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GORGI GOCKOV∗

KATERINA KOLEVA∗∗

THE IMPACT OF MONETARY POLICY ON THE OPERATION OF SMALL AND MEDIUM-SIZED ENTERPRISES - ASSESSMENT USING A REGRESSION MODEL

Abstract

How effective and efficient are the instruments of the monetary policy in stimulating the work of small and medium-sized enterprises? What are the studies that examine the impact of monetary policy on the survival of small and medium-sized enterprises? These questions initiate that the focus of this research is precisely determining the impact of monetary policy on the operation of small and medium-sized enterprises, which impact will be evaluated by applying the regression model. Despite the extensive literature available to us, there is still a lack of specific literature based on the relationship between monetary policy and the performance of small and medium-sized enterprises. For this purpose, this study tries to evaluate the impact that loans given by banks, the money supply in circulation M2 and the mandatory reserve have on the operation of wholesale and retail trade in the Republic of North Macedonia. It also investigates the effect that interest rates on treasury bills and interest rates on loans to small and medium enterprises have on the performance of small and medium enterprises. The rest of the work paper refers to the literature review, research methodology, presentation of results and concluding observations.

Keywords: monetary policy, SME, models

JEL Classification: E43, E51, E52

∗ PhD, Ss. Cyril and Methodius University in Skopje, Faculty of Economics – Skopje, Republic of North Macedonia, e-mail: gockovg@eccf.ukim.edu.mk
∗∗MSc, Ss. Cyril and Methodius University in Skopje, Faculty of Economics – Skopje, Republic of North Macedonia, e-mail: dinkovakaterina92@gmail.com

Introduction

Small and medium enterprises undoubtedly represent a vital segment of the economic structure of any country. The enormous importance of small and medium-sized enterprises for every economy is also reflected through the prism of employment, innovation, entrepreneurial spirit, participation in the growth of the gross domestic product, and they themselves have the potential to develop, become more numerous and significant, and receive crucial importance in modern economic trends. The largest part or 90.47% [1] of the active entities belong to the category of micro, small and medium enterprises, which confirms the enormous importance of this sector for the economy in the Republic of North Macedonia.

Monetary policy is one of the techniques through which the activity of small and medium-sized enterprises is stimulated. The basic objectives of the monetary policy are to maintain a certain rate of economic growth, to maintain a certain level of production and employment, to determine the stability of the general level of prices, to maintain a balanced balance of payments and a stable exchange rate. Very little is known and the literature describing the impact of monetary policy on small and medium-sized enterprises is very modest.

1. LITERATURE REVIEW

1.1. Classical quantitative theory

Of greatest importance, with the greatest dose of support, the quantity theory is considered, which from its inception, through each development stage, undergoes a series of changes and additions, and therefore there are several segments of it. I. Fisher gave a transactional variant of the quantitative theory, and thus he is considered the creator of the mathematical variant of the quantitative theory of money, i.e. the amount of money and the speed of money circulation is directly proportional to the price index and aggregate income. [2] According to him, the size and quantity of produced and realized goods is defined by production conditions, natural conditions, technology, capital accumulation. The speed of circulation is determined by the institutional conditions such as: the system of payments, the degree of synchronization, which in the long term are slowly changing.

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[1] Average participation of MSMEs in the total number of project entities in the period from 2015-2021, State Statistics Office
[2] I.Fisher,*The Purchasing Power of Money, its Determination and Relation to Credit, Interest and Crises*,1991, p.31-35

1.2. Keynesian theory of the economic cycle

This theory is based on the teaching of John Meinart Keynes showing the measures of economic policy in order to eliminate or neutralize cyclical fluctuations in the economy. Monetary factors, i.e. money and credits, are a very important instrument with which monetary authorities influence overall macroeconomic trends. According to this theory, inflation is always and everywhere a monetary phenomenon. E. Prasetyo and N. Cahyani[3] in their research apply Keynesian theory in Indonesia, especially in solving the issue of unemployment and poverty through the problem of enormous government spending, economic growth and human resource capacity and they were facing an approved thesis.

