

THE SOUNDNESS OF THE BANKING SYSTEM DURING THE GLOBAL FINANCIAL CRISIS

Empirical
study

Bank stability

Subprime crisis

Systemic risk

Bank performance

Efficiency

JEL Classification

G21, G01, C53

Abstract

The economic world is currently under the sign of profound changes, determined, in a significant extent, by the mutations in financial markets, the regulatory and institutional changes, illustrating its powerful impact on the financial system actors. The paper's main purpose is to provide a comparative analysis of the performance and efficiency of commercial banks in seven European Union countries and an empirical analysis regarding the soundness of the Romanian banking system. The analysis undertaken in the paper highlights the need for banks to apply essential adjustments in their activity, such as the orientation to a new banking model, or the gearing to the latest regulations and tighter conditions of supervision on the financial sector. There were pointed out a series of issues which captured the overwhelming implications of the global financial crisis on the “health” of the financial system in EU, noticing the need for further measures that have as a main goal the avoidance of a financial system collapse.

1. Introduction

The recent economic crisis and the recessionary slide revealed major institutional gaps that have accompanied the contemporary economic trend.

The current crisis manifested primarily on financial markets, so the spread was relatively fast on national economies through the transmission channels, amplifying risk manifestation. In the present conditions, it was established a *status-quo* of budget deficits and public debt, so under the devastating effects of the economic crisis, there is, undoubtedly, a revival of the financial stability issue. For ensuring a healthy, solid and stable banking sector the evaluation and analysis of bank soundness is crucial, so that the possible weak points and weaknesses can be corrected and disposed.

The paper aims to address the crisis repercussions, providing an overview on the stability of the banking system in terms of non-euro EU countries, but also a more detailed casuistic on Romanian banking system. In this regard there were also outlined some of the crucial lessons that rotate around policies and measures pursued by central banks.

The rest of the paper is structured as follows. Section 2 positions the paper within the existing literature. Section 3 highlights the consequences arising from the subprime crisis regarding the banking system robustness and performance in the countries analyzed and main measures embraced by the authorities to support financial system stability. Section 4 presents the empirical results, regarding the soundness of the Romanian banking system. The paper ends with a summary conclusion.

2. Literature review

During the global financial crisis, the literature has shown a keen interest in *financial stability* issues, suggesting that this provision has always been a *natural concern of the monetary authorities*, the

primary motivation being to counter financial shocks (Stein, 2011).

In this respect, it is considered that the current crisis has affected the banking system of so high intensity that it cannot be compared with previous turbulences, suggesting the indispensable role of central bank in the financial system, so it can be assumed that the crisis "has shaken the comfortable world of central banks" (Borio, 2011).

Consequently, in order to avoid a collapse of the financial system, and aiming an enhancement in transparency and liquidity, it was adopted in 2011 a new Basel Agreement, which is regarded as the main response of monetary authorities to the deficiencies caused by the international financial crisis. Compared to previous regulatory acts, this agreement has two additional security systems, *capital conservation buffer* and *countercyclical buffer*, which are activated in case of excessive lending; thus banks are protected from an increasing level of non-performing loans or a suddenly change of the business cycle (BIS, 2011).

The financial and institutional changes, such as the liberalization of capital flows, enhancing the level of competition, the increasing volume of speculative transactions etc., led to an increase in financial instability, thus facilitating risk diversification, mainly credit risk.

In this background, the impact of risk on performance and soundness of the banking system was indeed a theme intensely addressed, especially during the international financial crisis. In most of the paper reviewed the purpose was to empirically assess risk implications, desiring to identify some appropriate tools to monitor them and to highlight more clearly the related correlations (see Hughes and Mester, 1997; Berger, 1997; Altunbas et al., 2000; Pasiouras and Fethi, 2010; Epure and Lafuente, 2012; Berger and Bouwman, 2012).

Regarding the concept of performance, it was noticed that this issue has been

approached over the years in numerous studies and analyzes, in most of them being explained in terms of effectiveness or adaptability (i.e. Wagner, 2009).

However, in the banking environment this aspect is seen related to the concept of creating additional value, for that reason the purpose being to generate cost-benefit optimality. The analysis of this indicator is vital to identify the *pulse of banking activity*, so the approach should be made at micro and macro level.

