THE CONVERGENCE OF ROMANIA WITH THE EUROZONE IN TERMS OF FINANCIAL INSTITUTIONS

Adrian Petre
Bucharest University of Economic Studies, 6 Romana Square, 1st district, Bucharest, 010374 Romania
adrian.petre21@gmail.com

Abstract: *This study examines the integration of Romanian monetary system into European one and the transmission of liquidity shocks from eurozone to Romanian monetary market. Since Romania become a member of European Union, most of the Romanian banks are mainly provided by financial institutions placed in Europe. With the accession of Romania to the European Union, has started a process of integration of the national banking system into the eurozone banking system and thus, domestic financial institutions has began to be increasingly more subject to liquidity conditions and external contagion liquidity risk in the eurozone. In some periods, between EU accession and until the beginning of 2014, Romania has managed to reduce the volatility of the daily rates of monetary policy, compared with the eurozone, where, in the same periods, were recorded high volatility of monetary policy interest rates. Partial decoupling of the two money markets can be explained by economic stabilization policies adopted by Romania by improving the liquidity of the financial institutions and national measures taken by monetary policy makers in Romania. The main conclusion of this study is that the domestic banking sector is only partially integrated in the European banking sector in terms of money market liquidity and liquidity risk, and creating a stable framework for liquidity in Romania requires a mix of fiscal and monetary policies conducive to the development of financial instruments in long-term. However, the analysis shows that the sensitivity of liquidity in the Romanian banks to adverse developments on the European money market has increased and the ability of the internal factors to predict the liquidity conditions in national banking institutions is still high. Considering these aspects, we can say that, when we analyze liquidity risk in the Romanian banking system, we must take into consideration the influence of the external factors.*

Keywords: Monetary integration, liquidity risk, financial markets, eurozone, EURIBOR, ROBOR, financial crisis

JEL classification: F62, O11

Introduction

An important condition for Romanian banking system to finance the real economy is represented by a strong position of banking liquidity. To outline some conclusions regarding liquidity risk in Romanian banking sector is essential to analyse the interbank markets. Along with Romania's accession to the European Union in 2007, the integration of Romanian banking sector in the European banking sector has accelerated. Due to this increasingly powerful integration, Romania exhibited to negative outlook brought by the international financial crisis in emerging European markets through the external contagion risk, thus bank liquidity decreased a lot. By evaluating external contagion it is provided a separation of the influences that internal factors have on the national interbank market liquidity to shape up the measures necessary to implement locally in order to stabilise the banking sector in terms of liquidity. Because the financial markets ability to incorporate

new information in a relatively short time, they were the first component of the national financial system to react to external shocks.
The financial turmoil triggered in late 2008, along with the bankruptcy of Lehman Brothers, were rapidly transmitted to domestic financial markets, but their effect in the banking sector in Romania was felt in early 2009. For a more accurate understanding of the context in which the liquidity risk in the national interbank markets is analysed I have to mention that along with Romania's accession to the European Union a process of privatization of the Romanian banking institutions began, and at this point the majority of banks in our country are held by European financial institutions. The purpose of this research is to identify whether liquidity shocks in the European financial system are transmitted to the Romanian banking system through money market.

Litereature review

Ashcraft A. McAndrews and J. Skeie (2009) studied the liquidity for banking groups in the developed countries, in terms of interbank markets. Beirne J., Caporale G.M., Schulze-Ghattas M., Spagnolo N., Diebold F. Yilmaz, K (2009), Ehrmann M., Fratzscher M., Rigobon R. (2010) and Kadow A., Cerrato M., MacDonald R., Streaetmans S. (2013) studied the contagion from developed capital markets to emerging capital markets.

