



XXXI International Scientific Conference
Strategic Management
 and Decision Support Systems
 in Strategic Management
Sm2026

Subotica (Serbia), May 18, 2026

Milica Šušljik

University of Novi Sad, Faculty of Economics
 in Subotica
 Subotica, Serbia

milica.susljik@ef.uns.ac.rs

Participation (direct/virtual):

JEL:

Miloš Pjanić

University of Novi Sad, Faculty of Economics
 in Subotica
 Subotica, Serbia

milos.pjanic@ef.uns.ac.rs

Direct

G33,C21

Nada Milenković

University of Novi Sad, Faculty of Economics
 in Subotica
 Subotica, Serbia

nada.milenkovic@ef.uns.ac.rs

CREDIT RISK DETERMINANTS IN THE BANKING SYSTEM: EVIDENCE FROM WEST BALKAN COUNTRIES

Abstract: Credit risk is one of the major elements while taking banking management into account and therefore it is of the essence to habitually monitor what exerts a significant influence. West Balkan countries are prone to fluctuations of credit risk as the region is influenced by turbulence of financial markets. For that reason, these countries are in the focus while conducting the research. The prime objective of this paper is to closely examine the factors which significantly contribute to the level of credit risk in the period from 2013 to 2025 in that effective credit risk management could be performed in the long-run. The research was conducted by using panel data regression analysis with random effects on variables. Credit risk, as a dependent variable, is measured in non-performing loans to total gross loans. On the other hand, explanatory variables include return on assets (ROA), reference interest rate, bank size, liquid assets to total assets, GDP growth and inflation. The results of a random effects model reveal that reference interest rate and GDP growth affect credit risk positively and significantly, whereas bank size, liquid assets to total assets and inflation rate have a negative and significant impact on credit risk. The limitation of the study refers to the fact that the time series covers the period 2013-2025. As well as that, the results of the research cannot be applied to developed countries since the West Balkan countries are considered as emerging countries.

Keywords: credit risk, West Balkan countries, panel-data regression, random-effects model

1. INTRODUCTION

It has been quite harder for banks to manage their performance after financial crisis left marks. An increasingly high number of banks across West Balkan market have greatly diminished in value, which led to jeopardizing financial markets. The banking sector is influenced by turbulence which results in great number of banks disappearing due to not being able to face the risks and failures (Beck, Jakubik, & Piloju, 2015). The most common obstacle in banking management is credit risk, which is associated with non-performing loans (NPLs) (Ćurak, Poposki, & Pepur, 2013). Also, credit risk is considerable since the half of the bank assets are credit placements. Banks are obliged to regularly follow credit risk fluctuations; otherwise, banks might easily come to an end with their performance. The definition of credit risk is based on the possibility of debtors not repaying a loan together with its interest for a particular period, which is approximately 90 days or more (Louzis, Vouldis, & Metaxas). Moreover, if a client is late with a loan repayment for more than a mentioned period, that loan becomes a non-performing one.

The level of non-performing loans always exerts a damaging effect on whole economy and it is representative of banking hazards and a sign of deeper troubles (Naili & Lahrichi, 2022). For that reason, it is of utmost importance to occasionally evaluate the risk and monitor the amount of non-performing loans on a national level. Apart from being a threat to an individual bank, the value of NPLs is an indication of the overall weakness of the banking system as well as a reliable determinant of banking crisis (Zawadzki, 2023). Credit risk is usually in the focus while typical risks evaluation since loan origination highly depends on the quality of credit risk management. For that reason, it is essential to habitually monitor what contributes to the level of credit risk.

The concerning fact is that banks are usually in search of finding solutions to handle the risk, rather than prevent it (Cheng, Nsiah, Charles, & Ayisi, 2020). That is why it is advisable to proactively investigate what impacts NPLs and possibly take those determinants into consideration to maintain banking stability. This should be especially the case with West Balkan countries since they are all bank-oriented and their financial strength highly depends on banking institutions.

