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PROFITABILITY OF THE BANKS IN THE REPUBLIC OF NORTH MACEDONIA - PANEL ANALYSIS FOR THE 2010-2019 PERIOD

ABSTRACT

The purpose of this paper is to examine some of the significant factors that affect the profitability of the banks in the Macedonian banking industry. The profitability is shown through the ROA indicator. The analysis uses a model of multiple regression with a data panel that includes 14 banks in the Republic of North Macedonia for the 2010 - 2019 period.

The analysis shows that operating efficiency is a variable with a significant impact on profitability. The size of the bank cannot be argued to be a significant factor in the profitability of banks, but the share of loans in total assets shows a positive impact on profits. On the other hand, the share of deposits and the share of interest income in total income, they both have a weaker impact on profitability.

The results of the research can help to determine the most important factors for the success (or failure) of the banking industry. Also, they could help make sound decisions of bank management in the future, especially in terms of improving banks profitability.

Keywords: *banking industry, profitability, Republic of North Macedonia.*

JEL: *G1, G21*

1. INTRODUCTION

Banks differ in key activities, financing strategies, financial exposure and risk management. Each bank seeks its competitive advantage in leveraging access to individual resources, available market opportunities and managerial skills. The result of this effort is reflected in the profitability of the bank. This means achieving a sufficient rate of return on total assets and capital at a certain degree of risk.

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In terms of traditional banking operations, it could be said that lending activities dominate. The eventual non-repayment of the loan to the bank is a loss. In this case, the bank must cover it with its reserves or in the worst case, with its share capital. High losses from the materialization of credit risk can cause unprofitable operations, but also insolvency of the bank and even bring it into a state of bankruptcy.

This paper is expected to provide relevant information on the profitability of Macedonian banks. The impact of credit risk on banks' profitability is indisputable. Namely, the high amount of non-performing loans and the allocation of high amounts of impairment both have a negative impact on the financial result of the banks.

Numerous papers confirm this regularity. So, the purpose of this paper is to point out those determinants, which do not reflect the quality of the loan portfolio, and which are expected to have an impact on the banks' profitability. Assessing the banks' profitability which reflects their overall operations and risk profile, is important for some entities: first of all the depositors, then the owners and potential investors, and last but not least, the managers and regulators.

Having in mind all of the previous, the paper is organized as follows: the first part provides an overview of the literature that treats profitability from different perspectives; data and indicators for the Macedonian banks are given in the second part, and in the third part, the empirical analysis of the profitability of the Macedonian banks is moved, accompanied by an explanation of the obtained results. Concluding remarks are given at the end.

2. Literature review

Profit is an important prerequisite for the existence and growth of a bank because it is a basic internal source for financing future operations and development. There are numerous papers that deal with the importance of profit in the field of banking, the factors on which it depends, as well as the relationship with the risks to which banks are exposed in their operations.

According to Golin (2001), adequate gains are needed for banks to be able to maintain solvency, but also to survive and grow in competitive conditions. Bobáková (2003) believes that the better the profitability is, the greater the opportunities for raising additional capital are. This stems from the fact that the higher the profit is, the greater the investor confidence in the financial power of the bank is. Therefore, the profit has an impact, not only on the internal strengthening of the bank's capital, but also on the cost of attracting new capital from external investors.

Stiroh and Rumble (2006) focus on the relationship between banks' sources of income and their profitability in research by US banking holding companies. DeSarbo and Grewal (2008) include performance, efficiency, and financial performance size, and Halaj and Zochowski (2009) include risk indicators, arguing that this allows banks to position themselves in the return on equity space, which is particularly important for the banking sector.

A study examining European banks from 2005 to 2011 (Bouheni, Ameur and Cheffou, 2014) concluded that strengthening of supervision could be a significant factor influencing profitability. Namely, it contributes to improving the stability of the banking system. Also, a positive correlation was found between profitability and the rate of capital adequacy, as well as the deposit insurance system.

