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Determinants of non-performing loans – evidence from Southeastern European banking systems

Abstract

In recent years banking systems in Southeastern Europe have experienced high growth of non-performing loans. The deterioration of credit portfolio quality however could, at least, affect bank overall performance but also jeopardize the bank capital and lead to the insolvency. Additionally, in case of increasing non-performing loans in considerable part of the banking system, financial stability of the whole sector is threatened. Moreover, credit rationing related to unwillingness of banks to accept additional credit risk produce adverse effects on the real economy. Thus, understanding the factors of non-performing loans is valuable for banks as well as for regulators.

Motivated by the fact of the growth of non-performing loans as well as adverse consequences of credit risk for financial stability of both individual banks and banking system as well as for economic activity, this paper empirically investigates the determinants of non-performing loans in Southeastern European banking systems. The analysis is based on sample of 69 banks in 10 countries in the period from 2003 to 2010 and Generalized Method of Moments estimator for dynamic panel models. The research encompasses both macroeconomic and bank-specific factors. The results show that lower economic growth, higher inflation and higher interest rate are associated with higher non-performing loans. Additionally, the credit risk is affected by bank-specific variables such as bank size, performance (ROA) and solvency.

Keywords: non-performing loans, macroeconomic determinants, bank-specific factors, Southeastern European banking systems, dynamic panel analysis.
JEL Classification: G21, C23.

Introduction

Although credit risk has always had the highest importance in bank's management, the last financial crisis and recession have made non-performing loans one of the major concerns for both bank managers and regulatory authorities. The recent crisis, as well as others that occurred in the past, confirm that bad loan portfolio is one of the most important factors of fragility of a specific bank and banking system, and could produce negative effects on the overall economic activity. Namely, at high level of non-performing loans, the bank's net worth is exposed to high risk and this could lead to the bank's insolvency. Even for those banks that do not go bust, non-performing loans negatively influence the bank's overall performance. In case the problem of non-performing loans arises in substantial part of the banking sector, financial stability of the whole sector is jeopardized.

Moreover, the growth of non-performing loans negatively affect bank's lending behavior since it increases the bank managers' concern related to the problems of asymmetric information that result in adverse selection and moral hazard problems. The uncertainty created by non-performing loans makes difficult for banks to allocate funds efficiently from surplus economic units to deficit economic units with productive investment opportunities. The banks are unwilling to take new credit risk and to lend funds. This results in an excess of demand for loans, especially those of enterprises. The subsequent credit rationing leads to the decline of economic activity.

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Following a high credit growth during the last decade, since financial crisis 2008/2009, banking sectors in Southeastern Europe have experienced high growth of non-performing loans. In part of the countries the ratio of non-performing loans in total loans even doubled in the period from 2009 to 2011. Namely, the ratio in Bosnia and Herzegovina rose from 5.9 to 11.7 percent, in Bulgaria from 6.4 to 13.5 percent, in Romania from the level of 7.9 to 13.4 percent, while in Montenegro it changed from 13.5 to 21 percent (data refers to 2010), reaching the highest level in the region. The lowest value of non-performing loans to total loans ratio of 2.3 percent was experienced in Slovenia (see Appendix).

In part of the countries, non-performing loans are dominantly related to the corporate sector loans. Thus, in Montenegro and Serbia non-performing loans to corporate sector participated in total non-performing loans with almost 80 percent in 2011. The same ratio was in the range from about 55 to 65 percent in Albania, Macedonia, Bulgaria and Croatia, indicating that both loans to households and loans to business affected non-performing loans (European Banking Coordination "Vienna" Initiative, 2012).

Taking into account these facts, as well as the negative consequences that deterioration in banks' balance sheets related to credit risk could have on financial stability and economic activity, as well as the lack of evidence of the drivers of credit risk in these countries, it is important to answer the question on what factors determine growth of non-performing loans.

