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Effects of the NPL on the banks' profitability during the COVID-19 pandemic: the case of the Republic of Serbia

Ефекти проблематичних кредита на профитабилност банака током КОВИД-19 пандемије: случај Републике Србије

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Abstract: During the pandemic caused by the new SARS-COV2 virus, the country's economic performance is lower than before the health crisis. The global health crisis has directly and indirectly affected the economic and financial indicators of almost all countries. Regardless of state financial aid, which inevitably prevented the collapse of the national economy and financial markets, certain economic sectors are still facing the consequences of the crisis. One of the reasons for the lower financial performance of countries in this period is the insufficient readiness of banks to deal with non-profitable loans. This study aims to consider the profitability of the banking sector concerning non-profitable loans in Serbia during the pandemic, using the methods of description, deduction, and regression. In addition, a comparison method was used to assess the ability of banks to deal with non-profitable loans during the previous global financial crisis. For statistical data processing, the official data of the National Bank of Serbia was extracted from the statistical section, as well as from annual and periodic reports. A linear regression model was used to measure the effect of the NPL on the banks' profitability in the period 2008-2021, after the regression assumptions had been successfully tested (such sample adequacy, distribution symmetry, and multicollinearity). Non-profitable loans, income from interest, ROA, and ROE are the variables used in regression modelling. The results showed that non-profitable loans do not have a statistically significant effect on banks' profitability.
Keywords: NPL, ROA, ROE, loans, regression analysis
JEL classification: C1, C40, C58, G21, G32

Сажетак: Током пандемије изазвне новим корона вирусом, економски учинак земље је нижи у односу на период пре настанка здравствене кризе. Глобална здравствена криза изазвана овим вирусом је утицала директно и индиректно на економске и финансијске показатеље готово свих земаља. Без обзира на државну финансијску помоћ, која је неминовно спречила колапс националне привреде и финансијских тржишта, одређени привредни сектори се још увек суочавају са последицама кризе. Један од узрочника нижег финансијског учинка земаља у овом периоду је недовољна спремност банака у суочавању са проблематичним кредитима. Ова студија има за циљ да размотри профитабилност банкарског сектора у односу на проблематичне кредите у Републици Србији током пандемије, коришћењем методе дескрипције, дедукције и регресије. Осим тога, коришћена је метода компарације за процену способности банака у суочавнању са проблематичним кредитима током претходне глобалне финансијске кризе. За статистичку обраду података коришћени су званични подаци Народне банке Србије естраговани из статистичког одељка, годишњих и периодичних извештаја. Након што су претпоставке регресионог моделирања (као

што су адекватност узорка, симетрија дистрибуције и мултиколинеарност) успешно тестиране, коришћен је линеарни регресиони модел за мерење утицаја проблематичних кредита на профитабилност банака у периоду 2008-2021. Проблематични кредити, приход од камата, ROA и ROE су варијабле које се користе у регресионом моделирању. Резултати су показали да проблематични кредити немају статистички значајан утицај на профитабилност банака.
Кључне речи: НПЛ, ROA, ROE, кредити, регресиона анализа
ЈЕЛ класификација: C1, C40, C58, G21, G32

Introduction

Banks have a significant role in a country's economic growth as they are mediators between the investor or the borrower and the country's industry (Christaria & Kurnia, 2016; Jakšić, 2021). After the global financial crisis, significant attention was paid to studying banks' creditworthiness and the accumulation of non-profitable loans, and their impact on economic growth (Serrano, 2020). The creditworthiness of the banking sector has weakened since the beginning of the pandemic caused by the SARS-COV2 virus in many countries around the world and the region (Slijepčević, 2021). Banks' low creditworthiness, inter alia, was caused by non-profitable loans (hereinafter: NPLs). NPLs are one of the determinants of banks' profitability as high levels of these loans have a negative impact on a bank's net income, which is determined by analysing doubtful debts and writing off bad debts. This affects not only net income (profitability) but also bank's equity (Ombaba, 2013). When a bank is unable to collect loans that exceed the bank's equity, this results in a banking crisis, which often escalates into a financial crisis (Biabani et al., 2012). The last global financial crisis occurred around 2008.

