



TRANSMISSION MECHANISM OF MONETARY POLICY IN ROMANIA. INSIGHTS INTO THE ECONOMIC CRISIS

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Abstract

The paper² analyzes the monetary policy transmission mechanism in Romania focusing on the exchange rate channel. The analysis is made in the context of an economy described by a mix of institutional and market behaviors illustrated by a SVAR model in which the restrictions imposed on the coefficients underline the adopted behavior hypotheses.

The behavior of the four economic variables, as reflected by the SVAR analysis, is consistent with the measures adopted by the National Bank of Romania after the 2008 economic crisis. In this respect, the results underline three main aspects: 1) the importance of the interest rate channel; 2) the key role of demand, and of stimulating the demand through the right economic measures; 3) the complex impact of the exchange rate channel.

Keywords: SVAR model, monetary policy transmission mechanism, exchange rate channel

JEL Classification: E52, C13, C51

1. Introduction

The economic crisis that began in 2008 proved to be far reaching and more resilient than anticipated. The specialists that analyzed this cycle suggested that there are complex factors that account for its evolution, the difficulty of tackling and the resilience of the crisis. In this respect, the manifestation of the last phase of a Kondratieff cycle suggested by the limits of current technologies interacted synergically with some other specific factors: the excessive risks in the financial markets, the lack of sustainability in the macroeconomic policies, which led to serious disequilibrium.

The transmission channels of the crisis toward the national economies were mainly of a monetary nature (like the channels of assets prices, the credit channel, the

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exchange rate channel, etc). This nature of the transmission of shocks affected in a serious manner the confidence of the economic agents in the financial system, and it has also destabilized the credibility of the macroeconomic policies.

From this perspective, the focus of the paper is on the transmission mechanism of monetary policy in Romania, with the aim of underling some specific characteristics of the transmission mechanisms in the Romanian economy and insights into the economic crisis.

The main contributions of the paper is in describing a mix of institutional and market behaviors illustrated by a SVAR model in which the restrictions imposed on the coefficients underlines the adopted behavior hypotheses, and in seeing if the results of the analysis are consistent with the measures adopted by the National Bank of Romania after the 2008 economic crisis.

The paper is structured into five chapters. The second chapter focuses on the literature review, with an emphasis on the contributions analyzing the monetary policy transmission mechanisms, especially the ones focusing on the VAR methodology. The third chapter focuses on the peculiarities and characteristics of the financial crisis and its impact in the case of Romania. The fourth chapter focuses on the presentation of the model and on the analysis of the output of the model. The fifth chapter presents the conclusions of the paper.

2. Theoretical Aspects and Literature Review

The importance of the currency exchange rate channel has increased (J. Taylor, 1993, 1995, M. Obstfeld, 1995, K. Rogoff 1995, Bryan Hopper and Mann, 1993) simultaneously with the markets internationalization and the intensification of the globalization process. We should mention that this channel may not be separated from the interest rate one. Thus, when the actual interest rate increases all over the interest rates of other countries, the national currency bank deposits become more attractive than the deposits denominated in other currencies, thus becoming obvious the increase in the national currency deposit values and, consequently, the appreciation of this currency by comparison to foreign currencies.

2.1. Peculiarities of the Monetary Policy Economic Transmission Mechanism

The complexity of the behavior of the economic transmission mechanism is underlined by many studies with sometimes conflicting conclusions.

One key element in the monetary transmission mechanism is represented by the volatility of the exchange rate. The short-term volatility of the currency exchange rate and the deviation of its size from the long-term equilibrium level resulted from the Purchase Power Parity by monetary impacts was demonstrated by Rogoff (1996). Price steadiness models explain the movements of the currency exchange rates as an effect of the monetary impacts, translated to the actual currency exchange rate as long as prices are established for long term.

Huizing (1978) and Stockman (1987) demonstrated that, in conformity with the theoretical approach, the variations in the currency exchange rate may be caused by

permanent impacts and according to Campelle and Clarida (1987), Messe and Rogoff (1988), only a small part may be the result of the actual interest rate differential.

G. Benigno (2004) demonstrated that the persistent deviations of the currency exchange rate from the long-term equilibrium value given by the Purchase Power Parity are consistent with the monetary theory. They show that, in case the monetary policy is coordinated by inertia, the actual currency exchange rate keeps being deviated from the equilibrium level, and the adjustment through the interest differential is also slow, within a certain time interval. Moreover, he considers that the existence of the contracts in the nominal terms within the economy is another explanation of the deviations persistence and of the way to understand the relationship between the actual currency exchange rate and the monetary impacts.

