

The effects of exchange rate on balance trade and on monetary aggregates of macedonia and the impact of the current world crisis in its economy

Kadishe Limani, Jeta Hani

Abstrakt

Macedonia is a country that is close related to the European Union countries where the majority of the Macedonian foreign trade is with the European Union countries (52%). So the Macedonian economy is in a high level dependency of Euro. Since Denar is connected closely to Euro, and the level of its usage in everyday economic activity is close to the usage of Denar, it is obvious to be discussed as a dilemma whether Macedonia should have Euro as its currency. However, the problem lies in that whether it is the right time for such action as the best solution for Macedonian economy, keeping in mind the fact that in the international arena there is present a second crisis that is the crisis of Euro-Zone.

Based on various sources and on our econometric results, in this paper is argued and supported the main hypothesis that the fix exchange rate for Macedonia is a more optimal choice in comparison with the unilateral euroisation and flexible exchange rate. Thus, during the research we found out some arguments that support the existing regime, such as: under a flexible regime an eventual devaluation of the Denar is more possible, which can lead to more negative effects on the economy than benefits. Thus, devaluation of the Denar will have no significant effects on the balance trade (export and imports) and GDP. This means that the competitiveness of a country relies on the other factors. In addition an eventual devaluation of the Denar, it will not have significant effects on monetary aggregates (M2 and M4) due to the asset substitution from Denar deposits to foreign deposits and vice-versa.

Key words: *Financial Crisis, Public Debt, Monetary Aggregates, Balance Trade, Exchange Rate and Eurozone.*

1. Introduction

1.1 Studies Aim

The *main aim* of this research is to analyze the effects that an eventual devaluation of the Denar against Euro has on certain macroeconomic variables (export and imports of goods and services, and on monetary aggregates) The *second aim* of this research is to find a better solution toward the coordination of the monetary and fiscal policy in order to achieve positive effects on the economy and to overcome the recession period caused by the global financial economic crisis of 2008 and 2011. In order to realize the aim of this study, we have used the quantitative method known as: Vector Error Correction Methodology. This method is used to obtain the effects that exchange rate have on monetary aggregates (M2 and M4) and on the balance trade components (export of goods and services). In order to obtain more reliable results, the data is mostly taken from two sources: National Bank of Republic of Macedonia and State Statistical Office of Republic of Macedonia. The impacts of the structural shocks that occurred from 1997-2011 are taken into consideration as well. But, still the quality is limited due to the questionable quality of the data available and due to the short-time span of 9 years taken into analysis for these variables: export and import of goods and services due to the unavailable data in millions of Euro.

Overall, the aim of this research is to confirm or reject the following hypothesis:

The main hypothesis:

- A change in the exchange rate (eventual devaluation) will not have significant effects on exports, imports of goods and services, and on the monetary aggregates¹ Also, in short run will increase the demand for deposits in foreign currency (increase in euroisation). *For the analysis is used Vector Error Correction Methodology (VECM).*

1.2 Problem description

From 1997-2009, rate of inflation in Macedonia has been a single-digit number, so this means that by having the exchange rate as an **intermediate target** of the monetary policy, stabilization of the price level has been achieved in the economy. The global financial economic crisis of 2008 caused high macroeconomic instability which was accompanied by a decrease in the Denar deposits, while on the other side have increased the deposits in Euro creating pressure for devaluation of the Denar. Also, the most recent crisis which is known as the Euro-Zone crisis caused the opposite affects of that happened on

¹ M2-includes short-term deposits in domestic and foreign currency, and M4, (the broad aggregate) includes the long-runs;

2008-2009. The tendency of Euro depreciation roots the Macedonian currency to be more reliable, which was followed by an increase in the domestic deposits.

Macedonia's foreign trade mostly is developed with the EU countries, especially with Germany which represents the main partner for export and import². Before Euro came in the international arena, the German Mark was one of the most important currencies in the economic activities of Macedonia. Many products, the average salaries, etc, were counted in this currency and now days its place has taken euro. Macedonia is connected with EU countries in two aspects, in the economic one, whereas 52% of its foreign trade is developed with these countries³, and in the social aspect, where a great portion of its population has emigrated to these countries, which somehow effects the economic life, and make euro to continue to be one of the main currencies of this country.

Thus nowadays the question that has frequently arouse is linked to the argument if Macedonia should continue maintaining the fixed exchange regime keeping in mind the effects of the most recent crisis in the world or urgently change the regime to unilateral euroisation or flexible?

2. The impact of the Euro-Zone crisis in the Republic of Macedonia

The financial crisis that started in 2007 and that exploded in the whole world in 2008 was just a kind of reminder of that how fragile and returnable is the history of the mankind progress. From all point of views this financial crisis is considered as one of the most economic events, it is also considered as a phenomenon that is similar to the Great Depression (1929 - 1939).⁴ It shocked not only United States but the entire world as well, especially the economy of the European Union, with which Macedonia is closely linked in economic and the social aspect. In such circumstances, keeping in mind the fact that Macedonia has a small and open economy; the exchange rate has remained its political instrument. Macedonia's fixed exchange regime has helped the economic stability, but in meanwhile various factors, especially the financial global crisis has pressured initiating debates for the change of the exchange regime of Macedonia as one option for the improvement of the economy or supporting and implementing euroisation as a second option, always keeping in mind the fact that Macedonia aims the membership of EU (on March 2004

² Based on the Review Foreign Trade of Macedonia 2011, University American College Skopje, Ministry of Economy, Republic of Macedonia, pg.10 - 22.

³ Review Foreign Trade of Macedonia 2011, University American College Skopje, Ministry of Economy, Republic of Macedonia, pg.16.

⁴ The Financial Crisis of Our Time, Robert W. Kolb, Financial Management Association Survey and Synthesis Series, Oxford Universities Press, 2011.

Macedonia applied for EU membership, and on 17 December 2005 it has been granted with the status of candidate for EU membership).

2.1. Europe in Problem, an overview about the Euro-Zone crisis

The Financial crisis made the financial institutions of EU to experience banking panic, loss of confidence between the clients and businesses, sharp decrease of the interest rates. Banks, as well won an unlimited access to the facilities of the lender of last resort with their Central Banks, where their Balance Sheets were extended, and financed with new capital or were guaranteed by the governments. Not only in United States, but as well in the global level it came in surface the absence of the solution about the failure of the financial institutions. The Authorities were dealing within two frames, such as: bankrupting the corporations and giving public funds.

