Non-Performing Loans in North Macedonia - Lessons Learned?

Andrej Ilievski

University American College Skopje, Boulevard III Makedonska Brigada 60, 1000 Skopje, North Macedonia, andrej.ilievski@uacs.edu.mk

Abstract: The object of this paper is to offer a complete and comprehensive study of non-performing loans, in the Republic of North Macedonia, as the most sensitive slice of the loan portfolios. It is expected that this work provides an extensive analysis of the reasons for the emergence of non-performing loans, their early detection, and effective ways to address them. Furthermore, analysis of the impact of non-performing loans, on the entire economy of the Republic of North Macedonia, is conducted. The analysis made with this study concludes that the growth of the total assets of banks have a positive impact on non-performing loans. On the other hand, the dynamics of non-performing loans, does not produce a significant impact on the macroeconomic indicators for the overall economy, in the country, except for, the rate of unemployment, whereby a reduction of the rate, increases the amount of problem loans.

Keywords: Non-performing loans; North Macedonia; credit risk

1   Introduction

After the monetary independence of Republic of North Macedonia, the banking sector was in a difficult situation, caused by the burden of non-performing loans. Thus, according to some estimates, in 1993, the non-performing loans reached a level of 70% of the loan portfolios of the banking sector. This was a result of the banks' affiliation with their major debtors, who participated in the governing bodies, but also due to the political influence on the banks' operations. Later on, with the adoption of the Law on Rehabilitation and Reconstruction of some of the Banks in the Republic of North Macedonia from March 16, 1995, the largest project for revitalization of the banks after the monetary independence, has had started. Several years later, on December 31, 1999, the Law on Guaranteeing the Investment of a Strategic Investor was adopted, in the way that the state took over the receivables from customers of Stopanska Banka AD Skopje in the total amount of 235 million DEM (around 120.3 million euro).

Fortunately, in 2002, there was a turnaround in the quality of the banks' loan portfolio, when in just one year the percentage of non-performing loans as reduced by more than half. Since then, there has been a significant improvement in the quality of the loan portfolio of the banking sector, and by the end of 2007, the share of non-performing loans was reduced to 6.4%. This is a consequence of several factors, such as: strengthening of supervisory standards, improved corporate governance of banks, takeover of banks by foreign banks, reforms in the judicial system, economic revival, restructuring of privatized companies, etc. Later on, over the course of 2009 and 2010 as a consequence of the effects of the global financial and economic crisis, the amount of non-performing loans increased again, and reached 7.1% (at the end of 2010). However, the loan portfolio of Macedonian banks is still much worse when compared with the EU, where the share of the non-performing loans is around 3% [1].

The higher share of non-performing loans can lead to additional cost, and therefore we can assume a negative relationship between the total loans over the total assets (TLTA) as the indicator of credit risk at one side, and the cost efficiency at the other. An example of the existence of a negative relationship is presented in [2] and [3].

According to the regulatory framework in the Republic of North Macedonia, loans classified in the risk categories D and E, or credits for any reason (principal, interest and other non-interest receivables) in arrears more than 90 days from the date of maturity are classified as non-performing loans. Additionally, Macedonian banks are obliged to have recorded and re-entered the dedicated accounting expense for non-performing loans (in the accounting plan for bank's bad and doubtful debts) [1]. At present, if the calculated interest reaches a non-performing status, the bank is obliged to make a full correction of its value. The claim may return from category of non-performing receivables, if the amount due is paid and if conditions for its reclassification in the better category of risk, are not met. Much often, non-performing loans represent a source of other types of risks, most often liquidity, but in other cases, they can be solvency risk, under assumption if they are related to a significant portion of the loan portfolio [4]. Hence, early detection is very important in the operation of the banks [5], especially from the perspective of their potential for resolving the non-performing loans.

When discussing the non-performing loans management, we first need to start with a credit risk management that is one of the most complex topics, which requires special attention in the banking system, and needs to be continuously upgraded and regulated at both national and global level [6] and [7]. Regulation of the credit risk on national level is of the regulatory bodies, responsible for the supervision of the banks [8]. Therefore, it can be assumed that the research problem emerges from the area that is constantly changing. Also, this area i.e. credit risk management is very relevant in Banking industry. Over the course of the global financial crisis of 2008, risk management takes even greater significance because the area has brought all the weaknesses in risks management. The topic of the economic research in the banking system in the transition countries, as well as the impacts of the banking

policies and activities on the overall economy of one country. Thus, the main basis of this research is the analysed and the dynamic of non-performing loans in the Republic of North Macedonia in the period 2006-2016.