As shown in the study by Benigno (2004), the currency exchange rate behavior should be explained by connecting it with the behaviors of the other key variables in the monetary transmission mechanisms, such as the interest rate and monetary mass. The study of Benigno (2004) illustrates the numerous interdependencies between the nominal economic variables. In this respect, the prices inertia is transferred to the inflation inertia and, further on, to the persistence of the actual currency exchange rate conduct, an opinion also sustained by Mussa (1986), who insisted upon the idea that this is a short-term reaction of the nominal and actual currency exchange rate. The conclusion reached by Benigno (2004) is that the impacts of transmission mechanism depend on the way the monetary policy rules are established.

The numerous interdependencies between the nominal economic variables indicate two important aspects of the transmission mechanisms. First, the behavior of the economic transmission mechanism is very sensitive to local and temporal peculiarities and, consequently to the hypotheses employed by the authors. Second, the economic transmission mechanism should be studied by looking at the behavior and specific mechanisms of the key nominal variables.

From the perspective of the first aspect, the impact of the monetary policy is an open question. While due to its structure, the monetary policy reacts only to the inflation deviations at the established target (the inflation target is an instrument of the monetary policy), the actual currency exchange rate is isolated by the productivity impacts and, thus, the monetary policy impacts would not have a persistent effect. The orthogonality of the actual currency exchange rate vs. the supply impacts disappears as soon as we take into account Taylor's rule according to which the interest rate reacts to the deviations of the inflation and of the gross domestic product at the established targets. According to Taylor's rule, the monetary policy impacts have no persistent effect. As long as the rigidity degree is the same or is close among countries, the inertia of the monetary policy is necessary to make an actual currency exchange rate keep its trajectory in case of an unpredictable nominal impact.

From the second perspective, there are several variables whose transmission mechanisms were analyzed. We already presented above the case of the currency exchange rate. Taylor (1995) analyzed the transmission mechanism from the perspective of the financial market based on three categories of prices, namely the currency exchange rate, the short-term interest rate and the long-term interest rate. He considered that both the last technological changes and the modifications of the

regulations have affected the size of the money supply, so that the function of the money demand (defined by the monetary mass M1, shortly, or M2, largely speaking) has significantly moved over during the last years.

Clarida and Gali (1994) applied the stochastic version of the rational expectations model for an open economy – a model developed by Obstfeld (1985), which consists of three equations (IS curve, prices equation, LM curve and the parity condition of the interest rate between two countries). Using the technique of the auto-regressive vectors (VAR) they identify three categories of shocks: a supply one, non-monetary demand and nominal shocks, according to the hypothesis that the latter two do not affect the output for long term and the nominal impacts do not influence the actual currency exchange rate. The conclusion of the study is that nominal impacts largely explain (over 41% of the unconditioned fluctuation of the actual currency exchange rate of the US Dollar vs. the DEM and, respectively, over 35% of the US Dollar vs. Yen) the fluctuations of the actual exchange rates of the mentioned currencies, a conclusion which complies with the demonstrations made by Eichenbaum and Evans (1992).

2.2. Using the VAR Methodology to Analyze the Economic Transmission Mechanisms of Monetary Policy

The study of Clarida and Gali (1994) indicate that the VAR methodology seems to be a well fitted methodology for the analysis of the transmission mechanisms. A number of relevant studies have followed the same path.

S. Kim (2003) reviewed the effects of the intervention over the currency market and of the conventional measures of monetary policy over the currency exchange rate in the USA by applying the technique of the auto-regressive vector within a structural model. He starts from a structural VAR model for the identification of the monetary policy actions, by including non-recursive contemporary restrictions, similarly to the works of Gordon and Leeper (1994), Sims and Zha (1995), Kim (1999) Kim and Roubini (2000), and short-term restrictions for better allowing the separation of the pulses afferent to different types of policies. In order to identify the monetary policy, the author makes use of a series of variables well-known in the literature dedicated to the monetary aspects of the business cycles, such as the interest rate, prices (consumer prices index - CPI and most sensitive materials prices index - PC), monetary aggregates (monetary basis - M) the output (by means of the industrial production index - IP) to which there are added, as specific variables, the net interventions on the currency market (FEI) and the currency exchange rate (E). All variables used are logarithmic, multiplied by 100, except for the net interventions on the currency market and on the interest rate FED (FFR).