In 2007 the economies of many countries of European Union were put in a question mark whether they fulfill the Maastricht criteria in the point of the budget deficit, according to which criteria the total public debt is not allowed to exceed 60% of the GDP. Based on the following figure of the total public debt that has published the European Commission, Cyprus and Austria stand in a line with limits of fulfillment of these criteria, which means that their budget deficit represents 60% of their GDP, whereas Malta for a small percentage has exceeded this criteria. Countries such as: Germany, Portugal, Hungary and France broke the fulfillment of the Maastricht criteria for percentages that are not so high, whereas we have Italy which exceeds this criteria for 100% followed by Greece.⁵

What is important to be mentioned is the fact that the global financial crisis made that European Union to be attacked directly from an another crisis known as European crisis, where the main actor is Greece as a member state of EU, which faces up with a crisis of the sovereign budget, debt which is directly connected with the global financial crisis causing problems to the European financial sector immediately after the Lehman Brothers bankruptcy. In fact, we can say that Greece represents a special case in a sense that the level of the Greek debt has been in a high level before the crisis (since 2003). In 2007 its level has been 107.7% of the GDP, whereas in 2010 it has been increased to 144.9% of its GDP.⁶ As a result of the problems with the payments of the Greek public debt caused achieving the culmination in 2010.

⁵ Economic Crisis in Europe: Causes, Consequences and Responses, European Economy 7|2009, pg.44

⁶ Ulrich Volz, Lessons of the European Crisis for Regional Monetary and Financial Integration in East Asia, ADBI Working Paper Series, ADBI Institute, No.347, February 2012, Asian Development Bank Institute, pg.7

BOX 1. EUROSTAT: Europe continues to be kneeling by the crisis

Euro Stat reports that Europe continues to be kneeling by the crisis, and even, no positive signal for her recovery. Unemployment in the 17 countries of the euro area recorded at record high of 10.3 percent. According to the most recent Euro-Stat, in November was recorded a figure of 16.3 million unemployed only in the Euro zone. Data for all EU member states also show that unemployment is increasing compared months, and 9.8 percent figure marks. Spain has the highest unemployment rate of 22.9 percent. Greece ranks second with 18.8 percent. Meanwhile, the countries with low level of unemployment are: Austria, Luxembourg and the Netherlands at 4.9 percent.

Source : <http://alsat-m.tv/index.php/bota/108638.html>

The president of the European Commission José Manuel Durão Barroso in one of his conferences of G8⁷ (on 18 May 2012) emphasizes the importance of the economic growth where G8 must pay attention not only to the regulation of public finances, but as well to the economic growth, watching these two dimensions as close connected to each other. Yes, the financial crisis in the United States triggered the fall down in Europe, but due to the absence of fiscal integration, the collapse would have happened sooner or later. Euro has found itself facing a huge asymmetrical shock. Euro skeptics believe that breaking up the Euro now that it exists would have very serious costs. Any country that uses Euro as a main currency would face a huge panic especially on its banks, as depositors with transfers their funds to a more secured currency. Immediately Europe needs to stop the panic attacks, thus the European Central Bank has to be ready to buy government bonds of euro nations. (Paul Kurgman, 2012).

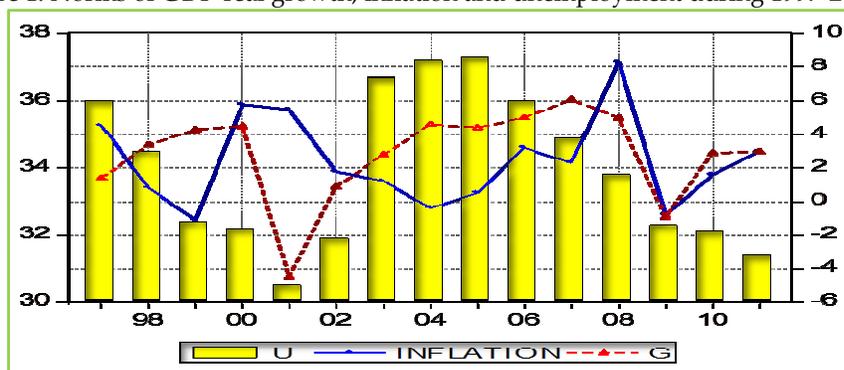
2.2 The effects of the Euro-Zone crisis in Macedonia

Macedonia is a small country with a population up to 2 million positioned in the middle of Balkan Peninsula with a surface of **25713 km²**. Since its functioning as an independent country (1992) from the former Socialist Federal Republic of Yugoslavia it faced up with many challengeable problems of the economic field, politics, social, accompanied with regulatory and structural

⁷ The Group of Eight (G8) , is a forum for discussing the global issues for the governments of eight world biggest economies , part of which is European Union together with Canada, France, Germany, Italy, Japan, Russia, United Kingdom and United States.

reforms in order to break off from its transition oriented to the market economy. Its economy is small with a Gross Domestic Product of 424 762 million Denars⁸. Macedonia is characterized with a relatively low living standard, with a high norm of unemployment, slow economic development and a slow process of its membership in European Union.

Figure 1. Norms of GDP-real growth, inflation and unemployment during 1997-2011⁹



Source: Author's calculations. Data taken from the Central Bank of Republic of Macedonia

From the Figure 1 we see that the global financial crisis has not have significant effects in the economy of Macedonia. Only in 2009 it records a decline of GDP with negative values, but this reflects the effect of the conflict of 2001. After this armed conflict, the economy of Macedonia started to increase relatively fast, because of the politics for economic stabilization and a period of a politics relatively stable. According to the data of the National Bank of Macedonia, the GDP of Macedonia after 2001 is as follows: the economic growth started in 2003 (2.8%) and continued in 2004 (4.6%), 2005 (4.4%), 2006 (5.0%), 2008 (5.0%)¹⁰, 2009 (-0.9%), 2010 (2.9%),¹¹ 2011 (3%) and it is estimated that 2012 will have a growth from 2%.¹²

⁸ Gross Domestic Product in the Republic of Macedonia in 2010 - preliminary data -, News Release, State Statistical Office, No. 3.1.11.06, Year XLIX, 28.10.2011, pg.1

⁹ Gross Domestic Product in the Republic of Macedonia in 2010 - preliminary data -, News Release, State Statistical Office, No. 3.1.11.06, Year XLIX, 28.10.2011, pg.2

¹⁰ Data refers to the National Bank of Macedonia, Statistical Office, Ministry of Finances, as well to the data from the Ministry of Economy.

¹¹ <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&plugin=1&language=en&pcode=tsieb020>

¹² <http://www.gfmag.com/gdp-data-country-reports/229-macedonia-gdp-country-report.html#axzz1yit8tgHn>

Actually, Macedonia was shielded from the impact of the Eurozone crisis in 2011 mainly on account of the country's prudent fiscal policy, absence of major imbalances and a financial system that is not reliant on significant parent bank capital.¹³ But, there are some records that demonstrate that there have been some drops that Macedonia has experienced. It is a fact that the families that live in Macedonia ensure a good portion of their budget through the emigrants. This is one more factor that makes Euro even more present in daily activities of the citizens, and in meanwhile this means that each attack of the economies of the countries where they live, attacks directly their budget, indirectly it is attacked the budget of the families that live in Macedonia. This weakness of the budget of the families that live abroad (emigrants), together with the other citizens of the country where they live represent a decrease of the general demand of these countries, which results to the decrease of the demand for the exports of Macedonia. This affects as well the decrease of the interest of the European investors which influences to the reduction of Foreign Direct Investments (FDI). So, in 2009 FDI in Macedonia reduce from 8,6 million Euro in 2007 to 2,1 million euro in 2009.¹⁴

Macedonia is part of the list of the countries characterized with episodes of currency crisis (in 1997)¹⁵ and with systematic banking crisis.¹⁶ It is important to be emphasized that there exists a difference between the crisis that occur in advanced economies and those that are under development, such as Macedonia, but their origin relies in similar factors. One of the best alternatives to resolve a situation of systematic banking crisis worsen from the devaluation of the currency risking in this way the public finances, is the *public debt*. As we saw it represents an important point for EU member states, for Macedonia as well which aims being part of this union.

