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Determinants of Credit Risk in Commercial Banks of Kosovo

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Donjeta Morina[1]

Abstract:

Purpose: *The purpose of this paper is to analyze some of the determinants of credit risk in commercial banks in Kosovo through the use of regression analysis for a dataset covering a time series of 7 years (2012 - 2018).*
Design/Methodology/Approach: *The data have been collected from publications of Central Bank of Kosovo and from Kosovo Agency of Statistics The data have been analyzed on quarterly basis. In order to conduct the empirical part of the study that gives us the answer to the relationship between credit risk and the determinants of this risk, we analyzed 6 variables in the study. To perform the necessary analysis we have used the statistical software SPSS 23. Through the regression analysis, the main findings and results of the study were generated.*
Findings: *After analyzing the necessary data, the paper concludes that, among credit risk determinants, interest rates on loans and profitability of banks (ROA) have the largest and most significant impact on credit risk, namely non-performing loans as the credit risk measure.*
Practical implications: *For researchers and academics, the study provides a useful basis on which further studies on credit risk and the factors that cause this risk can be conducted.*
Originality/Value: *The research paper is based on recent studies that assess credit risk in other countries and use reliable data on the banking sector in Kosovo.*

Keywords: *Commercial banks, credit risk, non-performing loans.*

JEL: *G21, G32.*

Paper Type: *Research article.*

[1]*University 'Haxhi Zeka' – Peja, Kosovo, Faculty of Business,*
email: donjeta.morina@unhz.eu

1. Introduction

Banks perform many functions in the economy through which increase the economic development of the country. They have the responsibility to take deposits and lend for consumption or investment purposes. Commercial banks, nowadays offer a large number of financial products and services in the market and among these products and services, lending is their main activity generating income (Grima and Thalassinos, 2020; Thalassinos *et al.,* 2015). By performing this activity among other risky activities the bank is associated with numerous risks, where credit risk is listed first (Atakelt and Veni, 2015). Credit risk otherwise called counterparty risk, consists of the possibility that bank borrowers will not repay loans received, causing losses for the banks. The high exposure to credit risk represents the high level of non-performing loans in commercial banks (Rupeika-Apoga *et al.,* 2018; Thalassinos and Stamatopoulos, 2015). A non-performing loan is the amount of the loan that is borrowed but not repayable by the debtor at least 90 days after the due date.

Non-performing loans are the main indicator of financial stability, especially when it comes to banking stability (Prasanna, 2014). The high ratio of non-performing loans adversely affects banks' profits, and this ratio is always at odds with the development of the economy. If the situation does not improve, it will not only reduce profits for the bank but can also lead to the bank closing. Due to the importance and role of the banking system in economic development, it is necessary to analyze factors or determinants of credit risk, given that this type of risk directly and negatively affects the performance of banks. The most common measures used to measure credit risk are loan loss provisions and non-performing loans ratio. Due to the availability of data, most studies but also this study used non-performing loans as a representative or measure of credit risk.

The internal conditions under which these banks operate but also other external or macroeconomic factors affect their activity, both in the collection of deposits and lending. In other words, the position of non-performing loans within each bank depends on these factors. These factors can be internal and external. External factors are considered to be: economic growth, unemployment, interest rates and inflation. External factors have the power to affect the whole economy while internal factors such as bank size, profit and credit level are directly related to banking activity.

The purpose of this paper is to analyze the impact of some factors such as bank size, bank profits, interest rates on loans, inflation and economic growth on the level of non-performing loans of the Commercial Banks in Kosovo for the period 2012 - 2018. To see the impact and the role of each of these factors we used the regression analysis constructed using the statistical software SPSS 23. The paper is constructed in that form that includes, first the literature review that brings other studies that have studied the credit risk and non-performing loans in different countries,

consequently getting to our analysis, which enables us to realize the purpose of the study.

2. Literature Review

Banks during lending can face a large number of risks. Credit risk is the main and the most important risk among the risks faced by commercial banks. It is the main and perhaps most important type that has been present always in finance and international trade. Credit risk as an integral part of the banking business implies that the payment may be delayed or eventually fail and this can cause losses for banks and affect their liquidity (Thalassinos and Thalassinos, 2018). Increased credit risk means the growth of non-performing loans in commercial banks which today have become an important part of the financial system. The presence of a high percentage of non-performing loans in commercial banks can cause a large number of problems for banks, in the balance sheet and in the income statement as a result of loan loss provisioning (Kumar and Tripathi, 2012). Due to the weight and importance of non-performing loans in banks' profitability, it is necessary to study those loans and determinants that cause them. When these determinants are properly assessed, it is possible to minimize the level of non-performing loans and credit losses, minimize bank failures and financial crises (Atakelt and Veni, 2015).

