

BANK OF ALBANIA

DETERMINANTS OF NET INTEREST MARGIN IN THE ALBANIAN BANKING SYSTEM

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ABSTRACT

Research on banking system efficiency has always been a debatable and interesting issue. This paper analyses net interest margin as a measure of efficiency for the banks which operate in Albanian banking system and the main focus is the identification of the factors that affect this indicator. According to the estimations carried out for the Albanian banking system, the results show that the net interest margin is positively affected by the interest rate volatility (mainly of euribor, domestic currency's and slightly of the libor rate), by the level of operating expenses which have had an increasing tendency and by the amount of banks' reserves in the Central Bank. Other factors that affect the net interest margin are the level of bank capitalization, which should be interpreted with caution; net commission incomes which are negatively related to the dependent variable implying that these two indicators are substitutes of each-other; the effectiveness of management work; credit risk and the concentration level in terms of loans.

Key Words: Net Interest Margin, Banking System

1. INTRODUCTION

The important political-economic changes that have taken place in Albania since the beginning of 1990s have influenced the development and reformation of the banking system. The latter has experienced the movements toward the switching to two-tier system, the privatization process, the liberalization of the interest rates and lending, the introduction of monetary policy indirect instruments, the consolidation of regulatory and supervisory framework, the opening to foreign financial institutions and recently the banks merging process. All these innovations have affected the banks efficiency, the quality of products and services that they offer to the public, the competition level they encounter during their everyday activity, and the intermediation costs.

The banking system constitutes the most important element of the Albanian financial sector because its assets account for nearly 97 per cent of the financial sector assets. In Albania, banks act as the main players in channelling funds from lenders to borrowers, and for this reason it is important that their intermediary role is carried out with the lowest possible costs in order to achieve higher social welfare. This paper is originated exactly considering all these facts, aiming that it identifies the factors affecting net interest margins for the Albanian banking system and hoping that it will contribute to the literature written around this issue; as such a paper is realized for the first time for Albania.

Net interest margin serves as a measure of banks' efficiency and it is calculated as the proportion of net interest income to total assets or earning assets. However, it should often be kept in mind that its reduction not always signals an efficiency improvement. A reduction in NIM may be caused by a reduction in tax rate or by an increase in provisioning (according to the accounting decomposition of this indicator). In the first case the NIM reduction reflects the improvement of banking system functioning, while for the second one the opposite should be admitted (Demirgüç-Kunt and Huizinga 1999). On the other hand, if we take into consideration the formula of calculation, the changes in net interest margins may result from the variations in the numerator (net interest income) or in the

denominator (earning assets). With regard to these facts, studying the financial intermediation and its costs may be an interesting area and widely touched by foreign literature.

Different stakeholders but notably the policymakers are interested in establishing and functioning of stable and efficient banking systems. The stability requires adequate profitability, while the economic efficiency calls for not too high margins applied by the banks. The results taken from the analysis of net interest margin determinants may be useful for the specific measures of economic policies. If for instance, a considerable part of net interest margin trend is explained by the volatility of interest rates, public policies should aim the achievement of a stable macroeconomic environment. But if the net margin is more affected from the banks' market power, this means that the policies should get oriented towards the encouragement of increasing competition. According to the contribution that every variable can give in explaining the net interest margin (credit risk, operating expenses, management quality, etc.), the policies may get oriented towards special aspects of banking activity.

The original model used in the literature for identifying the factors affecting net interest margin, is the Dealer Model¹, first developed by Ho and Saunders (1981), which shows that banks are considered as risk-averse financial intermediaries. Later on, other authors have worked on this model and have adapted some changes and improvements consistently with the specific conditions of the economies where it is applied.

The paper will be organized as follows: in Section 2 is described the methodology used for the identification of net interest margin determinants according to the accounting decomposition, the theoretical model and the empirical results taken from different studies. In the third section we will have a general view of net interest margin for the Albanian banking system. In the fourth section will be analyzed empirically the factors affecting the interest margin for the banks of the Albanian banking sector. The last section presents the main conclusions of the study.

2. NET INTEREST MARGIN DETERMINANTS ACCORDING TO ACCOUNTING, THEORETICAL AND EMPIRICAL RESULTS

Bernanke (1983) has defined the cost of intermediation as the difference between the gross costs paid by a borrower and the net return received by a saver. Although there isn't a unique definition of the interest margin in the empirical literature, the one that predominates is the Net Interest Margin, calculated as the ratio between net interest income and earning assets. This indicator may also be calculated in proportion to total assets and the differences may not be significant if earning assets constitute an important share of total assets.

There are two methods for measuring net interest margin: *ex-ante* and *ex-post*. According to the first one, net interest margin is calculated as the difference between the contractual interest rates for deposits and loans. These are the rates that the public can easily see and compare. As for the second method, the variable can be measured as the difference between banks' interest income and interest expenses for the period taken into consideration, data that may be extracted from the financial statements. The difference between these two measures is the amount of loan defaults. The *ex-post* method is more useful as it originates more accurate results. It is often noticed that the data used for the *ex-ante* analyses may be inconsistent, because they rely on different sources. On the other hand the *ex-post* method may have its shortcomings, as the interest income and loan loss provisioning tend to materialize in different time periods (Demirgüç-Kunt and Huizinga 1998).

The *ex-ante* analysis of differences between the average new loan and deposit rates, reveals that Albania is ranked amongst those regional countries with higher level of this indicator (see table No. 2 at the annex). This way of measurement, generates considerably different outcomes from net interest margin, which shall be employed throughout the study and which shall be calculated as an *ex-post* indicator, based on the data of financial statements of the banks.

