A Comparative Study On The Efficiency Of Islamic And Conventional Banks In Mena Region Applying Data Envelopment Analysis (Dea) Method

دراسة مقارنة حول كفاءة البنوك الإسلامية والبنوك التقليدية في منطقة الشرق الأوسط وشمال إفريقيا بتطبيق أسلوب تحليل البيانات (DEA)

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Abstract:

The aim of this study is to measure the efficiency of Islamic and conventional banks in MENA region using the data envelopment analysis (DEA) approach.

This study is based on financial data of 20 banks from 10 countries from MENA region which divided into 5 countries from North Africa and 5 countries from Middle East.

The analysis of the results obtained by the DEA approach allowed us to determine which are efficient. As for the comparison we used the Mann-Whitney non-parametric test to obtain the rank sum on the scores of efficiencies of both banks and see if there are any significant differences between efficiency of Islamic banks and efficiency of conventional banks. The result of this test shows that Islamic banks in MENA region are mostly more efficient than conventional banks but there was no significant difference between Islamic banks efficiency and conventional banks efficiency.

Keywords: Islamic banks, conventional banks, MENA region, Efficiency, DEA.

JEL Classification Codes: G21, G32, D21

ملخص:

إن الهدف من هذه الدراسة هو قياس كفاءة البنوك الإسلامية والتقليدية في منطقة الشرق الأوسط وشمال إفريقيا باستخدام نهج تحليل مغلف البيانات وترتكز على البيانات المالية لعشرين بنكا من 10 دول من منطقة الشرق الأوسط وشمال إفريقيا: 5 بنوك من منطقة شمال افريقيا و5 بنوك من منطقة الشرق الأوسط. سمح تحليل النتائج التي تم الحصول عليها من خلال تطبيق نهج تحليل مغلف البيانات بتحديد البنوك ذات الكفاءة والبنوك التي لا تتمتع بالكفاءة وبالتالي تحديد البنوك التي تعتبر معايير مرجعية. أما بالنسبة للمقارنة فقد سمح استخدم اختبار *Mann-Whitney* بالحصول على مجموع الرتب على درجات كفاءات كل من البنوك الإسلامية والبنوك التقليدية ومعرفة ما إذا كانت هناك فروق ذات دلالة إحصائية بين كفاءة هذه البنوك. تظهر نتيجة هذا الاختبار أن البنوك الإسلامية في منطقة الشرق الأوسط وشمال إفريقيا هي في الغالب أكثر كفاءة من البنوك التقليدية ولكن لم يكن هناك فرق كبير بين كفاءة كل من هذه البنوك.

كلمات مفتاحية: البنوك الإسلامية، البنوك التقليدية، منطقة الشرق الأوسط وشمال إفريقيا، الكفاءة، تحليل مغلف البيانات

تصنيفات JEL : G21, G32, D21

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A COMPARATIVE STUDY ON THE EFFICIENCY OF ISLAMIC AND CONVENTIONAL BANKS IN MENA REGION APPLYING DATA ENVELOPMENT ANALYSIS (DEA) METHOD

INTRODUCTION:

Globalization encompassed a great variety of impact in the economic, social and cultural sectors. It has brought revolutionary changes through deregulation of economies, technological advancements, innovation of products and services in every single sector including banking sector which experienced a several transformations. Islamic banks have a history of conducting business activity under niche market to attract and offer the products and services based on profit and loss sharing paradigm governed by Islamic principles of Sharia. The growing significance of Islamic banking during recent years and their outperformance against conventional system globally has increased relative competitiveness of both banking systems.

As the evolution that Islamic finance and banking know those recent years specially after the financial crises the interest about the Islamic finance had increased and many economists was interested in studying the efficiency of Islamic banks and compare them to conventional banks. So, banking system in the MENA region was one of the interesting systems to studies as the most of countries in MENA zone are Muslim countries and most of these countries have a dual banking system: Islamic banking and conventional banks.

