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Efficiency of the Albanian banking system: Traditional approach and Stochastic Frontier Analysis

Suela Kristo¹

Abstract

Efficiency issues become even more sensitive for post-communist European countries and for Albania as well, as their economies have created relatively new financial systems being currently of little experience, moreover when they become part of EU. Their survival requires them among others, to be as efficient as possible. The paper focuses on the dynamics of bank efficiency banking system as a whole and for each of the banks in particular. Firstly, the analysis is done through traditional indicators. These indicators clearly show a poor performance and decreased efficiency of Albanian banking system after year 2007. Then, is estimated the cost efficiency through Stochastic Frontier Approach (SFA). This efficiency estimation captures essentially the deviation that a bank has from the theoretical best-practice bank. Results show that in particular, the largest banks (which have the largest market share G3 group) seem to be more efficient than the smaller banks. However, the differences that they have on each other are much smaller than in the case of traditional indicators. Moreover, it is not clear the relationship between ROA or size of the bank with the cost efficiency.

Keywords: bank efficiency, Albanian banking system, SFA

JEL Classification: G21, G14, C33

1. Introduction

Banks are a service industry. They contribute to economic growth by providing financial assets to facilitate the production in industries. Although, the direction of the finance-growth nexus is country-specific (Fukuda and Dahalan, 2012), an efficient banking sector provides the greatest contribution to economic growth and at the same time on welfare. Banks contribute more to economic growth by promoting the accumulation of capital through credit supply.

Bank efficiency studies show that the inefficiencies in this market exist for a long time. It is possible that governments and respective authorities protect the banking

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markets, particularly in emerging markets, Matthews (2010). In this way, management objectives will be different from those of profit maximization or cost minimization, given that “they will be protected anyway”. Moreover, the process of financial integration in the European banking industry is accompanied by the debate about the benefits of strengthened competition in credit markets and greater efficiency (Kooli, 2012). Therefore, this paper aims to know how efficient the Albanian banking system is, which belongs to the emerging markets and it has been passed 20 years since it was restructured. During these years, none of the Albanian banks comes out from the market. In addition, only a merger between banks has been occurred. So, all of this has happened because the banks and the whole system are efficient and support very well the competition in this market, or that “they are more protected than efficient”?

To answer this question, first I provide some evidence for the efficiency level and its development focused more on the period 2002-2011. Then it is estimated the cost efficiency through Stochastic Frontier Approach (SFA). At the core of this method is the evaluation of the cost efficiency level for each bank through the distance that each of them has from best-practice bank. In addition, this indicator is compared with traditional indicators to check the compatibility between them.

The paper is organized as follows: Section 2 gives the basic theory of efficiency measurement ways in the banking sector, to see better the differences between them. Section 3 analyzes the level and development of traditional and simple indicators that measure efficiency in the Albanian banking market. The fourth section presents in details the methodology of SFA approaches, variables and data. On the fifth and sixth section are presented the cost efficiency results and conclusions of the paper.

2. Empirical findings on banks efficiency in the emerging countries

The efficiency of banking institutions is an important factor that fosters the economic development in transition economies (Bonin and Wachtel, 2003). There are numerous studies on banking efficiency, some of which belong to the economies in transition. Many studies focused on the banking sector were performed for only one country in transition. A lot of them investigate efficiency in the relationship with other variables. Moreover, the estimation methodologies vary across these studies. I briefly examine some of the evidence provided by these studies in this section.

In their study, Kraft and Tirtiroglu (1998) measured scale efficiency and X-efficiency of banks in Croatia for the period 1994-1995. They showed that the newly established banks were less efficient, but more profitable than the older privatized banks and the state ones. Whereas, Jemric and Vujcic (2002) analyzed banks in Croatia between 1995 and 2000 and showed that the foreign and newly established banks were more efficient. By analyzing the banking sector in Hungary in the transition period Hasan and Marton (2003) showed that the foreign banks perform better, followed by domestic private and state-owned banks. Havrylchyk (2006) analyzed the efficiency of the banking market in Poland for the period 1997- 2001. He showed that the efficiency level did not increase over