1.3. Monetry theory of the economic cycle

Monetarism as a theory considers changes in the quantity of money as a powerful and dominant factor that explains changes in nominal income. The monetarist theory advocates freedom in the operation of the market, an increased share of the private sector in the performance of economic activity and limited intervention of the state in the economy. According to this theory, the entire economic cycle is conditioned by the action of monetary factors, that is, by the mass of money in circulation, which is the dominant factor in explaining changes in nominal income, as well as the central banking system. Accordingly, monetary authorities concentrate on maintaining price stability so that excessive expansion of the money supply resulting in price inflation does not occur. According to the monetary theory of the economic cycle, monetary aggregates are key instruments for achieving the goals of monetary policy, due to the strong correlation they have with nominal income and the strong influence and control by the Central Bank.

1.4. Empirical review

The fact is that there are big differences between SME and large enterprises, which difference is also reflected in the influence that monetary policy has on them. It is particularly significant to emphasize the fact that SMEs are much more dependent on bank financing, unlike large companies. Hence it follows that the situation in the banking sector, as the main creditor of SMEs, is closely correlated with their survival.

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[3] E. Prasetyo and N. Cahyani,2022: *Investigating Keynesian Theory in Reducing Unemployment to the case of Indonesia*

And for their part, banks face difficulties in assessing the creditworthiness of SMEs. [4] The theoretical and empirical literature shows that younger and smaller companies are more likely to be credit limited. Unconventional monetary policy measures for small and medium enterprises are vital given their banking dependence and importance reflected in economic activity. J. Michel, M. David, S. Andrew, D.Vavanos particularly point out that the active use of direct instruments such as the reserve requirement, the provision of credit facilities, as well as the purchase of government securities have a much greater impact on the performance of SMEs.[5] An essential need for the survival of businesses and for smooth business activity are exactly credits.

2. OVERVIEW AND METHODOLOGY

Through the example of Michael Oluwasegun Ogundipe[6] who investigated the impact of monetary policy on small and medium enterprises in Nigeria, this research examines the effect of monetary policy on small and medium enterprises in the Republic of North Macedonia. The assumption is that the monetary policy in the country, expressed through the selected set of independent variables, is a significant determinant of trade, as a significant part of the overall Macedonian economy.

Several monetary variables have been taken as indicators of the monetary policy, namely: the **money supply M2** as a monetary aggregate and the placement of **loans from banks and savings banks** as a factor through which the Central Bank implements the monetary policy and influences the overall economic movements in the country. In accordance with the fact that auctions of treasury bills appear as a basic instrument of the monetary policy of the Republic of North Macedonia, the **interest rate of treasury bills** is a reference interest rate of the NBRM, i.e. it represents an indicator of the direction in monetary policy, as well as a basis for establishing the same are taken as an independent variable in the model.

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[4] Smaghi B. Pesa L. - *Monetary policy, credit flows and small and medium-sized enterprises*, Member of the Executive Board of the ECB San Casciano Val di, 2009,pp. 12-16

[5] Joyce M., Miles D., Scott A., Vayanos D. - *Quantitative Easing and Unconventional Monetary Polic*y - An Introduction, The Economic Journal, 2012 pp. 271-274.

[6] Oluwasegun Ogundipe M.-*The Impact of CBN Monetary Policy on the Survival SMEs in Nigeria*,2022 p.8-12

Table 1: Presentation of variables taken into the model

Variable	Description	Unit	Source
Trade	Wholesale and retail trade in motor vehicles and motorcycles, parts and accessories and their maintenance and repair	million denars	State Statistical Office
m2	Total money supply - cash in circulation, deposits with depository institutions, in denars, in foreign currency, in denars with a currency clause	million denars	NBRM
Reserve	Mandatory reserve of banks and savings banks	million denars	NBRM
IR-Treasury Bills	Monthly weighted interest rate on treasury bills	%	NBRM
IR-Loans	Interest rate on loans (denar without currency clause) to the corporate sector (non-financial institutions, public and others)	%	NBRM
Loans	Loans (in denars) given by other deposit institutions (banks and savings banks) to non-financial institutions (public and others), to households and other residents	million denars	NBRM