As for our research, the topic of credit risk is investigated by using variables which include both bank-specific and macroeconomic factors. Bank-specifics cover ROA, liquid assets to total assets and bank size and they are used with the purpose of examining what influences NPLs from different perspectives inside banks. On the contrary, macroeconomic explanatory variables are reference interest rate, the rate of real GDP growth as well as inflation rate. These are usually put forward and emphasized under numerous academic discussions as the external indication of credit risk management. Our study consists of several parts, where the first one is introduction which summarizes the key points of the demand of credit risk evaluation. Then, there is a literature review which is oriented towards other authors' contributions to the related topic. The third section about methodology and data covers the variable selection and suitable methods. After that, results and discussion cover main findings based on conducted calculation together with comparing it with the results of other studies. In the end, there is a part dedicated to concluding remarks as well as limitations of our research and possible recommendations for its development.

2. LITERATURE REVIEW

The research explains the influence of macroeconomic and bank-specific variables on credit risk and therefore in the following section the authors emphasized their contributions on the same topic. As for macroeconomic variables, Hariyanti (2024) examined the influence of GDP growth and inflation rate on the level of NPLs by using fixed-effects model based on Indonesian commercial banks and concluded that neither GDP growth nor inflation rate significantly impacts credit risk. On the other side, Ćurak, Pepur and Poposki (2013) used a dynamic panel model to test the impact of ROA, bank size, GDP growth, inflation rate and reference rate on non-performing loans in Southeastern European banking systems. Their research revealed that inflation rate and interest rate positively influence non-performing loans, whereas ROA, GDP growth and bank size affect negatively. This was more expected rather than the results of Hariyanti (2024) since NPLs are at risk of increasing due to macroeconomic variables. This was also proven by the study of Zawadzki (2023) is based on panel data approach with the scope of both developed and developing countries. As a result, they expressed the opinion that inflation rate, GDP growth and reference interest rate do not significantly influence NPLs. In their findings based on dynamic panel approach Koju, Koju and Wang (2018) revealed that ROA affects credit risk negatively, whereas bank size impacts positively based on performance of Indian banking sector.

As far as bank size is concerned, Chaibi and Ftiti (2014) claimed that the larger banks take excessive risks and therefore it is better situation for banks to have larger bank size. By conducting a dynamic panel data regression in a cross-country study (Germany and France), they concluded that bank size exerts a positive and significant effect on credit risk. Together with bank size, they showed that both inflation rate and GDP growth negatively affect credit risk. The explanation is straightforward for the dependence of GDP growth on credit risk where the market prosperity decreases the potential of credit risk improvement. As for inflation, the authors claimed that higher inflation weakens borrowers' ability to service debt by reducing their real income. Also, Chaibi and Ftiti, (2014) point out that reference interest rate has a strong and positive effect on credit risk. On the contrary, Radivojević and Jovović (2017) investigated which determinants impact credit risk by using panel data approach on emerging countries. According to their research, there is a negative and significant relationship between ROA and credit risk as the lower ROA expresses bad management and consequently it results in higher credit risk. Along with that, the authors imply that GDP growth influences NPLs in a negative way in comparison with inflation which affects credit risk positively as higher inflation always puts banking sector at a higher credit risk than usual. Us, (2017) investigated the relationship between NPLs on one side and bank size as well as macroeconomic variables including GDP growth and inflation rate on the other side. Panel data research has revealed that bank size and GDP growth negatively and significantly influence credit risk, whereas inflation rate influences in the opposite way. The study of Jović (2017) explains the significance of certain determinants on credit risk in Serbia by using VAR model. The research presents reference interest rate does not significantly affect credit risk. However, GDP growth impacts credit risk in a negative way. Concerning bank performance and size, Godlewski (2005) used both 2SLS and 3SLS to test how the variables affect credit risk on emerging markets and consequently it was revealed that both ROA and size exert a negative and significant effect on credit risk. Taking Greece into consideration, Louzis, Vouldis and Metaxas (2012) conducted an in-depth analysis by examining the influence of variables on credit risk based on different types of loan portfolio. As a result of a dynamic panel data regression, the authors point out that size does not have a significant effect on credit risk, whereas GDP growth has a strong and negative influence.