In the past period the political and economic crisis rumbled in the banking sector, which has been reflected by the non-performing loans and increasing foreclosures. In the analysis performed by the World Bank in the Balkan countries, there is a decrease in the rate of non-performing loans (the lowest measurement was made is in the Republic of Kosovo, 4.7%). The countries of the region have registered a decline of problem loans, but the rates remain relatively high, when compared with the period before the financial crisis. According to the data, the highest on the list are the Republic of Albania and the Republic of Serbia, where the rate of non-performing loans exceeds 20% [8]. The World Bank report states that the Republic of North Macedonia is having a rate of 7.5%, making it the second among the Balkan countries in terms of collection of non-performing loans. This has also been confirmed by the National Bank, according to which in the second quarter of 2016 decline of non-performing loans to households and non-financial sector has been noted.

The level of non-performing loans has significantly decreased in the country in 2016, due to the obligation to write off loans (which they are fully reserved for more than two years). The largest part, 76% of the write-offs of non-performing loans belong to non-financial companies. The analysis shows a decrease in non-performing loans in the second quarter of 2016 to 32%. Namely, in the first half of 2016, 11.3 billion denars (around 184 million euro) of non-performing loans were subject of write off procedure. Later, in the second half of 2016.

According to the National Bank, the non-financial sector has seen a reduction in the rate of non-performing loans of 11.6%. The rate of non-performing loans in 2016 is still the highest in construction and activities related to real estate sector. However, due to the dynamics of non-performing loans, as well as the effects of their write-offs, a significant decrease was noted in this particular sector, but also in overall industry.

In households, non-performing loans were also reduced, to 2.8%. Hence, the credit cards and overdrafts on current accounts have significant reduction, (i.e. these claims of households have the highest write-off). Despite the significant decrease in non-performing loans, loans to households increased positively, at quarterly basis. It is important to emphasize that, the analysis of the financial literacy surveys concluded that households are financially vulnerable, most of them do not compile budgets in advance and do not have any reserves for potential financial shocks due to financial crises. For example, the case of Hungary, also sheds light on the fact, that despite the adoption of debt limits, the regulatory authority compels credit institutions to prudential lending, relatively high credit margins and interest income in the sector contribute to an increase in credit supply, as well as, the high demand population who "absorbs" loans in almost unlimited amount [9].

Communication with clients, as well as, postponement of the deadlines for collection of bad loans, are key tools in finding workable solutions for this problem. Successful collection of non-performing loans will be achieved through enhanced monitoring, analysis and monitoring of placements based on precisely defined procedures. In addition, the successful collection of non-performing loans will gain in efficiency through lending of new loans to sustainable and profitable businesses, supported by a stable financial construction and financially sustainable investment programmes, linking with the economic stabilization programmes of the Government [10].

Through descriptive statistical analysis precisely to emphasize the statistical trends of rates of problem loans in the Republic of North Macedonia in correlation with assets of banks, gross domestic product, unemployment and employment, government spending and human capital, macroeconomic indicators for the overall economy. Later, with conclusive statistical analysis to show causality and the impact of non-performing loans to the economy, i.e. other selected macroeconomic indicators in the Republic of North Macedonia. This paper covers problem loans and their impact in the Republic of Macedonia in the period from 2006-2016.

The main goal of the research is presentation and scientific analysis of the modern theoretical achievements and practical experiences in the conceptualization and operational management of problem loans (effective problem management), and their impact on the economy in the Republic of North Macedonia. Furthermore, this paper analyses the implications that are challenged by the non-performing loans, compared to macroeconomic rates with total assets of banks. This gives a clear picture of the impact of non-performing loans on the economy of the Republic of Macedonia. In addition, in the empirical part of the paper, through specific statistical operations, the statistical trend of these loans and their impact on the macroeconomic rates of the economy in the Republic of North Macedonia are being described. From all the above, both main hypotheses arise, which are defined as follows:

1) With the increase of the total assets, the amount of the problem loans of the bank increases

2) An additional hypothesis: growth of non-performing has negative impact on macroeconomic parameters in the Republic of North Macedonia

The rest of this work is organized in a following manner. In Section 2, the methodology of the research is explained. Section 3 presents the non-performing loans management, including early detection of non-performing loans and non-performing loans resolving modalities. In Section 4 we present the results of statistical analyses of non-performing loans in Republic of North Macedonia. Finally, in Section 5, the main conclusions are presented.

2   Methodology

The objective of the research is pre-conditioned by the correct choice of methods and techniques that will be applied in the research. The methods of quantitative and comparative analysis are used in the research [11]. Advertised methods combined with the historical method are applied in analysing the different models of management with problem loans in the North Macedonia.