Consequently, the main objective of the paper is to empirically investigate determinants of non-perfor-

ming loans in Southeastern European banking systems. The research encompasses both macroeconomic and bank-specific factors. To accomplish this task, we apply panel data of 69 banks from 10 countries in period from 2003 to 2010 and Generalized Method of Moments (GMM) estimator for dynamic panel models.

The paper adds to scarce cross-country empirical studies of non-performing loans that cover both bank-specific and macroeconomic variables. According to our best knowledge, this is the first study on determinants of non-performing loans in Southeastern European banking systems and it contributes to the empirical researches on drivers of non-performing loans in emerging markets.

The paper is structured as follows. Section 2 gives the review of empirical researches on causes of non-performing loans. Section 3 describes variables, data and the methodology. The results of empirical analysis are presented and discussed in section 4. The final section concludes and gives some policy implications of the results as well as suggestions for future work.

1. The literature review

Although banks are exposed to variety of risks, from different types of financial risks, hazard risks, operational and strategic risks, as loans dominate in bank assets, credit risk is the most important risk for banks. The realized credit risk could be reflected in non-performing loans whose growth can be threat for financial stability and consequently for economic activity. In order to ensure a sound banking system, able to support economic growth, it is important to find out the determinants of non-performing loans. This has encouraged empirical researches on drivers of the bad loans. Some of the existing studies are focused on general economic conditions while others deal with both bank-specific characteristics and macroeconomic environment. Part of the studies includes institutional factors. These determinants have been empirically investigated mainly on the basis of individual country, and partly on the cross-country level. The review of the studies follows.

The forerunner of empirical researches on factors affecting non-performing loans is the research of Keeton and Morris (1987) performed on sample of 2470 US commercial banks in the period from 1979 to 1985. According to the findings, the most important factors that explain variations in loan losses among the banks are local economic environment, some of low-performing industries and differences in risk-taking behavior of banks. Based on US large commercial banks data in 1987, Sinkey and Greenwalt (1991) conclude that loan rates, volatile funds, and loan volume prior three years, determine non-performing loans.

Clair (1992) analyzes loan growth and loan quality on the sample of Texas banks for 1984 through 1990. The study finds that relationship between loan growth and loan quality depends on bank capital level. Namely, rapid loan growth reduces loan quality with highest effect on banks with low capital adequacy ratio. The evidence of the relationship between loan growth and loan losses of US banks in the period from 1982 to 1996 is also provided by Keeton's (1999) later study.

Salas and Saurina (2002) provide evidence of credit risk determinants of Spanish commercial and savings banks, analyzing both bank-specific and macroeconomic data in the period of 1985-1997. The variables that explain credit risk encompass economic growth, indebtedness of businesses and household, loans growth, inefficiency, portfolio structure, size, net interest margin, solvency ratio, and market power. Moreover, the results confirm differences between commercial and savings banks. Credit risk of Spanish credit institutions sector is also investigated by Jimenez and Saurina (2006). The sample covers both commercial and savings banks that represent 95 percent of credit institutions' assets in the period from 1984 to 2002. The results show that a positive, but quite lagged, credit growth during boom periods, lower credit standards and lower interest rates are associated with higher loan losses.

Following empirical evidence on determinants of credit risk in developed banking systems, the researchers broader the analysis on emerging markets. In the research of the relationship between capital and credit risk taking on the sample of 2770 banks in 30 emerging countries from South America, Asia, and Central and Eastern Europe for 1996-2001 period, Goldewski (2005) finds the importance of bank size, capital, and performance as well as regulatory, institutional and legal factors.

Bank credit risk in emerging markets consisted of 16 African countries in the period from 1993 to 2002 is analyzed by Fofack (2005) showing causal relationship between economic growth, real exchange rate appreciation, the real interest rate, net interest margins, and non-performing loans.

Glogowski (2008) investigates factors of loan losses of 108 Polish banks in the period from 1996 to 2006. The author finds evidence on the importance of the set of macroeconomic variables consisted of real GDP growth, real interest rates and unemployment.

