



UNEMPLOYMENT AS A DETERMINANT OF NON PERFORMING LOANS: THE CASE OF EUROPEAN COUNTRIES

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Abstract: Non-performing loans represent a very important indicator of the banking sector stability and, at the same time, of the financial system of an economy. A high share of non-performing loans in the structure of total loans can represent a potential cause of the insolvency of the banking system and the emergence of a banking crisis. The issue of non-performing loans is particularly important for the economies with bank-centric financial systems, in which the banking sector is the most important element of the financial system and often the most important source of financing economic activities. The subject of the paper is based on examining the influence of unemployment on the stratum of non-performing loans. The goal of the research is to establish whether and to what extent unemployment affects the level of non-performing loans in the observed economies, as well as to what extent the differences in the level of non-performing loans can be explained by the differences in unemployment. The research results suggest that unemployment has a statistically notable but relatively small influence on the stratum of non-performing loans in the observed economies.

Keywords: non performing loans; unemployment; banking sector; European Union; Western Balkans.

JEL classification: E24, E44, G21

1. Introduction

Asset quality represents one of the key dimensions for assessing the balance of the banking sector and the financial system in general. The most significant indicator of asset quality assessment is the stratum of non-performing loans (NPLs), most often expressed through the share of NPLs in total approved loans of the banking sector. Except for the indicator above, additional assessments of the quality of banking sector assets are made on the basis of the sectoral distribution of loans in relation to total loans and provisions for NPLs. The higher the share of NPLs in total loans, the lower the quality of banking sector assets and vice versa. The presence of a high share of NPLs in the long term has a negative influence on the stability of the banking sector and may be the cause of the banking crisis. The aforementioned hinders the normal functioning of the banking system and may result in a decrease in credit activity, which may have negative implications for economic growth and other macroeconomic performances.

Bearing in mind the negative effects of the high share of NPLs in total credit placements on the financial and economic system of the national economy, during the last two decades, there has been an intensive development of approaches for monitoring and managing NPLs. From a national perspective, the key role in this process is played by national supervisory institutions - usually central banks. However, the globalization of the financial system and the relatively quick and easy transfer of financial crises from one to other financial systems created the need to define a global approach to solving NPLs and generally preserving a financial stability. A key role in this process is played by the International Monetary Fund, which created a set of indicators for assessing the financial stability, within which one segment refers to the management of NPLs, i.e. the quality of assets. The essence of this approach is to achieve the harmonization of policies, strategies, management mechanisms and monitoring of financial stability at the global level, which would positively affect the balance of the global financial system.

There is a close interdependence between the macroeconomic performance and the level of NPLs. On the one hand, unfavorable macroeconomic performance expressed in the form of lower and declining rates of economic growth, higher inflation, high unemployment, pronounced depreciation of the national currency influence the increase in the stratum of NPLs. However, on the other hand, trends in NPLs can significantly shape a country's macroeconomic performance. In the conditions of continuous growth of NPLs, banks are gradually reducing the offer of loans, which results in a lower credit activity, which at the same time limits the economic activity.

Taking into account the above-mentioned, the paper tries to examine to what extent unemployment affects the level of NPLs in the observed European economies. Previous research on this subject indicates that unemployment has a

positive influence on the stratum of NPLs, that is, that the growth of the unemployment rate encourages the growth of NPLs. On the other hand, the goal of the research is to establish to what extent the differences in the levels of NPLs in the observed economies can be explained by the differences in the unemployment rate. Based on the subject matter and research objective defined in this way, the hypotheses are formulated:

H1: There are notable differences in the stratum of non-performing loans between the EU15 member states, the rest of the European Union and the states of the Western Balkans.

H2: The unemployment rate has a significantly notable influence on the stratum of non-performing loans in the observed economies.

The first part of the paper refers to empirical research, which examines the relationship between the unemployment and NPLs. The research methodology is presented in the second part of the paper, while the research results are presented in the third part. In the conclusion of the paper, the most important implications, the limitations and possible directions of further studies are listed.

2. Literature review

During the last thirty years, the issue of NPLs has been the subject of numerous researches. This was primarily influenced by the fact that most financial crises, since the 90s of the last century, were caused by an uncontrolled increase in the level of NPLs. The same can be confirmed in the case of the financial crisis of 2008, given that NPLs were one of the key causes of the crisis (Mitrašević, 2021). In terms of conceptual definition, NPLs represent the state of placement debt that is more than 90 days in arrears or less than 90 days in arrears, if the bank assesses that the debtor's creditworthiness is so threatened that the repayment of the debt in its entirety is called into question (IMF, 2005; Alihodžić, 2012).