Methodology

To assess the degree of integration of the Romanian banking system into the European banking system and to analyse the money market liquidity, I model the volatility of interest rates EURIBOR3M and ROBOR3M with GARCH and EGARCH models. I use these interest rates because are representative for the two money markets and their direction of evolution provides important clues about the behavior of investors in the two financial markets.
In order to determine the liquidity conditions in the domestic banking sector relative to the degree of liquidity developments in the euro area banking sector, is required to model the interest rate volatility in the two areas. The GARCH model implies that changes in volatility time series in financial markets can be expected due to the nonlinear dependence of the historical and present volatility.

$$\varepsilon_t^2 = \alpha_0 + \sum_{i=1}^{q} \alpha_i \varepsilon_{t=1}^2 + \sum_{i=1}^{p} \beta_i 6_{t=1}^2$$

EGARCH model identify periods of volatility and captures asymmetrical variations. Using EGARCH model, we can get clear information about the evolution of the Romanian and euro area banking sector liquidity during the financial crisis.

$$\varepsilon_t = \sigma_t Z_t$$

$$\log(6_t^2) = \omega + \sum_{j=1}^{p} \beta_j \log(6_{t=j}^2) + \sum_{i=1}^{q} \alpha_i g(Z_{t=i})$$

$$g(Z_t) = \theta z_t + \lambda(|z_t| - E(|Z_t|))$$

Data

In order to apply this methodology, I selected the following indicators: the interest rate on euro area money market with 3 months maturity, EURIBOR3M and the interest rate on Romanian money market with 3 months maturity, ROBOR3M.
The time series have daily frequency, between January 2007 and April 2014. The sources from which the data were collected are the website of the central banks from Romania and Finland.

Empirical results

The eurozone interest rate with a maturity of over 3 months, EURIBOR3M, evolved on an upward trend before the global financial crisis begun (2008), due to inflationary pressures and robust economic growth, but immediately after the bankruptcy of Lehman Brothers in 2008 entered into a stressed downtrend because of the successive reduction of interest rate monetary policy made by the the European Central Bank.

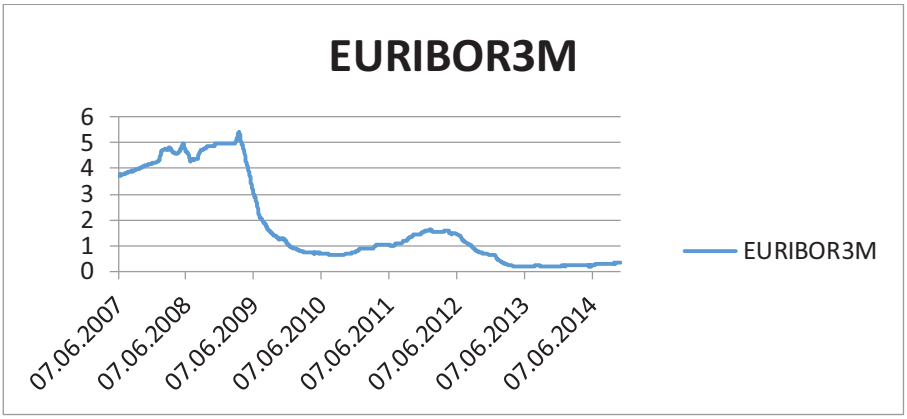

Chart 1. The dynamic of EURIBOR3M

Source of data: http://www.suomenpankki.fi/

Althrough the monetary policy used by the European Central Bank reduced interest rates and the volatility in the euro money market, there were new periods of high volatility due to sovereign debt crisis in some European countries and international financial shocks. As of 2010, EURIBOR3M interest rate returned to an upward trend due to economic recovery in the eurozone and due to the international financial markets stabilisation.

Due to foreign contagion from developed markets, the interest rates on the national money market recorded a strong upward trend at the beginning of the global financial crisis (Chart 2). The monetary policy interest rate, ROBOR3M stabilised and entered on a slightly downward trend as of 2011, remaining at a higher interest rate compared to EURIBOR3M.