The findings of Abdelaziz, Rim and Helmi (2022) are focused on reciprocal relationship between credit and liquidity risks. By performing seemingly unrelated regression in MENA region the authors presented that liquidity positively affects credit risk. Also, it is concluded that bank size and GDP growth influence credit risk in a negative and significant way, whereas inflation rate impacts positively. There is further discussion related to the impact of liquidity on credit risk in the study of Tran, Nguyen and Duong (2022) where they examined the relationship between the

variables based on panel data approach in Vietnam. They state that liquidity positively impacts credit risk as banks tend to create liquidity to support credit activities, which result in greater number of NPLs. Besides, Toh (2019) puts forward a view that banks are bound to increase liquidity to handle excessive credit risk. That was examined by implementing panel data approach in Malaysia.

In order to ensure better understanding of credit risk factors, in the following table 1 there is a list of authors according to results of their studies.

Table 1: List of authors according to research results

Variable	Negative impact (-)	No significant impact (0)	Positive impact (+)
Return on assets	(Ćurak, Poposki, & Pepur, 2013), (Koju, Koju, & Wang, 2018), (Radivojević & Jovović, 2017) (Godlewski, 2005)		
Reference interest rate		(Zawadzki, 2023), (Jović, 2017)	(Ćurak, Poposki, & Pepur, 2013), (Chaibi & Ftiti, 2014)
Bank size	(Ćurak, Poposki, & Pepur, 2013), (Us, 2017), (Godlewski, 2005), (Abdelaziz, Rim, & Helmi, 2022)	(Louzis, Vouldis, & Metaxas, 2012)	(Koju, Koju, & Wang, 2018), (Chaibi & Ftiti, 2014)
Liquid assets to total assets			(Abdelaziz, Rim, & Helmi, 2022), (Tran, Nguyen, & Duong, 2022), (Toh, 2019)
Real GDP rate	(Ćurak, Poposki, & Pepur, 2013), (Chaibi & Ftiti, 2014), (Radivojević & Jovović, 2017), (Us, 2017), (Jović, 2017), (Louzis, Vouldis, & Metaxas, 2012), (Abdelaziz, Rim, & Helmi, 2022)	(Hariyanti, 2024), (Zawadzki, 2023)	
Inflation rate	(Chaibi & Ftiti, 2014),	(Hariyanti, 2024), (Zawadzki, 2023), (Abdelaziz, Rim, & Helmi, 2022)	(Ćurak, Poposki, & Pepur, 2013), (Radivojević & Jovović, 2017), (Us, 2017)

3.METHODOLOGY AND DATA

Our research is based on data retrieved from the financial statements of a central bank related to a particular West Balkan country (Serbia, Bosnia and Herzegovina, Albania, Montenegro and North Macedonia). Concerning the period from the year 2013 to 2025, the study covers 65 observations. The authors used non-performing loans(NPL) as a dependent variable in order to express credit risk. However, independent variables include bank-specific variables which are reference interest rate (RIR), bank size (BS) and liquid assets to total assets (LATA). Together with them, macroeconomic ones cover real GDP rate (GDPR) and inflation rate (INF).

The table 2 below presents the overview of the variables along with their calculation.