Due to the numerous negative effects that a high share of NPLs can have on the financial and economic system, it is crucial to identify the key causes of NPLs, in order to take appropriate actions to reduce them. The most significant determinants of NPLs can be divided into two categories: macroeconomic factors and factors related to banking operations (Espinoza & Prajad, 2010). In terms of macroeconomic factors, the most important determinants of NPLs can be mentioned: the rate of economic growth, the stratum of unemployment, the rate of inflation, the stratum of interest rates, changes in the exchange rate. Apart from the mentioned factors, certain research emphasizes the influence of fiscal indicators (level of public debt and budget deficit) as significant determinants of NPLs (Louzis et.al.2012; Makri et.al.2014a; Foglia 2022; Orfia & Mucciardi, 2022). Regardless of which macroeconomic variables are taken into account, poorer macroeconomic performance creates conditions for the increased levels of NPLs (Nkusu, 2011).

The second group of factors of NPLs is represented by factors related to banking operations. The most significant among them are: the dynamics of credit activity, the level of capital adequacy, profitability, the stratum of the interest rate, the size of the bank, the net interest margin. In this context, it is considered that the growth of credit activity creates the conditions for an increase in NPLs, given that the conditions for a larger offer of loans with lower interest rates are less rigorous conditions for granting loans (Messai & Jouini, 2013). In banking systems with higher interest rates and higher interest margins, there are stimulating conditions for higher participation of NPLs (Adusei, 2018). Capital adequacy or solvency is inversely related to the level of NPLs since banks with higher levels of regulatory capital may have a smaller share of NPLs in total credit placements (Levent Erdas & Ezanoglu, 2022). Regarding the level of profitability, it is pointed out that banks with higher levels of profitability may have a low share of NPLs (Ahmed et.al, 2021). When looking at the criterion of bank size, there is a polarization of opinion. On the one hand, larger banks are considered to have more liberal credit policies compared to smaller banks, which stimulates the growth of NPLs (Stern & Feldman, 2004). On the other hand, there are views that larger banks have better opportunities for loan collection, which therefore affects the fact that larger banks have a smaller share of NPLs compared to smaller banks (Ozili, 2019). Apart from the mentioned factors, the level of NPLs in the previous period stands out as a very significant determinant of NPLs arising from banking operations.

As part of the analysis of macroeconomic factors, numerous studies point to unemployment as one of the most significant determinants of NPLs. At the same time, it is emphasized that there is a direct correlation between these two variables, considering that the growth of unemployment encourages the growth of NPLs (Salas & Suarina 2003; Bofondi & Ropele 2011; Blanco & Gimeno 2012). Research by Milleris (2012) confirmed that changes in the macro-economic environment have a strong impact on the quality of bank assets in 22 European economies. He also points out that unemployment and interest rates significantly determine the level of NPLs. Louizis et al. (2010) looked at the key determinants of NPLs in the Greek banking sector between 2003 and 2009. The results of their study indicate that unemployment and general macroeconomic conditions have a notable influence on the stratum of NPLs, with this impact somewhat less pronounced in the case of mortgage loans compared to consumer and business loans. The importance of unemployment as a determinant of NPLs in the banking sector of Greece was confirmed by research conducted by Charalambakis et al. (2017) for the period 2005-2015 years. The results of the study confirm that high unemployment rates and political insecurity are crucial factors in the sudden increase in NPLs after 2012.

Babouček & Jančar (2005) investigated the key determinants of NPLs in the Czech banking sector in the period 1993-2004. Through the VAR methodology, the research results confirmed that the unemployment rate has a positive influence

on the stratum of NPLs. In line with these results are the researches of Melecki et al. (2015), i.e. Petkovski et al. (2018), which also confirm that unemployment significantly affects the level of NPLs in the Czech Republic. Kjosevski & Petkovski (2017) observed the key determinants of NPLs in the Baltic economies (Lithuania, Latvia, Estonia) for the period 2005-2014. Using a panel analysis for 27 banks, it was determined that macroeconomic factors, including the unemployment rate, significantly determine the level of NPLs.

Nkusu (2011) examined the relationship between the macroeconomic performance and NPLs for 26 developed economies in the period from 1998 to 2009. In particular, the study observed how the rate of economic growth, unemployment, changes in asset prices, inflation, the nominal effective exchange rate and the reference interest rate are reflected on the stratum of NPLs in the observed economies. The results of the study confirm that weaker macroeconomic performance, primarily expressed through slower GDP, higher unemployment and a decrease in the price of assets can be the cause of the increase in NPLs in developed economies. Makri et al. (2014b) also confirmed in their research a strong connection and a statistically significant impact of unemployment on the level of NPLs in 14 Eurozone countries. The study confirmed the point of view that the state of unemployment negatively affects the borrower's capacity to fulfill his credit obligations, which is consequently reflected in the growth of the share of NPLs.