The table below gives an overview how the Macedonian public debt has developed through the years (from 2001 until 2011), trying in this way to understand the effects of Eurozone crisis combined with the global financial one.

¹³ Regional Economic Prospects in EBRD Countries of Operations: October 2012, EBRD Office of the chief Economist.

¹⁴ National Bank of Republic Macedonia, <http://www.nbrm.mk/?ItemID=750FC531FC3D1B49B16440313562D400>

¹⁵ Pierre- Oliver Gourinches and Maurice Obstfeld, Stories of the Twentieth Century for the Twenty-First*, University of California at Berkeley, National Bureau of Economic Research, Centre for Economic Policy Research, July 2011, Forthcoming AEJ-Macro,pg.56

¹⁶ Pierre- Oliver Gourinches and Maurice Obstfeld, Stories of the Twentieth Century for the Twenty-First*, University of California at Berkeley, National Bureau of Economic Research, Centre for Economic Policy Research, July 2011, Forthcoming AEJ-Macro,pg.58

Table 1. Governmental debt of Macedonia 2001-2011

Years	Gov. Public Debt*	External Public Debt**	Internal Public Debt**
2001	1873.4	63.6	36.4
2002	1715.9	63.5	36.5
2003	1599.1	62.9	37.1
2004	1583	62.7	37.3
2005	1848.8	67.4	32.6
2006	1673.4	61.3	38.7
2007	1430	61.3	38.7
2008	1386.7	66.4	33.6
2009	1596.9	69.2	30.8
2010	1710.6	68.6	31.4
2011	2088.6	75.7	24.3

Source: Ministry of finances¹⁷ * in million euros ; ** in % of governmental public debt

One of the effects of internal debt is the paid interest from the government. They result to an increase of governmental expenditures and may cause the fiscal deficit. The table above shows us that for a period of ten years approximately has an internal public debt of 30% from the total governmental public debt. In 2011 this debt is decreased in 24.3% which represents the lowest percentage. For a moment maybe makes us feel happy this fact of the decrease for 7.1% from the previous year, but if we take a look to the percentage of the external public debt of the same year, than maybe we would be afraid to feel totally happy. In 2011 the external public debt constitutes 75.7% of the governmental public debt, which means that it has increased for 7.1%, fact which is even more concerning us. External public debt creates a directly money burden. It includes the transfer of funds from the country that takes the debt towards the foreign citizens. Spending the governmental sources in order to pay the foreign debt represents a cost for expenditures that have to do with public utility programs, in meanwhile it represents a worrying trend for future generations that unfairly will have to pay the cost of the decisions that the actual generation take. It is another matter whether the taken debt is used in a productive way. In general, funds mostly are ensured from the revenues that generate exports or from foreign markets. Global financial crisis and the one of Eurozone made that in 2009 the exports of Macedonia (especially those of textile and metal) take negative values.¹⁸

¹⁷ http://www.finance.gov.mk/files/u4/Stock_of_central_government_30_04_2012.pdf

¹⁸ 2011 International Monetary Fund, February 2011, IMF Country Report No. 11/42, pg.8

2.3. Euroisation in Macedonia

Eastern European countries are among the countries in transition, where the levels of foreign currency held by residents are the highest. Foreign currency assets in the region are primarily in euro and than in small amounts in US dollars, Swiss francs, etc. In this sense we can talk about euroisation or concretely about an unofficial euroisation, which currently happens in Macedonia. Its economy has shown so far an uncertain recovery after the economic destablity caused by the conflict of 2001. Ethnic tensions aren't overcome yet. Despite the official and private transfers, the imbalance of the current account remains essential.

Macedonia's foreign trade mostly is developed with the EU countries, especially with Germany which represents the main partner for export and import¹⁹. Before euro came in the international arena, the German Mark was one of the most important currencies in the economic activities of Macedonia. Many products, the average salaries, etc, were counted in this currency and now days it's place has taken euro. Macedonia is connected with EU countries in two aspects, in the economic one, whereas 52% of its foreign trade is developed with these countries²⁰, and in the social aspect, where a great portion of its population has emigrated to these countries, which somehow effects the economic life, and make euro to continue to be one of the main currencies of this country.

BOX 2. Macedonia between currency stability and braking of the economy

Macedonia has a stable currency and a solid monetary policy. But experts estimate that restrictive monetary policy has its own negative consequences.

Economic problems faced by the Euro Zone and the economies of the countries in the region will not cause an eventual devaluation of the

¹⁹ Based on the Review Foreign Trade of Macedonia 2011, University American College Skopje, Ministry of Economy, Republic of Macedonia, pg.10 - 22.

²⁰ Review Foreign Trade of Macedonia 2011, University American College Skopje, Ministry of Economy, Republic of Macedonia, pg.16.

domestic currency of Macedonia. However, the domestic currency will remain stable because the foreign reserves, has reached the highest historical level of 2.96 billion.. "Extremely high level of foreign currency reserves, low debt and budget deficit country ensuring that the currency remains at the same rate," said Minister Stavreski.

Central bank policy remains consistent, with stable exchange rate of the Denar against the Euro and inflation at a low level compared with inflation in the euro zone, said the governor of the National Bank, Dimitar Bogov. "Over the last two months the National Bank purchased the surplus of the foreign currency –Euro, in the foreign exchange market. Citizens' savings in national currency continues to grow, these data indicate Denar stability," said Bogov

Experts warn about Euro-zone crisis

Economic experts evaluate that maintaining the stability of the domestic currency has its own price. "Fiscal policy and monetary policy should be harmonized in a restrictive direction. Interest rate will be relatively high, it enables the stability of the Denar but indirectly, the economy will feel the effects of this policy," says Nikola Popovski expert on economic issues.

Professor, Bilal Kasami says that the Euro zone financial crisis will have an impact on economic development in Macedonia."Denar is directly tied to the euro, so that any movement of the Euro relative to other currencies will have an impact on Denar in relation to other currencies also."

Source: <http://www.dw.de/dw/article/0,,16220868,00.html>

"The first is, as soon as it is possible to cut all non-productive public spending, because it can make a positive willingness government. Second, consider the possibility of credibility, to take credit lines with lower capital costs to support the real sector, which has significant effect on the economic growth, and a third of all non-productive costs to transfer in productive expenditures," said Abdylmenaf Bexheti, a university professor.

Source: <http://alsat-m.tv/ekonomi/156264.html>

According to experts, the country's economy will not be immune to external developments, and it is necessary for the government to take appropriate measures to defuse the situation.

