ANALYSIS OF THE ALBANIAN BANKING SYSTEM IN A RISK-PERFORMANCE FRAMEWORK

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Views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank of Albania.
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ANNEX 42
The banking industry is the most important segment of the Albanian financial system and, for that reason, it requires more attention when it comes to financial analysis. This paper handles theoretically and analytically some indicators of risk and performance, and for the first time, the methodology of measuring a risk index for the Albanian banking system is presented. The aim of this paper is not simply to analyse financial ratios or measures of risk and return, but also to suggest some indicators and an index that may be used by supervisors during their work.
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<tr>
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<tr>
<td>AU</td>
<td>Asset Utilization</td>
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<tr>
<td>B</td>
<td>Burden</td>
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<tr>
<td>BVE</td>
<td>Book Value of Equity</td>
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<tr>
<td>COL</td>
<td>Cost of Liabilities</td>
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<tr>
<td>EA</td>
<td>Earning Assets</td>
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<tr>
<td>EAER</td>
<td>Earning Assets to Equity Ratio</td>
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<tr>
<td>EAR</td>
<td>Earning Assets Ratio</td>
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<tr>
<td>EAT</td>
<td>Earnings After Taxes</td>
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<td>EM</td>
<td>Equity Multiplier</td>
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<td>ER</td>
<td>Expenses Ratio</td>
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<tr>
<td>IE</td>
<td>Interest Expenses</td>
</tr>
<tr>
<td>INIR</td>
<td>Interest to Non-Interest Ratio</td>
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<tr>
<td>IOA</td>
<td>Interest on Assets</td>
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<tr>
<td>IOE</td>
<td>Interest on Equity</td>
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<tr>
<td>IR</td>
<td>Interest Revenues</td>
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<tr>
<td>ITIR</td>
<td>Interest to Total Income Ratio</td>
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<tr>
<td>LEA</td>
<td>Liabilities to Earning Assets</td>
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<td>LLP</td>
<td>Loan Loss Provisions</td>
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<tr>
<td>NEIR</td>
<td>Net Earnings to Interest Ratio</td>
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<td>NENII</td>
<td>Net Earnings to Net Interest Income</td>
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<tr>
<td>NENIR</td>
<td>Net Earnings to Non-Interest Ratio</td>
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<tr>
<td>NIE</td>
<td>Non Interest Expenses</td>
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<td>NIEA</td>
<td>Non-Interest on Earning Assets</td>
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<tr>
<td>NII</td>
<td>Net Interest Income</td>
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<tr>
<td>NIIOE</td>
<td>Net Interest Income on Equity</td>
</tr>
<tr>
<td>NIIR</td>
<td>Net Interest to Interest Ratio</td>
</tr>
<tr>
<td>NIRTIR</td>
<td>Non-Interest Revenues to Total Income Ratio</td>
</tr>
<tr>
<td>NIM</td>
<td>Net Interest Margin</td>
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<tr>
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<td>Non-Interest on Equity</td>
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<td>Non-Interest Revenues</td>
</tr>
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<td>NITIR</td>
<td>Net Interest to Total Income Ratio</td>
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<tr>
<td>NNII</td>
<td>Net Non-Interest Income</td>
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<td>NOI</td>
<td>Net Operating Income</td>
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<tr>
<td>NREA</td>
<td>Net Return on Earning Assets</td>
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<td>PL</td>
<td>Paying Liabilities</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>PM</td>
<td>Profit Margin</td>
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<td>REA</td>
<td>Return on Earning Assets</td>
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<tr>
<td>ROA</td>
<td>Return on Assets</td>
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<td>ROE</td>
<td>Return on Equity</td>
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<td>T</td>
<td>Taxes</td>
</tr>
<tr>
<td>TA</td>
<td>Total Assets</td>
</tr>
<tr>
<td>TIEA</td>
<td>Total Income on Earning Assets</td>
</tr>
<tr>
<td>TIOE</td>
<td>Total Income on Equity</td>
</tr>
<tr>
<td>TOE</td>
<td>Total Operating Expenses</td>
</tr>
<tr>
<td>TOI</td>
<td>Total Operating Income</td>
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</tbody>
</table>
1. INTRODUCTION

Recently, as a consequence of difficulties financial markets have been experiencing since 2007, more attention has been dedicated to issues concerning the safety and stability of the financial system as a whole and notably the banking sector, as its cornerstone, in particular. The measures for tougher supervision and greater caution during risk-performance analysis of the banks, increased. These analyses are helpful and of a great interest for all stakeholders, and not only for the regulators and supervisors. Differing from the traditional methods of analyzing banking indicators, as used in annual supervision reports, this paper provides additional elements, seen from a different perspective, for the Albanian banking system.

The following section decomposes the ROE ratio by using the modified DuPont model and identifies the factors affecting this indicator. In the third section, a matrix of useful indicators for the financial analyses of the banking system is constructed. The fourth section presents the methodology and calculates for the first time a Risk Index for the Albanian banking system, based on the model derived by Hannan and Hanweck (1988) and later applied by different authors. In the fifth section some conclusions are presented.
2. FINANCIAL RATIOS ANALYSIS, USING THE MODIFIED DUPONT MODEL

Measuring and analyzing the ratios that provide a clearer view of a banks’ financial situation is becoming more and more important, most notably when efforts to preserve financial stability are at the fore. Furthermore, the preliminary analyses of the financial indicators present a picture of the banking sector and can highlight weaknesses which could reveal themselves in the future.

2.1 THE DUPONT MODEL AT A GLANCE

The starting point for the measurement of a financial indicator and the analysis of an enterprise (or industry) is the rate of return on equity (ROE), which shows the profitability provided over a certain period, from the shareholders’ point of view.

The DuPont Model established since 1919, is broadly used nowadays by almost all industries and acts as the basic model whereby a detailed analysis of the return on equity and the factors that affect it, is made possible. The reason why this model has persisted over time relates to the fact that it serves two main purposes: firstly, it allows us to perform an analysis of the components that affect profitability and compare two businesses with each other or with the industry aggregate; secondly, it facilitates trend analysis which is useful for detecting the source of a shift in profitability and for taking corrective action before it is too late (Walker, 2007). Or as Professor Stephen Jablonsky succinctly put it, “The DuPont model is a way of visualizing the information so that everyone can see it.”

The DuPont model (equation) breaks the ROE down into several components by following three stages:
First stage:
In this stage, the return on equity breaks down into two elements; return on assets (ROA) and financial leverage (or the so called equity multiplier - EM):

\[ ROE = ROA \times EM \]  

(1)

Second stage:
The second stage of ROE decomposition consists of breaking down ROA into two other components, respectively the profit margin (PM) and asset utilization (AU):

\[ ROA = PM \times AU \]  

(2)

Third stage:
At this stage some new ratios are created, starting from the components of the numerator or the denominator of the indicators generated in the previous stages and adapted to the specific characteristics of each industry.