Empirical research, such as those conducted by Psaila, Spiteri & Grima (2019), and other research covered in the literature review, pointed to a possible or determined link between high levels of NPLs and banks' low profitability. On the other hand, studies have shown that NPLs are poorly managed by the banks' management, in the form of inappropriate NPL monitoring. If the bank's management additionally saves on NPL monitoring resources to reduce operating costs, this points to poor control of the loan portfolio and, consequently, to poor bank management (Louzis, Vouldis & Metaxas, 2010). During the last period, investments in bank management operations, especially in digital technologies, are crucial for the banks' profitability growth potential (Musabegović et al., 2021).

Theoretical bases, empirical research, and new circumstances caused by the pandemic prompted the author of this paper to develop hypotheses on the analysis of the relationship between NPLs and banks' profitability in the Republic of Serbia (hereinafter: the RS). Banks' profitability parameters used in this paper are: return on assets (hereinafter: ROA) and return on equity (hereinafter: ROE). Considering the prevalence of empirical research results that show NPLs' negative impact on banks' profitability, a negative relationship is expected between these indicators. According to the findings of the author of this paper, no research has been conducted on NPLs' impact on banks' profitability in the RS which is grounded on the methodological basis of this paper during the pandemic. Therefore, the aim of this research is to make up for this shortcoming in the scientific literature.

For the purpose of clarity of this paper, it is organized into sections and sub-sections. The following section of the paper looks into the interdependence of NPLs and the profitability of the banking sector and includes the literature published before the pandemic. The second section of this paper reviews literature related to NPLs and banks' profitability published during the pandemic, as well as the trends analysis in our country. The third section of this paper presents the data used for statistical analysis, and the models used for measuring the relationship between variables. The fourth section discusses research results, whereas the last section of the paper presents conclusions and recommendations for further research.

1. Interdependence of non-profitable loans and banking sector profitability

In the empirical analysis of Ranjan & Dhal (2003), the authors conducted research related to the link between NPLs and commercial banks' profitability in India. For the purposes of the (panel) regression analysis, these authors took into account parameters such as the size of banks, macroeconomic indicators, interest rates, and credit cultures in this country. The outcome of their research showed that NPLs' growth has a negative effect on banks' profitability.

After reforms that covered the banking sector in Nigeria, research was conducted on examining NPLs' impact on the banks' profitability in this country. Based on annual data for the period 2006-2012 and applying the regression analysis, the outcome of Adebisi & Matthew (2015) showed that NPLs have a double impact on banks' profitability. Namely, it was determined that NPLs affect ROA, while they do not affect ROE of the banks in this country. In both cases, the regression coefficients are negative, pointing to the negative impact that NPLs had on both ROA and ROE, whereas the regression model for ROE did not show statistical significance. The credibility of both models is moderately high (R-Square for the ROA model = 69%, and R-Square for the ROE model = 68%).

The research conducted by Christaria & Kurnia (2016) included an analysis of the impact of capital adequacy ratios, loan and deposit ratios, and NPLs on ROA in Indonesian listed banks. Using banking sector data for the period 2012-2014 and applying multiple linear regression, the results indicated that all independent variables have a significant impact on banks' ROA, with the model credibility of 49.3%.

In their analysis of NPLs' impact on the profitability of 35 listed commercial banks, Psaila, Spiteri & Grima (2019) took into consideration seven countries in the Euro-Mediterranean region. For the purpose of determining whether the change in NPL levels affects the ROA of listed commercial banks, these authors used secondary data (official data sources and data from banks' annual reports) for the period 2013-2017. Their econometric approach consisted of applying four regression models in which control variables were the liquidity and solvency ratios of these banks. Built on the results of the data analysis, they found that NPLs have a negative effect on the ROA of these banks, while the solvency ratio significantly explains variations within the dependent (ROA) and independent (NPL) variables.

Serrano (2020) measured the NPLs' impact on credit activities in banks in European countries. For this purpose, he used the data collected from 75 banks for the period 2014-2018. For the purpose of measuring this impact, he conducted the regression analysis showing that NPLs' growth has an impact on a decline in credit growth, which affects the real economy. In addition, it was noticed that in crisis periods banks have a higher growth rate of lending to the economy compared to the rate of lending to individuals.