Many studies have proved that Data Envelopment Analysis methods DEA is the most appropriate method to measure the efficiency like the study of Berger and Humphrey in 1997. Data Envelopment Analysis methods (DEA) present many interests to evaluate effectiveness, in particular, for organizations gathering multiple comparable units such as commercial networks. These interests are illustrated by an application to the case of a banking network.

Our study aims to rank Islamic and conventional banks in terms of efficiency by measuring the efficiency of MENA region's banks using data envelopment analysis approach, while comparing the efficiency of Islamic and conventional banks and determine which type of banks is more efficient.

1. Banking system in MENA region:

Most banks in the region are expected to be able to withstand sudden stress. Their loss absorption buffers have been stronger, partially due to the implementation of International Financial Reporting Standards 9 (IFRS 9), which came into force on January 1, 2018. However, high levels of credit concentration and related-party lending remains a key risk, and a modest rise in problem loans is expected due to the lagging effect of the economic slowdown. Overall, the impacts of IFRS 9 on banks are manageable. The capital positions of banks will remain broadly adequate, as the lending growth will be modest and the profitability will be stable. Moreover, governments' willingness and capacity to support banks remain high. In addition, Middle East banking sector's liquidity will remain at a healthy level in 2019, on the back of current oil prices and sovereign support. Banks' funding has been less pressured and is expected to remain stable. (Aitabdellah, 2015)

Nevertheless, the financial performance of Qatari banks has been affected negatively by the continued boycott imposed by other Gulf states. Some banks in the country also face potential risks posed by their international operations, specifically the exposure to Turkey. In addition,

the profitability of banks in Oman and Bahrain is expected to deteriorate, because of the higher loan loss provision charges. The fiscal balances of Oman and Bahrain continues to be under pressures, which reduces the governments' capacity to support banks. In October 2018, Bahrain received $10 billion (BHD 36.73 billion) in financial aid from Saudi Arabia, Kuwait and the UAE, and its government announced a package of reforms that aims to balance its budget by 2022.

Middle East banks are increasingly looking to gain scale and stay competitive through consolidation. Many banks in the region have been involved in takeover or merger talks, especially those in the UAE and Saudi Arabia. For example, Abu Dhabi Commercial Bank announced that it is in merger talks with Union National Bank and Al Hilal Bank in September 2018, and National Commercial Bank, Saudi Arabia's biggest lender, has started initial talks with Riyad Bank for a merger in December 2018. However, only some of these talks can result in a merger. Bank mergers are complex in the region, largely due to substantial government ownership of major banks. Increasing regulatory demand, higher compliance costs, and rapid technological innovations are also key drivers of consolidation. Looking forward, the bank consolidation and merger trend is expected to continue in the region, which will help further consolidate the over-crowded banking systems and improve banks' funding and profitability.
In conclusion, despite the downside risks, the outlook for the Middle East region is positive. The economic growth for the region is expected to strengthen in 2019, and the banking sector on the whole, will deliver good financial performance. (• Athanassopoulos AD, 2000)

2. Literature review:

The comparison between Islamic banks and conventional banks is carried out through two methods: an approach by calculating returns via financial and economic ratios and the so-called efficiency approach, the stochastic frontier approach. It is in this sense that Samad and Hassan (1999), Iqbal (2001) Samad (1999), Bashir (1999), Hassanet Bashir (2003),Bader, Ariff, and Shamsher (2007) have compared the performance, in In particular, the profitability of Islamic banks with their conventional counterparts in using financial ratios, while other authors, namely Al-Jarrah and Molyneux (2003),Shammari (2003), Hussein(2004), Brown and Skully (2005) and Bader , Ariff and Shamsher (2007) used the stochastic frontier approach for the analysis of efficiency between conventional and Islamic banks Bahrain over the period (1985-2001) is relatively stable and in line with the banks of the Organization for Economic Co-operation and Development (OECD).

Hassen noted, that in general, there is no great difference in efficiency between Islamic banks and the traditional investment banks. On the other hand, the only Islamic bank in its sample outperformed their conventional counterparts it was due to a lack of competitions where the Islamic commercial bank has been able to reduce costs inputs and loads.