Methods of scientific research are applied, such as the methods of analysis (content, structural, comparative, causal), synthesis, generalization, induction and deduction. The method of induction is used to formulate the basic conclusions about the phases and procedures in for non-performing loans management.

For this purpose, to cover the ten-year period 2006-2016, for comparison of non-performing loans with macroeconomic indicators. The analysis begins by showing the statistical trend of rates during this period and making comparative analyses. In the next phase of the analysis their potential correlation causality and connectivity (through Granger Causality Tests and Dickey-Fuller Augmented test), is being performed, which is followed by the presentation of the statistical trend.

A survey has been carried in support of the comprehensive analysis of the impact of non-performing loans in North Macedonia, for the period 2006-2016. This paper presents the quantitative procedures and methods relevant to the research problem which are being used. It should be noted that in this comprehensive analysis dependent variables are covered such as gross domestic product, the total assets of banks, employment and unemployment, human capital, and government spending in the Republic of North Macedonia. On the other hand, the rate of non-performing loans is used as an independent variable in the country in the observed period [12].

Credit risk management is one of the most complex topics to which special attention is paid in the banking system. It is constantly being upgraded both nationally and globally. Credit risk regulation at national level is implemented and controlled through the regulatory bodies. They are responsible for supervision of the banks in the corresponding countries. Therefore, the need for research is of continuous relevance. Moreover, in the period since the beginning of the global crisis in 2008, risk management has become more important because it has brought to the surface all the weaknesses which arise from its practical implementation in risk management.

The period of negative trend in many of the banks and credit institutions in the EU, which started after the financial crisis in 2008, also continued afterwards, until 2017. While in the EU the number of credit institutions in 2008 was 8525, in 2017 the number dropped to 6250. This is mostly due to the mergers in the banking sector, which strive to enhance their profitability. This trend can be also observed in the case of a number of employees in the credit institutions. By end of 2017 the banks in the EU countries employed about 2.71 million people, compared to 3.28 million at the end of 2008. This paper points out that the global financial crisis has led to a

substantial increase in non-performing loans. This trend has been increasing since 2008 leading to a maximum non-performing loans ratio of 7.5% in EU countries in 2012.

As of 2021, the ratio of non-performing loans declined significant across the EU, and in 2017, the ratio of non-performing loans reached only 3.7% suggesting that non-performing loans are no longer a tread for European banks. The European banks have continued to build a strong capital position and strengthen their balance sheets [13].

The subject of research in this paper is a comprehensive study of non-performing loans, as the most sensitive part of the bank's loan portfolio. The paper is expected to provide an in-depth analysis of the causes of problem loans, their early detection and effective ways to solve them, but also their impact on the overall economy of the Republic of North Macedonia, which influences the status and statistical trend of non-performing loans.

Hence, the main goal of the research is presentation and scientific analysis of modern theoretical achievements and practical experiences in the design and operationally effective management of non-performing loans (effective problem loan management) and their impact on the economy in the Republic of North Macedonia.

The comprehensive analysis covers dependent variables such as: gross domestic product, total bank assets, employment and unemployment, human capital and government spending in the Republic of North Macedonia, and on the other hand, as an independent variable the rates of non-performing loans in the Republic of North Macedonia in the specified time period. From this, all the two main hypotheses are derived, which are defined as follows:

- The increase in total assets of the banks in North Macedonia, result in increase of the non-performing loans, and

- The amount of non-performing loans in the Republic of North Macedonia has a negative impact on the macroeconomic parameters.

3   Non-Performing Loans Management

3.1   Early Detection of Non-Performing Loans

There are two types of warning signs of non-performing loans, warning signs in operations of the client-borrower and signs of warning in financial statements [14]. Warning signs in the operations of the client usually includes: reducing the volume of total income company; hard to reach managers and owners; late payment of creditors, including the banks; dependence on one buyer or supplier; vulnerability to changes in technology; delay of cash from customers and pressure from suppliers;

request by the client to activate the collateral (especially guarantees); changes in the terms of trade; lack of stocks or existence of non-current (old) inventory in warehouse; unbalanced management team, leadership changes; large staff fluctuations; too close ties with bank officers; beginning of the recession in the industry, changes in regulation in the industry and high-risk country.

