THE EFFECT OF RECENT CRISIS SITUATIONS ON THE SUSTAINABILITY OF INDEBTEDNESS OF THE FINANCIAL SECTOR OF SERBIA

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Abstract: This study examines how recent crises have affected the capacity of the Serbian financial sector to service its debt. The research, which covers the years 2014 to 2022 and focuses on the financial and economic difficulties faced by the industry after the crisis, uses the debt ratio as its primary dependent variable and several selected macroeconomic and microeconomic indicators as independent variables. The aim of the study is to show how resilient and adaptable the industry is to challenging economic circumstances by examining the dynamics of indebtedness in the financial sector during periods of crisis. The results of this study will improve the understanding of the capacity of the financial sector to sustain debt during periods of economic crisis and will provide insight to policymakers, industry participants, and financial institutions regarding possible approaches to increase financial stability and longevity in this domain.

Keywords: Indebtedness, debt, financial sector

JEL classification: G10, G21, G32

1. INTRODUCTION

The financial stability of banking institutions is intricately intertwined with the complex interplay of macroeconomic and microeconomic factors. Nowhere is this more evident than in the context of Serbia, where banks navigate a dynamic economic landscape shaped by both domestic and global forces. Understanding the influence of these macroeconomic and microeconomic factors on the debt levels of banks in Serbia is crucial for assessing their resilience and sustainability within the financial system. At the macroeconomic level, factors such as GDP growth, inflation rates, and government fiscal policy play significant roles in shaping the operating environment for banks. Economic growth can stimulate loan demand, leading banks to extend credit more liberally, while inflationary pressures and exchange rate volatility can affect the value of assets and liabilities on banks' balance sheets On the microeconomic front, factors such as bank-specific characteristics, risk management practices, and regulatory frameworks exert considerable influence on debt dynamics. Banks' capital adequacy, liquidity management, and asset quality significantly impact their ability to manage debt effectively. The interaction between macroeconomic and microeconomic factors creates a dynamic environment wherein banks in Serbia must navigate to maintain sound financial health. Understanding the intricate relationship between these factors is essential for policymakers, regulators, and market participants alike to formulate effective strategies for ensuring the stability and resilience of the banking sector amidst evolving economic conditions.

There are five sections in the paper. The topic and purpose of the research were stated in the first

part, along with some opening remarks. A review of the pertinent literature is included in the next section. The methodological framework of the study is covered in the third section, along with a list of the econometric models and pertinent diagnostic tests that were used. The research findings are presented and their significance is discussed in the fourth section. The collected results are described in the final part, which also contains recommendations for additional research and a list of the study's shortcomings.

2. THE REVIEW OF LITERATURE

Djalilov & Piesse (2016) conducted a study to investigate the determinants influencing bank profitability in early-transition CEE (Central and Eastern Europe), late-transition countries in the former Soviet Union, and both. Petria, Capraru, and Ihnatov (2015) conducted an investigation of 27 European Union financial systems as part of another study. One of the research looked at whether raising capital requirements makes banking institutions run more economically and effectively while lowering risk. It encompassed 39 OECD nations (Bitar, Pukthuanthong & Walker, 2018). The results showed that while both risk-based and risk-free capital ratios boost bank productivity and profitability, risk-based capital ratios do not lower bank risk.

Singhal, Goyal, Sharma, Kumari, and Nagar's (2022) study includes a capitalization and profitability ratio analysis using the banking sectors of the BRICS nations as an example.