From the literature review it can be extracted the statement that there is a strong link between the regulatory framework and the financial system, or more specifically between financial supervision and bank performance (Chortareaset al., 2010). Despite this, Herring (2003) stress out the fact that excessive regulation could lead to constraints on banking activity, which would conduct to a downward trend in financial performance.

Besides, numerous studies have revealed the relationship between the business cycle and bank performance, such as Albertazzi, Gambacorta (2009) and Bolt et al. (2010). Thus, if GDP growth is high, the loan request rises and thus the banks can obtain superior profits registering a higher stability. On the contrary, if GDP growth decelerates, the banks are threatened with a higher level of credit risk, increasing provisions and subsequently the bank's performance and stability is reduced. According to the literature, (Demirgüç-Kunt and Huizinga, 1998; Mendes and Abreu, 2003; Naceur, 2003; Pasiouras and Kosmidou, 2007) there is a positive relation between GDP growth rate and bank soundness.

On the one hand, in order to improve the consistency of performance and efficiency in addressing banking systems, and also to increase the level of comparability between countries, IMF has defined a *set of financial soundness indicators* that are segmented into two categories: core set and encouraged set

(financial firms, non-financial corporations, households and real estate market). On the other hand, the ECB has promoted also a set of *macro-prudential indicators* which has the same mission as those developed by the IMF, respectively benchmarks for ensuring the soundness of the financial system.

In the reviewed literature there were identified studies that focuses on an in-depth analysis of financial soundness indicators for shaping the overall picture of the banking sector, such as the study of return on assets, indicator, which was either decomposed in more than two terms (Du Pont model) or in only two indicators, namely the return on investment funds (ROIF) and return on financial leverage (ROFL) in order to differentiate the performance of assets and liabilities (see Lindblom and Willeson, 2011).

Despite the fact that there were other large crises of which there weren't drawn the suitable lessons, maybe the unprecedented size of the current turmoil is a warning for both policy makers and actors of the financial systems in order to prevent imbalances (Grant, 2012).

In order to keep under control vulnerabilities and risks in the financial system, there has been adopted a range of measures of fiscal consolidation, economic and regulatory, which were seen at first as a *panacea*, and after it was considered that served as a drainage element, to a new model banking business, promoting an increase in the level of financial education.

3. Developments of CEE Banking System and Implications of the International Financial Crisis

For the analysis performed there were chosen seven non-euro EU countries, namely Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania and Hungary. The reason for choosing these countries is based on their *similar characteristics*: *first* the economic and financial structures are not crystallized; *second*, they have a high potential for expansion; *third* they

face judiciary and public administration sensitivity; and *fourth* the fiscal factors are dominating the macroeconomic policy mix (see Dinga, 2009). The information source was the official statistics of the IMF, World Bank and the central banks. The period under study is 2008-2012, which allows us to assess the implication of the subprime crisis.

The countries listed have made two remarkable transitions over the past two decades, namely the transition from plan to market economy and in the next step the joining to European Union, which led to a wave of trade and integration in global financial markets.

In the current analysis we addressed both qualitative and quantitative performance recorded by the banking sectors in Central and Eastern Europe, so we chose to analyse the financial soundness indicators promoted by the IMF, which is divided into two categories in accordance with the standards IMF, namely: basic analysis and the recommended one.

Regarding the analysis of the *adequacy of capital*, i.e. regulatory Tier 1 capital, there is a downward trend in the growth ratio during 2009-2012, the present situation being stabilized, although it is considered to be more robust (see Figure No.1). In 2012, the risks addressing financial stability, increased considerably in the light of worsening sovereign debt crisis and intensification of negative effects on the banking sector. Due to the recession, to the currency depreciation, income cuts etc., there was an inability to honour properly the debt service, which led to an increase in the level of nonperforming bank loans. From the countries analysed, in the third quarter of 2012, in the top there were Lithuania, Hungary and Latvia. The mean of this indicator assessed by reference to the region studied is 25.88% for 2009-2012, the deviations from the mean being notably in the mentioned countries, so the maximum value of this indicator is 77.11%

(Lithuania) and the lowest was observed in Poland (12.96%). Credit risk, a significant pillar in the management of a credit institution, can be estimated by *asset quality*, accordingly the most important indicators in this regard are: the evolution of non-performing bank loans and sectorial distribution of loans to total loans weights. In the countries surveyed it stands out that the biggest share of loans is granted to non-financial corporations, averaging 91.66%.

