trade	The terms of trade adjustment is equal to the capacity to import (current price value of exports of goods and services deflated by the import price index) less exports of goods and services in constant prices.	World Bank
agy	age dependency ratio, young (% of working-age population)	Age dependency ratio, young, is the ratio of younger dependents--people younger than 15--to the working-age population.	World Bank
ago	age dependency ratio, old (% of working-age population)	Age dependency ratio, old, is the ratio of older dependents--people older than 64--to the working-age population.	World Bank
tfp	total factor productivity	Measure how efficiently the economy uses capital and labor to be more productive.	World Bank

Source: author calculations

Table.2 Linear regression

VARIABLES	(1) gross savings
real interest rate	0.406 (-0.232)
terms of trade	-4.73e-10*** (-1.13E-10)
age dependency ratio, young	1.372 (-0.83)
age dependency ratio, old	5.737*** (-1.101)
total factor productivity	0.430** (-0.151)
Constant	-116.3** (-42.1)
Observations	14
R-squared	0.962

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: author calculations

Table.3 Test for heteroskedasticity

Breusch–Pagan/Cook–Weisberg test for
heteroskedasticity

chi2(1) = 0.01

Prob > chi2 = 0.9377

Source: author calculations

3. RESULTS

Table 2 highlights the results of the significance of the model described in section 2. The model is developed by using the ordinary least square method to study the relationship between the independent and dependent variables of savings. The regression equation (1) combined with the estimated coefficient in Table 2 can be rewritten as follows:

$$\text{gross savings} = -116.3 + 0.406(\text{real interest rate}) - 4.73e - 10(\text{terms of trade}) + 1.372(\text{age dependency ratio, young}) + 5.737(\text{age dependency ratio, old}) + 0.430(\text{total factor productivity})$$

The specifications of the model will give us a possibility to interpret the interaction between the explanatory variables and independent variable of gross savings. According to the results, for every increase of one percent of *real interest rate* the average expected increase of gross savings is 0.406 percent, meaning there is positive correlation between interest rate and saving, but this relationship is not significant at any level of significance. For one unit of increase of *terms of trade* there is an average expected decrease in gross savings by 4.73e-10 units and this decrease is significant at 1%. A rise in on percent of *young age dependency ratio* is associated with an increase of 1.372 percent of gross savings, a positive but non-significant impact of young age dependency. On the other hand, *old age dependency ratio* is significant at 1% level of significance, meaning one percent increase in old age dependency ratio rises savings by 5.737 percent. The independent variable, *total factor productivity* that focuses on the capital and labor employment to boost productivity has a positive correlation with gross savings and is significant at 5% level. According to the results, a one percent increase in total factor productivity will increase gross saving by 0.430 percent. Also, the constant that represents the expected average level of savings in the case where each independent variable is null, is significant at 5 % level. The model has a R-squared of 0.962, implying that the variables adopted in the model explain 96.2 percent of gross savings. A Breusch–Pagan test in Table 3 if performed to check for heteroskedasticity in the data. The null hypothesis is that of constant variance in regression residuals and alternative hypothesis is where variance is not constant. With a p-value of 0.9377 the regression model as it is presented fails to reject the null hypothesis, meaning the data is homoscedastic and the variance of residuals is constant.

4. DISCUSSIONS

The goal of this paper was to study the interactions between stated macroeconomic variables and gross savings for the case of North Macedonia. Considering the specifications of the model, several independent variables notably, terms of trade, old age dependency ratio and total factor productivity where shown to have a significant impact in the North Macedonian economy and these results fit well with the ones shown in Kerdrain et al (2010). Even though the model has a high R-squared of 96,2 percent and the independent variables explains nearly all of gross savings, the results of this study should be treated with some constraint primarily due to the explanatory variables chosen to be included in the model. Moreover, the selected yearly data and the period considered may be relatively short to express with certainty unbiased results.

5. CONCLUSIONS

The research paper points out that a selected variable has an impact over gross savings for the period 2000-2024. Firstly, it starts with making a comparative analysis with European Union member countries that showed gross saving for North Macedonia reached a low point in 2002 before surpassing that of the EU countries in 2010 and reaching a peak in 2017. Secondly, a model was created to test the significance of the determinants of gross saving. Results show a significant impact of *terms of trade*, *old age dependency ratio* and *total factor productivity* in defining savings. Also, a Breusch–Pagan test for heteroskedasticity was conducted to check for validity of the data

and remarked that the regression model fails to reject the null hypothesis, advocating for homoscedasticity of the data and constant variance of residuals.

ACKNOWLEDGEMENTS

I am grateful to the University of Tetovo in providing the necessary conditions and the access to various databases to perform the calculation to create this study.

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