THE EFFECTIVENESS OF THE INTEREST RATE CHANNEL IN NEW EU MEMBER STATES

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Abstract

The issue regarding the pass-through of monetary policy interest rate changes into other types of interest rates ("the interest rate pass-through") and, hence, the monetary policy effectiveness has been a widely analysed topic especially in EU countries. The importance of this topic is given by the fact that the speed and degree of interest pass-through of the monetary policy interest rate and money market interest rates into retail bank interest rates actually quantify the strength of monetary policy transmission. In the view of the accession to the Monetary Union, when the monetary policy decisions of the European Central Bank must be passed into commercial banks' lending and deposit taking activity in a manner similar to other Euro zone countries, the interest rate pass-through becomes a topic of outmost importance for Romania too. In order to analyze the interest rate pass through in Romania, we perform an empirical study based on Error Correction Models, an econometric technique which uses the cointegration properties of nonstationary data series. The study distinctively takes into consideration the response of interest rates charged on loans and interest rates paid for deposits by commercial banks. The results show that interest pass-through is not complete and the degree of interest rate pass through is bigger for interest rates charged on loans than for interest rates paid for deposits. Also, the spread associated to the lending activity is consistently bigger than the spread of the deposit taking activity. The mean adjustment lag at which market interest rates are fully passed through to both loans and deposits interest rates is found to be almost 3 months.

Keywords: *interest rate pass-through, policy effectiveness, degree of pass-through, speed of the pass-through, Error Correction Model*

JEL codes: *E43; E52; G21*

1. Introduction

A key issue regarding the transmission mechanism of monetary policy is the extent to which monetary policy interest rates affect market interest rates, in particular money market rates and eventually also government bond yields, and bank lending and deposit rates charged

in relation to its customers. The interest rate pass-through process from monetary policy rate to interest rates practiced by banks is essential from a monetary policy decision making point of view, because changes in lending and deposit rates affect financial conditions of households and non-financial corporations. There is a related and growing body of literature on the subject of interest rate pass-through which represents the responsiveness of individual bank interest rates to changes in monetary policy rates. The issue regarding the pass-through of monetary policy interest rate changes into other types of interest rates ("the interest rate pass-through") and, hence, the monetary policy effectiveness has been a widely analyzed topic especially in EU countries. The importance of this topic is given by the fact that the speed and degree of interest pass-through of the monetary policy interest rate and money market interest rates into retail bank interest rates actually quantify the strength of monetary policy transmission. In the view of the accession to the Monetary Union, when the monetary policy decisions of the European Central Bank must be passed into commercial banks' lending and deposit taking activity in a manner similar to other Euro zone countries, the interest rate pass-through becomes a topic of outmost importance for Romania too.

The actual context of the eastern enlargement of the European Union (EU) in 2004 and 2007 is completed by an eastern enlargement of the Euro zone. In this context, the nominal convergence specified through Maastricht criteria regarding inflation rates, market interest rates, exchange rates and government deficits and debt plays a central role. The nominal convergence criteria are completed by the need of achieving integration within the European financial systems. This topic is important from two points of view: the retail banking sector is the least integrated market of the financial sector (Baele et al., 2004); and differences in financial structure are the most important cause for national asymmetries in the monetary transmission mechanism generating a less homogenous Euro zone monetary transmission (Cecchetti, 1999). Campa and Gozalez Minguez (2006) find that in Europe, pass-through is relatively slow and heterogeneous across both financial products and countries. For example, pass-through is slower for retail banking products such as deposits, consumer loans, mortgages than for corporate products such as corporate loans. Moreover, short-term products are more responsive than long-term products.

The explanation for this slow responsiveness is related to factors like market structure and competition, and the lack of integration in retail banking. These are explanations suggested by Mojon (2000) Sander and Kleimeier (2004), de Bondt (2005) and Kleimeier and Sander (2006). Cottarelli and Kourelis (1994), Mojon (2001), de Bondt (2005) studied

financial structure heterogeneity within the current European Monetary Union (EMU) and other European countries using pass-through interest rates analysis. These studies find considerable differences in the pass-through across the countries of the Euro zone. Moreover, evidence of substantial short-run bank interest rate stickiness and limited evidence for a full pass-through in the long run is found. Also, it is argued that retail interest rates present asymmetric adjustment. Finally, current research shows that EURO as the single currency could make the pass-through faster, more homogeneous and more complete. These effects could be the results of synchronized policy shocks in the Euro area as in Bobeica and Bojesteanu (2007).