2. Non-profitable loans during the pandemic caused by SARS-COV2

After the global financial crisis, the balance sheets of European banks showed that the NPL levels increased significantly, which reduces the capacity of these banks to lend to economic activities (Thornton & Di Tommaso, 2020). This condition of banks led European policymakers to create an NPL reduction strategy with the aim of restoring the stability of the banking system in Europe (Council of the European Union, 2017). Similar balance sheet figures in banks were recorded outside Europe, i.e. in other developed and less-developed countries, during the pandemic. There has been strong government support to maintain stability during the COVID-19 pandemic in Serbia as well (Čavlin, Đokić & Miletić, 2022).

Based on a sample of 10 Indonesian banks and based on the information used from their reports, Irwan et al. (2022) examined the impact of NPLs on ROA during the pandemic. Using the Wilcoxon test and descriptive analysis, the authors found that NPLs are one of the most important indicators that influence ROA performance. In addition, they found that the pandemic was the main cause of a decline in the performance of the banking sector, which is reflected in the negative relationship between NPLs and ROA, i.e. in the NPLs' negative impact on ROA. In this regard, the Wilcoxon test of NPLs proved to be statistically significant for ROA (value amount = 0.02%, p-value < 0.05). Using the qualitative approach to scientific research, Agustin & Solikin (2021) studied the effects of the implementation of SMEs (small and medium-sized enterprises) credit restructuring policies in Indonesia during the pandemic. Relying on the results of previous research, as well as on NPL regulations in that country, these authors found that SMEs efficiently implemented credit restructuring policies. In addition, they found that the efficient implementation of these policies requires cooperation between different institutions, industrial sectors, and regulations of the government of that country.

Concerning the effects of the pandemic on the banks' profitability in Europe, a study was conducted with the purpose to find and measure the connection between the effects of the pandemic and ROA and ROE (Haider & Mohammad, 2022). The sample consisted of 500 banks from Europe (Germany, England, France, Italy, and Spain) and South Asian countries (India, Bangladesh, Pakistan, and Sri Lanka). Data were collected on a quarterly basis for the period 2016-2021, and the regression model was used to evaluate the impact of variables (for both developed and developing countries). The results of the research of these authors showed that the impact of the pandemic on banks' ROA and ROE has been statistically significant and that there is a difference in the results obtained for developed and developing countries. The difference is reflected in the size of banks and their liquidity, which

takes precedence over other determinants such as banks' efficiency and credit quality. Namely, the pandemic caused a ROA and ROE decline in European banks, whereas profitability increased in South Asian banks.

Grubišić, Kamenković & Kaličanin (2022) studied the relationship between profitability and market power in the banking sector in Serbia. Using the data for the period 2010-2019, collected from banking reports, and the regression analysis, their results showed that variations in the concentration ratio may explain ROA and ROE changes, and claimed that banks' profitability may largely be the result of banks' efficiency. The credibility of the regression models of these authors varies from 39 to 61%.

In the research conducted by Vesić (2021), the author conducted an NPL analysis in the banking sector in the RS with the intention to make a prediction for the period 2020-2025. This author made two types of predictions for an optimistic and pessimistic scenario. The optimistic scenario assumes a CAR (capital adequacy ratio) increase by 30%, and the pessimistic scenario assumes a reduction also by 30%. The results of the optimistic scenario showed that NPLs in Serbia will shoot up in the relevant period. In this regard, this author claims that it can be expected that the Government of this country will take various measures to support the sustainability of the national economy during the pandemic. However, the banking sector will have unfavourable conditions because the capital adequacy ratio will be significantly above the minimum (it will increase from 8% to 12%). In terms of the pessimistic scenario, the results showed that NPLs will increase by more than 3 times, which will significantly affect the movement of NPLs in Serbia. This last could lead to the bankruptcy of a number of banks in this country. In case certain banks go bankrupt, certain companies may stop operating, and the final result may be an economic crisis.

Based on empirical research, the theoretical frameworks, and the goals of this paper, the following hypotheses have been formulated:

H1: NPLs have a negative and significant impact on ROA in the RS for the period 2008-2021;

H2: NPLs have a negative and significant impact on ROE in the RS for the period 2008-2021.