In their study of some open economies (Canada, Denmark, Sweden and the United Kingdom), Artis and Ehrmann (2000) used a SVAR model whose specification was different from the one in the model of Clarida and Gali (1994). The purpose of the study consisted in the identification of the role played by the currency exchange rate in the creation and propagation of disturbances. In their model, they used 25 identification hypotheses, of which 15 resulted from the standard hypothesis that the variation of the structural errors is unitary and uncorrelated, expressed by the mathematical expression $\Sigma_{\varepsilon} = I$. The other 5 restrictions result from the identification of

the supply impact. The study demonstrated that in any of the analyzed countries the response of the currency exchange rate to demand and supply impacts was significant, but on the contrary it was weak, the decomposition of the variation making evident that only a small part of the currency exchange rate fluctuations may be the result of these impacts; consequently, the currency exchange rate was just absorbing these disturbances.

2.3. Application of the VAR Methodology in the Analysis of the Transmission Mechanisms in the Central and Eastern European Countries

The VAR methodology was also used in the analysis of the transmission mechanism in the Central and Eastern European countries. In this respect, the study of Coricelli, Égert and Mac Donald (2006) makes a review of the studies concerning the monetary policy transmission mechanism in the Central and Eastern European countries. The need of such studies is based on the fact that, on the one hand, many of these countries adopted or were to adopt the target of the inflation taken for monetary policy strategy intended to control prices steadiness and, on the other hand, these studies point out different aspects of the way the transmission mechanisms act in these countries that are preparing themselves for integration into the EUR area. The use of the auto-regressive vector methodology (VAR) is frequent in the studies that review the influence of the monetary policy impacts over macroeconomic variables, the most frequent being the studies concerning Hungary, Poland, the Czech Republic, or the 10 countries integrated into the EU in 2004, Romania and Bulgaria being much more rarely included in such studies.

The studies analyzing the economic transmission mechanism for Romania and, in general, for the Central and Eastern European countries indicated important peculiarities of these countries.

In this respect, Coricelli, Égert and Mac Donald (2006) mention the view-point of Canales-Kriljenko, 2003, according to which the interventions of the central bank on the currency market are more efficient in countries whose economies are developing, the main arguments being: i) the interventions of the central bank are not wholly sterilized; ii) the interventions size is relatively large by comparison to the market business turnover on the narrow currency markets; iii) the market structure and the operation regulations are much more favorable to interventions; iv) the moral hazard plays a much more important role; and v) the central banks have the informational advantage, much larger than the one of the other market players.

Referring to the impact of the currency exchange rate over investments, Coricelli, Égert and Mac Donald (2006) quote the study of Campa and Goldberg (1995) according to which this impact size depends on the share of exports and imports within the production of the sector. Thus, the devaluation (appreciation) of the national currency stimulates (restrain) investments if the exports share is higher, while, in the case of imports high share the phenomenon is reversed. The volatility of the currency exchange rate is another factor important to the foreign trade and investments, because an increased volatility negatively influences the exports and this negative effect is transmitted, somehow delayed, but with significant impact, to sectors in which the exports share is 80%.

In a study published in 2005, Égert and Morales-Zumaquero, by reviewing the effect of the currency exchange rate over the exports in different sectors of activity, showed that, for Romania, it had been difficult to establish a co-integration process for half of the cases, and that, at the moment when the process was found out and the estimated rate was significant, the volatility was negatively correlated to the exports expressed in nominal terms. This indicates the presence of the Marshall-Lerner condition (the sum of the resiliency of the imports and exports demand prices is higher than the unit).

Égert, Mac Donald (2008), by using the VAR, review the impact of the short-term interest rate on the nominal currency exchange rate in the transition economies. Their conclusion is that a positive impact on the interest rate may result both in the appreciation and the devaluation of the nominal currency exchange rate.

Égert (2007) shows that the interventions of the central bank through crowns sale on the currency market reversed the trend of the short-time appreciation of the currency and that the measures combined with interventions of the central bank over the foreign currency, the communication between the central bank and the agents and the interventions for the modification of the interest rate lead to the lowering of the trend of the currency exchange rate appreciation even after 60 days. A similar situation was also evident in Croatia, in the Czech Republic, in Romania and Slovakia according to Égert (2007). In Croatia, the Czech Republic and in Slovakia, it was also evident that it was possible to revert, by interventions, the trend of the national currency appreciation vs. other currencies.

