MEASURING THE PRODUCTIVITY OF A MAINLY FOREIGN OWNED BANKING SECTOR USING NON-PARAMETRIC APPROACH; CASE OF ALBANIA

Lindita VARESI PhD

Banka NBG Albania S.A, NBG Group

University "Aleksander Moisiu" Durres, Albania

Abstract

The reformation of the Albanian banking sector came as necessity to support social and economic transformations occurred since the year 1990 and onwards. Given that the banking sector occupies 90.3% of financial system total assets, with an intermediary level at 99.3% by the end of year 2013 (Bank of Albania, FSR, 2014 H1, p.11) and considering that 90% of total assets of this sector belong to subsidiaries of foreign banks operating in the country, assessing the performance of this sector in terms of productivity and efficiency remains important for the stability and progress of the Albanian economy in general. Sample of this study are the sixteen banks constituting the Albanian banking industry, thirteen of them are totally foreign owned, two are joint ventures and one is completely owned by nationals. Each bank under study is considered as a Decision Making Unit (DMU). The paper examines the sector, gives evidences, evaluates the productivity and identifies changes in the productivity of three groups of banks as classified: Albanian, Greek and Other Foreign Owned during the period 2008-2013 estimated using Data Envelopment Analysis and Malmquist Productivity Index. Based on results, the domestic banks have an average increase in total factor productivity index in contrary with the foreign owned as they have been less affected by fluctuations of the international markets and the financial instability of the region and Euro Zone during the studied period. The productivity growth is not proportional to the banks' size. Small and medium sized banks resulted to be more productive than the large ones.

Keywords: developing economy, banking sector, foreign ownership, productivity, DEA Malmquist Index

JEL Classification: G21, C14, C61, C67

1. INTRODUCTION

1.1 Reasons for Studying the Albanian Banking Sector and its Performance

The presented paper is focused on evaluating the Albanian banking sector productivity during 2008-2013 considering the financial difficulties and crisis suffered from the Western Balkans and world economies during this period. The financial sector of Albania, as other developing economies, has experienced transition, deep reforms, transformations and progress. The bank oriented structure and the majority of this segment in the financial sector of Albanian economy, increases the interest for assessing productivity, evidencing and analyzing changes intending improvement, welfare and progress.

Actually, the banking sector is characterized from concentration and dominated from foreign-owned banks (IMF Country Report, 2014, p.7). Referring to the same report, banks represent more than 90% of financial system total assets. Five of the sixteen banks operating in the country possess ¾ of total assets and deposits of the financial system and 90% of the banking sector total assets belong to the foreign banks' subsidiaries operating in Albania. Almost 81% of the Albanian banking sector is foreign owned. These affiliates belong to countries as Austria, Turkey, Greece, Italy, France, Germany, Bulgaria, Malaysia, Saudi Arabia and Kuwait.

Table 1: The Albanian Banking Sector by Ownership

OWNERSHIP	NR.	BANKS OPERATING IN ALBANIA	FOREIGN (in %)	% of TA	By C&O*
1- Albanian 2- Albanian & Foreign Ownership	1.	Credins Bank	0	8.38%	A
	2.	Société Générale Bank – Albania	89	5.31%	A&F
	3.	Union Bank (Albania)	13	2.41%	A&F
Greek Ownership Banks Operating in Albania	4.	Alpha Bank – Albania	100	5.89%	G
	5.	National Bank of Greece (Tirana Branch)	100	3.32%	G
	6.	Tirana Bank/(Part of Piraeus Bank)	100	7.39%	G
Italian Ownership Banks Operating in Albania	7.	Intesa Sanpaolo Bank Albania	100	10.95%	I
	8.	Veneto Banka/Italian Development Bank	100	1.58%	I
					Other
Foreign Ownership Banks	9.	National Commercial Bank	100	21.41%	F
	10.	Credit Bank of Albania	100	0.17%	F
	11.	First Investment Bank, Albania S.A	100	1.16%	F
	12.	International Commercial Bank	100	0.66%	F
	13.	Credit Agricol	100	2.66%	F
	14.	Procredit Bank	100	3.24%	F
	15.	Raiffeisen Bank, Albania	100	25.00%	F
	16	United Bank of Albania	100	0.50%	F

Source: IMF Country Report No.14/79, Albania FSSA, March 2014 p.32
  *Note: C&O – Capital & Ownership; A – Albanian, A&F – Albanian & Foreign, G – Greek, I – Italian, F – Other
  Foreign Countries

Other segments of financial sector in Albania are the Insurance Companies, Pension Funds, Investment Funds, Savings and Credit Associations, Unions and other financial institutions.

Table 2: List of Entities Licensed from the Bank of Albania (in number)

YEAR	2007	2008	2009	2010	2011	2012	2013
Banks and branches of foreign banks	18	16	16	16	16	16	16
Non-bank financial entities	6	7	13	17	19	21	21
Foreign Exchange Bureaus	112	189	221	284	301	322	333

| Savings-Loan Association | 130 | 133 | 135 | 126 | 126 | 126 | 12 |
| Unions of Savings-Loan Associations | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

Source: Bank of Albania

In case of vulnerabilities, the impact of these segments in the financial sector will be insignificant due to the low weight they have in the sector as total.

Table 3: Share of Financial System Assets to GDP in years (% by entity)

YEAR	2007	2008	2009	2010	2011	2012	2013
Banking System	75.9	76.7	77.5	80.9	84.7	89.6	90.5
Non-Bank Institutions	1.48	1.7	2.2	2.7	2.5	2.7	2.5
SLAs and their unions		1.4	1.5	1.4	1.5	1.6	1.6
Insurance companies	1.36	1.52					
Pension Funds			0.01	0.01	0.01	0.02	0.03
Savings & Loan Associations (Investment funds)	0.63	0.71				1.21	3.7

Source: Bank of Albania

Albania faced the financial crisis of 2008 well, although the economy was weak and macroeconomic indicators worsened. By the end of the year 2013, the economic growth was at 0.7% and the public debt to GDP at 71% (IMF Country Report, 2014, p.10).

The regional macroeconomic environment, full of uncertainties due to the market fluctuations and the increased stress, is not favoring any notable progress. Considering "…the stagnant euro area growth, with an output construction in Italy, no growth in France and unexpected weakness in Germany in the second quarter of 2014" is forecasted "…an increase in recession risks, particularly in euro area than the rest of World group" (World Economic Outlook, IMF, October 2014, p.3, 13).

This study becomes even more important if analyzing the financial soundness indicators of the Albanian banking sector during crisis compared with the pre-crisis period. The profitability indicators as return on assets (ROA) and return on equity (ROE) decreased during the period 2008-2013 compared with the pre-crisis period (Varesi, L., 2014). The ratio of nonperforming loans increased in the year 2013 at 24% from 3.4% by the end of year 2007 (IMF, Country Report, 2014, p.10). A part of loan portfolio is in Euro currency and it bears risks because of low hedging, maturity mismatches and is difficult to evaluate the exchange risks. Decreases in Foreign Direct Investments will affect the capacity of Euro liquidity. The sovereign debt, the investment funds and banks are related. Banks have invested 1/3 to government securities which by their side constitute 2/3 of government debt (IMF, Country Report, 2014, p.12).

Table 4: Albanian Banking Sector, FSI (Dec.2007 versus average 2008-Sept. 2013/crisis period)

INDICATORS	2007	Average '08 -'13	I/D
A. Capital Based			
Regulatory Capital (% risk-weighted assets)	17.1	16.4	↘
Regulatory Tier 1 Capital (% risk-weighted assets)	16	14.97	↘
Regulatory Capital (% of total assets)	6.2	8.68	↗
Shareholders' Equity (% of total assets)	7.6	8.87	↗
Nonperforming loans, net of provisions (% of RC)	11.2	40.47	↗
Nonperforming loans, net of provisions(% Share HLDs' Eq)	9.1	40.53	↗
ROE (Annual Basis)	20.7	4.42	↘
Net open position in FX (% of regulatory capital)	1.7	4.18	↘
B. Asset Based			
Liquid – asset ratio (% of total assets)	49.8	30.23	↘
ROA (Net Income to Average Total Assets/Annual Basis)	1.6	0.38	↘
Non-Performing Loans (gross) (% of total loans)	3.4	16.10	↗
C. Income and Expense Based			

Interest Margin to Gross Income	92.7	128.57	↗
Interest Expenses to Gross Income	58.5	83.78	↗
D. Other Indicators			
Customer deposits (as % of total, non-interbank loans)	215.5	166.50	↘
Foreign CCY – denominated loans to total loans	72.5	68.12	↘
Foreign CCY – denominated liabilities to total liabilities	46.9	43.13	↘
E. Other Indicators (Core)			
Risk Weighted Assets (% of total assets)	36.4	53.23	↗
Total Loans (% of total assets)	39.4	48.85	↗
Total Loans (% of Share HLDs' Eq.)	516.4	552.77	↗

Source: IMF Country Report No.14/79, Albania FSSA, March 2014 and Authors' Calculations

The financial problems occurred during 2008-2013 and their consequences in the parent countries of foreign banks operating in Albania can be source of risks for the stability of the financial system and the economy as a whole.