The following section of this paper presents an analysis of the NPL trend in the RS in relation to ROA and ROE and a review of the new situation caused by the SARS-COV2 pandemic. This analysis seeks to validate, invalidate or complement previously conducted research, as well as to point to potential future trends of defined indicators.

2.1. The current NPL trend in the RS

Before presenting the data and the methodological framework, the author of this paper presents the NPL trend in the RS for the period of the global health crisis. This trend is presented for a more efficient understanding of the current situation in terms of the goal of this research and the situation in the domestic credit market, as well as a more credible interpretation of the results.

Ten banks make up half of the total assets of the RS banking sector (NBS, 2021a). The total loan balance consists of loans to the corporate sector and loans to the retail sector. To be more accurate, total domestic placements are the sum of receivables from loans, securities, interests, fees, and other receivables. An overview of the credit activity and NPL indicators are presented in Table 1.

Table 1: The credit activity trend in the RS: 2020-2021

		Q1 2021	Q2 2021	Q3 2021	Q4 2021	Q1 2022
Share in total loans*	Corporate sector	8.4	20	49.1	59.8	64.1
	Retail sector	22.5	44.8	37.8	28.8	23.3
NPLs share in total loans**	Corporate sector	3.1	2.9	2.9	2.8	2.4
	Retail sector	4.1	4	3.9	4	4.2
* billion RSD, ** %						

Source: the author's calculation. Adjusted according to NBS quarterly reports

In Q1 2021, total domestic placements indicated a slowdown in year-over-year growth by an average of 9.7%. In this period, part of the total loans were loans to the corporate sector (investment loans) in the amount of RSD 8.4 billion, while loans to the retail sector increased by RSD 22.5 billion (1.8%). With regard to total NPLs, their share in total loans amounted to 3.9% in March 2021, of which 4.1% accounted for the retail sector, and 3.1% for the corporate sector. The data were calculated in relation to the end of 2020 (NBS, 2021a, p. 6-15).

In Q2 2021, total domestic placements indicated an accelerated year-over-year growth by an average of 6.3% compared to the previous year. In this period, loans to the corporate sector increased by RSD 20 billion, while loans to the retail sector increased by RSD 44.8 billion. The share of NPLs in total loans amounted to 2.9% for the corporate sector, and 4% for the retail sector in June 2021. The data were calculated in relation to March 2020 (NBS, 2021b, p. 6-13).

In Q3 2021, loans to the corporate sector increased by RSD 49.1 billion, and loans to the retail sector increased by RSD 37.8 billion. In terms of total NPLs, their share in total loans amounted to 2.9% for the corporate sector, and 3.9 for the retail sector. The data were calculated in relation to June 2020 (NBS, 2021c, p. 6-15).

In Q4 2021, total domestic loans recorded high growth (one of the highest in Europe). Lending was predominantly directed toward the corporate sector than toward the retail sector, which confirms the economic crisis caused by the health crisis. Part of the total loans were loans to the corporate sector which increased by a record RSD 59.8 billion compared to the beginning of 2021. Loans to the retail sector increased by RSD 28.8 billion (mainly housing loans). Regarding total NPLs, their share in total loans amounted to 3.5% in December compared to September 2021, of which 4.0% accounted for the retail sector, and 2.8% for the corporate sector. The data were calculated in relation to September 2021 (NBS, 2021d, p. 6-14).

In Q1 2022, total loans grew slowly but continuously. The share of loans to the corporate sector in total loans increased by RSD 64.1 billion, while NPLs' share in this sector decreased compared to the previous period and amounted to 2.4%. On the other hand, loans to the retail sector increased by RSD 23.3 billion, while NPLs' share in this sector amounted to 4.2% in March 2022. The data were calculated in relation to December 2021 (NBS, 2022a, p. 6-15).

From the beginning of 2021 to the end of Q1 2022, the year-over-year growth of credit activity increased rapidly. Investment loans and loans for helping the economy during the health crisis made the dominant share. The goal of increased lending to the corporate sector and decreased lending to the retail sector in order to maintain the national economy has been partially achieved. On the other hand, the dominant share in loans to the retail sector was housing loans (60% in Q1 2022), which matches the market logic of investing in real estate during crisis periods. NLPs' share in total loans had a decreasing trend until Q3 2021, following a slight increase until Q1 2022 for the retail sector, while it is continuously decreasing for the corporate sector largely due to the measures taken by the RS Government during the pandemic.

