

Efficiency in the MENA banking industry, the stochastic frontier approach (SFA)

[http://doi.org/10.21272/fmir.6\(2\).56-59.2022](http://doi.org/10.21272/fmir.6(2).56-59.2022)

Samar Rizk, ORCID: <https://orcid.org/0000-0002-4374-905X>

PhD, Banking risks reporter and Lecturer, Lebanon

Email: drizksamar@gmail.com

Abstract

The main focus of this paper is the study of efficiency in the Middle Eastern and North African (MENA) banking industries throughout the period 1999-2017. The study of efficiency in many other regions reveals the existence of failures in the allocation of resources for banking sectors which results in the appearance of banking inefficiency in terms of cost. The empirical results, using a parametric cost frontier applied, show a fluctuating yet improving efficiency in the MENA and are used to rank efficiency of banking industries by country over the years (1999-2017). Promoting a strong and stable banking system reduces uncertainties and systemic risk which leads to greater efficiency. A stable and efficient banking system is then, necessary, for economic development. Since 1990s, and due to reforms required by supervisory authorities, banks in the MENA region have faced many structural changes and have tried to develop their activities by seeking to enter new markets and new sectors of activity in order to adapt to the economic and institutional environment changes by adopting internal and / or external growth strategies. These strategies can increase banks market power and diversify banking industries' activities in order to achieve efficiency gains.

Keywords: (In) Efficiency, Stochastic frontier, Efficiency scores, Banks, MENA countries.

JEL Classification: C13, D24, G21, H21.

Cite as: Rizk, S. (2022). Efficiency in the MENA banking industry, the stochastic frontier approach (SFA). *Financial Markets, Institutions and Risks*, 6(2), 56-59. [http://doi.org/10.21272/fmir.6\(2\).56-59.2022](http://doi.org/10.21272/fmir.6(2).56-59.2022)

Received: 16.04.2022

Accepted: 04.06.2022

Published: 30.06.2022



Copyright: © 2022 by the author. Licensee Sumy State University, Ukraine. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>)

Introduction

In a process of globalization and regulatory reforms that is becoming demanding and in a competitive and uncertain banking environment, banks are required to be resilient. Faced with these requirements, banks in MENA countries have to maintain the stability of the banking industry and ensure that it contributes more to covering the financing needs of economic agents. For this, a set of rules was required from banks, including: "a capital constraint¹". On the eve of the reforms², financial industries in most of MENA countries were showing: a weakened economy, doubtful debts (Nashashibi et al, 1998), the state overshadows the market³, the state forms the major participant in the capital and the stock market is only rudimentary. What was the impact of these reforms on MENA banking industries' efficiency?

Main part

Cost efficiency objective is to determine the best combination between factors; inputs and outputs that helps producing the optimal combination of outputs while minimizing the cost of production. This approach leads us to a cost objective through measuring efficiency. Cost efficiency measures the extent to which a bank's fees are a reasonable approximation of those of best practice or least cost banks. In other words, cost inefficiency assesses the distance between the costs of one

¹ As per BCBS (Basel Committee on Banking Supervision), central banks and supervisory authorities' requirements in most of MENA countries since 1990s.

² According to IMF country reports for MENA selected countries of the research.

³ State dominance has been weak in Lebanon, Jordan and Morocco.

credit institution and other institutions those with the lowest costs (Berger and Mester, 1997).

Sample description

The empirical analysis uses on a sample of banks in 18 MENA countries (Algeria, Bahrain, Egypt, Israel, Iraq, Jordan, Kuwait, Morocco, Malta, Lebanon, Mauritania, Oman, Qatar, Saudi Arabia, Tunisia, Turkey and Yemen). Data is sourced from banks' financial statements extracted from the international banking database Bankscope of BVD-IBCA⁴ for 240 banks ranging from year 1999 to year 2017.