As a confirmation of the above said, according to the last year stress test, six of sixteen banks, constituting 21% of total banking sector assets (IMF Country Report, 2014, p.19), resulted unable to face exceeded pressure. The depreciation of domestic currency can be source of deterioration in loan portfolio quality. The liquidity test showed that the banking sector cannot afford a massive withdrawal of deposits. The risk of contagion effects exists but is considered as limited due to the measures taken by the Bank of Albania to convert the branches of foreign banks into subsidiaries with mandatory capital adequacy ratio and liquidity at required levels.

Despite the problems presented, the banking sector has undergone technological changes due to increased competition and requirements. The use of information technology and communication tools to further upgraded techniques to promote banking services and products, facilitating their use and accelerating access to them, is important for improving the performance of the banking sector."…such changes have significantly modified bank production" as per Kurtaran, A., and Murat Ar, L., (2013, p.129).

Referring to Yue, P., (1992) the banking performance assessment and the continuous monitoring of their financial situation is important for the investors, depositors, owners, managers and regulators.

The paper is divided into sections as follows: the second refers to an overview of the Albanian banking sector considering it as didactic for other countries that are in their way of transformations and development. The third part of this paper refers to the productivity analysts and researchers, the importance of their studies, method/s used and results. In the section four is given a detailed description on methodology used and data selected. The fifth section is a presentation of findings, evidence of changes in productivity by comparing banks analytically and in groups according to the classifications made based on the their ownership and size, to result in several conclusions hoping helpful for improving the banking productivity indicators and encouraging increase as "…and weak growth in total factor productivity are coming to the fore and need to be tackle" (World Economic Outlook, [IMF], October 2014, p.1).

1.2 Overview of the Albanian Banking Sector

The Albanian financial system transformations started in 1992 as a necessity to respond to profound social and political changes in the country. The existing system was not able to support the dynamic developments of the period. In such conditions, emerged as immediate need the transformation of the financial system and its institutions. The reforming of banking sector started gradually with the establishment of two bank levels (two – tiered) and continued with the privatization of state owned banks, the liberalization of the sector , the entrance of new and foreign owned banks in the domestic financial system. Foreign banks' activity affected positively the progress of banking sector and the economic development in general. Their presence during this period, deepened the intermediary role of the banking sector, increased the competition, improved the quality of services, increased the range of products etc. The effects on the stability of financial sector are not the same during crisis period as foreign banks are related to international banking and market. The financial shocks in the parent countries may cause contagious phenomena and have negative impacts on the economies of countries where their subsidiaries operate.

While the banking sector was gradually developing the financial market of Balkan countries remained underdeveloped.

The reforms undertaken for improving the functioning and the structure of financial sector needed the establishment of an appropriate legal system to support their application (Albanian Association Banks [AAB], Annual Report, 2011).

After 90's, Albania as other countries of Western Balkans, adapted new laws in compliance with the standards of European Union related to the Central Bank independence, banking regulatory system, the financial market operation etc.

Bulgaria was the first to start changes of the centralized financial system and to present a two–tier banking sector in 1987 while Albania the least (Golubović, S., and Golubović, N., 2005).

The potentiality of the banking sector in the Albanian financial system increases the necessity of evaluating its performance and allocating inefficiencies. Any vulnerability of the banking sector will be immediately translated as instability of the financial system and the economy in general.

Actually, the Albanian banking sector consists of First and Second Level Banks. The First level includes the Bank of Albania performing the roles and duties of a Central Bank while in the second group are included the sixteen commercial, private owned banks grouped in: 1) foreign capital ownership (81% of banking sector) 2) joint venture, foreign and national capital ownership (the remaining of 9%) (Bank of Albania, 2013, p.19).

The Albanian economy is examined/considered because of its specifics and transformations that have occurred. It has undergone substantial changes from centralized, totally state-owned, into an open, liberalized economy. The economy has suffered from transition starting from the year 1991 and thereafter. The high poverty, the political instability and deteriorated macroeconomic indicators were characteristics of the country during this period (Varesi, L., 2014, p.4, 6/table1). The process was followed by economic reforms for supporting the social and political perspectives towards democracy and progress. Particular attention was paid to the financial system since the economic development could not relay on the existing. It needed structural changes and improvements.

The reforms started with the banking sector intending the establishment of a productive and efficient banking industry, able to perform its basic, intermediary role in the economy. Before and during the transition, the intermediary function of banking sector was at low levels. The few number of transactions registered and services provided, the minimum interest rates offered for the deposited amounts, the slow payment system and the payment delays for more than fifteen days was not encouraging the financial activity. There was no competitiveness due to the state ownership in property and economy. The low crediting, the lack of reliability/credibility, were typical for the Albanian banking sector during this period. Considering the above mentioned, the reformation of the banking sector emerged as immediate need.

The banking system in early nineties consisted in: the State Bank established since January 1945, performing the tasks of a Central Bank: the monetary policy controlling and the managing of credit according to the state planning (Cani, Sh., and Haderi, S., (n.d)). The Savings Bank of Albania established later to provide a few transactions and services to the people as the State bank was dealing with the government and its policies. Being an agricultural country, it was established the Agrarian Bank for supporting the rural development. Due to the financing of the existing state economy, for providing payment and other services, the Commercial Bank of Albania was established.

By the end of the year 1992, a two level banking system based on two laws for 'Bank of Albania' and 'Banking System in the Republic of Albania' was established. The 'Bank of Albania' was authorized as Central Bank while the Savings Bank, National Commercial Bank and Agrarian Commercial Bank as Second Level.

During the year 1993 and after there was an improvement of macroeconomic indicators (Haderi, S., and Hida, S., (n.d)). The economic recovery emerged also the need for reforming and developing the financial market in the country. It was officially inexistent and the only transactions made were some foreign exchanges made from unlicensed subjects or individuals.

The economic situation, the increased needs, the deficiencies of the banking sector not responding to the savers' demands, the minimal returns on the money deposited and the lack of possibilities for investing the accumulated capital due to the state ownership on properties and the economy, led the financial sector in informality. "Savers" withdrew their money from banks and invested them in informal market at high interest rates. The lack of supervision justified with the lack of legal restrictions caused the increased number of 'informal investors'. They were operating unlicensed and there was no existing legal framework to prevent their activity. Out of this was created an informal market, where transactions were performed avoiding the presence of banks, the legal frames and supervision from respective authorities.

Albania is quite a clear example of consequences caused by preventing the intermediary role of the banking sector. The economic activity of the country during the years 1996-1997 was minimized in pyramidal schemes. The only result was the economic collapse. It was inevitable despite the repeated notifications/announcements of the Central Bank, the suggestions of International Monetary Fund and the World Bank. This time the recovery program applied intended to maintain stability as the citizens lost all their savings and properties, the country was in total disorder, new political demands emerged and the unemployed rates increased causing an increase in tendency for immigration.

This time the reforms were focused on restructuring the banking sector as its activity was totally frozen. The inflation rate had considerably increased. The recovery program consisted in the monetary control, capital inflows, financial market and financial intermediaries' new strict policies. The money could have been invested more efficiently but the concentration in few hands reduced demand and investments. There was no economic development but growth due to the increased imports. The macroeconomic growth was explained with the reforms undertaken in the first stage.

After 1997 and onward, the National Commercial and Agrarian banks as state owned, the Savings Bank from Raiffeisen Financial Group were privatized and completed in the beginning of 2004.

The first foreign bank entered in the Albanian banking sector was the American Bank of Albania that started officially its activity in the year 1998. The National Commercial Bank was privatized from Calik Turkish Group. Today thirteen of sixteen banks operating in the country are foreign owned. During the period 2004-2007, the Albanian banking sector noticed positive developments and progress, a rapid growth in lending supported by other financial sources except deposits that was not sufficient to face the increased credit rates (Bank of Albania, Supervisory Council, 2009). Referring to the same report, the performance of the banking in the year 2008 reflected the developments in the regional and Euro Zone economies, increased the uncertainties of depositors about the safety of their savings and concluded in an increase of 2% of total deposits compared with 20% in the year 2007. The credit growth was decelerated at 35% compared with 48 % in the year 2007. The intermediation activity of the banking sector constrained. The Albanian banking sector remained well capitalized during the period 2008-2013 despite the extended risks and the low level of banks intermediation during this period.

3. LITERATURE REVIEW

By definition (OECD Manual, 2011, p.124-125):

Efficiency is the level representing the 'best practice' of the production process for both technical and allocative efficiency.

> - *Full technical efficiency* refers to the production process through which the maximum production is realized using a set of given input and technology.
> - *Full allocative efficiency* refers to input and output combinations to minimize costs and maximize profit.

Production refers to any activity, organization or firm that uses inputs to produce outputs.

Production Function refers to maximum output produced using a given number of inputs. The technical efficiency is related to the frontier of production. It is part of a possible production set including all the combinations of inputs and outputs, not indispensably efficient.

Productivity change has to do with a combination of technical and allocative efficiency changes' effects. Factors like utilization of capacity and errors in measurement have their impact in the residual, when productivity changes are measured residually.

Total Factor Productivity or *multifactor productivity* concerns with determining the contribution of all the factors in increasing output.

Considering the changing economic environment and its impact in the banking system, has increased the interest of researchers on measuring productivity and evaluating efficiency.

There are no previous studies on Albanian banking sector productivity. The review of thought will refer to similar studies in other countries.