Cottarelli and Kourelis (1994) find evidence of complete pass-through for several European countries. The long-term adjustment parameter from their study is on average 0.97 and ranges between 0.75 and 1.25 in majority of the cases. In Borio and Fritz (1994) the long-term adjustment parameter is between 0.8 and 1.1. Burgstaller (2003) and Bredin (2001) find similar results in their studies for Austria and respectively for Ireland. De Bondt (2002) studied interest rate adjustments for the Euro countries and concluded that the long-term pass-through for bank lending rates is almost complete. This is not the case of the speed of adjustment which proved to be much more volatile across studied countries. Duration of adjustment was found to vary between 2 months and 3 years. Mojon (2000) finds sluggish responses of retail rates, the response of short-term rates to be faster than that of long-term rates, and a higher pass-through, in short-run, when money rates increase compared to when they decrease. He assumes complete pass-through in the long-term and focuses on the short-term reactions and measures the degree of pass-through in five European countries: Germany, France, The Netherlands, Belgium and Spain. Crespo-Cuaresma (2004) studies some EU countries with an ARDL model. For the case of Hungary it was found complete pass-through for the short-term corporate loan rate and incomplete pass-through for the household deposit rate. Recent empirical research concludes that short-term corporate loan rates adjust completely in the long run. Hence, corporate loan rates in Hungary behave in a similar manner to other European countries' loan rates, at least in terms of long term adjustment.

2. Linear econometric modeling of the pass-through phenomenon

The focus of the paper is the price setting behavior of banks in Romania compared with other EU countries, more specifically the pass-through from changes in monetary policy

rates over market interest rates changes to retail banking interest rates. Interest rate pass-through studies can provide evidence on both issues: firstly banking markets are said to be integrating when different national bank rates react similarly to market interest rate changes and secondly, if monetary transmission heterogeneities are mainly driven by financial structure differences, then pass-through convergence may be at the heart of monetary transmission convergence. In order to analyze the interest rate pass through in Romania, we perform an empirical study based on Error Correction Models, an econometric technique which uses the cointegration properties of nonstationary data series. Using this technique we are able to determine the spread between money market interest rates and retail bank interest rates and the speed and degree of adjustment to a modification of the monetary policy interest rate. The study distinctively takes into consideration the response of interest rates charged on loans and interest rates paid for deposits by commercial banks.

The results show that interest pass-through is not complete and the degree of interest rate pass through is bigger for interest rates charged on loans than for interest rates paid for deposits. Also, the spread associated to the lending activity is consistently bigger than the spread of the deposit taking activity. The mean adjustment lag at which market interest rates are fully passed through to both loans and deposits interest rates is found to be almost 3 months.

Nowadays, in most countries, monetary policy has become the principal tool of macroeconomic policy for the stabilization of output and inflation. There is a growing literature on the subject of identification of the ways in which monetary policy influences the economy. Mishkin (1995) describes three different channels for the transmission of monetary policy changes: an interest rate channel, an exchange rate channel and an asset price channel. In the banking literature has been described a further channel, known as the credit channel as Bernanke and Gertler (1995) and Hubbard (1995) named it. According to Bernanke and Gertler, this is more accurately interpreted as a set of frictions in financial markets, which amplify the conventional interest rate effect and not as a separate channel.

2.1 Method of estimation

Bank interest rates can be characterized through stickiness in the sense that they do not respond immediately or completely to changes in the corresponding reference market rates against which they are priced. Many of the explanations advanced to explain price stickiness in goods markets are also applicable to financial markets despite the fact that in the banking

sector, price stickiness has often been attributed to a lack of competition. For example, Hannan and Berger (1991) use a menu cost model to explain stickiness in bank deposit rates and Klemperer (1987) use a model of switching costs for the same purpose. Also Stiglitz and Weiss (1981) show that in an equilibrium characterized by credit rationing, the loan rate may not move when other interest rates move. The problem of stickiness of deposit and lending rates has monetary policy implications as changes in the monetary policy rate may not be fully reflected in the interest rates banks offer their customers. The observed sluggishness in the bank interest rate pass-through has been explained through a variety of reasons. It has been suggested that loan rate stickiness is a result of credit rationing of borrowers due to problems of asymmetric information. This means that because of problems such as adverse selection generated by the fact that borrowers know their true creditworthiness better than lenders, and moral hazard due to distortions in borrower behavior banks may choose not to adjust loan rates in response to an increase in policy rate and ration credit instead. Using micro data Berger and Udell (1992) offer an alternative explanation: banks may offer their long-term borrowers "implicit interest rate insurance" by smoothing bank loan rates over the business cycle. In order to compensate its customers, banks may offer below-market rates during periods of high interest rates and above-market rates in low-interest rate periods. The stickiness of bank lending rates with respect to money market rates is often regarded as an obstacle to the smooth transmission of monetary policy impulses.