Two approaches may be used for the identification and analysis of the factors that determine the net interest margin in the banking system. The first one is the accounting decomposition approach which will be treated in the following section, while the second is related to the theoretical model. Both are then used in the practical application of econometric analysis.

2.1 ACCOUNTING ANALYSIS OF NET INTEREST MARGIN

For analyzing the interest margins some kinds of analyses may be carried out, one of which is the accounting decomposition first developed by Hanson and Rocha (1986). Using the banks' profit and loss statements, the following equation is derived:

$$NI = NII - (OE - NNII - NEI) - LLP - T \quad (1)$$

where, NI (Net Income) represents the net result of banks (after taxes), NII stands for Net Interest Income, OE corresponds to the Operating Expenses, NNII represents the Net Non-Interest Income, NEI stands for the Net Extraordinary Income, LLP represents the Loan Loss Provisions and T stands for Taxes.

If we make a rearrangement of the equation (1) and express them as percentage against total assets (TA), there can be noticed the items that mostly impact the determination of Net Interest Margin (NIM), which here is calculated as net interest income to total assets.

$$NIM = \frac{(OE - NNII - NEI)}{TA} + \frac{LLP}{TA} + \frac{T}{TA} + \frac{NI}{TA} \quad (2)$$

According to equation (2) we can conclude that the net interest income (which is the numerator of the net interest margin formula) is

influenced by the operating expenses not covered by the other (non interest) incomes, the level of provisioning for nonperforming loans, the taxes paid to the state and the amount of profits realized.

2.2 THE THEORETICAL ANALYSIS USED FOR THE IDENTIFICATION OF THE FACTORS WHICH AFFECT NET INTEREST MARGIN

Another approach of net interest margin determinants is the theoretical one. It is developed first by Ho and Saunders (1981) and is called the dealer model. The way it works can be briefly explained as follows: the banks are considered as risk-averse agents that accept deposits and make loans, which arrive randomly and the probability of arrival depends on the margins that banks fix and on the elasticity of loan demand/deposit supply. The random nature of loan demand and deposit supply exposes the bank to interest rate risk. Let's suppose that a new deposit reaches the bank and owing to the lack of the simultaneously demand for loan, this latter shall be invested in the money market. In such a case the bank encounters the re-investment risk at the end of the maturity period when it should re-invest this amount. On the other side, if a new loan demand is financed in the money market, the bank will encounter the re-financing risk as at the end of the maturity period, it has to provide funds once again. In this case, in addition to interest rate risk, the bank will encounter the credit risk too. Hence, a risk-averse financial intermediary shall request as recompense a higher margin

Ho and Saunders (1981) argue that the mark up the banks put over the market interest rates for deposits and loans, theoretically depends on four factors: (I) risk aversion; (II) banking market structure; (III) the average size of bank transactions and (IV) interest rate volatility. According to these authors, the margins will continue to be positive, even if banks operate in markets of high competitive structure. This means that the interest rate margins will exist, because of the uncertainty that accompanies the transactions. The margin caused by the uncertainty is called "pure" margin. The

above model goes through two stages. In the first stage, it realizes the estimation of the “pure” margin, pointing out the effects of explanatory variables which are not explicitly introduced in the theoretical model. After that, the relationship between the “pure” margin and the variables presented in the theoretical model is analyzed.

According to Ho and Saunders (1981), the banks are considered as intermediaries that accept deposits and make loans in a passive way. This means that the prices of loans and deposits (P_L and P_D) are set by the bank while their quantity is defined exogenously. So,

$$P_L = p - b \text{ and } P_D = p + a,$$

where p - is the bank’s opinion of the “true” price of the deposit or loan, while a and b - are fees for the provision of service immediacy. P_L and P_D - are prices, so they are inversely related to the interest rates of deposits and loans. Thus, we can write the above equations as $r_D = r - a$ and $r_L = r + b$, where r_D and r_L are the deposit and loan interest rates that the bank sets, while r is the market interest rate.

Thereby, the interest margin (s) may be measured as: $s = r_L - r_D = a + b$

From Ho and Saunders (1981)², after some transformations of this equation, will result that

$$s = r_L - r_D = \alpha/\beta + 1/2 * R\sigma_1^2Q$$

where, α/β shows the risk neutral spread, or α and β itself express respectively the intercept and the slope of symmetric function of the deposits and credits. Thus, this ratio measures somewhat the level of bank’s market power. The other part of the formula encompasses the elements of a risk premium. R stands for the coefficient of risk aversion, σ_1^2 for the interest rates variance and Q for the size of bank’s transactions.

2.3 EMPIRICAL RESULTS TAKEN BY THE STUDIES TREATING NET INTEREST MARGIN DETERMINANTS

Many empirical studies are carried out for the identification of net interest margin determinants, for a group of countries or for specific economies; for individual banks or for aggregated data of banking systems.

The dealer (two-stage) model of Ho and Saunders (1981) which was improved later on by Saunders and Schumacher (2000), is applied from different authors for analyzing the effects of explanatory variables in net interest margin. Although this model has the advantage of estimating a “pure” margin, its application requires time series long enough for this estimation.

On the other side, McShane and Sharpe (1985), Angbazo (1997) and Maudos and Fernández de Guevara (2004) have applied the one-stage model, including among the explanatory variables not only those mentioned in the theoretical model but also other factors and imperfections not included in the “pure” margin modelling.

Demirgüç-Kunt and Huizinga (1999) have analyzed a group of 80 countries in their study, and they concluded that the net interest margin is higher in transition economies than in the industrialized ones. It has also been concluded that foreign banks have the tendency to set higher interest margins in developing countries than in the developed ones (Claessens, Demirgüç-Kunt and Huizinga 1997). The main reason of this behaviour may be explained by the fact that foreign banks have technological advantages compared to domestic banks (in developing countries), but on the other side they lack a complete information about the domestic market. These banks may also be subject to low provisioning or tax obligations.