2.2 THE METHODOLOGY OF DECOMPOSING ROE FOR THE BANKING SECTOR

Cole (1972) was the first that adapted and applied the DuPont model for banks. The banking system operates like any other industry in a regulated, supervised and competitive market. It has its own products and services that distinguish it from other industries. The financial statements of the banking sector also differ from those of other sectors, with regard to the peculiarities that characterize banking activity. As a consequence, the financial or economic ratios of efficiency and performance of banking operations, take on another meaning when they are calculated for this sector.

Cole (1972) deemed that there are other more realistic ways for banks to measure performance than just net income growth or net income per share. In his paper, he suggests another indicator that may be used – the ratio of the return on shareholders’ equity – as the basic element where all financial analyses originate and
expand. As may be seen in the equation (3), this ratio shows the net income generated from the capital invested in the bank. A high value of ROE usually indicates a more stable and safer situation of the bank. But a higher value of this indicator may be caused by a lower level of shareholders’ equity (which is not a preferable situation) or by a higher level of net income for that period. On the other hand, simultaneous negative values of shareholders’ equity and net income would result in positive values of ROE.

\[
\text{ROE} = \frac{\text{Earnings after taxes}}{\text{Book value of equity}} = \frac{\text{EAT}}{\text{BVE}}
\]  

(3)

In these circumstances, in order to avoid the misleading picture that the return on equity may draw sometimes, this indicator that measures how efficiently the shareholders’ equity is used, may be broken down into two components (EM and ROA)\(^1\), with the ROA decomposed into two further elements (PM and AU)\(^2\).

\[
\text{EM} = \frac{\text{Total assets}}{\text{Book value of equity}} = \frac{\text{TA}}{\text{BVE}}
\]  

(4)

The equity multiplier (EM) indicates the total assets the banks have available per unit of equity invested by the shareholders in the banks, and it is the inverse of the “book value of equity / total assets” ratio which shows the level of banks’ capitalization. In effect, EM provides necessary indications for the financial leverage of the bank, while the ratio \((1-1/\text{EM}) = \text{Debt} / \text{Total assets}\), shows the level of the bank’s liabilities. A higher value of equity multiplier indicates that the bank is financed more by debt (which means that the banking sector is accepting more deposits but it has also more opportunities for generating income).

The return on assets (ROA) may be expressed as:

\[
\text{ROA} = \frac{\text{Earnings after taxes}}{\text{Total assets}} = \frac{\text{EAT}}{\text{TA}}
\]  

(5)

\(^1\) See equation (1).
\(^2\) See equation (2).
The indicator of ROA shows how effectively the bank’s assets are used to generate higher incomes. A higher value of ROA confirms that the bank has appropriately formed its portfolio, contributing to higher financial results.

It is better to look at both the financial ratios, ROA and ROE. Even though they differ from each other and express different things, they both remain two indicators of management efficiency towards generating income from money invested by shareholders and from the total investments made in assets, as well. While ROE does not provide an indication of the bank’s financing from borrowing, ROA does this. That is why both indicators complement each other.

Different authors have decomposed ROA into two important elements, in order that the financial analysis becomes deeper and its determinant factors become identified:

\[ PM = \frac{\text{Earnings after taxes}}{\text{Total operating incomes}} = \frac{\text{EAT}}{\text{TOI}} \]  \hspace{1cm} (6)

and

\[ AU = \frac{\text{Total operating incomes}}{\text{Total assets}} = \frac{\text{TOI}}{\text{TA}} \]  \hspace{1cm} (7)

The profit margin shows the relationship between the after taxes and total operating income of the banking system. Cole (1972) suggested breaking down the numerator of this ratio into the income and expenses components, expressed as a proportion of total operating income, in order that it may be identified which of those items contributes more to the profit margin.

The second element, the asset utilization ratio (AU), shows the connection between total operating income and total (average) assets, in a certain way creating an indicator of gross return on average assets.

A more detailed analysis of the indicator of return on assets will be performed in this paper, by using a combination of two models: the one suggested by Koch and MacDonald (2002), and the other
suggested by Vensel et al. (2004). Both models are extensions and modifications of the DuPont model. In the analysis offered by these authors, more indicators than in the DuPont model are included, which presents a more comprehensive framework of factors that affect the banking system’s profitability.

Initially, Koch and MacDonald (2002) formulate the ROE indicator as a combination of ROA and EM. Afterwards, they break down the ROA into two indicators, one for the bank’s ability to generate income and the other for the ability to control expenses, as the following equation shows:

\[ \text{ROA} = AU - ER \]  \hspace{1cm} (8)

where, AU is the above-mentioned asset utilization ratio; and ER stands for the expense ratio. While the first indicator (AU) operates as an approximation of income management, the second one (ER) expresses the quality of expenses management.

Following equation (8), the indicators of AU and ER\(^3\) may be broken down down into:

\[ AU = \frac{TOI}{TA} = \frac{IR + NIR}{TA} \] \hspace{1cm} (9)

and

\[ ER = \frac{TOE}{TA} = \frac{IE + NIE + LLP + T}{TA} \] \hspace{1cm} (10)

The components of both total operating income and expenses as a proportion of average total assets, after some transformations, form important indicators that must be further analyzed. Thus ROA may be written as:

\[ \text{ROA} = \text{AU} - \text{ER} = \frac{(IR - IE) + (NIR - NIE) - LLP - T}{TA} = \frac{NI + NNII - LLP - T}{TA} \] \hspace{1cm} (11)

After that, the respective ratios may be transformed into:

\(^3\) About meaning of acronyms through the paper, please refer to the List of Abbreviations.
and

\[ B = \frac{NNII}{TA} = \frac{NIR - NIE}{TA} \]  

(13)

The EAR ratio is an important indicator of a bank’s efficiency and investment strategies as it shows the proportion of total assets invested in income-generating assets. The bank’s burden for not covering the non-interest expenses by the non-interest income (B) shows the degree to which operating expenses are managed. Usually it takes negative values, as the non-interest income (which includes income from commissions, operations with securities, foreign exchange operations, etc.) does not cover the non-interest expenses (personnel costs, other administrative expenses, rents, etc.). The net interest margin (NIM) is another important factor that measures the efficiency of bank intermediation and expresses the net income generated by each unit of assets invested in income earning activities. Since this indicator measures the main source of a bank’s returns, it must be analyzed in more details, as follows:

\[ \text{NIM} = \frac{IR}{EA} - \frac{IE}{PL} \cdot \frac{PL}{EA} = \text{REA} - \text{COL} \cdot \text{LEA} \]  

(14)

REA expresses the average returns on earning assets (in gross terms, before expenses’ deduction), by giving an average rate for the interest earned on investments in loans, government securities, or shares. COL may be considered as the average cost of borrowed funds, as it shows the ratio of interest expenses to interest paying liabilities. The last indicator (LEA) measures the intensity of bank investment (i.e. the proportion of interest-paying liabilities invested in earning assets).