The way in which the changes in the monetary policy interest rate influence the interest rates of commercial banks determines the magnitude of the income, substitution and wealth effects through which interest rates can affect the real economy. There are three main mechanisms through which interest rates can influence the real economy, describing the interest rate channel. The reaction of companies and households depends on the magnitude of the substitution effect. This effect is represented by the change in the relative costs of alternative credit and deposit possibilities. The income effect is generated by the changes in the interest rates which alter the incomes and expenditures of economic agents and, consequently, their net income. Finally, the changes in interest rates affect the value of real and financial assets and, therefore, the wealth of companies and households, describing the wealth effect. The way changes in monetary policy interest rates controlled by central bank are passed through to changes in banks' rates determines the strength of these effects. Hence, the effectiveness of monetary policy depends on the degree and speed of commercial banks' interest rates adjustment to changes in the monetary policy interest rates. In order to analyze

the interest rate pass through in Romania, we performed an empirical study based on Error Correction Models, an econometric technique which uses the cointegration properties of nonstationary data series. Based on this type of models we succeeded in estimating the spreads of active and passive interest rates with respect to money market interest rates and the degree of pass through in our banking system. We have also highlighted the characteristics of the monetary transmission mechanisms through short term and long term interest rates in case of both an increase and a decrease in the monetary policy interest rate.

In order to analyze the interest rate pass through in Romania, we used monthly data series for monetary policy rate, interbank rates as one month Bucharest Interbank Offered Rate (BUBOR 1M) and one month Bucharest Interbank Bid Rate (BUBID 1M), bank retail interest rates both for credits and deposits. The model is fitted to quarterly data for the Romanian economy for 1998Q1 – 2007Q1. National Bank of Romania's (NBR) policy rate is computed as a weighted average of the interest rates used by the NBR in different open market operations: deposits, certificates of deposit and reverse Repo operations.

2.2 Interest Rate Channel

An important aspect of our research consists in determination of interest rates spreads between monetary policy rate and interbank rates on one hand and between money market rates and retail interest rates on the other hand. Figure 2 presents the policy rate, BUBOR 1M, BUBID 1M, average lending rate and average deposit rate evolution for 2000M1 – 2007M1 period. We can observe that almost the time, excepting short periods, spreads are relative constants. Moreover, the economical intuition regarding the interest rate channel is respected:

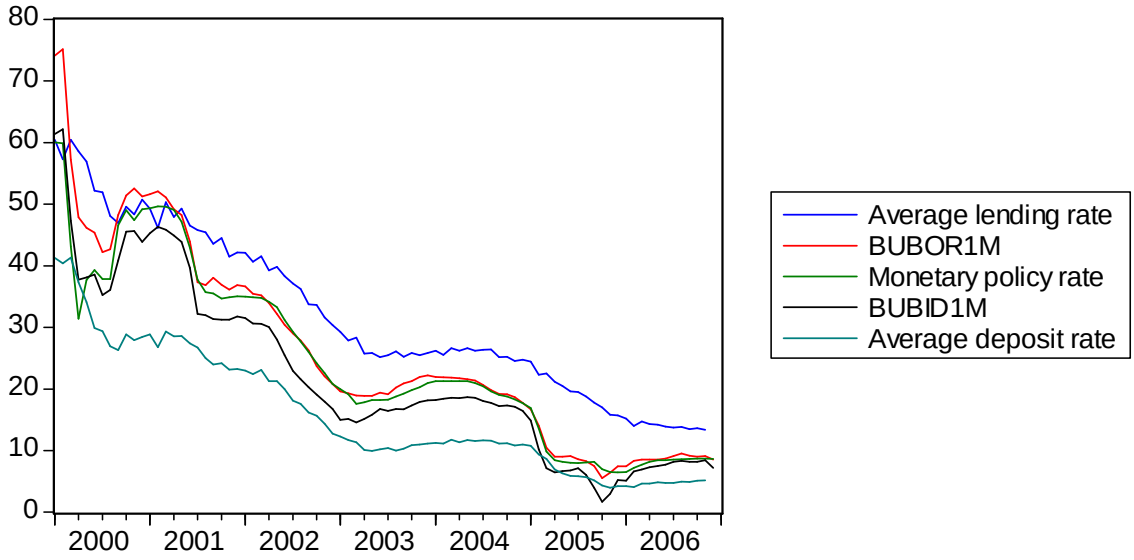
Figure 1. Interest Rate Channel

Average lending rate > BUBOR 1M > **Policy rate** > BUBID 1M > *Average deposit rate*

In order to explain the pass-through of policy rate to interbank rates and of market to retail interest rates, we start from the fact that banks are financial intermediaries: they transform deposits into loans. The objective of a bank is to maximize its profits by charging loan rates above the risk-free rate and by offering deposit rates below the (interbank) market rate. The policy rate influences market rates but this influence depends on monetary policy effectiveness or the strength of monetary policy transmission which is quantified by the speed

and degree of interest pass-through of the monetary policy interest rate into money market interest rates and into retail bank interest rates.

