The Effects of the Recent Economic and Financial Crisis on the Romanian Economy

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Abstract: Recent economic and financial crisis has raised a new stock of questions to the economic policy makers regarding the framework definition of central bank activity. The aim of this paper is to explain how the economic and financial crisis has been influencing the monetary policies and what was the impact of changing the monetary variables and ISD on the Romanian economy. The different econometric models for Romania showed that after the crisis generated shock, the variations of foreign direct investments had an influence of over 10% on the domestic credit variations, while changing the interest rates had little influence in domestic credit variations, a possible explanation being the heterogeneous character of private credit. There was a clear long term causality relation between monetary mass need and real GDP, which is aligned with existing economic theory. Also, during the economic and financial crisis and shortly after it, the need for monetary mass had a slightly negative impact on the GDP, which can be explained by the fact that credit was used more for local consumption and less for investments that would generate economic growth.

Keywords: economic crisis, monetary policy interest rate, Foreign direct investment, monetary policy
JEL Classification: C51, C53

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1. Introduction

The development of economic policies, especially the monetary policies, has been deeply affected by the tsunami of the economic and financial crisis that started back in 2007. In Romania, the Governor of the Central Bank has structured those effects as both direct – a significant larger toxic active in the banking sector – and indirect – reduced liquidity and lower capital levels especially from foreign sources. For Romania, the indirect effects were resented as a descending trend in the volume and number of direct foreign investments, an increasingly growing of profits distribution to foreign mother companies, a higher volatility of exchange rate and a temporary loss of investors' appetite for developing markets.

Recent economic and financial crisis has raised a new stock of questions to the economic policy makers regarding the framework definition of central bank activity, including new aspects of macro-prudence and micro-prudence, inclusion of the financial stability reasons in the monetary policy, which proves the importance of this approach for all central banks.

A number of scientific research have been conducted in order to analyse and depict the operational instruments of the monetary policy both in the pre and post crisis time windows, of which we mention here: Bindsel (2016, p.3) who classifies those papers in four distinct categories: (1) official or semi-official papers, issues by banking institutions and attempting to explain how the monetary policies have been implemented by the central banks; (2) large comparative studies like Borio (1997) or even smaller, dedicated either to emergent, Asian, few central banks of even to a specific operational issue; (3) academic studies of certain aspects of the monetary policy; (4) messages from central bank governors or presidents (i.e. Bernanke, 2009 or Trichet J. C, 2009).

This paper is looking for an answer to the questions of how the economic and financial crisis has been influencing the monetary policies and what was the impact of changing the monetary variables and ISD on the Romanian economy. *The used methodology* for reaching the paper objectives involves econometric techniques with self-regression vectors (VAR), error correction vectors (VEC) that are often used in similar papers in order to highlight the hit response of different variables.

2. Literature review

A number of studies employing econometric techniques like autoregressive vectors (VAR) or Bayesian techniques (BVAR) shown the influence of monetary policy on the economy. Therefore, some studies employing VAR techniques (Hoke and Tuzcuoglu, 2016; Frank and Hesse, 2009; Čihák, Harjes, Stavrev 2009) shown a number of crisis effects on the interest rates and on the monetary policy transmission mechanism, like the negative effect of the interest rate shock on the monetary evolutions and industrial production (Hoke and Tuzcuoglu, 2016), the importance of the communication of changes in the monetary policy interest rates on the evolution of the interest rate and the positive effect on the stress in the monetary markets (Frank and Hesse, 2009), the weak signal transmission of the monetary policy interest rates on the market interest rates (which is explicable in the conditions where some monetary policy interest rates went down close to zero) and the inefficiency of this instrument in the first phase of the crisis (Čihák, Harjes, Stavrev, 2009).

Using VAR interacted panel data for 20 advanced economies Jannsen, Potjagailo and Wolters (2015) shown that: (1) in the crisis period the impact of the monetary policy on the real economy is powerful and faster, (2) that an expansionist monetary policy in the crisis period had positive effects on the inflation and the output generated in the acute crisis period, (3) that there are different efficiency levels depending upon the specific crisis period, (4) that in the crisis period the interest rate channel can be efficient even when the interest rate is going to zero, if the trust of population and economic agents is won.