In the same vein, several economists have supported the idea of efficiency of Islamic banks compared to conventional banks as shown by Hassan and Bashir (2003), Sarker (1999), Bashir (1999), Yudistira (2004) and Hassen (2004).

However, there is no conclusive evidence in this respect. To further substantiate on this controversial issue, the study Shamsher Mohamad, Taufiq Hassan and Mohamed Khaled I. Bader (2009) used a new set of international data over the period (1990-2005) and applied the stochastic frontier approach (SFA) to measure efficiency -cost of 37 conventional banks and 43 Islamic banks at the level of the size, age and region. The results show that there was no

difference in between the overall efficiency performance of conventional banks and the overall efficiency the Islamic ones. (Weill, 2006)

Moreover, Mohamed Khaled I. Bader; Shamsher Mohamad; Mohamed Ariff and, Taufiq Hassan (2008) used the method of data envelopment analyses DEA to masur cost, revenue and profit efficiency of Islamic banks versus conventional banks. They measured the cost, revenue and profit efficiency of 43 Islamic and 37 conventional banks over the period 1990-2005 in 21 countries using Data Envelopment Analysis. The result of this study shows that there is no significant different between efficiency in Islamic banks and conventional banks. Also, both of Habib Ahmed, Syed Zulfiqar Ali Shah and Idrees Ali Shah (2011) utlised Data Envelopment Analysis DEA to measure efficiency of Islamic and conventional banks. The result of their study shows that Islamic banks were technically more efficient than its conventional.

In the same context Jill Johnes, Marwan Izzeldin and Vasileios Pappas (2014) examined efficiency in 19 Islamic bank and 50 conventional bank in the GCC region (2004-2007) using financial ratio analysis (FRA) and data envelopment analysis (DEA).This study showed two different results : The FRA suggests that Islamic banks are less cost efficient and more revenue and profit efficient than conventional banks while DEA results suggests that gross efficiency is significantly higher, on average, amongst conventional compared to Islamic banks, and the difference is significant for both pure technical and overall technical efficiency across the pooled set of efficiencies. In the same year Dr. Said Jaouadi, Rachida Ben Jazia and Azza Ziadi examined the Efficiency and the Effectiveness of Islamic and Conventional Banks in Indonesia using empirical methods. The result of this study shows that Islamic banks in Indonesia are more effective and efficient than conventional banks. (Yudistira, 2004)

In June 2016 Majed Alharthi economics and Finance Plymouth Business School Plymouth University used Data Envelopment Analysis DEA to measure of Efficiency, Profitability and Stability in the Banking Sector he made a cooperation between Islamic, Conventional and Socially Responsible Banks in MENA zone and United Kingdom UK. The result of his study about efficiency shows that Islamic banks are mor efficient than conventional banks. (improve., 2020)

3. Methodological elements:

3.1. Sample determination (DMU):

In order to conduct a meaningful evaluation of efficiency, the DEA Method requires the selection of the homogenous decision-making units operating in comparable environments in terms of opportunities and constraints.

As a response, and in the aim of assessing the efficiency of conventional and Islamic banks in MENA region, in three years from 2016 to 2018, we have chosen to measure the efficiency of the 20 bank from MENA region (10 Islamic banks and 10 conventional banks) to determine the difference in terms of efficiency between the two types of bank (Islamic and conventional).
The table below represents the chosen banks to fulfill the study. (Bekkar, 2006)