Rezitis, N., A, (2006), investigated the Greek Banks' productivity growth during the period 1982-1997 using DEA and Malmquist Index technique. The author also compared the productivity of banks in the sample between the two periods, 1982-1992 and after 1992 due to the profound changes occurred in this sector. For evaluating the productivity was considered the intermediary role of banks in economy and the intermediate approach.

There were two outputs employed a) loans and advances and b) investment assets. As inputs were used a) labor b) capital expenses and c) deposits. Referring to the conclusions, the banking sector growth until the year 1992 was because of the technical development while its progress after the year 1992 was due to the efficiency improvements. The author used the Tobit regression model to indicate the positive impact of size in the scale and pure efficiency.

Lyroudi, K., and Angelitis, D., (2006), examined the productivity changes of the recent ten EU members for the six years period between 1996 and 2002. The Malmquist Index was calculated using DEA method. For the exact allocation of efficiency, the productivity index was broken into technical and technological change indexes. In this study, the significance of the relationship between size of banks and the productivity using the value added approach was investigated. The variables used consisted in three inputs: a) personnel expenses b) other operating expenses c) total fixed assets and three outputs: a) the total deposits, b) customers' loans and c) investments. According to results, both authors concluded in an insignificant relationship except Latvia case where it resulted positive. Based on index scores, the trend of productivity change was increased during the period studied.

Daley, J., and Matthews, K., (2009), analyzed the banking sector productivity of Jamaica. The number of banks sampled was twelve and the method used was DEA and Malmquist Productivity Index. The productivity change for Jamaican banks was examined for the period 1998-2007. Four models were adapted for measuring productivity using same inputs and different outputs. The inputs used were: a) operating costs and b) deposits while as outputs in Model 1: a) total net interest income and b) non interest income. In Model 2: a) gross loans and b) investments were the two outputs; while in Model 3 there were: a) the gross loans – NPL (net) and b) investments. In the fourth model outputs employed were: a) net loans plus investments and b) non perfuming loans (as bed output). Based on the conclusions of this study, the foreign banks productivity was increased more than of the domestic owned ones. Three of banks showed zero increase in productivity and analyzing scores it was noticed a decreased efficiency by the end of crisis 1998/9. Referring to this study the Jamaican banks were not very productive producers but able to face failure because of regulatory polices applied. The commercial banks resulted to less productive than the other type of banks analyzed in the study.

Toci, V., Z., (2010), studied the efficiency and productivity of South-East European countries consisting in Bulgaria, Croatia, Kosovo and Montenegro during the period 2002-2005. The non-parametric method, DEA was used for studying the intermediation role of banking sector in the region. Referring to the findings, the banking sector efficiency of the above mentioned countries, indicated progress for the three groups (size, ownership and country). Kosovo resulted in less efficient than other countries in the sample. The role of banking sector as intermediary in the countries studied resulted insignificantly improved in terms of productivity changes because of no technical progress. Differently from the efficiency, the total factor productivity change resulted higher in Kosovo than in other countries, indicating that Kosovo is making progress towards the financial intermediation function of banking industry. According to the author, inefficiencies of the sector sourced from the regulatory policies and measures taken from the Central Bank aiming its controlling due to the dynamic expansion of the sector.

Kamau W., A.,(2011) studied the productivity of Kenya's banking sector and its intermediation efficiency. The performance indicators were analyzed by using data from 40 banks operating in Kenya during the period 1997-2009. The method applied for evaluating efficiency changes was the non-parametric CRS and VRS DEA while for measuring productivity was used Malmquist Index. According to the findings resulted that the banks were performing well during the studied period although not at a full efficiency, living place for technological and operational improvements.

Authors, Ngo, Dang-Thanh, and Ngyen Thi Phuong, L., (2012) studied the productivity of 27 banks operating in Thai during the period 2007-2010 using DEA and Malmquist Index as method. According to the results, the foreign owned banks were volatile during the studied period. Some of these banks improved their productivity indicator while others decreased it. The researchers addressed the deterioration of indicators to the decreased return of scale indicating reduce of resources due to the enlargement of the sector.

Keskin-Benli, Y., and Degirmen, S., (2012), measured the productivity of 31 banks operating in Turkey between 2004-2009, a six years time period, by classifying them in three main groups according to the deposits' ownership: a) publicly owned (three banks) b) private owned (10 banks) and c) foreign owned (18 banks). The productivity indicators were compared for each of thirty one banks and between groups for concluding in the best performance. Referring to the score analysis, the foreign owned banks resulted to be more productive than the other two groups. The variables used as inputs consisted in: a) deposits and b) interest expenses while as outputs a) credits and b) interest incomes. 'Intermediary' was the approach adapted in the study for measuring the productivity and evidencing productivity changes for the Turkish banks sampled.

Neupane, B., (2013) considered twenty two from thirty two commercial banks operating in Nepal for measuring productivity and evaluating their efficiency during the 2007/08-2011/12 period. The impact of different factors in performance indicators was also analyzed in this paper. There was an increase in the productivity change of banks considered in the sample and it was due to the technical developments rather than improving efficiencies. Some of indicators like structure, the ratio of loans to assets, NPL loans and assets (logarithm) presented insignificant impact to the efficiency. In line with the literature, the productivity results to be positively related with efficiency in this study. Significant indicator affecting performance was the ratio of debt to equity. Banks with lower leverage and higher risk weighted resulted in more efficiency. The author addresses deficiencies to management and practices followed and suggest increased interest in monitoring and evaluating efficiency.

Park, J., J., and Baek, J., (2014), both investigated the impact of crisis in the productivity of the banking sector during the period 2007-2011. The number of banks sampled to measure the productivity of banks operating in Arkansas, US was thirty and were listed in three groups: a) ten national banks b) the number of state banks was ten and the third was the group of Arkansas banks. The method employed for evaluating efficiency prior the productivity was the input oriented, CCR and BCC DEA and the Malmquist Index for measuring the productivity of each group of banks. Intermediary approach was employed in this study too. According to the findings, the productivity was increased during crisis period and it is explained by technologic improvements. In this study was not mentioned the increase of costs for adapting better technology due to the increased competitiveness between banks during the crisis period. The national banks were more productive than banks of two other groups.

The variables used as inputs in the study were: a) noninterest expenses b) deposits c) stock holders equities and total debts; and as outputs a) incomes before income tax b) investment securities c) total loans.

Camanho, A.S., and Dyson, R.G., (2006), both developed measures using Malmquist Productivity Index for identifying different inefficiencies of individual decision making units (DMUs) from those of the whole group. The performance was evaluated for branches operating in four different regions. The productivity index was used for measuring productivity changes of one DMU in two time periods. The developed measurement index in the authors study enabled the possibility of measuring relative performance of groups of DMUs in the same moment, considering the differences in conditions where they operate. The productivity index was divided in two indexes, the one for evaluating the performance of branches within the same group and the other for comparison of frontier productivity under the impact of environmental and managerial specifics. The method developed was presented as favorable to be used for comparing two DMU groups considering the one as reference. It was proposed an adjusted index to make possible the comparison of more than two groups of DMUs. It presented some advantages of this index. A number of anonymous comments were made in drafted paper, reflected in the presented one. The variables implied as inputs were: a) the number of employees/branch and b) operational costs without including the salary and other personnel expenses. As outputs are considered a) total deposit b) total loans c) value of off balance sheet items, in total and d) total number of transactions made by branch.

4. DATA AND METHODOLOGY FOR ESTIMATING PRODUCTIIVTY

4.1 Research Topics

    i.   How is in terms of productivity, the banking sector of Albania presented during the period 2008-2013?

    ii.   Are the foreign owned banks more productive than the domestic owned ones?

    iii.   Does the productivity depend on the size of the sector?

    iv.   Are the differences/changes in total factor productivity due to financial difficulties and economic shocks of 2008-2013 periods?

4.2 Data and methodology

In this study, the data presented refers to the sixteen commercial banks (second – level) operating in Albania. For assessing and evidencing the productivity changes of the Albanian banking sector are used panel data of banks for a period of six years, 2008-2013. The data are taken from secondary sources, the audited annual reports of each individual bank published in the respective websites. Referring to Kuiper, Sh., (2009) the "secondary sources often provide information to help define the problem more clearly and to identify elements that should be investigated" (p.275). The financial statements are audited, prepared according to International Financial Reporting Standards and are reported to the Central Banka of Albania.

Referring to literature, empirically searched, results that the most used method for evaluating banking sector performance indicators using the non – parametric method of Data Envelopment Analysis is the intermediary approach. According to Sharma, D., et al., (2011) from 88 investigated studies, in 56 of them was used the intermediary approach to choose variables against 21 using the productivity approach, 15 the value added and 6 other approaches.

The intermediation function of financial sector is important in any economy. "Intermediation can be of many forms beyond the traditional banking…" (Reserve Bank of Australia [RBA], March 2014). The intermediation role of banking sector in financial systems consists in: 1) accumulating capital and combining resources b) transforming assets c) allocating the capital in efficient investments given the risks and managing them properly d) monitoring and systematic informing of borrowers e) calculating with accuracy based on appropriate legal system and regulatory framework.

Considering the all above said, the selection of variable in the study will refer to the intermediary role of the sector focused. As outputs will be considered products and services offered consisting in investments and loans while in inputs are included labor, capital, deposits, number of branches etc.