the analyzed period. Moreover, foreign banks newly entered on the market presented a higher level of efficiency than the local banks or than the foreign banks that acquired local banks. Asaftei and Kumbhakar (2008), estimated the cost efficiency of banks in Romania for the period 1996-2002. The results of the research indicate that the cost efficiency of all banks in Romania increases with the improvement of the regulation framework and with the adjustment of the monetary policy to the market conditions. Dardac and Boitan (2008) measured the relative efficiency of a homogeneous group of credit institutions. They identified the factors generating inefficiency, highlighting the impact of the management performance on bank efficiency. Mihajlović et al. (2009) ranked banks in Serbia based on the efficiency. However, no other study to my knowledge has explored bank efficiency in Albania. This paper attempts to fill in the gap in the literature by providing empirical evidence for Albanian banks and banking system with the help of frontier methods.

On the other hand, in the past studies concerning the comparative efficiency in the emerging countries have intensified. They focused on the analysis of the ownership impact form on the efficiency of banks, this because of the increasing presence of foreign investors in the financial systems in the transition economies. Thereby, Drakos (2002) analyzed the effect of structural reforms on the bank efficiency in six states in Central and Eastern Europe in the period 1993-1999. Grigorian and Manole (2002) performed an analysis of the banking sector in 17 states from Central and Eastern Europe in the period 1995-1998. Their analysis suggests that the foreign ownership and consolidation is likely to improve efficiency of banking operations and the effects of prudential tightening on the efficiency of banks vary across different prudential norms. Weill (2003) analyzed the impact of the nature of ownership form on the efficiency of 47 banks in the Czech Republic and Poland in 2007. This study showed that foreign banks had a higher level of efficiency than the local banks. Bonin et al. (2005) analyzed the effect of the ownership form regarding 225 banks in 11 states in transition for the period 1996-2000. They showed that the privatization of banks was not enough to increase the efficiency of banks and that government banks were inefficient than the private banks. Rossi et al. (2005) found significant differences among bank management of 9 countries in Central and Eastern Europe in the period 1995-2002. They provided some evidence of an increasing tendency over time in profit efficiency and, to an even stronger extent, in cost efficiency. Moreover, cost and profit efficiency scores are negatively correlated both on a country wide as well as on a bank by bank basis. Fries and Taci (2005) examined the cost efficiency of 289 banks in 15 East European countries. They found that banking systems in which foreign-owned banks have a larger share of total assets have lower costs and that the association between a countries progress in banking reform and cost efficiency is non-linear. Yildirim and Philippatos (2007) studied the efficiency of banking sectors in 12 countries in transition in Central and Eastern Europe during the period 1993-2000. The authors showed that the managerial inefficiencies in CEE banking markets were found to be significant, with an average cost efficiency level for 12 countries of 72 and 77 percent by the DFA and the SFA, respectively. The alternative profit efficiency levels are found to be significantly lower relative to cost efficiency. In another study on the bank efficiency in Central and Eastern Europe, Koutsomanoli-Filippaki et al. (2009) analyzed

the data for the period 1998–2003 and showed found that productivity change in CEE is driven by technological change rather than efficiency change. Andries and Cocris (2010), analyzed the efficiency of the main banks in Romania, the Czech Republic and Hungary for the period 2000-2006. Their results of the analyses showed that the banks in the three East-European countries reach low levels of technical efficiency and cost efficiency, especially the ones in Romania, and that the main factors influencing the level of banks efficiency in these countries are: quality of assets; bank size, annual inflation rate; banking reform and interest rate liberalisation level and form of ownership. Banerjee (2011) examines the relative rankings in efficiency of individual countries across the studies and the effect of ownership structure on bank performance. According to him the Czech banking system ranks among the highest nontechnical and profit efficiency but lowest in cost efficiency. Slovenian and Estonian banks rank among the most cost efficient banks.

Albania is excluded from the above studies notably due to the lack of complete information. A few studies offer comparative information regarding the efficiency of banks in transition economies including Albanian banking system. Turk-Ariss (2010) studied 60 developing countries over the period 1999-2005. The profit efficiency indicator in Albania appear to be higher compared to the some eastern European countries, but lower in term of cost efficiency.