Adelopo, Lloydking, and Tauringana's (2018) study examined the relationship between macroeconomic factors unique to banks and bank profitability in the African ECOWAS member states prior to (1999–2006), during, and following the financial crisis (2010–2013). Islam & Nishiyama (2016) investigated how 259 banks in South Asian nations like Bangladesh, India, Nepal, and Pakistan were affected by macroeconomic, industry-specific, and bank-specific factors. Lopez-Penabad, Casal, and Neto (2022) concluded that a brief decline in interest rates reduces the net interest margin when rates are already negative.
There are several studies pertaining to the analysis of banking indicators in a single country in addition to research encompassing multiple countries. Alaagam (2019) investigated the variables influencing Saudi Arabian banks' profitability. The Madugu, Ibrahim, and Amoah (2019) study was centered on Ghana's banking industry. Numerous scholars have examined the profitability of public and private banks in the Indian market, including Bansal, Singh, Kumar,

and Gupta (2018), Brahmaiah & Ranajee (2018), Kiran & Jones (2016), and Narwal & Pathneja (2016). Acaravci & Calim's (2013) study concentrated on the profitability of the Turkish banking industry and the effects of macroeconomic and microeconomic variables. Miljković, Filipović & Tanasković (2013) featured a comparison of Serbia's banking industry with those of Central, Eastern, and Southern Europe, as well as an examination of the banking sector's market concentration. Conversely, a study conducted in 2019 by Vesić, Gavrilović & Petronijević contained a summary of the liquidity and profitability of the biggest banks in Serbia's banking industry.

3. RESEARCH METHODOLOGY

An investigation of 20 banks from Serbia's financial industry is part of the research. The coverage period was from 2014 to 2022, with a segmentation between times immediately following and during crises. The years 2018 to 2022 are categorized as the post-crisis period, whereas the years 2014 to 2017 are regarded as the crisis period. To have a deeper understanding of the impacts of macroeconomic and microeconomic factors, segmentation was carried out. The dynamic GLS (Generalized Least Squares) model is used, and it represents a statistical method used to analyze data by accounting for heteroscedasticity and serial correlation, allowing for more accurate parameter estimation in dynamic systems. The dependent and independent variables utilized, together with the computation techniques, are displayed in Table No. 1 below.

Table 1. Dependent and independent variables

Variables	Calculation	Symbol
Dependant variables		
Debt/Assets	Total debt/Total assets	DEBT
Independent variables		
General Liquidity	Current assets/Current liabilities	GL
Profitability	Net profit/ Total assets	ROA
Net interest margin	Net interest profit/Total assets	NIM
Capital adequacy	Capital/Risk weight assets	CA
Nonperforming loans	% Nonperforming loans	NPL

Variables	Calculation	Symbol
Gross domestic product	% Annual growth	GDP
Inflation	% CPI Annual	INF

Source: author's

Based on defined segmentation criteria as well as dependent and independent variables, the authors generated the following equations:

$$CDebt_{it} = \alpha + \beta_1 GL_{it} + \beta_2 ROA + \beta_3 NIM_{it} + \beta_4 CA_{it} + \beta_5 NPL_{it} + \beta_6 GDP_{it} + \beta_7 INF_{it} + \varepsilon$$

$$PcrDebt_{it} = \alpha + \beta_1 GL_{it} + \beta_2 ROA + \beta_3 NIM_{it} + \beta_4 CA_{it} + \beta_5 NPL_{it} + \beta_6 GDP_{it} + \beta_7 INF_{it} + \varepsilon$$

Where are:

CDebtit = Debt to assets in the crisis period ratio for bank i in time period t
PcrDebtit=Debt to assets in the post-crisis period ratio for bank i in time period t
GLtit = Liquidity ratio for a bank I in time period t
ROAtit = Profitability ratio for a bank i in time period t
NIMtit = Net interest margin of the bank i in time period t
CAtit = Capital adequacy ratio for a bank i in time period t
NPLtit = Non performing loans of the bank i in time period t
GDPt= GDP growth rate in time period t
INFt= Inflation growth rate in time period t

Table no. 2 below shows the descriptive statistics of the variables used in both models. Model 1 statistics show that general liquidity, GDP growth, and non-performing loans had the highest level of standard deviation which means that in the case of those variables, the trend during the pre-crisis period was more prone to big swings. In model 2 the same variables also showed the highest levels of standard deviation but on a smaller level compared to the pre-crisis period. The non-performing loans and general liquidity variable showed the greatest levels of standard deviation.