In a study of the transmission mechanism of the monetary policy in transition countries, Ganev, Molnar, Rybiński and Woźniak (2002), referring to the currency exchange rate channel, mentioned the importance of the currency exchange rate regime both by its pertinence, and by the regime credibility for the economic agents and their conduct concerning the evolution of the nominal currency exchange rate vs. the substitution currencies. The authors reveal the importance of the structural reform of the economies, of the financial discipline and the support climate of the investment process as a way to attract foreign investment. They also insisted upon the fact that, under circumstances of a high degree of substitution of the national currency, the efficiency of the classic instruments of monetary policy (monetary market interest rate, refunding rate) show diminished efficiency. More efficient policy instruments are then those which are related to influencing the economic agents' conduct concerning the monetary structure of their assets.

The monetary policy transmission mechanism approached in Romania is less present in studies. We can mention the studies of E. Pelinescu (2001), Antohie *et al.*, (2004), Fiquet, Nevlovski (2006). Duemwald *et al.* (2002) showed that Romania and Bulgaria have lately faced a massive increase in credits, which provoked a different reaction of the central bank in Romania vs. Bulgaria, a fact leading to the matter of the relationship between the credit and the monetary policy regime adopted by the two countries and of the efficiency of these regimes concerning the impact absorption.

Boțel Cezar (2003) approached the issue of efficiency of the currency exchange rate channel in the transmission of the monetary policy pulses in Romania by using a VAR model. Starting with the need of the central bank to harmonize the external equilibrium objective with the disinflation objective, within a strongly dollarized economy, with an

incompletely liberalized currency market before the year 1997 (Romania adopted article VIII of IMF in March, 1998), the author demonstrates the existence of a strong effect of the currency exchange rate over prices. The presence of high inertia expectations and a relatively low efficiency of the monetary policy in the Romanian economy influence the evolution of the inflation and of the currency exchange rate in the absence of a support offered by other economic policies, especially by fiscal policies and policies of adjustment of the actual economy.

The study of Gueorguiev (2003) focused on the currency exchange rate in Romania and on the mechanism of transmission of its fluctuation effects over the inflation. By using the VAR he showed that in Romania, until 2003, the influence of the currency exchange rate in relation with the American dollar was higher, by comparison to other currencies, and the deflator (the industrial production index and the consumer prices index) had different influence on the national currency fluctuations. The applied model showed that in Romania about 40-60% of the inflation (the administrated prices excluded) can be explained as the result of the currency exchange rate, while in the industrial products price index this influence reaches 59-72%.

Figuet and Nenovsky (2006) remark the low number of the studies dedicated to these two countries, by comparison with other former transition economies. They use the VAR methodology in order to simulate the response of the two economies to external impacts. The first conclusion about Romania is that the model revealed the lack of reaction of the actual incomes in Romania to impacts from the European Union. According to the authors' opinion, this demonstrates that the isolation of the Romanian economy from the European economy is stronger than it is with countries such as Bulgaria, Hungary or the Czech Republic. In other words, Romania is less connected to the EU's economic cycles.

3. Elements of Financial Crises Impact in Romania

The ongoing financial crisis that started during 2008 was compared in intensity with the Great Depression in the 1930s. Although the crisis was initially located in the US economy, it rapidly extended to the global economy, affecting both developed and emerging economies. The specialists that have begun to analyze this dramatic cycle have proposed several ideas which could explain those events. As an example, it may be a limit to the current technologies, which suggests the existence of the last phase of a Kondratieff cycle and other specific factors, such as the excessive risks in the financial markets, the lack of sustainability in the macroeconomic policies, which led to serious disequilibrium.

The transmission channels of the crisis toward the national economies were mainly of a monetary nature (like the channels of asset prices, the credit channel, the exchange rate channel, etc). This nature of the transmission of shocks affected in a serious manner the confidence of economic agents in the financial system. It has also destabilized the credibility of the macroeconomic policies.

The Romanian banking system, due to a prudent policy of the National Bank, was not directly affected by the financial crisis. In effect, it did not need governmental support. However, there are a few channels through which the Romanian economy might be

