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Efficiency of Commercial Banks Selected North African Countries

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ABSTRACT

This article examines technical efficiency of commercial banks in 3 North Africa countries namely Libya, Tunisia and Algeria for the period of 2002-2009 by using data envelopment analysis (DEA). Also, evaluate the efficiency of Libyan commercial banks under the financial reform in banking industry of Libya in the period of study and compare with the efficiency of Tunisia and Algeria. The data collection was obtained for 18 commercial banks of the three countries from bankscope. The finding has showed that striking differences in technical efficiency of the banks including in the study. Libyan banks had the higher mean technical efficiency; it was 0.94 comparing with Tunisia and Algeria 0.78 and 0.47 respectively. In addition, the results show that the technical efficiency changes grew by average 1.238 % annually for all the banks of the study.

Keywords: Technical Efficiency, commercial Banks, Data Envelopment Analysis

INTRODUCTION

The financial sector usually plays a central role in the process of economic development and growth in a country. Banks as financial intermediaries play a key role in transforming deposits into financial assets (Mohammed, 2002). Banking sector is one of the leading sectors in modern economies; it has become the criterion for measuring the safety of the national economy of any country since it receives massive attention (Berger & De Young, 1997).

The evolution of the role of banks and other financial institutions in the national economy and its responsibilities in the provision of credit for the needs of economic sectors with giving the credit facilities and banking services in accordance with credit policy clear and comprehensive. This is a fundamental pillar to push the national economy towards growth and stability.

As a result of economic openness and free trade agreements the liberalization of the capital from Intensity competition within the banking industry .it's become necessary Banks increase the efficiency at the cost and profit to be able to do its work and the ability to continuity in the banking industry. The efficiency levels achieved by the banking system for any country reflect the relative competitiveness of this system. The financial sector reforms have been actively promoted to improve the efficiency and productivity of banks this will lead to better banking competitiveness and disruptive and increases the vulnerability of financial system to economic and financial problems.

Efficiency estimation of banks has been research interest for the economists. This is an important area that can explain more economy points. The level of efficiency for bank is a guide to the bankers to get the efficiency production score in a competitive environment. The estimate of commercial banks efficiency is a need both developing and developed counties .a lot of researchers carried out a number of studies to assets the efficiency of bank. For the developing countries, there are little of works in this area. So, this study will provide an insight into the performance of commercial banks operate in the three countries Libya, Tunisia and Algeria.

This study attempts to assess the banking efficiency in Libya, Tunisia and Algeria using a Data Envelopment analysis **(DEA**) during the period from 2002 to 2009.The most important for this study to assess the state of Libyan banks by comparing with the banks from other countries. . The finding has showed that striking differences in technical efficiency of Libya, Tunisia and Algeria. Libyan banks show more efficient than other countries.

The rest of this paper is organized as follows .section 2 present literature review .section 3 discusses the methodology of DEA. Section 4 presents the results and analysis and finally, section 5 concludes.

LITERATURE REVIEW

In the banking literature, two main methods for the empirical evaluation on bank efficiency and productivity are at mostly, used: parametric and non-parametric approaches. Parametric methods are considered more sophisticated compared to the non-parametric approach since the method is able to incorporate both input allocative and technical efficiencies. The two major methods frequently used are the Stochastic Frontier Approach (SFA), also the mathematical Approach (DEA).

In this study we will focus on the non-parametric approach (DEA). This approach is called data envelopment analysis in (1978, 1981) the method developed by Charnes, Cooper, and Rhodes. In microeconomic the theory of production function, it's shows the technical efficient output-input relationships of firm. DEA constructs an efficient nonparametric frontier or a piece of wise linear surface. The model is employed by researchers for compute the efficiency of the DMU as banks.

There a lot of studies apply DEA in single country case. They analyze the efficiency and productivity. Wu (2005) investing the productivity and efficiency analysis of banks in Australia since the liberation of the Australian financial system in early 1980s, using data envelopment analysis (DEA), in order to compute the level of the changes in the efficiency of Australian banks over the period from 1983 to 2001 for 527 banks. The results show the effect of deregulation on efficiency and productivity for all banks groups. The technical efficiency shows the possible to reduce the in input's quantities. TE goes down slightly as a result of relatively lesser raise in pure technical efficiency combined with larger fall in scale efficiency.