In his research, Klein (2013) observed the causes of NPLs in 16 countries of Central, Eastern and Southeastern Europe in the period 1998-2011 year. The research results show that the dynamics of NPLs in the observed economies is largely determined by macroeconomic conditions. The research confirms the point of view that a higher unemployment rate along with currency depreciation and inflation growth affects the increase in the level of NPLs. Škarica (2014) identified on a sample of seven countries of Central and Eastern Europe in the period 2007 - 2012 that the rate of economic growth and the level of unemployment are the most significant macroeconomic determinants of NPLs in the observed economies. Tatarici et al. (2020) observed the factors of NPLs for 12 European transition countries, including Serbia, in the period 2005-2017. The research confirmed the view that the level of NPLs increases as macroeconomic conditions worsen. At the same time, there is a very pronounced influence of unemployment on the level of NPLs, whereby the authors explain this influence by rigidities in the labor market. Szarowska (2018) identified unemployment as the most important macroeconomic factor of NPLs for 11 Central and Eastern European economies. Using panel regression with fixed effects analysis for the period from 1995 to 2011, it was determined that in the observed period, a rise in the unemployment rate by 1% had an effect on a rise in NPLs by 0.54%.

When it comes to the states of the Western Balkans, several studies have identified the importance of unemployment as a determinant of NPLs. Gashi et al.

(2022) found out that, in addition to other macroeconomic variables (economic growth, government spending, real interest rates, domestic savings), the unemployment rate significantly affects the level of NPLs. A study conducted by Komoni et al. (2022) for the period between 2010 and 2019 confirms that unemployment has a positive impact on the level of NPLs in the countries of the Western Balkans and the observed OECD economies. The results of this study additionally suggest that by controlling the unemployment rate, favorable conditions can be created for reducing the level of NPLs.

The research by Kjosevski et al. (2019) confirms the presence of the influence of unemployment on the level of NPLs in the banking sector of North Macedonia, while the study conducted by Golitis et al. (2022) suggests that this influence is present both in the short and long term. In contrast to the above, Ilievski (2022) in his research established an inverse relationship between the unemployment rate and the level of NPLs in the banking sector of North Macedonia in the period 2006-2016 year. In the context of Bosnia and Herzegovina, Kozarić & Žunić-Dželihodžić (2020) confirmed that the unemployment rate has the greatest influence on the stratum of NPLs in the banking sector of this economy. The specific results of the study indicate that an increase in unemployment by 1% affects the growth of NPLs by 0.73%. Agić & Jeremić (2018) investigated the key determinants of NPLs in the banking sector of Bosnia and Herzegovina in the period 2006-2016 year. The structure of independent variables consisted of three macroeconomic (economic growth, inflation, unemployment) and five variables related to banking operations (capital adequacy, ROA, ROE, interest rates and the level of credit activity). The results of the work confirmed the positive correlation and statistically notable influence of the unemployment rate on the level of NPLs. The importance of unemployment as a determinant of NPLs in the banking sector of Bosnia and Herzegovina was confirmed in the research of Džidić and his associates (2022). When it comes to Serbia, the research by Otašević (2013) suggests that the deterioration of macroeconomic conditions, primarily in the form of a decrease in economic growth and the depreciation of the dinar, has an impact on the level of NPLs. Unemployment as a determinant of NPLs in the banking sector of Serbia was confirmed in research by Ristić & Jemović (2021), which indicates that the unemployment rate from the previous period significantly determines the stratum of NPLs in the observed period (2010-2019). According to the above-mentioned, it can be sublimated that the unemployment rate is a significant determinant of NPLs, while its importance varies depending on other macroeconomic performances and characteristics of the financial system.

3. Research methodology

In order to identify the relationship between the unemployment rate and the stratum of NPLs in the observed economies, the following were used in the paper: Kruskal-

Wallis test, correlation and regression analysis. The Kruskal-Wallis test was first used to indicate whether there are statistically notable differences in the stratum of NPLs among the observed economies. The choice of this non-parametric test is conditioned, first of all, by the fact that there is no normal data distribution, whereby the assumption of normality was tested using the Shapiro-Wilk method. In addition, the Kruskal Wallis test was used considering that all the observed economies were distributed into three groups. The first group consisted of EU15 countries, that is, countries that became the members of the Union as of 1995. The second group included the states that became part of the European Union during and after 2004 (with the exception of Malta due to incomplete data). The third group consisted of economies that were in the process of accession the EU, which integrally formed the grouping of the Western Balkans (Serbia, Montenegro, Bosnia and Herzegovina, Albania, and North Macedonia).