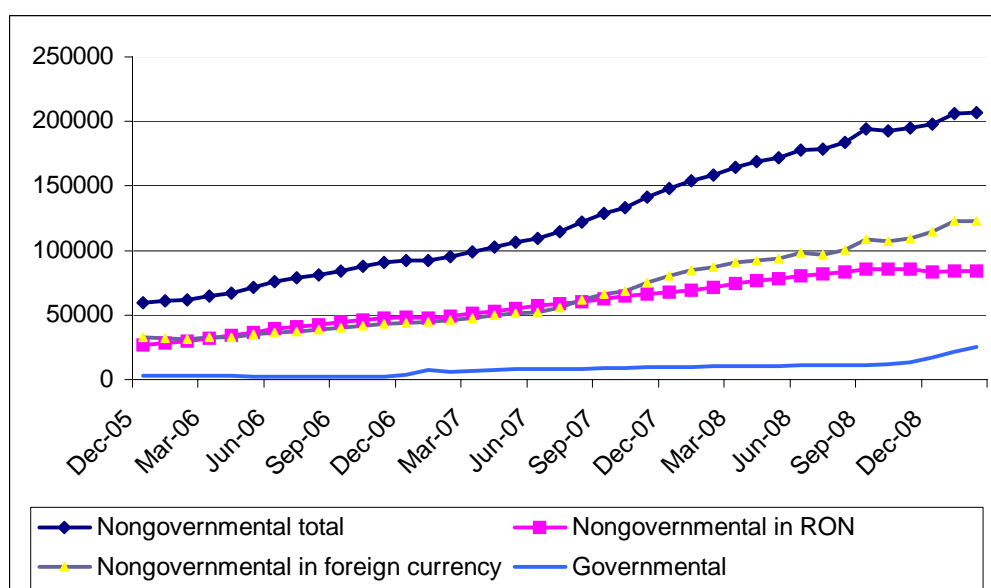
influenced: the credit channel, the real economy channel (through the drop in demand), the trade channel and the exchange rate channel. Hence, efforts should be directed towards the impact through such channels.

The monetary policy measures in Romania seem to follow the recommendations and lessons of other countries, in the following way:

1. A reduction in the interest rate.
2. The supply of liquidity in the banking system through the reduction of the minimum reserve rates for foreign currency liabilities with a term higher than two years in order to revitalize a sustainable credit process in the economy and also to harmonize the RMO with that of the ECB's.
3. The easing of the banks access to credit through the instruments that the central bank can use determine a very rapid expansion in credit, mainly in the nongovernmental sector, with a higher growth in the credits in foreign currency. As the banks became more prudent in granting credits, in the first quarter of 2009, we can see a slowing growth in credits (Figure 1).

Figure 1

Credit Dynamics in Romania

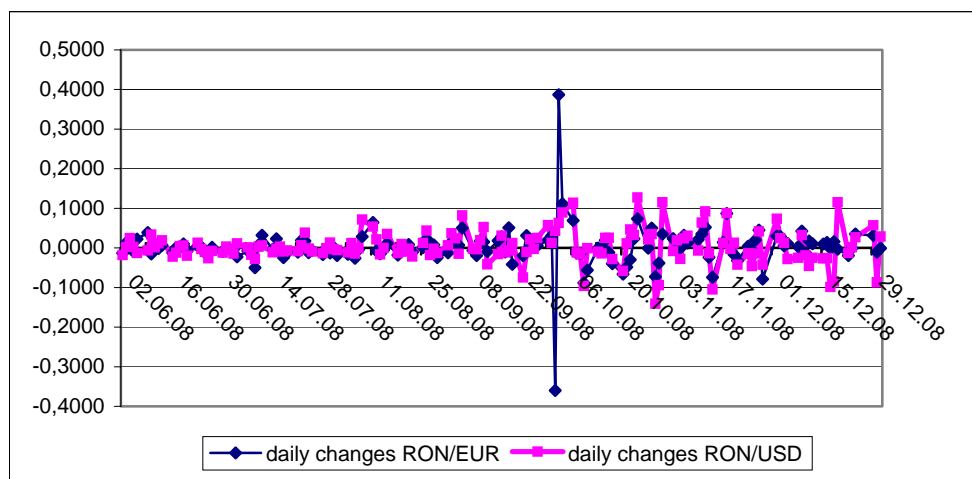


Source: Computations of data from NBR.

4. As a preventive measure to ensure the confidence in the financial system, the Romanian government asked for a foreign credit line totaling 19.9 billion euro. Under these circumstances, after the accelerated depreciation in January 2008, the RON entered a phase of temperate depreciation and lower volatility (see Figure 2).

Figure 2

Dynamics of Foreign Exchange Rates



Source: Computations of data from NBR.

With respect to this issue, (Ghosh, Chamon, Crowe, Kim, and Ostry, 2009, p.13) mentioned: "In response to the current crisis, Romania has attempted to avoid complications that could arise from high foreign ownership of domestic banks by actively seeking support for recapitalization from their parent banks in the context of an IMF-supported program".