Source: Developed by the authors

The research refers to the Republic of North Macedonia, for the period from 2011 to 2022 and the data is on a quarterly basis (48 observations in total). The source of the data is the database of the National Bank of MK, as well as the database of the State Statistics Office. From data on the money supply in circulation M2 that are available on a monthly basis, in order to harmonize the frequencies, they are averaged to obtain them on a quarterly basis. The model was estimated using the ordinary least squares method, a commonly used technique in regression analysis in practice. The analysis basically consists of estimating a multiple linear regression model, and testing hypotheses related to the significance of its parameters.

In relation to the functional form of the model, the variables whose original values are expressed in absolute amounts (trade, credits, money supply and mandatory reserve), during the evaluation of the model, are taken in logarithmic form, while those that are expressed in percentages are taken in their original values (without logarithms).

A check was made regarding the stationarity of the time series, in order to determine whether they have a single root, that is, to determine the order of their integration. It was determined that all variables are non-stationary, that is, they are integrated from the first order, while in the model they are transformed using the first difference method, in order to avoid the problem of possible false regression. Through Augmentet Dickey Fuller's test to determine whether a single root is present in the sample of the time series, it is differentiated and with such a transformation the meaning of the variables also changes, i.e. they are no longer states, but an increment that in turn affects the interpretation of the results, that is, the coefficients.

2.1. Research Hypotheses

H01: The growth of small and medium enterprises in the Republic of North Macedonia is influenced by the money supply M2

H02: The mandatory reserve of banks and savings banks has an impact on the growth of small and medium enterprises

H03: The interest rate of bank loans significantly affects the growth of small and medium enterprises

H04: The interest rate on treasury bills significantly affects the growth of small and medium enterprises

H05: Loans from banks significantly affect the growth of small and medium enterprises

3. RESULTS

Before evaluating the initial model, the descriptive statistics (Table 2) and an overview of the correlation between the variables (Table 3) and a tabular display of stationarity of series, determined through Augmentet Dickey Fuller's test of stationarity, are attached. Based on the available set of data, it can be stated that in the period from the first quarter in 2011 until the last quarter in 2022, that is, with 48 observations, wholesale and retail trade in the Republic of North Macedonia

ranged between 4,607 million denars and 13,541 million denars, i.e. 7,199 million denars on average per quarter.

Table 2: Descriptive statistics of variables in initial model

Descriptive statistics of variables in the model						
	TRADE	M2	RESERVE	LOANS	IR_Loans	IR-Treasury Bills
Mean	7,438.08	285,881.80	21,826.61	428,224.10	5.93	2.94
Median	7,199.50	261,831.80	18,957.67	412,177.80	6.02	3.25
Maximum	13,541.00	438,398.40	32,606.67	636,363.30	8.72	4.75
Minimum	4,607.00	204,155.90	15,914.90	272,326.70	3.27	1.25
Std. Dev.	1,873.64	72,393.47	5,365.29	105,243.00	1.85	0.92
Skewness	1.29	0.73	0.69	0.30	-0.01	-0.53
Kurtosis	4.85	2.16	1.91	1.97	1.59	2.34
Jarque-Bera	20.14	5.68	6.15	2.81	4.00	3.10
Observations	48.00	48.00	48.00	48.00	48.00	48.00