To test the second hypothesis, a correlation analysis was first used to establish how the changes in unemployment were reflected in the level of NPLs. More precisely, by means of a correlation analysis, an attempt is made to examine whether the results of previous research indicating a positive correlation between unemployment and the stratum of NPLs can be confirmed, in the sense that a rise in the unemployment rate creates the conditions for a rise in the stratum of NPLs. For this purpose, Spearman's correlation test was used, because the assumption of normality was violated. The examination of the impact of unemployment on the stratum of NPLs was carried out by means of a single regression in order to establish the level to which the changes in the stratum of NPLs can be explained by the changes in the stratum of unemployment.

The research was conducted on a sample of 32 countries, that is, 27 member countries of the EU and 5 countries of the Western Balkans. To assess the level of NPLs, annual average data on the share of NPLs in total loans from the International Monetary Fund database were used. On the other hand, the annual average data from the World Bank database, aligned with the methodology of the International Labor Organization (ILO), were used for unemployment. The research covers the time period from 2008 to 2022, where all the research analyses were done in the software package SPSS.

4. Research results and discussion

Empirical research regarding the key determinants of NPLs singles out unemployment as one of the most significant factors. Immediately before analyzing the relationship between the mentioned variables, it is useful to first point out the key characteristics of the observed sample of countries in terms of unemployment and NPLs. Accordingly, Table 1 shows the results of the descriptive analysis.

Table 1. Results of descriptive analysis

| Parameters | Unemployment | NPL |
|--------------------|--------------|--------|
| Sample size | 32 | 32 |
| Minimum value | 4,60% | 0,64% |
| Maximum value | 25,28% | 22,29% |
| Middle value | 10,11% | 7,09% |
| Standard deviation | 5,314 | 5,403 |

Source: Authors

In the context of unemployment, it can be concluded that the lowest average unemployment rate in the observed period was 4.60% and it was recorded in the Czech Republic, while the highest average unemployment rate in the observed period was North Macedonia 25.28%. Between the countries of the EU, Spain (18.48%) and Greece (18.40%) had the highest average unemployment rate in the observed time. When it comes to the countries of the Western Balkans, Albania had the lowest average unemployment rate (13.94%), while, along with North Macedonia, the highest average unemployment rate was recorded in Bosnia and Herzegovina (22.49%). At the level of the observed sample, the average unemployment rate is 10.11%. When looking at the share of NPLs in total loans, the lowest average share of NPLs was recorded in Sweden (0.64%), followed by Luxembourg (0.74%), while the highest average share of NPLs was in Greece (22.49%), which is understandable considering that this country was faced with the public debt crisis in the Eurozone to the greatest extent. When considering the states of the Western Balkans, the banking sector of North Macedonia had the lowest average share of NPLs (7.16%), while the highest average share of NPLs was achieved in Albania (13.11%), i.e. Serbia (12.86%).

The mentioned two economies would have recorded a higher average share of NPLs, if strategic steps to solve NPLs had not been taken. In the middle of 2015, an Action Plan for reducing

the volume of NPLs was created in Albania. At the end of 2012, the National Bank of Serbia amended the regulations in order to ensure the conditions for reducing NPLs in the banking sector of Serbia. Certain restrictions related to the transfer of claims from legal entities have been eliminated (Stakić, 2014). A systemic step in the management of NPLs was made in August 2015 with the adoption of the Strategy for Solving NPLs (NBS, 2021). The average share of NPLs at the level of the observed sample is 7.09%.

In order to determine whether the differences in unemployment rates affect the differences in the stratum of NPLs, it is first necessary to determine whether there are

statistically notable differences in the stratum of NPLs among the observed economies. For this purpose, the Kruskal-Wallis test was used, considering that the Shapiro-Wilk normality test indicates that there is no normal data distribution, since the stratum of notable ($p=0.004$) is lower than the defined stratum of notable ($p=0.05$) or the defined confidence interval (95 %), which can be seen from Table 2.

Table 2. Normality testing

| | Kolmogorov-Smirnov | | | Shapiro-Wilk | | |
|-----|--------------------|----|------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | Df | Sig. |
| NPL | .157 | 32 | .044 | .893 | 32 | .004 |

Source: Authors

The results of the Kruskal-Wallis test show that there are differences between the observed groups regarding the stratum of NPLs. Thus, the EU15 member countries have the lowest values of the mean rank, while the states of the Western Balkans have the highest mean values of the rank. Between these two groups are the European Union member states that became part of this integration during and after 2004.