4.3 Method used for measuring productivity changes and evaluating efficiency.

The Malmquist DEA method was applied to panel data for measuring the Albanian banking sector total factor productivity (TFP), technological, technical and scale efficiency change. DEA is commonly used because of its advantages towards other parametric or non-parametric methods applied for evaluating banking and other sectors' indicators of performance. It does not require a defined functional form of frontier and dependencies or relationship between inputs and outputs. The only information required is the quantity of variables (inputs & outputs) not their prices. Another priority of the method is the use of more than one inputs and outputs to enable assessment of productivity and efficiency of a certain DMU or group of DMUs without having specific requirements on data included in calculations (Graham, A., 2005). DEA can be used for identifying inefficiencies and their source/s. According to Charnes, A., et al., (1978), through the method can be identified peers which are efficient DMUs for each non-efficient DMU that can be used as model for the latter. Referring to Cubbin, J., and Tzanidakis, G., (1998), the average performance indicators evaluation made using regression models is substituted in DEA with the optimization model making possible the evaluation of individual DMUs.

Main disadvantage of DEA is that it does not consider error in the efficiency and productivity calculations as a deterministic method and not a statistical one. Statistical regressions are not applied in DEA. The method is used for measuring relative efficiency compared with the best practice of the analyzed DMUs. It excludes the possibility of comparing scores between two studies due to unknown differences between best practices of observed samples.

The results depend from the size of sample and the variables' specification. Cook, W., et al., (2014) specifies that while in statistical regression models the sample size has considerable importance in DEA model is irrelevant. It must be noticed that the frontier is constructed based on best practice whatever the sample is. In case that we add a

DMU in an existing group of DMUs taken as sample it simply will be efficient or non-efficient compared with the best indicator/practice. DEA is constructed based on linear programming and optimization.

The number of DMUs to be used in the sample is discussed from a number of researchers. Referring to Golany, B., and Roll, Y., (1989), the number of DMUs sampled must be two times the combination of inputs with outputs. According to the 'rule of thumb' specified from Banker, R.D., (1989), the number of variables must be max inputs multiplied by outputs, or three times the inputs multiplied with outputs. "…such a rule is neither imperative nor does it have statistical basis…" (Zhu, J., 2014, p.7). As per Dyson, R.G., et al., (2001), the set of units that will be evaluated must be homogenous meaning to produce same products, offer same services and operate in the same business, economic environment. Referring to the author, the range of variables used for measuring performance indicators must include all the sources used and the products produced between the DMUs evaluated and compared. As per the researcher, the 'rule of thumb' for the number of DMUs to be taken as sample for more confident results must be at a minimum two times inputs multiplied with outputs.

In the study presented, the number of DMUs will be equivalent to two times (inputs multiplied by outputs), 16.

Through the Malmquist Index, the efficiency changes are classified into efficiency growth due to changes relative to the frontier constructed based on best practice and into productivity growth referring to improvements related to similar frontier.

The total factor productivity can be measured using the Malmquist Index DEA as model. Through this model the changes in productivity can be dissolved into technical change and technical efficiency change.

Färe, R., et al. (1994), presented the output-oriented Malmquist Index applied for assessing the changes in the banks' productivity considering e given technology S which includes all the possible input – output vectors and transform in any period t = 1,2…T inputs $x^t \in R^N_+$ into outputs $y^t \in R^M_+$. The above mentioned can be presented:

Technology S in t $\Rightarrow$ $S^t = \left\{ (x^t, y^t): x^t \text{ produces } y^t \right\}$ where t = 1,2,3……..T   (1)

The output distance (D) function can be defined according to Shephard, R.W., (1970) and Färe, R., (1988) at time t as below:

$D^t_o(x^t, y^t) = \inf \left\{ \theta : (x^t, y^t/\theta) \in S^t \right\}$ where t = 1,2,3……..T   (2)

The above function presents the maximum proportional output vector extension y^t using the given inputs x^t. The D^t_o $(x^t, y^t) \leq 1$ only if $(x^t, y^t) \in S^t$. $D^t_o(x^t, y^t) = 1$ only in case that (x^t, y^t) is in the technology frontier and it happens in a totally efficient production.

The technical efficiency is defined by Farrell, M.J., (1957) "…as the maximal proportional contraction of outputs". The costs must be reduced at equivalent portions. The distance function must be defined considering two time periods, t_o and t_1.

$D^t_o(x^{t+1}, y^{t+1}) = \inf \left\{ \theta : (x^{t+1}, y^{t+1}/\theta) \in S^t \right\}$ (3)

This function is a presence of maximum output proportional changes needed to make possible the (x^{t+1}, y^{t+1}) related to technology S. The total productivity factor as a geometric mean of two Malmquist Indexes can be written as below:

$$M_0(x^{t+1}, y^{t+1}, x^t, y^t) = [M_0^t(x^{t+1}, y^{t+1}, x^t, y^t) x\ M_0^{t+1}(x^{t+1}, y^{t+1}, x^t, y^t)]^{1/2} =$$

$$= \left[\frac{D_0^t(x^{t+1}, y^{t+1})}{D_0^t(x^t, y^t)} x\ \frac{D_0^{t+1}(x^{t+1}, y^{t+1})}{D_0^{t+1}(x^t, y^t)} \right]^{1/2}$$

(4)

The Malmquist indices $M_0^t(x^{t+1}, y^{t+1}, x^t, y^t)$ and

$M_0^{t+1}(x^{t+1}, y^{t+1}, x^t, y^t)$ measure the productivity changes between two periods, t+1 and t related to technology used in time t+1 and t.

Referring to Färe, R., et al., (1989), the Index calculated as presented in equation (4) can be dissolved as below:

$$M_o(x^{t+1}, y^{t+1}, x^t, y^t) = \frac{D_0^{t+1}(x^{t+1}, y^{t+1})}{D_0^t(x^t, y^t)} x\ \left[\left(\frac{D_0^t(x^{t+1}, y^{t+1})}{D_0^{t+1}(x^{t+1}, y^{t+1})} \right) \left(\frac{D_0^t(x^t, y^t)}{D_0^{t+1}(x^t, y^t)} \right) \right]^{1/2}$$

(5)

$$\Downarrow \qquad\qquad\qquad \Downarrow$$

Efficiency Change (EFFCH)   Technical Change (TECHCH)
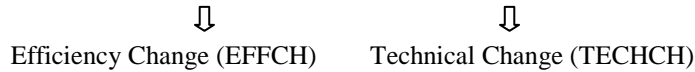
Total Factor Productivity Change = Efficiency Change x Technical Change (TFPHC = EFFCH x TECHCH)
Efficiency Change (EFFCH) actually measures how close to the production frontier in t+1 versus the t period are the operating units. The technical efficiency (TECHCH) presents the shift in frontier because of changes in technology of production.
Efficiency Change, calculated using constant return to scale, can be further dispersed into Pure Scale Efficiency Change (PECH) and Scale Efficiency Change (SECH) calculated under variable return to scale.

EFFCH = PECH x SECH and TFPHC = PECH x SECH x TECHCH

$$PECH = \frac{D_0^{t+1}(x^{t+1}, y^{t+1}/VRS)}{D_0^t(x^t, y^t/VRS)} \tag{6}$$

$$SECH = \left[\frac{D_0^t(x^t, y^t/VRS)}{D_0^t(x^t, y^t)} \times \frac{D_0^{t+1}(x^{t+1}, y^{t+1})}{D_0^{t+1}(x^{t+1}, y^{t+1}/VRS)}\right]^{1/2} \tag{7}$$

VRS in (6) and (7) refers to variable return to scale.

D_0 (·/VRS) $\rightarrow$ presents the distance function calculated under Variable Return to Scale. The Malmquist Index is calculated by solving the below distance function problems using linear programming:
$D_0^t(x^t, y^t)$, $D_0^{t+1}(x^t, y^t)$, $D_0^t(x^{t+1}, y^{t+1})$, $D_0^{t+1}(x^{t+1}, y^{t+1})$

The distance function $D_0^t(x^t, y^t)$ is measured:

$$D_0^t(x^{k',t} y^{k',t})^{-1} = \max \theta^{k'} \tag{8}$$

Subject to:

$$\theta^{k'} y_m^{k',t} \le \sum_{k=1}^{K} z^{k,t} y_m^{k,t}$$

Where m=1,2,…M

$$\sum_{k=1}^{K} z^{k,t} x_n^{k,t} \le x_n^{k',t}$$

n=1,2…N,   and $z^{k,t} \ge 0$ where k=1,2,…K

In case of banks for example, k=1,2…K sampled banks; each bank produces m =1,2,…M outputs $y_m^{k,t}$ using n=1,2,…N inputs $x_n^{k,t}$ in t=1,2,…T period. The variable $z^{k,t}$ presents the extension of each bank employed in production.

In case of deployment of EFFCH (Efficiency Change) into PECH (pure efficiency and scale efficiency (SECH) must be calculated in additional two more distance functions: $D_0^t(x^t, y^t/VRS)$ and $D_0^{t+1}(x^{t+1}, y^{t+1}/VRS)$ under

$$\sum_{k=1}^{K} z^{k,t} = 1$$

VRS technology and the restriction added in equation (8):

Base for calculating Malmquist Index is the technical efficiency. Overall Technical Efficiency is dissolved into pure and scale technical efficiency where the pure efficiency excludes the scale efficiency.

According to the model and literature improvements in efficiency are not necessarily followed by increased productivity as due to the two time periods studied the technology changes.