Encompassing 46 banks from 12 countries in the MENA region, Boudriga et al. (2009) provide evi-

dence of the importance of the following factors: foreign ownership originated from developed countries, bank capitalization level, credit growth, loan loss provisions, quality of information provided by public and private credit bureaus, and institutional environment.

Dash and Kabra (2010) research non-performing loans in Indian banking sector in period from 1998-99 to 2008-09. They employ both bank-level and macroeconomic-level data and provide evidence of importance of loans growth, loans to assets ratio, economic growth, and exchange rate for loan losses. Non-performing loans are analyzed in GCC region on the sample of 80 banks during the period of 1995-2008, by Espnoza and Prasad (2010). The research results indicate that at macroeconomic level, economic growth and interest rate appear to be important while credit growth, capital and efficiency are significant factors of bad loans at the bank level.

The most recent studies are those of Bofondi and Ropele (2011), Nkusu (2011), and Louzis et al., (2012). Investigating macroeconomic determinants of bad loans provided to households and firms by Italian banks in the period from 1990 to 2010, Bofondi and Ropele (2011) show the importance of general economic conditions, the cost of borrowing and the debt burden with lagged influence.

The macroeconomic approach to analysis of bad loans is also applied by Nkusu (2011), but on a sample of 26 advanced economics in the period from 1998 to 2009. The findings show that economic growth, unemployment and asset prices are determinants of non-performing loans.

Louzis et al. (2012) investigate macroeconomic and bank-specific determinants of non-performing mortgage, business and consumer loans in 9 largest banks in Greek banking system in period from 2003 to 2009. Among macroeconomic variables, GDP growth, unemployment, interest rate and public debt affect losses in all categories of loans, while among internal factors, performance and efficiency appear to be important. Furthermore, quantitative impact of the determinants varies among the type of loans.

2. Variables, data and methodology

2.1. Macroeconomic and bank-specific factors of non-performing loans. This research consists of both macroeconomic and bank-specific factors that, according to the existing empirical studies performed on set of other countries, could affect non-performing loans. General economic conditions are among important factors that affect operations and financial conditions of bank customers (businesses, households), and consequently banking business and performances. Among indicators of general economic environment there are gross domestic product growth (GDP), inflation, real interest rate and exchange rate. The GDP growth reflects positive economic environment beneficial for both businesses and households. In the favorable economic condition, incomes of households and business grow and the borrowers have sufficient funds to service their debts. Thus, we expect that the economic growth has negative effect on bank bad loans.

We include inflation variable in the analysis as do authors of part of the existing studies e.g. Fofack (2005) and Dash and Kabra (2010), but in these studies it appears insignificant. The impact of inflation on non-performing loans can be positive or negative. As an indicator of price stability, the low level of inflation is important for the growth of economy, contributing to debtors' capacity to repay the loans. In the case of price instability the real value of debt expressed in nominal terms erodes, making repaying their loans easier for debtors. On the other hand, high inflation reduces real value of the income and weakens the debtors' ability to service the loan. The same is true for the variable rate loans that are adjusted according to the inflation.

Lending interest rate indicates price the borrowers pay for loans and thus, debt service cost. Increase of interest rate produces additional debt burden and the level of non-performing loans. Moreover, high lending rate reflects high risk premium that banks charge for low credit quality debtors, indicating poor credit portfolios.

Exchange rate may affect loan losses for those loans nominated in foreign currency, what is often the case in emerging markets. Since there is no currency matching between the income the households and businesses receive and their loan debts, the changes in exchange rate may affect debt burden. Namely, depreciation of domestic currency increases debt and debtors' inability to repay the loans, leading to loan losses for the banks.

Beside general economic conditions, bank-specific characteristics are analyzed in their influence on non-performing loans. They include bank size, loan growth, solvency ratio, and bank performance.