Fang et al. (2011) examines the cost and profit efficiency of banking sectors in six transition countries of South-Eastern Europe over the period 1998–2008. They found that Albania and F.Y.R.O.M. have relatively high cost efficiency, because of the relatively high level of banking sector concentration. Bulgaria has the highest level of profit efficiency, followed by F.Y.R.O.M., Albania, Croatia, and Serbia. Albania had a high level of profit efficiency before 2003 and this could be attributed to the fact that until 2003 still over 70% of the bank assets were invested in government treasuries that had high interest margin. These and other studies differ considerably in sampling, methodology, and measurement. Therefore, the comparison of the general conclusions should be done carefully.

3. Efficiency in the Albanian banking market. Traditional efficiency indicators

Traditional indicators will first evaluate the Albanian bank efficiency. The traditional indicators of the efficiency are related with the analysis of various financial ratios. Among them are: net interest margins (NIM), cost-income ratio, overhead costs to total assets, operating expenses to operating revenues and return on assets (ROA). Higher levels of net interest margins (NIM), overhead costs indicate lower levels of bank efficiency, as they incur higher costs and there is a higher wedge between lending and deposit interest rates. Moreover, cost-income ratio, overhead costs to total assets and operating expenses to operating revenues indicate lower levels of cost efficiency with higher ratios. Whereas, return on assets (ROA), regarded as one of the basic indicators of bank profitability or for banking system as a whole. There is almost a positive trend of this indicator for the period 2002-2007 (table 1) due to better financial result of banks from the main operations, in spite of high operation expenses from expansion. After the year 2008 has a decline trend of this

indicator giving a more low-performance of the Albanian banking system. ROA shows a positive trend in 2010 due to the rapid growth of net profit compared to an almost negligible increase in average assets. However, it seems that there has not been a sustainable growth, because the year 2011 shows a significant downward trend.

Table 1: Some efficiency indicators for Albanian banking system (in %)

Year	ROA	NIM	Operating expenses to operating revenues	Cost to income ratio	Overhead costs to total assets
2002	1.2	2.91	55	66.01	2.46
2003	1.24	3.23	49	64.88	2.16
2004	1.28	3.08	61	66.74	2.36
2005	1.4	3.75	56	54.64	2.26
2006	1.36	4.22	54	61.02	2.33
2007	1.57	4.09	51	56.06	2.19
2008	0.91	4.13	57	52.67	2.42
2009	0.42	4.04	57	55.82	2.44
2010	0.72	4.32	53	51.86	2.30
2011	0.22	4.27	62	49.01	2.09

Source: Bank of Albania (2003-2012)

There is a positive trend about NIM in the period under consideration, indicating lower levels of banking system efficiency. Generally, during the years 2007, 2008 and 2009, appear minor changes of NIM. This has come due to the balanced development of the two components. Performance of the NIM in 2010 shows a slight increase, which is mainly due to the decline in the component that determines the financial cost of earning assets. The NIM fell slightly in 2011 due to the higher growth rate of paying liabilities compared to the increase in average earning assets. Operating expenses to operating revenues is more unstable. Its improvement (2006, 2007) has been influenced from such developments as the network extension of various banks, provision of a broader variety of services and products, intensified marketing and overall improvement of bank–customer relations. However, after year 2007, the efficiency indicator has a significant increase in comparison with the previous period. It shows the change of banking activity direction and its repression of income generation, turning back the ratio at 2004 levels. This because of the more moderate increase in total expenses, coupled with the sharper decline in operating

income. Performance of overhead costs to total assets appears generally balanced, during the years of the period under consideration, with a negative trend in last three years. Cost-income ratio shows this negative trend as well, but not only for these years. This trend shows improvement of cost efficiency for the banking system.

Comparing net interest margins, cost to income ratio and overhead costs to total assets for some countries of South Eastern Europe in year 2011, show that these indicators put Albanian as the most efficient banking system (table 2). The lowest indicators appear for Serbia. ROA indicator does not show the same thing as the other indicators. The sharp fall in income was highly driven by the high loan loss provisions, which have a direct negative impact on the ROA for Albania.

Table 2: Some efficiency indicators for SEE countries in 2011

Efficiency indicators	Albania	Bosnia and Herzegovina	F.Y.R.O.M.	Montenegro	Serbia
Cost to income ratio (%)	49.01	63.26	65.71	66.03	87.74
Net interest margin (%)	4.27	4.44	4.30	4.96	5.37
Overhead costs to total assets (%)	2.09	3.33	3.03	3.90	16.84
Return on assets (%)	0.22	0.98	0.38	-0.36	0.96

Source: Bank of Albania (2013)

The observation of traditional indicators of efficiency does not give a clear idea about the efficiency of the Albanian banking system. Therefore, to understand better the efficiency of Albanian banking system the cost efficiency indicator based to the SFA method, will be used.

