BANK EFFICIENCY IN ALBANIAN BANKING SYSTEM: DEA APPROACH

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Abstract
Financial system in Albania is bank oriented as financial market is not active. This is the main reason why should be an intense attention to these financial institution. Banking system makes most part of financial system so it is vital for Albanian economy to evaluate time after time bank efficiency as the private sector finds there all the funds needed for their development. Even more in these times as financial crisis is knocking in all doors, we should estimate the position our banks have and take care of future actions to prevent additional crisis as Albania.
With this paper I intend to present an overview of Albanian banking system and evaluate its efficiency during the last 5 years, using some traditional accounting approaches in complimentary with new approaches.
During the analysed period the impact on bank efficiency on the following factors is studied: change property, introduction of foreign investors, competition, structure of bank assets, central bank policy.
The limitations of traditional accounting approaches for bank efficiency estimation are discussed in comparative with some new approaches like Data Envelopment Analysis. For this purpose it is used the Intermediation and Operating approach, a model of DEA. Smaller banks are more competitive and efficient than bigger banks in the context of internal financial system.
This is the first time that the approaches mentioned above are used to measure the banks efficiency in a transition economy like Albania. It is very important to measure the bank efficiency of Albanian banks as the banking system with a two tier level is new in a time context, as before `90 there was only one government owned bank.
Key words: Bank financial efficiency, traditional approaches, DEA non-parametric analysis, Albanian Banking System

1. ALBANIAN BANKING SYSTEM

Banking system assets and financial intermediation

The banking system remains the main financial intermediary in Albania. At end-2010, its assets accounted for about 81% of the Gross Domestic Product (GDP). During 2010, the banking system total assets doubled in annual terms. The banks' asset structure continued to be financed mainly by household deposits and was focused on lending, primarily to the private sector. At end-2010, the loan portfolio accounted for about 49% of the banking system total assets.

In 2010, the banking system's total assets were up by about ALL 104.3 billion or about 12%, indicating accelerated growth rates in 2010 compared to 7% in 2009. Consequently, in 2010, banking activity continued to deepen its intermediation in the economy. This intermediation, banking system total assets to the GDP , increased by 3.5 percentage points in 2010 vis-à-vis 0.8 percentage points in 2009. Concentration indicators during 2010, presented in the Herfindahl index, are shown in levels almost equal to those in the last three years, remaining far from optimum levels.

Table 1

Indicators	2005	2006	2007	2008	2009	2010
H Index (assets)	0.21	0.18	0.15	0.15	0.14	0.14
H Index (deposits)	0.24	0.2	0.17	0.17	0.16	0.15
H Index (credit)	0.1	0.11	0.12	0.11	0.11	0.11

Source: Bank of Albania

Banking system credit highlights

Banking system investments, despite recording a slower growth compared to previous periods, follow an upward trend year-on-year. However, this growth was slower regardless of high growth rates of the banking sector lending to total asset ratio, over the last two years. Perception of a higher lending risk was followed by bank's tendency to increase their placements at other, mainly foreign, financial institutions. Nevertheless, the decelerated lending growth is deemed to have been temporary. More specifically, lending to the economy grew by 9.07%, with the highest growth concentrating more during the last quarter.
This development has affected the loan portfolio quality. At end-2010, non-performing loans rose to ALL 68.5 billion, increasing by ALL 21.4 billion year-on-year. However, in 2010 Q4, non-performing loans increased by ALL 3.4 billion, the lowest record over the last two years. Non-performing loans dropped by ALL 1.1 billion in December 2010 compared to November 2010.

Consequently, the monthly non-performing loan indicator declined for the first time in the last two years, from 14.4% in November to 14.0% in December 2010 .
Furthermore, it is worth noting that non-performing loan growth was lower in 2010 than in 2009. Loan portfolio quality dropped for both businesses and households. Non-performing loans to total outstanding business and household loan was respectively 15.5% and 11.7%. Moreover, loan portfolio quality deteriorated both in lek and in foreign currency loan. Quality indicators,
"non-performing loan/outstanding loan in lek" and "non-performing loan/ outstanding loan in foreign currency" were 14.4% and 13.7%, respectively. The second most significant item was the "Treasury and inter-bank transactions". At end-2010, this item reached about ALL 296 billion, accounting for 30% of total assets. This increase was due to the increase in transactions with commercial banks, credit institutions and other financial institutions, from 6.3% of assets at end-2009 to 9.3% at end-2010.