Bank size could reflect bank strength and ability to cope with the problem of information asymmetry, resulting in lower level of non-performing loans. Contrary, smaller banks have fewer resources to realize credit analysis efficiently. Moreover, bank size may be an indicator of diversification opportunities increasing of which should lower bank risk. Consequently, we expect negative relationship between bank size and non-performing loans.

Loan growth reflects bank credit policy. In order to achieve higher market share and to improve performance in the short run, banks may alleviate level of credit standards. These actions may result in the problem of adverse selection and in an increase of non-performing loans.

Solvency level, measured by capital to total asset ratio, reflects the capital strength of bank. Higher level of capital allows bank to absorb shocks that may appear in the credit market. On the other hand, the higher capital may stimulate banks to take more risky credit activities resulting in loan losses. The same may occur at lower level of bank capital because the problem of moral hazard behavior of bank managers may arise, leading to higher non-performing loans. Thus, the effect of solvency ratio on loan losses is ambiguous.

At higher level of past performance bank managers are less pressured to make profit, resulting in lower credit risk exposures. Moreover, since bank cost efficiency is reflected in bank profitability, there is indirectly relation between efficiency and non-performing loans. Namely, since low level of efficiency reflects bad bank management which is, among other aspects, poor in credit analysis and monitoring of borrowers, the problem of information asymmetry arises, resulting in both adverse selection and moral hazard. Because of low efficiency, bank management tends to engage in more risky credit arrangements. Thus, higher bank inefficiency implies lower profitability and higher risk exposure. In other words, there is expectation of negative relationship between bank past performance and non-performing loans.

The above listed variables are measured in accordance to the proxies of the variables used in the existing empirical studies. The measures used, data and their sources, as well as the model are presented in the following section.

2.2. Data description and the empirical model. In our empirical investigation of the factors affecting loan losses we form sample consisted of 69 banks from 10 Southeastern Europe (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Moldavia, Montenegro, Romania, Serbia, and Slovenia) in the period from 2003 to 2010. The choice of variables, the number of banks and the time period is determinated by data availability, especially for those related to bank-specific variables. There are four sources of data used in this study. The data on bank-specific variables are obtained from Bankscope database. We use unconsolidated financial statements, with exception of Slovenia. As sources of macroeconomic data we use World Development Indicators of World Bank and Transition Indicators of European Bank for Reconstructing and Development and Oanda.com.

Table 1. Descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Non-performing loans	7.959	10.478	0.07	98.79
Economic growth	3.594	3.922	-8.5	10.7
Inflation	5.718	4.466	-1.07	23.98
Interest rate	11.848	4.151	5.91	25.61
Exchange rate	16.391	31.492	-7.85	139.94
Bank size	6.161	1.298	3.111	9.806
Loans growth	26.765	34.489	-38.6	297.92
Solvency	12.395	7.106	2.84	63.09
Return on assets	0.837	2.099	-20.85	6.76

Source: Authors' calculations.

The minimum length of the panel is 3 years period while the maximum covers a period of 8 years. Thus the panel is unballanced. Since we expect that the explanatory variables do not affect non-performing loans immediately, with exception of bank size, the variables are lagged. Tables 1 and 2 present descriptive statistics and correlations for the data used in the analysis.

Measures of used variables follow. As it is standard in credit risk literature, the dependent variable is measured by the ratio of non-performing loans to total loans. Economic growth is expressed by annual percentage growth rate of gross domestic product. The inflation variable is the annual growth rate of the GDP implicit deflator. As real interest rate we use the lending interest rate adjusted for inflation as measured by the GDP deflator. For the effect of exchange rate on bad loans, percentage change of exchange rate (EUR/National currency) is used. Bank size is measured by bank asset. Loans growth is presented by annual percentage bank loans change. As a solvency measure we use capital to asset ratio. Return on asset is measure of bank performance.