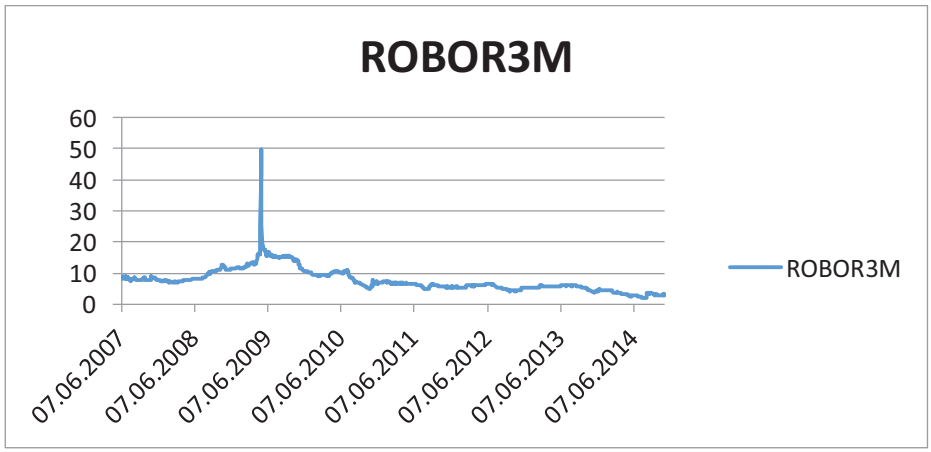

Chart 2. The dynamic of ROBOR3M

Source of data: www.bnr.ro

Charts 3 and 4 shows that the two interest rates registered large variations during the analysed period and the reason of why these movements have been recorded in a short time is the global financial crisis that emerged in late 2008.

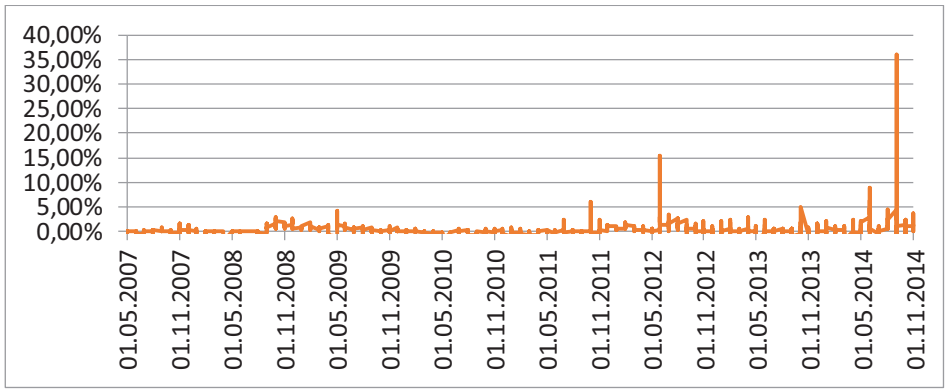

Chart 3. Daily variation for EURIBOR3M
Source of data: http://www.suomenpankki.fi/

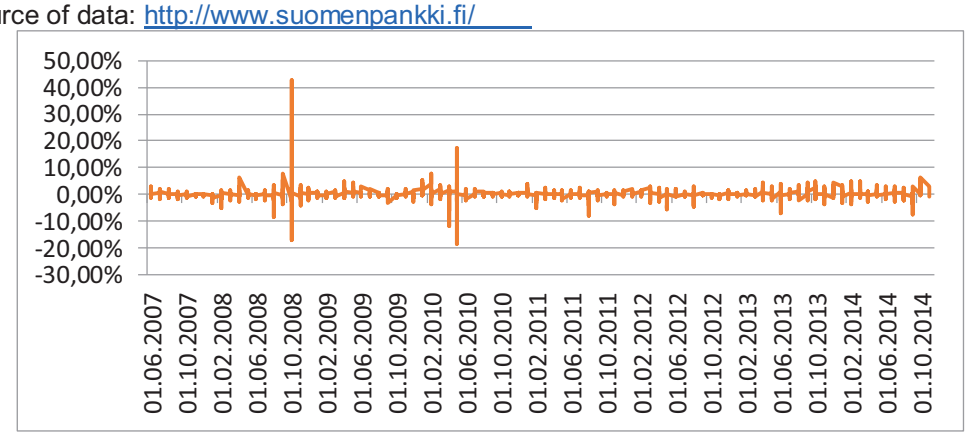

Chart 4. Daily variation for ROBOR3M
Source of data: www.bnr.ro

In order to determine the values of parameters *p* and *q* of the GARCH model, we will assign certain successive values, starting with p = q = 1, until I obtain a model in which the coefficients will be positive and their sum nil. GARCH coefficients (1, 1), estimated for the two time series are shown in Table 1.