For a realistic assessment of the situation of an institution is required the *operational results* analysis, due to the fact that these indicators are the most suitable in terms of time for determining bank performance. In this respect, the most expressive indicators calculated are: return on assets (ROA), return on equity (ROE), net interest margin and non-interest expenses, the last two being reported to total revenue recorded.

According to Table No. 1, after the spread of the international financial crisis, the banking system of the countries surveyed showed a downward trend regarding profitability and efficiency indicators. Therefore for some countries these indicators entered into a negative territory, observing low performances in all operations involved, regardless of their importance. The largest decline in the performance took place in 2009, for Latvia and Lithuania, the situation trickling in 2010 but at a slower pace. Currently this indicator remains on average constant values, but in the case of Romania, return on equity touched a negative point in the third quarter of 2012. The best results were found in the case of Latvia, the Czech Republic and Poland, the growth of ROE for Latvia in the third quarter of 2012, being 154.01%. The main causes of these results are the bigger level of risk provisions as a result of more stringent requirements of the monetary authorities. The leverage suggests that additional resources have been used in an advantageous manner.

With reference to *bank liquidity*, it was taken into consideration the liquidity ratio and the share of liquid assets to total short-term liabilities. In 2012, the fastest liquidity growth rate was identified for Latvia, while the share of liquid assets in short-term liabilities recorded a contrary trend (see Figure No.2).

The average liquidity growth rate recorded in the countries studied was 27.94%, in the third quarter of 2012, down with 4.55% over the same period last year. The liquidity position of commercial banks is at a corresponding level, the parent banks dependence adjusting is realized in a gradual and orderly manner; thus the main implication of this trend being reflected in the future development of financial intermediation and credit risk. The revival perceived in the liquidity position can be motivated through the external financing agreements of the EU, IMF and IFIs, the higher level of provisioning imposed and the augmented efforts of credit institutions to obtain superior revenues.

A particular importance in the present environment has the *sensitivity analysis* in this respect analysing the net open position in foreign exchange to capital. An important step to counter risks in the international financial environment, is represented by the implementation of an integrated set of measures designed for systemically important financial institutions (the 29 institutions), taken by G20. ECB supports the new international standards intended primarily to prevent moral hazard and the negative externalities associated with systemically important institutions. These measures are a necessary step to reduce the likelihood and severity of financial instability, thus reducing the level of sensitivity of credit institutions in international corrections. In this respect, it is worth mentioning the mechanism promoted by the ESRB, which is aiming at monitoring of the banking environment, and is based on the regime *act or explain*.

To identify the general level of risk in banking systems currently under study, we chose to calculate the *Z index* which shows the failure probability of an institution, being calculated after the following formula:

$$Z = \frac{ROA + C/A}{\sigma_{ROA}}(1)$$

Where ROA - return on assets, C/A - the share of capital in total assets and σ_{ROA} - volatility of ROA.

When the values of this indicator are high, the entity is less vulnerable, and such high values can come from either higher revenues or additional capital, which indicates a high level of financial stability (see Table No. 1). With reference to the countries under study, it is observed that the highest value of the indicator was recorded in Czech Republic for 2009-2012, the average being 185.28, while the lowest value, even alarming, is recorded for Latvia where the average for the same period is 6.65.

The second pillar of the study is based on the *encouraged analysis*, aiming a set of indicators such as the share capital assets, major exposures on capital assets related to the weight of FD, i.e. liabilities capital, commercial revenues, staff costs weighted non-interest expenditure, the share of deposits in total loans, the share of foreign currency loans in total loans and foreign currency liabilities in total liabilities, etc.