Radu (2010) made use of both empirical analysis and VAR methods in order to show the influence of the monetary market interest rate variation to the level of debit and credit interest rates for population and non-banking economic agents, concluding that the inter-banks interest rate shocks are gradually transmitted to credit interest rates and that debit interest rate variations for population are closer related to inter-banks interest rates due to a higher motivation from the banks to preserve their margins. The 2008 economic and financial crisis had an effect of increased inter-banks interest rate volatility and weaken on the short term debit and credit interest rates for population.

Fung (2002) made use of panel VAR methodology for 7 East-Asian countries, concluded that this methodology is according to the theory in the pre-crisis period (n.a. the 1987 crisis), but for the crisis period it is not giving significant results according to the monetary theory. There is a hypothesis that the used VAR variables are not characteristic for 1987 Asian crisis.

Peersman (2011) made use of a structural VAR model for the period of time between 1999 and 2009, using monthly data for euro zone, aiming to identify the spikes created by the credit market, showing that by using nonconventional monetary policies there are drifts in the monetary basis as well as in the banks account balances. The comparison against the effects generated by the interest rate changes leads to the conclusion that the size of the impact due to those policies (increase in the monetary basis or of the central bank balance for a specific monetary policy interest rate) over the real economy is rather high, being comparable with the impact generated by a decrease of the monetary policy with 20 points of comparable with a 10% increase of the monetary policy. The results need to be careful considered due to the inclusion of both crisis and pre-crisis period.

Gelman et all (2016) made use of a VAR panel for 12 EMU countries, including Greece, argued that the countries situated at the periphery faced a reduction of foreign capital inflows in the crisis period, while the rest of the EMU countries met a relative constant level of foreign capital inflows and the response of the real economy and of the GDP was also significantly different. Even more, the analysis shown that the evolution of European Overnight Index Average was an important source of uncertainty for the private credit operators in the EMU periphery.

3. Presentation of the model results

We empirically analyse the relation between monetary policy defined by different variables: real monetary need (M2_SA), domestic credit (CREDIT), foreign direct investment inflow (ISD), monetary policy interest rate (RATA_DOBANZII) and quarter GDP value (2010=100) (PIB_SA). The data series are quarterly sampled and there are two time windows 1995Q1 to 2016Q1 and 2009Q1 to 2016Q1. Where season factors are detected, data has been normalized. For domestic credit, interest rate and direct foreign investments there was no need to normalize the data. For GDP (2010=100) and real monetary need the data

was adjusted by using Tramo-Seats method. The 1995Q1 to 2016Q1 data is first analysed. Table No 1 shows the correlation matrix for used variables.

Table 1. Correlation matrix for 1995Q1 to 2016Q1 variables

	CREDIT	FDI	M2_SA	GDP_SA	INTEREST RATE
CREDIT	1	0.296875	0.58872	0.608072	-0.627784
FDI	0.296875	1	0.238247	0.424085	-0.432726
M2_SA	0.58872	0.238247	1	0.956482	-0.90977
GDP_SA	0.608072	0.424085	0.956482	1	-0.956947
INTEREST RATE	-0.627784	-0.432726	-0.90977	-0.956947	1

Source: authors calculations

As the correlation matrix shows, GDP is strongly and positively correlated with real monetary need, and as strongly with the monetary policy interest rate but in opposite direction. The inverse correlation between GDP and interest rate is also confirmed by the economic theory. When the interest rate goes down the companies are stimulated to invest which directly increases the investments component of the GDP.