Table 2: Selected variables

Symbol	Variable	Expected effect
Dependent variable		
NPL	Non-performing loans/total gross loans	/
Independent variable		
ROA	Net income/total assets	-
RIR	Annual rate	+
BS	The logarithm of bank size	-
LATA	Liquid assets/total assets	+
GDPR	Annual rate	-
INF	Annual rate	-

In order to test independent variables on non-performing loans, it is essential to formulate the hypotheses:

- H₁: Return on assets negatively affects credit risk.
H₂: Reference interest rate positively affects credit risk.
H₃: Bank size negatively affects credit risk.
H₄: Liquid assets to total assets positively affect credit risk.
H₅: Real GDP rate negatively affects credit risk.
H₆: Inflation rate negatively affects credit risk.

Taking selected variables into account, there is an equation which represents panel model in the following form (Radovanov, Milenković, Kalaš, & Marcikić Horvat, 2023):

$$NPL_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 RIR_{it} + \beta_3 \log(BS)_{it} + \beta_4 LATA_{it} + \beta_5 GDPR_{it} + \beta_6 INF_{it} + \epsilon_{it}$$

α is an intercept coefficient; ϵ_{it} is an error term; β_{jit} - regression coefficient of independent variable i stands for a country, whereas t stands for the time (the period from 2013 to 2025)

4.RESULTS AND DISCUSSION

This part of the research includes descriptive statistics, multicollinearity tests, Breusch-Pagan test for heteroskedasticity, augmented Dickey-Fuller test for stationarity as well as conducted panel data model with Hausman test.

STATA version 13 as statistical software is used in order to conduct a research.

Table 3 below presents descriptive statistics of the main variables.

Table 3: Descriptive statistics

Variable	Mean	St.dev.	Min	Max
NPL	8.7615	5.7258	2.2	22.2439
ROA	3.9061	2.3426	-0.1	9.4125
RIR	2.6896	3.0034	-1.6	14
log(BS)	6.4369	0.6763	5.2175	7.7049
LATA	20.7591	6.3021	11.4	38.0974
GDPR	10.5895	7.7232	-4.7	27.7
INF	3.7614	3.5761	-3.3	15.11

Source: Authors' calculations

Regarding multicollinearity, it is advisable to minimize it between the variables as much as possible. If there is a case of strong correlation between determinants, a model is at risk not to be well-performed and not suitable for further examination. To ensure validity of the model concerning multicollinearity, the authors conducted both correlation matrix and variance inflation test.

Table 4: Pearson's correlation coefficients

	NPL	RIR	INF	GDRP	ROA	log (BS)	LATA
NPL	1.0000	-0.0794	-0.3227	0.3013	-0.0866	0.0043	-0.3750
RIR	-0.0794	1.0000	0.1522	-0.2620	-0.2080	0.2547	0.0427
INF	-0.3227	0.1522	1.0000	0.0420	0.0490	0.1160	0.0447
GDRP	0.3013	-0.2620	0.0420	1.0000	0.2307	0.5184	0.2456
ROA	-0.0866	-0.2080	0.0490	0.2307	1.0000	-0.1529	0.4478
log (BS)	0.0043	0.2547	0.1160	0.5184	-0.1529	1.0000	0.1000
LATA	-0.3750	0.0427	0.0447	0.2456	0.4478	0.1000	1.0000

Source: Authors' calculations

According to Shrestha (2020), if the absolute value of Pearson correlation matrix is less than 0.8, there is no case of collinearity. Table 4 corresponds to the author and it can be concluded that there is no issue of multicollinearity.

Speaking of variance inflation (VIF) test, Kyriazos and Poga (2023) imply that VIF score between 5 and 10 indicates the presence of multicollinearity. Table 5 presents that mean VIF amounts to 1.54, which is less than 5, which means that multicollinearity is not severe.

Table 5: VIF test

Variable	VIF	1/VIF
GDPR	2.02	0.4957
log(BS)	1.93	0.5171
ROA	1.47	0.6822
RIR	1.45	0.6904
LATA	1.34	0.7459
INF	1.04	0.9615
Mean VIF	1.54	

Source: Author's calculations

Augmented Dickey-Fuller test for stationarity is the unit root test of the essence while testing the validity of data and model and therefore the authors conducted the one for all the used variables. The model is suitable for further examination if the test proves the acceptance of stationarity.

