

[DOI: 10.20472/EFC.2019.012.001](https://doi.org/10.20472/EFC.2019.012.001)

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THE IMPACT OF INTEREST RATES ON ECONOMIC GROWTH IN THE REPUBLIC OF NORTH MACEDONIA

Abstract:

The Republic of Macedonia is considered a developing country and is still in transition and is accompanied by numerous macroeconomic problems such as high unemployment, high interest rates, low level of domestic investment. Therefore, the main purpose of this paper is to present and explain, based on concrete facts and relevant results of economic activity in the Republic of Macedonia, the occurrence of interest rates, their level, their causes and their impact on other economic processes, with particular emphasis gross domestic production and economic growth. By using regression analysis and small squares estimation (OLS) we will present variables links that will help us better investigate this phenomenon. The data we will present below date from 1993 to 2013. Earlier scholars of this phenomenon have verified the close correlation of interest rates with economic development. The data, the analysis and the conclusions to be drawn in this paper show the close and negative link between the interest rate and the economic growth of the Republic of Macedonia.

Keywords:

interest rates, economic growth, GDP, monetary measures, economic development

1. Introduction

Interest rates represent one of the most important macroeconomic factors, ie the important monetary policy factor that depends heavily on economic developments, including investments, various deposits, lending to the economy, and so on. The research and analysis of the aforementioned factor is of relevance for all national states and economies, regardless of their characteristics and development. The multidimensional effect of interest rates on economic chain processes is an interesting problem for many researchers and economists. Their studies are focused on finding the optimal level of interest rates that the central bank should apply, or better, by saying the rate that will prevail in the banking market to have economic growth and to give impetus to various investments that can be realized by entities operating in the market of a given country. However, different countries have different economic development and as a result use different monetary policies. Thus, the economically important countries such as Japan, South Korea, China, Singapore, India, Qatar, the United States use expansionist monetary policy and as a result have low interest rates for the sake of saving sums of money the large monetary system that makes the population in banking systems; eg. Qatar in 2013 has saved 59% of GDP (Forbes). In the countries of Eastern and Balkan countries, including the Republic of Macedonia, a tighter, restrictive monetary policy is used, as these countries have had a radical change in the social and economic system, whereby social ownership and the managed economy have made transition to the system of market economy, capitalism and private property, a process known to the transition term. The Republic of Macedonia is already in a prolonged transition, the Central Bank uses restrictive monetary policy and as a result, the banking market dominates high interest rates and entities are reluctant to borrow and make investments as the borrowed capital costs are too high. This phenomenon has adverse effects because in the absence of continuous investments by different entities and investors, other problems will arise in the fields of production, sales, unemployment, aggregate demand, aggregate supply, economic growth and so on. This situation emphasizes the problem and the need for further analysis of the effects of interest rate policy on economic growth and the relative benefits of using different interest rate policies. So let's ask: In case of interest rate cut / increase, will there be a growth / economic downturn in the Republic of Macedonia? To answer the research question, we will present the hypothesis in the following lines:

H1/1: The increase in interest rates will affect the economic downturn in the Republic of Macedonia.

For the determination of the validity of the hypotheses we will apply the method of small squares respectively regression analysis. Therefore, through the analysis of regression, the hypotheses in question will be confirmed or rejected. After the introduction and determination of the hypothesis, the paper is organized as follows: in the second part I will review the literature; in the third part through the mathematical formulas I will make the specification of the econometric model and clarify the evaluation method. Then through the specialized STATA program I managed to replace the values of the variables found in the formula and test the chosen model; in the fourth part I will make the interpretation of the results and the last part is the conclusion and the limitations of the model with recommendations for economists and further research of this problem by other authors.

2. Literature Review

In this part of the paper, we will analyze empirical evidence about the impact of interest rates on economic growth and the results that economists have gained during the analysis of this phenomenon in different countries of the world, whether developed or developing countries. Despite numerous research, we note that we still do not have a clear answer as to the interest rate policy that should lead countries to have consistent economic growth. The change of macroeconomic monetary policies comes as a result of the different economic characteristics of different countries of the world, such as: the development of capital markets, financial unity, economic cooperation between countries, inflation and so on. So many scientific researches have been made in different perspectives, alluding to positive / negative impacts on economic growth by lowering / increasing interest rates. This situation gives us an additional point to explore the impact of interest rates on the economic growth of the Republic of Macedonia, always bearing in mind the fact that this country is still in transition. In the following lines, we will begin by examining the empirical evidence that has been done in developed countries, and then we will continue to review other empirical results that have been made in the developing or transition countries. The latter will be a strong support of our work, due to the common characteristics of the Republic of Macedonia with these countries. The study by Robert Ford and Douglas Laxton (1999)¹ analyzes the impact of interest rates and public debt on the GDP of the 9 OECD countries and concludes that the growth of public debt has led to an increase in real interest rates by 4%. Julian Di John and Jay c. Shambaugh (2006)² within the framework of the International Monetary Fund, analyzes the link between interest rates in major industrial countries and real economic growth in other countries.