The typical warning signs in financial statements are: reduced volume of bank account inflows; the emergence of new loans with other banks and large ratio of indebtedness; achieving a low gains and realization of losses; late submission, i.e. completion of calculations; changes in accountants and auditors; rapid decline in liquidity and negative cash flows; short-term financing of long-term assets and the investments in non-produced assets; loss of control over overhead costs; negative trends in debt, inventory and payment to suppliers. Furthermore, the early warning signs that indicate problems in the management structure are [15]:

a) Decisions are made exclusively by the CEO: a person who in making decisions excludes the suggestions and opinions of other managers, and the concept of teamwork is only formally present. Because one person is not able to continuously monitor all aspects of the operation of the enterprise, by himself/herself, decisions sometimes cannot be comprehensively analysed, which leads to problems in the operations of the enterprise.

b) The management team is non - complementary: often the management team is inadequate in its composition form the professional point of view, including many different incompatible management styles. This situation leads to possible conflicts, which could result in inefficiency of the company. If the management team is composed only of technical staff or if there is a combination of profiles in the team, which does not include a financial manager, then it is an inappropriate and incomplete management team.

c) No replacement (rotation) of the manager is planned: the successful long-term operation of the company depends upon a small number of people. Such cases occur in companies that are based on family tradition and failure to form a managerial staff. This problem arises in the case when there is an autocratic management of a person who does not delegate competencies and does not allow the proper formation of a management staff that will succeed him.

d) Frequent changes of staff (quick abandonment of existing work): people who work in the company, the best way is to equally treated by their superiors and that normal working atmosphere is created. The frequent turn-over of staff is a sign that the employees are not satisfied with the management or the situation in the company. Especially dangerous sign of warning may be leaving the chief financial officer or even worse, shifts between the financial officer and the chief accountant. The reason is simple: financial and accounting experts best recognize the signs of insolvency of the company in which they work.

e) Inadequate vertical communication: quality communication is a prerequisite for a quality management system. Communication "from the top down" is required for presenting the vision, objectives and plans of the company in terms of motivating the employees better. "Bottom-up" communication helps the management to timely identify the problems in the implementation of those plans and to properly correct or deviate from them if they prove unrealistic. Adversely, much is wrong if you do not create a good communication of management and employees. Actually, if there is a barrier and distancing of employees from management, they may not result in a boycott of certain business ventures than by the employees.

f) Excessively slow turnover of employees: slow replacement of personnel, especially those managing the company can be a signal for the weak outlook of the company. Namely, new people with different and richer experiences can diversify company's portfolio of ideas, that would ultimately result in better positioning on the market and strengthening of the financial power. In contrast, the company can stagnate and slowly "sinking" into the routine without innovations and lack of motivation, outlined in a previous period.

When certain external events represent a cause for concern, loan officers need to seek additional information about the financial performance of the customer under the new conditions [16]. When there is doubt that the borrower may have difficulty in servicing the receivables of the Bank, we need to strengthen the control and credit risk management, related to the customer. Actually, the Bank must understand the plans that are related to the credit risk management in correlation with the conditions and different risk scenarios [17].

3.2   Non-Performing Loans Resolving Modalities

When resolving non-performing loans, the starting point is the assessment of the existence of the possibility of survival of the debtor. This is done through a process of objective and subjective assessment of the creditworthiness of the client, taking into consideration the short-term and long-term aspects of the assessment. The main goal is that the debtor, for whom the assessment is prepared, have real possibility for survival and prospects for further operation. Additionally, with appropriate incentive economic measures the debtor should be supported in the efforts to achieve the set goals of remediation of the operation and thus indirectly influence its readiness and the ability to settle its liabilities to the bank.

In resolving the non-performing loans, we are starting from the interdependence of bank receivables, which means the context of the company in relation to the bank, but also to total surrounding. In doing so, an entrepreneurial approach is used, at the same time considering all elements that affect the financial relationship of the debtor to the bank and its impact on the financial result of the bank. This means that when calculating the effects, the impact of the measures on all items of the bank's financial calculations is considered. The size of the company is very important. The debtor

and the absolute and relative share of the bank in the total liabilities of the debtor are respected. This means that large loans have an advantage over the small ones and at the same time, that the approach and behaviour of the bank are different if the bank is the main creditor, compared to a scenario where the bank is only one, of several creditors.

In order to prepare the proposal for resolving the bad loans, the bank should previously receive an offer from the debtor for resolving its liabilities, with a solid proposal of measures to achieve the set of goals, with all necessary financial and other information (i.e. remediation program). The Bank evaluates the proposal at the micro and the macro level, specifically from its entrepreneurial attitude point of view. If there are broader social interests, the survival of the debtor, institution that have such interest for supports need to ensure payment of the existing obligations of the debtor or appropriate provision that should be time aligned over rehabilitation or a restructuring of the debtor. In the event of a declaration of emergency settlement for the debtor, the Bank is obliged to develop a plan of financial reorganization with the content prescribed in the Law on Forced Settlement, Bankruptcy, and Liquidation and to deliver it to the bank, which in dismissal of investments in the company would have respected the provisions of the Law. In the process of evaluating of the way of performing and the methods of resolution of bad loans, the bank should start with combining of the effects of profitability, provision, and liquidity. By default, with no method of resolving of these investments position of the bank and delivery of the receivables cannot be endangered. Moreover, when assessing the suitability of the method for resolving, it is better to use combined approach (profitability at the expense of the Provision and/or liquidity etc.).