Petria et al. (2015) explore the main determinants of profitability in the banking sectors of 27 European countries. In this analysis, all determinants are divided into three groups: internal (banking specific), specific to the banking sector and macroeconomic determinants i.e. factors. Their findings confirm that credit risk, liquidity risk, business diversification, market concentration/competition, and economic growth, all affect profitability as measured by two indicators, ROA and ROE.

Menicucci and Paolucci (2016) investigate the internal determinants of profitability on a sample of 28 European banks for the period 2006-2015. By applying regression analysis, they conclude that the bank's size, the capital adequacy ratio and the higher deposit base all have a positive effect on profitability. According to the research, poor asset quality reduces profitability.

Apart from the studies performed on the European banks, the researches carried out in other banking sectors are also interesting. They reaffirm the dependence of profitability on internal banking specific determinants such as credit risk and liquidity risk. Thus, the profitability of the banking sector in Turkey is explored by Reis, Kilic and Bugan (2016). They conclude that there is a significant correlation between leverage, loans/deposits ratio and market capitalization of profitability. The correlation was measured by ROA and net interest margin. Yuksel et al. (2018) surveyed the profitability in 13 banking sectors of the countries of the former Soviet Union in the 1996-2011 period. They conclude that the number of loans, non-interest income and gross domestic product are important determinants of profitability.

There are several empirical studies on the profitability of Macedonian banks. Curak, Poposki and Pepur (2011) investigate the specific banking factors, macroeconomic variables and factors related to the Macedonian banking industry. They applied panel analysis of 16 Macedonian banks for the period from 2005 to 2010. According to the obtained data, the management of operating costs has the greatest influence among internal factors.

Then, solvency and liquidity risk have a significant impact on profitability. In terms of external factors, the economic growth, the banking system's reforms and the sector's concentration, have the most significant impact on the Macedonian banks' profitability.

Iloska (2014) based on data for the period 2008-2011, concludes that operating costs and impairment for loans are negatively correlated to the profitability of banks, while staff costs, the size of the bank and the share of loans in total assets, have a positive impact on profitability. In addition, the results show that liquid assets, deposits and non-interest income, have a weak impact on profitability.

Popovska and Trpkoski (2013) conclude that the following parameters are statistically significant for ROA and ROE: the capital adequacy ratio, the share of capital in total assets, the share of highly liquid assets in total assets, the share of non-performing loans in total loans, net interest income in total income, and the employee costs. On the other hand, the GDP growth rate, household loans in total loans, and loans to legal entities as a part of the total loans are statistically insignificant for ROA and ROE.

3. Basic characteristics of Macedonian banking sector

Within the Macedonian banking sector, by the end of 2019 (on December 31, 2019), there were registered 15 banks and two building societies. The total assets amounted to 550 billion denars[3]. Banks apply a traditional business model of banking, i.e. collecting free cash from households and the corporate sector, and directing them to approve loans to cash-strapped entities. Modern banking instruments, such as financial derivatives, have not been developed yet.

Foreign capital participates with 74.6% in the total share capital. Dominant foreign-owned banks have a major role with a share of over 65% in all important positions in the balance sheets of the banking sector. Thus, their assets participate with 69.1% in the total assets of the Macedonian banking sector, and they create the deposit base with 69.4%. Also, they participate with 74.6% in the total loans. Finally, their participation in the total financial result was 85.2%.

According to the size of the assets, banks are divided into three groups: large, medium and small[4].

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3 The data for the individual indicators and sizes in this subheading are borrowed from the Data and indicators for the banking system of the Republic of North Macedonia, http://www.nbrm.mk/podatotsi_i_pokazateli_za_bankarskiot_sistem_na_republika_makedonija.nspx.

4 According to internal methodology of National bank of Republic of North Macedonia, www.nbrm.mk

The group of large banks consists of five banks with assets of more than 34.8 billion denars (on December 31, 2019). The group of medium-sized banks consists of seven banks with assets between 8.65 and 34.8 billion denars on December 31, 2019. The group of small banks consists of three banks with assets of less than 8.65 billion denars.