Different results (sometimes contradictory) are extracted from studies undertaken in order to capture the relation between interest rate margin and its determinants. In the following paragraphs, are

sorted out some of the determinant factors of interest margin, which have resulted from econometric analyses:

Capitalization – Demirgüç-Kunt and Huizinga (1998), Saunders and Schumacher (2000), Afanasieff et al. (2002), Liebeg and Schwaiger (2006), have found a positive correlation between net interest margin and bank capitalization. Brock and Franken (2002) have found a negative correlation between these two variables, explaining that more capitalized banks tend to be more conservative in granting loans (resulting in lower margins) because more shareholder equity is at risk. On the other hand, less capitalized banks have more incentives to take more risk (resulting in higher margins) in order to gain higher returns.

Operating expenses – in their study, Ho and Saunders did not include operating costs as one of the determinant factors of interest margin. Lerner (1981) has criticized this fact, arguing that banks face other operating expenses while acting as financial intermediaries. For this reason, Maudos and Fernández de Guevara (2004) have included in their model this determinant factor. It is clear that the higher the operating costs, the higher will be the margin for covering those costs. Even in the absence of market power and of any kind of risk, a positive margin is necessary to cover the operating costs. Liebeg and Schwaiger (2006), Estrada et.al (2006), Naceur (2003), Affanasief et al.(2002), Maudos and Fernández de Guevara (2004) have found a positive correlation between interest margins and operating expenses. The coefficient before this variable shows what proportion of the bank operating costs is passed on to its depositors and borrowers (in terms of lower deposit and/or higher loan interest rates). Even in the absence of market power and of any kind of risk, a positive margin is necessary to cover the operating costs.

Banks' size – Naceur (2003) says that big banks tend to lower margins as a result of economies of scale.

Market share of deposits and loans – different studies have taken different results. If the correlation is positive, this means that a bank with a high market share of deposits, will have more power and it

may put higher margins. A negative coefficient presents efficiency in using the economies of scale, transferring some of the benefits to the bank customers, in the form of lower margins.

Credit risk – nonperforming loans are a measure of credit risk. The higher the level of nonperforming loans, the higher the credit risk, and consequently the higher will be the interest margin. The bank will need to cover the losses caused by this kind of loans, by passing on the additional costs to its customers, in the form of higher loan rates or lower deposit rates, or a combination of both of them. Maudos and Fernández de Guevara (2004), Brock and Franken (2002) and Demirgüç-Kunt and Huizinga (1998) have found a positive correlation between interest margins and credit risk.

Studies performed for some Latin American countries have showed that there is a negative correlation between the two variables (Brock and Rojas-Suárez 2000). This fact can be explained by the decrease of loan interest rates or the increase of deposit interest rates. The reduction in loan rates may happen in banks, which despite of the high level of bad loans, put in risk their income aiming the market share increase. On the other side, the deposit rate increase comes as a reaction toward the increase of the nonperforming loans at the industry level. These results may have two explanations: first, the increase of bad loans level may affect the abilities of the government to provide credible deposit guarantees which will be accompanied by the banks reaction for increasing deposit rates in order to make them more attractive. Second, for unconsolidated banking systems, undercapitalized banks will find ways for increasing their funds by increasing the deposit rates. At the individual bank level, the effects of deposit rates increase will not be as high as in the systematic level, because the depositors care more about the deposit guarantee than about the problems of an individual bank. If the deposit insurance scheme functions in the proper way, the banks face an elastic deposit supply, so that small deposit rate increases will generate enough funds to cover the loan losses.

Non interest incomes – usually have a negative effect on interest margins³. The banks tend to lower the margins if they compensate

the lower interest incomes by higher commission or non-interest incomes. However in the literature, two kinds of correlation between net interest margins and non-interest incomes are mentioned. In a high competitive banking market, where the banks may not perfectly affect the market, commission incomes are expected to be a substitute of interest incomes. In this case, the correlation will be negative. On the other side, if the banks have a certain market power (as a result of specialization on some kind of products or services), they can fix the interest rates. In this case the commission incomes and the interest incomes will be complementary of each-other and the correlation between net interest margins and commission incomes will be positive (Estrada et al. 2006).

Management quality - Angbazo (1997) and Maudos and Fernández de Guevara (2004) say that a good management means picking up high quality assets (low risk and high return assets) and low cost liabilities. As the management quality is measured by the cost/income ratio, an increase of this ratio means a deterioration of management quality and will result in a decrease in the net interest margin.

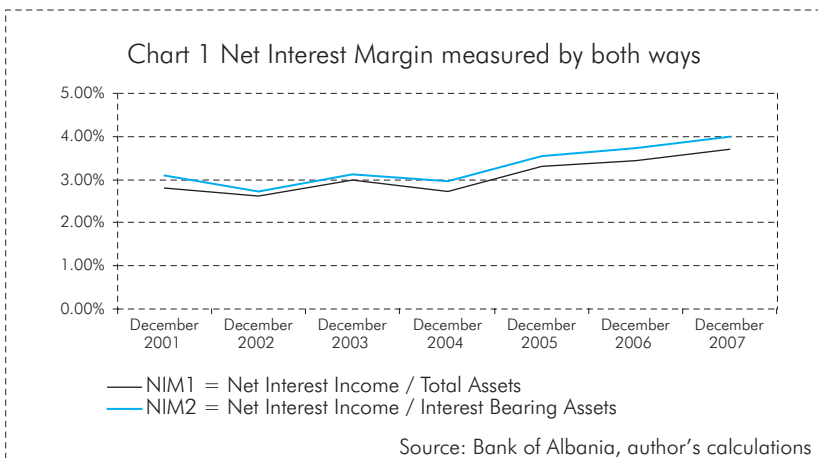
Opportunity costs – banks are constrained to deposit in the Central Bank the obligatory reserves⁴. The opportunity cost of keeping reserves, must be compensated by setting higher loan rates. In their studies, Estrada et al. (2006) and Gelos (2006) have found a positive coefficient for this variable.