During the restructuring of their receivables to the problematic debtor, bank should not worsen its position. The aim of the restructuring of the bank loans is that there is a harmonized settlement of obligations of the debtor of its objective financial possibilities, with the provision of quality provision. As a rule, the bank will not write off its investments without using all means and methods for their collection. The method of recovery through conversion of claims into ownership deposits in the company, the bank has applied only as an exception and only in cases where it determines that there is a real possibility its capital investments to sell in a short period of time or to replace for another, safer or more liquidity investment [8]. The choice of methods and the modality of settlement of investments is subject to a decision, which depends on the position of the debtor, the readiness of the management and the owners of the debtor, the property situation, the security, etc. Implementation of operational plan can use combined solutions as: restructuring/rescheduling of debt; obtaining appropriate additional security; sale of assets of the debtor which is set in favour of the bank, contract or by judicial means; initiating a procedure for forced settlement, bankruptcy, or liquidation, in accordance with the applicable legal regulations; sale of receivables to other interested parties [18].

Finally, effective auditing and monitoring in the loan approving process, that can improve the ability of financial institutions to become able to avoid over-lending to clients with a high-risk profile, are essentially important. Thus, stabilization of the operation of banks and financial institutions through the positive effects of credit monitoring and a strictly regulated environment needs constant improvement. Also, several international organizations have adopted recommendations after the crisis to promote an adequate quality of banks' governance also contributes to a stricter operation of banks. In this respect, the CRD Directive, and the recommendations of the Basel Committee and EBA aren't of crucial importance [19].

4   Statistical Analysis of Non-Performing Loans in North Macedonia

As stated above in the methodological part of the paper, in order to have a clear picture of the situation and management of non-performing loans in the North Macedonia, it is necessary to analyse the rates of these loans. In addition, they need to be compared with other macroeconomic indicators of the economy of the Republic of Macedonia, over a longer period in order to get relevant and objective analysis and that for a period of at least 10 years, 2006-2016. For the performed analysis, the data from relevant institutions [20] [21] were used.

Table 1

Rates of non-performing loans Total assets of Banks and other macroeconomic indicators

Year	Non-performing loans (NPL)	Total Assets of Banks (BA)	Gross Domestic Product Change (GDP)	Employment	Unemployment	Inflation	Government consumption	Human Capital
2006	10.099	174.111	5.1	39.6	36.0	2.9	-0.5	17.9
2007	9.398	223.659	6.5	40.7	34.9	6.1	0.6	30.7
2008	11.335	250.704	5.5	41.9	33.8	4.1	-0.9	14.5
2009	15.777	268.543	-0.4	43.3	32.2	-1.6	-2.6	-3.5
2010	17.289	305.290	3.4	43.5	32.0	3.0	-2.4	9.8
2011	20.089	331.176	2.3	43.9	31.4	2.8	-2.5	6.9
2012	22.688	352.886	-0.5	44.0	31.0	4.7	-3.8	7.6
2013	26.481	369.505	2.9	46.0	28.6	1.4	-3.8	6.2
2014	28.671	400.281	3.6	46.0	27.6	-0.5	-4.2	22.2
2015	30.008	423.668	3.8	47.8	27.3	-0.4	-3.5	18.4
2016	18.501	444.680	2.9	56.8	24.5	1.6	-3.2	20.4

Source: Prepared by the author

Table 1 shows the rates of non-performing loans by size of banks, total assets of the banks in that period, and other macroeconomic indicators, which according to economic theory of problematic loans are the causal link or a direct impact between them. The impact on the employment rate of the amount of non-performing loans in the country, the rate of human capital with the credit situation in a country, with the rate of inflation and unemployment. In this part, a comparative analysis is conducted, through graphical representations of the total non-performing loans with the total assets of the banks in the period 2006-2016. Then, the possible correlation between the rates of non-performing loans and the rates of other macroeconomic indicators of the economy of the Republic of North Macedonia in the period 2006-2016 are analysed.