Table 2. Descriptive statistics

Var.	Mean	Max	Min	Std. Dev
Model 1				
Cdebt	0,6216	0,8444	0,1588	0,1566
GL	2,474	11,2	1,11	1,6018
ROA	-0,024	0,1205	-1,421	0,1633
NIM	0,0413	0,1267	0,0039	0,0196
CA	0,2267	0,8515	0,0881	0,1154
NPL	17,452	21,584	9,848	4,8269
GDP	-0,793	0,8485	-2,136	1,1565
INF	0,0224	0,0297	0,0155	0,0057
Model 2				
PcrDebt	0,6424	0,9201	0,0118	0,1484
GL	2,358	6,48	1,11	1,1283
ROA	0,0044	0,0417	-0,054	0,0169
NIM	0,0305	0,126	0,0002	0,0202
CA	0,1855	0,9879	0,0695	0,1063
NPL	4,3303	9,848	3,5744	1,0319
GDP	-2,213	1,1393	-8,823	3,899
INF	0,0324	0,0609	0,0166	0,0166

Source: author's

4. FINDINGS AND DISCUSSION

The authors first report the outcomes of unit root tests in this section of the study to demonstrate stationarity. They then do a variance inflation factors test to prove the lack of multicollinearity, and in the remaining sections, they highlight the key findings of this investigation. The results of panel unit root tests, including the Levin, Lin, and Chu test and the Im, Pesaran, and Shin test, are displayed in Table No. 3. Microeconomic indicators exhibit stationarity at the level indicated by the coefficients and statistical significance levels reported, but the GDP and INF variables achieve stationarity following the first difference.

Table 3. Unit root tests

Variables	Levin, Lin & Chu		Im, Pesaran & Shin	
	Level	1st diff	Level	1st diff
DEBT	-6,09540 (0,0000)	-7,28090 (0,0000)	-2,63672 (0,0042)	-2,45006 (0,0000)
GL	-8,65526 (0,0000)	-2,69477 (0,0035)	-14,0054 (0,0000)	-5,03194 (0,0000)
ROA	-78,5568 (0,0000)	-29,7340 (0,0000)	-166,878 (0,0000)	-30,1560 (0,0000)
NIM	-4,47987 (0,0000)	1,13920 (0,8727)	-16,0116 (0,0000)	-6,01426 (0,0000)
CA	-23,7413 (0,0000)	-6,94017 (0,0000)	-60,0100 (0,0000)	-11,6351 (0,0000)
NPL	-23,3474 (0,0000)	-2,99321 (0,0014)	-12,8515 (0,0000)	-0,33348 (0,3694)
GDP	16,7310 (1,0000)	4,42571 (1,0000)	-21,7891 (0,0000)	-7,42355 (0,0000)
INF	17,7885 (1,0000)	2,97850 (0,9986)	-13,9371 (0,0000)	-4,36735 (0,0000)

Source: author's

A variance inflation factor test was performed to determine whether multicollinearity existed

between the employed independent variables once the stationarity of the data had been established. Since the average value of the VIF indicator is less than the threshold value of 10, the average value of 2,58763 shows the lack of multicollinearity.