Table 3. Kruskal-Wallis test results

| | EU15 | EU (after 2004.) | Western Balkans |
|------------|-------|------------------|-----------------|
| N | 15 | 12 | 5 |
| Mean Rank | 11.67 | 18.83 | 25.40 |
| Asymp. Sig | .010 | | |

Source: Authors

Except for the fact that the results of the Kruskal-Wallis test show that there are differences between the observed groups, their statistical significance can be confirmed in parallel. Based on the obtained results, it follows that the level of statistical significance ($p=0.010$) is lower than the defined level of significance ($p=0.05$) or the defined confidence interval (95%), **which can confirm H1 hypothesis.**

Given that the presence of differences in the stratum of NPLs between the observed groups of countries has been confirmed, the question arises to what extent unemployment dynamics contribute to changes in the stratum of NPLs? In order to answer the above question, first of all, the connection between the related variables should be established by means of correlation analysis. As can be seen from Table 4, there is a direct relationship between unemployment and the stratum of NPLs in the sense that an increase in the unemployment rate affects the increase in the share

of NPLs in total loans. This is understandable considering that if individuals move from employment to unemployment, it is very difficult for them to be able to fulfill their obligations based on loans in a timely manner, which affects the increase of NPLs in the structure of total approved placements. Analyzing Spearman's correlation coefficient, it can be determined that there is a moderately expressed correlation between unemployment and NPLs (0.641), where it is especially important to emphasize that this is a statistically significant connection, since the obtained level of significance is considerably lower than the defined limit of statistical significance ($0.000 < 0.05$).

Table 4. Results of correlation analysis

| | | NPL | Unemployment |
|--|------------------------|---------|--------------|
| NPL | Spearman's correlation | 1.000 | 0.641** |
| | Sig. | | 0.000 |
| | N | 32 | 32 |
| Unemployment. | Spearman's correlation | 0.641** | 1.000 |
| | Sig. | 0.000 | |
| | N | 32 | 32 |
| **. Coefficient is notable at the 0.01 stratum | | | |

Source: Authors

In order to establish the impact of unemployment on the stratum of NPLs in the observed economies, a regression analysis was conducted, whereby the regression model (Table 5) can be presented as follows:

$$\text{NPL} = f(\text{UN}) + \varepsilon,$$

That is:

$$\text{NPL} = \beta_0 + \beta_1 \text{UN} + \varepsilon.$$

Table 5. Results of regression analysis

| Parameters | Value |
|----------------|-------|
| R ² | .236 |
| Sig | .005 |
| Constant | 2.095 |
| Beta | .486 |

Source: Authors

Observing the results of the regression analysis, it can be established that unemployment has a statistically notable influence on the stratum of NPLs in the observed economies, since the obtained stratum of notable ($p=0.005$) is lower than the defined stratum of notable ($p=0.05$), i.e. the confidence interval (95%). However, when looking at the specific impact, based on the value of the coefficient of determination, it can be established that unemployment has a fairly mild impact on the stratum of NPLs, since only 23.6% of the variability in the share of NPLs is the result of changes in unemployment rates. According to this fact, **H2 hypothesis can be confirmed**. According to the obtained results, the set regression model can be interpreted as follows:

$$\text{NPL} = 2.095 + 0.486\text{UN} + \varepsilon$$

The obtained result is understandable, given that the level of NPLs is decided by a whole range of factors of a macroeconomic nature (economic growth, inflation, exchange rate changes), as well as factors specific to banking operations (level of credit activity, capital adequacy, profitability indicators - ROA; ROE, values of interest rates, etc.). In addition, in highly euroized (dollarized) economies, which include some of the observed economies (primarily the states of the Western Balkans, Croatia, Bulgaria and Romania), the degree of euroization is a very notable determinant of the stratum of NPLs. In conditions where the dominant part of credit placements is denominated in foreign currency, the depreciation of the domestic currency can affect a significant rise in credit obligations and, thus, the deterioration of the quality of assets and a greater share of NPLs.

Based on the above, it follows that a rise in the unemployment rate by 1% leads to a rise in the stratum of NPLs by 0.486 % in the observed group of countries. Through this, the results confirm the positive relationship between unemployment and the level of NPLs, which is in accordance with numerous empirical studies (Salas&Suarina 2003; Bofondi&Ropele 2011; Blanco&Gimeno 2012; Klein 2013; Makri et.al, 2014). In the context of the strength of the influence of the independent on the dependent variable, the obtained result is somewhat lower compared to the research of Szarowska (2018), i.e. the study conducted by Kozarić & Žunić-Dželihodžić (2022), which is understandable considering the different sizes of the observation sample.

