



Approaches to the Impact of Non-Performing Loans on the Romanian Economy

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ABSTRACT

Non-performing loans (NPLs) are a financial item that affects bank profitability by reducing banks' income from lending and increasing non-performing loans at the industry level. This phenomenon is associated with a decrease in lenders' financial capacity due to inflation and exchange rate instability. We aim to analyze the impact of non-performing loans on the Romanian economy based on an econometric model for the period 2010-2021 using financial indicators on bank non-performing loans in correlation with macroeconomic indicators such as unemployment, inflation, GDP deflator and general government final consumption expenditure. The methods used consist of literature review on non-performing loans, consolidation of a database, application of econometric modelling techniques using linear regression. The results of the study support the possibilities of reducing the negative impact of non-performing loans through macroeconomic recovery and smart financial allocation.

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1. Introduction

Currently, non-performing loans (NPLs) are a significant concern for banks and financial institutions around the world. Non-performing loans are loans that have not been repaid by the borrower for a certain period, usually defined as being at least 90 days. The causes of this phenomenon may be economic recession, non-payment of the loan or inadequate credit risk assessment by the lender. The presence of a high level of NPL in the portfolio of a bank has negative implications on the health and financial stability of the bank.

In 2020, the European Commission launched an Action Plan (European Commission, 2020) which aims to prevent the future build-up of non-performing loans in the European Union due to the COVID-19 pandemic by ensuring that businesses and governments continue to have access to the necessary funding throughout the crisis. The main objectives of the Bad Debt Plan are shown in Figure 1.

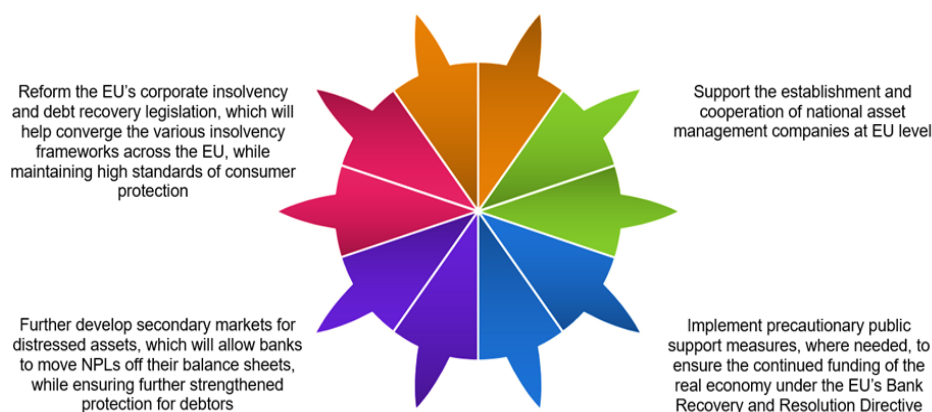


Figure 1. Main objectives of the Action Plan on tackling non-performing loans following the Covid-19 pandemic

Source: Elaborated by the authors according to the Action Plan on addressing non-performing loans as a result of the Covid-19 pandemic (European Commission, 2020)

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The use of appropriate credit standards and credit risk management are important to reduce non-performing loans and prevent the accumulation of bad loans.

According to the European Central Bank (European Central Bank, 2023) in order to reduce credit risk, banks should take into account: granting loans only to customers who have the ability to repay them; early recording of sufficient provisions to support loss coverage; monitoring credit information in order to be able to identify debtors in difficulty early and try to remedy this situation.

The Romanian banking sector faces new challenges due to deteriorating macroeconomic balances, geopolitical conflict and the energy crisis. Ensuring adequate levels of regulation and adherence to prudential standards contribute to the smooth functioning of the banking system.

The activities of the banking institutions involve financial and operational risks resulting from the responsibility of the bank to ensure and maintain price stability (BNR, 2022).

The main banking risks include credit, market and operational risks, according to Figure 2.