Source: Developed by the authors

Graph 1: Graphic representation of wholesale and retail trade -
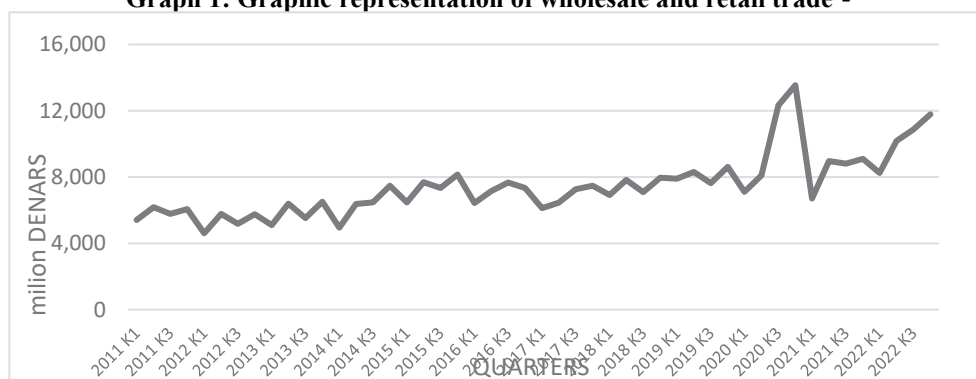
Source: Developed by the authors

From the attached graphic display of wholesale and retail trade, it can be seen that trade has a moderate increase in the analyzed period and a drastic increase in Quarter 3 and Quarter 4 of 2020 and Quarter 1 of 2021, which increase is primarily due to the low comparison basis which is the result of the strict measures taken to prevent the spread of Covid-19.

Apart from the comparative basis, the reason for the drastic growth of trade is considered to be favorable movements in the economy, which in turn are related to the stabilization of the epidemiological situation and the initiation of the immunization process in the country. In addition, a high degree of linear association between the independent variables can be observed from the displayed coefficients,

which can potentially be reflected as multicollinearity later when evaluating the models. Based on the calculated correlation coefficients, it can be seen that trade has a moderate and positive linear relationship with the reserve requirement, a pronounced positive linear relationship with the money supply M2 and credits, and a pronounced linear negative relationship with credit interest rates. Regarding the correlation of wholesale and retail trade with interest rates on treasury bills, there is a moderate negative relationship. For that reason, it is the differentiation of the series that represents one way to remove that possible multicollinearity from the model.

Table 3: Tabular overview of correlation of variables

	TRADE	M2	RESERVE	LOANS	IR_Loans	IR- Treasury Bills
TRADE	1.00	0.78	0.65	0.80	-0.76	-0.49
M2	0.78	1.00	0.91	0.98	-0.94	-0.72
RESERVE	0.65	0.91	1.00	0.89	-0.92	-0.90
LOANS	0.80	0.98	0.89	1.00	-0.98	-0.70
IR_Loans	-0.76	-0.94	-0.92	-0.98	1.00	0.78
IR_Treasury Bills	-0.49	-0.72	-0.90	-0.70	0.78	1.00

Source: Developed by the authors

Regarding multicollinearity, although there is a certain correlation between the independent variables in the original form, which is shown in table 3, which could potentially be a source of multicollinearity in the model, it has been removed by differentiating the variables. Namely, all variance inflation factors in the model are below the limit value of 5.

The starting model (Final-0) was evaluated, which in mathematical form can be expressed as:

$$\Delta \log(Trade) = \beta_0 + \beta_1 \Delta \log(Loans) + \beta_2 \Delta \log(M2) + \beta_3 \Delta \log(Reserve) + \beta_4 \Delta KS_{loans} + \beta_5 \Delta KS_{\text{Treasury Bills}}$$

Equation (1)

During the evaluation of this model, it was determined that the interest rates on treasury bills are statistically insignificant, while the rest of the independent variables are statistically significant at the significance level of 0.1 and 0.05. In addition, it was determined that the model has a low adaptability (adjusted coefficient of determination equal to 0.33), that is, only about 33% of the variations in the dependent variable are explained with the help of the given independent variables.

Also, most of the assumptions of the classical linear regression model are violated, such as the assumption of correct functional form of the model (Reset test), the assumption of heteroskedasticity (White test), and the assumption of normal distribution of residuals (Jarque-Bera test)). On the other hand, it is necessary to take into account that differentiating the series causes another potential problem, which is autocorrelation of the first order. Namely, by differentiating the variables in the model, the random error becomes a first-order autoregressive process.[7]

Although it is not significantly expressed in the model, it can be seen through the Durbin-Watson statistic, which generally falls in the indecision zone, that is, it cannot be confidently claimed that in the model has no first-order autocorrelation. In order to overcome this problem, a correction was made to the standard errors of the grades in the model (robust standard errors), using the HAC (Newy-West) method. [8]At first, this correction of standard errors led to an improvement in the statistical significance of total loans and money supply.