Comment: Despite all these economic struggles of Macedonia and the crisis that have captured the EU countries with which it collaborates and is tightly connected, there is as well a negative attitude of the European Central Bank (ECB) which doesn't welcome the unilateral euroisation, where an adaptation of Euro outside the Treaty leads to the effects that are against the basic economic justification of the European Monetary Union.²¹ **So, at the moment it is not recommended an unilateral euroisation to Macedonia.**

3. The effects of the exchange rate over balance trade (export and import of goods and services) and monetary aggregates (M2 and M4)

3.1. Variable selection and data description

The data necessary for practical realization of this research have been mainly obtained from National Bank of Republic of Macedonia. It is important to mention that the data and variables selected can affect the quality of the research because countries like Macedonia are characterized with short and questionable quality time series. The limited number of observation to 28 might have some effect on the consistency of the results because VECM²² requires time series for a longer period of time at least 20 years (B.E. Huitema, 2007). All the variables in the model are in nominal terms and they enter the model in their logarithmic form, meaning that their coefficients represent respective elasticity²³. For the period prior to 2003, no official quarterly or monthly data for export or import of goods and services exists in millions of Euros. The graphs below show the percentage or the share of each component of the balance trade, and the percentage of the monetary aggregates. Also, we have collected data for monetary aggregates (M2 and M4 in millions of Denars) quarterly and data for the exchange rate (Denar/Euro) expressed in the indirect

²¹ (ECOFIN 2000; Duisenberg 2001; European Commission 2002).

²² OLS - is a clear, simple method which is considered more suitable for *stationary series*, thus if it is used for non-stationary series may give incorrect results. In this quantitative analysis the structural shocks are not taken into consideration. Also by using OLS the data available is not tested to decide whether they are stationary or non-stationary. Therefore, exists a high chance that the results above to be spurious.

VECM- is applied when working with *non-stationary data* (trended series). VECM investigates whether the two time series are moving together over time (co integration between them). In other words co integration requires a long-run relationship between series for instance, at least twenty years. We have used VECM to analyze the quantitative effects of exchange rate over balance trade components and over monetary aggregates M2 and M4 and PPI by taking into consideration also the structural shocks. Based on VECM results exchange rate does not have significant effect on balance trade and on the monetary aggregates.

²³ Elasticity provides percentage growth in the dependent variable arising from one percent in the independent variable.

method starting from 2003 up to 2011 in order to have same sample period as the components of the balance trade. Overall, since the sample period starts from 2003q1-2011q4, we have identified two structural breaks and which is the global financial economic crisis of 2008 and the most recent one, Euro zone Crisis.

$$dum1 = (t \geq q(2008q3)) * (t \leq q(2010q4)) \rightarrow \text{Global Financial Economic Crisis}$$

$$dum2 = (t \geq q(2011q1)) \rightarrow \text{The Euro - Zone Crisis}$$

Chart: 1. Pie Chart of Balance Trade Components in %

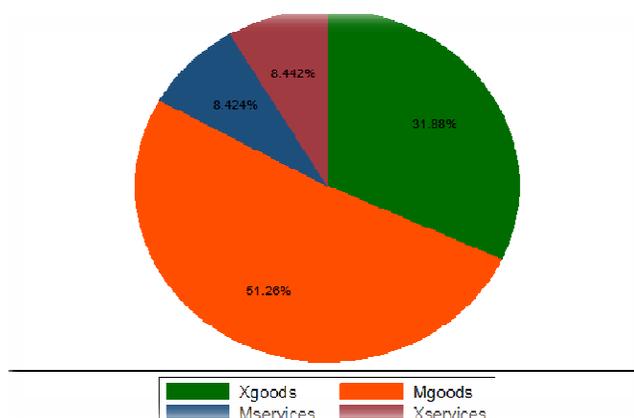
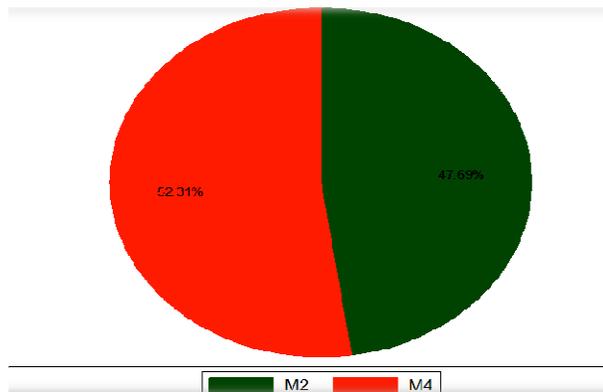


Chart: 2. Pie Chart of Monetary Aggregates in %



Source: Authors' calculation. Data from NBRM

3.2. Calculations of results by using Augmented Dickey-Fuller test and VEC methodology

In fact many, time series, particularly macroeconomic time series, are non-stationary. Once again one of the statistical tests that permit researchers to determine if series are non-stationary is the Dickey Fuller Test. In the *table below* is estimated that these variables: exports of goods and services, monetary aggregates (M2 and M4) are non-stationary in all the levels:

- Including a constant in regression with one lag (distance)
- Including a constant and first difference in regression with one lag (distance)
- Including trend and a constant in regression with four lags in order to obtain a more optimal result

In all levels *test statistic* $|t| < 5\%$ *critical value* \rightarrow we accept the **null hypothesis** of a unit root providing statistical evidence that these variables are *non-stationary*. Also, even though the exchange rate in the first difference is declared stationary, when we include **trend** in regression they turn to be non-stationary with a deterministic (constant) trend.²⁴

Table: 2. Augmented Dickey-Fuller Test for Unit Root

	Regress lags(1)	1 st difference regress lags(1)	Trend regress lags(4)	MacKinnon- ρ -value
	a. Critical value of 5%	a. Critical value of 5%	a. Critical value of 5%	Based on the MacKinnon- ρ -value $\rho > 0.05 \rightarrow$ nonstationary
	b. Test- statistic (t) ²⁵	b. Test- statistic (t)	b. Test- statistic (t)	I(1)
	c. ρ -value	c. ρ -value	a. ρ -value	$\rho < 0.05 \rightarrow$ stationary I(0)
Log_xgoods	a. -2.997	a. -2.978	a. -3.576	
	b. -1.561	b. -1.484	b. -0.462	
	c. 0.5032	c. 0.5414	c. 0.9849	I(1)