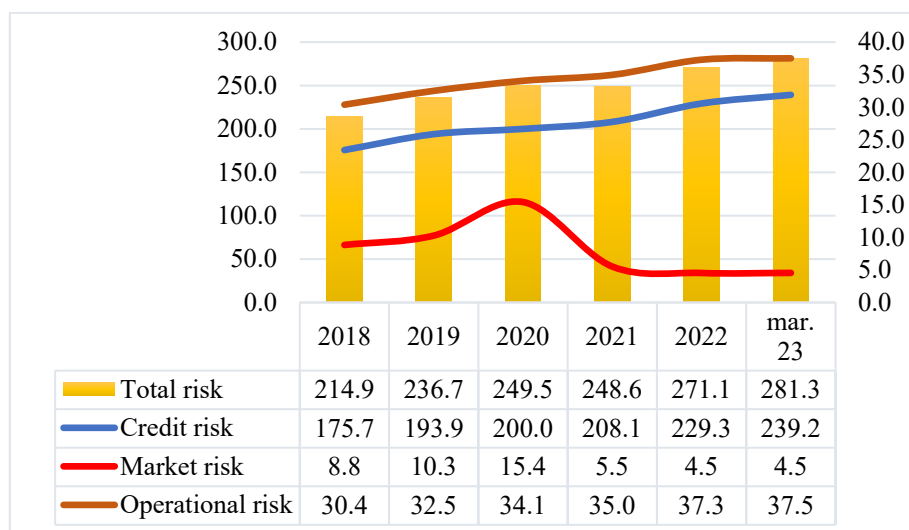


Figure 2. Evolution of the main types of banking risks in Romania (bln. Lei)

Source: Elaborated by the authors according to NBR (NBR, 2023)

From Figure 2, it can be seen that credit risk has been on an upward trend in the analysed period 2018-March 2023, increasing by 4.05% in 2021 compared to 2020 and by 10.18% in 2022 compared to the previous year, which demonstrates the worsening economic effects caused by multiple crises. As a result of these macroeconomic influences in the period 2018-2023, the steady increase in total risk is observed according to the trend equation $y = 12.409x + 206.92$.

The effects of non-performing loans on the Romanian economy were manifested in higher interest rates, affecting the stability of ROBOR (Interest rates on the interbank market ROBID) and the establishment of IRCC (Consumer Credit Reference Index) (Guvernul României, 2019). Problems with ROBOR transparency and stability prompted the switch from ROBOR to IRCC. ROBOR was affected by speculation in the financial market and other external sources, which led to large fluctuations in interest rates on RON loans. The IRCC was created to provide a clearer and more stable method of calculating interest rates on loans (Alexandru Dobre, 2023).

To address these problems, the Romanian authorities have implemented stricter banking supervision and regulation measures to prevent the accumulation of non-performing loans in the banking system. We appreciate as necessary better credit risk management and rigorous monitoring of the activity of financial institutions to prevent the effects of non-performing loans. It is important that banks are transparent and provide accurate and complete information about their asset quality. By implementing these measures, we appreciate that the financial stability of the Romanian banking system can be improved and a favourable environment for economic development can be created.

The objectives of the research are as follows:

01: literature review on the impact of non-performing loans.

02: to design the statistical model for the assessment of macroeconomic determinants on non-performing loans.

03: implementation, testing and validation of the model.

04: dissemination of research results on the impact of non-performing loans.

The study continues with a review of the literature on non-performing loans, research methodology, presentation of results and conclusions on the assessment of macroeconomic determinants of non-performing loans in Romania in the current crisis context.

Non-performing loans are a topic of real interest in the literature because they represent one of the biggest problems facing the banking system and the economy as a whole.



A study by authors Wengerek S.T, Hippert B. and Uhde A (Wengerek et al., 2022) examines the relationship between securitization and the ratio of non-performing loans of issuing banks to total assets, the study is conducted over the period 1997-2010 on 57 listed banking institutions in the European Union. The authors highlight the negative impact of securitization on the non-performing exposures of issuing banks, suggesting that banks primarily use securitization as a credit tool. It also argues for a time-sensitive relationship between securitization and non-performing exposures, with stronger effects during the boom phase and a reverse effect during and after the global financial crisis. The authors also highlight the limitations of securitization of high-risk loans, such as the effect of reducing non-performing loans being less effective in times of financial crisis. To ensure that securitization is effective in allocating non-performing loans to institutional capital market investors, the process of revitalizing the European securitization market needs to move forward. Another interesting study by a group of authors Radivojević N. et al. (Radivojević et al., 2019) presents the theoretical advantages of GMM on the occurrence and determinants of non-performing loans and identifies the main macroeconomic and microeconomic factors affecting non-performing loans. The authors conclude that GDP has a significant effect on non-performing loans in Latin America.

In a study by Bazar Y (Bayar, 2019) the macroeconomic and bank-specific determinants of non-performing loans (NPLs) in emerging market economies from 2000 to 2013 were examined. The authors show

that unemployment, public debt and an NPL had vulnerability-increasing effects, while economic growth, inflation and institutional development had vulnerability-reducing effects. The study highlights the importance of macroeconomic factors and institutional development for the effective functioning of the banking sector (Karadima & Louri, 2020). An interesting paper by a group of authors in China (Wang et al., 2023) examines the impact of fintech on bad loan risk in commercial banks in Beijing. The authors use commercial bank branch data from 2005-2022 and build an econometric model. The research results show us that Fintech inputs significantly reduce the risk of non-performing loans, with IT staff and software inputs contributing the most. Fintech also indirectly affects bank performance by reducing the risk of non-performing loans, with a positive feedback loop.

