DETERMINANTS OF NET INTEREST MARGINS - THE CASE OF MACEDONIA

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Abstract

The paper aims to examine the determinants of the net-interest margin (NIM), firstly theoretically, then empirically on the case of Macedonian banks. Since, it is generally agreed that a strong and healthy banking system is a prerequisite for sustainable growth, surviving negative shocks and maintaining financial stability, identifying the determinants that mostly influence bank profitability, expressed through NIM in Macedonia, is of great importance. The regression analysis employs bank level data for the period between 2008 and 2011 to determine the crucial factors that affect NIM. The results show that high net-interest margin and hence profitability tend to be positively associated with banks that employ quality and high-paid staff, and banks that concentrate a great part of their investments in loans. During the period under study, the results show that management's behavior towards risk, the size of the bank and expenses management did not have a clear-cut or significant impact on bank profits.

Key words

Profitability; Net interest margin; Bank-specific factors; Multiple regression model.

INTRODUCTION

Generally, the main role of every financial system is to enable the flow of funds between savers and borrowers. Doing this efficiently will result eventually in improved profitability, increased volume of funds flowing, better quality services for customers, enhanced economic and financial growth of a country. As financial intermediaries, banks play an essential role in the operation of most economies, by transforming savings into investments. Taking in consideration that savings and investments are among the most important determinants of economic growth, the

health of the general economy of a country is in a great way dependent on the well-functioning financial system. Unlike in the developed countries, where the financial markets and the banking sector work in unison, in the developing countries the financial markets are not developed or undersized, so it is on the banks to fill in the gap between the savers and borrowers and provide profitable and secure funds channeling (Sufian & Habibullah, 2009). This holds especially true for countries like Macedonia, where the banking sector is the backbone of the economy. In Macedonia, the banks have a dominant role (with 88.5% of the total financial assets in 2012), with the capital market segment for long-term finance being illiquid and, in some cases, underdeveloped, while non-bank financial intermediaries, such as life insurance companies and private pension funds, are still at an embryonic stage of development. Hence, changes and performance of the banking sector do not affect just the particular banks, but are also highly relevant for the economy as a whole. Accordingly, efficiency and profitability of the banking sector, or more precisely, their determinants, are of an interest not just at individual bank level, but also at a broader macroeconomic level.

There are plenty aspects of banks which could be analyzed, but we focus specifically on bank profitability. Profitability is a reflection of how banks are run, given the environment in which they operate. More precisely, it should mirror the quality of a bank's management and shareholders' behavior, bank's competitive strategies, efficiency and risk management capabilities (Aburime, 2007). Profits affect bank's cost of raising capital in both ways, as a direct contributor to equity financing and as indicator for external investors' assessment of the financial strength of the bank.

On a macro level, a sound and profitable banking sector is better capable to endure negative distress and adds to the strength and the stability of the financial system. Hence, it is vital both to macroeconomic stability and to favorable long-term growth prospects. Despite the fact that there is increased trend toward bank disintermediation observed in many countries, the role of banks remains central in financing economic activity. Given the relation between the well-being of the banking sector and the growth of the economy, determining the underlying factors that influence bank profitability is therefore of interest and essential not only for the managers of the banks, but also for numerous stakeholders such as the central banks, bankers associations, governments, and other financial authorities. Knowledge of these factors would be useful in helping the regulatory authorities and bank managers formulate future policies aimed at improving the profitability of the Macedonian banking sector (Athanasoglou et al, 2005).

The main goal of the paper is by using an empirical analysis, to determine the key determinants that influence NIM in Macedonia, following the literature and taking into account country's particular characteristics. The remainder of the paper is structured as follows: a review of the relevant literature regarding the determinants

of the NIM is given in the next section; Section 3 contains description of the data on which the analysis is based and a brief outline of the econometric methodology to be applied; the interpretation of empirical results is presented in Section 4; lastly, Section 5 summarizes the relevant conclusions and suggestions.

THEORETICAL BACKGROUND

By now, there is overwhelming evidence that a well-functioning financial system is important for economic growth. Hence, the performance of the banking sector has received a lot of attention in recent years. Based on a review of the existing literature it would be legitimate to assume that the two broad sets of variables that control bank profitability and, therefore margins, are a function of the sector-specific determinants as well as the macroeconomic environment within which the banking sector operates. The first ones or internal determinants are related to bank accounts (balance sheets and/or profit and loss accounts) and so could be termed as micro or bank-specific determinants. The external or macroeconomic determinants are not related directly to bank management, but reflect the economic and legal environment, which affect operation and performance of financial institutions.

The determinants have been widely studied both theoretically and empirically. Mainly, those studies can be grouped in: studies focusing on an individual country (Kosmidou et al, 2006; Naceur & Goaied, 2008) or a geographical region (Olson & Zoubi, 2008) that have examined bank-specific determinants of profitability, and others encompassing multiple countries (Valverde & Fernandez, 2007) which have considered external determinants in addition to a few internal determinants of profitability. The main conclusion emerging from these numerous studies is that internal determinants explain a great portion of profitability. Various measures of costs, higher liquidity, greater provisions for loan losses and more reliance on debt have been indicative of lower bank profits. Larger bank size, greater dependence upon loans for revenue, and higher proportions of capital to assets have generally been associated with greater profitability. Nevertheless, external factors such as inflation, business cycle, market concentration etc., appear to play a significant role in shaping the performance of banking institutions. For instance, higher market concentration, greater GDP growth and inflation have generally been associated with greater profitability.