The group of large banks has a dominant share in all indicators of the operation of the banking sector as a whole. They account for 74.7% of the total assets, 79.1% of the total deposits and 74% of the gross loans of nonfinancial entities in the Macedonian banking sector. The share of foreign capital in the total capital of large banks is 80.4%, the capital of large banks accounts for 76% of the total capital of banks and with 97.4% they almost completely create the financial result of the Macedonian banking sector.

The group of medium-sized banks participates with 21.9% in the total assets, with 17.7% in the total deposits and with 22.5% in the gross loans of the non-financial entities in the Macedonian banking sector. Their capital accounts for 21% of the total capital of the banks and they have an insignificant share with 0.6% in creating the financial result of the banking sector. [5]

The group of small banks have insignificant influence in the Macedonian banking sector with a share of 3.3% in total assets, 3.2% in total deposits and 3.4% in gross loans to nonfinancial entities. The share of foreign capital in the total capital of small banks is 57.2%, their capital accounts for 3% of the total capital of the banks and they participate with 1.9% in creating the financial result of the banking sector as a whole.

From the above data, it is clear that the operations of the group of large banks determine the basic indicators for the entire banking sector.

4. Methodology and data used in the paper

Starting from the fact that the banks in the Macedonian banking sector are divided into three groups (large, medium and small), the research is aimed at the analysis of each individual group, in order to determine the impact of the selected indicators on profitability by a group of banks. The research uses annual data from 2010 to 2019 for each bank, but it is grouped according to the stated criterion. This provides a basis for comparative analysis.

The data used for the Macedonian banking sector are secondary, i.e. they are published in the audit reports on each bank's website. In order to find the empirical connection between the independent variables and the dependent variable, the relationship between the variables determined in the hypotheses, was tested and analyzed.

5 This is due to the fact that one medium-sized bank had a negative financial result for that period.

For that purpose, the descriptive statistics and the method of multiple regression for data analysis with the method of ordenary smallest squares, have been applied.

A dependent variable in the research is the Return on average asset rate (ROAA). It is the most commonly used measure of profitability. The indicator is calculated as a quotient between net profit after tax and total assets. This indicator reflects the ability of the bank management to use the financial and real investment resources of the bank for profit (Hassan & Bashir, 2003), i.e. the ability of the bank management to generate a profit from the average assets of the bank for a certain period. The height of the indicator depends on the decisions of the management, the policy of the bank, as well as on factors over which the management of the bank has no control, and are related to the economic policies and the regulation in the sector. A higher value of this indicator indicates a more efficient and successful use of the bank's assets in generating profit.

From the other side, the following independent variables are used in the research: the size of assets, the share of loans in assets, the share of deposits in assets, the operating efficiency ratio and the share of net interest income in total income.

There is a great disagreement in empirical researches regarding the impact of the size of the bank's assets on profitability. Along with the growth of the bank, it is possible to reduce costs through economies of scale by diversification of the loans and other products. This can provide access to markets that small banks cannot enter. According to Kosmidou (2008), greater opportunities for diversification should maintain or increase profits while reducing risk exposure. In general, the size of the assets has a positive effect on profitability, but to a certain extent. When the bank becomes quite large, then the positive effect may be lost at the expense of more difficult and complex management, as a partial consequence of aggressive growth strategies. This is why the relationship between bank asset size and profitability is non-linear (Eichengreen and Gibson, 2001). For instance, the positive relationship has been confirmed in many cases. In this sense, Garcia-Herrero & Vazquez (2007) concluded that large banks in developed countries are more profitable. But, the research of Kosmidou (2008) and Spathis et al. (2002) highlight the negative effect of asset size. The reason is sought in the fact that the small banks goal is usually rapid growth even at the expense of their profitability.

In traditional banking, on the one hand, dominates share of loans in total assets and on the other hand is the share of deposits in sources of financing (in total liabilities). The loans granted to households and enterprises are the most important part of the bank's credit placements. When approving loans, banks must properly analyze and assess the creditworthiness of borrowers, because the quality of assets has a significant impact on the reliability and profitability of the bank.