A study by Antonio Sánchez Serrano (Sánchez Serrano, 2021) analyses the impact of non-performing loans on the lending activities of 75 European banks during the period 2014-2018. The author shows that higher rates of non-performing loans are associated with lower growth rates of performing loans, and banks with higher declines tend to lend more to the real economy. The findings can help policymakers address the problem of non-performing loans.

Another study by Burak Pirgaip and Aydın Uysal (Pirgaip & Uysal, 2023) shows that better corporate governance and effective NPL share pricing lead to a positive response. An interesting paper (Bacchiocchi et al., 2022) analyzes two duopoly models for banks competing in a credit market with an isoelastic demand function. The models have different bounded rational adjustments for increasing profits under different assumptions. The paper focuses on the adaptive best-response mechanism and a dynamic adjustment mechanism, the paper also highlights the importance of comparing the local and global stability properties of the two models, especially when considering competition between banks. Bank heterogeneity affects equilibrium stability.

Authors Eero Tölö and Matti Virén (Tölö & Virén, 2021) analyse the impact of the accumulation of non-performing loans (NPLs) after the crisis on European bank lending. The authors find that NPLs decrease bank profits, increase funding costs, and erode bank capital. The intensity of the credit crunch depends on the level of NPLs in the sample. The study suggests that a high NPL burden could have a negative effect on economic growth, highlighting the importance of addressing this issue.

A study by a collective of authors (Ari et al., 2021) finds that macroeconomic and financial sector policies can prevent NPL problems during crises, such as monetary and prudential policies, prudent fiscal policies, exchange rate flexibility and a strong institutional environment. Another study by Dimitris Mokas and Massimo Giuliadori (Mokas & Giuliadori, 2023) analyses the impact of macroprudential policies on household credit, house prices and consumption of durable goods in 18 EU economies over the period 2000-2019. The results of the study show us that delayed implementation leads to contractionary effects on credit, while early implementation leads to stronger effects on house prices.

A study by a group of authors (Bolognesi et al., 2020) compares direct sales and securitisation strategies for managing non-performing loans (NPLs) in Europe. The study shows us that securitisation minimises the costs of deleveraging while estimating the benefits of government-backed guarantees. The study shows that policy makers promote measures to reduce the transfer of value from banks to third parties, considering the impact of portfolio valuation assumptions and uncertainties related to recovery procedures.

3. Methods

We aim to achieve the objectives of the research and the study of the evolution of NPL under the impact of the changes induced by the macroeconomic evolutions in 11 years in Romania through an econometric approach using modeling for the determination of the vulnerabilities induced by crises multiple on NPL.

To implement the statistical model of assessing the macroeconomic determinants on non-performing loans, we used a database for the period 2010-2021 of the following indicators:

- NPL - Bank nonperforming loans to total gross loans (%) (The World Bank, 2022a)
- UNEMP - Unemployment, total (% of total labor force) (The World Bank, 2022e)
- INFL - Inflation, GDP deflator (annual %) (The World Bank, 2022d)
- GRW - GDP per capita growth (annual %) (The World Bank, 2022b)
- GOVCONEXP - General government final consumption expenditure (% of GDP) (The World Bank, 2022c)

For the implementation of the model, data was collected from The Word Bank for a period of 10 years, 2010-2021 and econometric modelling based on multiple linear regression using SPSS vs 26 was used.

Through this model, we have analyzed the macroeconomic determinants in terms of non-performing loans. The dependent variable was the share of Bank nonperforming loans to total gross loans and the impact of macroeconomic variables (Unemployment, Inflation, GDP per capita growth, was assessed, General government final consumption exposure) on non-performing loans.

The following working hypotheses have been defined:

H1: The increase in non-performing loans is positively influenced by the rise in unemployment.

H2: Economic growth has an impact on the reduction of non-performing loans.

H3: Rising inflation has a significant impact on the growth of non-performing loans.

The regression equation of the model is:

$$\text{NPL} = 0,545 \text{ UNEMP} - 0,109 \text{ INFL} - 0,643 \text{ GRW} - 2,836 \text{ GOVCONEXP} + 54.326$$

Where:

NPL-dependent variable

UNEMP, INFL, GRW, GOVCONEXP – regressors

According to the regression equation, there is a significant rate of influence of the regression variables on non-performing loans, which means that macroeconomic aggregates (unemployment rate, inflation, and, GDP per capita growth and General government final consumption expenditure) have a significant influence on non-performing loans.