In this study, the main focus is on the first category of determinants, the bank-specific of microeconomic drivers of margins, based on the financial ratios derived from the main financial statements, that reflect the bank's management policies and decisions in the allocation of the resources and are direct indicators of the earning power and the costs of banks.

Many authors find a strong, positive correlation between bank's capitalization and its profitability (Staikouras & Wood, 2003). Others, postulate a link between capitalization and risk aversion and according to them, banks with a high level of capital are more risk averse and ignore potential diversification options or other methods to increase profitability (Goddard et al, 2004). With respect to the impact of the bank's size on its profitability, the results are ambiguous, but newer studies generally find a negative correlation (Kosmidou et al, 2006; Alexiou & Sofoklis 2009). Regarding the risks in the banking business, most of the studies find negative correlation (Ramlall, 2009; Vong, 2005; Kosmidou, 2008), while few find a positive one (Naceur & Goaied, 2008; Ali et al, 2011). A number of studies have concluded that expense control is the primary determinant of bank profitability. Lowering the expenses usually rises the efficiency and in the same time the profitability (Ramlall, 2009; Kosmidou, 2008), except the salary expenses which exhibit positive correlation with profitability, especially in the developing countries that employ high-quality staff that will not have negative consequences regarding the efficiency (Athanasoglou et al, 2005; Iloska, 2014). Although bank loans are the main source of revenues and are expected to affect margins positively, findings from various studies are not conclusive. While the studies by Abreu & Mendes (2000) and Iloska (2014) document a positive relationship between the loan ratio and profitability, the study by Staikouras & Wood (2003) show that a higher loan ratio actually affects profits negatively. The latter study notices that banks with more non-loan earnings assets are more profitable than those that rely heavily on loans. Empirical evidence from Naceur & Goaied (2008) indicates that the best performing banks are those who maintain high level of deposit accounts relative to their assets.

DATA SET AND ECONOMETRIC METHODOLOGY

Variables' specification

Bank profitability and bank interest margins can be seen as indicators of the (in)efficiency of the banking system, as they affect the net return to savings and the gross return for investment. Both ex ante and ex post spreads can be used to measure the efficiency of bank intermediation. Ex ante spreads are calculated from the contractual rates charged on loans and rates paid on deposits. Ex post spreads consist of the difference between actual interest revenues and expenses. The ex post measure of the spread generally differs from the ex ante measure and it is more useful, as it controls for the fact that banks with high-yield, risky credits are likely to experience high loan default rates. For these reasons, we focus on ex post interest spreads in this paper. As a measure of bank efficiency and a dependent variable, we consider the accounting value of a bank's net interest income over total assets, or the net interest margin (NIM). Thus, in line with the previous saying, NIM is an ex post interest margin that differs from the ex ante interest margin (simply the loan interest rate minus the deposit interest rate) because of possible loan defaults. NIM is in a

great way dependent on management's capability to earn sufficient return on assets and secure financing from cheaper resources. The importance of NIM comes from the fact that interest revenues and interest expenses are two main categories in the profit and loss account. Hence, NIM has to be wide enough to cover the non-interest expenses and to provide certain earning for the shareholders.

While net interest margin can be interpreted as a rough index of bank (in)efficiency, the changes in its value should be carefully interpreted. Usually higher NIM signals improved or higher profitability. This situation is not desired if the higher NIM is due to new loans with higher yield and yet risk. On the other side, reduction in NIM may reflect an improved functioning and efficiency of the banking system due to the greater competition among banks, but it can also reflect a high loan default rate. That is why the yields should be monitored at the same time with the risks undertaken. However, higher NIM contributes to the stability of the banking system, by adding to the bank's capital needed as a secure measure against any adverse situations. The evidence says that NIM is usually highest in middle-income countries, where the banks also have the highest values for operating expenses and loan loss provisions to assets variables. Banks in the high-income countries, instead, achieve the lowest NIM, and they face the lowest ratios of operating expenses, loan loss provisions, and net profits to assets. Overall, for NIM to be a good measure of profitability, interest rate revenues and expenses should be closely related to banks' behavior, and not to government decisions (Demirguc-Kunt & Huizinga, 1999).