Figure 2. Interest rate evolution in 2000M1 – 2006M12 interval



Source: Author's calculation and NBR

3. Model and Estimations

First of all we test the order of integration of variables of interest. The Augmented Dickey Fuller test (ADF test) indicates that all the variables are integrated of order one I(1) and is necessary to test the existence of cointegration relations. For this purpose we used the Johansen cointegration test. For example we describe the cointegration technique for the following channel (for the other channels the results are similar):

Figure 3. First channel of monetary transmission mechanism

Monetary policy rate → BUBOR 1M → Average lending rate

Johansen cointegration test applied to policy rate and BUBOR 1M and to BUBOR 1M and average lending rate distinctly, indicates the existence of one cointegration relation for both pair of variables. Maximum eigenvalue test and Trace test show that we can reject at 5% significance level the null hypothesis of no cointegration relation between the variables. On the other hand we can't reject at the same significance level the null hypothesis that there is a cointegration relation between monetary policy rate and BUBOR 1M on the one hand and BUBOR and average lending rate, on the other hand. Other important results of Johansen cointegration test consist in determination of cointegration vectors which means

determination of long run relation between the variables as well as determination of adjusting coefficients in cointegration relation. If one of the adjusting coefficients is not statistically significant than the correct econometric approach is an Error Correction Model (ECM model is formed from one equation) and not a Vector Error Correction (VEC model is formed from a system of equations). Weak exogeneity tests for cointegration relation between monetary policy rate and BUBOR 1M on the one hand and BUBOR 1M and average lending rate on the other hand demonstrate the necessity of using an Error Correction Model in our analysis. We can see analyzing values from the table, that t statistic for BUBOR 1M adjustment coefficient show that this variable does not adjust the system when it is departed from the long run relation. This is why an ECM model is more appropriate than a VEC model in order to model the relation between the variables.

In order to apply the ECM model we follow the Engle-Granger two step approach. In first step it is estimated the long run relationship between the variables of interest using a linear regression model with the variables in levels. In the second step a regression using the first difference of variables and lag error term from long term relation is estimated. This error term represents a measure of deviations of the variables from their long term relation.

For the first channel presented in Figure 3, which describes the transmission mechanism from monetary policy rate to money market rates and average lending rates we estimate two different Error Correction Models. The equations of the models are:

ECM 1

$$\begin{aligned} &BUBOR1\mathrm{M}_t = m + \lambda Polrate_t + \nu_t \\ &\Delta BUBOR1\mathrm{M}_t = \beta_0 + \beta_1 \Delta Polrate_t + \beta_2 \Delta Polrate_{t-1} + \alpha \Delta BUBOR1\mathrm{M}_{t-1} - \gamma(BUBOR1\mathrm{M}_{t-1} - \\ &m - \lambda Polrate_{t-1}) + \varepsilon_t \end{aligned} \tag{1}$$

ECM 2

$$\begin{aligned} &Lendingr_t = m + \lambda BUBOR1\mathrm{M}_t + \nu_t \\ &\Delta Lendingr_t = \beta_0 + \beta_1 \Delta BUBOR1M_t + \beta_2 \Delta BUBOR1M_{t-1} + \alpha \Delta Lendingr_{t-1} - \gamma(Lendingr_{t-1} - m - \\ &\lambda BUBOR1\mathrm{M}_{t-1}) + \varepsilon_t \end{aligned} \tag{2}$$

The second channel presented in Figure 4 describes the transmission mechanism from monetary policy rate to money market rates and average deposit rates. We also estimate two different Error Correction Models for this channel described in equations (3) and (4).