GDP growth - Bernanke and Gertler (1989) have concluded that the borrowers' solvency is countercyclical. The coefficient should have a negative sign because during recessions, the solvency decreases and the borrowers may take loans only with higher interest rates, causing the interest margin increase.

3. DETERMINANTS OF NET INTEREST MARGIN IN ALBANIAN BANKING SYSTEM

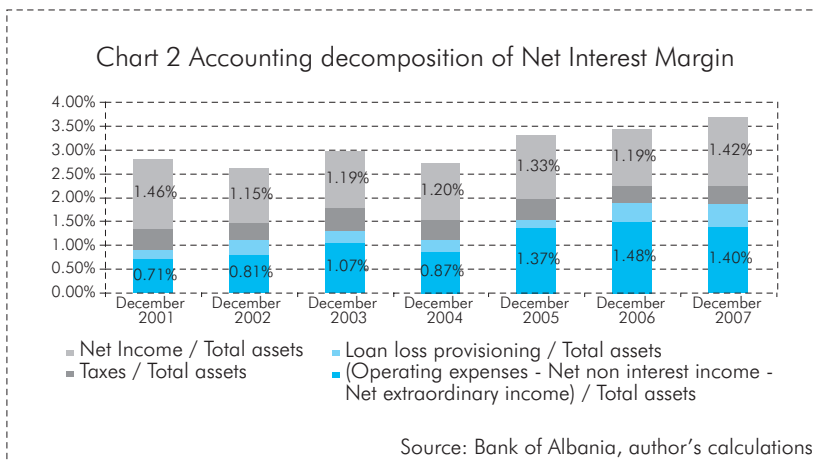
The Albanian banking system is generally characterized by high loan rates and a low credit to GDP ratio⁵. Recently, after the big foreign banks entrance and the growing competition, it is noticed that the credit to the private sector has intensified and the loan interest rates have turned down.

The net interest margin (for the banking system) has increased especially during the recent years, which coincides with the period when the banking sector has been more aggressive towards lending and commitments to more profitable and risky activities. On the other side, during this period banks have increased the amount of their branches for providing a larger geographic expansion⁶, which is going along with the operating expenses augmentation. The latter are also affected by the increase of employees' number, which has more than doubled for the period of 2003-2007⁷. The Chart No.1 presents net interest margin (NIM_1 and NIM_2) measured by both forms. It can be noticed that their trend is similar during all the period taken into account. The not so big difference between the two lines evidences that the earning assets constitute the largest part of banks' assets.



3.1 THE ANALYSIS OF ACCOUNTING DECOMPOSITION OF NET INTEREST MARGIN FOR ALBANIAN BANKING SYSTEM

In this section will be covered the accounting decomposition of net interest margin for the Albanian banking system with the items that constitute it, according to the financial statements that banks report to the Bank of Albania.



As can be seen by the above chart and by an analysis of income and expenses structure, it results that:

- Net interest margin has increased notably during the last three years, a phenomenon accompanied by the fast credit growth. It should be mentioned that at the end of 2001 credit comprised only 9 per cent of the banking system assets, while at the end of 2007 this figure reached to 40 per cent.
- The higher level of operating expenses not covered by the net extraordinary incomes and net non interest incomes, resulted in higher interest margin, constituting the largest part of it. This high level is caused by both the higher level of operating expenses as by the decrease of non interest

income⁸. Albanian banking system depends considerably on interest incomes, owing to the concentration of investments of this sector mainly in loans and securities. Notwithstanding commission incomes are increased at absolute value during the considered period, again they stay at rather low rates as a ratio to total assets (about 0.6 percent of total assets).

- The operating expenses have increased mainly due to personnel expenditures increase (the employees' number and payments have been raised). The latter comprise nearly 40 per cent of Albanian banking sector's operating expenses.
- Recently, it has been noticed a raise in provision expenses, caused by the rapid growth of risky assets, which has affected the net interest margin increase.
- Also the net income that the banks have generated is considered an important element of net interest margin, and evidences a high level of profitability.
- The taxes that the banks have paid as a proportion of total assets have decreased.

4. ECONOMETRIC RESULTS TAKEN FROM THE ANALYSIS OF NET INTEREST MARGIN FOR THE ALBANIAN BANKING SYSTEM

"Banking systems of the economies that are in the process of liberalizing and reforming their financial systems are not in long-run equilibrium" (Brock and Rojas-Suárez, 2000). For this reason, the interpretation of the results should be done with special care, because they are not as straightforward as for the industrialized economies. Not fully consolidated banking systems have the tendency to take more risk. In these systems, the reaction of the loan and deposit interest rates and of the net interest margin may be different from what is expected and from what is seen in the developed systems. As for the considered period in this study, the Albanian banking system has not reached a full consolidation, the results will be carefully interpreted and also will be compared to other countries that are in the same stage of development.

This section analyzes the factors that are supposed to affect the net interest margins for banks that operate in the Albanian banking sector, using econometric methods.

4.1 MODEL SPECIFICATION

The dealer model of Ho and Saunders (1981)⁹ consists in the estimation of net interest margin determinants following a two-stage process, but it requires long data series. Later on, other researchers (McShane and Sharpe 1985, Angbazo 1997 and Maudos and Fernández de Guevara 2004) have applied a one-stage model for identifying the factors that affect the net interest margin. Since the Albanian data series are short (2002-2007), it is impossible to apply the first model. So, the equations will be estimated using the single-stage model applied by Maudos and Fernández de Guevara (2004), who have identified the factors that determine the net interest margin for five countries of the European Union, analyzed with Panel Data for individual banks. Differently from these authors I have identified the determinants of net interest margin for a single country, Albania.