Table 6: Augmented Dickey-Fuller unit root test

Variable	ADF t statistic	Level Prob
NPL	-3.8745	0.0001
ROA	-4.4752	0.0000
RIR	-2.2486	0.0123
log(BS)	-2.0278	0.0213
LATA	-3.3966	0.0003
GDPR	-2.9960	0.0014
INF	-2.5973	0.0047

Source: Authors' calculation

Apart from table 6, here are the hypotheses formulated to ensure the accuracy of the model:

H_0 : All models contain unit roots.

H_1 : At least one panel is stationary.

Considering all the variables, level probability is below 0.05 and therefore it can be concluded that the null hypothesis can be rejected meaning that panels are stationary.

As a result of all the previous tests proving to be satisfactory, the panel data regression together with Hausman test can be conducted. Hausman test offers the explanation whether fixed effects or random effects model is more suitable for the purpose of panel regression. As Đaković, Milenković and Andrašić (2024) outlined in their research, in order to test the suitability of a certain regression model, hypotheses are stated as it follows:

H_0 : Random effects model is adequate.

H_1 : Fixed effects model is adequate.

Table 7: Hausman test

Test summary	Chi-square statistic	Probability
	5.91	0.2057

Source: Authors' calculation

According to table 7, probability amounts to 0.2057 by which the null hypothesis can be accepted and it can be concluded that random effects model is adequate. As a result, table 8 shows the results of random effects panel regression and after that there is an in-depth discussion considering all the variables.

Table 8: Random effects model

Variable	Coefficient	Std.Error	t-statistic	Prob.
ROA	0.014492	0.281551	0.05	0.959
RIR	0.472700	0.218290	2.17	0.030
log (BS)	-2.659138	1.120175	-2.37	0.018
LATA	-0.459378	0.100087	-4.59	0.000
GDPGR	0.493523	0.100189	4.93	0.000
INF	-0.527531	0.155361	-3.4	0.001
constant	30.844510	6.780489	4.55	0.000
R2	0.475			
F-statistic	8.16			
Prob (F-statistic)	0.0000			

Source: Auhors' calculation

The results show that reference interest rate and GDP rate significantly and positively impact credit risk, which results in H_1 being accepted and H_5 being rejected. As for reference interest rate, our research corresponds to the studies of Chaibi and Ftiti (2014) and Ćurak, Poposki and Pepur (2013), whereas Zawadzki (2023) and Jović (2017) stated insignificance of the variable on credit risk. Higher reference interest rate enables banks to serve loans with the higher interest rate which leads to increase in debt and higher amount of non-performing loans as well. Besides, higher reference interest is the indication of potential recession on the market which always leads to customers' inability to pay off the loans. Ćurak, Poposki and Pepur (2013), Chaibi & Ftiti (2014), Radivojević and Jovović (2017) and Louzis, Vouldis and Metaxas (2012) revealed the opposite results of our research in the terms of the relationship between credit risk and GDP growth. The reason why our research differs up to an extent is the fact that economic prosperity of West Balkan markets depends on investment loans. Moreover, the loans are provided with the purpose of investing in certain economic activities and due to their great amount non-performing loans are considerable as well.