There is also a strong correlation between interest rate and the monetary need, but in negative direction. The monetary need is correlated with the transaction need. If there is a high need for transactions, there will be a high demand for money. The GDP can be translated as the household's income, that is saved or consumed. If the long term interest rate grows, then grows the appetite for saving, therefore the households will consume less and save more, therefore requesting less money, therefore the monetary need will be lower. Therefore, the negative correlation is perfectly explained by the economic theory. Also, the GDP is directly but with average intensity, correlated with the domestic credit. The rapid growth in the economy is a signal for financial instability. As the domestic credit grows, the internal consumption grows, therefore the GDP grows.

The unit root tests were executed on the series with non-seasonal factors (the ADF test was used). All series exhibited unit roots and different transformations were made in order to make them stationary: domestic credit rate calculus, foreign direct investments rate calculus, first diff for GDP, interest rate and monetary need.

While all data series are stationary, a VAR model was built. According to the majority of lag selection criteria, the optimal value for lag is 1. We therefore, estimate a VAR(1) for all variables with stationary made data series.

For proposed VAR(1) model, the errors are not correlated and homoscedastic until a lag value of 12. However, the distribution of the error is not normal according to Jarques-Bera test (the test results are available on request). As one can see from the estimations, an increase of GDP variation in a previous period had a positive effect over the domestic credit growth rate, but the growth of the domestic credit rate generated a lower GDP variation, in the sense that the many credits were given the economic growth slowed down. A possible explanation of this is that the named domestic credits were used less for investment and more for consumption. The variance decomposition of the credit rate is shown in Table 2.

Table 2. The variance decomposition of the credit rate

Period	Standard error	Credit rate	FDI rate	D_M2	D_GDP	D_interest
1	106.5146	100.0000	0.000000	0.000000	0.000000	0.000000
2	107.1225	98.88034	0.104119	0.715211	0.235177	0.065151
3	107.2056	98.73536	0.180631	0.774736	0.235328	0.073946
4	107.2141	98.72014	0.184635	0.784789	0.235442	0.074997
5	107.2158	98.71709	0.185399	0.786530	0.235847	0.075134
6	107.2162	98.71634	0.185525	0.786896	0.236089	0.075151
7	107.2164	98.71612	0.185551	0.786985	0.236195	0.075153
8	107.2164	98.71605	0.185557	0.787009	0.236235	0.075153
9	107.2164	98.71602	0.185558	0.787016	0.236250	0.075153
10	107.2164	98.71601	0.185559	0.787018	0.236255	0.075153

After a shock in the economy, the domestic credit rate variation is explained exclusively on the basis of changes for this variable. During the second period after the shock, 98,88% out of credit rate variation explains on the basis of changes for this variable and 10,41% on the basis of changes for the foreign direct investments rate. During next periods a significant reduction in the variation explained by credit rate at a 98,7% percentage.

We note a strongly positive reaction both for credit and monetary mass M2 during the first periods after the shock, followed by a gradual reduction of the impact until the 7th period, and even 10th period, which indicates a delay in the

absorption of a greater shock for monetary mass M2. However, the reaction of direct foreign investments and GDP is different, that is a significant reduction immediately after the shock, therefore a highly responsive reaction to interest rate changes.

We now estimate a VEC model for GDP and request for monetary mass, variables that co-integrated on the first order. The Johansen test identified a co-integration relation between the two variables both at 1% and 5% signification level.

The model is valid, the errors are non-correlated, homoscedastic and with normal distribution for a 5% signification level, according to the tests made. The C(1) coefficient is the correction factor for errors, that is, the adjustment to equilibrium speed. We take into consideration two causality types: short term and long term causality. On the long term, if C(1) coefficient is negative that means there is a long term causality from domestic credit to GDP. In our specific case, C(1) equals -0,047, which is a negative value. Therefore, there is a long term causality relation between monetary mass need and GDP in Romania, between 1995T1 and 2016T1. In other words, the growing need for monetary mass translates into a bigger GDP.

In order to confirm a short term causality relation we test if C(4)=0 and C(5)=0. In order to do this, we apply the Wald test. The probabilities statistically linked to the Wald test are higher that 0.05 (see Table 4), therefore the coefficients are null from a statistical point of view, which implies that there is no causality relation on a short term between monetary mass need and real GDP.