4. Stochastic Frontier Approach for Efficiency in the Albanian banking market

While in the above section it was analyzed the efficiency in the Albanian banking market by traditional indicators, in this section I will evaluate it by an alternative approach. This methodology relates to the measurement of cost efficiency by Stochastic Frontier Approach (SFA).

4.1 Methodology and data

The focus of research on bank efficiency has shifted from the traditional approach of analyzing financial ratios to estimating efficiency through frontier techniques. Financial ratios are single factor measures of performance, and that they may be misleading indicators of efficiency because they do not control for product mix or input prices. Farrell (1957) was the first that introduced the idea of efficiency of a production unit, under the concept of “input oriented measure”. Throughout the past two decades, hundreds of articles have developed the idea of Farrell. However, the two most widely used approaches to bank efficiency measurement in transition economies, are the stochastic frontier approach (SFA), a parametric method, and data envelopment analysis (DEA), a non-parametric method. The advantage of SFA is that it can disentangle the inefficiency term from the residual. DEA method assumes that all efficiency deviations are caused by the company. Nevertheless, there are some elements, such as the legislative framework, level of competition, etc., which cannot be controlled by the company and which affect the performance of the company. On the contrary, the SFA method allows for the modeling of these factors by introducing the random error in the specification of the determining model for the frontier efficiency (Murillo-Zamorano, 2004).

The main problem of SFA is the misspecified functional form. On the contrary the most important advantage of DEA is that it does not require in advance assumptions about the production function’s analytical form. This method does not require a model specification for production or cost functions, but it uses linear programming methods to construct the efficient frontier from the observed input-output ratios as a piece-wise linear combination of the most efficient units.

There are a lot of studies that employs Data Envelopment Analysis on banking efficiency in transition countries (Grigorian and Manole, 2002; Tomova, 2005; Jemric and Vujcic, 2002; Mihajlović et al., 2009). There are many other that employs Stochastic Frontier Approach (Kraft and Tirtiroglu, 1998; Yildirim and Philippatos, 2002; Bonin and Wachtel, 2003; Bonin et al., 2005; Fries and Taci, 2005; Yildirim and Philippatos, 2007; Karas et al., 2010; Turk-Ariss, 2010). However, some of the researcher apply two or more techniques to an identical data set. Some of them compare parametric and non-parametric techniques like Bauer et al. (1998), Casu and Girardone (2002), Beccalli et al. (2006), Theodoridis and Psychoudakis (2008), Andries and Cocris (2010), Banerjee (2011). In fact, there is no consensus which of the available methods is the best. This paper employs the stochastic frontier analysis (SFA). The most important reason why SFA is selected for analysing efficiency in the Albanian banking system is that in transition economies the quality of banking data is not perfect and measurement errors are quite widespread. Some authors argue that parametric methods, which are more robust to data problems, would constitute more suitable empirical tools for analyzing banking efficiency (see Fries and Taci, 2005). However, in further research should use multiple techniques, especially parametric versus non-parametric techniques, to check for the robustness of results.

The SFA approach is based on the idea of Aigner et al. (1977) and Meeusen et

al. (1977). It includes the evaluation of specific parameterized efficiency frontier with a composite error term. The error term consist of nonnegative inefficiency and noise components. Because of its deterministic character, the Translog function is generally preferred form. Other form are Cobb-Douglas and Fourier function. However, the last function is more controversial in the empirical literature, because it may be unable to reach close approximation and may result in inconsistent parameters¹. Given the multiplicity of bank functions, I will choose the Translog function model which seems to be adapted to the multi-criteria character of banks efficiency. Indeed, this functional form makes it possible to take into account the multiple complementarities links between explanatory factors and it does not impose any restriction. Moreover, panel data with random errors will allow to mitigate the weakness of available quantity on banks level data. Specifically, efficiency scores are estimated using the Battese and Coelli's (1992) time-varying stochastic frontier approach for panel data with firm effects. All estimations are run using bank fixed effects. Using the maximum likelihood technique, bank efficiency is estimated for each bank i as Battese and Coelli (1992).