In addition, if we look at the movement of the residuals from the model, we can see some structural disruption in the corona period, where we have an increase in trade during that period (unusually high growth rates), as well as in the first quarter of 2021, when observed a significant sharp decline.

Picture 1: Graphical representation of model residual
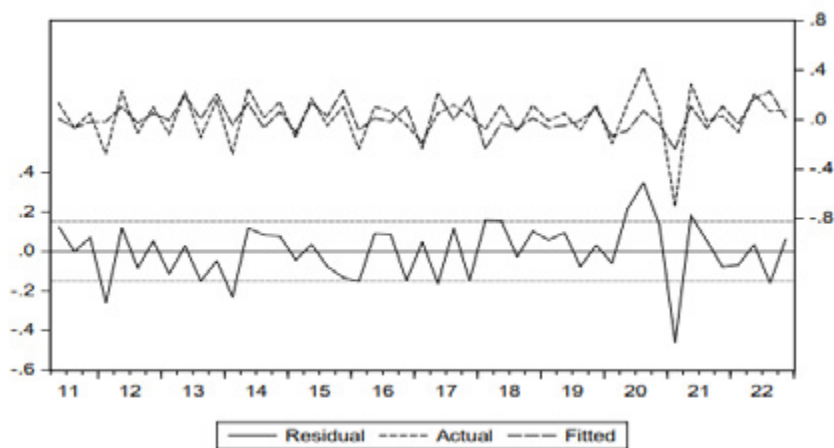
Source: Developed by the authors

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[7] Bucevska V.- *Econometrics and application of Eviews*, Skopje,2006,pp. 321-350
[8] Newey, Whitney K., and Kenneth D. West."*A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix*." Econometrica, 1987, pp:703–708

Taking into account all the above, in the starting model (equation 1), in addition to the correction of standard errors, two artificial variables were added, one covering the entire period of the corona crisis (from the second quarter of 2020 to the first quarter of 2021), as and an additional dummy variable for the first quarter of 2021 only, in order to isolate that structural decline in the trade growth rate. Mathematically, this model could be written as follows:

$$\Delta \log(Trade\ ) = \beta_0 + \beta_1 \Delta \log(Loans) + \beta_2 \Delta \log(M2) + \beta_3 \Delta \log(Reserva) + \beta_4 \Delta KS_{loans} + \beta_5 \Delta KS_{\text{Treasury Bills}} + \beta_6 DUM_{Covid} + \beta_7 DUM_{2021Q1}$$

Equation (2)

In this way, the overall significance and adaptability of the model is significantly improved (the adaptability is over 60%), while it fully satisfies all the assumptions.

The results of the evaluated models are shown in Table 4.

Table 4: Evaluation of the regression model

Dependent Variable: DLOG(TRADE)				
Independent variables	Model 1	Model 2	Model 3	Model 4
C	-0.0628	-0.0440	-0.0477	-0.0253
DLOG(LOANS)	4.2214 *	4.2619 **	5.1493 ***	5.5825 ***
DLOG(M2)	-2.7371 *	-2.0552	-3.2150 ***	-3.4081 ***
DLOG(RESERVE)	-1.1453 **	-0.8966 *	-0.8639 **	-1.0361 **
D(IR_LOANS)	-0.5258 **	-0.3302 *	-0.2260	
D(IR_TREASURY)	0.1237	0.0825	0.0878	
DUM_COVID		-0.5412 ***	0.2610 ***	0.2670 ***
DUM_2021Q1			-0.7783 ***	-0.8232 ***
R-squared	0.40	0.56	0.67	0.65
Adjusted R-squared	0.33	0.49	0.61	0.61
F-statistic	5.49 ***	8.48 ***	11.25 ***	15.22 ***
Durbin-Watson stat	2.33	2.22	2.54	2.55
Ramsey RESET test (1 fitted term)	4.84 **	0.38	0.66	1.18
Jarque-Bera	4.93 *	0.36	1.13	0.74
White test (cross terms)	31.06 *	23.18	16.73	11.24
*Note: *, **, and *** mean statistically significant coefficient on 0.1, 0.05, and 0.01 significance level respectively.*				