Figure 4. Second channel of monetary transmission mechanism

Monetary policy rate → BUBOR 1M → Average lending rate

ECM3

$$BUBID1\mathrm{M}_t = m + \lambda Polrate_t + \nu_t$$
$$\Delta BUBID1\mathrm{M}_t = \beta_0 + \beta_1 \Delta Polrate_t + \beta_2 \Delta Polrate_{t-1} + \alpha \Delta BUBID1M_{t-1} - \gamma(BUBID1\mathrm{M}_{t-1} - m - \lambda Polrate_{t-1}) + \varepsilon_t \quad (3)$$

ECM4

$$Depositr_t = m + \lambda BUBID1\mathrm{M}_t + \nu_t$$
$$\Delta Depositr_t = \beta_0 + \beta_1 \Delta BUBID1\mathrm{M}_t + \beta_2 \Delta BUBID1\mathrm{M}_{t-1} + \alpha \Delta Rpneg_{t-1} - \gamma(Depositr_{t-1} - m - \lambda BUBID1\mathrm{M}_{t-1}) + \varepsilon_t \quad (4)$$

In these equations $Polrate$ represents the monetary policy rate, $Lendingr$ represents average lending rate used by commercial banks in relation with its customers, $Depositr$ represents average deposit rate practiced by commercial banks in relation with its customers and $BUBOR1M$ respectively $BUBID1M$ represents one month interbank offered and bid rates. The estimated coefficients from these equations have certain economical interpretations: m is interest rate spread in each equation of the models, λ is the degree of pass-through, namely the extent at which changes in the policy rate are passed through to money market rates and further to banking rates in the long run, β_1 represents contemporary adjustments of explained variables to a one percent change in explicative variables, β_2 represents lag adjustments of explained variables to an one percent change, one month ago in explicative variables, and α is the speed of the pass-through, namely how long the adjustment takes. The speed of adjustment parameter (α) has sensible economic interpretation if it is positive. The time required for the adjustment to the long-run equilibrium can be expressed, for example, by the duration of 80% adjustment, expressed in months.

The main results are consistent with economical theory and with similar studies conducted for different economies with a comparable situation with our economy. The estimations offer important details regarding the degree of pass-through and the speed of the pass-through contributing to the understanding of the way in which the interest rates are adjusting in the short run and in the long run. In Table 1 are presented the main results from the estimation of

models in equations (1) to (4). As Table 1 shows, we can measure and interpret long-run and short-run adjustment separately.

Table 1. Estimation results for ECM interest rate channel models

	M 1 Polrate → BUBOR1M	**M 2 BUBOR1M → Lendingr**	**M 3 Polrate → BUBID1M**	**M4 BUBID1M → Depositr**
	Long term relationship			
m (spread)	**0.58**	**8.35**	**-1.99**	**0.98**
λ (the degree)	**0.99**	**0.92**	**0.98**	**0.65**
Complet pass-through? ($\delta = 1$?)	**DA**	**NU**	**DA**	**NU**
adjusted R^2	**0.99**	**0.91**	**0.97**	**0.95**
	Short term dynamics (ECM)			
Contemporary adjustment (β_1)	**1.03**	**0.21**	**0.76**	**0.16**
Lagged adjustment (β_2)	**-0.32**	**--**	**--**	**--**
Speed of the pass-through (γ)	**0.44**	**0.25**	**0.19**	**0.34**
Speed of the pass-through (in months)	**1**	**3**	**1**	**3**
adjusted R^2	**0.79**	**0.57**	**0.83**	**0.60**
Number of observations	**60**	**60**	**83**	**77**

Obs. All results are significant at a confidence level of 1% or 5%.

4. Conclusion

The long term analysis shows that the interest rate pass-through is complete in the case of the interest rate transmission mechanism from the policy rate to interbank interest rates (one month BUBOR and BUBID), the change in the policy rate being integrally transmitted to the money market rates. As we expected, the interest rate spread between the policy rate and BUBID1M (estimated at approximately 0.58%) is greater than the spread between the policy rate and BUBOR1M (estimated at approximately -1.99%) with almost 1.5 percents. The long term relationship between the money market rates and the average lending or deposit rates offers evidence of an incomplete pass-through (approximately 92% and 65% for the first and the second channel respectively) and a relatively great spread of 8.35% for the first channel. The short term relationship shows an adjustment speed for money market rates to the policy rate of approximately one month with an important contemporary adjustment coefficient. For the second part of the channels, the speed of adjustment of commercial banks interest rates to money market rates is about 3 months. The degree of disintermediation and the role of other

sources of financing different from banks have an impact on the elasticity of both loan demand and deposit supply with respect to the money market rate. On the asset side, loan demand is expected to react more strongly to interest rate changes in the case of an economy with developed capital and money markets, as companies may substitute bank loans with other forms of financing. This is not the case of the Romanian economy and this is why the adjustment response is slowly both on the asset side and on the liability side.

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