Table 4. VIF Test

Variables	Centered VIF
GL	1,127491
ROA	1,20651
NIM	1,188568
CA	1,169374
NPL	2,364535
GDP	6,637947
INF	4,418974
AVERAGE VIF	2,587628429

Source: author's

Table no. 5 below shows the results of the panel regression. The table presents separate results for Model 1 (Pre-crisis) and Model 2 (Post-crisis). In the case of model 1, the results indicated the statistical significance of the effects of indicators of liquidity, profitability, net interest margin, GDP, and inflation. In the pre-crisis period, liquidity is the only indicator that showed a negative impact, a 1% increase in liquidity leads to a decrease in debt value by -0.0244, which indicates the tendency of banks in the pre-crisis period to use their own funds to increase liquidity. A 1% increase in profitability, Net Interest Margin, GDP, and Inflation leads to an increase in debt by 0.323%, 0.0207%, and 4.3309% respectively. The results indicate that during the pre-crisis period, the growth of profitability and net interest margin affected the growth of debt, which leads to the conclusion that banks distributed excess funds to shareholders at the end of the business year and used additional debt for further business financing. There is also a noticeable impact of GDP on the growth of bank debt in the pre-crisis period, while this is not the case in the post-crisis period. The impact of inflation is also significant and intensive in the pre-crisis period compared to the post-crisis period - The intensive effect of inflation is also explained through the effect of profitability, where the tendency of the distribution of profits in relation to reinvestment of profits is shown. Therefore, inflation led to an increase in the price of debts, which explains the intense positive effect. In the post-crisis period, an indicator that had no impact in the pre-crisis period is capital

adequacy, a growth of 1% leads to a decrease in debt of 0.7338%. Such an effect can be explained by the tendency of banks to concentrate their own funds, in relation to debt, in the crisis period, to protect against potential risks to which the bank is exposed in its own operations. The effect of GDP and inflation is also present in the post-crisis period but with a lower statistical significance of 10%.

Table 5. Panel regression

Variables	Model 1	Model2
	GLS	GLS
GL	-0,024396 (0,0000)	-0,009212 (0,2683)
ROA	0,323398 (0,0169)	0,431113 (0,1705)
NIM	2,394665 (0,0000)	2,096176 (0,0000)
CA	-0,099654 (0,1982)	-0,733828 (0,0000)
NPL	0,002335 (0,2784)	0,005903 (0,5798)
GDP	0,020682 (0,0097)	0,024512 (0,1108)
INF	4,330867 (0,0056)	5,489293 (0,1062)
C	0,490699 (0,0000)	0,591313 (0,0000)
R squared	0,706835	0,760487
Probability	0,0000	0,0000

Source: author's

Table 6. Diagnostic Heteroskedasticity Test

Variables	
Heteroscedasticity Panel LR test	63,54292 (0,0010)
Model 2	
Heteroscedasticity Panel LR test	67,25039 (0,0000)

Source: author's

When selecting a model in table no. 5, a diagnostic test of heteroskedasticity was performed to determine the adequacy of the use of the model. The results of the panel LR test indicated the presence of heteroscedasticity of the data in both models, so it was decided to accept the dynamic GLS (Generalized Least Squares)

model in both models, in order to interpret the obtained results as accurately as possible.

CONCLUSION

In summary, the study's results shed light on the intricate dynamics of bank behavior in both pre- and post-crisis periods. During the pre-crisis era, factors like profitability, net interest margin, GDP, and inflation significantly influenced bank debt, indicating a tendency toward leveraging for expansion and profit distribution. Notably, inflation exerted a particularly intense effect, intertwined with profitability, driving up debt prices. However, in the aftermath of the crisis, a shift occurred, marked by the emergence of capital adequacy as a significant factor. Banks, wary of risks, opted to bolster their own funds, thus reducing reliance on debt. While the influence of GDP and inflation persisted post-crisis, their significance diminished slightly. These findings underscore the adaptive nature of banks in navigating economic landscapes, adjusting strategies to mitigate risks, and capitalize on opportunities, thereby contributing to the resilience and stability of the financial system. Suggestions for further research are the use of more countries with a similar financial sector for comparative analysis, as well as the use of a longer time period to include a larger number of crisis and post-crisis situations.