Table 2

Descriptive statistics of parameters of non-performing loans variable by bank size

	NPL Big sized Banks	NPL Medium sized Banks	NPL Small sized Banks	NPL Total
Mean value	14144.64	3696.27	1280.45	19121.45
Median	13157.00	4431.00	1069.00	18501.00
Skewness				0.138589
Stand. Deviation.	5842.022	1798.601	526.967	7273.495
Minimum Value.	7517	883	645	9398
Maximum Value.	24258	5888	2073	30008

Source: Prepared by the author

Data displayed in Table 2 is relevant to the analysis performed, through which it can be concluded that the non-performing loan rates of large banks have the same statistical trend, as it is the case with the small banks, but opposite is the case with medium-sized banks. Additionally, according to the mode, median and mean value can be concluded to have asymmetric negative distribution of the median decreased the mean value, or (735) at rates in the period 2006-2016. The coefficient of skewness for all banks is 0.138589, which points out to a slight positive asymmetry, meaning that the distribution has a tail to the right. This can also be concluded from the fact that the median is lower the mean value. On the other hand, in large and small banks, which also have an asymmetric distribution of rates in this period, but positive asymmetry of mean value decreased by the median, i.e. (917) in large and (211) in small banks. In the last column under Table 2, according to the distribution of the mean value, mode and median, it can be concluded that the total rates of non-performing loans in the Republic of North Macedonia have an asymmetric and positive distribution over the period 2006-2016. This means that they are under constant growth, in line with the expectations, having in mind the trend of the total assets of the banks. It poses a real question whether this increase in problem loans in realistic proportion to the rate of growth of GDP in the North Macedonia!?
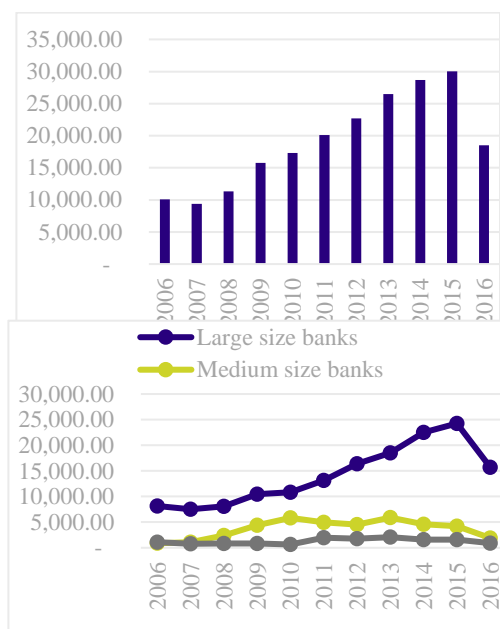
Figure 1

Non-performing loans in North Macedonia (total and by group of banks)

Source: Prepared by the author

Figure 1 shows the trend of non-performing loans in the Republic of North Macedonia in the period from 2006-2016. From the presented data in this figure, we recognize the abovementioned conclusion, stating that in the last year of the analysis, namely in 2016, the rates of non-performing loans are declining, in comparison with the previous year because of actual write-offs, in accordance with legal changes in the regulations. Also, Figure 1 shows the trend of these rates separately according to the size of the banks. Furthermore, the next question arises: does and to what extent these non-performing loans affect the profitability, productivity, and development of banks, in general? The answer to this question can be analysed through data on total assets shown in the table 1, as indicators of the profitability of the banks themselves in the period from 2006 to 2016 in the Republic of North Macedonia. In Figure 3, this statement can be clearly visualized, as a positive statistical trend, with an upward growth of total assets of banks. When comparing the rates of non-performing loans in the country (Figure 1), it can be concluded that it corresponds to the growth of total assets of banks. However, it should be highlighted that in 2016 the total assets experienced a growth, when compared to the rates of non-performing loans for the same year. Hence, the question whether this is an indicator that the profitability of banks does not depend on the amount of non-performing loans?
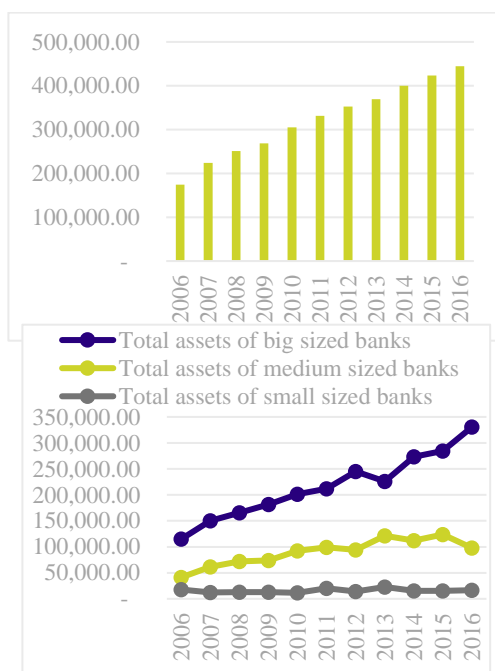
Figure 2

Total assets of the banks in the Republic of North Macedonia

Source: Prepared by the author

This is clarified through analysis of the data presented in Figure 3, which shows the total assets by size of banks and in 2016 there was a decline in the rates of total assets only in medium-sized banks. Does this mean that medium-sized banks have large amounts of write-off of non-performing loans? Figure 3 shows the casual link between non-performing loans and total assets of banks, in the Republic of North Macedonia in the period 2006-2016. The maximum values are reached in 2015, with the highest rate of non-performing loans and the highest total assets of banks in general.