Interest-bearing assets are also risky assets. These are assets on which banks calculate interest and make a profit, and on the other hand, banks pay interest on deposits. Hence, net interest income is a part of the regular bank's income that has an impact on the financial result.

A higher level of loans implies that a higher risk will be generated. Empirical studies have found that a higher loan ratio is associated with higher interest margins, which suggest that risk-averse shareholders seek larger earnings to compensate for higher credit risk (Demirguc-Kunt & Huizingua, 1999; Chirwa, 2003; Maudos & Guevara, 2004; Flamini et al., 2009). However, this indicates that higher income levels as a result of banks' lending activities tend to be more profitable. Menicucci and Paolucci (2016) conclude that the higher deposit base has a positive effect on profitability.

The Cost to income indicator is the other relevant indicator of banks' efficiency. It is calculated as the ratio between total operating costs and total regular income. This indicator is inverse, i.e. a higher amount of the indicator indicates lower efficiency, and vice versa, a lower amount indicates higher efficiency (Burger, Moormann and Sottocornola, 2009).

Table 1: Preview of variables

Variable	Method of calculation	Expected direction of movement
Dependent variable		
ROAA	Net profit / total average assets	
Independent variables		
Assets	Asset size	?
Loans to assets	Share of loans in total assets	+
Cost-to-income	Operating expenses / total regular income	-
Net income	Net interest income	+
Deposits to assets	Share of deposits in total assets	+

Source: *Authors' own reviews.*

Based on the economic logic of data interdependence, a multiple regression model is used. It is necessary to examine the impact on the bank's profitability by the following variables: the asset size, the share of loans in assets, the share of deposits in assets, the cost-to-income ratio and the share of net interest income in total income. This impact is reflected in the rate of return on average assets. The model is shown in the following equation:

$$ROAA = \alpha + \beta 1x + e, \quad \text{where:}$$

α = constant

β = coefficents of the independent variables

„e“ = residual

Based on previous empirical research, the following hypotheses have been proposed:

H1: A higher amount of the operating efficiency indicator causes a lower rate of return on average assets of banks;

H2: A higher amount of assets causes a higher rate of return on average assets of banks;

H3: Higher share of loans and deposits in assets causes a higher rate of return on average assets of banks;

H4: A higher share of net interest income in total income causes a higher rate of return on average assets of banks.

5. Research results

5.1. Correlation analysis and descriptive statistics by groups of banks

According to the data in Table 2, the average value of the rate of return on average assets for the group of large banks in the analyzed period is 1.27%. The operating efficiency indicator ranges from the lowest value of 32.6% to the maximum value of 118.2%, while the average value is 52.63%. Thereby, the standard deviation, i.e. the average deviation from the average value, is most pronounced in this indicator compared to the other indicators. The average share of the deposits in the assets is 75.51%, the average share of the credits in the assets is 60.34%, while the net interest income in the total income participates with an average of 66%.

Table 2: Descriptive analysis for the group of large banks

	COST_TO_INCOME	DEPOSITS_TO_ASSETS	LOANS_TO_ASSETS	NET_INCOME	ROAA	TOTAL_ASSETS
Mean	0.526320	0.755156	0.603409	0.660012	0.012689	10.87218
Median	0.498000	0.773307	0.612221	0.694677	0.011828	11.10696
Maximum	1.182000	0.871320	0.734386	0.824030	0.033885	11.72009
Minimum	0.326000	0.503953	0.405691	0.363925	-0.013381	8.967887
Std. Dev.	0.158461	0.083419	0.081050	0.126989	0.009312	0.635102
Skewness	1.877287	-0.768691	-0.626212	-0.842034	0.173247	-1.093046
Kurtosis	7.773957	3.375551	2.889557	2.917690	3.386305	3.736567
Jarque-Bera	76.84893	5.217885	3.293260	5.922618	0.561020	11.08652
Probability	0.000000	0.073612	0.192698	0.051751	0.755398	0.003914
Sum	26.31600	37.75780	30.17045	33.00058	0.634463	543.6089
Sum Sq. Dev.	1.230387	0.340977	0.321889	0.790187	0.004249	19.76436
Observations	50	50	50	50	50	50

Source: *Authors' own calculations.*

The Pearson coefficient "r" is calculated to show whether there is a statistically significant correlation between the indicators and the rate of return on average assets. The calculation shows that in the group of large banks there is a moderately significant negative correlation of the operating efficiency indicator (cost to income). Also, there is a moderately positive correlation with the share of deposits and loans in assets, as well as with total assets.