In 2005, Sufian and, Fadzlan Applied a non-parametric Malmquist Productivity Index (MPI) method, they computed the productivity changes of 10 Malaysian banks during the post crisis period of 1998-2003 Malaysian banking sector have productivity fell of 6.3% and that the productivity declined during the period of study was for the most part credited to Technological (6.1%) rather than Technical Efficiency (0.2%) decreasing. The decomposition of Technical Efficiency into its Pure Technical Efficiency (PTE) and Scale Efficiency (SE) proposed that PTE has largely resulted to Malaysian banks Technical Efficiency goes down during the period of study.

Comparisons Cross- country are difficult to interpret as economic and environments and regulatory conditions from country to country. The countries may be different in the quality and services. So it is not easy to get. These differences affect the results. Some studies have been done on comparison of efficiencies of more than one country. Berg el al. (1993), they used DEA approach to estimate the X- efficiency of the three countries banks the study show that Swedish banks were the more efficient than the two other European countries the malmquist productivity index was to compare the proportionate change of inputs that required for banks in the countries of study to be efficient frontier.

David and Vlad (2005), this study looked to beyond the conventional measures of performance of banks. The Conventional Indicators of Bank Performance for 1997-2002 .Total number of Sample Banks by Country 252 banks. In doing so, it compared the efficiency indicators of banks in Bahrain with that of their counterparts in Kuwait, Qatar, the United Arab Emirates, and Singapore, obtained by using a nonparametric estimation method called Data Envelopment Analysis (DEA).The results show Bahrain's banking sector performance and its competitiveness in the local context. Although the simulations suggest that Bahrain occupies a front-runner place among the sample GCC countries, also show that in terms of scale efficiency, banks in Bahrain operate at the similar level as banks in Singapore and their closest competitors in Qatar and the United Arab Emirates. And there is strong competition from other countries in the region.

In 2010 Chawki and Hassan Obeid ,The purpose of this paper is to proposed a method to assess the productive performance of Islamic banks operating in the GCC region, over the period 2005-2008. Therefore, they evaluated the productive performance of Islamic banks with the method of productive efficiency proposed by Farrell (1957).they used the method of data envelopment analysis (DEA) to decompose the productive efficiency into technical efficiency, allocative efficiency and cost efficiency .The using of this technique on a sample of 23 Islamic banks reveals that the technical inefficiency and allocative inefficiency improved bank costs, on average, by about 14% and 29% respectively. The results explained that internal and external factors seem to contribute significantly to the evolution of efficiency scores of Islamic banks operating in the GCC region.

Nur Azura and others in 2011, the study was to examine the competitiveness of Malaysian and Indonesian commercial banks from 2001-2007, by using the data envelopment analysis. The sample of banks was 27 Malaysian commercial banks and 21 Indonesian commercial banks. The application of Data Envelopment Analysis (DEA) methodology is formulated as a tool to estimate the technical efficiency as well as to evaluate the organization efficiency and it is more comprehensive compare with other approach. The finding has shown that no striking differences in technical efficiency of Malaysian

and Indonesian commercial banks Even though commercial banking in Malaysia relatively stables in reach the level efficiency compared with commercial banking in Indonesia.

METHODOLOGY

Two econometric techniques have been applied in the literature to calculate efficiency and estimate and total factor productivity (Bauer & Hancock, 1993) namely:

a) Parametric techniques
b) Non-parametric. Linear mathematical programming techniques**.**

To measure the efficiency of commercial banks operating in selected north Africa countries. Data Envelopment analysis used in this study. It's designed to cover a period of years (2002- 2009). Data Envelopment Analysis (DEA) is used for this study as a parametric approach which largely mentioned in the literature. This technique involves measuring the performance of each bank. The obtained efficiency scores are decomposed into technical, allocative, scale, and cost efficiencies. DEA suggests the benchmark for each inefficient DMU at the level of its individual mix inputs and outputs. The idea of efficiency was first developed by Farrel (1957). This was later put forward by Charnes, Cooper, and Rhodes in (1978) and received then the name of Data Envelopment Analysis. The latter proposed a model for assessing the efficiency of a unit under the assumption of constant returns to scale (CRS). This model was further extended by Banker, Charnes, and Cooper (1984) to allow for a production (cost) frontier with variable returns to scale (VRS).Coelli (1996)