Specification according to the SFA model is as follows:

$$\ln C_{it} = f(\ln Q_{it}, \ln W_{it}) + \varepsilon_{it} \quad (1)$$

where C is total costs, Q denotes bank output, while W indicates input prices defined below. Error ε_{it} decomposed into $v_{it} + u_{it}$, where v and u are two components that are assumed multiplicatively separable from the rest of the function. While v_{it} is the two-sided disturbance that accounts for random factors assumed to be independently and identically normal distributed with zero mean and variance σ_v^2 . The other component u_i is a one-sided non-negative inefficiency term and assumed to be half normally distributed with mean zero and variance σ_u^2 .

Constrained by the type of data (it was not possible to separate the data at disposal into components), I will use only one output. According to Shaffer (1993) and Berg and Kim (1994), this should be the total assets. The rationale for using such a variable is that the flow of the products and services produced by a bank is proportional to its total assets².

In order to estimate the cost function, linear homogeneity restrictions in input prices have to be hypothesised. Several researchers do this by normalising costs and input prices by dividing them with one of the input prices, such as in Pruteanu-Podpiera et al. (2008) who analyse banks in the Czech Republic, or Cebenoyan et al. (1993) for the USA, etc. I will use the ratio with the labour price. The reason is that all the other independent variables could be highly correlated to each other in almost all the cases. Moreover, regarding alternative estimations conducted, using the chosen variable could produce a better estimation than if using other variables for the normalisation process. Hence, using the frontier technique, I estimate the translog cost function, of the following form:

¹ See Kumbhakar and Lovell (2000) for a discussion of these functions and the other specifications

² Fernández de Guevara et al., 2007; Carbó et al., 2009; Berger et al., 2009; Turk-Ariss 2010, among others use total assets as output in this field of research.

$$\begin{aligned} \ln C_{it} = & \alpha_0 + \alpha_1 \ln Q_{it} + \frac{1}{2} \alpha_2 (\ln Q_{it})^2 + \alpha_3 \ln w_{1,it} + \alpha_4 \ln w_{2,it} \\ & + \alpha_5 \ln w_{1,it} \ln w_{2,it} + \frac{1}{2} \alpha_6 (\ln w_{1,it})^2 + \frac{1}{2} \alpha_7 (\ln w_{2,it})^2 \\ & + \alpha_8 \ln Q_{it} \ln w_{1,it} + \alpha_9 \ln Q_{it} \ln w_{2,it} + \varepsilon_{it} \end{aligned} \quad (2)$$

where:

\ln natural logarithm

i bank's index;

t time index;

C_{it} total costs over labour price (measured as ratio of personnel expenses to number of employees)

Q_{it} total assets of bank i at time t ;

$W_{1,it}$ capital price (measured as ratio of operating and administrative expenses to fixed assets)³ over labour price

$W_{2,it}$ fund price (measured as ratio of interest expenses to total deposits) over labour price

α_0 constant

$\alpha_{1,2,3...9}$ coefficients of respective variables

ε_{it} error of estimation

The empirical model in this research is performed in the Stata software and the results of cost efficiency come from software calculation. Cost efficiency measures the ratio of the minimum potential total cost to the total observed cost. For example, cost efficiency of 0.65 suggests that bank lose about 35% of its costs compared with the best practice bank due to mismanagement, outdated technology, etc... The study covers only the period of 2002-2011 because of the lack of consistent available data prior 2002. Data on the Albanian banking system are taken from the database provided by the Bank of Albania. These data are in the form of an unbalanced panel form, with 153 observations and 17 banks. The American Bank of Albania (now ISPA) and the Italian Albanian Bank are considered as separate banks until 2007 before their merger. In 2008-2011 they are consider as Intesa Sanpaolo Bank of Albania (ISPA), because of their merger.