3. Data and methodology

3.1. Definition and description of data

According to the definition and methodological explanation of the National Bank of Serbia (hereinafter: the NBS), NPL is a credit balance of the total remaining debt of an individual loan. The total remaining debt includes loans whose settlement by the debtor is delayed (interests or principals) by more than 90 days or less in the event the bank makes an assessment that the debtor's creditworthiness is risky. The debtor's risk capacity is estimated by analysing the debt repayment trend when it is considered that it has been called into question. In addition, the loans for which it has been calculated that the interest rate is equal to or higher than the quarterly amount of debt are also included (NBS, 2021a).

ROA and ROE indicators are defined according to Petersen & Schoeman (2008), whose definition matches the general definition of these indicators. Bank performance is determined by measuring ROA indicators, i.e. return on assets. The return on assets is calculated using the following equation:

$$ROA = \frac{net\ income}{bank's\ assets} \quad (1)$$

ROA, as a profitability indicator, shows how efficient the bank's management is in using the banks' resources (investments, interests, fees) to generate profit. ROE, as another banks' profitability indicator, represents the return on banks' equity and is calculated using the following equation:

$$ROE = \frac{net\ income}{bank's\ equity} \quad (2)$$

This indicator represents the return on equity (principal). ROE indicates the level of banks' earnings based on the value of investments according to the bookkeeping system of that bank. In other words, ROE measures the earnings of a bank based on the carrying amount of its investments (assets) and indicates the bank's efficiency in operational, financial, and tax terms.

According to NBS (2022b), income from interest is measured by applying the effective interest rate to the carrying amount of exposure (when exposure is defined as the result of an impairment loss). In other words, income from interest is measured by applying the effective interest rate to net impairment. Income from interest is one of the basic determinants of banks' income. NBS defines income from interest as an interest margin in relation to gross income.

In this paper, annual values are expressed in % according to the original NBS data. According to the key macroprudential indicators of the RS (NBS, 2022c), data for 2021 are expressed in quarterly values, thus, the authors of this paper calculated the annual value of the indicator using the mean formula (arithmetic mean) for all variables (see section 3.3). The description and definition of used indicators are followed by the specification of the models used for analysing the relationship between them.

3.2. Model specification

A regression model was used for estimating the relationship between NPLs and ROA and the relationship between NPLs and ROE, according to the examples of Perić (2020) and Mirović et al. (2022). By including the selected modelling variables in the general regression specification

$$Y_t = \alpha + \beta^t X_t + \varepsilon_t \quad (3)$$

the following models are formulated:

$$ROA_t = \alpha + \beta_1 NPL_t + \beta_2 IFI_t + \varepsilon_t \quad (4)$$

$$ROE_t = \alpha + \beta_1 NPL_t + \beta_2 IFI_t + \varepsilon_t \quad (5)$$

where: ROA_t and ROE_t – dependent variables, α – constant, that is, the mean value of Y (cross-section), β – regression coefficients (estimation of explanatory variables), NPL_t and IFI_t – independent variables, and ε_t – random error of the model.

The role of the IFI indicator in modelling is deemed necessary as income from interest contributes to the overall banks' profitability.

The p-value is used for assessing statistical significance. The p-value represents the statistical significance of a model ($p < 0.05$). If p is > 0.05, the regression model or its coefficients are not statistically significant. The test for variable significance is also performed using the t-test. The level of significance of the t-test is set at 95% for testing

hypotheses. Before performing models 4 and 5, it is necessary to observe the statistical description of indicators.

3.3. Descriptive statistics

In statistical analysis, especially when it comes to the regression model, it is necessary to determine the appropriate size of a sample. The sample size is important as it represents the basis for model validity. If the sample size is below the minimum number of observations ($N_{min} = 10$), it is not expected that the regression model will produce valid results. The same principle applies to oversized samples. Although there is no precisely defined rule on the sample size, the research community believes that at least 10 observations per variable should be used for the application of the regression model, that is, at least 30 observations in case the model has three or more independent variables (e.g. Verbeek & Nijman, 1993; Timofeev, 2004). Considering that the sample in this paper is size 14 and the regression model has 2 independent variables, the sample requirements for the application of the regression model have been met. The description of variables is presented in Table 2.