During the international economic crisis there has been adopted a *set of measures* aiming to support the financial system, which can be seen both from the state and the banks point of view. Thus, *the government* was involved in the help given to the recovery of the financial system, noticing: government guarantees on bank deposits, recapitalization, and dissociation of so-called "bad banks" and nationalization of credit institutions. For example, with regard to the deposit guarantee system, we can see that before the economic crisis, the law stipulated a minimum guarantee of 20,000 EUR, today this level reaching the value of EUR 100,000.

Central banks also played an important role in managing risks that arise from the economic crisis, their primary role being reflected in the provision of liquidity support to banks in a period that was characterized by lack of confidence in the banking system. Consequently, central banks cut interest rates to monetary policy, since financial market deterioration has changed the outlook in terms of price stability, but also to encourage bank lending (see Figure No.3).

The measures initiated to support financial system were used in combination, observing ad-hoc measures implemented in the individual financial institutions, and complex schemes applied when the global financial crisis intensified. *Ad-hoc measures* (conventional) were initially applied at an individual level due to the fact that the implementation process is fast and flexible. On the other side *complex schemes* (conventional), were used because they provide a more transparent perspective than the original, not leading to a distortion of competitiveness and could easily be taken as a forming part of a definite plan. Main unconventional measures adopted by the ECB in the crisis are those with respect to improving liquidity and intermediation in financial markets (refinancing of a fixed rate repo, swaps) and to counter liquidity constraints, respectively credit easing. These measures were designed to mitigate the impact of the international financial market strains.

Currently, central banks have started to reverse the measures destined support the economic and financial environment by waiving some of the unconventional measures. While the ECB tightened monetary character several times since the crisis occurred, the worsening economic and financial situation in the euro area, led the central bank to ease monetary policy stance again. On the other central banks, the currency appreciation trend, the gloomy forecasts for the end of this year, the financial and economic climate, are

reasons for maintaining the current level of interest rates.

A noteworthy challenge for monetary and fiscal authorities is the deepening of *sovereign debt crisis*. In the field of monetary policy and financial stability, the huge sovereign debt raises serious problems for authorities, affecting the future generations by slowing down the GDP growth rate. Therefore, there should be encouraged: a closer cooperation between fiscal and monetary front; an improvement in the enhancement capacity with financial stability; and a better transmission of monetary policy in the financial sector and the real economy. Another issue that stands out is regarding the monetary policy's image, namely the increasing level of damage acquired in the fight against inflation, which threatens the credibility of central banks.

A highly debated topic in the literature refers to the suitability of the supervision authorities. First, it was noted the *national prudential supervision*, observing that most studies focuses on the consequences regarding this kind of supervision, namely the possibility to shape the risk profile of credit institutions. Second, it perceived the *integrated prudential supervision*. The supporters of this policy, outline the benefits of integrated supervision, namely: reduced level of spillover effects, improved management structure of credit institutions, a higher speed of decision adoption and implementation at EU level and others.

Another challenge for the banking markets implies a change in the *banking business model*. The international financial crisis has changed the economic and financial climate, affecting the relationship between customers and credit institutions, regarded as individuals and businesses. The big institutions from financial markets have become the main concern of monetary authorities, but we must consider the fact that the size, market power and complexity are major issues related to the management of an institution. These

features need to be addressed in a specific manner so as not to affect the robustness and soundness of the banking system. In this regard, the major changes and challenges to the financial system have created a new trend in banking, namely a new banking business model.

In the current model, banks have tried to avoid exposure to these kinds of risks, providing loans, which they sell in order to transfer the risk off-balance sheet. Individually bank risks have increased due to reduced incentives to monitor the packets transferred off balance, to the deterioration of credit quality, the increase of bank debt and the level of risk combination, which was a precondition for the creation of speculative bubbles.

The current financial and economic crisis is considered to be unprecedented in the last half century; therefore the devastating effects are extending in all economic sectors, especially in banking.

4. Analysis of Bank Soundness and Performance. The case of Romania

At an international level, the turmoil caused by the financial crisis has generated concerns about the magnitude of spillover effects, namely banking market implications. In this regard the study focuses on an empirical analysis that has in its epicentre the Romanian banking system. The incentives of selecting this country are various, among which it can be stress out the fact that there are few studies on this nation, especially regarding bank soundness, and that Romania is the eight largest country of the European Union, therefore it's considered an important pillar for this region.