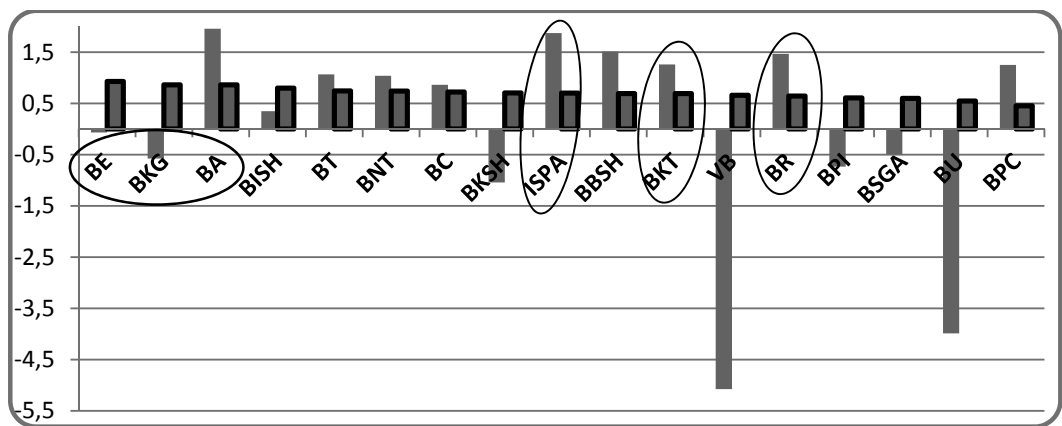
4.2 Results

I have applied the frontier technique to estimate equation (2). The empirical results are shown in Table A2 in the appendix. Estimation of the model parameters indicates that

³ See Fernández de Guevara et al., 2005; Carbó et al., 2009; Fungacova and Weill 2009, among others.

generally these parameters are statistically significant. Moreover, the Wald test shows a statistically significant model in general, at the level of 99%. Cost efficiency results for the Albanian banking system, measured by SFA technique, show that generally differences between banks are relatively small (Figure 1). Higher average values over the study period reach: Emporiki Bank, National Bank of Greek and Alpha Bank. While smaller values take ProCredit Bank and Union Bank. Greek banks presented the highest value of efficiency hence they have the greatest impact on group's efficiency.

Figure 1: Average cost efficiency and ROA⁴ for each bank in Albania for the period 2002-2011



Source: Author's calculations

ROA for each bank⁵ of G3 is more centred toward the group's average than for other banks in the system. However, they are not in the top of ranking by cost efficiency as are regarding the ROA indicator. These banks are very similar in terms of indicators of profitability than in terms of cost efficiency. ROA for three banks (BE, BKG and BSGA) of G2 group is estimated in average at negative levels for the period of the study, where two (BE and BKG) of these are the most efficient. Only two (BA and BPC) out of five G2 banks have a positive performance. But, in terms of cost efficiency, BPC stands at the end of the ranking. Generally, G1 banks are unable to generate sufficient profit. In average only two (BBSH and BNT) out of six G1 banks reports positive net result, while most of the banks fail to cover operating expenses with operating income. In general, this indicates that small banks have a pronounced lack of efficiency, associated by a limited volume of banking activities. However, two banks with positive ROA indicator have higher efficiency cost

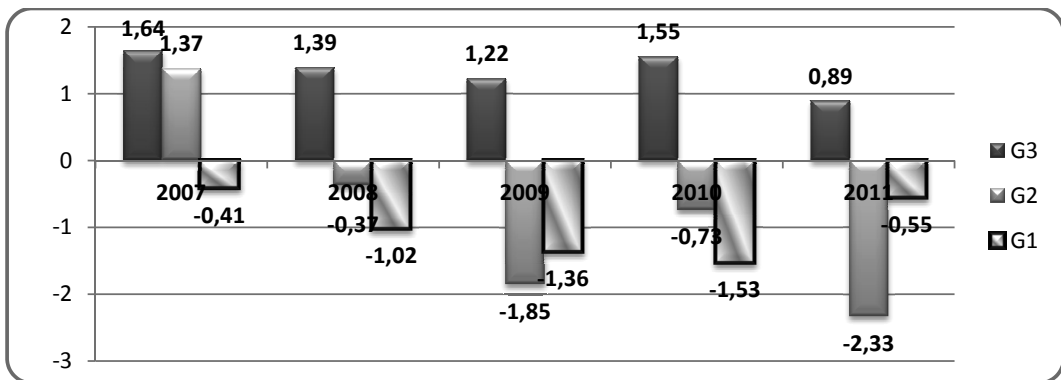
⁴ Average cost efficiency have only positive value, while ROA may be positive or negative

⁵ Classification of banks into groups and the bank name abbreviations are in the Appendix, Table A1.

than other banks. It is not clear the relationship between ROA or size of the bank with the cost efficiency.