Table 2: Descriptive statistics

Valid N = 14	Range	Min	Max	Mean		Std. Dev.	Variance	Skewness (std.err. =0.597)	Kurtosis (std.err. =1.154
	Stat.	Stat.	Stat.	Stat.	Std. Err.	Stat.	Stat.	Stat.	Stat.
Year	13	2008	2021	2014.5	1.118	4.183	17.500	0.000	-1.200
NPL	17.92	3.68	21.6	13.57	1.871	7.000	49.005	-0.382	-1.557
ROA	2.3	-0.1	2.2	1	0.216	0.810	0.655	0.214	-1.302
ROE	11.7	-0.4	11.3	5.13	1.084	4.057	16.458	0.135	-1.468
IFI	9.1	58.4	67.5	62.95	0.857	3.206	10.276	0.037	-1.553

Source: the author's calculation

Assuming a normal distribution of variables N(0.1), the symmetry of the data was verified. The Skewness and Kurtosis tests were used for this control. Considering that asymmetry values of both normality tests are acceptable (between -2 and 2 for Skewness and between -7 and 7 for Kurtosis), distribution is considered to be symmetric, and modelling can be continued (e.g. Blanca et al., 2013). In addition, multicollinearity has been tested and it is under the value of 10 (VIF = 5.478), meaning that there is no high multicollinearity between variables, and the regression model can be run (e.g. Salmeron Gomez et al., 2020).

Table 2 shows that the number of observations is identical for all variables (14), which indicates the completeness of data in the selected time series for the period of min = 2008 to max = 2021. The highest percentage of NPLs (max = 21.6) was recorded in 2015, while the lowest percentage of NPLs (min = 3.68) was recorded in 2021. The average ROA value (mean = 1, std. dev. = 0.81, var = 0.66) shows that the return on assets was 1% on average in the selected period. On the other hand, the average ROE value (mean = 5.13, std. dev. = 4.1,

var = 16.5) is higher than the average ROA value and shows that the return on equity was 5.13% in the same period. The profit resulting from interests was 62.95% on average (std. dev. = 3.2, var = 10.28) while the lowest value of this indicator was 58.4% in 2017, and the highest was 67.5% in 2013.

4. Results and discussion

Before the application of regression models and testing the hypotheses, a correlation analysis was conducted in order to determine the nature of the relationship between variables, that is, the positive or negative. The Pearson correlation coefficient (r) was used in this analysis, and the correlation matrix is presented in Table 3. It contains the statistical significance of the relationship (p-value, that is, Sig. at the level of 1% and 5%), as well.

Table 3: Correlation matrix

		Year	NPL	ROA	ROE	IFI
Year	Pearson Correlation	1	-.652*	0.252	0.399	-0.479
	Sig. (2-tailed)		0.012	0.385	0.158	0.083
NPL	Pearson Correlation	-.652*	1	-.776**	-.861**	.904**
	Sig. (2-tailed)	0.012		0.001	0	0
ROA	Pearson Correlation	0.252	-.776**	1	.984**	-.924**
	Sig. (2-tailed)	0.385	0.001		0	0
ROE	Pearson Correlation	0.399	-.861**	.984**	1	-.960**
	Sig. (2-tailed)	0.158	0	0		0
IFI	Pearson Correlation	-0.479	.904**	-.924**	-.960**	1
	Sig. (2-tailed)	0.083	0	0	0	
* Correlation is significant at the 0.05 level (2-tailed).						
** Correlation is significant at the 0.01 level (2-tailed).						