The analysis was performed using official statistics of the National Bank of Romania, using monthly data, for the period 2007-2012. Due to the fact that some indicators are reported quarterly, we opted for interpolation, aiming to obtain a homogeneous database. In analysing the soundness of the banking system in Romania we use auto-regression and moving average model.

The soundness is evaluated through Z score, which indicates the ability of a system to dissipate the repercussions caused by external shocks. The method aims to explain the unpredictable character of the indicator, being able to obtain also a forecast for a certain period of time. The model knows the following form:

$$Z_t = \alpha_0 + \alpha_1 Z_{t-1} + \alpha_2 Z_{t-2} + \epsilon_t \quad (2)$$

where Z_t - soundness indicator at time t, ϵ_t - random variable.

Preceding analysis itself, it shall be performed the *descriptive statistics* procedure for the variables taken into the study, with the purpose of describing the main feature of the data collection, using some commonly measures of central tendency, namely the *mean*, some measures of variability, which includes the *standard deviation, minimum value and maximum value* and some other indicators (see Table No.2). Due to the monthly data used we registered a number of 72 observations.

First we proceed by testing the stationary of the variable, suggesting that amplitude fluctuations are approximately uniform and vary around a constant mean. In this case variables did not meet this assumption, thus opting for an index calculation. The tests employed in this case are Augmented Dickey-Fuller (ADF), Phillips-Peron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS). After the model identification, it was followed the classical hypothesis testing, i.e. homoscedasticity hypothesis (ARCH test), test error autocorrelation (Breusch-Godfrey test) and normality of errors (Jarque-Bera test). The forecast obtained refer to the period January-December 2013.

Regarding the predictability of the strength indicator, if we consider the extent to which the market can be guided by econometric models in tracing the behaviour of financial markets, according to the results obtained, it could take the form of an *ARIMA-type (1,2,1)* (see Table No.3). The results suggest a slight

improvement in the level of bank soundness, namely the risks registered a slowdown (see Table No.4). Therefore we observe that the average value of Z score for 2012 was 11.63 and in the prognosis made was around 11.82, thus increasing by 1.59%.

A fundamental lesson that should be learned from the current crisis is that of *temperance*, open to all participants in the financial markets and beyond, which from the desire to gain quick wins assumed excessive risks, not falling under any circumstances under the rational agent pattern.

After many successful years, the global banking system is facing historical changes, so many of the mechanisms previously applied are found to be exceeded in the current economic conditions. In this respect, *the banking market* faces a series of pressures, observing a *reconfiguration*, which is viewed at three levels, namely economic, the business model and financial education. From the analysis undertaken, the banking system soundness will experience a relatively “shy” improvement in the near future, emphasizing the profound implications of the capital adequacy level, asset quality, management decisions and macroeconomic factors, issues that are supported by monetary and governmental measures.

5. Conclusions

The radiography of the crisis years reveals severe tensions on the banking sector in terms of lending deceleration, weakened financial soundness indicators, tightened banking regulations and others. Against this background it's perceived the vital necessity of a common European financial supervision structure.

Compared to previous studies, the novelty of this one stands in the fact that it “sketched” a picture of the international economic context, in order to monitor the “health” and soundness of financial institutions and markets, highlighting

strengths and weaknesses of each financial system analysed. Also, this study focused on the non-euro EU member countries and especially on Romania, aspect that is not very addressed in the academic literature.

In this study it was employed a comparative analysis of financial soundness indicators promoted by the IMF in the case of the non-euro EU countries, our results suggesting that the *risks* addressing financial stability *increased considerably* in the light of worsening sovereign debt crisis; thus intensifying the negative implications on the banking sector. Beside the comparative investigation, it was also carried out an empirical analysis for the Romanian banking system, choosing the auto-regression and moving average model. Our results suggested a positive impact of the consolidation measures taken so far on financial system soundness.

Therefore, we find that the period under review was one atypical, marked by challenges in the economic and financial arena. In this context, the central bank acted in a consistent manner to ensure financial stability, playing the role of an “anchor” in maintaining confidence in the banking system. After the spread of the international financial crisis, banking systems analysed were deeply affected, and although we are seeing a slightly recovery, we must consider one of the fundamental lessons being drawn from the crisis, namely *the vital need for prudence*.