The negative correlation of 0.65 between the rate of return on average assets and the operating efficiency indicator indicates that as long as the value of the operating efficiency indicator increases, the management is more inefficient in managing the bank's operating income and expenses. This confirms the existence of a relationship between profitability and efficiency. The correlation calculations are given in Table 3.

Table 3: Correlation between variables for the group of large banks

	COST_TO_INCOME	DEPOSITS_TO_ASSETS	LOANS_TO_ASSETS	NET_INCOME	ROAA	TOTAL_ASSETS
COST_TO_INCOME	1.000000	-0.803513	-0.004457	0.150330	-0.650506	-0.887191
DEPOSITS_TO_ASSETS	-0.803513	1.000000	-0.297013	-0.260551	0.427799	0.863711
LOANS_TO_ASSETS	-0.004457	-0.297013	1.000000	0.264472	0.400632	-0.200072
NET_INCOME	0.150330	-0.260551	0.264472	1.000000	-0.050732	-0.312564
ROAA	-0.650506	0.427799	0.400632	-0.050732	1.000000	0.587368
TOTAL_ASSETS	-0.887191	0.863711	-0.200072	-0.312564	0.587368	1.000000

Source: *Autors' own calculations.*

According to Table 4, the average value of the rate of return on average assets for the group of medium-sized banks was 0.06% for the analyzed period. Due to the negative financial result of one bank, its lowest value has a negative sign, and the highest value is 1.99%. The operating efficiency indicator ranges from the lowest value of 49.4% to the maximum value of 218.5%, while the average value is 84.78%. In the group of medium-sized banks, the standard deviation has the highest value as an indicator. The average share of the deposits in the assets is 72.19%, the average share of the credits in the assets is 58.9%, while the net interest income in the total income participates with an average of 50.16%.

Table 4: Descriptive analysis for the group of medium-sized banks

	COST_TO_INCOME	DEPOSITS_TO_ASSETS	LOANS_TO_ASSETS	NET_INCOME	ROAA	TOTAL_ASSETS
Mean	0.847798	0.721918	0.588929	0.501600	0.000636	9.334403
Median	0.824000	0.719767	0.596756	0.490809	0.002737	9.312265
Maximum	2.185000	0.927007	0.772864	0.824030	0.019957	10.31755
Minimum	0.494000	0.496503	0.146059	0.152745	-0.069805	7.692570
Std. Dev.	0.255865	0.104563	0.136613	0.164660	0.014479	0.524721
Skewness	2.767912	-0.162570	-1.254194	0.055874	-2.668502	-0.689028
Kurtosis	14.41646	2.367597	4.813574	2.457500	12.30537	3.986349
Jarque-Bera	395.7450	1.243053	23.55345	0.754202	282.8889	7.060142
Probability	0.000000	0.537124	0.000008	0.685847	0.000000	0.029303
Sum	50.02006	42.59315	34.74684	29.59442	0.037552	550.7298
Sum Sq. Dev.	3.797092	0.634134	1.082466	1.572554	0.012159	15.96927
Observations	59	59	59	59	59	59

Source: *Autors' own calculations.*

The correlation calculations for the group of medium-sized banks are given in Table 5. From there, a conclusion can be derived that in the group of medium-sized banks there is a weak positive correlation of the ROA indicator to the share of loans, to the size of assets, and to net interest income. There is a weak negative correlation with operating efficiency, while there is almost no correlation with the share of deposits and ROA.