4. Description of the Model and Empirical Analysis

To reveal the currency exchange rate channel, we used a SVAR-grounded model.

$$Y_t = [r_3re_sa, \Delta gdp_lei_sa, ixm, \Delta er_sa]$$

The variables taken into account are: Δgdp_lei_sa , which expresses the modification in real time of the gross domestic product, expressed in million lei, in 2000 reference prices; r_3re_sa , which expresses the interest rate index for a 3-month time term on the monetary market, expressed at a quarter level in Romania; Δer_sa , which is the quarterly modification of the lei/EUR exchange rate; and ixm , which is the net export increase index by comparison with the previous quarter.

All variables have been de-seasoned. They are all expressed in a logarithmic form, except for the interest rates. Data is from the Eurostat database and frequency is quarterly. The reporting period is Q1:2000, Q3:2008.

The number of lags chosen for VAR is 2, following the criterion for selecting the lag number. The models, tests for the VAR structure validation and for the validation of the hypotheses concerning the residuals, show the fact that both models are steady and the residuals are uncorrelated, are normally distributed and homoscedastic. The tests could be offered on request.

By considering these elements, the restrictions used in the two VAR models for matrices A and B are shown below. Matrices A and B are determined by means of the maximum likelihood probability method (LM) and they should be square and non-singular matrices, an imposed condition concerning the fact that the structural innovations should be multi-variate, normal. The minimum number of restrictions imposed to this VAR case is $k(3k-1)/2$. By taking into account that in our case $k=4$, it is necessary to impose at least 22 restrictions so that the matrices A and B should be identifiable. When establishing the restrictions, we applied the technique described in the literature by imposing first the condition the restrictions in the matrices A and B should be independent, and matrix B should be a diagonal-covariance matrix, which means that the elements on the main diagonal should be calculated. Thus, we established 25 restrictions, the SVAR being over-identified.

$$A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & c_{32} & 0 \\ c_{31} & 0 & 1 & 0 \\ c_{41} & c_{42} & c_{43} & 1 \end{bmatrix}, B = \begin{bmatrix} c_{11} & 0 & 0 & 0 \\ 0 & c_{22} & 0 & 0 \\ 0 & 0 & c_{33} & 0 \\ 0 & 0 & 0 & c_{44} \end{bmatrix},$$

By using the form of the Amisano and Giannini (1997) model for SVAR, we may write the model used as follows:

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & c_{32} & 0 \\ c_{31} & 0 & 1 & 0 \\ c_{41} & c_{42} & c_{43} & 1 \end{bmatrix} \begin{bmatrix} R_3re \\ \Delta GDP_re \\ IXM \\ \Delta ER \end{bmatrix} = \begin{bmatrix} c_{11} & 0 & 0 & 0 \\ 0 & c_{22} & 0 & 0 \\ 0 & 0 & c_{33} & 0 \\ 0 & 0 & 0 & c_{44} \end{bmatrix} \begin{bmatrix} R_3re \\ \Delta GDP_re \\ IXM \\ \Delta ER \end{bmatrix} + \begin{bmatrix} u_{R_3RE} \\ u_{gdp} \\ u_{IXM} \\ u_{ER} \end{bmatrix}$$

where: u_{R_3RE} , u_{GDP} , u_{IXM} , and u_{ER} are structural disturbances from impacts of the monetary policy interventions (u_{R_3RE}), over the actual economy (u_{GDP}), in the external balance (u_{IXM}) and in the currency market (u_{ER}).

The first equation is interpreted as a rule of monetary policy, the central bank using the interest rate to influence the highest-liquidity currency supply, without affecting the actual economy. This leads to the use of zero as coefficients for c_{12} , c_{13} and c_{14} . The second equation, aggregated demand, shows the money demand. It highlights the impact of the money demand as an instrument of monetary policy over the actual activity. It uses as restrictions the ones largely agreed with in the economic literature, according to which the central bank does not immediately react to the evolutions within the actual economy due to delays in getting information. This leads to the zero restriction of the coefficients of exchange rate modifications and it imposes restrictions on zero of the coefficients c_{21} and c_{24} . The third equation, taken for an equation of external environment, reveals the influence over the actual economy of the modifications in the relationship with the exterior and it imposes zero restrictions for the coefficients c_{32} and c_{34} , and the fourth equation could be an equilibrium equation on the financial market.