Finally, ROA and ROE may be expressed as:

\[ \text{ROA} = (\text{REA} - \text{COL} \cdot \text{LEA}) \cdot \text{EAR} + B \cdot \frac{\text{LLP}}{TA} \cdot \frac{T}{TA} \]  

(15)

\[ \text{ROE} = [(\text{REA} - \text{COL} \cdot \text{LEA}) \cdot \text{EAR} + B \cdot \frac{\text{LLP}}{TA} \cdot \frac{T}{TA}] \cdot \text{EM} \]  

(16)
2.3 PERFORMANCE ANALYSIS OF THE ALBANIAN BANKING SYSTEM, USING THE MODIFIED DUPONT MODEL

Table 1 presents indicators of return on equity and assets in the period 2005-2008, for the Albanian banking system and for the banking systems of some other regional countries, as of December of each year.

Table 1. The ROE and ROA comparison for some countries of the region

<table>
<thead>
<tr>
<th>Country</th>
<th>Return on equity, in % (ROE)</th>
<th>Return on assets, in % (ROA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>22.4</td>
<td>20.2</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>6.2</td>
<td>8.5</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>21.4</td>
<td>25.0</td>
</tr>
<tr>
<td>Croatia</td>
<td>15.1</td>
<td>12.7</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>26.4</td>
<td>23.4</td>
</tr>
<tr>
<td>Macedonia</td>
<td>7.5</td>
<td>12.3</td>
</tr>
<tr>
<td>Montenegro</td>
<td>4.2</td>
<td>6.8</td>
</tr>
<tr>
<td>Romania</td>
<td>15.4</td>
<td>13.6</td>
</tr>
<tr>
<td>Serbia</td>
<td>6.7</td>
<td>10.0</td>
</tr>
<tr>
<td>Greece</td>
<td>15.9</td>
<td>12.7</td>
</tr>
<tr>
<td>Italy</td>
<td>9.7</td>
<td>14.3</td>
</tr>
</tbody>
</table>


As may be seen from the data, Albania is ranked among the countries with the highest return on equity, which indicates high efficiency in the usage of equity. At the same time, it may be said that the rate of return on assets is satisfactory and comparable to other countries of the region which provides further support for the view that the Albanian banking system has achieved satisfactory financial results in the last years, as a consequence of investing in activities with high profitability. However, in 2008, both indicators have fallen significantly. If these figures are analyzed for individual banks, the results show that, at the end of 2008, the number of banks with a negative return on assets and equity had doubled (the number of banks with negative earnings after taxes increased from 4 at the end of 2007 to 8 at the end of 2008)\(^4\).

\(^4\) See Graphs 7 and 8.
Section 2.2 described the generation of some important financial indicators by using some transformations and decompositions, based on Koch and MacDonald (2002) and Vensel et al. (2004), where the starting point is the return on equity indicator (ROE). The analyses of the trends shown by the indicators over the years, when calculated for Albanian banking system, present a clearer view of the system’s financial condition. The changes that occurred in the Albanian banking system in recent years (the privatizations of banks, the acquisition of some domestic banks by big foreign banks, the merger of two banks, the regulatory changes and the supervisory strengthening via stricter regulatory requirements, the widening of the range of products and services, the increased competitiveness, etc.) have undoubtedly affected the indicators that will be analyzed subsequently.

Table 2 presents the decomposition of return on equity and return on assets, initially according to the DuPont model and then according to the models suggested by Koch and MacDonald (2002) and Vensel et al. (2004). The data come from financial statements of the Albanian banking system. The balance sheet items (total assets, shareholders’ equity, earning assets, paying liabilities) are averaged, while the profit and loss statement items are on a cumulative basis for the whole year.

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5 Table 5 presents a reduced form of the profit and loss statement of the Albanian banking system through the years 2001-2008, with some transformations for adapting it to the models of statements used by foreign authors during the analysis of return on equity.
Table 2. The ROE components through years 2001-2008

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Return on Equity (in %), ROE = EAT/BVE</td>
<td>23.45</td>
<td>19.20</td>
<td>19.53</td>
<td>21.10</td>
<td>22.43</td>
<td>20.17</td>
<td>20.32</td>
<td>11.35</td>
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<tr>
<td>Return on Assets (in %), ROA = EAT/TA</td>
<td>1.58</td>
<td>1.20</td>
<td>1.24</td>
<td>1.28</td>
<td>1.41</td>
<td>1.36</td>
<td>1.48</td>
<td>0.91</td>
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<tr>
<td>The components of ROE, ROE = PM<em>AU</em>EM</td>
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<td></td>
</tr>
<tr>
<td>Profit Margin (in %), PM = EAT/TOI</td>
<td>15.99</td>
<td>14.23</td>
<td>14.29</td>
<td>15.80</td>
<td>17.24</td>
<td>17.67</td>
<td>17.95</td>
<td>10.43</td>
</tr>
<tr>
<td>Asset Utilization (in %), AU = TOI/TA</td>
<td>9.90</td>
<td>8.46</td>
<td>8.66</td>
<td>8.08</td>
<td>8.15</td>
<td>7.70</td>
<td>8.24</td>
<td>8.76</td>
</tr>
<tr>
<td>Equity Multiplier (in times), EM = TA/BVE</td>
<td>14.81</td>
<td>15.94</td>
<td>15.78</td>
<td>16.54</td>
<td>15.96</td>
<td>14.82</td>
<td>13.74</td>
<td>12.42</td>
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<tr>
<td>The components of ROA, ROA = AU - ER</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Asset Utilization (in %), AU = TOI/TA</td>
<td>9.90</td>
<td>8.46</td>
<td>8.66</td>
<td>8.08</td>
<td>8.15</td>
<td>7.70</td>
<td>8.24</td>
<td>8.76</td>
</tr>
<tr>
<td>Expenses Ratio (in %), ER = TOE/TA</td>
<td>8.32</td>
<td>7.26</td>
<td>7.42</td>
<td>6.80</td>
<td>6.75</td>
<td>6.34</td>
<td>6.76</td>
<td>7.85</td>
</tr>
<tr>
<td>The components of ROA, ROA = NIM*EAR + B - LLP/TA - T/TA</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Net Interest Margin (in %), NIM = NII/EA</td>
<td>3.35</td>
<td>2.91</td>
<td>3.23</td>
<td>3.08</td>
<td>3.75</td>
<td>4.22</td>
<td>4.35</td>
<td>4.13</td>
</tr>
<tr>
<td>Earning Assets Ratio (in %), EAR = EA/TA</td>
<td>91.00</td>
<td>94.21</td>
<td>95.85</td>
<td>94.80</td>
<td>93.33</td>
<td>93.19</td>
<td>93.34</td>
<td>92.95</td>
</tr>
<tr>
<td>Banks Burden (in %), B = NNII/TA</td>
<td>-0.77</td>
<td>-0.85</td>
<td>-1.11</td>
<td>-0.93</td>
<td>-1.45</td>
<td>-1.69</td>
<td>-1.62</td>
<td>-1.68</td>
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<td>Loan Loss Provisions to Total Assets ratio (in %), LLP/TA</td>
<td>0.23</td>
<td>0.33</td>
<td>0.25</td>
<td>0.26</td>
<td>0.19</td>
<td>0.48</td>
<td>0.53</td>
<td>1.05</td>
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<td>Taxes to Total Assets ratio (in %), T/TA</td>
<td>0.47</td>
<td>0.35</td>
<td>0.50</td>
<td>0.45</td>
<td>0.46</td>
<td>0.41</td>
<td>0.44</td>
<td>0.18</td>
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<td>The components of NIM, NIM = REA - COL*LEA</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Return on Earning Assets (in %), REA = IR/EA</td>
<td>8.39</td>
<td>7.73</td>
<td>8.07</td>
<td>6.96</td>
<td>6.84</td>
<td>7.05</td>
<td>7.72</td>
<td>8.06</td>
</tr>
<tr>
<td>Cost of Liabilities (in %), COL = IE/PL</td>
<td>5.33</td>
<td>5.17</td>
<td>5.23</td>
<td>4.14</td>
<td>3.28</td>
<td>3.05</td>
<td>3.70</td>
<td>4.30</td>
</tr>
<tr>
<td>Liabilities to Earning Assets ratio (in %), LEA = PL/EA</td>
<td>94.65</td>
<td>93.26</td>
<td>92.47</td>
<td>93.80</td>
<td>94.36</td>
<td>92.90</td>
<td>91.15</td>
<td>91.59</td>
</tr>
</tbody>
</table>