Variables used for assessing productivity of Albanian banking sector including sixteen banks during the period 2008-2013 are – as outputs: 1) loans , 2) interest incomes and the inputs: 1) number of full-time employees 2) total deposits 3) total assets 4) interest expenses.

5.   EMPIRICAL RESULTS

According to Färe, R., et al., (1994, p.71) , in case that there is no change in two time periods, meaning that $x^t = x^{t+1}$ and $y^t = y^{t+1}$ than the total factor productivity index indicates no change consisting in the $M_0 (\cdot)= 1$. It doesn't mean that the technical and efficiency changes for each bank operating in the country are equal to one. It is recorded productivity growth in case that the change in Total Factor Productivity Index is greater than one (TFPCH >1) and adverse change of performance if less than one. According to the literature the Efficiency Change is decomposed in pure efficiency and scale efficiency change where EFFCH = PECH x SECH and TFPCH = EFFCH x TECHCH (see Table 5). If EFFCH and TECHCH indexes result higher than one than it will be translated in technical efficiency and technology improvements. The declines in technical efficiency because of no progress made in technology, explains the less than one productivity change in both above mentioned indices.

Referring to the Malmquist Index Summary of Geometric Means (Table 5) the sector in general result not to has been productive during the 2008-2013 period. The total means for the Malmquist Indexes scored for each bank and of other components results to be less than one, indicating no improvements.

Among the banks with joint capital (foreign and domestic) or totally domestic owned, Banka Credins S.A must be the reference for the technical efficiency at one while the Union Bank S.A (13% foreign owned) has a positive increase of the total factor productivity at 14.8% during the studied period. The TFP progress is as result of an improvement in technical efficiency at 6% and technological progress at 8.2%. The improvements in the technical efficiency of Banka Union S.A are as result of expansion in both scale efficiency at 2.5% and pure efficiency at 3.4%. The TFP index for Banka Credins S.A that is totally domestic owned is at 1% and source of this is the technological progress although at a low percentage (1%).There is not noticed improvement in the TFP index of Banka Societe Generale Albania (< 1). The technical efficiency is improved during the 2008-2013 period at 0.7% but it is not followed by any change in technology as the TECHCH index scores 0.992 (less than 1). Considering the average TFPCH means of joint venture or domestic owned banks, they result with improved productivity during the period under study (average at 1.052).

Analyzing the three banks with Greek capital and ownership (2nd group, Table 5), between the period 2008 and 2013, during which occurred the deepest financial crisis in decades, extensively transmitted and negatively affected the economy of these subsidiaries' parent country, is concluded that there is no any increase in productivity if referring to the TFPCH index scores. The average TFP change index for the three Greek banks points 0.936 (< 1). For Banka NBG Albania S.A, the technical efficiency change indicates 1.000. The bank mentioned above referring to Malmquist Index Means turns technically efficient but has lagged behind the technological improvements and further developments to promote productivity growth (TECHCH scores 0.949 < 1). The TFPCH index is also less than one. The same is presented the situation for the Italian and other foreign banks operating in the country, technically efficient but without technological developments and productivity growth. Italy is also one of the most negatively affected by the recent years' crisis.

Analyzing the performance of the Greek and Italian banks operating in the Albanian financial sector/ economy, evidencing changes of the technical efficiency and productivity indexes respectively, we point out that in case of a mainly foreign owned banking sector any vulnerability in the financial stability of the subsidiaries' parent countries is reflected in their progress as the sector is more exposed in the international financial markets and highly affected by its fluctuations.

Based on scores for the International Commercial Bank (ICB Financial Group Holding AG /Malaysia registered in Switzerland) and Raiffeisen Bank (Raiffeisen SEE Region Holding /Austria) are two foreign owned banks that have an increased productivity according to the TFPCH scores at 1,059 and 1.022 translated in 5.9% and 2.2% respectively improved productivity. This increase derives totally from technological improvements (at 8.3%) for the ICB as it has been technically inefficient during the studied period.

Banka Raiffeisen, results efficient and productive. Its technical efficiency change scores one and the productivity exceeds one too, indicating a simultaneous work for achieving required levels of performance indicators reflected also in the net result and financial position of this bank (the biggest in the country referring to its total assets value).

Banks are grouped in small, medium and large according to their size defined from the value of their total assets. The small size are listed banks with a total assets value up to Euro 200 mill, above this amount up to Euro 500 mill are considered as medium sized while the remaining, with a total value of assets more than Euro 500 mill are grouped in the large sized. Referring to the data presented in the table 10, Raiffeisen Bank of Albania, with the highest total value of assets amounting at Euro 2,149,692,901, have scored a total factor productivity change index at 1.022 (or 2.2% increase in productivity during the period 2008-2013) while the Union Bank that belongs to the medium sized banks, has scored a TFPCH index of 1.148 or 14.8% (considerably higher than Raiffeisen Bank).The International Commercial Bank, listed in the small size group of banks operating in Albania, with a total asset value of Euro 57,061,341, results with a total factor productivity change index at 1.059 or 5.9% growth in productivity during the same period. Based on above analysis we conclude that the productivity does not depend on the size of organization but in better use of sources, increase in efficiency, by improving and developing the existing technology.

6.   CONCLUSIONS

In the presented study, the productivity of a mainly foreign owned banking sector like Albania for the period 2008-2013 is evaluated by employing the non-parametric approach of Data Envelopment Analysis and the Malmquist DEA Index. According to results' evidences and analysis, the average mean of total factor productivity change Index is decreased during the crisis period. Two of three domestic owned banks, and two of the foreign owned ones (different from Greek and Italian), result to have been productive. The outcomes from this research are in line with the conclusions of both authors, Madhanagopal, R., and Chandrasekaran, R., (2014) that analyzed 55 commercial banks operating in the Indian economy, from which 26 public, 20 private and 9 foreign owned during the period 2005-2012 by dividing and comparing them in pre-crisis, during and after crisis and concluded in a declined technological progress during crisis period even though the Indian financial system was not highly affected by crisis. It results the same with the Albanian banking sector case analyzed during the crisis period. In contrary, authors like Dang-Thang, Ngo., and Linh Thi Phuong Ngyen, (2012) analyzing 27 banks operating in Thailand during the 2007-2010 period concluded in late affects of crisis but their conclusions are in the same line with the presented study referring to foreign banks productivity fluctuations and in a stability of the domestic owned banks productivity. It is explained with a number of problems caused by the vulnerabilities of the financial sector of the foreign banks subsidiaries parent countries. The domestic banks were less affected by the international market crisis and its fluctuations. The facts explain the results of this study. The average score of total factor productivity change index of the domestic banks is at 1.052, Greek Banks at 0.936, Italian banks at 0.975 and of other foreign banks at 0.977.The results are also in line with the Liao, Chang-Sheng (2010) research on the productivity of foreign owned banks. The author analyzed 46 of banks operating in Taiwan during the period 2002-2006 by classifying them in domestic (27 of them) and foreign owned (the remaining 19). The productivity was evaluated using interest and fee revenues as outputs, interest expense and non-interest expenses as inputs by employing DEA, Malmquist Index as technique. Referring to the study conclusions, the Taiwan banks were more productive than the foreign owned ones as "…foreign banks are not always the best in emerging countries" (p.67) as specified by Sensarama, R., (2006)

Referring to the scores for each group of banks regarding to their size is concluded that banks belonging to medium and small size classification referring to the total value of its assets, results to be more productive than the banks classified as large. Referring to the conclusions pointed out from Daley, J., and Matthews, K., (2009) analyzing 12 banks during 1998-2007, using two models of input and output/variable combinations, that the top banks showed no productivity growth but in contrary with the presented study, the foreign owned banks outperformed the locally owned banks (p.17).

It will be valuable to re-evaluate the banking sector productivity using other approaches and employing different variables based on possibilities for collecting the data. Maybe this study will provide more comprehensive view of the banking sector performance in terms of productivity if conducted for a longer period of time or by comparing results in different periods of time for example banks productivity in pre-crisis, during and post developments etc…

Table 5: Malmquist Index Summary of Banks Geometric Means

Nr	DMUs		Effch	Techch	Pech	Sech	Tfpch	Own.
1	Credins Bank	CRB	1.000	1.010	1.000	1.000	1.010	A
2	Société Générale Albania	SGA	1.007	0.992	1.012	0.995	0.999	A
3	Union Bank (Albania)	UNB	1.060	1.082	1.034	1.025	1.148	A
	Mean						**1.052**	
4	Alpha Bank – Albania	ALB	0.969	0.961	0.971	0.998	0.931	G
5	Banka NBG Albania S.A	NBG	1.000	0.949	1.000	1.000	0.949	G
6	Tirana Bank /(Part of Piraeus Bank)	TIR	0.970	0.956	0.972	0.998	0.927	G
	Mean						**0.936**	
7	Intesa Sanpaolo Bank Albania	ISP	1.000	0.992	1.000	1.000	0.992	I
8	Veneto Banka	VB/IDB	1.000	0.958	1.000	1.000	0.958	I
	Mean						**0.975**	
9	National Commercial Bank	BKT	0.951	1.003	0.983	0.967	0.954	F
10	Credit Bank of Albania	CBA	1.000	0.998	1.000	1.000	0.998	F
11	First Investment Bank, Albania	FIB	0.927	1.029	0.936	0.990	0.953	F
12	International Commercial Bank	ICB	0.977	1.083	0.974	1.003	1.059	F
13	Credit Agricole	CA/EMB	1.000	0.940	1.000	1.000	0.940	F
14	Procredit Bank	PCB	0.977	1.002	0.984	0.994	0.980	F
15	Raiffeisen Albania	RZB	1.000	1.022	1.000	1.000	1.022	F
16	United Bank of Albania	UBA	0.883	1.028	0.865	1.021	0.907	F
	Mean						**0.977**	
	Total Mean		**0.982**	**0.999**	**0.982**	**0.999**	**0.981**	

