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Original scientific paper

THE INFLUENCE OF MACROECONOMIC FACTORS ON NON-PERFORMING LOANS IN THE COUNTRIES OF THE WESTERN BALKANS

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Abstract

The banking system of the Western Balkan countries (WBC hereafter) has undergone great development on the grounds of lending activities, where the issues of non-performing loans, as a crucial activity of the banking sector reached its peak, especially during the COVID-19 period. This paper analyzes the state of non-performing loans, and the reasons for the increase in the level of non-performing loans in the banking system of the Western Balkan countries, by relying on a panel data set of the WBC 6, (Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro, and Serbia), covering in principle the yearly period 2000 - 2019. The empirical assessment focuses on the relationship between the non-performing loans as a dependent variable and a set of macroeconomic explanatory variables such are GDP, unemployment rate, inflation rate, and interest rate, using the post-estimation results of Hausman Taylor econometric technique, suggested by the testing procedure of the panel data. The findings of the study suggest the agglomeration effect of non-performing loans due to the significant lagged dependent variable and the enhancement effect of non-performing loans driven by unemployment and interest rates.

Keywords: Banking system, problematic loans, GDP, unemployment rate, inflation rate

1. Introduction

To achieve the efficiency of the banks, first, the issue of problematic loans is undertaken subject of study in this paper, as a main factor that affects the progress and quality of further crediting of the banking sector. In recent years it is noticed an increase in the portfolio of non-performing loans (NPLs, hereafter) in the banking system of the Western Balkan countries. The main factor that has influenced this rapid growth of NPLsis the effect of the economic crisis, caused mainly by Covid -19 pandemic and the continuation of the conflict in Ukraine. However, other factors should also be mentioned, such as are poor financial performance of the crediting companies and the report of unrealistic financial situation by borrowers. The high levels of NPLs have limited the growth of the private sector, which has directly affected the growth rate of the economy of these countries.

Most economic analysts believe that the problematic loans, known as NPLs are one of the main causes of economic stagnation. Any problematic loan is a direct reflection of the bad state of the bank's customer and an indirect reflection of the bad state of the enterprise. The level of NPLs in the banking sector's assets affects the country's credit rating. Considering the importance of NPLs for individual banks, but also for the entire banking sector, and even for the economies of a country, they are often a topic in many economic analyses. Most of these analyses are related to the factors affecting bad-quality loans, and only a few authors define this term. The following part of the paper deals with a literature review. The third section deals with methodology, data, and empirical results. The final section of the paper outlines the limitations of the study and conclusion.

2. Literature review

The literature on problem loans is relatively extensive and provides valuable results on the factors that influence their growth, that is, on the factors that influence the deterioration of the quality of bank assets. Some studies were conducted at the level of one country and others at the level of several countries. Some of them were made at the level of individual banks, while others were made at the total level of the banking sector. Many factors affect low-quality loans, and authors usually divide them into two groups: bank-specific factors and macroeconomic factors. Tanaskovic and Jandric, (2017) state that, in addition to these two groups, "in the last paper one can also see attempts to explain the problem of problematic loans partly through the action of institutional factors that determine the rules of behavior in the banking sector of a certain country. When determining the variables used in the analysis, usually the level of problem loans is defined as a dependent variable and macroeconomic-specific related variables are considered as independent variables.

Mwanza Nkusu (2011) analyzed the relationship between non-performing loans and macroeconomic performance for 26 advanced economies from 1998 to 2009. In his study, only macroeconomic variables were presented, like GDP growth, unemployment, change in the housing price index, change in the capital price index, inflation, nominal effective exchange rate, interest rate, and credit to the private sector. His findings revealed that poor macroeconomic performance (i.e., slower GDP growth, higher unemployment, or falling asset prices) can be associated with increased credit in developed economies.

Klein (2013) investigated NPLs in Central, Eastern, and South-Eastern Europe (CESEE) using annual data in the period 1998 to 2011 and a VAR (Vector Autoregression) panel. The results show that the level of NPLs can be attributed to both macroeconomic conditions and bank-specific factors, although the latter group of factors has a relatively low explanatory power. The results obtained suggest that a higher unemployment rate, exchange rate depreciation (against the euro), and higher inflation contribute to higher NPLs while the growth of euro area GDP results in lower NPLs. Higher global risk aversion (VIX) was also found to increase NPLs. The influence of bank-specific factors suggests that the net capital-to-asset ratio and return on equity (ROE) are negatively related to NPLs while overleveraging (measured by the loan-to-asset ratio and the previous growth rate of bank lending) leads to higher NPLs.