Source: the author's calculation

Correlation coefficient values represent the level of correlation between variables. The correlation level can range from 0 to 1, where 0 is the lowest (non-existent) and 1 is the highest (absolute) level of correlation. According to the statistical community (e.g. Cohen, 1988), the low level of correlation ranges from 0.10 to 0.29, the medium level of correlation ranges from 0.30 to 0.49, while the high correlation level ranges from 0.50 to 1. Grounded on the correlation analysis presented in Table 3, both positive and negative correlations between variables are observed. There is a positive relationship between NPLs and IFI ($r = 0.904$), which is statistically significant ($p < 0.05$), and indicates a quite high correlation between these two variables. High correlation represents a high degree of interdependence between variables, which confirms theoretical and empirical bases. In addition, a high degree of positive correlation exists between ROA and ROE ($r = 0.984$) which is statistically significant ($p < 0.05$). This last was expected because both indicators of banks' profitability are closely related. In terms of negative correlations, there is a significant relationship ($p < 0.05$) between NPLs and ROA ($r = -0.776$) and NPLs and ROE ($r = -0.861$), which indicates that an increase in one indicator causes a decrease in another. It is assumed that NPLs' growth causes a reduction in ROA and ROE, which will be analysed by applying the regression

model. In addition to these negative correlations, there is a high and statistically significant relationship between IFI and both profitability indicators. Namely, the correlation coefficient between IFI and ROA is r = -0.924 and between IFI and ROE is r = -0.960, pointing to a high degree of probability that the growth of income from interest causes a decrease in banks' profitability in terms of coefficient "r", and vice versa. In order to determine the impact of independent variables on banks' profitability, a regression analysis was conducted and presented in Tables 4 and 5 below.

Table 4: Impact of NPLs on ROA in the RS: 2008-2021, in %

ROA model (4)		Non-std. coeff.		Std. coeff.	t	Sig.	95% Confidence interval for B	
p-value = 0.000		B	Std. Err.	Beta			Lower Bound	Upper Bound
R Sq. = 0.935	Cons.	19.90	3.633		5.478	0.000	11.904	27.895
Adj R Sq. = 0.81	NPL	0.038	0.029	0.329	1.311	0.216	-0.026	0.102
Durbin-Watson = 2.139	IFI	-0.308	0.063	-1.221	-4.874	0.000	-0.448	-0.169

Source: the author's calculation

In the representative regression model, where ROA is a dependent variable, the empirical value of the model is p = 0.000, which indicates its high statistical significance. The credibility of the model is also high and amounts to 81%. The value of Durbin-Watson statistics is higher than 2, which explains the lack of positive serial correlation. When testing the first hypothesis, different causalities with ROA can be found. In this regard, regression model (4) shows that there is a positive causality with NPLs in the amount of 0.038%, which is not statistically significant (p = 0.216). Based on this result, it is concluded that non-profitable loans do not statistically affect the return on assets growth. In addition, there is a negative causality with IFI in the amount of -0.308%, which is statistically significant (p = 0.000). This last explains that the growth of income from interest affects the growth of the return on banks' assets. Based on the obtained results, the first hypothesis is rejected.

Table 5: Impact of NPLs on ROE in the RS: 2008-2021, in %

ROE model (5)		Non-std. coeff.		Std. coeff.	t	Sig.	95% Confidence interval for B	
p-value = 0.000		B	Std. Err.	Beta			Lower Bound	Upper Bound
R Sq. = 0.960	Cons.	83.983	14.32		5.865	0.000	52.464	115.50
Adj R Sq. = 0.922	NPL	0.021	0.114	0.037	0.187	0.855	-0.230	0.273
Durbin-Watson = 2.199	IFI	-1.257	0.249	-0.993	-5.040	0.000	-1.806	-0.708

Source: the author's calculation

The value of the ROE model is p = 0.000, and it is 92.2% credible, while the value of Durbin-Watson statistics is higher than 2. When testing the second hypothesis, similar structural results are found as in the previous model. Namely, the ROE regression model

displays a positive causality with NPLs in the extent of 0.021%, which is not statistically significant (p = 0.855), and a negative causality with IFI in the amount of -1.257%, which is statistically significant (p = 0.000). Founded on these results, it is concluded that non-profitable loans do not have a statistically significant impact on the return on banks' equity, which is why the second hypothesis is rejected. On the other hand, income from interest has a positive and significant impact on the return on banks' equity, that is, growth, which is in line with the previous empirical research and the logic that banks are guided by in terms of income.