Source: Bank of Albania, author’s calculations
The rate of return on equity (ROE) fluctuated over the analyzed period, but it has generally remained at the 19-23% levels (in 2001-2007). We may, however, observe a sharp decline in this indicator in 2008. This decline (if we simply look at equation (3)) is affected by the decrease in net income that characterized the banking system throughout 2008, compared to the previous year (in the period 2003-2007, net income had an upward trend and averaged growth of 21% per year). The banking system’s earnings after taxes for 2008 were 7.3 billion leks, representing an annual decline of 26.5 per cent. By contrast, average shareholders’ equity has increased, but its pace of growth has varied through the years, with an average of 19 per cent in the period 2002-2008. The annual increase in shareholders’ equity was 31.6% at the end of 2008. Apparently, these two phenomena have affected the ROE decline.

However, let us look in more details at the components that produced the decline in the ROE (Graph 1).

The profit margin (earnings after taxes/total operating income) increased continuously from 2003, but suffered an evident decline in 2008 and it is one of the main factors that have caused the ROE decrease. Contributing to this deterioration, on one side, was the annual fall in earning after taxes by 26.5%, and, on the other side, the annual increase by the same rate (26.5%) in total income. A decline in the profit margin implies that a smaller part of total income (after the deduction of expenses) remains at the
shareholders’ disposal (to be distributed in the form of dividends) or at the bank’s disposal (to be re-invested).

Meanwhile, a slight increase in asset utilization from 8.24% (in 2007) to 8.76% (in 2008) is visible. Since this ratio had small variability through the years (it fluctuated between 8 and 9% between 2002 and 2007), it is not expected to affect the return on equity significantly.

The equity multiplier\(^6\) (EM) also continued its downward trend in 2008, a trend that started in 2005. This phenomenon has been induced by the faster annual increase in the shareholders’ equity (averaging 28% over 2005-2008, compared to the average annual increase in assets by 19% over the same period. The value of the equity multiplier at the end of 2008 shows that assets cover more than 12 times the invested capital. The annual increase in shareholders’ equity by about 32% for the year 2008 is a further proof of the measures taken by the banks to improve capitalization and management in the difficult situation that the global economy was facing. As mentioned in section 2.2, the equity multiplier (EM) is used to calculate another important element, the debt ratio of the banking system (see Table 3). The debt ratio has generally been stable (which shows that the liabilities and total assets have increased by the same rate over the period in question), but the indicator has experienced a slight decrease in 2007-2008. This may be explained by the fact that the banks preferred to rely more on the capital invested by the shareholders than on debt, as the latter has become more expensive and scarce in these times of financial uncertainty.

<table>
<thead>
<tr>
<th>Table 3. The debt ratio of the Albanian banking system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt ratio (in %), (1/1-\text{EM} = \text{Debt}/\text{Total Assets})</td>
</tr>
<tr>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>93.25</td>
</tr>
<tr>
<td>Source: Bank of Albania, author’s calculations</td>
</tr>
</tbody>
</table>

Up to now, we may draw the conclusion that the decrease of ROE in 2008 was mainly caused by a fall in the profit margin and the equity multiplier.

\(^6\) In the Annual Reports of Supervision Department of the Bank of Albania, this concept is referred to as “Financial Leverage”.
Next, we proceed with the decomposition of return on assets to identify the components that determine it and, notably, its decline in 2008 (Graph 2).

The rate of return on assets (ROA) for the Albanian banking system has been satisfactory in the last years. Generally, this indicator has remained in the interval of 1.2-1.6% in 2001-2007; however, in 2008 it dropped significantly to 0.9%. Looking at total revenue and expenditure as a percentage of total assets, they have moved in the same direction but not to the same degree. In 2008, there was an increase in both revenue and expenditure of the banking system, but apparently expenditure has increased more than the revenue, thus causing both net income and the return on assets to decline.

Furthermore, by performing another transformation of ROA (Table 2), the results presented in Graph 3 are obtained.

The net interest margin (NIM) is an indicator of the efficiency with which banks conduct financial intermediation. During the period under analysis, this indicator has generally displayed a positive trend, which shows that the Albanian banking system has generated higher and higher net interest income as a proportion of earning assets. But in 2008, the Albanian banking system experienced a fall in net interest margins. While for the years 2005-2007, the annual increase of net interest income was higher than that of earning
assets (which resulted in higher net interest margins), these trends were overturned in 2008, and the net interest income increased by only 12%, whereas the annual change in earning assets was 18%, resulting in lower levels of the NIM rate. This development demands a more detailed analysis in order to identify, from an accounting perspective, the elements that affected it (see later in the paper).

The Albanian banking system has been efficient in the investment of its assets. On average, its earning assets comprise more than 90 per cent of its total assets in the years 2001-2008. The EAR indicator decreased slightly during 2008, which is evidence that it was one of the factors that affected the decline in the return on assets, and, indirectly, the return on equity.