Banking literature acknowledges various determinants of NIM. They usually are consisted of elements internal to each financial institution, like the size of the bank, the attitude of the bank's owners and managers towards risk, the composition of the portfolio etc., and several important external forces shaping earnings performance, like the bank's ownership characteristics, the level of external competition the bank encounters, business cycle fluctuations, inflation etc. The first group, internal determinants, can be described as the factors that are influenced by bank management's decisions, actions and policies regarding funding resources and their usage, capital, liquidity and risk management, costs efficiency etc., that later reflect differences in bank operating results, including margins. As potential determinants of Macedonian banks' NIM we consider nine bank-specific measures:

- *Capital* - Capital refers to the amount of own funds (primarily by bank's owners, reserves and retained earnings) available to support a bank's business and for that reason it acts as a safety net in case of unexpected situations. As such, the strength and quality of capital will influence bank performance. Strong capital structure is essential for banks in developing economies, since it provides additional strength to withstand financial crises and increased safety

for depositors during unstable macroeconomic conditions. Furthermore, lower capital ratios imply higher leverage and risk, which therefore lead to greater borrowing costs. Thus, NIM should be higher for the better-capitalized bank (Staikouras & Wood, 2003). On the other hand, a relatively high capital-asset ratio may signify that a bank is operating over-cautiously and ignoring potentially profitable diversification or other opportunities (Ali et al, 2011). Since Macedonia is a developing country, we expect this variable to affect the NIM positively. We use the ratio of Capital-to-Assets (K_TA) to proxy this variable.

- *Bank size* – Bank size is usually considered an important determinant, but with no consensus on the direction of its influence. Generally, the effect of a growing size has benefits like economies of scale and reduced costs or economies of scope and product diversification, that provide access to markets that small banks cannot entry. In addition, large banks may be able to exert market power through stronger brand image or implicit regulatory (too-big-to-fail) protection. Working this way will positively affect the NIM. However, if the bank becomes extremely large, this effect turns out to be negative, because the bank is harder to manage and also due to bureaucratic and other reasons. Accordingly, the size - NIM relationship is expected to be non-linear (Ali et al, 2011). As a proxy we use the logarithm of the bank's total assets (LTA) in order to capture this possible non-linear relationship and also to lower the heteroskedasticity between the data, since banks of different size are included.

- *Risk management* – The need for risk management is inherent in the banking business. Bank profitability depends on its ability to foresee, avoid and monitor risks, possibly to cover losses brought about by risks arisen. Poor asset quality and low levels of liquidity are the two major causes of bank failures. Hence, in making decisions on the allocation of resources to asset deals, a bank must take into account the level of risk to the assets (Bobakova, 2003). Considering the nature of the Macedonian banks, hereby we include the liquidity risk and credit risk. Liquidity risk concerns the ability of a bank to anticipate changes in funding sources. This may have serious consequences on a bank's capacity to meet obligations when they fall due. Effective liquidity management seeks to ensure that, even under adverse conditions, a bank will have access to the funds necessary to fulfill customer needs, maturing liabilities and capital requirements for operational purposes. Without the required liquidity and funding to meet short-term obligations, a bank may fail. Intuitively, one would expect a positive relationship between the NIM and liquidity of a bank, due to the lower risk. However, holding that relatively high proportion of liquid assets does not earn high revenues, therefore the bank should be willing to accept lower returns (Gottard et al, 2004). In recent

years, almost all Macedonian banks have exhibited excess liquidity, so we expect it to affect NIM negatively. We represent this variable with the ratios Liquid Assets-to-Total Assets (LA_TA) and Total Assets-to-Total Loans (TA_TL). Their higher value indicates that greater deal of the assets is short-term invested, which results in lower risk exposure and in the same time lower interest rates. The second one – Credit risk is represented by the ratio Loan-loss Provisions-to-Total Loans (LLR_TL). It is a measure of bank's asset quality and reveals the extent to which a bank is preparing for loan losses by building up its loan-loss reserves against current income. If banks operate in more risky environments and lack expertise to control their lending operations, it will probably result in higher LLR_TL ratio. Changes in credit risk reflect changes in the health of the loan portfolio, which eventually will affect the bank's performance and results. A high ratio could signal a poor quality of loans and therefore a higher risk. Nevertheless, on the other hand, according to the risk-return hypothesis, high ratio with sound quality of loans could imply a positive effect on NIM. Therefore, it is difficult to hypothesize the sign of this relationship.

- *Operative Efficiency* – Bank expenses are also a very important determinant, closely related to the approach of efficient expense management, because they offer a major opportunity to be decreased (in this era of new electronic technology) and hence improve efficiency and performance. Here we use the ratio Operating Expenses/Total Assets (OE_TA) as an indicator of management's ability to control costs. The relationship between OE_TA variable and NIM is usually negative, as banks that are more productive and efficient aim to minimize their operating costs. On the other hand, if banks are able to transfer part of their operating expenses to their clients, this relationship may become positive (Vong, 2005).