5. Conclusion

A high level of NPLs does not only represent a threat to the stability and normal functioning of the banking sector, but also has notable implications for the economic system of a country. To a large extent, the level of NPLs in a country depends on macroeconomic factors, one of the most significant of which is the

unemployment rate. The results of the research confirm the theoretical assumptions that countries with higher unemployment rates have a higher share of NPLs, in comparison with those economies in which the unemployment rate is lower.

However, the unemployment rate cannot be characterized as a key macroeconomic cause of the high level of NPLs in the observed economies, although its statistical significance has been confirmed. Often, the macroeconomic performance of economies with a high unemployment rate is accompanied by lower rates of economic growth, lower levels of economic development and living standards, which ultimately creates conditions for higher levels NPLs.

The research confirmed that there are notable differences between the observed economies in terms of the level of NPLs. This results can be confirmed by the fact that the group of EU15 countries mainly consists of economies with lower unemployment rates and better economic performance compared to the countries that became members of the Union since 2004 and the states of the Western Balkans. In particular, the founding states of the European Union (with the exception of Italy) can be singled out, representing the most developed European economies with a low share of NPLs and relatively low unemployment rates.

Although the research results confirm that unemployment has a statistically notable influence on the stratum of NPLs, certain limitations can be observed in the work. The primary limitation of the research refers to the statistical techniques used to test the defined hypotheses, in the sense that it is necessary to include additional statistical analyses in order to identify the influence of unemployment on the stratum of NPLs in the observed economies as precisely as possible. Simultaneously, another limitation of the research is a relatively short period, given that the year 2008 was taken as the beginning of the research, due to the unavailability of data for the vast majority of the observed economies.

In this context, as part of future research, it is desirable to apply more sophisticated statistical techniques, which would identify the key causes of differences in the share of NPLs in the observed sample of states. This primarily refers to the introduction of new independent variables such as: economic growth, inflation, exchange rate and a degree of euroization, but also certain factors arising from banking operations. Bearing in mind the consequence of the banking sector in the financial system of Serbia, as part of future research, the key determinants of NPLs in the banking sector of Serbia can also be identified, in order to assess the long-term effects of the Strategy for solving NPLs.

References

- Adusei, C., (2018). Determinants of non-performing loans in the banking sector of Ghana between 1998 and 2013. *Asian Development Policy Review* 6(3) 142–154. <https://doi.org/10.18488/journal.107.2018.63.142.154>
- Agić Z., Jeremić Z., (2018). Makroekonomske i specifične bankarske determinante nekvalitetnih kredita u Bosni i Hercegovini, *Industrija* 46(1), 45-60. <https://doi.org/10.5937/industrija46-14956>
- Ahmed S., Majeed E., Thalassinos E., Thalassinos Y., (2021). The Impact of Bank Specific and Macro-Economic Factors on Non-Performing Loans in the Banking Sector: Evidence from an Emerging Economy, *Journal of Risk and Financial Management*, 14(5) 1-14. <https://doi.org/10.3390/jrfm14050217>
- Alihodžić, A. (2014). Analysis of non-performing loans movement and profitability of the banking market in BH. *Economic themes*. 52(3), 341-359. <https://doi.org/10.1515/ethemes-2014-0021>
- Babouček, I. Jančar, M. (2005). Effects of Macroeconomic Shocks to the Quality of the Aggregate Loan Portfolio; Czech National Bank, Working Paper No. 1.
- Blanco, R., Gimeno R., (2012). Determinants of Default Ratios in the Segment of Loans to Households in Spain, Banco de España Working Paper, No. 1210.
- Bofondi, M. & Ropele, T., (2011). Macroeconomic determinants of bad loans. s.l., Banca d'Italia, Occasional Paper No. 89.
- Charalambakis E., Dendramis Y., Tzavalis E., (2017). On the determinants of NPLs: lessons from Greece, Bank of Greece Working Paper No. 220.
- Džidić A., Živko I., Čolak A., (2022). Makroekonomski faktori problematičnih kredita: slučaj Bosne i Hercegovine, *Ekonomika misao i praksa*, 31(2), 421-438. <https://doi.org/10.17818/EMIP/2022/2.4>
- Espinoza, R., Prasad, A. (2010). Nonperforming Loans in the GCC Banking Systems and their Macroeconomic Effects, IMF Working Paper, 224, International Monetary Fund, Washington DC
- Foglia M., (2022). Non Performing Loans and Macroeconomics Factors; The Italian Case, *Risks* 10(1), 1-13. <https://doi.org/10.3390/risks10010021>
- Gashi A., Tafa S., Bajrami R., (2022). The impact of Macroeconomic Factors on Non-performing Loans in the Western Balkans, *Emerging Science Journal* 6(5), 1032-1045. <https://doi.org/10.28991/ESJ-2022-06-05-08>
- Golitis P., Khudoykulov K., Palanov S., (2022). Determinants of non-performing loans in North Macedonia. *Cogent Business & Management*, 9(1), 1-40. <https://doi.org/10.1080/23311975.2022.2140488>
- Ilievski A., (2022). Non performing loans in North Macedonia- Lessons Learned? *Acta Polytechnica Hungarica*, 19(8), 91-109. DOI: 10.12700/APH.19.8.2022.8.6
- International Monetary Fund (2005). The Threatment of Non Performing Loans
- Kjosevski J., Petkovski M., (2017). Non-performing loans in Baltic States: determinants and macroeconomic effects, *Baltic Journal of Economics* 17(1), 25-44. <https://doi.org/10.1080/1406099X.2016.1246234>
- Kjosevski, J., Petkovski, M., Naumovska, E. (2019). Bank specific and macroeconomic determinants of non-performing loans in the Republic of Macedonia: Comparative analysis of enterprise and household NPLs, *Economic Research*, 32(1), 1185–1203. <https://doi.org/10.1080/1331677X.2019.1627894>