As expected, the banking system burden is negative. The banks have not been able to generate enough non-interest revenues to cover the non-interest expenses. Furthermore, net non-interest income\(^7\), which has been negative, has continuously worsened due to a range of factors. First, the net income from other activities increased continuously, while the principal items of revenue and expenses from this category are the revenues and expenses from commissions and foreign exchange activities. Thus, it may be said

\(^7\) Calculated as follows: Net income from other activities + Net extraordinary income – Operating expenses. Another way of calculation is: Non-interest income – Non-interest expenses (refer to table 5).
that this item has positively affected net non-interest income. On the other side, operating expenses also increased and contributed to a worsening of the already negative net income from non-interest activities. It should be mentioned that operating expenses in 2008 continued to increase as they had done in previous years (by 23.5%) due to continuous widening of the range of activities and the geographical expansion of the banking system, where the personnel expenses comprise about 40% of operating expenses.

The ratio of loan loss provisions to total assets was low (less than 0.5%) between 2001 and 2007, but in 2008 there was a sharp increase to 1.05%, a consequence of a deterioration in loan portfolio quality. The high growth of loan loss provisions over 2008 (more than 1.4 times that of 2007), as a result of the loan portfolio deterioration and the measures taken by the banking system to put aside reserves under circumstances of increasing uncertainty, exceeded the increase in the average total assets of the system (19%), thus negatively affecting the return on assets.

Tax paid by banks comprised on average only 0.5% of the total assets, and fell in 2008 to 0.2%, positively affecting the return on assets. The drop in the absolute value of this expense was caused by the fall in earnings before taxes.

Graph 4. Graphical display of the components of net interest margin

Source: Bank of Albania, author’s calculations
In conclusion, the net interest margin generally had a positive trend over the period, with a slight reversal in 2008. To explain this trend, the components of the net interest margin will be analyzed below (see equation 14 and Graph 4).

The return on earning assets (REA) is a way of measuring the average interest earned on profitable assets by the banking system. This indicator increased in the recent years, which shows that the Albanian banks started to invest in higher return (but also more risky, e.g. lending) activities. Despite this increase, the return on invested funds has remained almost at the same levels as at the beginning of the period under consideration.

The cost of borrowed funds (COL) also increased in the last three years of the sample, but, compared to the beginning of the period (2001), this cost declined by 1 percentage point. The major share of interest expenses goes to interest paid to customers (for time deposits). These expenses increased over the period in question, not only as a consequence of the rise in the absolute value of liabilities, but also because interest rates increased notably in the later years (either because of a gradual raise of the policy rate since 2005, and/or the policy of banks to call the attention of their depositors to seasonal offers).

The ratio of paying liabilities to earning assets (LEA) was not so volatile over this period. In 2008, a slight increase can be observed in the ratio, but generally, during the period analyzed, more than 90 per cent of interest bearing assets was financed by liabilities that pay interest.

Finally, it may be said that the decrease in the net interest margin in 2008 results from the fact that the higher return on earning assets (REA) did not manage to cover the negative effect of the increase in the cost of liabilities (COL) and in the ratio of earning assets financed by the paying liabilities (LEA).
3. MATRIX ANALYSIS OF BANKING SYSTEM PERFORMANCE

An alternative way of analyzing financial ratios is through the matrix approach presented by Vensel et al. (2004). These authors introduce a different treatment of financial indicators of the Estonian banking system, by the creation of a matrix for the analysis of these indicators. In this section, we present the structure of the financial ratios’ matrix based on these authors’ work, with some differences as the matrix is adapted to the financial data and the most commonly used ratios for the Albanian banking system.

3.1 METHODOLOGY

Vensel et al. (2004) note that starting from \( n \) quantitative indicators \( Y_i (i=1,2,...,n) \), it is possible to define \( n^2-n \) qualitative indicators \( x_1, x_2, ..., x_{n^2} \) (financial ratios).

\[
x_i = \frac{Y_i}{Y_j} \quad (i, j = 1, 2, ..., n; i \neq j)
\]  

(17)

By the combination of these \( n \) quantitative indicators, we form a \((n \times n)\) matrix which is also called, the matrix model.

\[
X = \begin{pmatrix}
x_{11} & x_{12} & \cdots & x_{1n} \\
x_{21} & x_{22} & \cdots & x_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
x_{n1} & x_{n2} & \cdots & x_{nn}
\end{pmatrix} = \{x_{ij}\}
\]  

(18)

This is a symmetric matrix (18) – where the symmetric elements with respect to the main diagonal are reciprocal to each other (\( x_{ij} \) ratios are reciprocal to \( x_{ji} \) ratios) – and it comprises two triangular symmetric matrices: the matrix of effectiveness and the inverse matrix of effectiveness. The financial information needed for the analysis is presented in the matrix of effectiveness (the elements down the diagonal), without needing to calculate all the financial ratios. The main idea of presenting this matrix is the introduction and the analysis of interrelations among different financial indicators.
All the quantitative indicators that are analyzed and used for defining other financial ratios may be divided into two groups by their economic substance:

1. Input indicators of banking activity, which are obtained from the balance sheet. The reason why these indicators are called “inputs” is that after they are used by the banks, they generate and improve the financial results. The indicators included in this group are: total assets (TA), book value of equity (BVE), earning assets (EA), paying liabilities (PL), etc.

2. Output indicators of banking activity, which are obtained from the income statement. The reason why these indicators are called “outputs” is that they are results of the inputs’ usage. The indicators included in this group are: earning after taxes (EAT), total operating income (TOI), net interest income (NII), interest revenues (IR), non-interest revenues (NIR), etc.

The combination of these two initial groups of indicators forms the effectiveness matrix of financial indicators for the banking system, which comprises three partial matrices:

- A triangular matrix called “output matrix”, whose elements present proportions between two output indicators.
- Another triangular matrix called “input matrix”, whose elements present proportions between two input indicators;
- And a quadrate matrix called “output-input matrix”, whose elements present proportions between an output and an input indicator.
<table>
<thead>
<tr>
<th></th>
<th>Earning after taxes (EAT) (Y_1)</th>
<th>Net interest income (NII) (Y_2)</th>
<th>Interest revenues (IR) (Y_3)</th>
<th>Non-interest revenues (NIR) (Y_4)</th>
<th>Total operating income (TOI) (Y_5)</th>
<th>Earning assets (EA) (Y_6)</th>
<th>Total assets (TA) (Y_7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net interest income (NII) (Y_2)</td>
<td>(x_{21} = \frac{Y_1}{Y_2}) (\text{Net Earnings to Net Interest Income (NENII)})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest revenues (IR) (Y_3)</td>
<td>(x_{32} = \frac{Y_1}{Y_3}) (\text{Net Earnings to Interest Ratio} (NEIR))</td>
<td>(x_{33} = \frac{Y_2}{Y_3}) (\text{Net Interest to Interest Ratio} (NIIR))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-interest revenues (NIR) (Y_4)</td>
<td>(x_{44} = \frac{Y_3}{Y_4}) (\text{Interest to Non-Interest Ratio} (INIR))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total operating income (TOI) (Y_5)</td>
<td>(x_{55} = \frac{Y_4}{Y_5}) (\text{Non - Interest Revenues to Total Income Ratio (NIRTR)})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earning assets (EA) (Y_6)</td>
<td>(x_{66} = \frac{Y_5}{Y_6}) (\text{Profit Margin (PM)})</td>
<td>(x_{67} = \frac{Y_6}{Y_6}) (\text{Net Interest to Total Income Ratio} (ITIR))</td>
<td>(x_{68} = \frac{Y_7}{Y_6}) (\text{Interest on Earning Assets (IOA)})</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total assets (TA) (Y_7)</td>
<td>(x_{77} = \frac{Y_6}{Y_7}) (\text{Earning Assets to Equity Ratio (EAER)})</td>
<td>(x_{78} = \frac{Y_7}{Y_7}) (\text{Equity Multiplier (EM)})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**The net interest margin may be measured in two ways: Net interest income to Earning assets \(x_{26}\) or Net interest income to Total assets \(x_{27}\), (Kalluci, 2010).**
3.2 SOME EXPLANATIONS OF THE MEANING OF FINANCIAL RATIOS IN MATRIX NO.1