Note: DMU – Decision Making Units, Effch – Technical Efficiency Change, Techch – Technological Change, Pech – Pure

Technical Efficiency Change, Sech – Scale Efficiency Change, Tfpch – Total Factor Productivity Change (TFP).
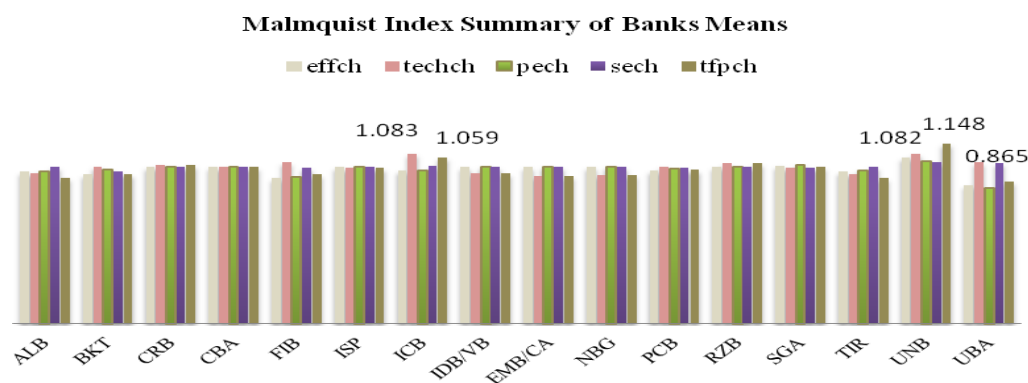
▨ Min   ▨ Max

Figure 1

Malmquist Index Summary of Banks Means

Table 6: Malmquist Index Summary of Banks Annual Means

YEAR	ΔEFFCH	ΔTECHCH	ΔPECH	ΔSECH	ΔTFPCH
2009/2008	0.988	0.909	0.981	1.007	0.898
2010/2009	1.000	1.002	1.021	0.980	1.003
2011/2010	0.966	1.028	0.975	0.991	0.992
2012/2011	1.011	0.980	0.998	1.013	0.991
2013/2012	0.945	1.086	0.940	1.006	1.027
Mean	0.982	0.999	0.982	0.999	0.981

Figure 2
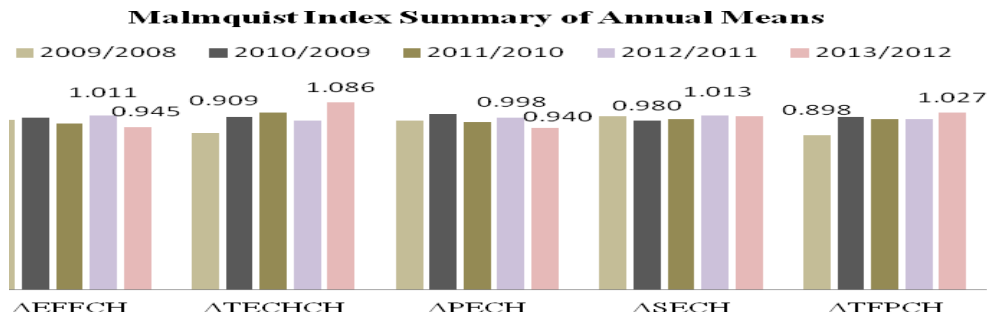
Figure 3
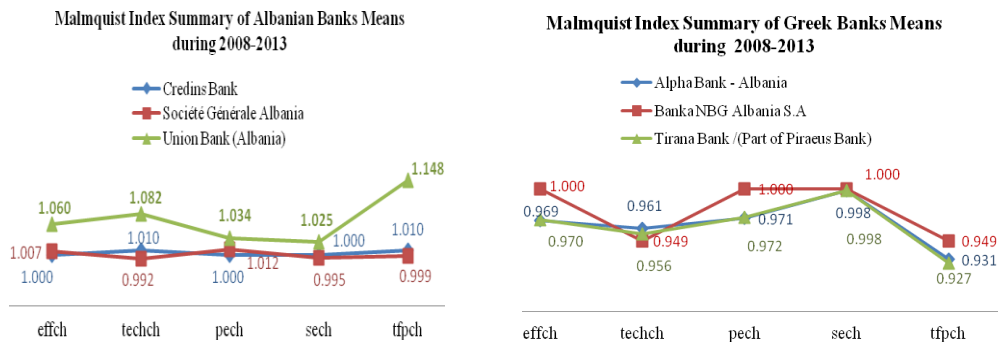
Figure 4
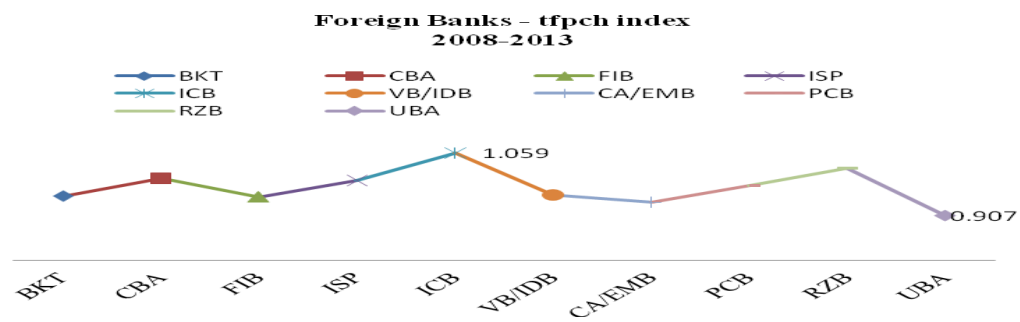
Table 7: Output Oriented Malmquist DEA

Nr	Banks Operating in Albania	ABBR.	crs te t-1	rel to tech T	in yr t+1	vrs te	Ownership
	DMUs						
1	Credins Bank	CRB	0.848	0.991	0.832	0.992	A
2	Société Générale Albania	SGA	0.728	0.885	0.737	0.895	A
3	Union Bank (Albania)	UNB	0.908	0.821	0.663	0.852	A
	Mean		**0.828**	**0.899**	**0.744**	**0.913**	
4	Alpha Bank – Albania	ALB	0.766	0.949	0.858	0.955	G
5	National Bank of Greece (Tirana Branch)	NBG	0.839	1.000	0.931	1.000	G
6	Tirana Bank (Part of Piraeus Bank)	TIR	0.802	0.977	0.900	0.978	G
	Mean		**0.802**	**0.975**	**0.896**	**0.977**	
7	National Commercial Bank ,Albania	BKT	0.701	0.866	0.733	0.920	F
8	Credit Bank of Albania	CBA	0.903	0.950	0.859	1.000	F
9	First Investment Bank, Albania	FIB	0.696	0.827	0.722	0.871	F
10	Intesa Sanpaolo Bank, Albania	ISP	0.857	1.000	0.871	1.000	F
11	International Commercial Bank, Albania	ICB	0.795	0.931	0.813	0.956	F
12	Veneto Banka, Albania	VB/IDB	0.857	1.000	0.938	1.000	F
13	Credit Agricole, Albania	CA/EMB	0.912	1.000	1.036	1.000	F
14	Procredit Bank	PCB	0.858	0.982	0.876	0.987	F
15	Raiffeisen Bank, Albania	RZB	0.889	0.990	0.849	1.000	F
16	United Bank of Albania	UBA	0.450	0.574	0.497	0.657	F
	Mean		**0.792**	**0.912**	**0.819**	**0.939**	

Figure 5

Output – Oriented Malmquist DEA
Group of Banks/ Ownership (2008-2013)
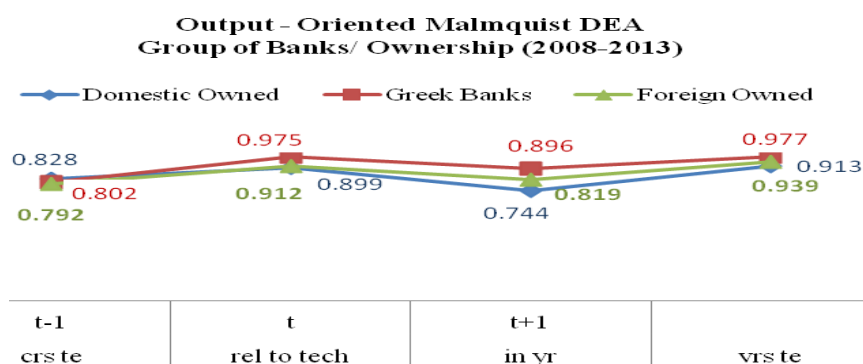
Table 9: The Albanian Banking System Structure