Table 1. GARCH model estimated for ROBOR3M and EURIBOR3M

	Robor3M	Euribor3M
α_0	0.0600	0.0600
α	0.16603324	0.09956060
β	0.70504602	0.83362535
$\alpha+\beta$	0.87107926	0.93318594

The models that we have estimated are valid because the coefficient conditions are met and the value for *p* and *q* considered in this analysis is 1. The next step is to estimate the EGARCH model (1.1) for EURIBOR3M and 3M ROBOR interest rates. The estimation results can be found in Table 2.

Table 2. EGARCH model estimated for ROBOR3M and EURIBOR3M

	Robor3M	Euribor3M
α	0.108359	0.163041
β	0.883325	0.836959
ω	0.000004	0.000001
θ	0.277038	0.000000

The value of the coefficient for the EURIBOR3M interest rate indicates that negative and positive shocks leads in the same manner the interest rate volatility in the euro money market. Regarding the domestic money market rate, 3M ROBOR, we obtained a value greater than 0 for θ, which indicates that positive shocks creates a higher volatility. This result obtained for the domestic money market is explained by the fact that the National Bank of Romania in 2008 imposed an upper limit on the interest rates in the money market.

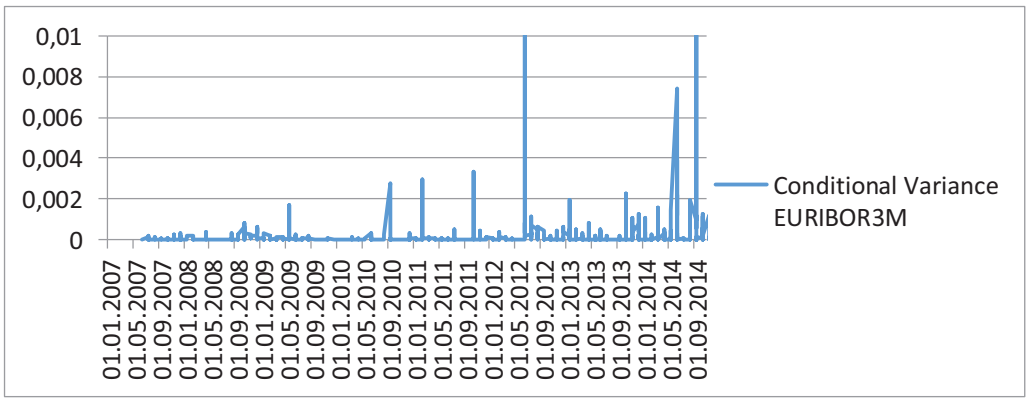

Chart 5. Conditional variance EURIBOR3M estimated with GARCH model
Source of data: http://www.suomenpankki.fi/