The most common credit risk measures in the existing literature are loan loss provisions and non-performing loans ratio. Due to the availability of data, most studies, including this study as well, use non-performing loans as credit risk representative. The recently available literature for determinants of credit risk indicates that there are at least two groups of important factors that determine the credit risk of banks (Ganic, 2014; Jędrzejowska-Schiffauer *et al.,* 2019).

Alexandri and Santoso (2015), studied 26 Indonesian banks for the period 2009 - 2013. From 5 variables taken into this study (bank size, capital adequacy, Return on Assets, GDP and Inflation), Return on Assets (ROA) had a positive and significant impact on non-performing loans. Bank size and GDP had a negative and significant impact on non-performing loans, while capital adequacy and inflation had a non-significant positive impact.

A study conducted in European countries (in 28 countries) is the study by Roman and Bolan (2015), which covers the period 2000 - 2015. According to these authors, macroeconomic conditions have a strong and decisive impact on credit quality. The ratio of non-performing loans increases when the level of economic growth declines and when unemployment increases. The relationship of macroeconomic factors with NPL has also been studied by Beck *et al.* (2015), who studied these factors in 75 countries for the period 2000 - 2010. Using panel data for these countries, they came to the conclusion that GDP growth rates have a negative and significant relationship with the NPL, while interest rates on loans have a positive relationship. The general explanation is that high GDP growth usually translates into more income that

improves the debt service capacity of borrowers. Another study carried out in Europe is also the study of Skarica (2013), which was conducted in Central and Eastern European countries and involve the period 2007 - 2012. The findings of this study showed that the GDP growth rate and unemployment rate have a negative relationship with NPL. While the study conducted for some Eurozone countries by Makri *et al.* (2014) covers the period 2000-2008. According to this study, the level of GDP growth, Return on Assets (ROA), and Return on Equity (ROE) had an negative impact on the NPL, while unemployment and the level of inflation had a significant positive impact.

Louzin, Valdia and Metaxas (2010) conducted a study for 9 largest Greek banks for the period 2003-2009 and concluded that real GDP growth rate, interest rate and unemployment rate have a significant impact on non-performing loans. According to them, increased unemployment and interest rates have a positive impact on non-performing loans, while GDP growth is negatively related to non-performing loans, a finding which is consistent with most of the literature. Similar results have also been given by the study of Massai and Jouini (2013), who used 85 banks as sample from three different countries (Italy, Greece and Spain) for the period 2003 - 2009. In terms of internal factors, the study conducted by Louzis *et al.* (2010), concluded that profitability indicators (ROA and ROE) are significant and negatively related with non-performing loans for mortgages and consumer loans, while they are not relevant to business loans. This study covered about 90% of the Greek banking sector. A significantly negative relationship between profitability indicators and NPLs supports the fact that one bank with high profits has less incentive to generate income and less liable to engage in risky activities, such as risky lending.

According to Idris and Naynan (2016), non-performing loans positions of banks and other institutions are influenced by external business environment factors. Overall, the fact that macroeconomic conditions will affect credit risk has also been confirmed by studies conducted in developed countries (Ekanayake and Azeez, 2015).

3. Research Methodology

The paper provides a quantitative analysis through the use of secondary data. The reason for using secondary data is the fact that in this case secondary data are more reliable as they are published by relevant institutions such as the Central Bank of Kosovo and the Statistical Office. The purpose of this paper is to find the relationship between the determinants of credit risk and non-performing loans in Commercial banks in Kosovo.

3.1 Data Collection and Processing

The data collected for conducting the research cover the period of 7 years, respectively the period 2012 - 2018. The data have been collected from publications

of Central Bank of Kosovo (Quarterly assessment of macroeconomic developments, Financial System Quarterly Evaluation) and from Kosovo Agency of Statistics (data for GDP and Inflation). The data have been analyzed on a quarterly basis. In order to conduct the empirical part of the study that gives us the answer to the relationship between credit risk and the determinants of this risk, we analyzed 6 variables in the study. Non-performing loans are defined as the dependent or explained variable that depends on the impact of the independent variables such as, bank size, bank profit (measured by ROA), interest rate on loan, inflation and economic growth (GDP).