From Table 1 it can be seen that the model is valid (the coefficient of determination of errors being in conditions of acceptance, i.e. below the 5% threshold of representation) and statistically significant, the value of the adjusted coefficient of determination R^2 being 0.833, which demonstrates that the proposed model for assessing the macroeconomic determinants of non-performing loans in Romania has a statistical significance of 83%.

Table 1. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	0.945	0.894	0.833	2.49684	0.894	14.745	4	7	0.002	1.758
a. Predictors: (Constant), GOVCONEXP, INFL, GRW, UNEMP										
b. Dependent Variable: NPL										

Source: Authors' calculations using SPSS v 26

Economic growth has a negative impact on non-performing loans (NPLs) because it increases income and at the same time increases the creditworthiness of individuals and companies, according to the Pearson correlation coefficient calculated at -0.262. This proves working hypothesis H2: Economic growth has an impact in decreasing NPLs.

There is a positive relationship between the increase in unemployment rate and non-performing loans because unemployment leads to job loss and at the same time reduces the income of individuals and this increases the percentage of non-performing loans. The UNEMP indicator - Unemployment, total (% of total labour force) influences the variation in the increase in non-performing loans according to the Pearson correlation coefficient calculated at 0.844. This proves hypothesis H1 The increase in non-performing loans is positively influenced by the increase in the unemployment rate.

The increase in inflation has a significant impact on non-performing loans because the increase in inflation leads to an increase in costs for individuals, which means that it reduces their availability for repayment of loans that lead to increase in non-performing loans. It is demonstrated H3 working hypothesis The increase in inflation has a significant impact on the growth of non-performing loans. Therefore, reducing the income sources of individuals and legal entities leads to a regression of loans and at the same time increase the NPL.

4. Results and discussions

From Table 2 ANOVA test shows the homogeneity of the model on non-performing loans by assigning a 4% weight to the variable in the regressors sum of squares calculation i.e. a root mean square of 91.926 against the regression root mean square of 367.703. The Sig. coefficient tends towards 0, demonstrating the preservation of the alternative hypothesis and the rejection of the null hypothesis.

Table 2. Anova

Model	Sum of Squares	df	Mean Square	F	Sig.
1					
Regression	367.703	4	91.926	14.745	.002 ^b
Residual	43.640	7	6.234		
Total	411.342	11			
a. Dependent Variable: NPL					
b. Predictors: (Constant), GOVCONEXP, INFL, GRW, UNEMP					

Source: Authors' calculations using SPSS v 26

The histogram distribution of the proposed model reveals a statistical homogeneity of the distributions of the dependent variable NPL under the Gaussian curve with a rightward skewness of the distribution (as shown in Figure 4).

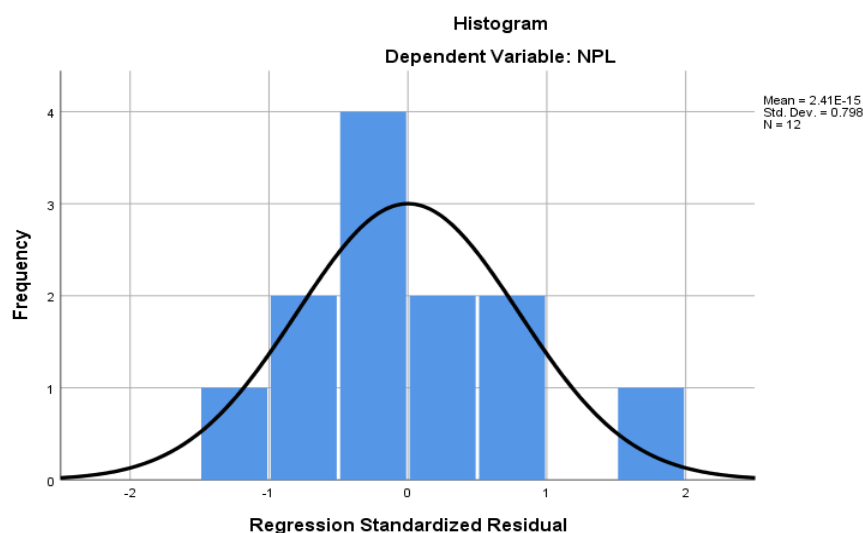


Figure 3. Histogram of the model

Source: Authors' calculations using SPSS v 26

From Table 3, an average NPL of 10.5% is recorded for the period 2010-2021, the maximum of the indicator being recorded in 2013 (after the financial crisis of 2009) and the minimum in 2021. The average GDP per capita growth indicator (annual %) was 3.34%, the minimum was -3% in 2010 and 2020 (years affected by the financial crisis, i.e. health crisis, Covid-19 pandemic). In terms of the Unemployment indicator, total (% of total labor force), an average of 5.93% can be observed during the period analysed, the minimum recorded being 3.91% in 2019 and the maximum recorded was 7.18% in 2011.