Their results show that interest rates in developed countries have a contractual impact on the real annual growth of GDP in the domestic economy, but this effect is concentrated in countries with fixed exchange rates. Among other things, they conclude that while interest rates in developed countries may have an effect on the real economies of other countries, this link exists only for countries with stable economic development. Brigitte Desroches and Michael Francis (2006-07)³ in their analysis of the G7 countries (Canada, France, Germany, Italy, Japan, England and USA) point out that although the interest rate has increased with the cyclical expansion of the global economy, long-term real interest rates remain at the lowest levels in more than 35 years. They note that the interest rate will also depend on other variables such as investments and

¹ Robert Ford, Douglas Laxton, "World Public Debt and Real interest Rates", Oxford Review of Economic Policy, Vol.15, No: 2, 1999

² Julian di Giovanni, Jay C. Shambaugh, "The impact of Foreign Interest Rates on the Economy: The Role of the Exchange Rate Regime", IMF Working Paper, February 2006

³ Brigitte Desroches, Michael Francis, "Global Savings, Investment and World Real Interest Rates", Bank of Canada Review, Winter 2006-2007

savings. But Mahmudul Alam and Gazi Salah Uddin (2009)⁴ analyze the link between interest rates and stock prices, developed and developing countries. They note that there is a significant negative link between interest rate changes and stock price changes. They go even further, pointing out that if interest rates are controlled by these countries, this will be a major benefit to countries that have developed securities markets as this will attract many investors and will contribute to economic growth. An interesting work by Stefan Collignon (2013)⁵ concludes that low interest rates reduce the long-term rate of economic growth. Shri Sotkantha Pattanaik, Harendra Behera, Arvind Kumar and other authors (2013)⁶ with the regression panel method, Quantile Regression and the simple OLS have analyzed the real interest rate and its impact on investment and economic growth and found that with the growth of the interest rate of 100bps, the investment rate will be reduced by about 50bps and the GDP growth will be averaged to 20bps. Barry P. Bosworth (2014)⁷ notes that there is a weak link between real interest rates and economic growth. These findings have been made by analyzing the major economic powers such as G7 countries and 19 OECD countries. From the review of empirical evidence in developed countries, we find that there is no significant link between interest rates and economic growth. But on the other hand, we look forward to seeing more important links to the above-mentioned factors for emerging or transitional countries. Different economists have come to the transition countries, which have come to different conclusions, among which we will mention: Lazaros E. Molho (1986)⁸ has concluded that interest rate growth may promote savings and investments in developing countries by alleviating financial pressures and positively impacting economic growth.

Contrary to this finding, Deena R. Khatkhate (1988)⁹ points out that from the analysis of less developed countries, the real interest rate level has little or no impact on economic growth. Pablo A. Neumeyer and Fabrizio Perri (2005)¹⁰ analyze business cycles and the role of interest

⁴ Mahmudul Alam, Gazi Salah Uddin, "Relationship between Interest Rate and Stock Price: Empirical Evidence from Developed and Developing Countries", International Journal of Business and Management, Vol.4, No.3, March 2009

⁵ Stefan Collignon, "Implications of the Low Interest Rate Environment for the Real Economy", European Parliament, February 2013

⁶ Shri Sotokantha Pattanaik, Harendra Behera, Arvind Kumar, "Real Interest Rate impact on Investment and Growth- What the Empirical Evidence for India Suggests?" DEPR Annual Research Conference

⁷ Barry P. Bosworth, "Interest rates and Economic Growth: are they related?", Center for Retirement Research of Boston College, May 2014

⁸ Lazaros E. Molho, "Interest Rates, Saving and Investment in Developing Countries; a Re-examination of the Mckinon-Shaw Hypotheses", International Monetary Fund, 1986

⁹ Deena R. Khatkhate, "Assessing the impact of Interest Rates in less developed countries", Elsevier, Volume 16, Issue 5, May 1988