- Klein, N. (2013). Non-Performing Loans in CESEE: Determinants and Macroeconomic Performance. IMF Working Paper 13/72
- Komoni A., Morina F., Grima S., Ozen E., Mazreku I., (2022). A comparative analysis between Western Balkan countries and selected OECD countries of the effect of unemployment on non-performing loans, *Journal of Economics and Administrative Science*, 9(1), 656-678. <http://dx.doi.org/10.30798/makuiibf.979620>
- Kozarić K., Žunić-Dželihodžić E., (2020). Effect of Macroeconomic Environment on Non-Performing Loans and Financial Stability: Case of Bosnia and Herzegovina, *Journal of Central Banking Theory and Practice*, 9(2), 5-17. <http://dx.doi.org/10.2478/jcbtp-2020-0011>
- Levent Erdas M., Ezanoglu Z., (2022). How Do Bank-Specific Factors Impact Non-Performing Loans: Evidence from G20 Countries, *Journal of Central Banking Theory and Practice*, No. 2., 97-122. <https://doi.org/10.2478/jcbtp-2022-0015>
- Louizis D.P., Vouldis A.T. Metaxas V.L. (2010). Macroeconomic and bank-specific determinants of non-performing loans in Greece: a comparative study of mortgage, business and consumer loan portfolios, Bank of Greece Working Paper No.118.
- Louizis, 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 and Finance*, 36(4), 1012-1027. <https://doi.org/10.1016/j.jbankfin.2011.10.012>
- Makri, V., Papadatos, K. (2014a). How Accounting Information and Macroeconomic Environment Determine Credit Risk, Evidence from Greece. *International Journal of Economic Sciences and Applied Research*, 7(1), 129–143. Retrieved 13.6.2023. from https://ijbesar.ihu.gr/volume7_issue1.php
- Makri V., Tsagkanos A., Bellas A., (2014b). Determinants of Non-Performing Loans: The Case of Eurozone, *Panoeconomicus*, 61(2). 193-206. <https://doi.org/10.2298/pan1402193m>
- Melecký, A., Melecký, M. and Šulganová, M. (2015). Non-performing loans and the macroeconomy: modeling the systemic credit risk in the Czech Republic, *Politická Ekonomie*, Vol. 8, 921–947. DOI: 10.18267/j.polek.1045
- Messai A., Jouini F., (2013). Micro and Macro Determinants of Non-performing Loans, *International Journal of Economics and Financial Issues*, 3(4), 852-860. Retrieved 14.6.2023. from <https://www.econjournals.com/index.php/ijefi/article/view/517>
- Mileris, R. (2012). Macroeconomic Determinants of Loan Portfolio Credit Risk in Banks. *Izerine Ekonomika-Engineering Economics*, 23(5), 496–504. <https://doi.org/10.5755/j01.ee.23.5.1890>
- Mitrašević, M. (2021). The role of macroprudential policy in bank housing loans portfolio quality assurance. *Economic themes* 59(2), 281-296. <https://doi.org/10.2478/ethemes-2021-0016>
- Narodna banka Srbije (2021). Godišnji izveštaj o poslovanju i rezultatima rada za 2021. godinu
- Nkusu, M. (2011). Nonperforming Loans and Macrofinancial Ulnerabilities in Advanced Economies. IMF Working Paper 161.
- Otašević D., (2013). Analiza makroekonomskih determinanti kvaliteta kreditnog portfelja banaka u Srbiji, Narodna banka Srbije, Radni papiri br. 27.