Table 2. Pairwise correlations

Variable	Non-performing loans	Economic growth	Inflation	Interest rate	Exchange rate	Bank size	Loans growth	Solvency	Return on assets
Non-performing loans	1.000								

Table 2 (cont.). Pairwise correlations

Variable	Non-performing loans	Economic growth	Inflation	Interest rate	Exchange rate	Bank size	Loans growth	Solvency	Return on assets
Economic growth	-0.213	1.000							
Inflation	-0.164	0.352	1.000						
Interest rate	-0.066	0.104	0.665	1.000					
Exchange rate	-0.051	-0.043	0.523	0.486	1.000				
Bank size	-0.055	-0.115	-0.099	-0.275	0.059	1.000			
Loans growth	-0.283	0.409	0.341	0.051	0.029	-0.036	1.000		
Solvency	0.084	-0.046	0.211	0.275	0.216	-0.435	-0.078	1.000	
Return on assets	-0.152	0.196	0.158	0.000	0.036	0.148	0.096	0.011	1.000

Source: Authors' calculations.

We form the following model:

$$NPL_{it} = \alpha + \chi NPL_{i,t-1} + \beta'_{MEF} X_{it}^{MEF} + \beta'_{BSF} X_{it}^{BSF} + \eta_i + u_{it},$$

where the subscripts i, t represent country and time period, respectively. NPL is the dependent variable of interest, that is, non-performing loans. $NPL_{i,t-1}$ is the one-period lagged dependent variable. It reflects dynamic model, accounting for the persistence in the non-performing loans. χ, β'_{MEF} and β'_{BSF} are the coefficient or the vectors of coefficients to be estimated. X_{it}^{MEF} and X_{it}^{BSF} are sets of macroeconomic and bank-specific variables, respectively. Finally, η_i are the unobserved individual effects and u_{it} is the error term.

In order to overpass the problem of correlation between the regressors and the error term related to introduction of past values of the dependent variable to affect its current value, the analysis is based on two-step General Method of Moments (GMM) estimator developed by Arellano-Bond (1991) and Arellano and Bover (1995). Consistent results of the estimator are achieved under the assumptions that there is no second order correlation in the first-differenced residuals and the instrumental variables are uncorrelated with the residuals. We test both first order (m_1) and second order (m_2) serial correlation in the first-differenced residuals while Sargan test is used for testing the validity of instruments.

3. Empirical results

Applying dynamic panel data method we achieve the results presented in the Table 3. The tests confirm the validity of the model. Namely, there is no first-order or second-order serial correlation. According to Sargan test, the instrumental variables used in the model estimation are valid since there is no correlation between the instruments and residuals.

The results show that non-performing loans are influenced by both macroeconomic and bank-specific factors. With exception of the non-significant variables, all other coefficients have expected sign. As in the most existing empirical studies, GDP growth explains non-performing loans. Thus, economic environment determines debtor's ability to repay the loans. There is negative relationship between the variables.

Contrary to results of existing studies that show insignificant effect of inflation on bad loans, but in accordance to theoretical arguments, the coefficient of inflation variable is positive and significant at 5 percent level. It indicates that monetary instability decrease real value of income and variable interest rate adjusted for inflation aggravating debtors ability to repay the loans.

As expected, there is positive correlation between the real interest rate and non-performing loans. Thus, the increase in the real interest rate makes additional burden for debtors with variable rate loan contract. The finding is consistent with those of Fofack (2005), Espnoza and Prasad (2010) and Louzis et al. (2011).

Negative relationship between size and bad loans indicate that larger banks are more able to solve problems of information asymmetry in comparison to their smaller counterparts. With skilled employees and qualitative information bases, larger banks are more effective in credit analysis and monitoring their debtors. Although bank size can serve as an indicator of bank diversification opportunities too, this explanation for the relationship between size and credit risk is less applicable in analyzed banking systems in comparison to those in advanced economics. Namely, banks in Southeastern Europe are dominantly concentrated on credit activities. The same result is found by Salas and Saurina (2002), Godlewski (2005), and Louzis et al. (2011).