As for bank size, liquid assets to total assets and inflation rate, all of them exert a negative and significant influence on credit risk, meaning that H_3 and H_6 are accepted and H_4 is rejected. The results of Ćurak, Poposki and Pepur (2013), Us (2017), Abdelaziz, Rim and Helmi (2022) correspond to ours regarding bank size as greater bank assets ensure diversification. In other words, increased bank assets can offer banks other chances how to increase their portfolio apart from giving loans. By making the most of these alternatives West Balkan countries appear to decrease the level of credit risk. However, the research of Chaibi and Ftiti (2014) shows the same significance of inflation rate as ours, i.e inflation rate negatively impacts credit risk which does not correspond to Hariyanti (2024), Zawadzki (2023) and Abdelaziz, Rim and Helmi (2022). Even though it was expected that inflation rate positively impacts non-performing loans, the case in West Balkan countries is quite different where higher inflation is associated with diminishing in real value of outstanding loans in the banking sector and therefore the number of non-performing loans decreases accordingly. Also, higher inflation is connected to lower unemployment which additionally explains the negative relationship between inflation rate and credit risk. Even though Abdelaziz, Rim and Helmi (2022), Toh (2019), Tran, Nguyen and Duong (2022) presents that liquidity ratios positively impacts credit risk, our results attached to West Balkan market shows the opposite. The explanation is based on the fact that increased liquidity (expressed through liquid assets to total assets) enables banks to grant loans on a larger scale and it leads to greater amount of non-performing loans as a result of large credit exposure.

Our results show that the only variable which does not significantly affects credit risk is ROA which was not the case with the studies of Hariyanti (2024), Koju, Koju and Wang (2018) and Godlewski (2005). Their results emphasize the negative and significant relationship between the variable, which cannot be applied to our case. In the case of our mentioned region, certain banks can be profitable but still have an issue with credit risk as other aspects of banking activities are satisfactory. Also, credit risk exposure on West Balkan markets has mostly been influenced by external factors related to financial crisis whose outcomes are always a serious issue and sometimes are quite hard to control.

5.CONCLUSION

Credit risk management is of the great essence for banking institutions on turbulent markets, especially for bank-oriented countries since they highly depend on banks as leading financial institutions. Therefore, the main objective of the research is to outline the factors which play the key role in assessing credit risk.

Having conducted the research, the results show that all the variables, except from ROA, significantly impact credit risk on West Balkan market. A random-effects model summarized key relevant points which include both different countries as well as time range from 2013 to 2025. As a result, the research has proved that reference interest rate, real GDP rate, inflation rate, liquid assets to total assets and bank size should be regularly followed as they highly significantly contribute to the amount of non-performing loans on mentioned market.

This research would be highly beneficial to banking management to keep abreast of major credit risk factors, which would undoubtedly lead to better risk management. Permanent credit risk evaluation is essential as that is the only way how credit risk management can be monitored. Credit risk is attached to other aspects of the bank, e.g. liquidity risk as well as capital adequacy and for that reason an ongoing monitoring on certain factors is crucial.

As for limitations, this research cannot be applied to developed markets as West Balkan markets are emerging. Also, including data from the year 2013 to 2025 can be misleading for researchers whose aim is to cover longer time period.

The potential recommendation for further research would be to take additional determinants into consideration in order to have a thorough examination regarding credit risk factors. It is advisable to include more macroeconomic determinants as they might be quite challenging on the market.