Table 5: Correlation between the variables for the group of medium-sized banks

	COST_TO_INCOME	DEPOSITS_TO_ASSETS	LOANS_TO_ASSETS	NET_INCOME	ROAA	TOTAL_ASSETS
COST_TO_INCOME	1.000000	-0.132043	-0.666482	-0.437082	-0.367805	-0.583867
DEPOSITS_TO_ASSETS	-0.132043	1.000000	0.345653	0.097606	-0.050143	-0.077521
LOANS_TO_ASSETS	-0.666482	0.345653	1.000000	0.572904	0.372179	0.629301
NET_INCOME	-0.437082	0.097606	0.572904	1.000000	0.362401	0.480618
ROAA	-0.367805	-0.050143	0.372179	0.362401	1.000000	0.314580
TOTAL_ASSETS	-0.583867	-0.077521	0.629301	0.480618	0.314580	1.000000

Source: *Autors' own calculations.*

Regarding the data in Table 6 for the analyzed period, the average value of the rate of return on average assets for the group of small banks was negative (-1.45%), and its highest value was 1.43%. The negative financial result of two small banks for a longer period of time contributes to the negative values of this indicator.

The operating efficiency indicator averaged 111.32%, the share of deposits in total assets averaged 77.54%, the share of loans in total assets averaged 56%, and net interest income averaged 42.92% in total revenues.

Table 6: Descriptive analysis for the group of small banks

	COST_TO_INCOME	DEPOSITS_TO_ASSETS	LOANS_TO_ASSETS	NET_INCOME	ROAA	TOTAL_ASSETS
Mean	1.113167	0.775418	0.560267	0.429223	-0.014472	2.123665
Median	0.855000	0.785305	0.574105	0.433942	0.002534	2.163802
Maximum	4.012000	0.864851	0.746626	0.577465	0.014346	2.206812
Minimum	0.597000	0.539216	0.320728	0.326923	-0.100559	1.882648
Std. Dev.	0.693898	0.085711	0.075333	0.064729	0.034810	0.085240
Skewness	2.742942	-1.306953	-0.813016	0.100263	-1.347335	-1.407553
Kurtosis	11.34205	4.306877	5.670618	2.463738	3.296115	4.096483
Jarque-Bera	124.6060	10.67554	12.22022	0.409734	9.186159	11.40887
Probability	0.000000	0.004807	0.002220	0.814756	0.010122	0.003331
Sum	33.39500	23.26255	16.80802	12.87669	-0.434174	63.70994
Sum Sq. Dev.	13.96333	0.213044	0.164579	0.121505	0.035141	0.210709
Observations	30	30	30	30	30	30

Source: *Autors' own calculations.*

The correlation calculations for the group of small banks are given in Table 7. The calculation shows that in the group of small banks there is a significant negative correlation of the operating efficiency indicator. On the other side, there is a moderate positive correlation to the share of deposits in assets, and a weak correlation to the share of net interest income in total revenue.

Table 7: Correlation between variables for the group of small banks

	COST_TO_INCOME	DEPOSITS_TO_ASSETS	LOANS_TO_ASSETS	NET_INCOME	ROAA	TOTAL_ASSETS
COST_TO_INCOME	1.000000	-0.549153	-0.421960	-0.364053	-0.787340	-0.618669
DEPOSITS_TO_ASSETS	-0.549153	1.000000	0.538963	-0.095588	0.583914	0.324095
LOANS_TO_ASSETS	-0.421960	0.538963	1.000000	-0.017094	0.377018	0.377421
NET_INCOME	-0.364053	-0.095588	-0.017094	1.000000	0.148817	-0.063787
ROAA	-0.787340	0.583914	0.377018	0.148817	1.000000	0.607875
TOTAL_ASSETS	-0.618669	0.324095	0.377421	-0.063787	0.607875	1.000000

Source: *Autors' own calculations.*

The comparative analysis by groups of banks shows that the group of large banks achieves the highest efficiency, while the efficiency of the group of medium-sized banks is lower.