The C(7) coefficient is positive which indicates the fact that there is no long term causality relation between monetary mass need and real GDP. We check also the short term causality relation by testing C(8) and C(9) coefficients, that statistically are not significantly different from 0. Therefore, there is no short term causality between the two variables.

Table 3. The Wald test results for coefficients

Null hypothesis	Test statistics	Prob.
C(3)=0	1.739026	0.187262
C(6)=0	0.932208	0.334290

Source: authors calculations

Therefore, we conclude that there is only a long term causality relation from monetary mass need to GDP in Romania between January 1996 and March 2016. On the long term, an increased need for monetary mass leads to growth in real GDP. We start again the model estimation for the after-crisis period, 2009T1 to 2016T1. The model is valid, the errors are non-correlated, homoscedastic and with normal distribution for a 5% significant level, according to the tests.

Also this time, there is a long term causality between monetary mass need and real GDP. Basis on the estimations, we conclude that an increase in the monetary mass need has a slightly negative influence in the GDP. Although there is a higher need for monetary mass, the GDP decreased. However, by increasing the GDP, the domestic credit increased also. This situation that contradicts the economic theory (the negative impact of the need for monetary mass over the domestic credit) is explained by the crisis vulnerable context, when the credits were less used for investments that generate economic growth and more used for consumption. This negative correlation has been previously identified also by Hagmayr and Haiss (2007) for 4 south-eastern EU countries, Haiss and Kichler (2009) which also identified and inverse relation between non-performant credits and GDP. Many explanations are possible:

- The potentially endogenous character of the private credit;
- The economic and financial crisis, Mehl et al. (2006) showing that the influence of the financial sector depends on the quality of the economic environment.

Therefore, the relation between monetary mass need and GDP is positive in the whole studied period and confirms the economic theory, but if the analysed timeframe is reduced to the after-crisis period we note the negative influence of the monetary mass need over the real GDP. In conclusion, the credits in the after-crisis period were not performing and did not sustained economic growth.

4. Conclusions

The global economic and financial crisis that was started back in 2007 by the subprime crisis in USA was resented with a 3-year delay in Romania, with a significant impact between 2010 and 2012, which lead to another delay in adopting response measure from NBR – comparing to other countries. More

than this, different from measures adopted by other central banks, the monetary policy interest rate in Romania recorded a slight increase, from 7.5% in 2007 to 10.3% in 2008 on an increased inflation background, and then in the next years the trend was reversed down to a minimum of 1.8% in December 2015, the minimum that maintained this level also in 2016.

Foreign direct investments recorded a decline in the crisis period, with a total amount of approx. 4 bln. RON between 2009 and 2010 comparing to 2008, which in turn had a direct influence on the variations of monetary policy interest rate. The negative impact of economic crisis over the foreign direct investments in Romania were highlighted also by Iloiu et al. (2015). In this context, there was a need to create special policies to increase the foreign direct investments, designed to improve the business environment and secure legal facilities for foreign investors, recommendations that were also considered by Kalotay (2017) for 11 EU countries.

The different econometric models that were considered showed that after the crisis generated shock, the variations of foreign direct investments had an influence of over 10% on the domestic credit variations, while changing the interest rates had little influence in domestic credit variations, a possible explanation being the heterogeneous character of private credit.

The econometric models also shown that there was a clear long term causality relation between monetary mass need and real GDP, which is aligned with existing economic theory. Also, during the economic and financial crisis and shortly after it, the need for monetary mass had a slightly negative impact on the GDP, which can be explained by the fact that credit was used more for local consumption and less for investments that would generate economic growth.

The undergone empirical research could be extended by considering a rather bigger number of macroeconomic variables. More than this, in future research, the analysis of the impact of the economic crisis on the relationship between Romania and its main foreign investors and as well the possible Brexit influence on the foreign direct investments should be considered. Due to the local social, economic and political context, high impact international changes – like the Brexit – might significantly affect local economy.

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