Shingjergji conducted two studies on non-performing loans in the banking sector in Albania. The first study entitled "The Impact of Macroeconomic Variables on Non-Performing Loans in the Albanian Banking System during 2005-2012" (original title: The Impact of Macroeconomic Variables on the Non-Performing Loans in the Albanian Banking System) deals with the analysis of macroeconomic factors affect poor quality loans in 16 private commercial banks in Albania (Shingjergji (a), 2013, p. 335 - 339). The author emphasizes that the banking sector in Albania has evolved significantly over the last few years, but a major problem is the high level of bad loans in bank assets. The study starts from the hypothesis that macroeconomic factors influence the level of problem loans in this banking sector. The analysis included four macroeconomic variables (GDP growth rates, inflation, exchange rates, and interest rates), and the results show that GDP growth rate, interest rates, and exchange rates have a positive relationship with bad loans and a negative relationship between inflation and bad loans was found. Another study entitled "Impact of BankSpecific Variables on Non-Performing Loans Ratio in the Albanian Banking System" deals with the analysis of special factors in banking that affect problem loans in the period from 2002 to 2012 (Shingjergji (b), 2013, p. 148-152).

This study, unlike the previous one, comes from the hypothesis that special banking factors influence the level of problem loans in the banking sector in Albania. The analysis includes five specific banking factors: capital adequacy ratio, total loans, interest margin, return on equity capital, and loan-to-asset ratio. The results show that total loans and interest margin have a statistically significant and positive impact, and the capital adequacy ratio, loan-to-asset ratio, and return on capital have a statistically significant and negative impact on non-performing loans in the banking sector, while the impact of the capital adequacy ratio is not statistically

significant. This study concludes that NPL-s are also affected by macroeconomic and specific banking factors. by macroeconomic and specific banking factors.
The results of previous research show that macroeconomic factors affect poor-quality bank loans, but their impact is different. Therefore, it is not possible to draw a general conclusion on the impact of a particular factor on bad loans and apply it to all countries, but it is necessary to conduct research in each country, especially to be able to determine with certainty which factor and how it affects the quality of the bank's loan portfolio.

3. Methodology

The research methodology of this paper consists of econometric models such are Pooled OLS, Fixed Effects, Random Effects, and Hausman Taylor. The Pooled OLS model is the simplest form of using data and information in the longitudinal form, which is realized by ignoring the panel data structure, while the panel data analysis enables the control of individual heterogeneity to avoid biases in the assessments that result. Heterogeneity between countries is a key aspect of panel data analysis, which is the main focus of the analysis (Green, 2002 p.283).
The difference between Fixed and Random Effects models lies in the fact that the Fixed Effects model is a statistical model that represents the observed quantities in terms of explanatory variables that are treated as if the quantities were non-random. This is in contrast to random effects models and mixed models in which either all or some of the explanatory variables are treated as if they arise from random causes. Stock and Watson (2003) point out that if the unobserved variable does not change over time, then any change in the dependent variable must be due to influences other than fixed characteristics. The use of "Fixed Effects" is done whenever we are interested in analyzing the impact of variables that may change over time. Fixed effects deal with the relationship between the predicted parameters, and the results of the variables within a certain entity, which may include (country, person, company, state, etc.). The Random Effects model, also known as the components of change model, is a type of hierarchical linear model. Moreover, The Hausman-Taylor (1981) model adopts a "mixed" structure to address the need for incorporating a time-invariant variable and capturing unobserved individual heterogeneity. This "mixed" characteristic refers to its intermediate nature, lying between fixed effects and random effects models, combining elements of both approaches. In our analysis, we employed the Hausman test to determine the appropriate model specification, choosing between fixed effects and random effects models, as well as the Hausman-Taylor model.

Hausman Taylor model is described as follows:

$$Yit = c + \beta 1\ (yit - 1) + \beta 2\ (lnngdpc) + \ \beta 3(infl) + \beta 4(unemp) + \beta 5(interest) + ui$$

Yit is a dependent variable denoting non-performing loans, i for countries, t for years, $yit - 1$ lagged dependent variable, c is constant, whereas, explanatory variables are $lnngdpc$ (GDP per capita %); $infl$ (inflation rate); $unemp$ (unemployment rate); $interest$ (interest rate).