ROA by bank groups shows higher profitability for G3 banks, followed by G2 and G1 banks (Figure 2). This dynamic continues in following years of the period study with year 2009 and 2011 exception, where the G2 group is the last classified. More noticeable in this graph is the performance of the G3 group, distinctly higher and stable than the other two groups.

Figure 2: ROA indicators by bank peer-groups (in %)

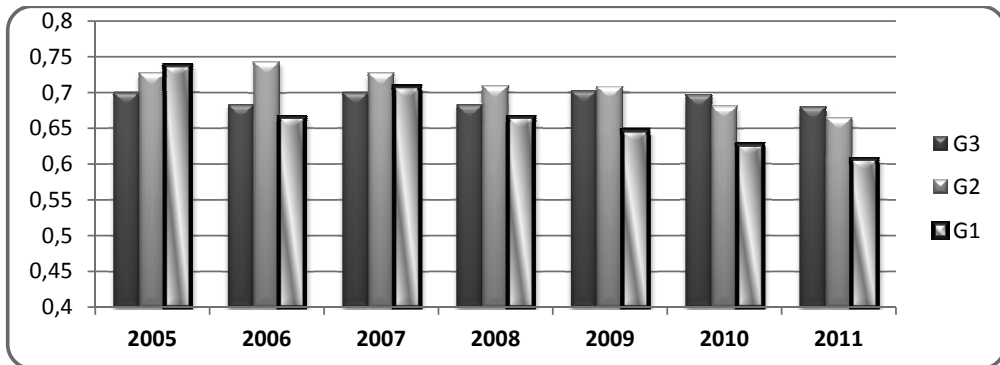


Source: Bank of Albania (2008-2012)

ROA for the G2 group has a larger downward trend in recent years, and it is quite volatile for banks within the group. Better situations looks in 2010. However, performance in 2011 is unlikely to preserve this trend. During this year, this indicator worsens. Among others this deterioration, may have come because of the Union bank's classification into second group. Whereas ROA for G1 banks displays even higher negative values, showing worsened figures due to the deeper losses. Even worse appears the performance of this group in 2010. In 2011, appear signs of improvement, but these generally come from changes in the group's composition.

Observation of development of cost efficiency for groups (Figure 3) compared with ROA indicator (Figure 2) show that this indicator will give the same classification of peer groups in the last two years of study period as ROA indicator we have seen above. Switching of these banks from one group to another has had its influence on the outcomes of the groups. For example, the highest value in 2006 for the G2 group is due to the classification in this group of two Greek banks: Alpha Bank and Emporiki Bank that come from G1 group. The classification of Alpha Bank into G3 group, in year 2007, makes very small the difference between the two biggest groups.

Figure 3: Cost efficiency by bank peer group⁶

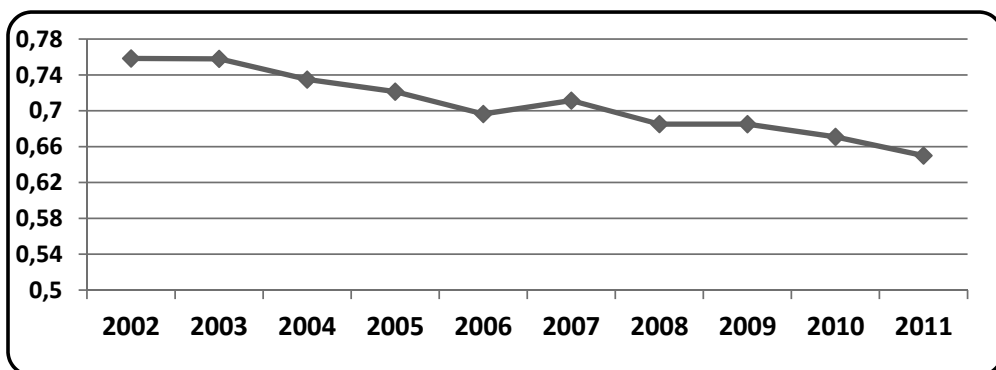


Source: Author's calculations

The difference between groups is not as deep as in the case of return on assets. Moreover, the difference between the third and the second group is smaller than the difference between the second and the first, implying that larger banks find it easier to provide revenue without being so efficient. This fact casting doubt again, that providing the highest revenue is not due to higher efficiency, but maybe because of greater power that they exercise on the market, or due to a lack of competition in this market.