¹⁰ Pablo A. Neumeyer, Fabrizio Perri, "Business cycles in emerging economies: the role of Interest Rates", Journal of Monetary Economics, Volume 52, Issue 2, March 2005

rates in developing countries. They have come to the conclusion that business cycles in developing countries are more volatile and interest rates are countercyclical and lead the cycle. Sidrat Jilani, Muhammad Asim, Farooq-E-Cheema (2010)¹¹ analyzed the impact of macroeconomic variables in Pakistan's GDP using secondary data and multivariate regression method have come to the conclusion that interest rates have a significant significance to GDP. They recommend that interest rates should be kept high due to the positive relationship with GDP. The interest rate limit should be removed in order to have economic growth. Another study of the effect of interest rates on economic growth by Chris O Udoka and Anyingang Roland (2012)¹² highlights the inverse relationship between the above-mentioned factors: the interest rate rise will affect Nigeria's GDP decline. These authors have also used the Multivariate Regression analysis. Abdul Aziz Farid Saymeh and Marwan Mohammad Abu Orabi (2013)¹³ analyze the effects of the inflation rate, the GDP in the economic growth of the Kingdom of Jordan. With the Cointegration test, Granger Casualty, the ARCH effect GARCH model and the regression model have come to the conclusion that inflation triggers interest rates and that the latter has a strong positive relationship to economic growth. On the other hand, Prachi Mishra, Peter Montiel, Peter Pedroni and Antonio Spilimbergo (2014) analyze the monetary policy effects on lending rates in the underdeveloped countries using SVAR's long-term defined methodology. Their conclusion is that theoretically, monetary policy shocks affect lending rates to countries that have developed institutional financial frameworks while having a weaker impact on transition countries. As can be seen from the above mentioned empirical evidence, the variables they have used in their studies and the methodology for confirming their hypothesis, we conclude that there are mixed responses regarding the optimal interest rate setting which would have an effect positive in economic growth. This is due to the diversity of economic characteristics of developed and underdeveloped countries, as well as the types and quantities of variables that they have explored in their models. However, these represent an important guide for further studies and research in this field, giving us the opportunity, new researchers, to fill out the disclosure outlined in the literature on the impact of interest rates on economic growth, with particular emphasis in the economy of the Republic of Macedonia. Therefore, I hope that through this paper I have contributed a little to compile this dissemination of the research question with empirical analysis and with important recommendations that will influence the clarification of the interest rate factor and its impact on economic growth in the Republic of Macedonia.

3. Empirical analysis on testing the effects of interest rates on economic growth

After we have revised the empirical evidence of the impact of interest rates in relation to the different macroeconomic variables of developed and transition countries, we will now, through

¹¹ Sidrat Jilani, Muhammad Asim, Farooq-E-Cheema, "Exploring Impact of Macro Economic Variables on GDP of Pakistan", *Journal of Management and Social Sciences*, Vol.6, No.2, Fall 2010

¹² Chris O Udoka, Anyingang Roland, "The Effect of Interest Rate Fluctuation on the Economic Growth of Nigeria, 1970-2010", *International Journal of Business and Social Science*, Vol.3, No.20 [Special Issue-October 2012]

¹³ Abdul Aziz Farid Saymeh, Marwan Mohammad Abu Orabi, "The Effect of Interest Rate, Infaltion Rate, GDP, on Real Economic Growth Rate in Jordan", *Asian Economic and Financial Review*, 2013

an econometric model, test the impact of interest rates on economic growth and GDP in the Republic of Macedonia. At the beginning we will make the specification of the econometric model and the evaluation method and after the specification of the model, we will analyze the data in the empirical work and we will calculate the econometric model and interpret the result. Also, in this section will be checked the validity of the hypotheses defined in the introduction of this paper.

3.1 Specification of the Econometric Model and Small Squares Assessment (OLS)

Through the simple linear regression method and the small square method application (OLS), we will test the effects of weighted interest rates on the credits granted and the M1 monetary mass in the GDP of the Republic of Macedonia.

Therefore, the specification of the linear regression model is as follows:

$$Y = \beta_1 + \beta_2 X_1 + \beta_3 X_2 + \mu$$

Y - represents a dependent variables (variables clarified, regressant, endogenous, predicted, etc.), in our case of research as a dependent variable is GDP (Gross Domestic Product expressed in percentages showing economic growth of the country);

X - represents the independent variable (regressor, exogenous, predictable, etc.), in our case, as independent variables are weighted interest rates for credit given and monetary measures M1;

B1, B2 dhe B3 these are estimates or coefficients of evaluation; where B1 is the constant parameter, while B2 and B3 are the independent variable evaluation parameters.