Clearly, each empirical work must acknowledge its methodological and sample related limitations. Therefore it was noticed the fact that there weren't taken into account the new international economic pressures, namely the implications of sovereign debt crisis (i.e. Cyprus), issue that will generate an increase in the level of risk. Despite the fact that the doctrine is really developed for studies to anticipate financial crises, their use in practice remains limited, thus the robustness of the forecast made on the next 12 months is somewhat

restricted. Consequently, future *research directions* are following a precise path, pursuing an extension of the time period studied and an increased sample of countries, focusing on corroboration with other econometric models in order to enhance the accuracy of the study.

In this respect, we conclude by saying that the financial system plays a fundamental role in ensuring financial stability, being drained and consolidated over time, so despite the pressure from international financial markets, it must be increased the level of efficiency regarding the implementation of various measures, which involves more flexible economic policies.

Reference list:

- [1] Albertazzi, U., Gambacorta, L. (2009) *Bank profitability and the business cycle*, Bank of Italy Economic Working Papers, No. 601.
- [2] Altunbas, Y., Li, M.H., Molyneux, P., Seth, R. (2000) Efficiency and risk in Japanese banking. *Journal of Banking & Finance*, Volume No. 24 (Issue No.10), 1605-1628.
- [3] Berger, A., Bouwman, C. (2012) How does Capital Affect Bank Performance During Financial Crises?. *Journal of Financial Economics*, Volume No. 109 (Issue No.1), 146-176.
- [4] Berger, A. (1997) Problem loans and Cost Efficiency in Commercial Banks, *Journal of Banking & Finance*, Volume No. 21 (Issue No.6), 849-870.
- [5] BIS (2011) *Basel III: A global regulatory framework for more resilient banks and banking systems*, BIS Working Papers.
- [6] Bolt, W., Haan, L., Hoenberichts, M. (2010) Bank Profitability during Recession, *Journal of Banking & Finance*, Volume No.36 (Issue No.9), 2552-2564.
- [7] Borio, C. (2011) *Central Banking Post-crisis: What compass for uncharted waters?*, BIS Working Papers, No. 353.
- [8] Chortareas, G., Girardone, C., Ventouri, A. (2010) Bank supervision, regulation and efficiency: Evidence from the European Union, *Journal of Financial Stability*, Volume No. 8 (Issue No.4), 292-302.
- [9] Dermigüç-Kunt, A., Huizinga, H. (1998) *Determinants of commercial bank interest margins and profitability: some international evidence*. World bank Working Paper, No.1900.
- [10] Dinga, E. (2009) *Criza financiara internationala si economia emergenta: Vulnerabilitate sau oportunitate?* [International financial crisis and emerging economy: Vulnerability or Opportunity?], *Wall-Street*, [Online] May 26, available at: www.wall-street.ro, [Accessed on April 1, 2009].
- [11] Epure, M., Lafuente, E. (2012) *Monitoring Bank Performance in the Presence of Risk*, Barcelona Graduate School of Economics Working Papers No.613.
- [12] Grant, J. (2012) Banks should rediscover the art of caution, *Financial Times*, [Online] December 13, available at: www.ft.com, [Accessed on December 15, 2012].
- [13] Herring, R. (2003) *How can the Invisible Hand Strengthen Prudential Regulation?*, The Wharton School Working Papers No.0412.
- [14] Hughes, J., Mester, I. (1997) Bank Capitalization and Cost: Evidence of Scale Economies in Risk Management and Signaling, *The Review of Economics and Statistics*, Volume No. 80 (Issue No.2), 314-325.
- [15] Lindblom, T., Willeson, M. (2011) *Financial Crisis and EU Banks' Performance*, University of Gothenburg Working Paper Series.
- [16] Mendes, V., Abreu, M. (2003) Do macro-financial variables matter for European bank interest margins and profitability?, In *Proceedings of the 2nd CIEF Workshop: European Integration and Banking Efficiency*, Lisbon: ISEG School of Economics & Management.
- [17] Naceur, S.B. (2003) The determinants of the Tunisian banking industry profitability: panel evidence, *Paper presented at the Economic Research Forum (ERF) 10th Annual Conference*, Marrakesh-Morocco: Universite Libre de Tunis.
- [18] Pasiouras, F., Fethi, M.D. (2010) Assessing Bank Efficiency and Performance with Operational research and Artificial Intelligence, *European Journal of Operational Research*, Volume No. 204 (Issue No.2), 189-198.
- [19] Pasiouras, F., Kosmidou, K. (2007) Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance*, Volume No. 21 (Issue No.2), 222-237.
- [20] Stein, J. C. (2011) *Monetary policy as financial-stability regulation*, NBER Working Paper No.16883.
- [21] Wagner, J. (2009) Measuring Performance-Conceptual Framework Questions *European Research Studies Journal*. Volume No.12 (Issue No.3), 119-134.