As discussed above, the partial “output matrix” presents proportions among items of the income statement. A lower value of NENII shows that earnings after taxes comprise a smaller part of net interest income, an undesirable situation that indicates higher operating expenses or loan loss provisions which reduce the earnings after taxes. A higher NIIR ratio signifies that a higher proportion of interest revenues remain at the bank’s disposal, after interest expenses are deducted. The INIR, ITIR and NIRTIR tell us about the way the total operating income is allocated between interest and non-interest revenues. Generally, a higher value of profit margin (PM) is preferable, as it shows that after the deduction of all expenses, the net results (earning after taxes) comprise a considerable proportion of total operating income.

In the partial “input matrix”, a higher EAR indicator is preferred, since this implies that a larger part of assets are invested in profitable activities. As concerns the equity multiplier (EM), the higher this ratio, the more banks depend on borrowing for financing their activities.

The partial “output-input matrix” presents proportions among items of the income statement and the balance sheet, and, in general, higher values for the qualitative indicators are preferred. In this case we can say that the utilization of input indicators has been effective and has generated high results.

3.3 MATRIX ANALYSIS OF THE ALBANIAN BANKING SYSTEM PERFORMANCE

Once the matrix is created and a range of financial ratios is calculated, we may judge the performance of the banking system. Unlike the modified DuPont model, by using the matrix, we may create more financial ratios and present them in a summary manner making comparison simpler. In matrix no.2, are presented
28 financial indicators (ratios) for the years 2001, 2005 and 2008. Thus, a range of matrices may be formed, with indicators for different years that may be compared with each other.

In the “output matrix”, $x_{15} = \text{PM}$ (profit margin) is the leading element which may be written as a combination of some other ratios:

$$x_{15} = x_{12} \times x_{23} \times x_{34} \times x_{45} \quad (19)$$

or,

$$\text{PM} = \frac{\text{EAT} \times \text{NI} \times \text{IR} \times \text{NIR} \times \text{NIRTIR}}{\text{TOI}} \quad (20)$$

Based on the above interrelations, we may establish diverse combinations that may be used to identify the factors that affect a certain element of the matrix (or that affect its increase or decrease compared to a prior period).

For instance, if $\text{PM}_{08} / \text{PM}_{01} = 0.652$, this may be expressed as a combination of the growth rates of each PM component during the period 2001-2008 (refer to equation 19 and matrix no.2), respectively:

$$\frac{\text{PM}_{08}}{\text{PM}_{01}} = \frac{\text{NENII}_{08} \times \text{NIIR}_{08} \times \text{INIR}_{08} \times \text{NIRTIR}_{08}}{\text{NENII}_{01} \times \text{NIIR}_{01} \times \text{INIR}_{01} \times \text{NIRTIR}_{01}} = 0.459 \times 1.281 \times 1.757 \times 0.631 = 0.652 \quad (21)$$

Here we see that the element which accounts for most of the decline in the PM over 2001-2008 is the NENII indicator. Subsequently, we may proceed with the decomposition of the latter into its components, for a detailed analysis of the situation and of the motives that may have caused it.

In the “input matrix”, $x_{68} = \text{EAER}$ (earning asset to equity ratio) is the leading element which may be written as a combination of two input indicators:

$$x_{68} = x_{67} \times x_{78} \quad (22)$$
or,

\[ EAER = EAR^*EM = \frac{EA}{TA} * \frac{TA}{BVE} = \frac{EA}{BVE} \]  \hspace{1cm} (23)

Similarly, we can analyze the factors that affect the decrease in EAER (over 2001-2008) to discover that the leading cause of this drop was the equity multiplier (EM).

Finally, in the “output-input matrix”, \( x_{18} \) – ROE (return on equity) is the leading element which may be written as a combination of:

\[ x_{18} = x_{12} * x_{23} * x_{34} * x_{45} * x_{56} * x_{67} * x_{78} \] \hspace{1cm} (24)

or,

\[ ROE = NENII^*NIIR^*NIIR^*NIRTIR^*TIEA^*EAR^*EM = \]

\[ \frac{EAT}{NII} * \frac{NII}{IR} * \frac{IR}{NIR} * \frac{NIR}{TOI} * \frac{TOI}{EA} * \frac{EA}{TA} * \frac{TA}{BVE} = \frac{EAT}{BVE} \] \hspace{1cm} (25)

Again, the elements that have produced the ROE fall may be identified as follows:

\[
\frac{ROE_{08}}{ROE_{01}} = \frac{NENII_{08}}{NENII_{01}} * \frac{NIIR_{08}}{NIIR_{01}} * \frac{NIRTIR_{08}}{NIRTIR_{01}} * \frac{TIEA_{08}}{TIEA_{01}} * \frac{EAR_{08}}{EAR_{01}} * \frac{EM_{08}}{EM_{01}}
\]

\[=0.459*1.281*1.757*0.631*0.866*1.021*0.839= 0.484 \] \hspace{1cm} (26)

As noted above, the decrease in NENII has been the most important factor causing the ROE ratio to decline in 2008, compared to 2001. Other factors that have also affected negatively the ROE are the NIRTIR, TIEA and EM declines.

In the same way we may continue to analyze the reasons behind the changes in the indicators over the years.
<table>
<thead>
<tr>
<th>Net interest income (NII)</th>
<th>Interest revenues (IR)</th>
<th>Non-Interest revenues (NIR)</th>
<th>Total operating income (TOI)</th>
<th>Earning assets (EA)</th>
<th>Total assets (TA)</th>
<th>Book value of equity (BVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54.8% (2005)</td>
<td>12.2% (2005)</td>
<td>97.5% (2005)</td>
<td>NII</td>
<td>EA</td>
<td>TA</td>
<td>BVE</td>
</tr>
<tr>
<td>51.2% (2008)</td>
<td>19.4% (2008)</td>
<td>88.5% (2008)</td>
<td>NII</td>
<td>EA</td>
<td>TA</td>
<td>BVE</td>
</tr>
</tbody>
</table>

Note: The table contains financial ratios for different years.