4. Descriptive statistics

In this paper, annual data for the period 2000-2019 are used for six countries of the Western Balkans, respectively for Albania, Bosnia and Herzegovina, Kosovo, the Republic of North Macedonia, Montenegro, and Serbia. Most of the data was collected from the World Bank database (World Development Indicators).

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Npl	87	11.290	5.546	1.901	23.492
gdpcg	119	3.871	3.337	-5.996	26.887
Info	118	5.322	11.460	-9.351	86.826
Unemp	104	23.980	10.239	10.294	57
Interest	102	4.500	6.225	-25.679	17.256

5. Empirical results

This section describes findings from regression analysis with OLS, Fixed, Random, and Hausman Taylor IV models. The table of Hausman test results is attached in the appendix, according to which we choose between the fixed, random, and Hausman-Taylor models. The Hausman test is the appropriate test used to decide whether a fixed effects or random effects model is more appropriate. Thus, the Hausman test identifies whether the fixed effects or random effects model is the best fit under the null hypothesis that the individual unobservable effects (ui) are not related to one or more explanatory variables (Xi). According to Gujarati (2004), the fixed effects model is more appropriate when the null hypothesis is rejected while the random effects model is more appropriate when the null hypothesis cannot be rejected. When the p-value exceeds 0.05, the null hypothesis is accepted, indicating that the random model is more efficient. Conversely, when the p-value is below 0.05, the null hypothesis is rejected, implying that the fixed effects model is more efficient. In this case, the alternative hypothesis is accepted.

Based on the results of the Hausman test for fixed and random, the value of p is <0.004, which means that we reject (H0) and accept (Ha). This section describes findings from regression analysis with OLS, Fixed, Random, Hausman Taylor IV models. The table of Hausman test results is attached in the appendix, according to which we choose between the fixed, random, and Hausman-Taylor models. The Hausman test is the appropriate test used to decide whether a fixed effects or random effects model is more appropriate. Thus, the Hausman test identifies whether the fixed effects or random effects model is the best fit under the null hypothesis that the individual unobservable effects (ui) are not related to one or more explanatory variables (Xi). According to Gujarati (2004), the fixed effects model is more appropriate when the null hypothesis is rejected while the random effects model is more appropriate when the null hypothesis cannot be rejected. When the p-value exceeds 0.05, the null hypothesis is accepted, indicating that the random model is more efficient. Conversely, when the p-value is below 0.05, the null hypothesis is rejected, implying that the fixed effects model is more efficient. In this case, the alternative hypothesis is accepted.

Based on the results of the Hausman test for fixed and random, the value of p is <0.004, which means that we reject (H0) and accept (Ha). The results of the Hausman test to choose between fixed and Hausman Taylor show the value of $p > 0.05$, respectively $p=1.862$ which means that we accept the null hypothesis and choose the Hausman Taylor IV model for interpreting the results as the most consistent model. As shown in Table 2, the impact of GDP and inflation rate are insignificant.

Table 2. Regression analysis

VARIABLES	(1) OLS	(2) FE	(3) RE	(4) HT
npl_1				0.488***
				(0.144)
Lnngdpc	2.176***	6.701***	9.664***	0.821
s.e	(0.303)	(1.856)	(1.806)	(0.736)
Info	-0.286	-0.808***	-0.00168	-0.466
s.e	(0.267)	(0.247)	(0.255)	(0.285)
Unemp	-0.314***	0.419***	-0.0619	0.483***
s.e	(0.0853)	(0.109)	(0.0912)	(0.114)
Interest	0.244	0.311	0.873***	0.362*
s.e	(0.160)	(0.226)	(0.196)	(0.205)
Code				-10.27***
				(3.028)
Constant		-53.22***	-72.92***	
		(16.98)	(16.85)	
Observations	69	69	69	69
R-squared	0.876	0.560		
Number of c		6	6	6

Note: Note: *Statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level; standard errors are within the brackets
Source: Author's calculations