- *Productivity* – Superior management is a prerequisite for achieving profitability and stability of a bank. The contrary situation will occur if management quality is low, and where some workers will not exert full effort which will cause 'free riding' on good workers. Hence, better management leads to better result, but it is too hard to measure this quality like all the other variables. We suppose that the quality should be reflected in the operating expenses or more precisely in salary expenses, expressed by the ratio Salary Expenses/Total Assets (SE_TA). The main intention is to increase productivity and therefore NIM, usually done by keeping the labor force steady, ensuring higher quality of newly hired labor, reducing the number of employees and increasing overall output by investing in new technology. This suggests that higher

productivity growth generates income that is partly channeled to bank profits. On the one hand, staff expenses, logically, are expected to be inversely related, because lower expenses mean higher efficiency and profitability. On the other hand, if managers are motivated (by salaries, benefits, power or prestige) and if they have discretion to pursue their own objectives, growth as well as profit may enter the bank's objective function (Gottard et al, 2004). Since salary expenses are high in the Macedonian banking system, we expect them to be a key determinant.

- *Balance sheet structure* – On the asset side, we utilize Loan-to-Asset (L_TA) ratio to capture the effect that the share of loans has on NIM. Since loans are riskier and provide the highest return of any asset, this variable should have positive effect as long as the bank is working cautiously and not taking excessive risk. A large loan portfolio can also result in reduced NIM if it mainly comprises of substandard credits. However, loans also posses higher operating costs arising from their origination, servicing and monitoring. Therefore, the conclusion is that L_TA affects NIM either positively or negatively, depending on the composition of the portfolio. In the end it is the quality, not the quantity of loans that matters. On the liability side, we use Deposit-to-Asset (D_TA) ratio to capture the effect of the proportion of deposits, which should be positive since they constitute a more stable and cheaper funding compared to borrowed funds. Increasing this ratio means that a bank has more funds available to use in different profitable ways and that should increase NIM ceteris paribus (Kosmidou, 2008). What may weaken this relation is the fact that they require widespread branching network and other expenses, especially if there is insufficient loan demand. Taking in consideration that traditional banking activities dominate Macedonian banks, we expect these both variables to positively affect profitability.

Bank profitability is also sensitive to macroeconomic conditions despite the trend in the industry towards greater geographic diversification and the greater use of financial engineering techniques to manage risk associated with business cycle forecasting. Generally, economic growth enhances bank profits through increased demand for loans, which generate good returns with fewer defaults. In the reverse situation, bad economic conditions can worsen the quality of the loan portfolio and generate credit losses, which eventually will reduce banks' profits. Regarding financial structure, banks in countries with a more competitive banking sector (where banking assets constitute a larger portion of the GDP) have smaller margins and are less profitable. The bank concentration ratio positively affects NIM, since large banks dictate the interest rates in the sector. Taking in consideration legal and institutional matters, indicators of better contract enforcement, efficiency of the legal system and lack of corruption are associated with lower realized interest margins

and lower profitability (Demirguc-Kunt & Huizinga, 1999). Ownership is also an important determinant. For example, evidence shows poor performance of government-owned banks, especially in developing countries and foreign banks usually realize higher interest margins and profitability than domestic banks due to the spillover effects from the superior performance (Sufian & Habibullah, 2009). In developed countries the differences are not that obvious. Inflation affects the real value of costs and revenues and it may have a positive or negative effect depending on whether it is anticipated or unanticipated. Anticipated inflation gives banks the opportunity to adjust interest rates accordingly, resulting in revenues increasing faster than the expenses, thus implying higher NIM (Kosmidou, 2008).

For any bank, NIM depends on bank's policy decisions as well as on uncontrollable factors relating to the economy and government regulations. As we said before, this paper's focus will be on the determinants that include elements internal to each financial institution, treated as independent variables. The external determinants will be excluded due to the time-dimension of the panel used, which is too small to capture the effect of control variables related to the macroeconomic environment (in particular the business cycle variable). In addition, external determinants are much more useful if included in studies consisting of different types of banks in one country (big vs. small or state vs. private) or when we make comparison among banks in two or more countries. Since this analysis refers to all banks in one country, including external variables that cover a short period, could just distort the final results.

Research Methodology

The majority of studies on bank profitability and determinants of NIM, such as Athanasoglou et al (2005), Goddart et al (2004) and Ali et al (2011), use linear regression models to estimate the impact of various variables that may be important. Regression analysis will help us discover the relationship and the level of significance that each one of the variables previously discussed, has on NIM. The study takes into consideration several microeconomic control variables that have proven to be particularly significant for the value of NIM in other studies.

To examine the determinants of the NIM of Macedonian banks, we adapt the following formulation:

$$y_{it} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \cdots + \varepsilon_{it}$$

where y_{it} is the dependent variable (in this case NIM), $\beta_0 \ldots \beta_n$ are regression coefficients, x_{it} stands for the independent variables (capital, size, credit risk…), ε_{it} is the disturbance term that is assumed to be normally distributed with a mean of zero. The cross-sectional units, denoted i =1…17, are observed at each of time periods,

denoted $t = 1...4$ (in this case years). The regression estimates will be derived using the ordinary least squares (OLS) method. Because of the general quality of minimized bias and variance, OLS estimates are believed to be the most reliable regression estimates. The t-statistics connected with each OLS coefficient is used to test whether any parameter in the population is equal to zero, in which case between the dependent and the independent variable there is no linear relationship and no influence at all. However, that is for testing just one parameter. To test a regression with multiple parameters we employ the F-test, which checks whether a group of independent variables (all together) have or do not have any influence on the dependent variable. In that way we measure the overall significance of the regression (Gujarati, 2003).