- Earning after taxes (EAT) = Net interest income (NII) + Interest revenues (IR) + Non-interest revenues (NIR)
- Earning assets (EA) = Earning after taxes (EAT) / Total assets (TA)
- Total assets (TA) = Earning assets (EA) * Book value of equity (BVE)

4. THE RISK INDEX

Generally, financial theory views returns as being related to risk, as higher risk needs to be compensated by higher returns in order to be undertaken by risk-averse shareholders. In the previous section we analyzed the performance of the Albanian banking system; now we move to compute the level of risk that this system encounters while performing its intermediary activity. Banks face risks that are characteristic to banking activity, such as credit risk, interest rate risk, liquidity risk, exchange rate risk, operational risk, etc. Aside from developing specific indicators to measure each of the above risks, a “Risk Index” can also be created that includes all these risks in a single index.

4.1 METHODOLOGY

The Risk Index (also know in literature as the Z-statistic, Z-index or Z-score) is an indicator of the overall level of risks that the banks face. Recently this index, which functions as a measure of soundness and stability of financial institutions, has become more important. The risk index is inversely related to the probability of book value insolvency of these institutions. Different versions of calculation are found in literature, for individual banks or groups of banks (grouped by ownership or by their activities, or for banking systems of a specific country). The calculation of this index was first performed by Hannan and Hanweck (1988)\(^8\), who derived the probability of book value insolvency\(^9\) (the probability that the bank’s losses in a certain period exceed the book value of the bank’s equity, or the probability that the assets value of the bank becomes lower than the value of its liabilities) in their paper.

The Risk Index is provided by a combination of the return on assets (ROA), the equity multiplier (EM) and the standard deviation of ROA. Its empirical form is:

\(^8\) Later this was applied by Liang and Savage (1990), Eisenberg and Kwast (1991), Sinkey and Nash (1993), Nash and Sinkey (1997), Naimy (2005), among others.

\(^9\) In terms of book value and not of market value.
\[ RI = \frac{E(ROA) + CAP}{\sigma_{ROA}} \]  \hspace{1cm} (27)

where:

- \( RI \) – is the Risk Index (also called the Z-statistic, Z-index or Z-score);
- \( E(ROA) \) – is the average (expected) return on assets;
- \( CAP = EM^{-1} \) – is the equity to asset ratio;
- \( \sigma_{ROA} \) – is the ROA’s standard deviation.

While the probability of book value insolvency (\( \Pi \)) is measured as:

\[ \Pi = \frac{1}{2 \cdot RI^2} \]  \hspace{1cm} (28)

“The risk index (Z-score) is the number of standard deviations below the mean by which the bank’s (or banking system’s) profit would have to decline in order to eliminate equity” (Eisenberg and Kwast, 1991); so it expresses the ability of the bank to absorb losses.

It should be noted that a value or interval that serves like a benchmark for the risk index (i.e. for understanding if a banking system (bank) is in a safer or riskier situation) does not exist. Generally, the index is observed for its trend; an increasing trend indicates a positive development whereas a decrease shows a negative development. Jordan (1998) distinguishes the Z-scores between the surviving and failed banks over 1989-1992 in New England, a period when the banking industry of that region experienced serious problems. He reached the conclusion that the group of banks which survived had a higher average value of the Z-index (13.33) and consequently a lower probability of book value insolvency, compared to the banks that failed (Z=8.71). Beck and Leaven (2006) measured the Z-scores for 57 countries and found differences among them. They calculate for 1997-2003 an average Z-score (for the banks included in the study) of nearly 50 for the United States, but only of 2 for Korea and 11.6 for Albania, while the average Z-score of all 57 countries was 24. Hesse and Čihák (2007) calculate the risk index for individual banks of 29 advanced and emerging OECD countries in the 1994-2004 period and conclude that cooperative banks have higher index values (the
group average score for these banks is 59.6) than savings banks (55.4) and commercial ones (46.5), which indicates that the first type is more stable. Čihák (2007), using a group of 29 countries, 12 of which have experienced systemic banking crises, found that banks in crises are characterized by significantly lower Z-scores (Z=32) than other banks (Z=89).

The international evidence shows that risk index values vary by countries and/or bank type. Thus, when the risk index is calculated for the Albanian banking system, it will be judged on the basis of its trend and not its absolute value. A lower value of the index implies a riskier bank, and a high value, a safer bank. Since the index value is inversely related to the probability of book value insolvency, a higher value means a lower probability that a bank faces solvency difficulties.

If a bank (banking system) is characterized by a high return on assets, a high level of capitalization and a low volatility of ROA, then the bank (banking system) is considered safer (it has a higher risk index). Not without purpose the index includes all three of these components, because each of them has a special connotation; the ROA indicator acts as the best measure of a bank’s performance (as it is discussed in the previous sections), its volatility is a standard measure of risk in finance, and the capitalization level represents a standard for the banks’ stability and safety.

4.2 COMPUTATION OF THE RISK INDEX FOR THE ALBANIAN BANKING SYSTEM

For the Albanian case, the risk index is calculated in very few papers by other authors, but in a context of studies performed in a cross-country framework. It should be emphasized that differences may be found between the approach we present below and these authors’ studies, due to the different time periods under review. Moreover, in the studies, data is used from only a sample of banks in the Albanian banking system (those whose financial statements

\[ \text{10 Beck and Leaven (2006); Ariss (2009); Agoraki et al. (2009).} \]
are in Bankscope). For the first time, in this paper is calculated a risk index for the whole Albanian banking system and a time series of its values is obtained for the December 2001-June 2009 period. The data are quarterly and initially. They are taken separately for each bank. Then, in order to calculate the required indicators which are components of the index, the data were aggregated for the whole system as weighted averages of the individual data (the share of each bank’s assets to total system assets were used as the weighting factors).

Two main methods of calculating average ROA and its standard deviation – which are used in index’s measurement – are found in the literature. The first calculates the expected (average) value, as the average value of ROA during a given period, from which the standard deviation of the values during the same period can be derived. This method is more appropriate in the case where the risk index is calculated over a time period and when it comes to a particular bank or banking system.

The second method is to calculate the average value of ROA at a specific moment in time using the weighted average of individual bank ROAs; the standard deviation is then the standard deviation across banks. This method is more applicable when we need to create a time series of the risk index and when we view the banking system as a whole, made up of individual banks, whose asset shares act as weighting elements in computing the average ROA and its standard deviation at a certain point in time.