REFERENCES

[1] Acaravcı, S. K. & Çalım, A. E. (2013). Turkish Banking Sector's Profitability Factors. International Journal of Economics and Financial Issues, 3 (1), 27-41. Retrieved from https://dergipark.org.tr/en/pub/ijefi/issue/31956/351875

[2] Adelopo, I., Lloydking, R., & Tauringana, V. (2018). Determinants of bank profitability before, during, and after the financial crisis. International Journal of Managerial Finance. DOI: https://doi.org/10.1108/IJMF-07-2017-0148

[3] Alaagam, A. (2019). The relationship between profitability and stock prices: Evidence from the Saudi Banking Sector. Research Journal of Finance and Accounting, 10(14), 91-101. DOI: https://doi.org/ 10.7176/RJFA

[4] Bansal, R., Singh, A., Kumar, S., & Gupta, R. (2018). Evaluating factors of profitability for the Indian banking sector: a panel regression. Asian Journal of Accounting Research, 3(2), 236-254.

DOI: https://doi.org/10.1108/AJAR-08-2018-0026

[5] Bitar, M., Pukthuanthong, K., & Walker, T. (2018). The effect of capital ratios on the risk, efficiency, and profitability of banks: Evidence from OECD countries. Journal of international financial Markets, Institutions, and Money, 53, 227-262. DOI: https://doi.org/10.1016/j.intfin.2017.12.002

[6] Brahmaiah, B. (2018). Factors influencing the profitability of banks in India. Theoretical Economics Letters, 8(14), 3046. DOI: https://doi.org/ 10.4236/tel.2018.814189

[7] Djalilov, K., & Piesse, J. (2016). Determinants of bank profitability in transition countries: What matters most? Research in International Business and Finance, 38, 69-82. DOI: https://doi.org/10.1016/j.ribaf.2016.03.015

[8] Islam, M. S., & Nishiyama, S. I. (2016). The determinants of bank profitability: dynamic panel evidence from South Asian countries. Journal of Applied Finance and Banking, 6(3), 77.

[9] Kiran, K. P., & Jones, T. M. (2016). Effect of non-performing assets on the profitability of banks–A selective study. International Journal of Business and General Management, 5(2), 53-60.

[10] López-Penabad, M. C., Iglesias-Casal, A., & Neto, J. F. S. (2022). Effects of a negative interest rate policy in bank profitability and risk taking: Evidence from European banks. Research in International Business and Finance, 60, 101597.

[11] Madugu, A. H., Ibrahim, M., & Amoah, J. O. (2020). Differential effects of credit risk and capital adequacy ratio on the profitability of the domestic banking sector in Ghana. Transnational Corporations Review, 12(1), 37-52. DOI: https://doi.org/10.1080/19186444.2019.1704582

[12] Miljkovic, M., Filipovic, S., & Tanaskovic, S. (2013). Market concentration in the banking sector: Evidence from Serbia. Industrija, 41(2), 7-25. DOI: https://doi.org/ 10.5937/industrija41-4064

[13] Narwal, K. P., & Pathneja, S. (2016). Effect of bank-specific and governance-specific variables on the productivity and profitability of banks. International Journal of Productivity and Performance

Management. DOI: https://doi.org/10.1108/IJPPM-09-2015-0130

[14] Petria, N., Capraru, B., & Ihnatov, I. (2015). Determinants of banks' profitability: evidence from EU 27 banking systems. Procedia economics and finance, 20, 518-524. DOI: https://doi.org/10.1016/S2212-5671(15)00104-5

[15] Singhal, N., Goyal, S., Sharma, D., Kumari, S., & Nagar, S. (2022). Capitalization and profitability: applicability of capital theories in BRICS banking sector. Future Business Journal, 8(1), 1-13. DOI: https://doi.org/10.1186/s43093-022-00140-w

[16] Vesic, T., Gavrilovic, M., & Petronijevic, J. (2019). The influence of liquidity and profitability on the banking sector performances: The example of Serbia. International Review, (1-2), 75 81. DOI: https://doi.org/ 10.5937/intrev1901075V