Table 3. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
UNEMP	12	3.91	7.18	5.9325	1.17928
INFL	12	1.38	6.80	4.0775	1.66832
GRW	12	-3.00	8.82	3.3417	3.63924
NPL	12	3.35	21.87	10.4950	6.11512
GOVCONEXP	12	13.46	18.66	15.5283	1.73496

Source: Authors' calculations using SPSS v 26.

The graphical representation of macroeconomic indicators is shown in Figure 5.

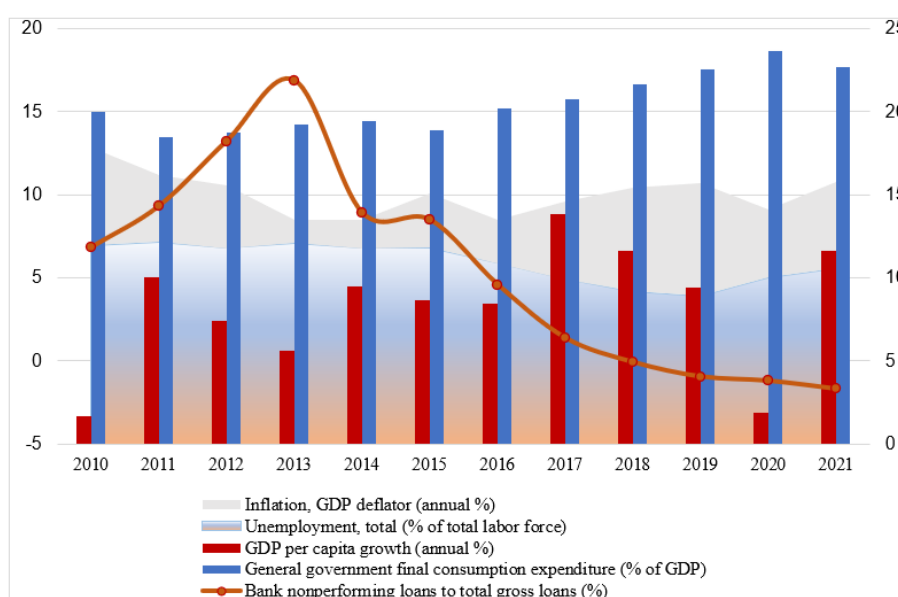


Figure 5. Macroeconomic indicators

Source: Elaborated by authors

According to a study conducted by the National Bank of Romania (BNR, 2022), it shows that the effect of non-performing loans may negatively affect Romania's economic growth and development potential. The efficient management of non-performing loans thus becomes a desideratum to ensure economic and financial stability at national level. In this context, the authorities must implement effective measures to reduce the level of non-performing loans and maintain the stability of the financial system. These measures include stricter lending regulations and linking these regulations to long-term economic development interests and statistically monitored credit risk. In addition, we appreciate that the constant monitoring and evaluation of the loan portfolio of banks, as well as supporting the activity of recovering non-performing receivables can constitute significant levers to reduce the impact of this phenomenon.

Another important aspect is the collaboration of the authorities with the private sector and international organisations to identify best practices in the management of non-performing loans and the implementation of these practices in Romania. The results obtained could thus strengthen the stability of the financial system and reduce the risks associated with non-performing loans. Strengthening the financial sector could help improve access to credit for businesses and the population, thereby facilitating economic growth and poverty reduction.

5. Conclusions

The authors have achieved their research objectives by conducting an extensive literature review and showing that the impact of non-performing loans has effects on the growth of unemployment, public debt and the triggering of future economic crises. The proposed econometric model demonstrated that sustainable economic growth could offset the effect of non-performing loans that are sensitive to rising unemployment and inflation. However, to regulate this negative phenomenon, concentrated measures by national decision-makers are needed to better regulate lending, monitor the bank's loan portfolio, and improve the bank transparency process. At the same time, increasing bank governance and improving banks' collaboration with the private sector and international organizations can be effective public policies in reducing this negative phenomenon and increasing the performance of the Romanian banking system. The limitations of the study consist in the relatively small number of indicators analyzed to determine the external causality of non-performing loans, the authors propose to extend this study on a future occasion, thus refining the conclusions of the study and increasing the number of proposals to reduce this negative phenomenon.

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