Because we use time-component data, we may face the problem of serial correlation. Although in its presence the OLS estimators remain unbiased, consistent and asymptotically normally distributed, they are no longer efficient. Consequently, the usual t, F and x^2 tests cannot be legitimately applied. That is why we first check with the Breusch-Godfrey test for serial correlation, also known as LM test. Further on, working with data that includes different-sized units (in this case small, middle and large-size banks) the assumption for homoskedastic variance of the residuals does not usually hold true. To check for residual heteroskedasticity, we employ the White's test.

For that instance, first we will test the sample to check if the residuals are normally distributed, then for the presence of serial correlation and heteroskedasticity. If their presence is confirmed, to avoid getting incorrect statistical significance and wrong conclusions, appropriate method for correction is used. In this case it is the Newey-West method, which transforms the standard errors into heteroskedasticity and autocorrelation consistent standard (HAC) errors and conducts statistical interference based on them. Since HAC standard errors are higher than the OLS standard errors, the t-statistic values with HAC standard errors are lower than before, which proves that OLS method underestimated the real standard errors.

Data Source and Sample Characteristics

To examine the determinants that explain NIM, we utilize data for the Macedonian banking sector for the years 2008-2011. We used several proxies based on balance sheet data at the individual bank level to capture the changes. The variables included in the regression represent ratios from the data given in the financial statements. The income statement, balance sheet and the notes to the financial statements were obtained from the annual reports of each bank as reported on their individual websites. The period of analysis represents the years for which electronic data were available for the majority of banks. All variables for the 17 banks are observed for each cross-section and each time period, resulting in a total number of

bank-year observations of 67. The values of the original data, from which the ratios are calculated, are shown in Macedonian denar (MKD).

Table 1 shows the descriptive statistics for the variables used in our main regression. As can be seen NIM variable is having positive mean value of 0.0407, which goes to the maximum of 0.079 and minimum of 0.013, with standard deviation of 0.0136. Further, on, for each variable we calculated mean, median, minimum, maximum value and standard deviation. We would like to draw attention and explanation on the high maximum value of K_TA and zero minimum value of D_TA. At first may seem illogical for a bank, but in this case, it is due to the fact that one of the banks in the analysis (Macedonian Bank for Development Promotion) does not have any deposits in its portfolio.

TABLE 1. DESCRIPTIVE STATISTICS

	NIM	K_TA	LTA	LLP_TL	LA_TA	TA_TL	OE_TA	SE_TA	D_TA	L_TA
Mean	0.0407	0.22124	22.7778	0.01905	0.3167	2.21351	0.09692	0.02156	0.62605	0.55275
Median	0.0380	0.13411	22.7322	0.01076	0.3012	1.74409	0.08408	0.01840	0.64001	0.57337
Maximum	0.0790	0.81733	25.1072	0.19597	0,7067	9.05846	0.20889	0.07751	0.87465	0.87279
Minimum	0,0130	0.06997	19.9862	-0,0632	0,1067	1.14575	0.01564	0.00274	0.00000	0.11039
Std. Dev.	0.0136	0.17173	1.31214	0.03870	0,1382	1.35282	0.04381	0.01386	0.21117	0.18179
Skewness	0.7394	1.45975	0.01768	2.56795	0,7983	3.00656	0.69739	1.93757	-1,6229	-0,5277
Kurtosis	3.6126	4.65659	2.49477	12.1866	0,5538	13.2721	2.99053	7.51643	5.59192	2.78923
Jarque-Bera	7.1526	31.4559	0.71607	309.235	730.300	395.505	5.43119	98.8664	48.1665	3.23328
Probability	0.02798	0.00000	0.69905	0.00000	0.02595	0.00000	0.06617	0.00000	0.00000	0.19857
Observations	67	67	67	67	67	67	67	67	67	67

We also present the figures of skewness and kurtosis of the data that will be needed for the test of normality distribution Jarque-Bera (JB) test. If we have normally distributed residuals, skewness would be zero, or it can be tolerated from –0.5 to 0.5. Here, that holds true just for two variables, LTA (0.01768) and L_TA (-0.52767). For most of the variables, the value is above zero, so we have positive asymmetry (skewness), and just two of the variables (D_TA and L_TA) exhibit negative values. Regarding kurtosis, normally distributed residuals should have value equal to three. In this case, just OE_TA satisfies that condition. Most of the other variables have coefficient higher than three. Hereby, we can conclude that just a few of the variables satisfy the assumption for normal distribution. The probability of accepting null hypothesis (H_0), that variables are normally distributed, is the highest for the variable bank size (LTA 0.69905) and is followed by L_TA and OE_TA.

Table 2 provides information on the degree of correlation between the explanatory variables used in the regression analysis. One of the assumptions of the linear regression model is that there is no multicollinearity among the independent (explanatory) variables. If correlation between explanatory variables is high, the estimation of the regression coefficients is possible, but with large standard errors and as a result, the population values of the coefficients cannot be estimated precisely. According to Kennedy (2008) multicollinearity is a problem when the correlation is above 0.80, which is not the case here.