According to the data presented under Figure 2 and 3, rates and amounts from the specified period can be compared. They are compared through procedures of inferential statistics, starting from the coefficient of correlation between the rate of non-performing loans and other macroeconomic indicators, shown in Table 1. Table 3 shows the data, according to Person coefficient of correlation, whereby can be ascertained three significant coefficients of correlation.

The first correlation is a relationship between rates of non-performing loans to total assets of banks, and the positive correlation with coefficient of 0.844 statistical significance for the first boundary of validity of 0.001 <0.01.
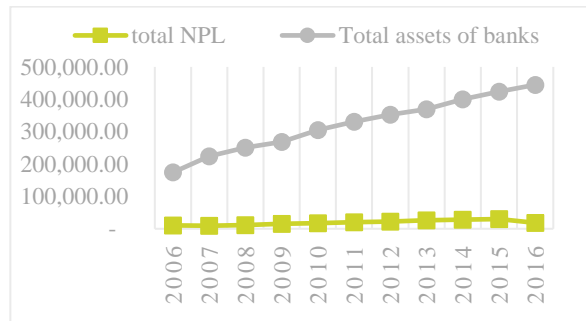
Figure 3
Non-performing loans in correlation with total assets of the banks
Source: Prepared by the author

It can be concluded that in the period from 2006 to 2016 the rise in non-performing loans is increasing and the total assets of banks of which cannot be concluded that the amount of non-performing loans affect the profitability of banks in general.

Table 3
The coefficient of correlation between the NPL and other macroeconomic parameters

			Total NPL	
			0.001	
			11	
			-0.384	
			0.243	
			11	
			0.472	
			0.143	
			11	
			-0.769	
			0.006	
			11	
			-0.569	
			0.068	
			11	
			-0.902	
			0.000	
			11	
			-0.145	
			0.670	
			11	

Source: Prepared by the author

Furthermore, as a significant factor of correlation and the connection between the rate of non-performing loans and the rate of unemployment i.e. negative correlation coefficient of -0.769 (high negative correlation), statistically significant for the first boundary of validity 0.006 <0.01. It can be concluded that the reduction of the rate of unemployment is correlating with growth of the amount of non-performing loans. It is expected that this correlation should be positive, i.e. that the increase in unemployment should lead to an increase of the amount of non-performing loans. This correlation further will be analysed through Granger test of causality.

These statistical analyses are used to check the first hypothesis of this study, which states that: with the increase of the total assets of banks also increase the amount of non-performing loans. According to the odds and display the statistical trend of total assets and the non-performing loans in the period from 2006 to 2016, it can be concluded that in this period, with the increase of total assets of banks to grow the amount of non-performing loans in the Republic of North Macedonia. Thus, the first hypothesis is confirmed and is sustainable.

Table 4
Test for causality - Granger Causality Tests

Date: 01/19/18 Time: 16:31			
Sample: 2006 -2016			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
VKUPNO AKTIVI does not Granger Cause VKUPNO_NFK	9	0.36800	0.7133
VKUPNO_NFK does not Granger Cause VKUPNO_AKTIVI		2.21973	0.2246
GDP does not Granger Cause VKUPNO_NFK	9	0.23363	0.8017
VKUPNO_NFK does not Granger Cause GDP		0.11032	0.8982
HUMAN_KAPITAL does not Granger Cause VKUPNO_NFK	9	0.26892	0.7770
VKUPNO_NFK does not Granger Cause HUMAN_KAPITAL		1.99622	0.2505
INFLACIJA does not Granger Cause VKUPNO_NFK	9	1.07068	0.4242

VKUPNO_NFK does not Granger Cause INFLACIJA		0.35322	0.7223
NEVRABOTENOST does not Granger Cause VKUPNO_NFK	9	0.03971	0.9614
VKUPNO_NFK does not Granger Cause NEVRABOTENOST		0.31706	0.7450
VLADINA_POTROSUVACKA does not Granger Cause VKUPNO_NFK	9	6.56412	0.0545
VKUPNO_NFK does not Granger Cause VLADINA_POTROSUVACKA		0.23520	0.8006
VRABOTENOSTA does not Granger Cause VKUPNO_NFK	9	0.54171	0.6192
VKUPNO_NFK does not Granger Cause VRABOTENOSTA		1.34674	0.3571