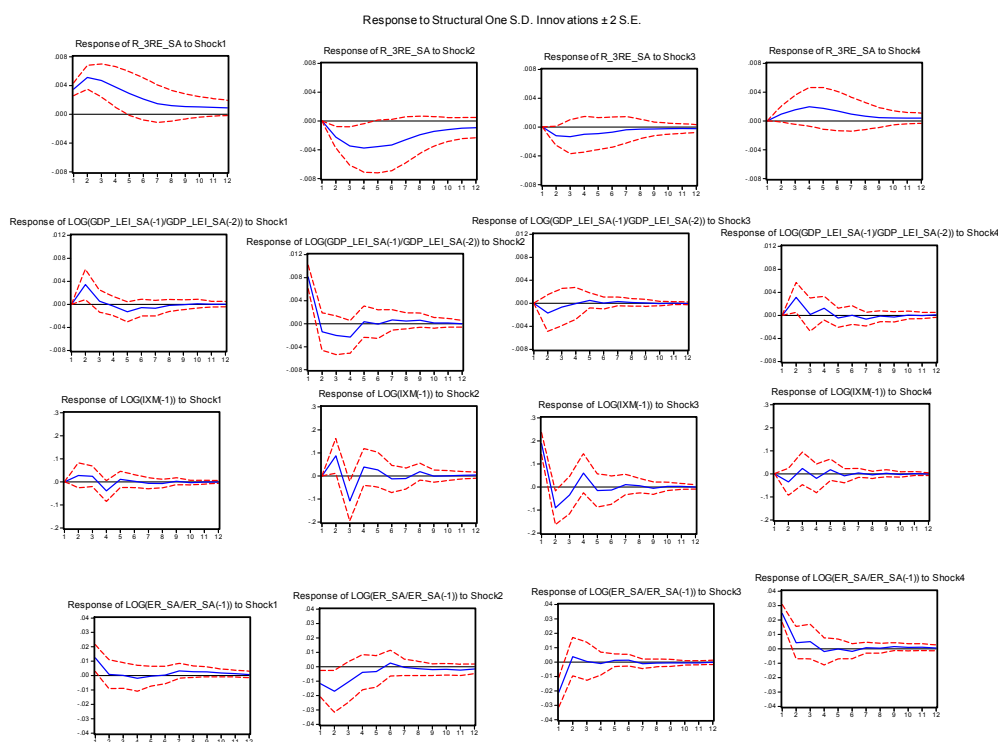
In the case of the model, by applying the LR test for the validation of the restrictions imposed on the model, the value calculated for Chi-square was 2.851421, and the probability 0.4151, which shows that the model is well restricted.

By applying the response functions to the model, we discuss the impulse response functions to an unanticipated, positive shock to the monetary policy instrument (shock 1), aggregate demand (shock 2), net export (IXM, shock 3), and the exchange rate (shock 4).

Figure 3 shows that the unexpected interest rate shock (shock 1) leads to a 0.4% drop in aggregate demand, with a delay due to the lag in the variables used. The impact on the exchange rate is rapid and strong. An unexpected shock in the net export leads to a drop by 0.4% in the interest rate. A shock in the exchange rate (shock 4) leads to a growth by 0.4% in the real interest rate at three months on the monetary market and a drop in the exports, with variations that span over five quarters.

Figure 3

The Response of Macroeconomic Variables to Structural Shocks



Source: Authors' computations.

Using the decomposition function we can reveal other interesting aspects regarding the reaction of macroeconomic variables to shocks, as presented in Table 1.

Table 1

The Variable Decomposition

Variance Decomposition of R_3RE_SA:					
Period	S.E.	Shock1	Shock2	Shock3	Shock4
1	0.003480	100.0000	0.000000	0.000000	0.000000
2	0.006759	83.71005	11.12374	3.257654	1.908559
3	0.009166	71.63506	20.56681	3.921463	3.876675
4	0.010830	63.50747	26.76523	3.683182	6.044116
5	0.011920	58.26693	30.99994	3.629724	7.103408
6	0.012656	54.46418	34.49573	3.545405	7.494681
7	0.013046	52.51024	36.50466	3.427124	7.557976
8	0.013259	51.62865	37.44518	3.362447	7.563728
9	0.013393	51.24256	37.89026	3.332271	7.534907
10	0.013494	51.05166	38.12257	3.312737	7.513035
Variance Decomposition of LOG(GDP_LEI_SA(-1)/GDP_LEI_SA(-2)):					
Period	S.E.	Shock1	Shock2	Shock3	Shock4
1	0.008090	0.000000	100.0000	0.000000	0.000000
2	0.009576	12.81637	73.52845	3.112152	10.54303
3	0.009830	12.48826	74.06355	3.423207	10.02499
4	0.010178	11.75188	74.25313	3.193790	10.80120
5	0.010288	13.10793	72.77681	3.358842	10.75642
6	0.010305	13.38313	72.54636	3.348429	10.72209
7	0.010373	13.63120	71.97717	3.392824	10.99881
8	0.010387	13.62503	71.98322	3.401511	10.99024
9	0.010408	13.57542	72.01348	3.390888	11.02022
10	0.010410	13.58503	72.00374	3.393025	11.01820
Variance Decomposition of LOG(IXM(-1)):					
Period	S.E.	Shock1	Shock2	Shock3	Shock4
1	0.187830	0.000000	0.000000	100.0000	0.000000
2	0.230471	1.457159	14.25663	81.92146	2.364748
3	0.259696	2.004066	28.90549	66.42089	2.669555
4	0.272829	3.942976	28.16492	64.92824	2.963867
5	0.275290	4.018584	28.56861	64.10298	3.309826
6	0.276127	4.004704	28.62559	63.97121	3.398498
7	0.276646	4.042355	28.69112	63.86572	3.400811
8	0.277452	4.097743	28.95833	63.52776	3.416170
9	0.277530	4.102688	28.94406	63.53256	3.420690
10	0.277585	4.114301	28.93317	63.51400	3.438530
Variance Decomposition of LOG(ER_SA/ER_SA(-1)):					
Period	S.E.	Shock1	Shock2	Shock3	Shock4
1	0.036359	11.19988	10.55538	33.04235	45.20240
2	0.040577	9.036780	26.21572	27.37666	37.37084
3	0.042225	8.344929	30.47339	25.29409	35.88759
4	0.042509	8.438977	30.91717	25.02640	35.61746