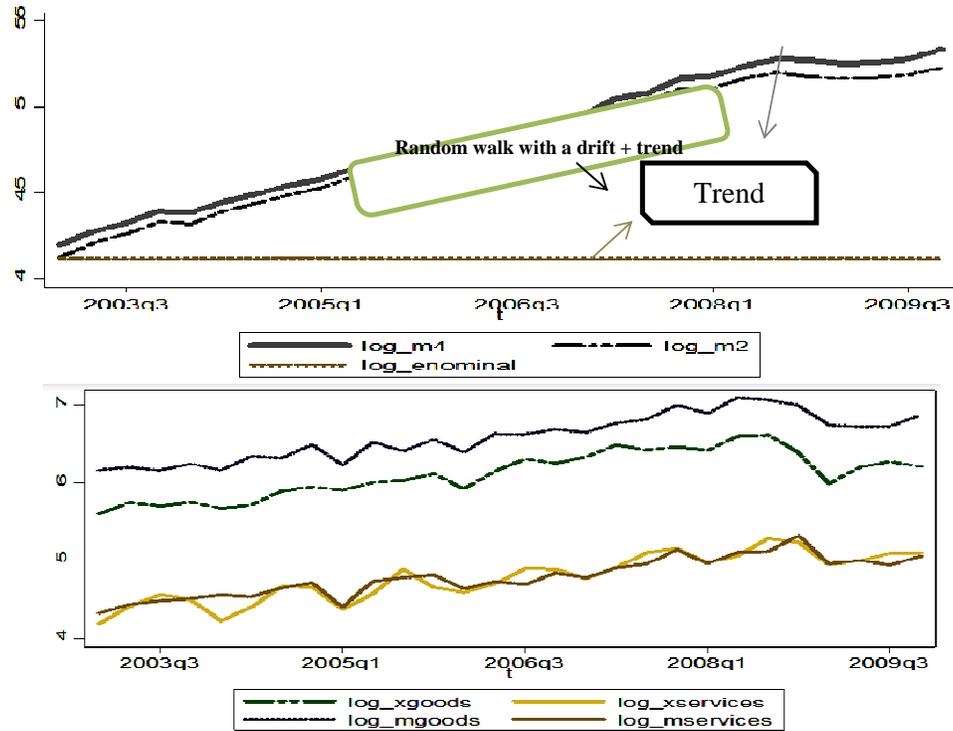
²⁴ Based on, Hill R.C., Griffiths W.E., & Judge G.G. (2001), 'Using EViews for Undergraduate Econometrics', Second Edition, John Wiley & Sons, Inc., pg.152-161.

²⁵ $|t| > \text{critical value of } 5\% \Leftrightarrow \rho < 0.05 \Leftrightarrow$ Series are stationary and the null hypothesis is rejected in favor of the alternative hypothesis and the series do not have a unit root;
 $|t| < \text{critical value of } 5\% \Leftrightarrow \rho > 0.05 \Leftrightarrow$ Series are non-stationary and the null hypothesis is accepted, so the series under these criteria do have a unit root.

Log_xservices	a.	-2.997	a.	-3.000	a.	-3.600	I(1)
	b.	-1.719	b.	-1.701	b.	-0.476	
	c.	0.4214	c.	0.4308	c.	0.9843	
Log_mgoods	a.	-2.997	a.	-2.978	a.	-3.576	I(1)
	b.	-1.234	b.	-1.332	b.	-2.396	
	c.	0.6587	c.	0.6144	c.	0.3816	
Log_mservices	a.	-2.997	a.	-2.978	a.	-3.576	I(1)
	b.	-1.521	b.	-1.577	b.	-1.844	
	c.	0.5231	c.	0.4950	c.	0.6833	
Log_M2	a.	-2.997	a.	-2.978	a.	-3.576	I(1)
	b.	-1.087	b.	-2.672	b.	-1.645	
	c.	0.4377	c.	0.0790	c.	0.7742	
Log_M4	a.	-2.997	a.	-2.978	a.	-3.576	I(1)
	b.	-1.166	b.	-1.322	b.	-3.412	
	c.	0.6881	c.	0.3799	c.	0.9813	
Log_exche	a.	-2.930	a.	-2.933	a.	-3.512	I(0) → I(1)
	b.	-33.861	b.	-33.538	b.	-0.969	
	c.	0.000	c.	0.000	c.	0.9481	

Author's calculations

Figure 2. Non-Stationary Behavior of Export, Import, M2, M4 and Exchange Rate



Source: Authors' calculation. Data from NBRM and different types of non-stationary data are based on the link:

<http://www.investopedia.com/articles/trading/07/stationary.asp#ixzz1WzdXm1dX>

Therefore, we can conclude that variables: export and import of goods and services are a combination of difference stationary (DS) and trend stationary (TS). The monetary aggregates (M2 & M4) are more considered as trend stationary (TS). On the other side, by using the constant and taking the first difference the exchange rate is obviously a stationary co integrated variable $I(0)$. But, when *trend* and *4 lags* are taken into consideration then it becomes non-stationary with a deterministic trend. The figures above clearly show that the variables are a combination of random walk and deterministic trend. Also, in our data for the variables, the optimal test result comes up with a trend in regression and 4 lags into the ADF test.

Table: 3. Johansen Test for Cointegration & Econometric results by VEC Methodology
 Sample:1998q1-2009q4
 Lags (4)

Identification: *beta is exactly identified Johansen normalization restriction imposed*

Variables Dependent/Independent	Max- rank (Π)	Trace Statistic	5% Critical Value	β	α	r^2 ²⁶
log_xgoods log_exche	0	14.2271 * ²⁷	15.41	0.003417	-4.136101	0.5990
	1	1.9913	3.76			
	2					
log_xservices log_exche	0	14.2271 *	15.41	0.0027303	-4.12925	0.8149
	1	0.6846	3.76			
	2					
log_mgoods log_exche	0	14.4798 *	15.41	0.0031362	-4.136436	0.7531
	1	1.3996	3.76			
	2					
log_mservices log_exche	0	15.0903 *	15.41	0.0038065	-4.133971	0.7252
	1	1.6941	3.76			
	2					
log_m2 log_exche	0	4.2361*	15.41	-0.022873	-3.969553	0.7687
	1	1.5002	3.76			
	2					
log_m4 log_exche	0	10.3722 *	15.41	-0.003100	-4.135677	0.8075
	1	2.6295	3.76			
	2					

Author's calculations

One part of the table above represents the results of the Johansen test, where it is clear that we cannot reject the Null hypothesis of having no rank ($r = 0$) and therefore there is no co integration²⁸ among the dependent variables (exports, imports, M2 & M4) and independent variable (exchange rate). The second part of the table above represents the econometric results by VECM which will be interpreted and analyzed in the following section 5.3 of the research.

²⁶ r^2 → Determination coefficient → for example, exchange rate as an independent variable explains 59.90% of the goods exported. α → adjustment coefficient; β → co integration vector ; ρ - values < 0.05 → indicates that we may reject the null at conventional significance level of 5%;²

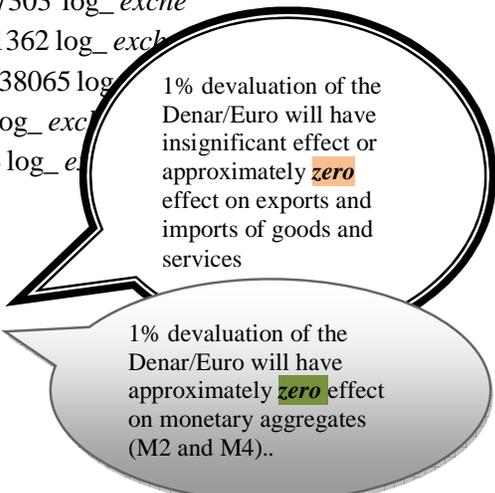
²⁷ * Determines the rank number

²⁸ The lack of co integration ($\Pi = 0$) reveals that among variables in long run does not exist any equilibrium.