Table (1): Sample banks

BANK	COUNTRIE	THE TYPE OF BANK
BNA Algeria	Algeria	Conventional
ABC Bank Algeria	Algeria	Conventional
Popular Bank Morocco	Morocco	Conventional
Export Development Bank of Egypt EBE	Egypt	Conventional
Attijari bank Tunisia	Tunisian	Conventional
Arab Tunisian Bank ATB	Tunisian	Conventional
Bank Sohar Oman SAOG	Oman	Conventional
First Abu Dhabi Bank FAB in UAE	Emirates Arab Union EAU	Conventional
National Bank of Bahrain NBB	Bahrain	Conventional
Capital bank Jordan	Jordan	Conventional
Oumnia Bank Morocco	Morocco	Islamic
Faysel Bank Egypt	Egypt	Islamic
Barakah Bank Algeria	Algeria	Islamic
Zitouna Bank Tunisia	Tunisia	Islamic
Al salam bank al Bahrain	Bahrain	Islamic
Bahrain Islamic Bank BisB	Bahrain	Islamic
Dubai Islamic Bank UAE	Emirates Arab Union EAU	Islamic
Sharjah Bank UEA	Emirates Arab Union EAU	Islamic
Alizz bank Oman	Oman	Islamic
Jordan Islamic Bank	Jordan	Islamic

Source: Elaborated from the literature review

3.2. Data :

Financial reports including balance sheets and income statements of respective banks are used to conduct this analysis so the data of 20 banks has been taken including 10 Islamic and 10 conventional from annual reports published by each bank every year.

3.3. Choice of returns to scale:

The use of DEAP software to get the results of the efficiency measurement of Islamic and conventional banks requires us to make a few decisions before proceeding, among which, we should choose a type of returns to scale whether CRS or VRS.

On the one hand, the assumption of constant returns to scale requires that the DMUs operate in an environment characterized by perfect competition, which is impossible to realize. This implies the choice of the variable return on scale assumption. On the other hand, the CRS hypothesis helps us to make comparisons between all the banks some are their ability to make decisions about their sizes.

So, in our work we're going to take into consideration both hypotheses, namely constant return on scale (CRS) and variable return on scale (VRS).

3.4. Choice of model:

The DEA method records the existence of four models, two of which are fundamental. The first model is the CCR, which assumes perfect competition under the assumption of constant returns to scale. While the second model the BCC assumes CRS for the measure of total efficiency and VRS for the measure of pure efficiency.

Since we chose to conduct our study under both hypotheses, we will use both models mentioned.

3.5. Choice of orientation:

When we measure the efficiency, using the DEA method, of a company that seeks to minimize its inputs while keeping a fixed level of outputs, we say that its system is input-oriented.
On the other hand, when it has a given level of inputs and aims to maximize its outputs, the measurement system is said to be output-oriented.
The choice of orientation has no impact on the results if we assume a constant CRS scale performance. On the contrary, if we assume a variable scale performance VRS, the results obtained by opting for the two orientations will be different.
In our study, we select an input orientation because the quantity of inputs appears to be the variable on which primary decisions are made.

3.6. Choice of variables:

In order to make the choice of outputs and inputs, we have opted for the variables used by the researchers in previous studies, the logic used to build the model and, above all, the availability of data.
Moreover, one of the conditions necessary for the application of the DEA method is that the number of observations must be greater than or equal to twice the product of the number of outputs multiplied by the number of inputs. We have chosen three inputs and two outputs to meet this condition.
The outputs and inputs used are measured in in thousands monetary units.
Before applying the DEA method, it is necessary to describe all the outputs and inputs used.

Table (2): inputs and outputs

Inputs	Description	Outputs	Description
Total deposits	It represents the level of deposits collected by a bank from its customers (clients and financial institutions).	Total credit	it represents the level of credit granted by a bank to its customers (clients and financial institutions).
Capital	Bank capital is the difference between a bank's assets and its liabilities, and it represents the net worth of the bank or its equity to investors.	Net banking income NBI	The NBI represents net interest income and non-interest income (fees and commissions).
Staff costs	It represents Wages, salaries and social insurance received by the bank employees		

Source: Elaborated from the literature review

Before presenting the results given by the DEA method, it is first necessary to present some descriptive statistics relating to the variables used to measure the efficiency of conventional and Islamic banks in MENA region during the period 2016-2018.