- Ofria F., Mucciardi M., (2022). Government failures and non performing loans in European countries: a spatial approach, *Journal of Economic Studies*, 49 (5), 876-887
<https://doi.org/10.1108/JES-01-2021-0010>
- Ozili, Peterson K. (2019). Non-performing loans and financial development: New evidence. *The Journal of Risk Finance* 20(1). 59–81. <https://doi.org/10.1108/JRF-07-2017-0112>
- Petkovski, M., Kjosevski, J., and Jovanovski, K.,(2018). Empirical Panel Analysis of Non-Performing Loans in the Czech Republic. What are their Determinants and How Strong is Their Impact on the Real Economy. *Finance a úvěr-Czech Journal of Economics and Finance*, 68 (5), 460-480. Retrieved 15.6.2023. from <https://journal.fsv.cuni.cz/mag/article/show/id/1420>
- Ristić, K., Jemović, M. (2021). Analysis of non-performing loans' determinantas in the banking sector of the Republic of Serbia. *Economic themes* 59(1), 133-151. <https://doi.org/10.2478/ethemes-2021-0008>
- Salas, V. Saurina, J. (2003). Deregulation, market power and risk behaviour in Spanish banks. *European Economic Review*, 47(6), 1061–1075. [http://dx.doi.org/10.1016/S0014-2921\(02\)00230-1](http://dx.doi.org/10.1016/S0014-2921(02)00230-1)
- Stakić N., (2014). Determinante kretanja nivoa problematičnih kredita u bankarskom sektoru u Srbiji. *Bankarstvo* 43(4), 122-145
<https://doi.org/10.5937/bankarstvo1404122S>
- Stern, G., and Feldman R., (2004). *Too Big to Fail: The Hazards of Bank Bailouts*. Washington, DC: Brookings Institution Press
- Szarowska, I. (2018). Effect of macroeconomic determinants on non-performing loans in Central and Eastern European countries. *International Journal of Monetary Economics and Finance*, 11(1), 20–35. <https://dx.doi.org/10.1504/IJMEF.2018.090564>
- Škarica B., (2014). Determinants of non-performing loans in Central and Eastern European countries. *Financial theory and practice*, 38(1), 37-59. <http://dx.doi.org/10.3326/fintp.38.1.2>
- Tatarici, L. R., Kubinschi, M. N., Barnea, D. (2020). Determinants of Non-Performing Loans for the EEC Region. A Financial Stability Perspective, *Management & Marketing. Challenges for the Knowledge Society*, 15(4), 621-642. <https://doi.org/10.2478/mmcks-2020-0036>

NEZAPOSLENOST KAO DETERMINANTA PROBLEMATIČNIH KREDITA: SLUČAJ EVROPSKIH ZEMALJA

Apstrakt: Problematični krediti predstavljaju veoma bitan indikator stabilnosti bankarskog sektora i, ujedno, finansijskog sistema jedne ekonomije. Visoko učešće problematičnih kredita u strukturi ukupnih kredita, može predstavljati potencijalni uzrok nesolventnosti bankarskog sistema i pojave bankarske krize. Pitanje problematičnih kredita posebno je značajno za ekonomije sa bankocentričnim finansijskim sistemima, u kojima je bankarski sektor najznačajniji element finansijskog sistema i neretko najznačajniji izvor finansiranja privrednih aktivnosti. Predmet rada se bazira na ispitivanju uticaja nezaposlenosti na nivo problematičnih kredita u zemljama Evropske unije i Zapadnog Balkana u periodu između 2008. i 2022. godine. Cilj istraživanja je da se utvrdi da li, i u kom stepenu, nezaposlenost utiče na nivo problematičnih kredita u posmatranim ekonomijama, kao i u kojoj meri se razlike u nivou problematičnih kredita mogu objasniti razlikama u pogledu nezaposlenosti. Rezultati istraživanja sugerišu da nezaposlenost ima statistički značajan, ali relativno mali uticaj na nivo problematičnih kredita u posmatranim ekonomijama.

Ključne reči: problematični krediti, nezaposlenost, Evropska unija, Zapadni Balkan.

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