To perform the necessary empirical analysis we used the statistical software SPSS 23. The data processing process in this program has gone through a series of stages. Initially, data was prepared in SPSS, where variables were coded. The data were then searched to identify possible errors, then continued with the measurement of variables, the calculation of descriptive statistics, and finally, through the regression analysis, the main findings and results of the study were generated.

3.2 Specification of the Econometric Model

The model defines the dependent variable and the explanatory variables that are included in the analysis. Our study uses Non-performing loans (NPLs) as a measure of credit risk because they reflect the status of credit risk in a country. These loans in the study are presented as the dependent variable that depends from the independent variables taken into account or the explanatory factors, such as Bank size (MADHB), profitability (measured by ROA), interest rate on the loan (IR), economic growth (GDP) and inflation (INFLR). Multiple regression deals with constructing a model where Y (Non-performing Loans) is expressed as a function of the independent variables:

$$Y = f(X1, X2, \ldots, Xn) + \varepsilon,$$

where:
ε follows normal distribution,
credit risk = f (credit risk determinants)
NPL = f (BS, ROA, IR, GDP, INFLR)

In order to achieve the objectives of the paper and based on the variables obtained for this study, the following econometric model for non-performing loans was constructed:

$$Y\ (NPL)t = \beta o + \beta 1(BS)t + \beta 2(ROA)t + \beta 3(IR)t + \beta 4\ (GDP)t + \beta 5(INFLR)t + \varepsilon i$$

where:
Y = Non-performing loans (NPLs) in period t;
X1 = Bank size (BS) in period t;
X2 = Bank profitability (ROA) in period t;

X3 = Interest rate on loans (IR) in period t;
X4 = Economic Growth (GDP) in period t;
X5 = Inflation (INFLR) in period t;
β_0 = represents a constant, or value of Y when all values of X are zero;
$\beta 1$ to $\beta 5$ = regression coefficients for the relevant variables;
εi = Error term, including the effect of variables not included in the model for t;
t = 2012 – 2018 (analyzed quarterly).

3.3 Description of the Study Variables

Non-performing loans (NPLs): The ratio of non-performing loans reflects the credit quality of the bank and is considered as an indicator of credit risk management. NPLs in particular show how banks manage their credit risk because it determines the percentage of the amount of credit losses in relation to the total amount of credit.

Bank size (BS): The log of total bank assets is used to determine the size of the bank. Regarding the relationship between the size of banks and non-performing loans, there are numerous and contradictory data. There are studies reporting a negative relationship between bank size and non-performing loans (Alexandri and Santoso, 2015). According to these studies, the opposite relationship implies that large banks have good credit risk management strategies against their smaller counterparts. There are also other studies that provide positive relationships (Abdullah *et al.*, 2012).

Bank profitability, measured by ROA: According to Tan and Floros (2012), Return on Assets (ROA) and Return on Equity (ROE) are financial ratios that measure the profitability of banks. ROA (Return on Assets), denotes the efficiency of using assets and indicates how much income the bank generates from its investment in assets. Regarding the relationship between ROA and non-performing loans, different researchers found different results. Ahmed and Bashir (2013), Alexandri and Santoso (2015) in their studies found a positive relationship between ROA and NPL. While other researchers such as Selma and Jouini (2013), Massai and Jouini (2013), in their studies found a negative relationship between ROA and NPL.

Interest rate on loans (IR): The interest rate on loans is considered as one of the main economic factors that cause bad loans (Ferhan *et al.*, 2012). Interest rate means the cost of borrowed funds. It is the price that borrowers pay for using the money borrowed from the bank. An increase in the interest rate affects the performance assets of commercial banks, as it increases the cost of loans to borrowers and reduces borrowers' capacity to pay (Ombaba, 2013). Thus the relationship between the interest rate on loans and non-performing loans is expected to be positive.

Economic Growth (GDP): GDP is one of the main indicators of the health of any country's economy and represents the market value of all goods and services produced in an economy within a given period of time. GDP growth is usually

accompanied by a decrease in non-performing loans (Bedi *et al.*, 2013). This is because GDP growth translates into more income, thus increasing borrowers' ability to repay loans and thereby reducing non-performing loans. Based on previous studies, the relationship between GDP and NPLs is expected to be negative.