Ui is stochastic or error term variables, contains all the factors or variables that are not foreseen in the model and is a random and unobserved variable that captures positive and negative values.

3.2 Small Squares Assessment (OLS)¹⁴

The simplicity of this model derives from the assumption for term error: assumed to be $e \sim N(0, \sigma^2)$. In other words, knowing the value of the term error which in the model does not clarify anything in relation to other variables (error term distribution is independent of other variables), and the term error observations are not correlated with each other. In principle only is normally distributed where $E(e) = 0$ (the term error has an average of 0) and a constant change. And for a given **X** there is no correlation between the series observations for more error terms are not heteroskedastic. In other words individual observations over time are different individual observations and such access may be reasonable in cases where the size of the samples from the indirect data is very small. However, ignoring the data panel structure assuming that the

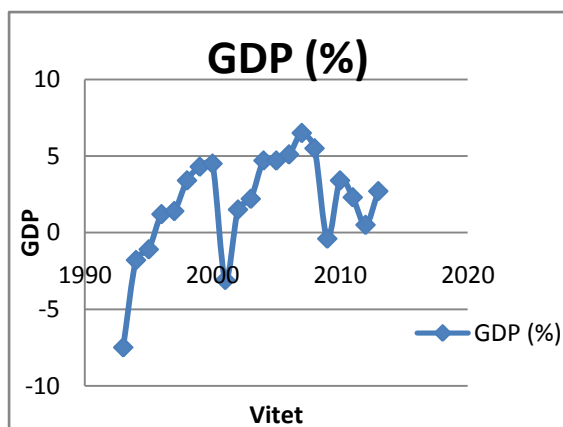
¹⁴ Besnik Fetaj, Analiza e kursit devizor në Republikën e Maqedonisë, Tetovë 2014, fq 8

term error is independent and distributed identically results in results that are not appropriate in many models. After the concerns mentioned by the classic linear regression model, efficient evaluation can be achieved using the small squares method (OLS). Despite numerous prejudices, similar to other studies in this study, the collected data will be evaluated by small squares (OLS) in our empirical analysis.

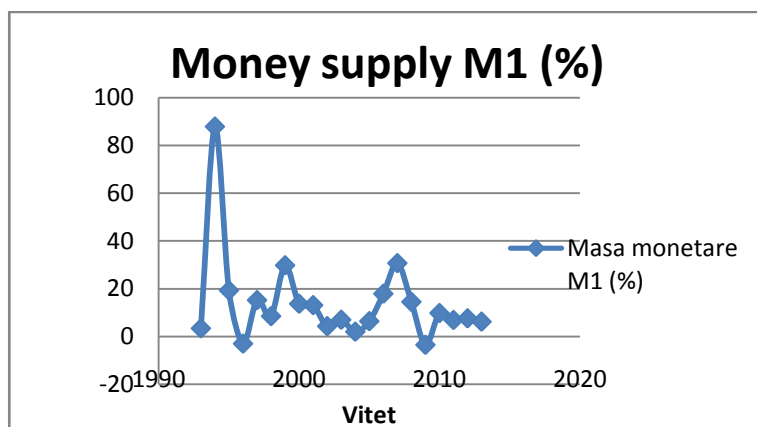
3.1 Data on the econometric model

In calculating regression, data are obtained from trusted institutions such as the World Bank and the People's Bank of the Republic of Macedonia. Scientific research has been done for the period from 1993 to 2013. The collected data are in annual time series. It is worth pointing out the obstacles we encountered during the collection of data for a longer period of time, respectively for the period before 1993, where for the variables we chose in the model there was no data either at the World Bank or in the institutions such as the State Statistical Office of the Republic of Macedonia and the National Bank of the Republic of Macedonia. The variables I have used in the econometric model are: GDP (dependent variable), weighted interest rates (independent variable) and monetary mass M1 (independent variable).

