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TECHNICAL EFFICIENCY OF ISLAMIC BANKS IN SELECTED AFRICAN COUNTRIES

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ABSTRACT

The size of banking market for Islamic banks in Africa is relatively small. This poses serious threat to the level of competition with conventional ones unless they are technically efficient. Unfortunately, available evidences have shown that Islamic banks in Africa are technically inefficient, though no consensus have been reached on the source(s) of such inefficiency. Therefore this study investigated the technical efficiency of Islamic banks in Africa with particular emphasis pure technical and scale efficiencies. Convenient sampling technique was used to select a sample of 36 Islamic banks for eight (8) years from 2012 to 2019. Data were collected for input and output variables from annual reports of the banks. Data Envelopment Analysis (DEA) was used to analyse the data by estimating the efficiency scores for the banks. The efficiency scores of 0.764 (a_r<1), 0.850 (a_r<1) and 0.896 (a_r<1) for OTE, PTE and SE respectively indicate that on average, the selected banks were technically inefficient. The study concluded that Islamic banks in Africa were technically inefficient due mainly to pure technical inefficiencies such as poor managerial performance. The study then recommended employment and training of staff with requisite skills and knowledge of Islamic banking and finance, to enhance managerial performance and boost their technical efficiency of the banks.

Keywords: Africa, Islamic Banks, Pure Technical, Scale Efficiency, Technical Efficiency.

JEL Classification Codes: G21.

INTRODUCTION

Islamic banking system was introduced in Africa to boost financial inclusion as many Muslims who have been unbanked due to their perception on interest in conventional banking business, were brought to formal financial system. The system also provides opportunity of having competitive rate of return on investment to investors even though they are indifferent to *shariah*-compliant aspect of bank interest. In the area of financial intermediation, Islamic banks have added to the depth of financial intermediation with their presence and operations across Eastern, Western, Northern and Southern Regions of Africa (Faye, Triki, & Kangoye, 2013).

Eastern Africa has the largest number of Islamic banks with Sudan taking the lead regarding the number of full-fledged Islamic banks. Others like Kenya, Djibouti and Tanzania also have about two Islamic banks each (Ernst & Young, 2012). In North Africa, Algeria, Mauritania and Tunisia have joined Egypt in promoting financial inclusion via Islamic banking while Morocco until recently (when the new regulation permitted establishment of full-fledge Islamic banks), has been carrying on Islamic banking business from Islamic windows of conventional banks (Faye, et al., 2013; Bank Negara Malysia, 2017). Gambia, Guinea, Nigeria, Niger and Senegal are West Africa countries with Islamic banking presence. In Southern Africa, two Islamic banks exist- one in South Africa and the other one in Mauritius contrary to the level of financial development of the sub-region. It could however be observed from the above mapping that few countries in the whole of Africa have Islamic banks. This makes Islamic banks in Africa to be negligible both in number and market share when compared with conventional banks.

On the market share of Islamic banking relative to the domestic banking market, African market depicts the under–developed nature of the region as the market share was just about 1.74% in 2017 and 0.85% in 2018. The value of Islamic bank assets in the region was $27.1 billion in 2017 but fell to $13.2 Billion in 2018 (IFSB, 2018, IFSB, 2019). The small size of the market will definitely make it difficult for Islamic banks to have a favourable competition with their conventional counterparts in the aspect of financial intermediation. This is because conventional banks are larger and occupy the larger share of the entire banking market. They are therefore better positioned to provide financial services to their various customers to lower costs. In other words, conventional banks enjoy economies of scale and size in their intermediation functions, which might put long run survival and growth of Islamic banks across Africa in jeopardy. Putting Islamic banks in good competitive position requires some level of efficiency as theoretical literature has linked competiveness of banks to efficient operations. It is therefore important for Islamic banks to operate efficiently at all times for them to be able to compete and survive the completive banking market with larger and established conventional banks as co-participants.

Unfortunately, available evidences have shown that Islamic banks in Africa are technically inefficient (A-Khasawneh, Bassedat, Aktan, & Thapa, 2012). Studies have traced technical inefficiencies to either managerial underperformance as a result of lack of expertise, skills or willingness on the part of the management. Mismatch in the scale of operation has also been linked with technical inefficiency (Effendi, 2016). When inefficiency results from management underperformance, operational performance and growth of the bank will be negatively affected. This is because resources will not be efficiently allocated to the most profitable opportunities. Such inefficiencies put the bank in a less competitive position in the market. Also sub-optimal operation means that increase in size of tends to result in higher cost than necessary for bank's operation (Repkova, 2015). However, the empirical studies on Islamic

banks efficiency in Africa have not given adequate consideration to the issue of managerial underperformance and operating scale making their reports inconclusive. It in this regard, that this study was conducted to investigate technical efficiency of Islamic banks in Africa with particular emphasis pure technical and scale efficiencies.