Generally, Maudos and Fernández de Guevara (2004) have found statistically significant correlations of net interest margin with all the independent variables and the coefficients signs that were predicted by the theoretical model. The dependent variable in my paper is calculated in two forms, as the proportion of net interest incomes to total assets and also as the ratio of net interest incomes to earning assets; differing from the original study where it is calculated only in the first way¹⁰. Another distinction is related to the number of variables included in the paper. For Albanian case a smaller number of variables are included compared to the original study I was relied on, because the short series of observations do not allow the usage of a large amount of variables. Differently from the study I was referred to, I have not included in the equations the variable that measures the interaction between credit and market risk as they are included separately in the study; and the variable that shows the average size of transaction measured by the amount of loans granted. Maudos and Fernández de Guevara (2004) have

measured the banks' market power firstly by using the LERNER index and then the Herfindahl-Hirschman index, while for the Albanian case only the latter is used, because of data lack for the calculation of the first index. In the original paper the market risk is measured by the interest rates volatility of the interbank market or public debt, while for the Albanian banking system it is used the standard deviation of interest rates for the treasury bills, euribor and libor as an approximation of this risk. This is because the loans and deposits of Albanian banking system are mainly denominated in lek, euro and dollars.

The balance sheet items involved in variables' computation, are calculated as average values between the beginning and end of the quarters, to smooth the fluctuations from one quarter to the other. Meanwhile for the items of profit and loss statement that are used in calculations, it is considered only the added value during the quarter in question.

In my model will be used eight independent variables that are thought to affect the net interest margin, deriving from the theoretical model or empirical studies of the same type. Thus, the explanatory variables included in this study are:

A) OPERATING EXPENSES

The variable that will be used for the operating expenses is calculated as the proportion of average overhead expenses to total assets, and a positive effect over the net interest margin is expected. The operating expenses are included in the equation, for testing if the higher costs are passed or not on the bank's clients, by setting higher margins.

B) RISK AVERSION

As a good approximation of banks' risk aversion, it is used the ratio of shareholder equity to total assets. Normally, a positive correlation is expected, because more risk-averse banks will tend to set higher margins in response. However, a higher capitalization level should be interpreted with caution, because not always it is caused by the banks' attitude towards risk. Banks are often obliged

to keep a certain amount of equity for regulatory and supervisory reasons¹¹ and not because they are risk averse.

C) CREDIT RISK

This variable is calculated by the nonperforming loans/total outstanding loans ratio and it is set in the equation with time lags, because it is normal that the banks react after some time to the bad loans appearance. A positive coefficient is expected, as a higher credit risk means a higher risk premium set by the banks for the new loans. In a certain way, the new borrowers will pay the costs of old unpaid loans.

D) MANAGEMENT QUALITY

Management quality is often approximated by the cost/income ratio. A good management quality means picking up low risk and high return assets and also low cost liabilities. In this study, the indicator is calculated by the operating expenses to gross operating income ratio which expresses the level of operating costs for generating one unit of income. If this ratio increases, this means that the management quality is deteriorated and it will be accompanied by the interest margin decrease. A negative correlation will be expected.

E) OPPORTUNITY COST OF RESERVES

These costs in our case will be calculated as the proportion of obligatory reserves put in the central bank to total assets¹². A positive correlation with the dependent variable is expected, because a higher level of reserves (remunerated in lower interest rates¹³) will affect the banks behaviour to setting higher loan rates for compensating the missing profit of investing these funds. This variable will be included with time lags in the equation, because it is thought that the effects of keeping reserves in the Central Bank will be exhibited in loan interest rates after some periods.

F) NON-INTEREST INCOMES

Another variable which is thought to affect the net interest margin is the net commission incomes (as a percentage of the sum of net

interest income and net other income). A negative correlation is expected between the dependent variable and this one, because banks that provide high commission incomes will tend to lower the interest rates and as a consequence the interest incomes and the net interest margin. This variable will be included with time lag, as the reaction of net interest incomes to the commission incomes change, will happen after some time.

G) MARKET STRUCTURE

In this study, this indicator is measured by the quarterly concentration index in loan terms. Herfindahl-Hirschman index (HHI) is calculated by the sum of squares of the loan market shares for every bank in the market. A higher concentration level means more power for the banks, which will result in higher interest margins. The literature suggests two opposite hypotheses related to the effect of concentration on banks price behaviour. The first hypothesis is the one so called Structure-Performance-Hypothesis (SPH) which argues that a more concentrated banking sector will behave oligopolistically and a higher concentration will cause higher interest margin for the banks. The second one, the Efficient-Structure-Hypothesis (ESH) confirms that concentration produces efficiency gains (because of cost reductions) causing interest margins decrease. Another reason may be that big banks have a different structure of earning assets or paying liabilities compared to smaller banks, which may affect the interest received or paid and consequently the interest margins.

H) MARKET RISK

A good way of measuring the market risk that banks encounter while operating in the market, is the volatility of interest rates. In our case it is calculated as the standard deviation for the quarterly Treasury Bills, EURIBOR and LIBOR rates¹⁴. The two last variables were included in the study because the large part of loans in Albanian banking sector are denominated in foreign currencies¹⁵. For this study, in the model will be included all the three variables separately for understanding which of the interest rates affects more the net interest margin.