The choice of the orientation is obvious in some studies. For instance, in firms where the focus is on technical efficiency, the appropriate choice would be an input orientation. In this study, the input-oriented model that assumes variable returns to scale (VRS) is adopted. This DEA model is stated as follows:

Data and Variables

The data used in this study are obtained from the" bank scope" for 18 commercial banks. The scope of the study will be 6 Libyan commercial banks, and 6 Tunisian banks and 6 Algerian banks. Exclude banks that do not follow the system of commercial banks .The data of banks were by local currency. So, we used the purchasing power parities (PPP) to convert the data to international dollar. It wills that the appropriate input-output approach is the intermediation approach. By using two bank outputs, loans and other earning assets also, include three input prices, one for labour, the other for physical capital and funds. The three price o inputs are compute by following the literature.

- Price of labor = total personal expenses / total assets
- Price of funds = total interests expenses / total customer deposits
- Price of capital = other operating expenses / fixed assets.

EMPIRICAL RESULTS

Table 1 shows mean variable return to scale (VRS) technical efficiency from 2002 to 2009. Libyan banks had the higher mean technical efficiency; it was 0.94 comparing with Tunisia and Algeria 0.78 and 0.47 respectively with the mean of overall time of study 0.73.

TABLE 1: Mean Vrs Technical Efficiecy

Country	2002	2003	2004	2005	2006	2007	2008	2009	Average
Libya	0.98	0.99	0.974	1	0.978	0.899	0.919	0.818	0.944
Tunisia	0.826	0.794	0.809	0.842	0.751	0.731	0.776	0.712	0.78
Algeria	0.299	0.333	0.801	0.59	0.504	0.428	0.456	0.354	0.47
Average	0.702	0.705	0.862	0.811	0.745	0.687	0.717	0.628	0.73

The figure 1 shows that there is striking differences in technical efficiency of commercial banks in three countries. The overall technical efficiency of the banking industry in Libya appears to have improved during the study period from 2002 to 2005. The period from 2005 to 2007 the TE

decreased from 1 to .0.899 than increased in 2008 to 0.919. This change of efficiency of Libyan banks show that government policy has a strong effect on technical efficiency after the government implemented the new policy, technical efficiency scores gradually increasing. This result let to Libya banks quite stable finding and more efficient comparing with Tunisia and Algeria.

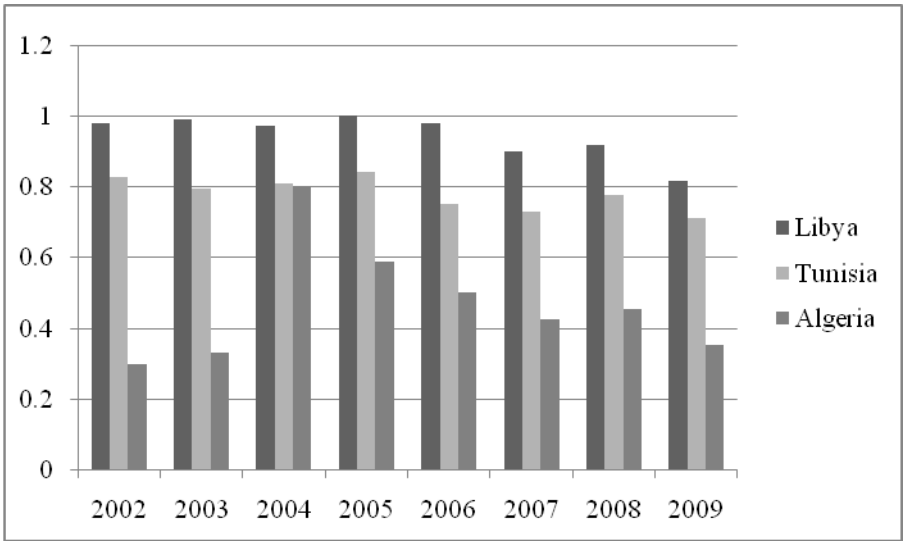

FIGURE 1: Mean Vrs Technical Efficiecy

CONCLUSION

Hence, in order to achieve the objectives, the data collection was obtained from bankscope of 18 North Africa banks during year 2002-2009. The application of Data Envelopment Analysis (DEA) methodology is formulated as a tool to estimate the technical efficiency as well as to evaluate the organization efficiency. The finding has showed that striking differences in technical efficiency of Libya, Tunisia and Algeria. Libyan banks show more efficient than other countries.

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