Methodology

To measure the cost efficiency of MENA banks, we adopt a parametric approach (SFA), proven as being the most reliable method in cost function evaluation (Bukart et al. 1999) and a Trans logarithmic function that fits best with respect to the functional forms (Kablan, 2007; Poshacwale and Kian, 2011; Benzai 2016). The cost function⁵ is written as follows (Fouopi and Song, 2016).

$$\begin{aligned}
 \ln CT = & C_0 + \sum_{rj} \beta_r \ln y_{rj} + \sum_{ij} \beta_i \ln P_{ij} \\
 & + \frac{1}{2} \sum_i \sum_k \beta_{ik} \ln y_{ij} \ln y_{kj} \\
 & + \frac{1}{2} \sum_i \sum_z \beta_{iz} \ln P_{ij} \ln P_{zj} \\
 & + \sum_r \sum_i \beta_i \ln y_r \ln P_i \\
 & + v_j + u_j
 \end{aligned} \tag{1}$$

A comparative analysis between selected MENA countries and by year is carried out (using the SFA method) to investigate the efficiency of banks vis-à-vis their exposure to banking risks. It also helps to analyze the positioning of banks in each country vis-à-vis other banking sectors in the MENA region. For this, an analysis is conducted on efficiency scores and coefficients based on "intermediation approach" (Wrenches Sealey and John Lindley, 1977) and the estimation of the cost function SFA was applied.

Results

The efficiency scores have an average of 0.9187, which shows that the level of average efficiency is relatively high, as it is around 92%, and that inefficiency is on average around 8%. Inefficient banks have then to reduce their costs by 8%. The calculation of the efficiency scores, to which we proceeded, ranked MENA banks, each relative to the other banks, and this according to "their level of efficiency". On average, the best efficiency recorded is for Jordan (93%) followed by Saudi Arabia and Oman (91%), Israel, Yemen and Egypt (90%), Lebanon and Morocco (89%), Tunisia (88%), Malta, Turkey and Kuwait (86%), Qatar and Bahrain (84%), UAE (82%), Iraq (81%), Algeria (80%) and Mauritania (77%). Moreover, the lowest level of efficiency is recorded by Iraq in 2017 (53%) and the highest level is posted by Jordan in 2007 (97%) and Israel in 1999 (96%).

Analyzing **coefficients linking inputs, price of inputs and outputs** integrated in cost efficient frontier (SFA), we discuss some main factors which influence cost function: **Deposits, Assets' level and labor cost.**

Deposits' factor: Its management is quite costly for banks in the MENA, whether as a collected resource (intermediation approach) taking into account liquidity management and interest paid on deposits, or as an output product (production approach) taking into account labor cost and cost of capital in the production of deposits and this is revealed in developed cost function and its coefficients.

Assets' level: The larger the bank, the more it tends to consume resources. Good management in cost allocation is important in improving bank efficiency. Cost may increase due to the absence of economy of scale. Considered as an output in the hybrid intermediation approach adopted in this research, Assets level is costly: it costs banks deposits, labor depreciation and management. Finding confirmed in literature by Dietsch (1992) and Battese-Coelli (1992).

Labor cost factor: Being a significant coefficient in (In)Efficient frontier estimation represented as wages and salaries paid to managing directors in MENA banks, it shows an important cost needed to implement

⁴ Note that only commercial banks were considered in this paper in order to maintain a homogeneous sample.

⁵ With CT: Total Cost (financial and operational costs), Y1: Total Earning Asset, Y2: Total Customer Deposit, Y3: Off Balance Sheet, P1: Total Interest Paid/Total Customer Deposit, P2: Labor cost= Personnel Expenses/Total Asset and P3: Assets cost = Administrative Expenses/Fixed Asset. β Coefficient C_0 an intercept accounting for all other cost determinants and v_{it} & u_{it} components of error terms.

“know –how” and “Bank strategy” in these banking industries. Improvement of risk management techniques in banks managing bodies would also help to reduce inefficiency.