3.3. Econometric interpretation and conclusion

Equations:

- $\log_xgoods = 4.136101 - 0.003417 \log_exche$
- $\log_xservices = 4.12925 + 0.0027303 \log_exche$
- $\log_mgoods = 4.136436 - 0.0031362 \log_exche$
- $\log_mservices = 4.133971 - 0.0038065 \log_exche$
- $\log_M2 = 3.969552 + 0.022873 \log_exche$
- $\log_M4 = 4.127594 + 0.0031004 \log_exche$



1% devaluation of the Denar/Euro will have insignificant effect or approximately **zero** effect on exports and imports of goods and services

1% devaluation of the Denar/Euro will have approximately **zero** effect on monetary aggregates (M2 and M4)..

Note: Due to the limited number of the observation and uncertainty in the quality of the data these estimates should be treated with caution.

3.3.1. Relationship between exports of goods and services and exchange rate

Goldstein and Khan (1978), argue that demand and supply conditions (production capacity) are equally important, especially for small and underdeveloped countries like Macedonia who can affect neither the price, nor the exports. Jovanovic (2009), by using VECM, OLS and ARDL determined that industrial production, the contribution of the metal price and the favorable foreign demand for domestic product) were the factors that caused a major growth in exports. All of these variables significantly affected exports. But, in contrast the exchange rate does not have significant effect on exports and therefore, have no dependability on the exchange.

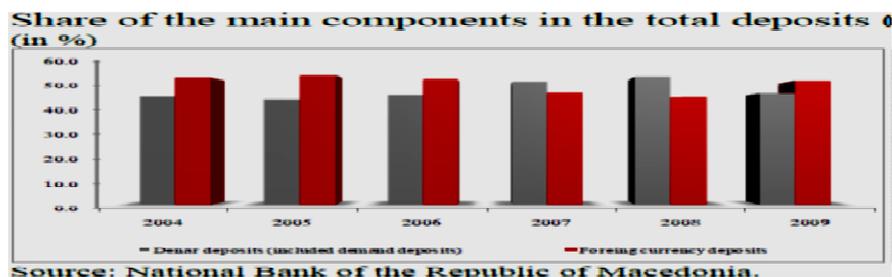
3.3.2. Relationship between imports of goods and services and exchange rate

Jovanovic, Petreski (2009), & Jovanovic (2007 & 2009), have indicated that imports are not particularly price elastic. Also, they indicate that the low and insignificant coefficient reveals that import do not depend on the exchange rate. *Particularly, import depends on other factors such as on: growth in consumption,*

investments, exports (components of GDP) and metal prices. Even though exchange rate is unlikely to be the factor that is responsible for the poor performance of net imports, it can strongly influence other aspects of performance in the economy such as in terms of the loss of **confidence** in the domestic currency will be very high (Jovanovic, 2009). Our results are consistent with Jovanovic (2009), conclusions in which exchange rate has insignificant effect in imports. Due to the lack of natural resources small economies like Macedonia import everything that they cannot produce themselves.

3.4. The relationship between the fix exchange rate (eventual devaluation) and short term deposits.

Figure: 3. Share of Denar/Foreign Deposits in the Total Deposits-as a good proxy to measure the level of euroisation in the economy

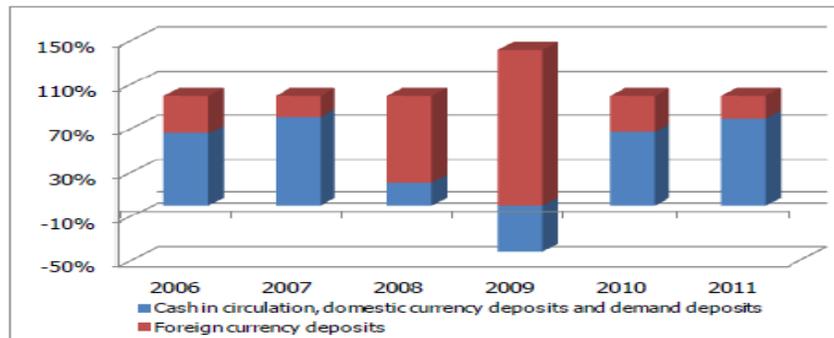


Source: National Bank of the Republic of Macedonia

In conditions of larger uncertainty, caused by the global crisis, the last quarter of 2008 and the year 2009 is followed by a continuous downward trend, particularly causing the loss of dominant position of the Denar deposits in the total deposits. The **world crisis (external structural shock)** in reality indicated changes in the economic agents' *preferences* or affected their behavior when making financial decisions. Thus, in December 2009, the Denar deposits registered 46.4% of the total deposits compared to 52.1% of the previous year, while in the other side was seen an annual increase of the foreign currency deposits by 22.4%. Therefore, the investment in foreign currency deposits proved as preferred instrument for depositors' in order to protect themselves from negative conditions in the economy (currency crisis). Moreover, in Macedonian economy, the credit market showed an increase of 53% in the last four years, but the main sources for the financing the economic activities are the potential deposits. The global stabilization in the second half of 2009

contributed in increasing the confidence that slowed down the decline in the Denar deposits.²⁹

Figure:4. Individual Preferences towards Domestic Deposits and Foreign Deposits
Share of the growth of individual components in the annual growth of the money supply M4 (in %)



Source: National Bank of the Republic of Macedonia.

Source: National Bank of the Republic of Macedonia

Comment based on the figures:

The figures above show that the households and the economic agents do not prefer to hold a devaluated currency, so they increase currency substitution. Also, the figures clearly explains that each time the Denar tends to devaluate the demand for deposits in Euro will increase and vice-versa. Thus, individual preferences are more psychological behavior depending on the movement of the foreign factors. **This leads us to accepting the second part of the main hypothesis that an eventual devaluation of the Denar in short run will increase the demand for deposits in foreign currency as shown in 2009 (increase in euroisation), and an eventual revaluation of the Denar in short run will increase the demand for domestic deposits as shown in 2010 and 2011 (decrease in euroisation due to the Euro Zone Crisis).** The uncertainty for the future of euro as a currency has caused a significant increase in the domestic deposits in 2011 compare to 2010 and especially to 2009. This entire explanation shows that the low credibility towards Euro or towards Denar influence the individual behavior particularly in the structure of the deposits. Any crisis, or any change in the factors of international markets has psychological consequence to the residents.³⁰

²⁹ NBRM(2008-2009), Annual Report , Published March 2009-2010, pg 84-93;

³⁰ The comment is based also on : NBRM(2011), Annual Report , Published April 2012, pg 89-90;

4. Conclusion

Regarding the effects of the exchange rates over balance trade components (export and import) and monetary aggregates (M2 & M4), **the results from our empirical findings in this section of the research proves the first part of the (main) hypothesis: that a change in the exchange rate (eventual devaluation) will not have significant effects on exports, imports of goods and services, and on the monetary aggregates.** The poor performance of the balance trade components does not rely on the exchange rate. The global financial crisis of 2008 and the Euro-Zone crisis of 2011 prove that structural shocks are the ones that hamper competitiveness. Exports and imports (as significant components of GDP) are defined inelastic to exchange rate. Also, with a fix exchange regime the Central Bank more easily can control the degree of euroisation (through following a restrictive monetary policy) and the credibility towards national currency is much higher. This conclusion is consistent with the findings of Jovanovic (2009 & 2007), and partially with the findings of (Nenovski and Makrevska, 2009).