4.2 THE DATA AND ESTIMATION METHOD

The information used in this study is mainly taken from the Bank of Albania, but also from other international institutions. The data used are quarterly and for individual banks during the March 2002-December 2007 period, in order to identify individual banks effects. Brock and Rojas-Suárez (2000) came to the conclusion that “it may be misleading to focus on aggregates to understand the behaviour of spreads”. If aggregated data would be used, not only would have lost the characteristics of individual banks, but also would have lost many data (for short time series reasons). For the banks that operate in Albanian banking system, the equations will be estimated by using the least squares method in Panel Data¹⁶ with fixed effects, enabling the identification of the individual effects of every bank.

The total number of observations used in this study is 273¹⁷ and the data are unbalanced. Following the model of Maudos and Fernández de Guevara (2004), the data are filtered taking into consideration two criteria: firstly, for the new banks established during the period included in the study, the data of the first year of their activity are eliminated, for avoiding any abnormal value. Secondly, for the banks that have faced structural changes during the period, the data for some quarters are also eliminated.

4.3 THE RESULTS AND ITS EXPLANATIONS

The equation to be estimated may be presented like the following:

$$NIM_{it} = \alpha_i + \beta_1 \cdot OE_{it} + \beta_2 \cdot RAV_{it} + \beta_3 \cdot CR_{it-4} + \beta_4 \cdot MQ_{it} + \beta_5 \cdot RES_{it-2} + \beta_6 \cdot COM_{it-1} + \beta_7 \cdot HHI_{it} + \beta_8 \cdot MR_{it} + \varepsilon_{it} \quad (3)$$

where:

$i = 1, 2, \dots, N$ is the i - bank; $t = 4, 5, \dots, T$ corresponds to the quarter t

$\alpha_i, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$, is a vector of parameters and α_i represents Fixed Effects.

<i>NIM</i>	The dependent variable (Net Interest Margin) calculated respectively, $NIM_1 = \text{Net interest incomes} / \text{Total assets}$ and $NIM_2 = \text{Net interest incomes} / \text{Earning assets}$;
<i>OE</i>	Operating expenses to total assets;
<i>RAV</i>	Risk aversion measured as Shareholders equity / Total assets ratio;
<i>CR</i>	Credit risk measured by the proportion of Nonperforming loans to Total outstanding loans;
<i>MQ</i>	Management quality expressed as the Operating expenses / Gross operating income ratio;
<i>RES</i>	The opportunity cost of reserves (Reserves in the Central Bank / Total assets);
<i>COM</i>	Other incomes measured by Net commission incomes / (Net interest incomes + Net other incomes);
<i>HHI</i>	The concentration Herfindahl-Hirschman index in loan terms;
<i>MR</i>	Market risk measured in three ways: the standard deviation of quarterly interest rates of treasury bills, euribor and libor.

The three equations outcomes that analyse the correlation of dependent variable NIM_2 with all independent variables are disclosed in Table No.1. The last variable (market risk) is stated in its three forms, measured by the standard deviation of T-bills (equation 4), euribor (equation 5) and libor interest rates (equation 6), respectively. That is the reason why there are presented three equations for each way of measuring the dependent variable, thus evaluating 6 equations as a total.

In terms of calculation way NIM_2 results a better indicator than NIM_1 (as it is a closer indicator of efficiency rate measurement and more employed for the Albania case), it is thought to disclose on the table the results related to first indicator.¹⁸ The comparison between tables No. 1 and No 3, shows that the obtained outcomes are similar for both measuring ways of NIM, related with the fact these measurements of efficiency do not change considerably in terms of the value (see chart No.1). If comparing among them the obtained outcomes for the three evaluated equations of the same dependent variable, it is noted to be close and they differ only in terms of last variable (market risk) as it is measured at different ways for each of equations (while the other seven variables are measured at the same form in each of three equations).

The adjusted R^2 shows satisfactory levels, which means that nearly 70 per cent of the volatilities in the net interest margin are explained by the volatilities of independent variables included in the equation.

Table 1 Econometric results for NIM_2

The independent variables	The dependent variable (NIM_2)					
	Equation 4		Equation 5		Equation 6	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
C	0.0132	7.8390	0.0124	7.5501	0.0123	7.1842
OE	0.0897	2.6988	0.1021	3.1458	0.0928	2.7837
RAV	-0.0111	-2.7569	-0.0095	-2.4379	-0.0099	-2.4671
CR(-4)	-0.0107	-2.2700	-0.0111	-2.4304	-0.0122	-2.5698
MQ	-0.0010	-5.0650	-0.0011	-5.8513	-0.0011	-5.5008
RES(-2)	0.0366	2.0588	0.0376	2.1742	0.0368	2.0688
COM(-1)	-0.0066	-3.8940	-0.0066	-3.9878	-0.0062	-3.6687
HHI	-0.0176	-2.1262	-0.0158	-2.0569	-0.0100	-1.2602
MR	0.1448	2.0981	0.9156	4.3777	0.1078	1.9221
Adjusted R^2	0.6865		0.7038		0.6856	
F-statistic	26.8978		29.0955		26.7924	
Prob(F-statistic)	0.0000		0.0000		0.0000	

The coefficient of the operating expenses variable displays (as expected) a positive sign and is statistically significant. This means that the net interest margin increases when the operating expenses increase, in order to cover the additional cost. This result is consistent with the ones derived by the accounting decomposition

of net interest margin. In the Albanian case, the ratio of operating expenses to total assets has an estimated coefficient of 0.1021 (for the fifth equation) in the net interest margin regression, which means that about 10 per cent of bank's operating expenses is passed on to its lenders and depositors (by setting higher loan rates or lower deposit rates).