Table 3. Determinants of non-performing loans (GMM system estimator)

	Dependent variable: non-performing loans
Explanatory variables	Coefficients (standard errors)[a]
Constant	1.532*** (0.487)
	Dependent variable: non-performing loans
Non-performing loans $_{(t-1)}$	0.103** (0.050)
Economic growth	-0.170** (0.077)
Inflation	0.367** (0.169)
Real interest rate	0.289* (0.173)
Exchange rate	0.001 (0.033)
Bank size	-4.469** (1.951)
Loans growth	-0.001 (0.005)
Solvency	0.279** (0.144)
Return on assets	- 1.182* (0.699)
Sargan test (p-value)	0.131
First-order correlation (m_1) (p-value)	0.741
Second-order correlation (m_2) (p-value)	0.573

Source: Authors' calculations.
Notes: ***, ** and * indicate significance at the 1, 5 and 10 percent levels, respectively. Standard errors are in parentheses.

There is positive relationship between solvency ratio and bad loans. Through engaging in more risky activities, banks with higher level of capitalization in the previous period, experience higher level of non-performing loans in the following year. The result is consistent with those of Godlewski (2004) and Boudriga et al. (2009).

Past performance expressed by return on asset negatively affects non-performing loans of banks in Southeastern Europe, implying that higher profitability makes bank managers less pressured in creating revenue from credit activities and thus, there is less exposure to credit risk. The relationship could additionally be explained from bank efficiency perspective. Namely, banks that are less efficient in credit analysis and monitoring loan customers are more exposed to credit risk and thus increase of bad quality asset, in comparison to more efficient banks. The negative effect of profitability on credit risk is found by Goldewski (2005) and Boudriga et al. (2009), and Louzis et al. (2012).

Conclusion

Applying dynamic panel methods, this paper analyzed key drivers of non-performing loans in Southeastern European banking sectors. The results showed that lower economic growth, higher inflation and higher interest rate are associated with higher non-performing loans. Additionally, credit risk is affected by bank-specific variables such as bank size, performance (ROA) and solvency.

Since the change of the variables may serve as warning indicators of future loan losses, the results have implications for decision makers at both macroeconomic and bank level. As the fall in general economic conditions is associated with higher credit risk, in order to ensure sound banking system, macroeconomic policy should make favourable economic environment. The same is true for monetary policy makers in order to ensure price stability. To the extent in which the real interest rate is influenced by the interest rate set up by monetary authorities, adaptation of monetary policy should be considered. Analyzing bank size, past performance and solvency ratio, supervisors could detect banks with potential for increase in bad quality assets. Making efforts in credit risk management, and in that way increasing the efficiency in credit risk analysis and debtors monitoring, is of the great importance.