2. Literature review- financial performance evaluation of banking institutions

The literature on performance evaluation of financial institutions is very rich. A large number of studies use traditional or modern approaches for analyzing financial performance. As the definition of efficiency or performance vary on the different studies performed, thus also vary the methods used from the traditional ones to the parametric or non-parametric methods.

Berger and Humphrey (1997) review 130 efficiency studies of financial institutions including commercial banks and explain that efficiency estimates of financial institutions in 21 countries vary across studies due to use of different methods in different countries.

They found that the various efficiency methods do not necessary yield consistent results and suggest some ways that these methods may be improved to bring about findings that are more consistent, accurate and useful.

Avkiran (1999) used two DEA models, taking interest expense an non-interest expense as inputs and interest income and non-interest income as outputs of the models, to evaluate the efficiency of Australian banks. He found that efficiency rose in post deregulation period and that acquiring banks are more efficient than target banks.

Chen and Yeh (1998) analyzed the operating efficiency in 34 Taiwan`s commercial banks using DEA model which used staff employed and interest expense as inputs and loans, non-interest income, bank assets and investment interest revenue as outputs. They find that the banks with higher efficiency are not necessarily more effective.

Al-Shammari and Salimi (1998) examined the comparative operating efficiency in Jordanian banks from 1991-1994, using a modified version of DEA. They found that most of the banks were inefficient.

Grigorian and Manole (2002) used DEA for 17 European countries and found that foreign banks are more efficient than domestic ones.

Analyzing the financial performance is a very difficult issue as it is a wide concept and is measured according to different point of views.

3. Traditional/accounting models for performance evaluation

Data envelopment analysis approach

First of all I am going to give an explanation for the performance of the major four banks which operate in Albania during 2005-2010, using the traditional indicators for 1. Profitability/Earning, 2. Leverage and Liquidity, 3. Capital Adequacy

1. Profitability/Earning

   ROA-Return on Assets

   ROC-Return on Capital

A measure of how effectively a company uses the money (borrowed or owned) invested in its operations. Return on Invested Capital is equal to the following: net operating income after taxes / [total assets minus cash and investments (except in strategic alliances) minus non-interest-bearing liabilities]. If the Return on Invested Capital of a company exceeds its WACC, then the company created value. If the Return on Invested Capital is less than the WACC, then the company destroyed value.

ROI-Return on Loans and Investments

A performance measure used to evaluate the efficiency of an investment or to compare the efficiency of a number of different investments. To calculate ROI, the benefit (return) of an investment is divided by the cost of the investment; the result is expressed as a percentage or a ratio.

2. Capital Adequacy

CAR-Capital to Asset Ratio

Capital Asset Ratio, (CAR) is similar to leverage; in the most basic formulation, it is comparable to the inverse of debt-to-equity leverage formulations (although CAR uses equity over assets instead of debt-to-equity; since assets are by definition equal to debt plus equity, a transformation is required). Unlike traditional leverage, however, CAR recognizes that assets can have different levels of risk.

The non-parametric DEA method has become increasingly popular in measuring efficiency in the countries with developed banking systems (Grigorian, Manole, 2002). The method was first proposed by Charnes, Cooper and Rhodes (Charnes, Cooper, Rhodes, 1978). The authors, relying on Debreu and Farell's concept of productivity, in which the efficiency measure was defined as a ratio of a single input to a single output, applied the method in a multidimensional situation in which there were more than one outputs and more than one inputs. The efficiency is measured in relation to other units in the group under study. The proof of economic efficiency can be the fact that the examined unit is on the efficiency frontier which means that it fully utilizes the available resources and also that it is not possible to increase the production of particular goods (for example, a bank's services). In this method, any units on the efficiency frontier are said to be efficient and their efficiency rates equal 1. The units below the efficiency frontier line have efficiency rates less than 1, which show a level of their inefficiency. The efficiency rate defined in this way takes the values from 0 to 1.