5	0.042654	8.390562	31.29777	24.93503	35.37664
6	0.042786	8.345508	31.44755	24.86993	35.33701
7	0.042933	8.853930	31.24482	24.77973	35.12152
8	0.043041	9.198812	31.17714	24.67637	34.94768
9	0.043193	9.472900	31.19221	24.52193	34.81296
10	0.043280	9.599463	31.23827	24.44371	34.71856
Factorization: Structural					

As we notice in Table 1, the variation in the actual interest rate for three months on the monetary market is explained during the first three quarters in a proportion of over 63% by its own variation, the tendency being to decrease strongly starting in the second quarter, reaching the level of over 51% after 10 quarters. The center of importance moves towards the gross domestic product which thus explains over 30% of the variation during the late 5 quarters, and the LEI/EURO exchange rate accounts for over 7% of this variation, while net exports explains only little over 3%. The variation in the gross domestic product (GDP) is explained in the largest proportion by an impact over its own value (over 72%), and, in order of impact, by an impact over the actual interest rate for three months on the monetary market (about 13%), by the currency exchange rate, about 10-11%. The variation in the actual currency exchange rate is explained in a major proportion (over 37% during the first two quarters) by its own variation, with a decrease in tendency maintained at a level exceeding 34% even after five periods, the remaining being explained, in order of impact, by the variation in the net gross domestic product (between 26-31%, except for the first period) and by the variation in the net exports of goods and services (between 33-24%), and by the variation in the actual rate of the monetary market interest for three months (between 8-11%).

5. Conclusions

The results of the VAR analysis reflect the behaviors of the four economic variables taken into consideration. These behaviors are specific to the Romanian economy at the beginning of the crisis; consequently, they should be consistent with the measures adopted by the National Bank of Romania. In this respect, the comparison underlines three main aspects: 1) the importance of the interest rate channel; 2) the key role of demand, and of stimulating the demand through the right economic measures; 3) the complex impact of the exchange rate channel.

First, we present the measures aimed at lowering the interest rate. The VAR model illustrates the negative effect of a positive shock in the interest rate on demand and on net exports. Moreover, the variation in interest rate is a key variable explaining the variation in demand. It is clear that the interest rate channel is important in the case of the Romanian economy in stimulating the demand, conclusion which is reflected by both the measures of the National Bank of Romania and the output of the model.

Second, we examine the measures aimed at increasing liquidity in order to stimulate the crediting process, especially in RON. This stimulates demand, which is consistent

with the results of the model that indicate the key role of the interest rate in explaining the variation in demand.

An interesting aspect is linked with the dynamics of crediting, especially with the increase in crediting in the national currency. This increase leads to an appreciation of the Romanian currency. The appreciation has a possible negative impact on net exports, but also has a negative impact on the demand for foreign goods and stimulates the demand for local goods. These are reflected in the model by the impact of the exchange rate on net exports, the later variables exhibiting variation around the previous levels. Nonetheless, the measured was preferred by the National Bank of Romania because it aimed at responding to the vulnerability of the Romanian agents (firms and individuals) to fluctuations in the RON/euro exchange rate.

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