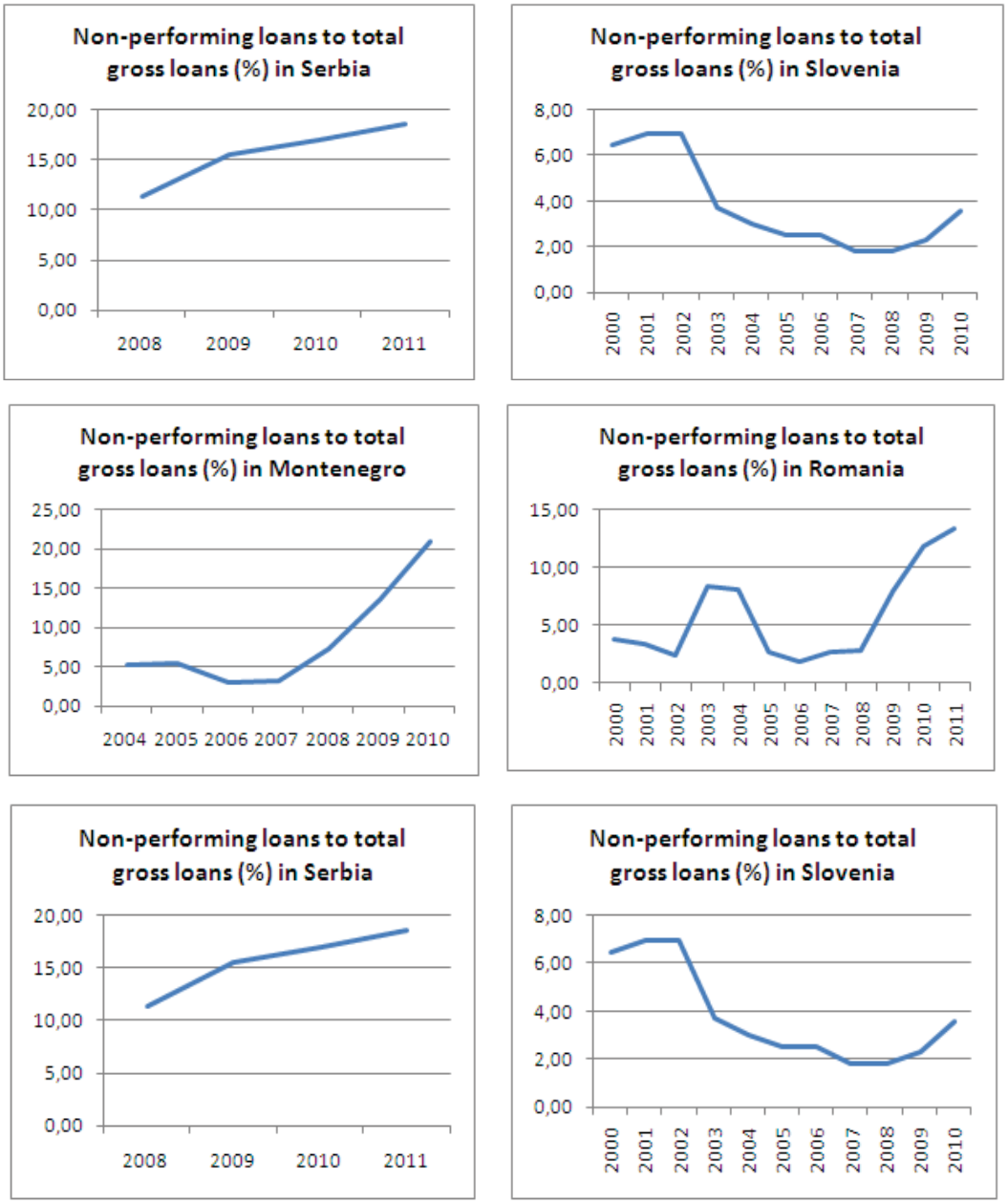
In the future research the model could be broaden with regulatory, institutional and legal factors. Moreover, causality issue between part of the analyzed factors and non-performing loans could be considered. Depending on data availability, comparative analysis of non-performing loans drivers for particular loan type (business, mortgage and consumer loans) could be subject of further empirical works.