Source: Prepared by the author

Although the correlation coefficient shows a certain correlation between the amount of non-performing loans and the amount of total assets of banks, the unemployment rate and government spending, a more realistic causal link between these variables is shown by applying the Granger Causality Tests. From the data in Table 4, it can be concluded that non-performing loans are not an impact factor on economic indicators. In other words, the change of the amount of non-performing loans does not affect the dynamics of the rates of other macroeconomic indicators, as a forecast for further economic dynamics in the Republic of Macedonia (in Table 4 all probability coefficients are greater than the first and second limit of validity).

Further analysis of the data obtained using the Augmented Dickey-Fuller test to determine the statistical trend of non-performing loans (shown in Table 5) confirms the general hypothesis that the trend of non-performing loans is unchanged because the probability is higher than the first and the second limit for validity.

Table 5
Test for statistical trend of NPLs - Augmented Dickey-Fuller test statistic

Null Hypothesis: D(VKUPNO_NFK) has a unit root		t-Statistic	Prob.*
Exogenous: Constant			
Lag Length: 0 (Automatic - based on SIC, maxlag=1)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.514006	0.1430
Test critical values:	1% level	-4.420595	
	5% level	-3.259808	
	10% level	-2.771129	

* MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 9
Source: Prepared by the author

Conclusions

The purpose of this work is to provide a complete and comprehensive analysis of non-performing loans in the banking system of Republic of North Macedonia, as the most sensitive part of the loan portfolio, during the period 2006-2016. To fulfil this goal, two basic hypotheses were set in the research. First, that with the increase of total assets of the banks, in North Macedonia, the non-performing loans increase. Second, that the amount of non-performing loans produces a negative impact on the macroeconomic parameters, in the Republic of North Macedonia. From the performed analysis, it can be concluded that the amount of non-performing loans in North Macedonia, in the observed period, is increasing, although in 2016 the rates of non-performing loans decreased compared to the previous year, due to loan write-offs, initiated by changes of the regulations. Under this context, it can be concluded that such trend of the non-performing loans is correlated with the augmentation of total assets of banks. Additionally, correlation is accepted with the performed statistical analysis. Thus, the first hypothesis can be confirmed.

On the other hand, there is no negative impact of non-performing loans on the macroeconomic indicators. According to the obtained results of the statistical analysis, it can be concluded that the second hypothesis of this research, according to which the growth of problem loans has a negative impact on macroeconomic parameters in North Macedonia, is not confirmed and is not sustainable.

However, from the conducted analysis we can draw following conclusions. Namely, non-performing loans, in the group of large banks, have the same statistical trend as in the group of small banks, which is not the case with the group of medium-sized banks. In the first two groups, the distribution of mode, median and mean, the distribution of rates in this period has a positive asymmetry. In contrast, in the group of medium-sized banks it can be concluded that there is an asymmetric negative distribution of rates in the period from 2006-2016.

Although contra-intuitive, reducing the rate of unemployment is negatively correlated to the amount of non-performing loans. It is expected that this correlation should be positive, i.e., that the increase in unemployment should lead to an increase for non-performing loans. Furthermore, non-performing loans are not a factor which influences any of the economic indicators, i.e., that the dynamics of the rates of other macroeconomic indicators in the Republic of North Macedonia does not depend on non-performing loans.

According to the analysis, the trend of non-performing loans remains unchanged and unpredictable or maybe the analysed period of this study is not sufficient to predict in which direction you are moving within the statistical trend.

Finally, from the Pandemic Crisis, but also previous financial crises, knowledge about individual crises is influenced by the extent to which a respondent is informed about financial and economic issues, thus, the correlation between respondents' education in this regard and their knowledge about crises. The recent study [22]

confirms that relevant education plays a significant role in shaping the cognitive level of attitudes (awareness, knowledge) towards crises. It can be therefore assumed, that more educated and informed individuals that borrow money from the financial institutions, the lower percentage of non-performing loans compared to total assets. Furthermore, a similar study, regarding family business in Hungary, was performed [23]. Thus, a recommendation on a macro level is needed to address this issue.

In addition, after the corona virus 2020 pandemic, the factors for selecting the bank have changed and this shows the change of the customer's preferences in the area of financial culture [24]. This can have significant impact on the habits of the customers related to the financial discipline. Thus, a recommendation from this research, is that a similar empirical analysis of the dynamics of non-performing loans in North Macedonia in the period before and after the pandemic, should be conducted.

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