The highest correlation coefficient is between OE_TA and SE_TA (0.7755), which is both logical and expected since staff expenses are component of the operating expenses. Also, the coefficient between LTA and SE_TA is high (-0.7258), which means that as the bank grows in size, staff expenses lower as a percentage of total assets; high negative correlation is spotted on the both sides of the balance sheet, between K_TA and D_TA (-0.6725) as two substitutes for bank resources and between LA_TA and L_TA (-0.7775) as two alternatives for assets allocation. All in all, the matrix shows that, in general, the correlation between the variables is not strong, suggesting that multicollinearity problems are either not severe or non-existent.

TABLE 2. CORRELATION MATRIX

	NIM	*K_TA*	*LTA*	*LLP_TL*	*LA_TA*	*TA_TL*	*OE_TA*	*SE_TA*	*L_TA*	*D_TA*
NIM	1									
K_TA	0.2321	1								
LTA	-0.1965	-0,7782	1							
LLP_TL	-0,0090	-0,1987	0,1126	1						
LA_TA	-0,0842	0,4733	-0,4540	-0,0401	1					
TA_TL	-0,0584	0,5515	-0,5023	-0,1455	0,7257	1				
OE_TA	0.3999	0,2503	-0,4959	0,2937	0,0631	0,1796	1			
SE_TA	0.4377	0,6275	**-0,7258**	-0,1588	0,3585	0,4785	**0,7755**	1		
L_TA	0,0087	-0,5931	0,5461	0,0495	**-0,7775**	-0,8275	-0,3139	-0,5911	1	
D_TA	0,0323	**-0,6725**	0,5093	0,2466	-0,0093	-0,1926	0,1321	-0,1824	0,1136	1

EMPIRICAL FINDINGS

The variables mentioned affect the NIM either directly (the amount of deposits, loans, liquid assets, bank size) or indirectly (operating expenses, capital, credit risk) through their influence on the formulation of interest rates. We begin the analysis by plotting the results of the regression of the dependent variable NIM on the independent variables, described earlier. The results are shown in Table 3.

TABLE 3. NIM REGRESSION RESULTS

Dependent Variable: NIM Method: Ordinary Least Squares Included observations: 67				
Variable	Coefficient	Std. Error	t-Statistic	Probability
C	-0.040616	0.058680	-0.692168	0.4916
D_TA	0.030375	0.013255	2.291512	0.0256
K_TA	0.048340	0.019109	2.529777	0.0142
L_TA	0.033666	0.017527	1.920796	0.0598
LA_TA	-0.020571	0.021026	-0.978339	0.3320
LLP_TL	0.061001	0.055974	1.089805	0.2804
LTA	0.001338	0.002258	0.592762	0.5557
OE_TA	-0.097105	0.097990	-0.990963	0.3259
SE_TA	0.854147	0.327489	2.608168	0.0116
TA_TL	-0.000508	0.001951	-0.260588	0.7953
Adjusted R-squared	0.316244	F-statistic		4.391741
S.E. of regression	0.011270	Probability (F-statistic)		0.000219
		D-W statistic		1.580259

From the Table 3, we can see that at 10% level of significance, from all nine variables, four are significant – staff expenses, capital, deposit and loan-to-asset ratio (balance sheet structure). To obtain more precise results we are going to make new parsimonious regression, only considering the significant variables, presented in the following Table.

TABLE 4. PARSIMONIOUS REGRESSION

Dependent Variable: NIM Method: Ordinary Least Squares Included observations: 67				
Variable	Coefficient	Std. Error	t-Statistic	Probability
C	-0.021148	0.013480	-1.568791	0.1218
D_TA	0.027053	0.010475	2.582632	0.0122
K_TA	0.042163	0.017388	2.424770	0.0182
L_TA	0.044129	0.010855	4.065130	0.0001
SE_TA	0.519818	0.142120	3.657600	0.0005
Adjusted R-squared	0.332912	F-statistic		9.234380
S.E. of regression	0.011132	Probability (F-statistic)		0.000006
		D-W statistic		1.429564

Loan-to-asset ratio, L_TA, is the variable with the highest statistical significance level, which is pretty much expected, taking in consideration that loans are one of

the biggest and the highest interest-earning source of bank's interest-revenues. Also their positive sign of influence is expected, as long as it is a good and quality credit portfolio, because we must not forget that not just the quantity, but the quality in this case matters a lot. L_TA has also the highest t-statistics (4.065130), but the coefficient is not particularly high (0.044129). We have completely different situation regarding the next variable SE_TA, staff expenses, with much higher coefficient, 0.519819. This proves us that staff expenses, as a constituent part of the expenses done by the credit sector in a bank in calculating the interest rate, has high and positive influence, firstly on the active interest rate and eventually on the NIM. Also, this confirms the Efficiency-wage theory, according to which productivity grows in line with increased salary and that higher productivity growth generates income that is mostly channeled to bank profits. As mentioned above, this situation is quite common in developing countries, including Macedonia, where banks employ high-quality staff, motivated by salaries, benefits, power or prestige, which translates into higher efficiency and therefore higher profitability.