While a positive correlation was expected between net interest margin and the level of bank capitalization for the Albanian banking system, this correlation resulted negative. The explanation of this phenomenon is related to the fact that banks with higher capital levels (which are considered as risk averse) are more cautious towards lending because more shareholder equity is at risk. Well-capitalised banks that follow a conservative policy prefer to grant more loans with less risk and at lower interest rates. Brock and Rojas-Suárez (2000), have obtained the same result arguing that regarding the countries with banking systems not considerably consolidated, such behaviour may be normal.

The coefficient sign of the credit risk variable is negative and statistically significant. According to other authors' empirical results and to the accounting decomposition of net interest margin for our banking system, a positive correlation was expected. In some studies made about some Latin American countries, it is concluded that the sign of the coefficient is negative, which means that the margin reacts negatively to a nonperforming loans' increase. In Albanian case, the margin reacts negatively to the increase of the nonperforming loans after four periods¹⁹. From what can be seen, Albanian banks have aimed the market share increase, causing the high level of nonperforming loans to affect negatively the margins.

The correlation between net interest margins and management quality for the banks that operate in Albania is negative and significant, as it was expected according to the results derived from similar studies. If the amount of operating expenses needed for generating one unit of income increases, it means that the management quality will deteriorate and the margins will decrease.

The net interest margin is positively related to the level of obligatory reserves settled in the Bank of Albania and this relation is statistically significant. The banks tend to increase the margins for compensating the missing incomes from investing in obligatory reserves (remunerated with lower interest rates) and as a result the margins react after nearly six months to the changes in reserve levels.

In Albanian banking system case, the coefficient of non interest incomes is negative and significant for all the three equations. This means that the banks that provide higher commission incomes, after one quarter will tend to lower the loan interest rates because they consider the two sources of income as substitutes of each-other.

Another explanatory variable used in the model is the concentration level in loan terms, measured by the Herfindahl-Hirschman index (HHI), whose correlation to the net interest margin resulted significantly negative. According to theoretical and empirical results, a positive correlation was expected. However, similar results are evidenced in the study of Brock and Franken (2003) for some variables that measure the spread in the case of Chile. What can be seen for the Albanian banking sector is that the Efficient Structure Hypothesis is confirmed. This means that the banks that operate in Albania exploit the higher level of concentration for the specialization towards different services or margin reduction.

The market risk is measured in three ways for the Albanian banking sector, because it is affected by the presence of foreign currency deposits and loans²⁰. From the first equation results that the net interest margin is positively correlated with the volatility of quarterly treasury bills interest rates. A weakly significant and positive correlation resulted with the standard deviation of libor rate too. But the strongest positive correlation was noticed in the equation where the euribor rate was included. For every 10 percentage points of change in the volatility of euribor rate, a change of more than 9 percentage points in the net interest margin will be noticed. These results were expected as the largest part of foreign currency loans are denominated in euro.

5. CONCLUSIONS

In this study, we analyzed the individual data for the banks that operate in the Albanian banking sector, through the period 2002-2007. After the theoretical and accounting analyses of the net interest margins, the attention was focused in the econometric estimation of the factors which were thought to affect the dependent variable. This paper shall not only provide a new research to the written literature concerning the factors which determine net interest margin, but shall also contribute as the first work for the case of Albania.

From the equations that were estimated, we took results that sometimes were expected and sometimes were different from what was predicted. The net interest margin of banks that operate in Albania is more affected by the volatilities in the base rate of euro, lek and dollar currencies. Recently, the Albanian banking system is characterized by a rapid credit growth and a large share of foreign currency loans (notably in euro) while on the other side of the balance sheet the source of funds (deposits) are mainly denominated in domestic currency.

Albanian banks tend to increase the intermediation margins as they face higher operating costs. Recently the banks have been more aggressive towards the expansion in more geographical areas by opening new branches, which has caused an augmentation in the level of operating expenses, resulting in net interest margin increase.

Although the obligatory reserve rate has not changed during the period taken into account, the increase in the volume of deposits (deriving from attractive offers made by the banks), has led to the increase of the volume of the obligatory reserves settled in the central bank. The missing incomes from the investment of these reserves in more profitable activities, has obliged the banks to pass a part of these costs to their clients.

Even though the commission incomes still comprise a small part of total incomes, they affect negatively the net interest margin.

Albanian banks lower the interest incomes every time they provide higher commission incomes, because they consider these sources of incomes as substitutes of each other.

In the case of Albania, the margin reacts negatively towards the increase of nonperforming loans (after four periods). As may be seen, Albanian banks during this period have given more importance to loan market share increase, which is reflected in the promotional offers made recently. During this period, the banks have increased the variety of loan products that offer, but have shortened the processing time, deriving from the increasing competition in loan market. When the competition becomes stronger and the nonperforming loans level has been low (although it is increasing), the banks have been more comfortable in setting the margins and have not increase the latter as a consequence of the credit risk.

But the banks are more conservative when it comes to capital protection. Even though they have been more aggressive in increasing market share, they still have been cautious for the quality of loans made. The more capital they have added (as a result of supervisory requirements or activity augmentation according to the level of license taken), the more careful they have been in choosing their loan customers, which is also witnessed by the good loan quality.

The results derived from this study may serve to policymakers for orienting towards issues that are more related to net interest margin determinants. Greater attention must be paid to interest rates fluctuations, the obligatory reserves amount, bank capitalization, etc. This study aimed the identification of the factors that may affect more the net interest margins for the Albanian banking sector. Other possible directions where efforts may be directed in the future may be the incorporation of longer time series. By expanding the time series, other macroeconomic factors may be incorporated in the study.