Table (03): Descriptive study of inputs and outputs in conventional and Islamic banks

Descriptive study of inputs and outputs.						In thousand
Variables	**Number**	**Year**	**Minimum**	**Maximum**	**Average**	**Stander deviation**
Total credit	20	2016	7998,319328	95807559,18	9748852,154	22160840,32
	20	2017	24421,351322	93749592,375766	10532510,943729	22436873,833154
	20	2018	65140,5547	101377904,8241	11545249,6008	23649664,9994
Net banking income NBI	20	2016	8,897676718	4749191,567	554449,9016	1111832,071
	20	2017	10,600707	4484115,724983	559692,976921	1081410,294348
	20	2018	1796,2323	4469762,3326	606189,8938	1085973,7098
Total deposits	20	2016	16806,72269	116462081,6	11600450,87	26607396,18
	20	2017	19453,367598	116111640,571818	12633560,902019	27013523,421069
	20	2018	31879,4349	137684419,3074	14088782,0246	31515729,7373
Capital	20	2016	9077,210755	2968306,867	537534,9945	756320,7481
	20	2017	40741,495213	2967336,963921	541454,419676	786237,280339
	20	2018	33925,9058	3748330,2164	798824,2811	1078250,0511
Staff costs	20	2016	2076,124567	64861744,32	3349798,208	14480466,66
	20	2017	2611,093265	47111657,773087	2456950,763304	10512817,904738
	20	2018	1762,7420	862293,6404	102915,4314	200749,5053

Source: Results obtained from EXCEL

Descriptive statistics show that the total deposits and total credit during the three years correspond to very large sums compared to other inputs and outputs. In addition, the variables show a significant disparity and an important interval between the minimum and maximum. The variables increased from 2016 to 2018, reflecting the improvement in banking activity and the increase in the level of intermediation.

4. Results presentation:

We applied the DEA method on the model using DEAP version 2.1 software. Subsequently, we obtained results in the form of efficiency scores under the two return to scale assumptions. The Constant Return to Scale (CRS) hypothesis is used to determine the efficiency scores.

gives us the scores for overall technical efficiency, while the assumption of variable scale efficiency gives us the scores for pure technical efficiency. Scale efficiency is given by the CRS/VRS ratio. The results obtained for each year are the following.

Table (04): Efficiency score for 2016.

Number	Bank	Crste	Vrste	Scale	
1	BNA Algeria	0,883	1	0,883	Drs
2	ABC Bank Algeria	0,728	0,879	0,827	Irs
3	Popular bank Morocco	1	1	1	-
4	Export Development Bank of Egypt EBE	0,724	0,877	0,826	Irs
5	Attijari bank Tunisia	0,912	0,923	0,988	Drs
6	Arab Tunisian Bank ATB	1	1	1	-

7	Bank Sohar Oman SAOG	0,896	0,904	0,991	Irs
8	First Abu Dhabi Bank FAB in UAE	1	1	1	-
9	National Bank of Bahrain NBB	0,687	0,71	0,968	Drs
10	Capital bank Jordan	1	1	1	-
11	Oumnia Bank Morocco	0,107	1	0,107	Irs
12	Faysel Bank Egypt	1	1	1	-
13	Barakah Bank Algeria	1	1	1	-
14	Zitouna bank Tunisia	0,872	0,933	0,935	Irs
15	Al salam bank al Bahrain	1	1	1	-
16	Bahrain Islamic Bank BisB	1	1	1	-
17	Dubai Islamic Bank UAE	1	1	1	-
18	Sharjah Bank UEA	0,7	0,808	0,866	Drs
19	Alizz bank Oman	0,296	0,366	0,809	Irs
20	Jordan Islamic Bank	1	1	1	-

Source: Results obtained by DEAP software.

Irs: increasing return to scale, **Drs:** decreasing return to scale

Table (05): Efficiency score for 2017.