Moreover, on the other side of the balance sheet, the highest significant influence belong to the deposit-to-asset ration, D_TA, with a little bit lower t-statistic (2.582632) and coefficient (0.027053), compared to the previous variables, but yet statistically significant in a positive way. This means that using deposits as a source of funding, rather that other external sources, is less expensive and more profitable for Macedonian banks. Finally yet importantly, capital represented by K_TA, has positive statistically significant influence on NIM with coefficient of 0.042163, close to the coefficient of L_TA. That proves us that the high level of capitalization of Macedonian banks is one of the main indicators of their safety and stability, which leads to lower financing expenses, reflected in the NIM. These four variables, together, explain 33.3% of the total variations in the NIM. In social sciences, especially in cross-sectional analysis, low R^2 value is not something unusual and it does not mean that the regression done with the OLS method, which has lower R^2 is less important or useless.

In addition to the above characteristics, a few more need to be pointed out. The standard error of the regression, or the unexplained variability, is 0.011132. F-statistic is 9.234380 (p = 0.000006), meaning that the regression is statistically significant. Durbin-Watson (DW) statistics has value of 1.429564, which points out that positive serial correlation among the variables is present.

To assure the authenticity of the results, as we mentioned earlier, we employed additional tests. First of all, to check the normal distribution, Jarque-Bera test is used. We also did this separately on each variable (in the part descriptive statistic) and the results showed that just one variable (LTA) exhibited normal distribution. Taking it now to the level of the regression, the test had the following results: test value of 9.396 with probability = 0.009, leads to rejecting H_0 (normally distributed residuals),

and we come to a conclusion that the residuals in this regression are not normally distributed. The variables were also checked for serial correlation and the results from Breusch-Godfrey test reveal that at 10% level of significance we can reject the null hypothesis implying that there is serial correlation between the residuals in this regression. In addition, the Durbin-Watson statistics (1.429564), shown in Table 4, has already led us to the same conclusion, that residuals have positive serial correlation. That means, a note of caution is needed when interpreting the results. Later, White's test has been employed to determine the presence or absence of heteroskedasticity and the results show that at 10% level of significance, we reject H_0, confirming the presence of heteroskedasticity. Concerning the presence of serial correlation and heteroskedasticity, which could distort the final results, we proceed with the empirical analysis using the Newey-West HAC standard errors.

TABLE 5. PARSIMONIOUS REGRESSION USING NEWEY-WEST METHOD

Dependent Variable: NIM Method: Least Squares Included observations: 67 after adjustments Newey-West HAC Standard Errors & Covariance (lag truncation=3)				
Variable	Coefficient	Std. Error	t-Statistic	Probability
C	-0.021148	0.015719	-1.345391	0.1834
D_TA	0.027053	0.016047	1.685824	0.0969
K_TA	0.042163	0.027893	1.511619	0.1357
L_TA	0.044129	0.013460	3.278544	0.0017
SE_TA	0.519818	0.246679	2.107268	0.0391
Adjusted R-squared	0.332912	F-statistic		9.234380
S.E. of regression	0.011132	Probability (F-statistic)		0.000006
		D-W statistic		1.429564

From the Table 5 we can see that now, due to the correction of the standard errors and hence decreasing the t-statistics and increasing probability, there is one variable that was considered statistically significant in the previous regression, but not anymore. More precisely, it is the capital variable, K_TA, for which we concluded that lowered the bank's financing expenses. Looking at the other variables, we can spot that there are some slight upward changes in probability (and upward in t-statistics), but despite that, they still retained their statistical significance.

Consequently, we proceed by running a new regression, excluding K_TA, and for the second time we got a variable that is not significant any more. Even though the variable D_TA, in the first regression showed that, there is difference whether the bank finances mostly by deposits or other external sources, after correcting the standard errors and removing the K_TA variable, the results show that D_TA is also statistically insignificant. Due to space storage, just the final results will be shown.

TABLE 6. FINAL REGRESSION USING NEWEY-WEST METHOD

Dependent Variable: NIM
Method: Ordinary Least Squares
Included observations: 67
Newey-West HAC Standard Errors & Covariance (lag truncation=3)

Variable	Coefficient	Std. Error	t-Statistic	Probability
C	0.009259	0.010536	0.878793	0.3828
L_TA	0.030809	0.015526	1.984309	0.0515
SE_TA	0.669158	0.145576	4.596612	0.0000
Adjusted R-squared	0.279622	F-statistic		13.80927
S.E. of regression	0.011568	Probability (F-statistic)		0.000010
		D-W statistic		1.456564

If we compare Table 6 and Table 5, we will notice that now at 10%, the first place in regards to statistical significance is taken by the variable SE_TA (which now has the highest t-statistics of 4.596612 and a coefficient of 0.669158, followed by L_TA with lowered t-statistics to 1.984309 and coefficient to 0.030809. These two variables together explain nearly 28% of the variations in NIM. Moreover, the standard error of the regression is 0.011568; F-statistic inclined from 9.234380 to 13.80927; and DW-statistic is now a little bit closer to 2.