References

1. Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte Carlo Evidence and an application to employment equations, *Review of Economic Studies*, Vol. 58, No. 2, pp. 277-297.
2. Arellano, M. and Bover, O. (1995). Another Look at the Instrumental Variable Estimation of Error-Components Models, *Journal of Econometrics*, Vol. 68, No. 1, pp. 29-51.
3. Bofondi, M. and Ropele, T. (2011). Macroeconomic determinants of bad loans: evidence from Italian banks, Questioni di Economia e Finanza (Occasional Papers), Bank of Italy, No. 89, (Assessed: November 25, 2012).
4. Boudriga, A., Boulila Taktak, N., Jellouli, S. (2009). Bank specific, business and institutional environment determinants of nonperforming loans: Evidence from MENA countries, ERF, 16th Annual Conference, November 7-9, 2009, Cairo, Egypt, http://www.erf.org.eg/CMS/uploads/pdf/1254829256_16AC_Boudriga_Boulila_Jellou-li.pdf (Assessed: November 29, 2012).
5. Clair, R.T. (1992). Loan Growth and Loan Quality: Some Preliminary Evidence from Texas Banks, Economic Review, Federal Reserve Bank of Dallas, Third Quarter 1992, pp. 9-22 http://www.dallasfed.org/assets/documents/research/er/1992/er9203b.pdf (Assessed: November 30, 2012).
6. Dash, M.K. and Kabra, G. (2010). The Determinants of Non-Performing Assets in Indian Commercial Bank: An Econometric Study, Middle Eastern Finance and Economics, No. 7, http://www.eurojournals.com/mefe_7_06.pdf (Assessed: November 30, 2012).
7. Espinoza, R. and Prasad, A. (2010). Non-performing Loans in the GCC Banking System and their Macroeconomic Effect, IMF Working Paper, No. 10/224.
8. European Banking Coordination "Vienna" Initiative (2012). Working Group on NPLs in Central, Eastern and Southeastern Europe, http://siteresources.worldbank.org/EXTFINANCIALSECTOR/Resources/282884-1242281415644/EBCI-NPL-WG-report.pdf (Assessed: November 30, 2012).
9. European Bank for Reconstruction and Development (EBRD) (2003-2011). Transition Report
10. Fofack, H. (2005). Nonperforming loans in Sub-Saharan Africa: causal analysis and macroeconomic implications, World Bank Policy Research Working Paper, No. 3769.
11. Goldewski, C.J. (2005). Bank capital and credit risk taking in emerging market economies, *Journal of Banking Regulation*, Vol. 6, No. 2, pp. 128-145.
12. Glogowski, A. (2008). Macroeconomic determinants of Polish banks' loan losses – results of a panel data study, National Bank of Poland Working Paper, No. 53, http://www.nbp.pl/publikacje/materialy_i_studia/53_en.pdf (Assessed: December 1, 2012).
13. http://www.oanda.com/currency/historical-rates/ (Assessed: November 27, 2012).
14. Jimenez, G. and Saurina, J. (2006). Credit Cycles, Credit Risk, and Prudential Regulation, *International Journal of Central Banking*, Vol. 2, No. 2, pp. 65-98.
15. Keeton, W.R. (1999). Does Faster Loan Growth Lead to Higher Loan Losses? *Economic Review*, Federal Reserve Bank of Kansas City, Second Quarter, pp. 5775, http://www.kansascityfed.org/publicat/ECONREV/PDF/2q99keet.pdf (Assessed: November 30, 2012).
16. Keeton W.R. and Morris, C.S. (1987). Why Do Banks' Loan Losses Differ, Economic Review, Federal Reserve Bank of Kansas City, May 1987, pp. 3-21, http://www.kansascityfed.org/PUBLICAT/ECONREV/econrevarchive/1987/2q87keet.pdf (Assessed: November 30, 2012).
17. Louzis, D.P., Vouldis, A., Metaxes, V.L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios, *Journal of Banking & Finance*, Vol. 36, No. 4, pp. 1012-1027.
18. Nkusu, M. (2011). Nonperforming Loans and Macrofinancial Vulnerabilities in Advanced Economies, IMF Working Paper, No. 11/161.
19. Salas, V. and Saurina, J. (2002). Credit risk in two institutional regimes: Spanish commercial and saving banks, *Journal of Financial Services Research*, Vol. 22, No. 3, pp. 203-224.
20. Sinkey, J.F. and Greenwalt, M.B. (1991). Loan-loss experience and risk-taking behaviour at large commercial banks, *Journal of Financial Stability Research*, Vol. 5, No. 1, pp. 43-59.
21. World Bank (2012). World Development Indicators.

Appendix

Fig. 1a. Non-performing loans to total loans in Southeastern European banking systems



Source: World Development Indicators, World Bank.

Fig. 1b. Non-performing loans to total loans in Southeastern European banking systems