As shown in Table 2, according to the Hausman-Taylor model, the impact of GDP and the inflation rate on NPLs are insignificant. While the unemployment rate has been found to have a positive impact on the increase in non-performing loans. This means that a (10%) increase in unemployment will increase non-performing loans by 0.4 (4.8%), on average, ceterus paribus. These findings are in line with studies of Klein (2013) and Shingjergji, (2013); On the other hand, the interest rate also positively affects the growth of non-performing loans, indicating that (a 10%) increase in the interest rate, problem loans will increase by 0.3 (3.6%). These findings are in line with the studies of Shingjergji, (2013); Siddiqui, et al., (2012); Foglia, (2022). In line with previous research, it has been shown that macroeconomic factors exert influence on the level of non-performing loans. The findings of the study, also, outline an agglomeration effect of the NPLs, having regard to the positive and significant coefficient of the lagged dependent variable, meaning that further loans are positively associated with the history of the problematic NPL-s, in the banking sector in the WB-countries, implying that refinancing activity by the microeconomic agents, like households and firms, is becoming a significant problem in the private sector, raising the liquidity concerns of this sector, which via second-round effect may imply the public sector as well. Various studies have investigated distinct macroeconomic factors about bad loans. However, our study reveals that the unemployment rate and the interest rate, as well as the historical problems related to NPLs, emerge as significant predictors of the current growth of non-performing loans.

6. Limitations of the research

In this study, an attempt was made to identify the factors that influence the level of non-performing loans in the countries of the Western Balkans, but it should be taken into account that the sample of this study is relatively small and there should be a certain amount of reserve and caution during interpretation of the results. A larger sample over a longer period would better summarize the relationships between the variables examined. However, the availability of data and their lack for certain years, especially for Montenegro and Serbia, limited our analysis. Also, other variables relevant to this topic have been left aside as a result of the availability of time series for these countries. So, the estimated models can explain to some extent the relationship between macroeconomic factors and the level of problem loans, but the analysis more comprehensive would be ensured if we increase the sample of countries wider than just the Western Balkans and incorporate other relevant variables. This paper makes a valuable contribution to the existing literature by focusing on the empirical determinants of non-performing loans, specifically for the Western Balkans countries. The limitation of the study is that the time frame of the analysis is limited due to the lack of data on non-performing loans and other indicators for the first decade of the transition.

7. Conclusions and recommendations

The countries of the Balkans are considered "bank-based systems", where banks play an important role in the financial market and which occupy the largest part of the volume of financial market activity. Licensing, operation, and supervision of second-tier banks are regulated by a special law, which is built on similar principles, but of course, there are also differences, due to the specifics of the countries we studied. Problem loans burden banks' balance sheets, weaken profits, and erode bank capital. High NPLs make it more difficult for banks to use the credit channel to support economic growth. Although in the countries that were taken for research, problem loans are being reduced, they are still high. The conclusions from the paper can help develop a framework for assessing and measuring the bank's credit risk, which is particularly important from the point of view of the monetary authority for financial stability in the country. The econometric relationships obtained in this paper can be used to predict the future movements of non-performing loans, as well as for stress testing, not only from the banking system as a whole but also from the level of individual operating banks in the country.

The main recommendations resulting from this study are:

- ✓ The macroeconomic situation is an important factor in the accumulation of new problem loans.
- ✓ The growing number of problem loans is evidence of the difficult economic conditions that businesses and consumers are going through.
- ✓ Although banks, after the financial crisis appeared, have tried to tighten loans by increasing interest rates for loans, they still have an increasing tendency.
- ✓ Despite the positive developments in the banking system, banks should play a more important role in future economic development.

The management of problematic loans would not be feasible if there is no macroeconomic stability and sound policies which are the basis for a stable and predictable general environment for the bank's operation and other economic entities. In addition to macroeconomic preconditions, the achievements of the corporate sector, the quality of company management, but also the ways banks assess the creditworthiness of their customers have a particularly important role. Therefore, any reform in the legal or tax system, or the broader regulatory framework in general, would not in itself yield positive results in dealing with non-performing loans, if there are weaknesses in the loan process and inadequate risk management by banks and also if those weaknesses are not detected in a timely and effective manner by the competent supervisory authority.

Appendix

Table. A1 Hausman Test

Test	Chi^2	Prob>Chi^2	Results
Fixed Effects vs Random Effects	15.06	0.0046	Reject HO
Fixed Effects vs Hausman-Taylor	6.18	0.1862	Does not reject HO

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