Depending on whether we are interested in maximizing outputs or minimizing inputs, we can calculate the input-oriented technical efficiency which shows how much a company's inputs should be decreased to be efficient leaving outputs unchanged, or output-oriented technical efficiency which presents how much a company's productivity should be increased using the same values of inputs.

The input-oriented analysis is particularly useful for evaluating banks' performance as it measures cost efficiency.

An important stage in applying this method is building up the behavioural model of a bank and defining the inputs and outputs of its activity. The main approaches used in modeling a bank's behaviour are production approach, intermediation approach and modern approaches, i.e. the ones that involve characteristic features of banks' activity, i. e. risk management and data processing for the classical theory of enterprise.

In the case of production approach, a bank's activities are treated as a production of services for deposit account holders and borrowers. However, one of the problems in

this approach is the way of assessing the volume of products. The question is: what is the most suitable way of presenting the volume of products: the number of accounts, the number of transactions on these accounts or maybe the sums of turnover? Due to the access to data, the sums of turnover in nominal value are used most frequently.

The intermediation approach is complementary to the production approach, and it differs in the way of specification of a bank's activities. In this model, an emphasis is put on the role of a bank in transforming the means borrowed from the deposit account holders into granted credits. Apart from these classical models, there are also other approaches such as the assets approach, value-added approach and user cost approach.

The literature on the subject presents a lot of arguments for and against particular particular models. However, there are no explicit conclusions which approach is the best.

In the model application of the DEA method to evaluate commercial banks' efficiency presented below, the value-added approach has been chosen. In this approach, an output of a bank's performance is any activity consuming its resour-ces. The choice of a model determines the classification of inputs and outputs. So, in this case, the volume of loans, deposits and non-interest income are outputs, and the net fixed assets and the total number of employees are defined as inputs (Resti, 1997).

The definitions of inputs and outputs are presented in the following way:

Inputs:

– assets,

– number of employees.

1. capital

Outputs:

– revenue

– profit

While evaluating efficiency by the DEA method, various assumptions referring to the economy of scale can be made, and so we can assume constant scale effects (e_crs), variable scale effects (e_vrs) or non-increasing scale effects of performance (e_nirs).

Table 2 presents the results of efficiency evaluation of commercial banks operating in Albania for years 2005-2010 of four major banks.

Table 2- Input oriented crs efficiency

Inputs	Capital				Capital and employee				Asset -Capital and employee			
Outputs	Revenue and profit				Revenue and profit				Revenue and profit			
Year	Bank A	Bank B	Bank C	Bank D	Bank A	Bank B	Bank C	Bank D	Bank A	Bank B	Bank C	Bank D
2005	0.99	1	0.65	0.45	0.99	1	1	1	0.99	1	1	1
2006	0.78	0.87	0.87	0.82	0.78	1	1	0.89	0.78	0.87	1	1
2007	1	1	0.99	0.66	1	1	0.97	0.77	1	1	1	1
2008	1	1	0.87	0.55	1	1	0.89	0.77	1	1	1	1
2009	1	1	0.82	0.6	1	1	0.82	0.55	1	1	1	1
2010	1	1	0.77	0.4	1	1	0.7	0.4	1	1	1	1

Source: Own calculations

The table above refers to the chosen banks in relation with input-output oriented data envelopment analysis. According to the results relating to the first model of DEA, bank B is the most efficient comparing with the other banks. The second DEA model refers as input to the capital and employees and revenue and profit as outputs. Referring to this model bank B is also the most efficient bank while for bank A there is no difference relating to the first model. The least efficient is bank D which showed good results only in 2005 and after that the efficiency decreased reaching in 2010 40%.

The third model includes as input capital, employees and assets while the outputs are the same. Bank A shows the same results, so the assets and employees does not have any influence in revenues and profit. According to the third model he most efficient bank is C and D. For this two banks assets and employees have a great influence in determining the efficiency. This is the reason for changing the level of efficiency from model 1 to model 3.