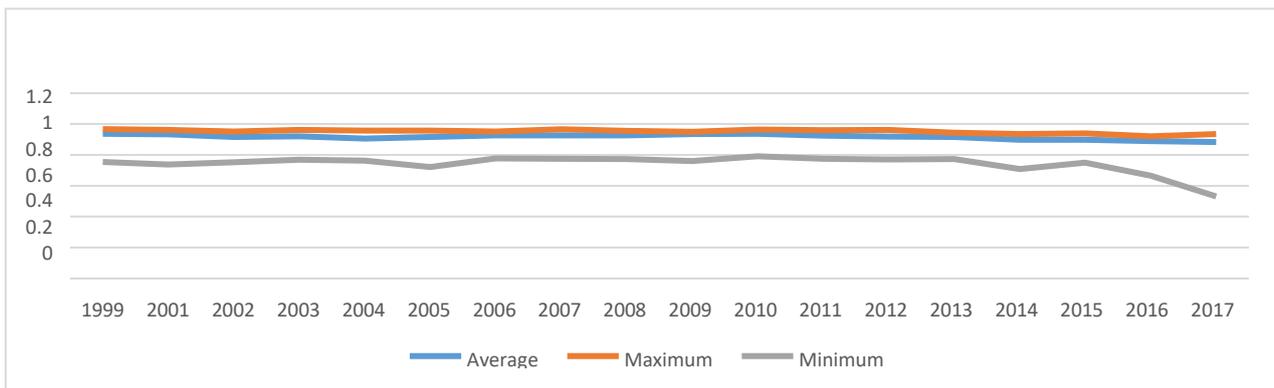


Figure 1. Efficiency Scores per year (1999-2017)

Source: compiled by the author.

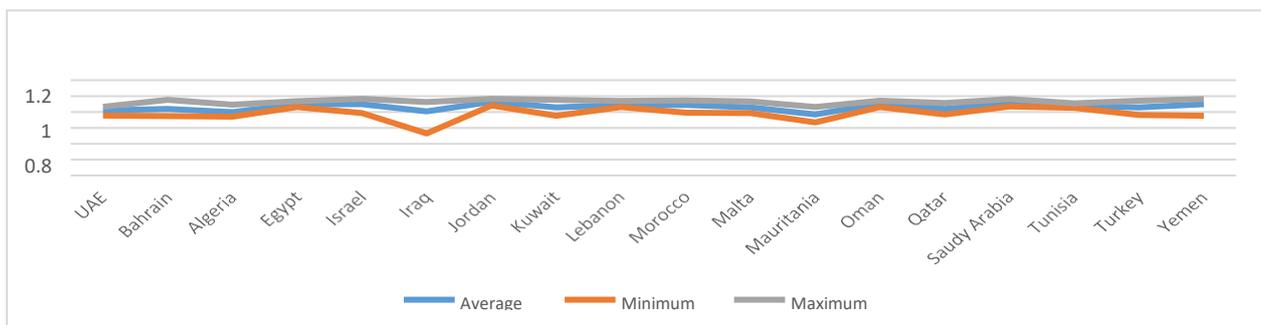


Figure 2. Efficiency Scores per year (1999-2017)

Source: compiled by the author.

Conclusion

Banking sectors in MENA countries show a significant change in average efficiency scores remaining on average within efficient level over the years of study (1999-2017).

The average total cost efficiency of MENA countries remains contained within a range of [77%, 92%] over the period of the study.

The study results show that MENA banks reflect an efficiency varying on average between a minimum of (88%) and a maximum of (95%). The best year in terms of efficiency was 2002 and the worst was the last year of the study, i.e. 2017.

The analysis by country reflects a better efficiency for Jordan (93% on average) against a lower average efficiency for Mauritania (77%). Among the 18 banking sectors of the MENA: 4 countries witness an upward efficiency trend (Egypt, Tunisia, Turkey and Yemen).

Managing Assets, attracting deposits and managing MENA banking industries show a significant impact on efficient cost frontier. In general, efforts made by these banking sectors in their diverse economic and regulatory environments have shown a significant impact on the level of efficiency. This is true for most banking sectors in MENA countries. Efficiency can improve in the banking sector by improving policies in managing banking assets’ portfolio while keeping a good capital level.

This paper has attempted to quantify, measure and trace the evolution of cost efficiency among MENA banking industries throughout the period 1999-2017 and has selected main factors and coefficients considered as input, output and price of inputs influencing the Efficiency cost. However, it is important to note that each score found (whether by banking industry or through years) brings a new research area.