Number	Bank	crste	vrste	Scale	
1	BNA Algeria	1	1	1	-
2	ABC Bank Algeria	0,877	1	0,877	irs
3	Popular bank Morocco	1	1	1	-
4	Export Development Bank of Egypt EBE	0,736	1	0,736	irs
5	Attijari bank Tunisia	1	1	1	-
6	Arab Tunisian Bank ATB	1	1	1	-
7	Bank Sohar Oman SAOG	0,913	0,923	0,989	irs
8	First Abu Dhabi Bank FAB in UAE	0,976	1	0,976	drs
9	National Bank of Bahrain NBB	0,703	0,723	0,973	drs
10	Capital bank Jordan	0,779	0,799	0,975	irs
11	Oumnia Bank Morocco	0,609	1	0,609	irs
12	Faysel Bank Egypt	1	1	1	-
13	Barakah Bank Algeria	0,628	0,757	0,829	irs
14	Zitouna bank Tunisia	0,858	1	0,858	irs
15	Al salam bank al Bahrain	0,788	0,806	0,978	irs
16	Bahrain Islamic Bank BisB	1	1	1	-
17	Dubai Islamic Bank UAE	1	1	1	-
18	Sharjah Bank UEA	0,69	0,799	0,864	drs
19	Alizz bank Oman	0,392	0,451	0,869	irs
20	Jordan Islamic Bank	1	1	1	-

Source: Results obtained by DEAP software.

Irs: increasing return to scale, **Drs:** decreasing return to scale

Table (06): Efficiency score for 2018.

Number	Bank	crste	vrste	Scale	
1	BNA Algeria	1	1	1	-
2	ABC Bank Algeria	0,762	0,885	0,861	Irs
3	Popular bank Morocco	0,917	1	0,917	drs
4	Export Development Bank of Egypt EBE	0,49	0,525	0,933	Irs
5	Attijari bank Tunisia	0,857	0,876	0,978	drs
6	Arab Tunisian Bank ATB	1	1	1	-
7	Bank Sohar Oman SAOG	0,7	0,704	0,995	Irs
8	First Abu Dhabi Bank FAB in UAE	1	1	1	-
9	National Bank of Bahrain NBB	0,397	0,399	0,997	Irs
10	Capital bank Jordan	0,434	0,45	0,964	Irs
11	Oumnia Bank Morocco	0,477	1	0,477	Irs
12	Faysel Bank Egypt	1	1	1	-
13	Barakah Bank Algeria	0,57	0,683	0,835	Irs
14	Zitouna bank Tunisia	0,808	1	0,808	Irs
15	Al salam bank al Bahrain	0,526	0,538	0,977	Irs
16	Bahrain Islamic Bank BisB	1	1	1	-
17	Dubai Islamic Bank UAE	0,936	1	0,936	drs
18	Sharjah Bank UEA	0,66	0,84	0,786	drs
19	Alizz bank Oman	0,289	0,327	0,884	Irs
20	Jordan Islamic Bank	0,963	0,965	0,999	Irs

Source: Results obtained by DEAP software.

Irs: increasing return to scale, **Drs:** decreasing return to scale

5. Results analysis:

If we refer to pure technical efficiency dimension, i.e., efficiency under the assumption of a variable return on scale, in 2016, twelve banks are pure technically efficient, including five conventional banks (BNA Algeria, Banque Popular Morocco, Arab Tunisian Bank ATB, FAB in EAU and Capital bank Jordan) and seven Islamic banks (Oumnia Bank Morocco Faysel Bank Egypt, Barakah Bank Algeria, Al salam bank al Bahrain, Bahrain Islamic Bank BisB, Dubai Islamic Bank UAE and Jordan Islamic Bank). These banks represent the best practices and are considered as benchmark banks within the analyzed sample and form an efficiency frontier.

In 2017, thirteen banks are pure technically efficient including six conventional banks (the same banks as 2016 in addition to ABC bank Algeria and Attijari bank Tunisia which become pure technically efficient in this year) and six Islamic banks. In this year both Barakah Islamic Bank Algeria and Al salam Islamic bank al Bahrain went pure technically inefficient while Zitouna Islamic bank Tunisia become pure technically efficient.