Nr.	BANK OF ALBANIA	ESTAB. YEAR	TOTAL ASSETS*	% TA	FOREIGN OWNED	CURRENT OWNERSHIP	NATIONALITY
1	RAIFFEISEN BANK	1992	2,149,692,901	25.00	100	Raiffeisen SEE Region Holding	Austria
2	NATIONAL COMMERCIAL BANK	1992	1,840,228,245	21.41	100	Calik Finansal Hizmetler A.S	Turkey
3	VENETO BANK	1994	135,520,685	1.58	100	Veneto Banca Holding S.A	Italy
4	UNITED BANK OF ALBANIA	1994	42,796,006	0.50	100	Islamic Development Bank	Saudi Arabia
5	TIRANA BANK	1996	634,807,418	7.39	100	Piraeus Bank	Greece
6	NATIONAL BANK OF GREECE - ALBANIA	1996	285,306,705	3.32	100	National Bank of Greece S.A	Greece
7	INTERNATIONAL COMMERCIAL BANK	1997	57,061,341	0.66	100	ICB Financial Group Holding AG	Malaysia/Reg. Switzerland
8	INTESA SANPAOLO BANK - ALBANIA	1998	941,512,126	10.95	100	Intesa San Paolo S.p.a	Italy
9	ALPHA BANK - ALBANIA	1998	506,419,401	5.89	100	Alpha Bank A.E	Greece
10	PROCREDIT BANK	1999	278,174,037	3.24	100	Procredit Holding A.G	Germany
11	CREDIT AGRICOLE BANK – ALBANIA	1999	228,245,364	2.66	100	IUB Holding	France
12	FIRST INVESTMENT BANK - ALBANIA	1999	99,857,347	1.16	100	First Investment Bank A.D	Bulgaria
13	CREDIT BANK OF ALBANIA	2002	14,265,335	0.17	100	Individuals	Kuwait
14	CREDINS BANK	2003	720,399,429	8.38	0	Individuals, Balkan Financial & Sector Equity Holding B.V	Albania & Netherlands
15	SOCIETE GENERALE BANK - ALBANIA	2004	456,490,728	5.31	89	Individuals & Societe Generale France	Albania & France
16	UNION BANK	2006	206,847,361	2.41	13	Financial Union, Tirane	Albania

* Source: IMF Country Report No.14/79, Albania FSSA March 2014 p.32

Table 10: MPI and its components by banks grouped according to their size determined by total assets

Nr.	DMUs/BANKS	EFFCH	TECHCH	PECH	SECH	TFPCH	TOTAL ASSETS*(in €)	% of TA	FOREIGN (in %)
							≥ Euro 500,000,000		
1	RAIFFEISEN BANK	1.000	1.022	1.000	1.000	1.022	2,149,692,901	25.00%	100 F
2	NATIONAL COMMERCIAL BANK	0.951	1.003	0.983	0.967	0.954	1,840,228,245	21.41%	100 F
3	INTESA SANPAOLO BANK – ALBANIA	1.000	0.992	1.000	1.000	0.992	941,512,126	10.95%	100 F
4	CREDINS BANK	1.000	1.010	1.000	1.000	1.010	720,399,429	8.38%	0 A
5	TIRANA BANK	0.970	0.956	0.972	0.998	0.927	634,807,418	7.39%	100 G
							Euro 200,000,000 - Euro 500,000,000		
6	ALPHA BANK - ALBANIA	0.969	0.961	0.971	0.998	0.931	506,419,401	5.89%	100 G
7	SOCIETE GENERALE BANK - ALBANIA	1.007	0.992	1.012	0.995	0.999	456,490,728	5.31%	89 A
8	NATIONAL BANK OF GREECE - ALBANIA	1.000	0.949	1.000	1.000	0.949	285,306,705	3.32%	100 G
9	PROCREDIT BANK	0.977	1.002	0.984	0.994	0.980	278,174,037	3.24%	100 F
10	CREDIT AGRICOLE BANK - ALBANIA	1.000	0.940	1.000	1.000	0.940	228,245,364	2.66%	100 F
11	UNION BANK	1.060	1.082	1.034	1.025	1.148	206,847,361	2.41%	13 A
							≤ Euro 200,000,000		
12	VENETO BANK	1.000	0.958	1.000	1.000	0.958	135,520,685	1.58%	100 F
13	FIRST INVESTMENT BANK - ALBANIA	0.927	1.029	0.936	0.990	0.953	99,857,347	1.16%	100 F
14	INTERNATIONAL COMMERCIAL BANK	0.977	1.083	0.974	1.003	1.059	57,061,341	0.66%	100 F
15	UNITED BANK OF ALBANIA	0.883	1.028	0.865	1.021	0.907	42,796,006	0.50%	100 F
16	CREDIT BANK OF ALBANIA	1.000	0.998	1.000	1.000	0.998	14,265,335	0.17%	100 F

Source: EFFCH – PECH – SECH – TFPCH Authors' Calculations   *Total Assets as presented by the IMF Country Report No.14/79, Albania FSSA, March 2014

BIOGRAPHY:

Mrs. Lindita VARESI, MBA, PhD(c) – is a banker and simultaneously has worked as lecturer in public and private Universities of Albania; Current job position: Head of Small Business Lending Credit Risk, Risk Division, Banka NBG Albania S.A (NBG Group); University Degree in Economics/Political Economy issued from the Faculty of Economy, University of Tirana, Albania. Master in Business Administration, Finance Accounting and Banking from Institute Universitare Kurt Bosch (IUKB), Switzerland, 2008/NYUT. Certificate of Comparability from United Kingdom NARIC, October 21,2010. Actually PhD(c), University of 'Aleksander Moisiu' Durres, Albania. Address (job): Rr.Durresit, Godina 'Comfort', Tirana, Albania. Address (personal): Barrikada Str., Tirane 2, Ndertim Vila 9/1/ TR 1714, Tirana, Albania, Tel.: +355 42 265 736, Mob: +355 68 39 31 273, E-mails: lindita.varesi@nbgal.groupnbg.com and varesi.lindita@gmail.com

REFERENCES

(AAB), A. A. (2011). Annual Report 2011. Tirana, Albania: *Albanian Association Banks*. Retrieved from: http://www.aab.al/en/statistics.php;

(IMF), I. M. (March, 2014). Albania, Financial System Stability Assesment, IMF Country Report, No.14/79, p.19. *Washington   D.C: International   Monetary   Fund.*   Retrieved   from: http://www.imf.org/external/pubs/ft/scr/2014/cr1479.pdf

(IMF), I. M. (March, 2014). Albania, Financial System Stability Assessment, IMF Country Report No.14/79, p.7. *Washington   D.C: International   Monetary   Fund*.Retrieved   from: http://www.imf.org/external/pubs/ft/scr/2014/cr1479.pdf

(IMF), I. M. (March, 2014). Albania, Financial System Stability Assessment, IMF Country Report, No14/79, p.12. *Washington   D.C: International   Monetary   Fund*.   Retrieved   from: http://www.imf.org/external/pubs/ft/scr/2014/cr1479.pdf

(IMF), I. M. (March,2014). Albania, Financial System Stability Assessment, IMF Country Report No.14/79 p.10. *Washington   D.C: International   Monetary   Fund.*   Retrieved   from: http://www.imf.org/external/pubs/ft/scr/2014/cr1479.pdf

(OECD), (2001). OECD Manual 2001: Measuring Productivity: Measurement of Aggregate and Industry - Level Productivity Growth. *OECD, 2001*. Retrieved from: Available on line: www.SourceOECD.org; Retrieved on: http://www.oecd.org/std/productivity-stats/2352458.pdf; Accessed on: January 14, 2015.

(WEO), W. E. (October, 2014). Legacies, Clouds, Uncertainities. Recent Developments Prospects,and Policy Priorities,   Chapter   1.   *International   Monetary   Fund,   p.1.*   Retrieved   from: https://www.imf.org/external/pubs/ft/weo/2014/02/pdf/c1.pdf; Accessed on: January 13, 2015.

(WEO), W. E. (October, 2014). Legacies, Clouds, Uncertainties. Recent Developments, Prospects, and Policy Priorities" Chapter 1, p.3,13. *Washington D.C:International Monetary Fund.* Retrieved from: https://www.imf.org/external/pubs/ft/weo/2014/02/pdf/c1.pdf; Accessed on: January 13, 2015.

Bank of Albania, (2013). Supervision Annual Report, 2013, p.19. Tirana, Albania: *Bank of Albania.*Retrieved from: http://www.bankofalbania.org/web/supervision_report_new_2614_2.php, Accessed on: January 14, 2015

Bank of Albnia, F. S. (October 23, 2014). Financial Stability Report - 2014 H1. Tirana,Albania: *Bank of Albania*. Retrieved   from:http://www.bankofalbania.org/web/Financial_Stability_Report_2014_H1_7138_2.php. Accessed on: January 5, 2015; 23:48

Bank of Albnia, Supervisory Council (2009). On the Financial System Stability in Albania for the Second Half of the Year 2008, Tirana, Albania. *Bank of Albania*, Publication Date: 31.03.2009
     Retrieved from:
     ttp://www.bankofalbania.org/web/BANK_OF_ALBANIA_STATEMENT_5363_2.php?kc=0,41,8,4,0

Banker, R.D., Charnes, A., Cooper, W.W., Swarts, J.,& Thomas, D., (1989). An introduction to Data Envelopment Analysis with some of its models and their uses, Vol.5. *Research in Government and Nonprofit Accounting* , 125-163.