Appendices

Table No. 1

Evolution of profitability and efficiency indicators in CEE, during 2009-2012 (%)

Country	2010				2011				2012 (Q3)			
	ROA	ROE	LE	Z	ROA	ROE	LE	Z	ROA	ROE	LE	Z
BG	0,84	7,77	9,25	18,93	0,63	5,74	9,11	19,08	0,8	7,9	9,88	18,58
CZ	1,39	22,17	15,99	186,47	1,32	20,16	15,27	188,15	1,39	20,95	15,08	195,66
LV	-1,83	-19,7	10,78	3,05	0,49	4,76	9,71	4,34	2,52	22,22	8,83	5,67
LT	-0,5	-6,54	13,19	5,39	1,21	12,88	10,65	8,03	0,8	7,03	8,79	9,23
PL	0,92	12,11	13,22	36,35	1,20	15,39	12,87	36,43	1,2	14,51	12,08	39,21
RO	0,2	0,15	0,75	13,25	0,03	-0,1	-4	12,71	0	-0,3	0	11,99
HU	0,6	7,32	12,22	26,49	0,25	3,17	12,65	26,12	0,26	2,89	10,97	26,15

Source: own processing after official statistics of IMF and central banks

Table No. 2

The descriptive statistics for the period 2009-2012

Indicator	Mean	Median	Max	Min	S.D.	S	K	J.B.	Prob.	Obs.
Z score	0,99	0,99	1,12	0,90	0,03	0,59	6,67	44,21	0,001	71

Note: we used the following abbreviations: S.D. - standard deviation; S - skewness; K - kurtosis; J.B – JarqueBera test, Prob. - probability

Source: own processing

Table No. 3

The estimation of the model

	AR(1)	AR(2)	ARIMA(1,2,1)
Adjusted R-squared	0,27	0,29	0,34
Akaike info criterion	-4,21	-4,21	-4,27
Schwarz criterion	-4,15	-4,12	-4,14
DW	1,76	2,05	1,88