New dimensions can be integrated in future studies trying to answer some major questions on the reason behind fluctuation of efficiency in MENA banks and the impact of exogenous and macroeconomic factors on these banking industries’ efficient frontier during the same period. Based on the causal relationship between

efficiency and its determinants, regulatory authorities may decide, for example, to increase capital ratio imposed on banks in order to increase banking stability. This policy could stabilize the banking sector but risks inducing a decline in bank efficiency. Modeling macroeconomic shocks that could affect banks behavior and more precisely their solvability could be also tested. In fact, macroeconomic and exogenous shocks integrated in cost frontier in future research help to consider procyclicality effects of regulations and reforms on banks efficiency.

Funding: There is no funding for this research.

References

1. Battese, G. E., Coelli, T.J. (1992) Battese G.E. Coelli T.J. (1995). Frontier production functions, technical efficiency and panel data: with application to paddy farmers in India, *Journal of Productivity Analysis*, 3, 153–169. [\[Link\]](#) [\[CrossRef\]](#)
2. BCBS. (Basel Committee on Banking Supervision). (2010a). Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems. Basel: Bank for International Settlements, December. [\[Link\]](#)
3. BCBS (Basel Committee on Banking Supervision). (2010b). Basel Committee on Banking Supervision, an Assessment of the Long-term Economic Impact of Stronger Capital and Liquidity Requirements. Basel: Bank for International Settlements. [\[Link\]](#)
4. BCBS (Basel Committee on Banking Supervision). (2014). Basel Committee on banking Supervision, Basel III Leverage Ratio Framework and Disclosure Requirements. Basel. [\[Link\]](#)
5. Berger A. And Mester L. (1997). Inside the black box: what explains differences in the efficiencies of financial institutions. *Journal of Banking and Finance*, 21, 895-947. [\[CrossRef\]](#)
6. Burkart O., Gonsard H. et Dietsch M. (1999). L'efficience coût et l'efficience profit des établissements de crédit français depuis 1993, Bulletin de la Commission Bancaire, 20 Avril, France. [Cost efficiency and profit efficiency of French credit institutions since 1993, Bulletin de la Commission Bancaire, 20 April, France]. [in French] [\[Link\]](#)
7. Benzai Y. (2016). Mesure de l'Efficience des Banques Commerciales Algériennes par les Méthodes Paramétriques et Non Paramétriques, These Pour l'obtention du grade de Docteur En Sciences Economiques Ecole doctorale: Management International Des Entreprises Option: Finance Internationale. [Measurement of the Efficiency of Algerian Commercial Banks by Parametric and Non-Parametric Methods, Theses For obtaining the degree of Doctor of Economics Doctoral School: International Business Management Option: International Finance] [in French] [\[Link\]](#)
8. Dietsch M. (1992). Quel modèle de concurrence dans l'industrie bancaire? *Revue économique*. [What model of competition in the banking industry? *Economic review*]. *Économie bancaire*, 43(2), 229-260. [\[CrossRef\]](#)
9. Jeitschko, T. D. and Jeung, S. D. (2005). Incentives for risk taking in banking – A unified approach. *Journal of Banking and Finance*, 29, 759–777. [\[CrossRef\]](#)
10. Kablan S. (2007). Mesure de la performance des banques des pays en développement: le cas de l'UEMOA, Workshop du 2 au 7 Juin. [Measuring the performance of banks in developing countries: the case of WAEMU, Workshop from June 2 to 7]. [in French] [\[Link\]](#)
11. Kablan, (2007). Measuring bank efficiency in developing countries the case of WAEMU (West African economic monetary union). African Economic Research Consortium. [\[Link\]](#)
12. Kumbhakar, S. C., and Lovell, C. A. (2003). Stochastic Frontier Analysis, Cambridge: Cambridge University Press. [\[CrossRef\]](#)
13. Nashashibi, K. (1998). Algeria: stabilization and transition to the market. *Funds IMF*, 5(2), 165. ISBN1557756910.
14. Poshakwale, S. S. and Binsheng, Q. (2011). Competitiveness and Efficiency of the Banking Sector and Economic Growth in Egypt. *African Development Review*, 23(1), 99–120. [\[CrossRef\]](#)