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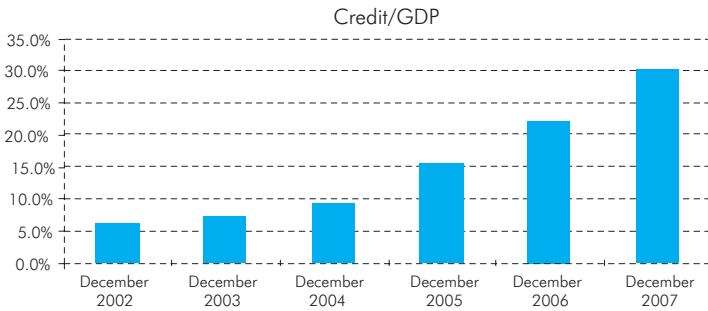
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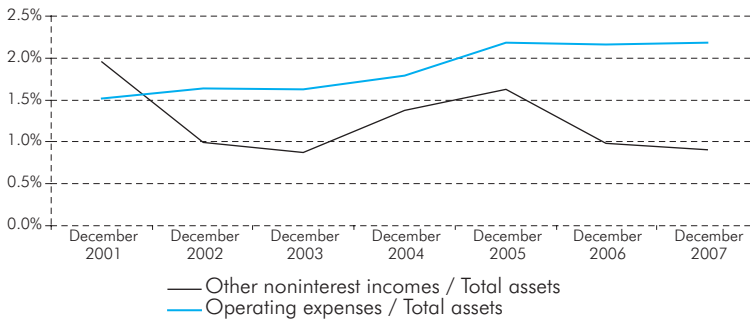
ANNEX

Chart 3 Credit/GDP for 2002-2007 periods



Source: Bank of Albania, author's calculations

Chart 4 The noninterest incomes and operating expenses to total assets ratio



Source: Bank of Albania, author's calculations

Table 2 Ex-ante margin for some countries (in %)

	2000	2001	2002	2003	2004	2005	2006	2007
Albania	13.8	11.92	6.76	5.93	5.15	7.99	7.71	8.44
Bulgaria	8.24	8.19	6.41	5.61	5.82	5.58	5.72	6.32
Croatia	8.33	6.32	10.95	10.05	9.88	9.48	8.21	6.99
Macedonia	7.75	9.38	8.8	8.03	5.9	6.9	6.63	5.35
Bosnia and Herzegovina	15.83	N/a	8.17	6.84	6.56	6.05	4.32	3.61

Source: International Financial Statistics, June 2008

Table 3 Econometric results for NIM_t variable

The independent variables	The dependent variable (NIM_t)					
	Equation 1		Equation 2		Equation 3	
	The Coefficient	t-statistic	The Coefficient	t-statistic	The Coefficient	t-statistic
C	0.0124	8.0805	0.0116	7.7678	0.0116	7.3812
OE	0.0631	2.0836	0.0745	2.5178	0.0659	2.1675
RAV	-0.0091	-2.4846	-0.0075	-2.1305	-0.0079	-2.1675
CR(-4)	-0.0092	-2.1397	-0.0096	-2.2988	-0.0107	-2.4495
MQ	-0.0010	-5.5187	-0.0011	-6.3512	-0.0010	-5.9798
RES(-2)	0.0335	2.0689	0.0343	2.1762	0.0336	2.0696
COM(-1)	-0.0068	-4.3944	-0.0067	-4.4835	-0.0064	-4.1426
HHI	-0.0191	-2.5417	-0.0171	-2.4368	-0.0117	-1.6099
MR	0.1459*	2.3205	0.8492**	4.4540	0.1011***	1.9769
Adjusted R ²		0.6713		0.6889		0.6693
Durbin-Watson		0.7551		0.7810		0.7851
F-statistic		25.1483		27.1924		24.9395
Prob(F-statistic)		0.0000		0.0000		0.0000

ENDNOTES

*The views expressed in this paper are exclusively those of the author and not necessarily those of the Bank of Albania. I thank Mr. Altin Tanku, Ms. Sofika Note, Ms. Elona Dushku and Ms. Elsidia Orhan for the opinions given during the preparation of this study.

¹ The Dealer Model

² For the derivation, please refer to Ho and Saunders (1981).

³ Liebeg and Schwaiger have found a negative correlation for the Austrian banking sector.

⁴ The applied obligatory reserve's rate for the Albanian banking sector is 10 per cent.

⁵ See Chart No. 3 of the Annex.

⁶ Number of banks' branches at the end of 2004 amounted to 188, while in 2007 amounted to 404.

⁷ Number of employees in Albanian banking system, pointed to 5,155 at the end of 2007 relative to 2,236 in 2003.

⁸ Please refer to chart no.4 in the Annex

⁹ Later on, this model is applied by Saunders and Schumacher (2000), Estrada et al (2006), etc.

¹⁰ Different works regarding net interest margin have employed one or the other way of calculation, but the fact why I employed the second calculation form in this study relates to the frequent use of this form in the analyses conducted for the Albanian banking system.

¹¹ The minimum capital adequacy ratio for the banks of Albanian banking system, is 12 per cent

¹² It is thought to be more representative to measure opportunity costs in the case of Albania, differently from the original study where this variable is measured by the liquid reserves to total assets ratio.

¹³ The remuneration rate for Albanian banking sector is 70 per cent of domestic currency policy rate, libor and euribor.

¹⁴ For the treasury bills, the quarterly interest rates published weekly by the Bank of Albania were taken into consideration. For quarterly euribor and libor rates, the published daily rates by the British Bankers Association were used.

¹⁵ As for December 2007, this figure reaches nearly 72.5 per cent of total outstanding loans

¹⁶ The method of least squares is used by the majority of authors that have studied the determinant factors of net interest margin.

¹⁷ Number of bank included in this study varies from 12 in 2002 to 17 in year 2007.

¹⁸ Table 3 shows the three equations as evaluated for NIM1 for each measurement form of the market risk.

¹⁹ The data are quarterly, so the margin reaction will be seen after one year

²⁰ Mainly in euro and usd.

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