Camanho, A. S., & Dyson, R.G.,(2006). Data Envelopment Analysis and Malmquist Indices for measuring group performance. *J Prod Anal (2006), Springer, Science + Business Media, LLC, 2006*. Available on:

http://www.nhh.no/Files/Files/insitutter/for/seminars/accounting_management_science/2007_spring/300507-3.pdf. Accessed on: January 15, 2015

Cani, Sh., & Haderi, S., (n.d.). Albanian Financial System in transition progress or fragility, p.4. *Bank of Albania.* Retrieved from: *http://www.bankofalbania.org/web/pub/cani_haderi_ang_203_1.pdf*

Charnes, A., Cooper, W.W., and Rhodes, E., (1978). Measuring the Efficiency of Decision Making Units, Vol.2. *European Journal of Operational Research* , pp.429-444. Available on: http://dx.doi.org/10.1016/0377-2217(78)90138-8

Cook, W., Tone, K., & Zhu, J.,(2014). Data Envelopment Analysis: Prior Choosing a Model, Vol.44, *Omega,2014, Doi:10.1016/j.omega.2013.09.2004*, pp.1-4.

Cubbin, J., & Tzanidakis, G.,(1998). Regression versus data envelopment analysis for efficiency measuremnt an application to the England and Wales regulated water industry, Vol.7. *Utility Policy*, pp.75-85.

Daley, J., & Matthews, K.,(2009). Measuring post-crisis productivity for Jamaican Banks, E2009/29. *Cardiff Business School, Cardiff University* , 1-19. Available on: http://www.cardiff.ac.uk/carbs/econ/workingpapers, Accessed on: January 15, 2015

Dyson, R.G., Allen, R., Camanho, A.S., Podinovski, V.V., Sarrico, C.S., & Shale, E.A., (2001). Pitfalls and protocols in DEA. *European Journal of Operational Research,* Nr.132, pp.245-259.

Färe, R. (1988). Fundamentals of production theory . *Lecture Notes in Economics and Mathematical Systems, Heidelberg: Springer - Verlag*.

Färe, R., Grosskopf, Sh., Norris, M., & Zhang, Zh., (1994). Productivity Growth, Technical Progress and Efficiency Change in Industrialized Countries, Vol.84, No.1, March 1994. *The American Economic Review Published by: The American Economic Association* , 66-83. Available on: http://links.jstore.org Accessed on January 16, 2015

Farell, M.J.,(1957). The Measurement of Productive Efficiency. *Journal of theRoyal Statistical Society, 1957, Series A, General, Vol.120, Nr.3*, pp.253-282.

Golany, B. & Roll, Y.,(1989). An application procedure for DEA, Vol.17, Nr.3. *Omega*, 237-*250*.

Golubović, S. & Golubović, N.,(2005). Financial Sector Reform in the Balkan Countries in Transition, Vol.2, No.3, p.231. *Facta Universitatis, Series: Economics and Organizations, Vol.2, No.3, 2005*, pp.229-236.

Graham, A. (2005). Airport benchmarking: a review of the current situation, Vol.2, No.2,. *Benchmarking: An International Journal* , pp.99-111.

Haderi, S. & Hida, S., (n.d.). Economic and Monetary Developments During the Transition Period in Albania. A Descriptive Approach, p.2. Retrieved from: http://www.seedcenter.gr/projects/MNE/1stconfer/1stconf_papers/Haderi.pdf; Accessed on: May 18, 2014

Kamau W., A., (2011). Intermediation Efficiency and Productivity of the Banking Sector in Kenya. *Interdisciplinary Journal of Research in Business,Vol.1, Issue.9, September, October 2011, pp.12-26.*

Keskin-Benli, Y., & Degirmen, S.,(2012). The Application of Data Envelopment Analysis Based Malmquist Total Factor Productivity Index: Empirical Evidence in Turkish Banking Sector . *Working Paper published by: University of Crete Greece, Paper 3-124*, pp.1-29.Available on: http://economics.soc.uoc.gr/macro/docs/Year/2012/paper_3_124.pdf, Accessed on: January 15, 2015

Kuper, Sh. (2009). Contemporary Business, Report Writing; Selecting Data Sources; Chapter 11; Fourth Edition. *Kuiper 4e 2009; 2005 South-Western CENGAGE Learning, Fourth Edition, Shirley Kuiper.* Retrieved from: www.cengage.com, Accessed on: January 15, 2015

Kurtaran, A. M., & Murat Ar, L.,(2013). Evaluating the Relative Efficiency of Commercial Banks in Turkey: An Integrated AHP/DEA Approach,Vol.6, No.4. *International Business Research, Vol.6, No.4, p.129-146,2013; Canadian Center of Science and Education Available in URL:Series: Economics and Organizations, Vol.2, No.3, 2005, pp.229-236.*

Liao, Chang-Sheng (2010). Are Foreign Banks in Developing Countries More Productive? The case of Twain. *Journal of International and Global Studies, Vol.3, No.2, pp.63-74.* Available on: http://www2.southeastern.edu/orgs/econjournal/index_files/JIGES%20DEC%202010%20LIAO%20RV%203-31-2011.pdf

Lyroudi, K. & Murat Ar, L.,(2006). Measuring Banking Productivity of the most recent European Union member countries: a Non-Parametric Approach. *Journal of Economics and Business, Vol.IX, 2006, No.1*, pp.37-57.

Madhanagopal, R.,& Chandrasekaran R., Global Economic Crisis and Productivity Changes of Banks in India: A DEA-MPI Analysis, *International Journal of Data Envelopment Analysis and 'Operations Research' Vol.1, Nr.3, 40-48,* DOI:10.12691/ijdeaor-1-3-1

Neupane, B., (2013). Efficiency and Productivity of Commercial Banks in Nepal: A Malmquist Index Approach. *Asian Journal of Finance & Accounting (Keskin - Benli, 2012),Vol.5, No.2, Published by: Macro Ethic Institute.* Available on: URL: http://dx.doi.org/10.5296/ajfa.v5i2.4326. Accessed on January 15, 2015

Ngo, Dang-Thanh & Ngyen, Thi Phuong, L.,(2012). Total Factor Productivity of Thai Banks in 2007-2010. An Application of DEA and Malmquist Index. *Journal of Applied Finance and Banking, Vol.2, No.5, Scienpress Ltd, 2012*, pp.27-42.

Park, J., Joon & Baek, J.,(2014). Impacts of Financial Crisis on Regional Efficiency of Banking Industry, Vol.10, No.1, March, 2014. *International Review of Business Research Papers*, pp.81-93. Available on: http://www.irbrp.com/staicdocuemnts/March/2014/7.%20Joon.pdf; Accessed on: January 15, 2015

RBA, R. B., (March, 2014). The Role of Financial Sector. *Reserve Bank of Australia*. @Reserve Bank of Australia, 2001-2015 Retrieved from: http://www.rba.gov.au/publications/submissions/fin-sys-inquiry-201403/role-fin-sec.html; Accessed on: January 16, 2015

Rezitis N., A. (May, 2006). Productivity Growth in the Greek Banking Industry: A Non-Parametric Approach, Vol.IX, No.1. *Journal of Applied Economics* , pp.119-138.

Sensarma, R., (2006). Are Foreign Banks Always the Best?Comparison of State-Owned, Private and Foreign Banks in India. *Economic Modeling , Vol.23,pp.717-735*

Sharma, D., Sharma, K.A., & Barua, K. M.,(2011). Efficiency and Productivity of Banking Sector: A critical analysis of literature and design of conceptual model, Vol.5, No.2, 2013.*Qualitative Research in Financial Markets,Emerald Group Publishing Limited © Emerald Group Publishing Limited,* pp.195-224. Available on: www.emeraldinsight.com/1755-4179.htm

Shephard, R.W., (1970). Theory of cost production functions. *Princeton University Press*, 1970

Valentin Z., T. (2010). *Efficiency of Banks in South - East Europe: with special reference to Kosovo* . Prishtine, Kosovo: Central Bank of the Republic of Kosovo. Available on: http://www.bqk-kos.org/repository/docs/2010/CBK_WP_no.4.pdf, Accessed on December 31, 2014.

Varesi, L., (2014). The Importance of the Financial System's Stability and Its Critical Role in an Economy. What are the Effects of 'Instability' In a Real Economy; Albania as a Didactic Case, Iliria College and Friedrich Ebert Stiftung International Conference, Prishtina, Republic of Kosovo, June 13-15, 2014, p.34. Available on: http://www.fes-prishtina.org/

Varesi, L. (2015). Western Balkans' Banking Sector Performance in Terms of Macroeconomic and Bank Specific Efficiency Determinants, pp.10, Table 7&8. In publishing process at Journal – E *Acta Universitatis Danubius, OEconomica*. Already submitted, available on: http://journals.univ-danubius.ro/index.php/oeconomica/author/submission/2692, Accessed on February 1, 2015,

Yue, P., (1992). Data Envelopment Analysis and Commercial Bank Performance a primer to applications to Missouri banks. *The Federal Reserve Bank of St.Louis Review, Vol.92, Nr.1*, pp.31-45.

Zhu, J.,(2014).Quantitative Models for Performance Evaluation and Benchmarking. Data Envelopment Analysis with Spreadsheets. Pp.7, *Switzerland: Business & Economics, Operations Research Management Science, Springer, Third Edition © Springer International Publishing Switzerland 2003, 2009, 2014.*Available on: www.springer.com; www.google.books