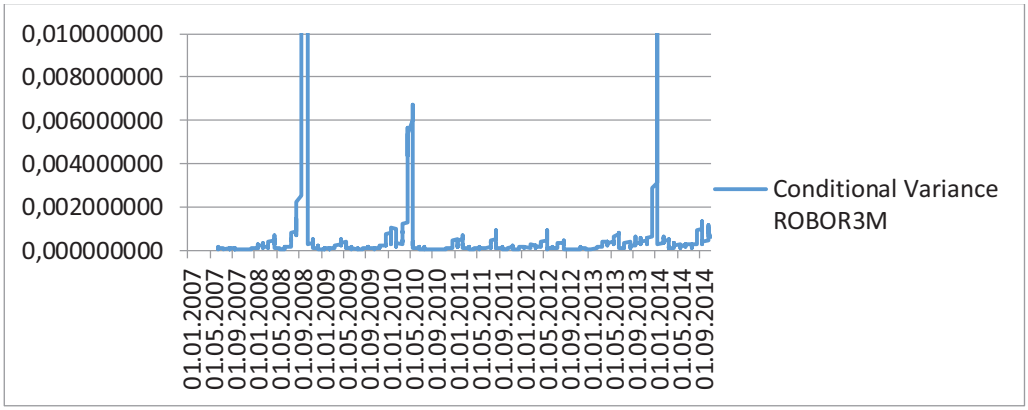

Chart 6. Conditional variance ROBOR3M estimated with GARCH
Source of data: www.bnr.ro

The evolution of GARCH (1, 1) conditional variance for ROBOR3M rates and EURIBOR3M rates explain changes in the liquidity conditions in the Romanian banking sectors and in

the eurozone (see Charts 5 and 6). Volatility tends to be lower in the euro money market, compared to that in Romania, a phenomenon that suggests broader changes for liquidity conditions in the domestic banking sector.
The results of EGARCH (1, 1) model estimation, i.e. EGARCH conditional variance for ROBOR3M and EURIBOR3M interest rates are presented in Charts 7 and 8.

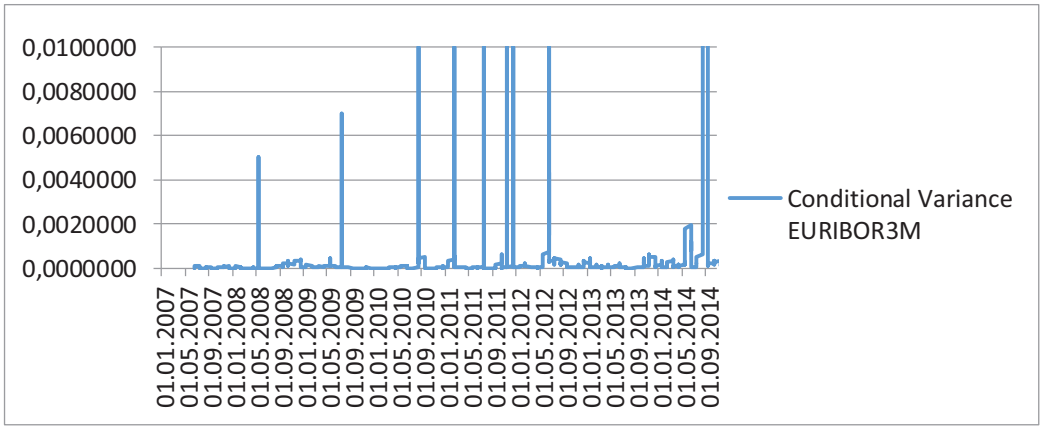

Chart 7. Conditional variance EURIBOR3M estimated with EGARCH model
Source: http://www.suomenpankki.fi/

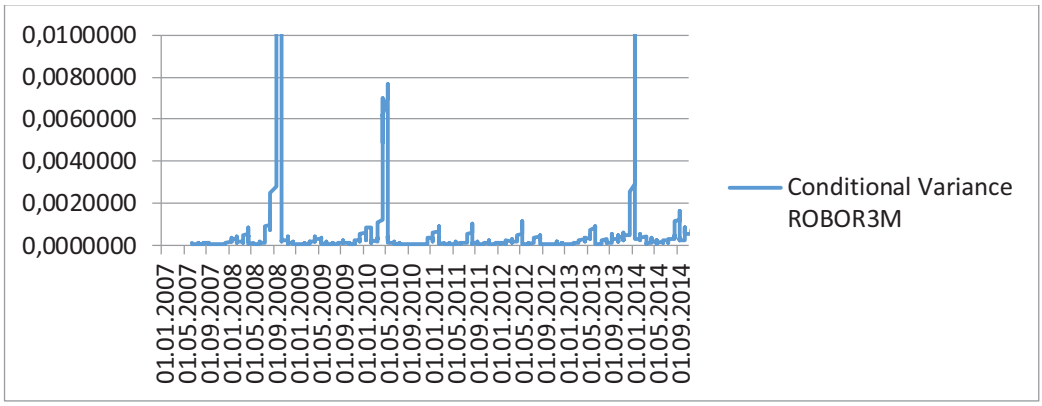

Chart 8. Conditional variance ROBOR3M estimated with EGARCH model
Source of data: www.bnr.ro