Source: Developed by the authors

As can be seen from what is shown, interest rates on loans and treasury bills are statistically insignificant determinants of trade in the Republic of Macedonia, even at a significance level of 0.1, compared to reserve requirements, money supply and total loans. Therefore, these two variables are excluded from the evaluation of the final model. In the final model, but also in the previous estimates, total credits have a positive impact on trade, while the mandatory reserve and the money supply have a negative impact. According to the results of the final model, an increase in total credit growth by 1% would cause an average increase in trade growth by about 5.85%, in case that everything else remains unchanged. Specifically, the 95% confidence interval for this parameter indicates that the increase in trade growth would range between 2.01-9.15%. Contrary to this, an increase in the growth of the money supply in circulation, i.e. the mandatory reserve by 1%, everything else unchanged, would lead to an average decrease in the growth of trade of 3.4%, i.e. 1.04% respectively. Similarly as before, the 95% interval for the money supply is from -5.75% to -1.07%, while for the reserve requirement it is from -1.81 to -0.26.

In the period of the corona crisis, the model shows 26.7% higher trade growth rates on average, compared to the period of economic stability, while in the first quarter of 2021, we have an average drop in the trade growth rate by 82, 3%. From the point of view of the statistical significance of the model, the conducted diagnostic tests show that it fully meets the assumptions of the classic linear regression model. Namely, with the adjustments made to the starting model, the problems with the functional form of the model, heteroskedasticity and the normal distribution of the residuals were solved. The final evaluated model has a high statistical significance (F-statistic = 15.22) and a adaptability of over 60%. However, as certain limitations could be highlighted using exclusively monetary independent variables in the model, as well as the presence of certain structural disturbances as a consequence of the corona crisis and other global flows towards the end of the period, which require appropriate quantification with the help of artificial variables.

Conclusion

According to the obtained results, it can be concluded that the decamonetary policy has an impact on trade, primarily expressed through crediting, the mandatory reserve and the money supply. In order to maintain a satisfactory level of wholesale and retail trade, the interaction of monetary factors is necessary. According to the constructed plausible model 4, the interest rate of bank loans and the interest rate of treasury bills are statistically insignificant variables for the growth of small and medium enterprises, thus hypothesis 3 and hypothesis 4 are rejected. On the other hand, hypothesis 1, hypothesis 2 and hypothesis 5 are accepted and supported, i.e. the growth of small and medium-sized enterprises in the Republic of North Macedonia is influenced by the money supply M2, the mandatory reserve of banks and savings banks that has an impact on the growth of small and medium-sized enterprises and loans from banks significantly affect the growth of small and medium-sized enterprises.

Considering the importance of SMEs as drivers of inclusive economic growth in the Republic of North Macedonia, it is necessary to provide a favorable business environment that will stimulate their operations, entrepreneurship and investments. Compared to other European countries, the financing of SMEs by borrowing from a bank is at a relatively low level, due to collateral requirements, high interest rates, complicated application procedures, etc. According to the fact that the Central Bank is responsible for the implementation of the monetary policy, all with the aim of stabilizing the economy, through the instruments of the monetary policy, the Central Bank increased the supply of money in the analyzed period, which increased the credit potential of the commercial banks, and according they become more accessible to small and medium-sized enterprises, which for their part always have the necessity of providing finance for their operations.The increase in the mandatory reserve ratio by the Central Bank reduces the credit potential of commercial banks and thereby reduces the money supply in circulation, thus negatively affecting the operations of small and medium-sized enterprises.

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