In 2018, nine banks are pure technically efficient including four conventional banks and five Islamic banks. In this year ABC bank Algeria, Arab Tunisian Bank ATB, Attijari bank Tunisia and Jordan Islamic Bank become pure technically inefficient.

During the last three years, Alizz bank Oman scored the lowest pure technical efficiency score.

6. The decomposition of efficiency:

We are going to verify whether there are any significant differences in the scores of Islamic and conational calculated in the tables above using the Mann-Whitney test, a rank comparison non parametric test. The results obtained by the test are represented in the table below:

Table 07: Efficiency decomposition of conventional and Islamic banks from 2016 to 2018

	Technical efficiency				Pure technical efficiency				Scale efficiency			
	Rank sum		z/p		Rank sum		z/p		Rank sum		z/p	
	Cnv	Islmic	Z	P	Cnv	Islmic	Z	P	Cnv	Islmic	Z	P
2016	101	109	-0.323	0.7466	113.5	96.5	0.725	0.4683	108	102	0.242	0.8085
2017	93	117	-0.937	0.3487	98.5	111.5	-0.577	0.5640	96	114	-0.703	0.4821
2018	102	108	-0.229	0.8193	111	99	0.476	0.6344	87	123	-1.371	0.1704

Source: developed from statistical processing using STATA 11 software.

Cnv: conventional **Islmic:** Islamic

According to the results obtained by the Mann-Whitney test, no significant difference was noted in 2016 or in the tow next years while Islamic banks have scored the highest rank of technical efficiency during the three years of study, the rank of Islamic banks increased during the period of the study contrary to the rank of conventional banks. In 2016 conventional bank scored a higher rank of pure technical efficiency than Islamic bank it was the same case scenario for 2018 while in 2017 Islamic banks scored the highest rank of pure technical efficiency, no significant difference was noted in these three years. As for scale efficiency conventional bank scored the highest rank for the year 2016 while Islamic bank scored a highest rank for both 2017 and 2018, during the three years of the study no significant difference was noted between the scores of Islamic and conventional banks.

the application of DEA method allowed us to measure the efficiency of twenty banks in the MENA region, determine which banks are efficient and which banks are not and so to determine the benchmarks banks.The application of the test Mann-Whitney allowed us to obtain the rank sum on the scores of efficiency of both Islamic and conventional banks in MENA region which we used to compare between the two type of banks and so determine which banks are more efficient. The results of this test shows that there is no significant difference between the efficiency scores of Islamic and conventional banks while the rank sum shows that Islamic banks in MENA region are mostly more efficient than conventional banks.

Conclusion:

The objective of this study was to assess the efficiency of Islamic and conventional banks in the MENA region during the period of 2016-2018 while make comparison to find out which banks are more efficient by applying data envelopment analysis (DEA) approach. In order to answer the main research question, we used the DEA method to obtain efficiency scores from each bank and then we applied the Mann-Whitney test on those scores to see whether there are any significant differences in term of efficiency between Islamic and conventional banks in MENA region.
After using data envelopment analysis, we were able to measure the efficiency of both Islamic and conventional banks. The application of DEAP software allowed us to obtain the efficiency scores of both banks and determine the benchmark banks.

The results of the efficiency scores of MENA region's banks show that the scores of each bank vary from year to year during the three years of study and some banks that have being determine efficient in the first year of the study can became inefficient in the next year. In addition, the application of the Mann-Whitney non parametric test on the scores obtained by DEAP software allowed us to calculate the rank sum of efficacy of each type of bank during the period of 2016-2018 and so we were able to compare between Islamic and conventional banks efficiency in MENA region.

The results of the Mann-Whitney test showed that Islamic banks are mostly more efficient than conventional banks in MENA region and yet no significant difference in the efficiency scores of both banks were notes during the three years of study.

So, the answer for the main question of our study is that Islamic banks are mostly more efficient than conventional banks in MENA region even though there is no significant difference between the score of efficiency of both banks.

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