REFERENCES

- Abdelaziz, H., Rim, B., & Helmi, H. (2022). The Interactional Relationships Between Credit Risk, Liquidity Risk and Bank Profitability in MENA Region. *Sage Journal*, 1-15., DOI: <https://doi.org/10.1177/0972150919879304>
- Beck, R., Jakubik, P., & Piloju, A. (2015). Key Determinants of Non-performing Loans: New Evidence from a Global Sample. *Open Economies Review*, 525-550., DOI: <https://doi.org/10.1007/s11079-015-9358-8>
- Chaibi, H., & Ffifi, Z. (2014). Credit risk determinants: Evidence from a cross-country study. *Research in International Business and Finance*, 1-13., DOI: <https://doi.org/10.1016/j.ribaf.2014.06.001>
- Cheng, L., Nsiah, T. K., Charles, O., & Ayisi, A. L. (2020). Credit risk, operational risk, liquidity risk on profitability. A study on South Africa commercial banks. A PLS-SEM Analysis. *Revista Argentina de Clínica Psicológica*, 5-18., Available at: <https://revistaclinicapsicologica.com/archivesarticle.php?id=110>
- Ćurak, M., Poposki, K., & Pepur, S. (2013). "Determinants of non-performing loans – evidence from Southeastern European. *Banks and Bank Systems*, 45-51.
- Đaković, M., Milenković, N., & Andrašić, J. (2024). Factors affecting the profitability of banks - Evidence from Serbia's banking sector. *Management: Journal of Sustainable Business and Management Solutions in Emerging Economies*, 73-83., DOI: <https://doi.org/10.7595/management.fon.2023.0006>
- Godlewski, C. J. (2005). Bank capital and credit risk taking in emerging market economies. *Journal of Banking Regulation*, 128-145., DOI: <https://doi.org/10.1057/palgrave.jbr.2340187>
- Hariyanti, A. D. (2024). Macro Determinants on Non-Performing Loans of Indonesia Commercial Banks (Credit Risk Scenario). *Jurnal Manajemen Indonesia*, 235-256., DOI: <https://doi.org/10.25124/jmi.v24i2.8214>
- Jović, Ž. (2017). Determinants of credit risk - the case of Serbia. *Economic Annals*, 155-185., DOI: <https://doi.org/10.2298/EKA1712155J>
- Koju, L., Koju, R., & Wang, S. (2018). Does Banking Management Affect Credit Risk? Evidence from the Indian Banking System. *International Journal of Financial Studies*, 1-8., DOI: <https://doi.org/10.3390/ijfs6030067>
- Kyriazos, T., & Poga, M. (2023). Dealing with Multicollinearity in Factor Analysis: The Problem, Detections, and Solutions. *Open Journal of Statistics*, 404-424., DOI: <https://doi.org/10.4236/ojs.2023.133020>
- Louzis, D. P., Vouldis, A. T., & Metaxas, 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*, 1012–1027., DOI: <https://doi.org/10.1016/j.jbankfin.2011.10.012>
- Naili, M., & Lahrichi. (2022). Banks' credit risk, systematic determinants and specific factors: recent evidence from emerging markets. *Heliyon*, 1-7., DOI: <https://doi.org/10.1016/j.heliyon.2022.e08960>
- Radojević, N., & Jovović, J. (2017). Examining of determinants of non-performing loans. *Prague Economic Papers*, 300–316., DOI: <https://doi.org/10.18267/j.pep.615>
- Radovanov, B., Milenković, N., Kalaš, B., & Marcikić Horvat, A. (2023). Do the Same Determinants Affect Banks' Profitability and Liquidity? Evidence from West Balkan Countries Using a Panel Data Regression Analysis. *Mathematics*, 1-17., DOI: <https://doi.org/10.3390/math11194072>
- Shrestha, N. (2020). Detecting Multicollinearity in Regression Analysis. *American Journal of Applied Mathematics and Statistics*, 39-42., DOI: <https://doi.org/10.12691/ajams-8-2-1>
- Toh, M. Y. (2019). Effects of bank capital on liquidity creation and business diversification: Evidence from Malaysia. *Journal of Asian Economics*, 1-19., DOI: <https://doi.org/10.1016/j.asieco.2018.12.001>
- Tran, O., Nguyen, D., & Duong, K. (2022). How market concentration and liquidity affect non-performing loans: evidence from Vietnam. *Polish journal of management studies*, 1-10., DOI: <https://doi.org/10.17512/pjms.2022.26.1.20>

- Us, V. (2017). Dynamics of non-performing loans in the Turkish banking sector by an ownership breakdown: The impact of the global crisis . Finance Research Letters, 109-117., DOI: <https://doi.org/10.1016/j.frl.2016.09.016>
- Zawadzki, A. (2023). Macroeconomic Determinants of Credit Risk on the Example of Non-performing Loans. Central European Economic Journal, 275-286., DOI: <https://doi.org/10.2478/ceej-2023-0016>