Comment:

The crisis that have occurred in human history are a good example to that that crises are not simply a coincidence in life, but they have some roots that then expand and take different forms. Failure not only of the market, but also, a failure of the government to combine in a right way the macroeconomic policies has been the healthier recipe to feed this crisis.

Source: This comment is based on the theoretical and empirical evidence discussed in the section above

5. Recommendations

Based on (Fiti 2011) Macedonia needs to coordinate the macroeconomic policies in a way to respond better to structural shocks that deeply affect the domestic economy.

There is no way to exist a “best” exchange rate regime but, choosing an optimal one might prevent effectiveness of macroeconomic policy” by following an expansive fiscal policy ($\uparrow G$ - particularly an increase in the capital spending component) in order to improve the economic activity. Since an expansive monetary policy causes more negative effects due to an eventual devaluation, we recommend an expansive fiscal policy (increasing the capital investments) to get the country out of the recession and a restrictive monetary policy in order to create macroeconomic stability.

Bibliography

1. Adkins L.C. & Hill C. (2011) 'Using STATA for Principles of Econometrics, Fourth Edition,' <http://www.principlesofeconometrics.com/>.
2. Besimi F. (2009), 'Monetary and Exchange Rate Policy in Macedonia', Accession to the European Union-Lambert Academic Publishing, Germany.
3. Besimi F. (2004), 'The Role of the Exchange Rate Stability in a Small and Open Economy: The Case of the Republic of Macedonia', Working Paper No. 10, NBRM.
4. Bexheti. A (2008), 'Sistemi Fiskal-Sistemi Tatimor dhe Sistemi I Shpenzimeve Publike', Cikel Leksionesh per programin e Masterit, Tetove.
5. Economic Crisis in Europe: Causes, Consequences and Responses, European Economy 7 | 2009.
6. Fetaj B. (2009), 'Optimal Strategy of Monetary and Fiscal Policy in Function of Maintaining Macroeconomics Stability.
7. Fiti T. & Kikerova I. (2011), 'Denari - jo Kurs Fiks', <http://alsat-m.tv/index.php/ekonomi/57863.html>
8. Fiti T. (2006), 'Ekonomija, osnovi na ekonomijata, prvo izdanie', Skopje.
9. Haderi S. (2009), 'Tregu Valutor & Institucionet Nderkombetare', Cikel leksionesh per programin e Masterit, Tetove, 2008.
10. Hani J. (2012), 'Kriza dhe in the Republic of Macedonia', Tetovo, 2009. Ndikimi i saj ne Ekonomine e Maqedonise-Implkime per Regjimin Valutor te Maqedonise ne Kendveshtrimin e Anetaresimit ne BE.
11. Hill R.C., Griffiths W.E., & Judge G.G. (2001), 'Using EViews for Undergraduate Econometrics', Second Edition, John Wiley & Sons, Inc., pg.152-161.
12. Jovanovic B. (2007), 'The Fundamental Equilibrium Exchange Rate of the Denar' Unpublished Master's thesis, Staffordshire University: UK..
13. Jovanovic B. (2009), 'Should the Macedonian Denar be Devaluated? Some Evidence from the Trade Equations', South-East Europe Review 3/2009.
14. Strahilov K. (2002), 'The Use of the Euro as a National Currency Substitute,' November.
15. Krugman P (2008), 'The Return of Depression Economics and the Crisis of 2008', Winner of the Nobel Prize in Economics.
16. Krugman P (2012), 'End This Depression Now', Winner of the Nobel Prize in Economics, New York.
17. Krstevska A., Terzijan S., Stojanova B. & Besimi F. (2003), 'Transmission Effect of the Exchange Rate for Monetary Strategy of the NBRM', National Bank of the Republic of Macedonia, Economic Research No.II/2003.

18. Limani K. (2011), 'Financial Costs of Exchange Rate in the Republic of Macedonia', Master Thesis-South Eastern European University-Postgraduate Studies-Second Cycle.
19. Mishkin Frederic S. (2001), 'The Transmission Mechanism and the Role of Asset Prices in Monetary Policy', Working Paper 8617, National Bureau of Economic Research, <http://www.nber.org/papers/w8617>.
20. Mishkin Frederic S. (1999a), 'Lessons from the Asian Crisis', Journal of International Money and Finance, 18, 4:709-723.
21. Mishkin Frederic S. (1996), 'Understanding Financial Crises: A Developing Country Perspective', Annual World Bank Conference on Development Economics, World Bank, Washington D.C.
22. NBRM (2007c), About NBRM/Functions/Monetary Policy Design.
23. NBRM (2004-2011), Annual Report, Published March -April 2005-2012.
24. Nenovski T. & Makrevska E. (2009), 'Influence of the Economic Crisis on the Exchange Rates of the Countries from Eastern and Central Europe', University American College, Fourth Annual International Conference on Europe: Europe in Crisis: Threats and Opportunities, Skopje 2009.
25. Petreski, M. and Jovanovic B. (2009), 'Keynesian Macroeconomic Model of the Republic of Macedonia: Economic Theory and Behavioral Equations', Ministry of Finance of the Republic of Macedonia Bulletin.
26. Robert W. Kolb (2011), "The Financial Crisis of our time", Oxford University Press, ISBN 978-0-19-973055-1.
27. Taylor J.B., 'The Monetary Transmission Mechanism: An Empirical Framework. Journal of Economic Perspective, Vol. 9.

Appendix 1.

Test descriptions that are used for analyzing the data's of these variables: Xgood, Xservices, Mgoods, Mservices, M2 and M4.

In order to carry out this task, first we need to determine:

1. Structural breaks - a particular event such as in: *government policy, a currency crisis, war and so forth*. For the sample period 1997q1-2009q4, I have identified four structural breaks that have been taken in consideration through these analysis

2. Dickey Fuller Tests for unit roots- is used to determine if the time series of prices (RPI & PPI), GDP and exchange rate are stationary or non-stationary.³¹

³¹ Non-stationary data, as a rule, are unpredictable and can't be modeled or forecasted. Also, the non-stationary data has a *variable variance* and a *variable mean* over time. There exists different types of non-stationary processes for example, *random walk, cycle* and *deterministic trends* (trends that are constant, positive or negative) independent of time for the whole life of the series and combinations of the three.