Inflation (INFR): Inflation refers to the overall rise in prices for goods and services within an economy. The relationship between inflation and non-performing loans is considered unclear. High inflation lowers the real value of loans by making debt burdens easier for borrowers and this may reflect in a negative relationship. On the other hand, rising inflation may weaken some borrowers' ability to repay debt by reducing their income when wages are volatile (Nkusu, 2011). Based on earlier studies we can say that the relationship between inflation and NPLs depends on the operation of the economy and as a result this relationship may be positive or negative.

***Table 1**. Description of the study variables*

	Variables	**Description**	**Measuring**	**Source**
Depend. V	**NPL**	Non-performing loans	Bad loans / Total loans	**CBK**
Independent variables	**Bank size**	Bank size	Natural logarithm of total assets	**CBK**
	ROA	Return on assets	Net Income / Total Assets	**CBK**
	IR	Interest rate	Interest rate on lending	**CBK**
	INFLR	Inflation	Annual percentage rate of inflation	**CBK, KAS**
	GDP	**Economic growth**	**Growth rate of GDP in percentage**	**CBK, KAS**

***Source**: Author's calculations.*

4. Analysis of Results

The empirical results of the study explain the determinants of credit risk for the Commercial Banks in Kosovo. Through the construction of the econometric model is shown the importance of each of these determinants at the level of non-performing loans as a measure of credit risk. The following data are results achieved through the use of statistical software SPSS 23.

4.1 Descriptive statistics

Table 2 summarizes the descriptive statistics for all study variables. We have a total of 28 quarterly observations for the period 2012-2018. According to Table 2, Non-performing loans in Kosovo for the study period have marked an average of 6.08%, with a value ranging from 2.70% minimum value to 8.70% maximum value. Non-performing loans have been steadily declining in recent years and the minimum

value belongs to 2018. Bank size as one of the determinants of non-performing loans for the study period recorded an average of 21.84%. During this period, the lowest value was 21.01% and the highest value was 22.12%. Another variable affecting these loans is the bank's profitability, for which we used ROA as a metric. During the study period, this indicator recorded an average of 1.9%, with a value ranging from 0.82% minimum to 3.00% maximum. Another very important variable in the study is the interest rate on loans, which has averaged 9.32% for the study period.

During this time, the interest rate on loans reached the lowest value of 6.30% and the highest value of 13.90%. Interest rates on loans in the banking sector in Kosovo have been steadily declining in recent years and the lowest rates mostly belong to recent periods. Other determinants of non-performing loans in the study include the two macroeconomic indicators, GDP and Inflation. During the study period, GDP recorded an average value of 3.54%, with a minimum value of 1.60% and a maximum value of 4.90%. Inflation rate as the second macroeconomic variable recorded an average of 0.78% with a minimum value of -0.60 and a maximum value of 3.20%.

Table 2. *Summary of descriptive statistics for the variables obtained in the study*

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
NPL	28	2.70	8.70	6.0861	**2.07706**
Bank size	28	21.01	22.12	21.8425	**.30078**
ROA	28	.82	3.00	1.9707	**.77223**
Interest rate in loans	28	6.30	13.90	9.3250	**2.71438**
GDP	28	1.60	4.90	3.5461	**.77035**
INFL	28	-.60	3.20	.7857	**1.06622**
Valid N (listwise)	**28**				

Source: *SPSS 23 output, own calculations.*

4.2 The Results of the Econometric Model

The linear regression model for non-performing loans is presented as follows:

$$Y\ (NPL)t = \beta o + \beta 1(BS)t + \beta 2(ROA)t + \beta 3(IR)t + \beta 4\ (GDP)t + \beta 5(INFLR)t + \varepsilon i$$

Table 2 gives the linear regression model with the following statistics: R, R2, Adjusted R Square and standard error. These values indicate the importance of the independent variables at the level of non-performing loans. The R value concludes that the dependent variable has a strong correlation with the independent variables at the level of 0.855 and 85.5% respectively. The most important value of Table 2 is the value of R Square (R2). According to results this value is 0.731, i.e. 73.1% of the change in the dependent variable, in this case, Non-performing loans is explained by

the independent variables taken into consideration being, Bank size, ROA, Interest rates in loans, GDP and Inflation. These factors account for 73.1% of the change in the level of non-performing loans, while the remaining 26.9% is explained from factors not included in the model (Ɛi).