Unlike traditional indicators, cost efficiency shows a declining trend in almost all the years of the periods taken into consideration (Figure 4). This throws doubt that the banks with foreign capital that entered massively in the Albanian banking market have no incentive to be more efficient. This lack of incentive may come due to the low pressure of competition, inadequate credit information, weaknesses in judicial systems or other financial and macroeconomic factors.

Figure 4: Average cost efficiency for Albanian banking system



Source: Author's calculations

⁶ The graph shows the tendency for the groups from 2005, due to changes from this year of the banks classification methodology into groups.

5. Concluding remarks

In this paper, I estimate and analyse the efficiency of the Albanian banking system for the period 2002-2011. I use standard indicators for bank efficiency, namely net interest margins (NIM), cost-income ratio, overhead costs to total assets, operating expenses to operating revenues and return on assets. The observation of traditional indicators of efficiency does not give a clear idea about the efficiency of the Albanian banking system. Therefore, to understand better the efficiency of Albanian banking system I used cost efficiency indicator based to the SFA method. Moreover, it is not clear the relationship between ROA or size of the bank with the cost efficiency. There are small banks with negative ROA that are more efficient than large banks with ROA at higher positive levels. The trend of cost efficiency shows a negative tendency. This may come due to the low pressure of competition, inadequate credit information, weaknesses in judicial systems or other financial and macroeconomic factors. Therefore, the analyses of the efficiency cost lead to the conclusion that inefficient banks in Albanian banking market do not lack. Therefore based on such analysis and limited information, I could not answer the second part of the paper question, if some inefficient banks that could not generate profits for years, are more protected.

The future research may concern at assessing profit and technical efficiency, factors that influence in efficiency for Albanian banking system, in order to identify the suitable policies for increasing banks efficiency. Further research can also compare parametric and non-parametric techniques for the same database.

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Appendix

**Table A1: Classification of banks into groups based on their activity size
at the end of 2011**

Banks	Groups	Year
United Bank of Albania (BBSH)	G1 banks sharing below 2% of total banking system's assets each	2003-2011
Veneto Bank (VB) Veneto Banka)		2004-2011
International Commercial Bank (BNT)		2002-2011
First Investment Bank (BPI)		2002-2011
Credit Bank of Albania (BKSH)		2004-2011
Union Bank (BU)		2006-2011
Procredit Bank (BPC)	G2 banks sharing 2 to 7 percent of total banking system's assets each	2002-2011
Emporiki Bank-Albania (BE)		2002-2011
National Bank of Greece Albania Branch (BKG)		2002-2011
Alpha Bank (BA)		2003-2011
Société Générale Albania Bank (BSGA)		2004-2011
Raiffeisen Bank, (BR)	G3 banks sharing more than 7% of total banking system's assets each	2002-2011
National Commercial Bank (BKT)		2002-2011
Intesa Sanpaolo Bank Albania (ISPA)		2002-2011
Tirana Bank (BT)		2002-2011
Credins Bank (BC)		2003-2011
Italian Albanian Bank (BISH)		Merger in 2008

Source: Bank of Albania (2012)

Table A2: Results taken from the cost function empirical estimation

Variables	Coefficients	std.errors
_cons	-3.568 *	(1.989)
lnw ₁	1.597 ***	(0.612)
lnw ₂	0.454*	(0.268)
lnq	0.924**	(0.372)
1/2(lnw ₁) ²	-0.182 *	(0.096)
1/2(lnw ₂) ²	-0.079 ***	(0.028)
1/2(lnq) ²	0.028*	(0.016)
lnqxlnw ₁	0.187 ***	(0.041)
lnqxlnw ₂	-0.085 ***	(0.013)
lnw ₁ xlnw ₂	-0.129*	(0.072)
Overall significance	Wald chi2(9) =1327.62 Prob > chi2 =0.000	

Statistical significance:* p<.1; ** p<.05; *** p<.01

Source: Authors calculations