In the euro area there were large variations of EGARCH conditional volatility from the last quarter of 2010 until mid-2012. This phenomenon was due to heightened sovereign debt crisis in some euro area Member States such as Italy, Greece, Portugal and Spain. In our country, there was a high volatility of money market interest rates in mid-2010, but the shocks were lower than in the euro area. The sovereign debt crisis that manifested in the euro area affected money markets in the area and in Romania, but the volatility was more pronounced in the euro area.
Financial shocks in the euro area only affected Romania partially as the domestic economic activity stabilised after the declining in 2009, and banking sector liquidity was adequate. High risk in the European banking system are highlighted by periods of pronounced instability in the money market in 2010, 2011 and 2012. During the same period, the domestic money market has detached largely by developments that took place in the European money market. The analysis of the integration of the banking system in Romania in the banking system of the euro area in terms of risk liquidity that characterise

the international financial and banking institutions, highlights the fact that convergence began with the accession of Romania to the European Union and led to an increase in the degree of integration. However, the sensitivity analysis shows that liquidity in banking institutions in Romania to adverse developments in the European money market has increased and the ability to predict the internal factors of the liquidity conditions in the national banking insitituţiile is still high.
Considering these aspects, we can say that it is necessary to analyse the liquidity risk in the banking system in Romania in order to include external factors. The models for measuring the liquidity risk of financial and banking institutions in Romania and the strategies to reduce this risk must reflect how the expectations of the liquidity conditions in the Romanian banking sector reacts to external factors.

Conclusion

In some cases the liquidity impact of external shocks are transmitted to the banking financial institutions in Romania is perceived with a delay because the domestic banking system is only partially integrated into the European banking system. This partial integration is demonstrated by the lack of a strong correlation of the daily developments among the money market from the euro area and from Romania.
If liquidity shocks have a structural impact and a high magnitude, the sensitivity of the national banking financial institutions to external developments becomes high.
The implementation of certain policies to reduce the impact of external developments in the domestic banking sector has limited the effectiveness because there is a strong presence of foreign capital, but these policies can bring benefits if they pursue structural objectives and are not neutralised by strong external liquidity shocks. Encouraging the use of local sources of funding for national banking financial institutions can be done through the development of policies to stabilise the expectations of liquidity conditions in the banking system.
Thus the diversification of funding national banking and financial institutions, and reducing the risk of bank liquidity, involves creating a mix of fiscal and monetary policies that shodul led to the development of long-term financial instruments, with which to create a liquidity stable climate.

References

Ashcraft, A., McAndrews, J., Skeie, D. (2009), "*Precautionary reserves & interbank market*", Staff Report No. 370, Federal Reserve Bank of New York
Beirne, J., Caporale, G.M., Schulze-Ghattas, M., Spagnolo, N., (2009), "*Volatility spillovers and contagion from mature and emerging stock markets*", Working Paper no. 1113, European Central Bank
Bollerslev, T. (1986), " *Generalized Autoregressive Conditional Heteroskedasticity*", Journal of Econometrics, vol. 31, 307-327
Diebold, F., Yilmaz, K., (2009), "*Measuring Financial Asset Return and volatility spillovers with application to global equity markets*", Economic Journal, vol. 119
Ehrmann, M., Fratzscher, M., Rigobon, R., (2010), "*Stocks, bonds, money market exchangerates. Measuring international financial transmissions*", Journal of Econometric
Kadow, A., Cerrato, M., MacDonald, R., Streaetmans, S. (2013), "*Does dominate Central and EasternEuropean money merkets?*", Journal of International Money and Finance, vol. 32