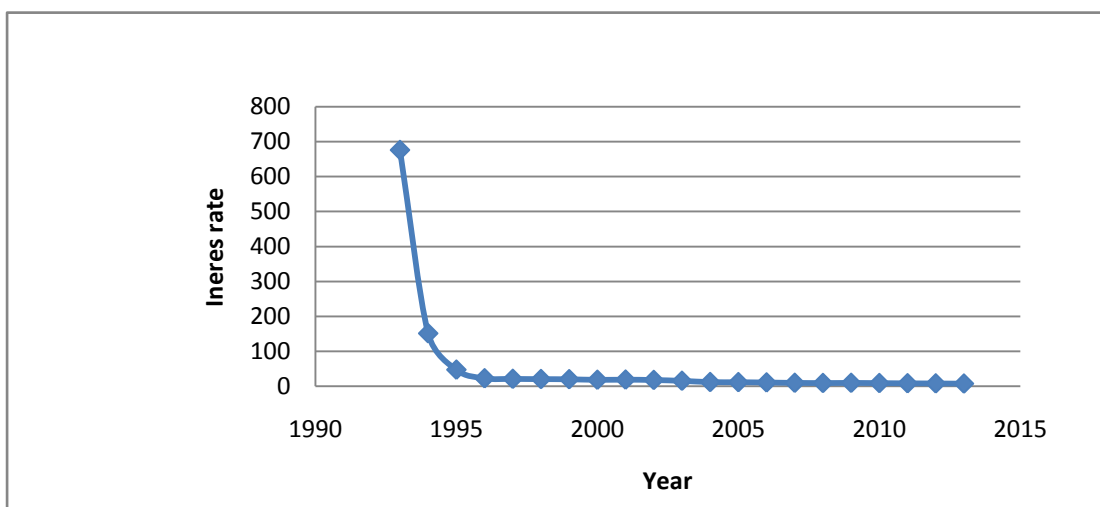
Graphic 3.1



Source: Author's Calculations



Source: Author's Calculations



3.1 Calculating the econometric model and interpreting the results

In this part of the paper, we will analyze and measure the impact of interest rates on the loans granted and the M1 monetary growth in the Republic of Macedonia, respectively in GDP growth. Through the correlation matrix, we will see the correlation between variables in the model. Then, through regression analysis we will test the validity of the hypothesis set out at the beginning of this paper. In the model, three variables are included, of which: the dependent variable will be the annual GDP expressed as a percentage, while the independent variables are the interest rates for the loans granted and monetary measures M1 also expressed in percentage.

3.1.1 Correlation Matrix

Correlation analysis is done to address the level of association or individual interaction of independent variables with the dependent variable in order to test the linear relation with the independent variable. The correlation explains the influence of the variables dependent on the independent variables.

$$\rho = \frac{cov(x_i y_i)}{\sqrt{var x var y}}$$

From the correlation matrix, we see that the results are different from scratch and have statistical significance. Gdp and interest rates are negatively correlated with one another, which means that with the growth of one variable (in this case with the increase in interest rates) the other variable (Gdp) will decrease. We have a similar interpretation with the monetary measure. (see table in appendix).

3.1.2 Econometric model

The econometric model of variables that we analyze can be written as:

$$GDP = B_1 + B_2 (Interest Rates) + B_3 (Monetary Mass M1) + u_i$$

where Y- represents GDP or regressant; B1- Constant coefficient; B2, B3, - Partial interest rate and monetary measurements - regressors and standard error rates. We calculate the estimation coefficients in the equation of the regression sample function by the software STATA_12. By their choice we get the evaluators B1, B2 and B3, who are known as small square evaluators. After calculating the estimation coefficients B1, B2 and B3, we can rewrite the equation of the three-dimensional regression by making the substitutions of the corresponding values also:

$$GDP = 2.820 - 0.01616 Interest rate - 0.0029 Monetary Mass M1$$

(se)	0.703	0.0038	0.029
(t)	4.01	4.25	0.10

Empirical research results point out that interest rates and monetary measures M1 have a significant impact on economic growth in the Republic of Macedonia. From the regression