***Table 3**. Summary of econometric model*

Model Summary [b]				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.855[a]	.731	.670	**1.19268**
a. Predictors: (Constant), INFLR, GDP, BS, ROA, IR				
b. Dependent Variable: NPL				

***Source:** SPSS 23 output, own calculations.*

Table 3 presents the coefficients of the independent variables, from which we can determine the impact of certain factors on the level of Non-performing loans.

***Table 3**. Coefficients of the independent variables*

Coefficients [a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	**Sig.**
		B	Std. Error	Beta		
1	**(Constant)**	-88.158	30.564		-2.884	**.009**
	BS	3.595	1.312	.521	2.741	**.012**
	ROA	1.597	.881	.594	1.813	**.083**
	IR	1.418	.284	1.853	4.997	**.000**
	GDP	-.059	.374	-.022	-.157	**.877**
	INFLR	-.570	.280	-.292	-2.035	**.050**
a. Dependent Variable: NPL						

***Source:** SPSS 23 output, own results.*

The results presented in the coefficients' Table show the importance of each variable in non-performing loans. We see the impact through the value of the coefficients and by the value of the signification. Using the data from Table 3, we build the following econometric model for projection purposes:

NPLR=-88.158+3.595(BS)+1.597(ROA)+1.418(IR)-0.059(GDP)-0.570(INRLR)+ Ɛi

The first variable, Bank size has a positive impact on the growth of non-performing loans, a statistically significant influence based on statistical parameters (p = 0.012). This result supports part of the literature (Abdullah *et al.*, 2012) but is inconsistent with another part of the literature (Alexandri and Santoso, 2015). A positive and statistically significant impact (p = 0.000) on non-performing loans is also shown to

have interest rates on loans. The increase in interest rates according to the study is the main factor driving the growth of non-performing loans. This is in full accordance with the theory, where the increase in interest rates implies an increase in debt to borrowers, thus affecting the non-payment of loans received. The interest rate parameter is 1.418, which means that a 1% increase in interest rates would increase non-performing loans by 1,418 units, and conversely a decrease in interest rates would decrease non-performing loans. Positive impact on non-performing loans seen to have also the bank profitability (measured by ROA), however, this has insignificant impact according to the results of study ($p = 0.083$). While the negative impact on non-performing loans was seen to have GDP and Inflation, impact that was insignificant for GDP (0.877) and significant for inflation ($p = 0.05$). Accordingly, the increase in GDP and Inflation will affect the reduction of non-performing loans reciprocally.

5. Conclusion

Credit risk is the main risk that commercial banks face. The most common measures for measuring credit risk are loan loss provisions and Non-performing loans ratio. The paper used the ratio of non-performing loans as a representative of credit risk. The high ratio of non-performing loans adversely affects banks' profits, and this ratio is always at odds with the development of the economy. Non-performing loans are the main measure of banking system stability. The level of these loans varies during different periods and depending on different factors. The internal conditions under which banks operate and other external factors affect their activity, whether in the collection of deposits or giving loans. In a word, the positions of non-performing loans within each bank depend on these factors.

The article has studied the impact of some of these factors (bank size, bank profitability, credit interest rate, GDP and inflation) on the level of non-performing loans. According to the data and analysis carried out within the study, we can come to the following conclusions:

Bank size based on total assets is an important factor affecting the level of non-performing loans. Although different studies have yielded mixed results, this study shows a positive relationship between non-performing loans and bank size. Another factor, the level of profitability of banks, as measured in this work through the ROA, is considered to have a significant impact on non-performing loans, but this impact is not significant ($p > 0.05$).

The main factor affecting the level of non-performing loans, according to this study is considered to be the interest rate on loans. In many studies, this factor has been found to have a positive impact on non-performing loans. Such a positive and statistically significant impact this variable has, also shown in this study. According to this, we can say that the increase of interest rates affects the growth of non-performing loans of the banking sector in Kosovo and vice versa. Increasing interest

rates on loans increase the debt burden on borrowing clients, thus increasing the likelihood of repayment of the loan received.

Of the most influential external factors in non-performing loans, we have selected economic growth (GDP) and the inflation ratio. Both of these macroeconomic indicators are seen to have a negative impact on the growth of non-performing loans. For GDP, we have a negative impact for the fact that GDP growth reduces non-performing loans, but this impact is negligible for the results of this study. Inflation is seen to have a negative and significant impact, given the fact that rising inflation will ease the debt burden on borrowers and reduce the value of the loan taken.

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