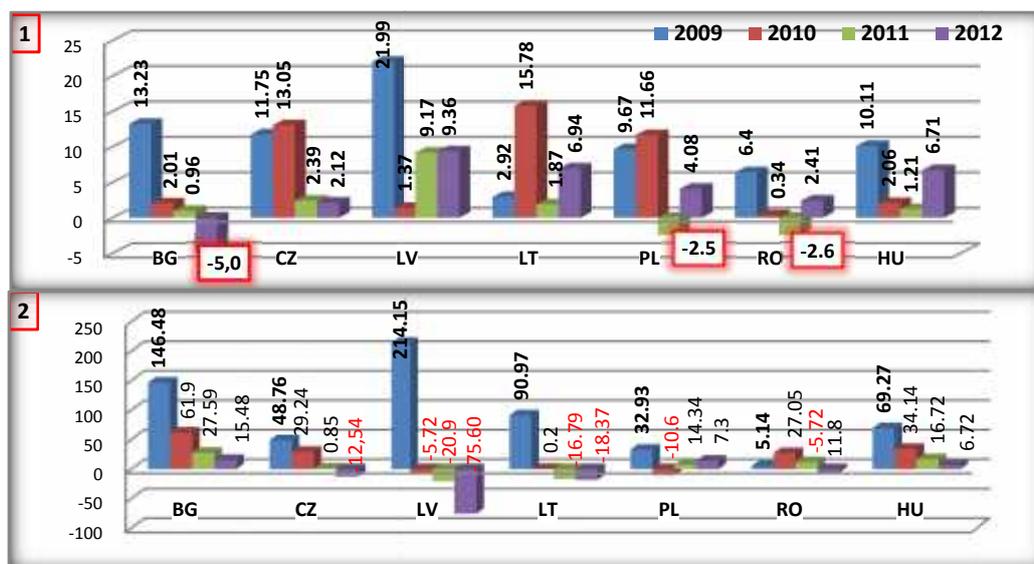
Source: own processing

Table No. 4

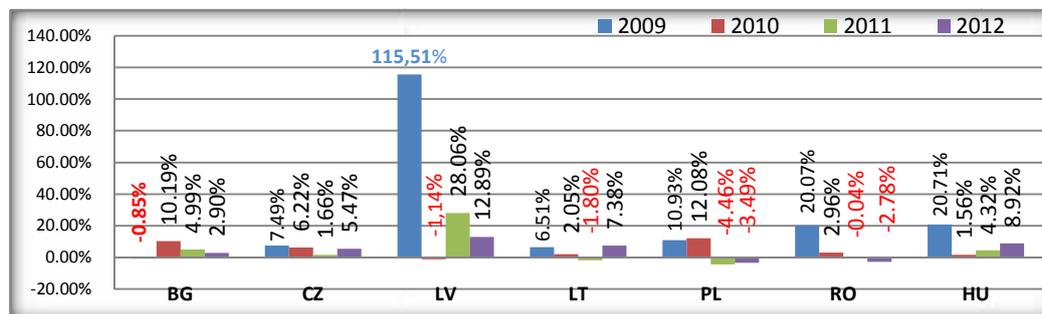
The forecast for Z score

Month	Z score	Month	Z score	Month	Z score
2013M01	10.04	2013M05	10.29	2013M09	12.62
2013M02	9.97	2013M06	10.61	2013M10	13.84
2013M03	10.00	2013M07	11.05	2013M11	15.17
2013M04	10.09	2013M08	11.62	2013M12	16.64

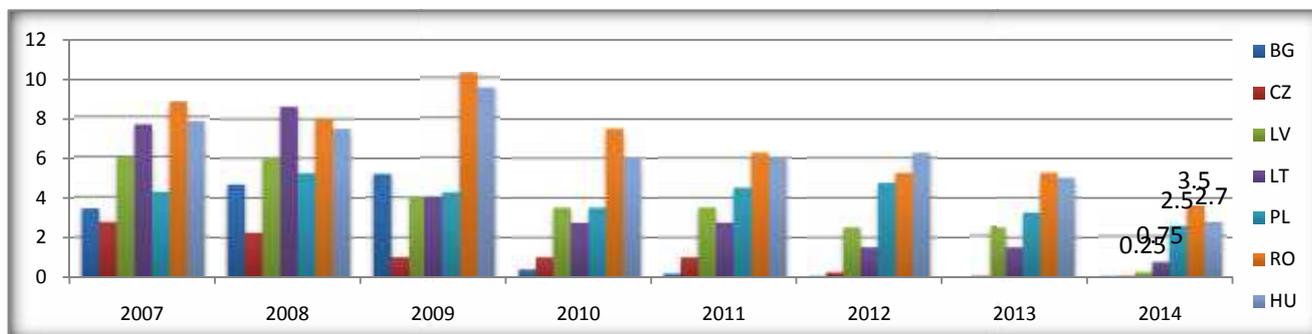
Source: own processing



Note: 1- Regulatory Tier 1 Capital to risk weighted assets; 2-NPL/Provisions
 Source:own processing after IMF and central banks
 Figure No. 1:Evolution of capital adequacy growth rate, during 2009-2012



Source:own processing after IMF and central banks
 Figure No. 2:Evolution of the liquidity growth rate in CEE, during 2009-2012



Source:own processing after IMF and central banks
 Figure No. 3:Evolution of monetary policy interest rate in CEE, during 2007-2014