3. Lag (distance)³²-is important for time series analysis in order to generate values with past values

4. The rank (number) of co integration³³- by using *Johansen test* for co integration-see for details see below :

Johansen's test is based on two statistics:

1. Trace-Statistics
 2. Maximum Eigenvalues
- are related to the **rank of the matrix**.

All we need to know is that:

- If the (*rank* = 0) , no co integration exist
- If the (*rank* = 1) , there is one co-integration or one equilibrium long long-run relationship exists between the variables.
- If the (*rank* = 2) , there are two and so on.

Appendix2.

Figure: 4. Regression Fit of the Movement of Export, Import, M2 and M4 (as dependent variables) in Response of the Exchange Rate (independent variable)

In order to receive consistent, reliable results, the non-stationary data (particularly *random walk data*) needs to be transformed into stationary data, so this is done by differencing (subtracting $Y_t - Y_{t-1} = \varepsilon_t$ or $Y_t - Y_{t-1} = \alpha + \varepsilon_t$ and then the process becomes difference-stationary. The disadvantage of differencing is that the process loses one observation each time the difference is taken.

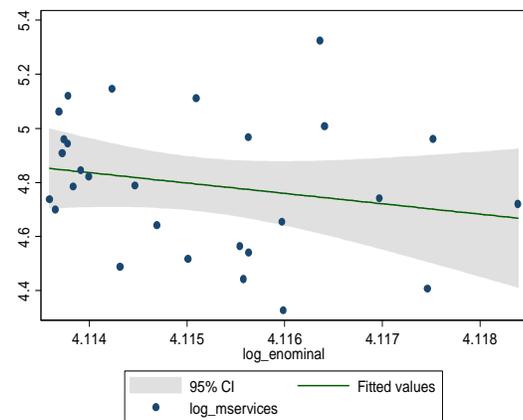
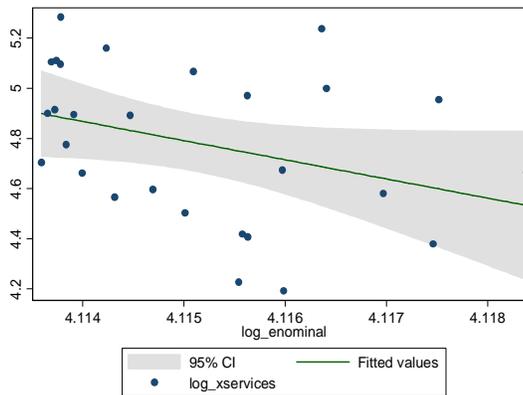
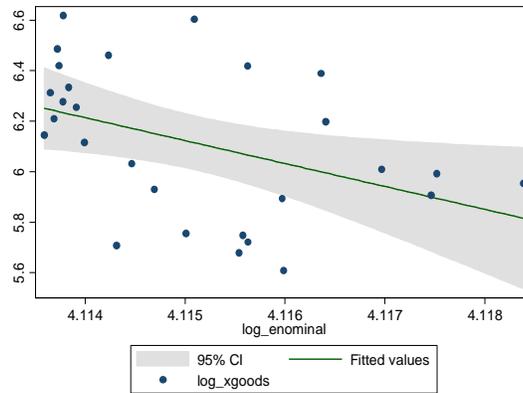
A non-stationary process with a *deterministic trend* becomes stationary after removing the trend, or de-trending. No observation is lost when de-trending is used to transform a non-stationary process to a stationary one.

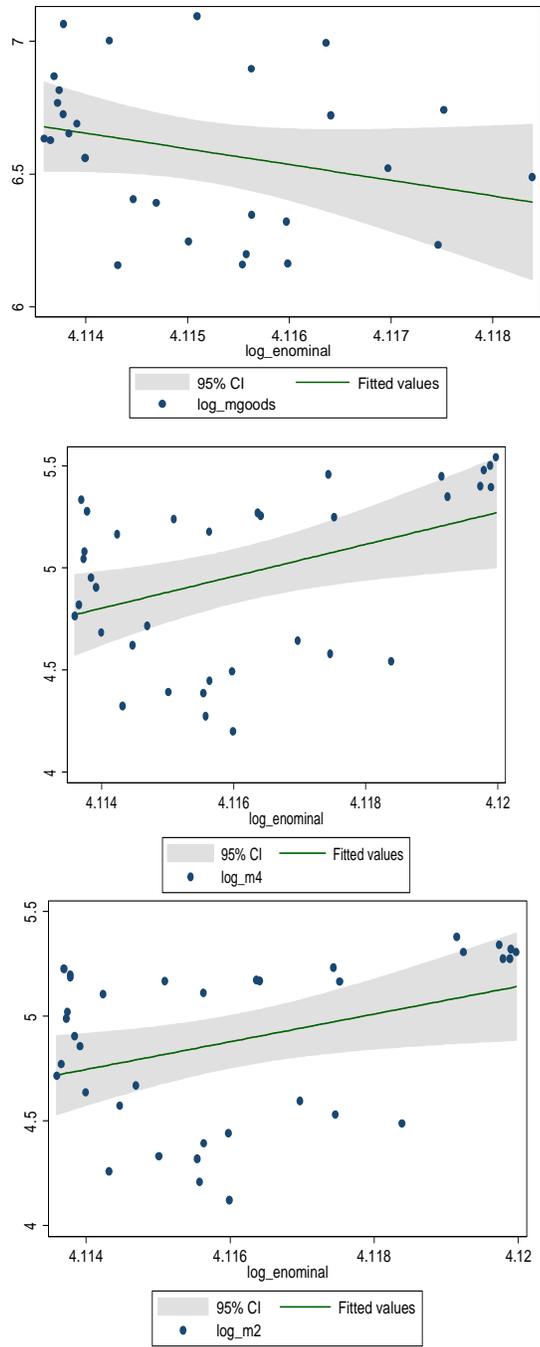
Therefore, if the variables are trend stationary, we can either de-trend the series' first and then perform regression analysis with the stationary (de-trended) variables or, alternatively, estimate a regression relationship that include trend variables.

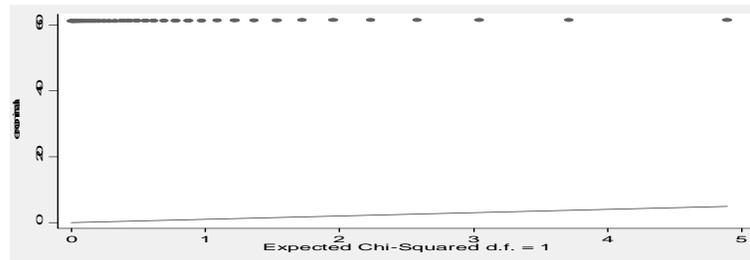
Stationary data, as a rule, are predictable and has a constant variance independent of time and a constant mean. If variables are stationary, or I (0) and co integrated, we can estimate a regression relationship between the levels of those variables without fear of encountering a spurious regression.

³² There is a rule of thumb that many Econometricians use in determining lags, which states that, if the data is yearly then use only one lag; if the data is quarterly, then use at least 4 lags, and similarly if the data is monthly, use up to 12 lags.

³³ Co integration refers to the fact that two or more series share a stochastic trend.







Source: Authors' calculations. Data from NBRM