results, we found that with the possible increase of 1% of the interest rates, the GDP on average will decrease to 0.016%. Since the t-test shows the value of $t = 4.25$, we emphasize that the variable has strong significance because it is greater than 0.05. While with the potential increase of 1% of the M1 monetary mass, the GDP on average will decrease to 0.0029%. And in this case $t > 0.05$, we emphasize that the variable taken in the model has significance. Based on these results, we prove our hypothesis **H1 / 1: Interest rate hikes will affect the economic downturn in the Republic of Macedonia**. With the aforementioned results, I agree with some of the studies conducted in various transition countries but also in some developed countries such as: Julian di Giovanni and Jay c. Shambaugh (2006), Pablo A. Neumeyer and Fabrizio Perri (2005), Chris O Udoka and Anyingang Roland (2012), Prachi Mishra, Peter Montiel, Peter Pedroni and Antonio Spilimbergo (2014). On the other hand, I disagree with Sidrat Jilani, Muhammad Asim, Farooq-E-Cheema (2010) who say there is a positive relationship between interest rates and GDP, especially when talking about a low economic development country such as Pakistan. The rest of the studies point out that interest rates almost do not have any significant effect on economic growth, especially in developed countries. In the Republic of Macedonia, due to the prolonged transition process, a restrictive monetary policy is governed, and the Central Bank has central role in guiding this policy. In the framework of this policy, it raises the mandatory reserve rates that commercial banks need to have in the Central Bank, thus limiting the credit potentials of these banks and increasing the interest rate.

4. Conclusion

The main purpose of this research is to analyze the impact of interest rates on economic growth in the period from 1993 to 2013. The search includes annual data on the Gdp, interest rates on loans granted and the monetary amount M1. Empirical research results point out that interest rates and monetary measures M1 have a significant impact on economic growth in the Republic of Macedonia, and we confirm our hypothesis: **H1/1: The increase in interest rates will affect the economic downturn in the Republic of Macedonia**. From the regression results, we found that with the possible increase of 1% of the interest rates, the GDP on average will decrease to 0.016%. Since the t-test shows the value of $t = 4.25$, we emphasize that the variable has strong significance because it is greater than 0.05. While with the potential increase of 1% of the M1 monetary mass, the GDP on average will decrease to 0.0029%. Even in this case $t > 0.05$, we emphasize that the variable taken in the model has significance. Our suggestion on this subject is that if it goes further with the application of restrictive monetary policy and high interest rates, the Republic of Macedonia will have very low economic growth and will stagnate in its long-term economic development. The development of the banking and financial system, the growth of banking competition, the application of the expansionist monetary method and the reduction of loan interest rates would be effective mechanisms in alleviating the economic stalemate and the revival of the economy and growth. It should be emphasized that our work has its limits, as in the model we did not include all the important variables that affect interest rates and economic growth such as: inflation, mandatory bank reserve rates, development financial etc. I hope that in future work, it would be important to analyze economic growth with other relevant factors that are related to interest rates, and to contribute to the clarification of macroeconomic factors that affect economic growth and econometric models to be used for forecasts of economic trends in the future.

5. Literature

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Appendix 1: Calculation Table in Stata

Source	SS	df	MS	Number of obs =	21
Model	111.57613	2	55.7880651	F(2, 18) =	9.08
Residual	110.573391	18	6.14296618	Prob > F =	0.0019
				R-squared =	0.5023
				Adj R-squared =	0.4470
Total	222.149521	20	11.1074761	Root MSE =	2.4785

gdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
normateint~t	-.0161665	.0038059	-4.25	0.000	-.0241623 -.0081706
masamoneta~1	-.0029367	.0290816	-0.10	0.921	-.0640349 .0581615
_cons	2.820539	.7036151	4.01	0.001	1.342298 4.298779

Variable	Obs	Mean	Std. Dev.	Min	Max
gdp	21	1.904762	3.332788	-7.5	6.5
normateint~t	21	54.07143	145.8611	8	676.3
masamoneta~1	21	14.17619	19.08866	-3.5	87.9

	gdp ninter~t masamo~1		
gdp	1.0000		
ninteresit	-0.7085	1.0000	
masamoneta~1	-0.0575	0.0575	1.0000

Appendix 2: Tabel with data used in model

Year	GDP (%)	Interes rate (%)	Money supply M1 (%)
1993	-7.5	676.3	3.4
1994	-1.8	151.7	87.9
1995	-1.1	47.8	19.3
1996	1.2	23.2	-3
1997	1.4	21.6	15.2

1998	3.4	21	8.5
1999	4.3	20.5	29.8
2000	4.5	18.9	13.7
2001	-3.1	19.4	13.1
2002	1.5	18.4	4.3
2003	2.2	16	7
2004	4.7	12.4	2
2005	4.7	12.1	6.4
2006	5.1	11.3	17.9
2007	6.5	10.2	30.7
2008	5.5	9.7	14.5
2009	-0.4	10.1	-3.5
2010	3.4	9.5	9.8
2011	2.3	8.9	6.9
2012	0.5	8.5	7.6
2013	2.7	8	6.2