Considering the results of the regression analysis there is no statistically significant relationship between NPLs and indicators of banks' profitability in the RS in the period 2008-2021. In other words, NPLs' growth does not statistically affect the reduction of ROA and ROE. The results of this research counter Ranjan & Dhal (2003), partially Adebisi & Matthew (2015), as well as Psaila, Spiteri & Grima (2019) and Irwan et al. (2022).

Considering the descriptive and deductive method, it may be concluded that the banking sector in the RS is not threatened by a banking crisis of such magnitude that would lead to the collapse of the banking sector and the financial crisis such as in 2008 (Ombaba, 2013; Biabani et al., 2012). Such a conclusion is given to a certain extent due to the measures that the RS government took preventively and reactively during the pandemic, and also due to efficient NPL management of large banks (Louzis et al., 2010). In addition, in accordance with the NPL trend, which was the highest in 2015 (several years after the global financial crisis), and the lowest in 2021 (during the pandemic) no sudden increase in NPLs is expected in the near future. However, it is necessary to monitor this trend with caution.

Based on the analysis of the current NPL trend, the claims of Serrano (2020) that banks in crisis periods tend to have higher rates of lending to the corporate sector and lower rates of lending to the retail sector are confirmed. In addition, after the global financial crisis (Thornton & Di Tommaso, 2020), slight NPLs growth in the RS, unlike in Europe, did not dramatically reduce the credit capacity of banks, which indicates the balanced liquidity of banks.

Conclusion and recommendations

The aim of this paper was to analyse the NPL trend in the RS with reference to banks' profitability during the health crisis caused by the new SARS-COV2 virus. This paper identified NPLs' impact on banks' profitability in this country for the period 2008-2021 and compared results with the previous global financial crisis. ROA and ROE were used as profitability indicators. In regression modelling, the IFI variable was used as one of the basic determinants of banks' income. In addition to regression models, a descriptive analysis of NPL trends in this country was conducted to gain insights into the current situation and a more credible interpretation of the results of this research. The results of this research showed that the growth of non-profitable loans does not statistically cause the reduction of banks' profitability.

Despite theoretical interests and empirical research, different studies link different variables with banks' profitability. Therefore, further research may expand the choice of independent variables depending on the choices and decisions of researchers. Limitations of this research may be seen in the following points, which also serve as recommendations for future research. First, econometric models could be taken into consideration in a larger number of observations to increase the probability of obtaining statistical significance of several independent variables. Second, GLS (generalized least squares) regression could be applied to make a comparison with the results of this study and to examine which regression model better describes the impact of independent variables on banks' profitability. Third, the sample would be larger if modelling was done with quarterly or monthly data, or if the time frame was considerably wider. In this case, even if there was a lack of data in time series, LMM (linear mixed model) could be applied, which takes into account not only fixed but also random effects. Fourth and last, models from this research could be reproduced with additional indicators of liquidity and banks' equity adequacy and/or standardized modelling data.

Lessons learned from the SARS-COV2 pandemic are based, inter alia, on the fact that banking crises are inevitable. In this regard, it may be concluded that the financial system and the banking sector should be prepared for the challenges caused by global financial shocks. Based on this, it is recommended that the banking sector perform lending activities selectively and to exercise continuous control over NPLs, even when this requires additional operating costs. This falls into the field of risk management, which is necessary for the improvement of banks' profitability, and which affects the level of trust of credit users and the general public. In addition to more efficient risk management conducted by banks' management, based on empirical studies it is recommended to banks' management to maintain low capitalization rates and take into account solvency, especially in the crisis period and particularly when NPLs rates are high. A high NPL level may be an indicator of the beginning of an economic crisis in the country. Therefore, it is quite important that institutions, supreme authorities, and fiscal and monetary decision-makers continuously analyse and envisage risks that may arise from the SARS-COV2 pandemic in order to prevent or mitigate negative consequences for the banking system, citizens, and the national economy. Finally, with regard to recommendations for decision-makers and institutional bodies that manage the country's macroeconomics and general economic growth, it is recommended to adopt and revise monetary, fiscal, and social measures which will, by mutual collaboration, keep under control public debt and unemployment, inflation and interest rates, especially in times of crisis, in order to contribute to the financial system and, consequently, to the banking sector.

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