From Table 6 we can see that the most important variables in explaining bank profitability are staff expenses and loan-to-asset ratio, now confirmed for the second time. Firstly, SE_TA with high statistical significance positively affects profitability. Hence, we can say that investing in high quality, educated and high-paid staff is justifiable for it generates income that is mostly channeled to bank profits. In addition, of course, the NIM is in great deal dependent on the amount of loans in the total assets, as part of the portfolio, which generates the highest interest rates. Hereby, we conclude that loans are much better investment for Macedonian banks that any other asset. This may be due to the underdeveloped Macedonian financial market, which lacks attractive possibilities for investing in securities.

Next, we will draw attention to the variables with the lowest significance level. Starting with liquidity coefficients, we can say that even Macedonian banks keep high portion of their assets in liquid form (since the loans are not as liquid as the ones in the developed countries), it does not seem to have a major either positive or negative effect on their NIM; furthermore the low significance of the variable LTA represents a proof that Macedonian banks are not large enough to experience the benefits of economies of scale or scope and hence no increasing returns to scale through the prioritization of fixed costs over a higher volume of services; low significance of OE_TA, tells us that efficiency in expenses management is not a robust determinant of bank profits as we thought in first place, proving that NIM is

not so dependable on the efficiency in expenses management; and finally, the undertaken credit risk or the quality of the loan portfolio does not play important part in explaining the value of NIM, but rather, the quantity of loans or L_TA has by far higher influence.

If we consider the variables i.e. the determinants that were not disturbed by any of the tests employed and held their significance level high enough, we can say that if Macedonian banks want to improve their NIM, they should pay attention to:

- Employing and keeping the current quality staff, which improves the productivity. Invest in human resources, but keep in mind that if this field starts to get overpaid, it may influence the expenses management or OE_TA, which till now did not have any particular influence on NIM, but usually affect profitability negatively; and

- Enhancing the growth of the share of loans in the overall bank portfolio, since they have proven to be the greatest interest-earning potential of Macedonian banks. This process shall keep going as long as the quality of the loans is on satisfactory level.

The Macedonian banking business model lays its foundations on sound and stable traditional banking activities, which were the main cause of its resistance to the spill-over effects of the World financial crisis. In order to keep this financial stability and soundness, the banks should also possess (as they do now) strong capital structure, which is essential for banks especially in developing economies, since it provides additional strength to withstand financial crises and increased safety for depositors during unstable macroeconomic conditions.

CONCLUSION

As financial intermediaries, banks play a crucial role in an economy, therefore a sound and well-functioning system is essential in providing for sustained growth and development. The most accurate confirmation is the recent financial crisis, which emphasized the fact that a profitable and lucrative banking system is best capable to absorb negative shocks and sustain the stability of the whole financial system. Crucially, financial intermediation affects the net return to savings, and the gross return for investment. The spread between these two returns mirrors the bank interest margins, in addition to transaction and other costs borne directly by savers and investors. This suggests that bank interest spreads can be interpreted as an indicator of the efficiency of the banking system. In that esteem, this study endeavors to shed light on the determinants of NIM for the banking system in Macedonia, by taking into consideration bank-specific factors. Theoretically, we show that profitability seems to have been positively affected by productivity, bank

size, balance sheet structure and capitalization, and negatively by operating expenses, credit and liquidity risk.

Accordingly, the empirical analysis of the determinants imply the following main findings: In order of statistical significance staff expenses are of a paramount importance, providing support to the argument that their high ratio increases efficiency and transfers into profitability, implying that highly paid, motivated and educated staff and management is essential and that quality matters, especially for banks in developing countries. As we expected, loan-to-asset ratio has a positive and significant impact, showing that loans are much better investment for Macedonian banks that any other asset. And they will continue to be the most profitable asset, at least until the Macedonian financial market enriches with different attractive investment options and alternatives, which will open new horizons and possibilities for other profitable investments besides loans.

Overall, the findings suggest that in favor to NIM, Macedonian banks need to cautiously monitor the productivity of their employees and to enhance the share of loans in the total assets without worsening their quality. Moreover, the stability and soundness should be kept at reasonable level because of the traditional way of operating, based on loans and deposits. In this way, the financial stability that the banks create is usually transferred into lower financing costs and higher margins and hence, profits. The design of all these changes and improvements must take into account the peculiarities of the Macedonian macroeconomic environment alongside the bank-specific circumstances.

Further development of Macedonian banking system depends on its efficiency, profitability and competitiveness. In these circumstances, banks need to find a way to make the optimal utilization of their resources, while minimizing the expenses and losses. That is supposed to enhance their position, resistance and effectiveness, leading to more stable and secure financial system. Finally, several other topics remain open for further research like the impact of external or macroeconomic factors, comparative analysis with the banks from other developing countries or other relevant issues.

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