Below the information of table 2 is organized in a different way.

Table 3

	Bank A			Bank B			Bank C			Bank D		
DMU	Dea 1	Dea 2	Dea 3	Dea 1	Dea 2	Dea 3	Dea 1	Dea 2	Dea 3	Dea 1	Dea 2	Dea 3
2005	0.99	0.99	0.99	1	1	1	0.65	1	1	0.45	1	1
2006	0.78	0.78	0.78	0.87	1	0.87	0.87	1	1	0.82	0.89	1
2007	1	1	1	1	1	1	0.99	0.97	1	0.66	0.77	1
2008	1	1	1	1	1	1	0.87	0.89	1	0.55	0.77	1
2009	1	1	1	1	1	1	0.82	0.82	1	0.6	0.55	1
2010	1	1	1	1	1	1	0.77	0.7	1	0.4	0.4	1

4. Conclusions

A comparison of results achieved both by the DEA method and the classical method of financial indicators seems to be interesting. Two basic indicators of financial analysis, i.e. return on equity (ROE) and employment efficiency rate (presented as a ratio of the financial result produced by one employee) and also two efficiency measures assessed by means of DEA (e_crs – a constant scale effect measure and e_vrs – a variable scale effect measure) have been chosen to compare the results.

Chart 2-3 compares the above-mentioned measures achieved by commercial banks in Albania in 2006–2010 and shows a convergence of results achieved by both methods (financial indicators and DEA).

The results achieved by both methods show an increase of the efficiency of banks' performance in recent years. We can trace the reasons for efficiency increase in a significant rise of the scale of banks' performance. The decisive factor for the development of the banking sector in Albania was a very dynamic increase of credit activity. The increase in the value of granted credits resulted from the high demand for credits among households and enterprises.

In the recent years, a particularly high demand for mortgages has been noted, and the upturn in the financial situation and the optimistic view of the future resulted in an increase in consumption credits.

A high dynamics of credits for enterprises has also been noted. Due to higher incomes from taxes and the inflow of funds from remittances and foreign direct investments , deposits of supervisory and self-government institutions have increased significantly. The Gross Domestic Product went up and that has been the fastest growth in this decade. The favourable macroeconomic situation and the increasing scale of banking sector activity have been reflected in the increase of banks' financial results, and this influenced the efficiency of banking in Albania.

The results of efficiency measurement by both methods prove these positive tendencies.

On the other hand, efficiency measure in the DEA method is calculated in a different way and considers far more factors affecting banks' performance.

The applied methods complement each other, and each of them has advantages and constraints.

The main advantages of the method of financial indicators are:

- simplicity and easiness of application,
- universality of application,
- obtained measures are absolute values and thus can be used for evaluations, comparisons, rankings, etc.
- availability of data.

Financial indicators can be used by all those interested in evaluating a bank's performance – banking supervision, owners, managements or customers.

The method of financial indicators has certain drawbacks. The basic one is a vast number of the indicators used. In banking practice, a few hundreds of such factors are used. Applying so many measurements can make a comparison of banks debatable. However, limiting the number of measurements does not give the whole picture of the situation since particular indicators provide only fragmentary information.

That is why it is advisable to supplement the method of financial indicators with a synthetic measure, i. e. the efficiency measure evaluated by the DEA method.

The main advantages of this method are:

- a greater extensiveness in comparison with the method of financial indicators;
- it does not require access to data over long periods of time.

This method has also certain constraints.

First of all, the efficiency measure evaluated by this method is a relative value and is measured only in relation to objects within a study group. Secondly, DEA is fairly sensitive to incorrect information, which means that one incorrect piece of data may significantly change the results of calculations.

However, it should be stressed once again that financial indicators are absolute values, whereas efficiency measurements achieved by means of DEA are relative values. These results show only whether banks transfer their inputs into effects in an optimal way and whether they have certain reserves – and thus can achieve better effects using the intended inputs.

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