The group of small banks achieves a high value of the cost to income indicator, which indicates the need to take measures to restructure and improve their operation. The largest profitability, measured by the rate of return on average assets is achieved by large banks, while unprofitable operations are characteristic of small banks. That is a consequence of operating with a negative result of two small banks. These results are in line with explained correlations between the selected variables.

5.2. Regression analysis by groups of banks

The research methodology is based on the ordenary least squares method (OLS). The analysis uses a multiple regression model with several independent variables (operating efficiency indicator, share of deposits in total assets, share of loans in total assets, share of net interest income in total income and the size of assets). They all affect the dependent variable (rate of return on average assets). For the validity of the data Durbin-Watson test was performed. A group of large and medium-sized banks is below 2, which indicates that the model does not have a problem with autocorrelation.

The purpose of the regression analysis is to give an interpretation of how much of the variation in the rate of return on average assets can be explained by the independent variables in the model. The regression analysis results are shown in Table 8.

Table 8: Representation of individual coefficients from the regression analysis by groups of banks

Large banks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.101321	0.048416	-2.092712	0.0422
COST_TO_INCOME	-0.012087	0.013618	-0.887581	0.3796
DEPOSITS_TO_ASSETS	-0.011901	0.021886	-0.543767	0.5893
LOANS_TO_ASSETS	0.055686	0.012572	4.429425	0.0001
NET_INCOME	0.000802	0.007419	0.108152	0.9144
TOTAL_ASSETS	0.008759	0.003735	2.344885	0.0236

R-squared	0.632679	Mean dependent var	0.012689
Adjusted R-squared	0.590938	S.D. dependent var	0.009312
S.E. of regression	0.005956	Akaike info criterion	-7.296684
Sum squared resid	0.001561	Schwarz criterion	-7.067241
Log likelihood	188.4171	Hannan-Quinn criter.	-7.209311
F-statistic	15.15726	Durbin-Watson stat	0.811351
Prob(F-statistic)	0.000000		

Medium-sized banks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013624	0.050281	0.270956	0.7875
COST_TO_INCOME	-0.010020	0.009639	-1.039549	0.3033
DEPOSITS_TO_ASSETS	-0.024160	0.019669	-1.228307	0.2248
LOANS_TO_ASSETS	0.024424	0.022621	1.079718	0.2852
NET_INCOME	0.016547	0.013321	1.242184	0.2196
TOTAL_ASSETS	-0.001043	0.004924	-0.211813	0.8331

R-squared	0.215951	Mean dependent var	0.000636
Adjusted R-squared	0.141984	S.D. dependent var	0.014479
S.E. of regression	0.013412	Akaike info criterion	-5.689252
Sum squared resid	0.009533	Schwarz criterion	-5.477977
Log likelihood	173.8329	Hannan-Quinn criter.	-5.606779
F-statistic	2.919561	Durbin-Watson stat	1.725096
Prob(F-statistic)	0.021165		

Small banks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.214242	0.188670	-1.135538	0.2674
COST_TO_INCOME	-0.028309	0.010695	-2.647019	0.0141
DEPOSITS_TO_ASSETS	0.098783	0.067207	1.469831	0.1546
LOANS_TO_ASSETS	-0.032300	0.065460	-0.493428	0.6262
NET_INCOME	-0.011557	0.079983	-0.144487	0.8863
TOTAL_ASSETS	0.083695	0.067748	1.235385	0.2286

R-squared	0.681346	Mean dependent var	-0.014472
Adjusted R-squared	0.614960	S.D. dependent var	0.034810
S.E. of regression	0.021600	Akaike info criterion	-4.655362
Sum squared resid	0.011198	Schwarz criterion	-4.375122
Log likelihood	75.83042	Hannan-Quinn criter.	-4.565710
F-statistic	10.26337	Durbin-Watson stat	2.414217
Prob(F-statistic)	0.000024		

Source: *Authors' own calculations*

Conducted regression analysis by groups of banks allows several conclusions to be drawn from the tested model. Namely, the regression analysis confirmed the first hypothesis according to which the higher amount of the cost to income indicator causes a lower rate of return on the average assets of the banks only for the group of small banks. In this group of banks, the increase of the cost to income indicator for 1pp leads to a decrease in the rate of return on assets for 0,028pp with a 5% level of significance. This confirms the research findings that poor management of the bank reduces its operational efficiency which in long run leads to reduced profitability.