Since the risk index is calculated for the first time for Albania and the main target is the creation of a series in order that trends can be identified, the second method will be used in this paper. However, future users of this risk measure may try to calculate the index value for a time period, following the above explanations of the first method. The expected value of the system ROA for each quarter is calculated as a weighted average of each bank’s ROA\textsuperscript{11} at the end of the quarter, weighted by the share of each bank’s assets to the

\textsuperscript{11} Usually, in calculating the expected value, the probabilities of a specific situation occurring are used as weighting factors. Since the probability distribution of future (predicted) values is missing, it is supposed that the expected value of the system ROA may be approximated by the weighted average of all current ROAs for each bank.
system assets, at the end of the respective period (29).

\[ E(ROA)_t = \sum (ROA_{it} \times wi)_t \]  \hspace{1cm} (29)

where

- \( E(ROA)_t \) – is the banking system’s average (expected) return on assets at quarter \( t \);
- \( ROA_{it} \) – is the return on assets of the bank \( i \) at the \( t \)-th quarter, on annual basis;
- \( wi \) – is the share of bank \( i \) assets to the banking system’s total assets, at the quarter \( t \);
- \( i \) – stands for the \( i \)-th bank and \( t \) for the \( t \)-th quarter.

The standard deviation is calculated according to equation (30):

\[ \sigma_{(ROA)_t} = \sqrt{\sum (ROA_{it} - E(ROA)_t)^2 \times wi}_t \]  \hspace{1cm} (30)

Table 4 displays the risk index obtained and the probability of book value insolvency for the Albanian banking system during the 2001-2008 period.

Table 4. The Albanian banking system’s Risk Index and Probability of book value insolvency

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</thead>
<tbody>
<tr>
<td>Risk Index (RI)</td>
<td>9.0</td>
<td>10.9</td>
<td>7.8</td>
<td>9.2</td>
<td>7.3</td>
<td>5.8</td>
<td>9.4</td>
<td>7.2</td>
</tr>
<tr>
<td>Average RI as of December values over ’01-’08</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
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<td>8.3</td>
</tr>
<tr>
<td>Probability of book value insolvency (( \Gamma ))</td>
<td>0.61%</td>
<td>0.42%</td>
<td>0.83%</td>
<td>0.59%</td>
<td>0.95%</td>
<td>1.48%</td>
<td>0.56%</td>
<td>0.96%</td>
</tr>
</tbody>
</table>

Source: Bank of Albania, author’s calculations

The Albanian banking system’s risk index has fluctuated over time, but its average level during 2001-2008 (if the values of each December over this period are taken into consideration) reached
8.3. At the end of 2008, the index’s value was lower than the average of the last eight years. In the first quarter of 2009, the value of the risk index declined to 5.1 reflecting the problems that financial markets worldwide encountered. Thus the riskiness of the Albanian banking system increased. However, in the second quarter of 2009, we notice an improvement of the index, which speaks for a more optimistic situation. This is in line with the forecast of commercial banks for an upturn in their activity and with a reversion of the public’s confidence in the banking system.

Generally, the equity/asset ratio has been increasing over time (i.e. it has positively affected the value of the risk index). The element that caused the index to decrease was the weighted average ROA of the system, which fell rapidly, notably in the three quarters prior to the second quarter of 2009. In this quarter, there is an improvement in the average ROA of the system causing the index to increase. In addition, the higher volatility of ROA contributed to the deterioration in the risk index at the end of 2008 and in the first quarter of 2009. As for the second quarter, the standard deviation decreased, which is reflected in the improvement in risk index (see Graph 5).

Looking at the results from the other side of the coin, the probability that the banking system’s equity would turn negative was low, fluctuating between 1 and 2 per cent over the period.
Despite the increase in the probability of book value insolvency during the global financial crisis (as a consequence of the decline in the risk index), its modest value is not a disturbing element for the Albanian banking system (see Graph 6).

Graph 6. The Albanian banking system’s Risk Index and Probability of book value insolvency

Source: Bank of Albania, author’s calculations
5. CONCLUSIONS

During the recent past, the Albanian banking system was characterized by a fast expansion of its activity, evident in the increase of total assets, expansion of the loan portfolio, deposit collection, range of products and services offered in the framework of increasing competition, earnings after taxes and other quantitative and qualitative indicators. In the period 2001-2007, the Albanian banking system mostly generated high rates of return on equity and assets, ranking among the first countries in the region. This testifies once more to the fact that Albanian banks engaged in risky activities, thus generating better financial results. However, in 2008 when the global economy was overcome by the financial crisis, the Albanian banking system also showed signs of a slowdown in activity and deterioration in financial indicators. The return on equity declined significantly owing to a decline in its two main components, the equity multiplier and return on assets. The latter fell as a consequence of the fall in the net interest margin and in the earning assets ratio, as well as a consequence of banks being unable to cover non-interest expenses by non-interest income and the rise in the loan loss provisions to total assets ratio. The net interest margin fell during 2008 as a result of the increase in the cost of borrowed funds and in the level of earning assets financing by paying liabilities.

This paper also presented, for the first time, a quarterly time series of the risk index values calculated for the whole Albanian banking system over the period December 2001 to June 2009. This index exhibited high values over the period analyzed, supported by high returns on assets and a well capitalized banking system, as well as low ROA volatility. Nevertheless, at the moment when the global financial crisis culminated, the risk index of the Albanian banking system also deteriorated, as a consequence of conditions in financial markets.

This study, more than just an analysis of the financial indicators for the Albanian banking system, aimed to bring some new indicators for measuring risk and performance, decomposed and analyzed in a novel framework, in order to facilitate periodic analyses of the banking system as performed by supervisors.
Future research may focus on the enrichment of these new indicators’ series, and on the identification of factors that affect the ROE and ROA by using econometric models. In addition, as concerns the risk index, extension of the time series may test the quality of the index employed and may enable its calculations over a certain period rather than at specific quarters.
REFERENCES


ANNEX

Graph 7. The distribution of ROE by the number of banks, for the Albanian banking system

Source: Bank of Albania, author’s calculations

Graph 8. The distribution of ROA by the number of banks, for the Albanian banking system

Source: Bank of Albania, author’s calculations

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<table>
<thead>
<tr>
<th>Table 5. Income statement of Albanian banking system (in million leks)</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>Interest revenues (1)</td>
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<tr>
<td>Interest Expenses (2)</td>
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<tr>
<td>Net interest income (3)=(1)-(2)</td>
</tr>
<tr>
<td>Non-interest revenues (Operating income from other activities + Extraordinary income) (4)</td>
</tr>
<tr>
<td>Non-interest expenses (Expenses for other activities + Operating expenses + Extraordinary expenses) (5)</td>
</tr>
<tr>
<td>Net non-interest income (6)=(4)-(5)</td>
</tr>
<tr>
<td>Loan loss provisions (7)</td>
</tr>
<tr>
<td>Taxes (taxes excluding income tax + income taxes) (8)</td>
</tr>
<tr>
<td>Earning after taxes (9)=(3)+(6)-(7)-(8)</td>
</tr>
</tbody>
</table>

Source: Bank of Albania, author’s calculations
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