Regarding the second hypothesis of the research that the higher amount of assets causes a higher rate of return on the average assets of the banks, the dependence of the size of the bank with the ROA indicator can be confirmed in the group of large banks. At the level of significance of 5%, increasing the assets for 1pp leads to increase in the rate of return on assets by 0,0087pp. This conclusion confirms the research of Garcia-Herrero & Vazquez (2007) and Iloska (2014).

Concerning the third hypothesis according to which the higher share of loans in total assets causes a higher rate of return on average assets is confirmed by the group of large banks. At the level of significance of 5%, the increasing the share of loans in total assets for 1pp leads to an increase in the rate of return on assets by 0,056pp. This connection confirms the fact that loans are the dominant income generator for banking institutions. But, on the other side, the part of hypothesis that a higher share of deposits in total assets causes a higher rate of return on average assets of banks, can't be confirmed in any group of banks.

Finally, the last hypothesis in the research predicts that the higher share of net interest income in total income causes a higher rate of return on average assets of banks. According to the results of the model, this hypothesis cannot be confirmed in the case of these three group of banks.

The determination coefficient in the group of large banks and the group of small banks, is more than 63%. This percentage of the variations in the rate of return on average assets could be explained by the independent variables in the model. In the group of medium-sized banks, the determination coefficient is 21.59%, i.e. such a percentage of the variations in the rate of return on average assets are explained by the independent variables in the model. This leads us to the conclusion that other factors and indicators may have a greater impact on their profitability in the group of medium-sized banks.

6. CONCLUSION

The research within the previously defined theses could suggest certain knowledge and directions to which every banking institution, but the creators of banking regulations as well, should strive. The results of the research could point to the improvement of the risk management process and the definition of the long-term strategies of the banks for achieving greater profitability.

The regression analysis confirmed the assumption for the inverse correlation of operating efficiency with profitability, i.e. that a higher amount of the operating efficiency indicator causes a lower rate of return on average assets of the group of small banks. Also, the research confirmed the hypothesis that the size of assets and the share of loans in assets have a statistically significant impact on higher profitability for the group of large banks. On the other hand, the share of deposits in the sources of financing and the share of net interest income in total income both have no statistically significant impact on the profitability indicator.

To sum up, the results of the research point to the fact that the profitability of banks in the Macedonian banking sector is driven by several factors. All of them should be subject to further thorough research and analysis.

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PROFITABILNOST BANAKA U REPUBLICI SJEVERNOJ MAKEDONIJI - PANEL ANALIZA ZA PERIOD 2010-2019 -

SAŽETAK

Svrha ovog rada je ispitati neke od značajnih faktora koji utiču na profitabilnost banaka u makedonskoj bankarskoj industriji. Profitabilnost se prikazuje kroz ROA indikator. Analiza koristi model višestruke regresije sa panelom podataka koji uključuje 14 banaka u Republici Sjevernoj Makedoniji za period od 2010 do 2019. godine.

Analiza pokazuje da je operativna efikasnost varijabla sa značajnim uticajem na profitabilnost. Za veličinu banke ne može se reći da je značajan faktor u profitabilnosti banaka, ali učešće kredita u ukupnoj aktivi pokazuje pozitivan uticaj na dobit. S druge strane, udio depozita i udio prihoda od kamata u ukupnom prihodu, oba imaju slabiji utjecaj na profitabilnost.

Rezultati istraživanja mogu pomoći u utvrđivanju najvažnijih faktora za uspjeh (ili neuspjeh) bankarske industrije i mogli bi pomoći u donošenju zdravih odluka u upravljanju bankama u budućnosti, posebno u smislu poboljšanja profitabilnosti banaka.

Ključne riječi: *bankarska industrija, profitabilnost, Republika Sjeverna Makedonija.*

JEL: G1, G21