LITERATURE REVIEW

This study is also hinged upon efficient structure hypothesis as the level of efficiency for Islamic banks will serve as signal for long term competitiveness, profitability and growth the banks as theoretically established. The efficient structure hypothesis developed by Demsetz (1973) states that in any competitive condition in the market, only efficient firms will survive and achieve some growths. The firms then become larger and stronger in the market with greater market share and opportunity for higher profits (Homma, Tsutsui, & Uchida, 2014). According to the theory, efficiency will make the firms to be strong enough to face any competition and surviving such competitive environment will increase market share leading to higher profitability. All other things being equal, long run survival of any firm is a function of profitability. The efficient structure hypothesis makes some theoretical clarifications on how efficient firms have their cost reduced in manner that bring about higher profits to the firms (Chortareas, Garza-Garcia, & Giradone, 2011).

This theory in a nutshell assumes that competitive power and market share and the resultant improved profitability, which are paramount to the survival and growth of any firm, depend on the firm's level of efficiency. According to efficient structure hypothesis, efficient firms tend to be strong enough to face any competition and surviving such competition increases their market share and profitability (Demsetz, 1973; Homma, et al., 2014).

Empirically, many of past studies relied upon the theoretical assumption of the efficient structure hypothesis to assess technical efficiency of Islamic banks. Mixed reports have however been given on comparative analysis of technical efficiency of Islamic and conventional banks across the globe. Mokhtar, Abdullah and Alhabshi (2007), Ahmad and Abdulrahman (2012) and Naeem-Ullah (2013) found that conventional banks are more technically efficient than Islamic banks. The higher technical efficiency recorded for conventional banks may be as a result of size, capital and the experience they have gained over the years of operations because Mokhtar *et al* (2007) have identified bank size and capital adequacy as some of the factors influencing technical efficiency in banks. In some other cases, Islamic banks recorded higher technical efficiency levels than their conventional counterparts (Qurashi, Norway, & Shaikh, 2012; Yahya, Muhammad & AbdulHadi, 2012). According to Hafez and Halim (2021), managerial efficiency in Islamic banks led to improved technical efficiency of the banks.

Focusing on Islamic banks, Abd-rahim, Kadri, and Ismail (2013) examined efficiency of full-fledged Islamic banks and found that the selected banks were technically inefficient. It means that low level of efficiency could be attributed to Islamic banks across regions (Hassine & Limani, 2014; Said, 2013). The cross-country analysis of efficiency of Islamic banks by Tahir and Haron (2010) indicated that Islamic banks in Europe and America are more efficient than those from other parts of the world including Africa. The low efficiency levels in Africa and Asia could be traced to different environmental factors like underdevelopment of financial markets, unislamic banking environment that manifested in fiduciary trust deficit, poor corporate governance and unethical behavior of bank staff and customers. Ahmad and Sufian (2010) reported similar findings on the technical efficiency levels of Islamic banks. Regionally, Yudistra (2004) examined efficiency of Islamic banks between Middle East and Non-Middle

East African countries. Although low level of technical efficiency was found, Islamic banks of the Non-Middle East were less efficient technically. Onour and Abdalla (2011) also reported inefficiency of Islamic banks.

Decomposing technical efficiency into scale and pure technical components, Ismail, Abdulmajid and Abdulrahim (2013) and Kamarudin, Nordin, Muhammad, and Hamid (2014) found that Islamic banks are better in terms of scale efficiency while conventional banks are more pure technically efficient. That is Islamic banks perform better in the selection of operating scale but less efficient when it comes to managerial performance. Abdulsamad (2015) compared pure technical and scale efficiency of Islamic banks and found scale efficiency to be higher pure technical efficiency of the banks. This means that inefficiency is largely due to managerial underperformance. Bahrini (2017) also found that pure technical efficiency was less than scale efficiency in Islamic banks. Contrarily, Yildrim (2017) reported scale efficiency score to be lower than pure technical efficiency.

It could be observed from the above empirical review of literature, that research findings on the technical efficiency of Islamic banks still remain inconclusive; which called for further empirical investigation.

METHODOLOGY

This study studied technical efficiency of Islamic banks in Africa. The study focused the –Africa countries with Islamic banking presence. The countries are Nigeria, Gambia, Djibouti, Kenya, Egypt, Mauritania, Senegal, Sudan and Tunisia. Only full-fledged Islamic banks whose annual reports are readily available and accessible online are selected for this study. Thus, convenient sampling technique was used to select a sample of 36 Islamic banks for eight (8) years from 2012 to 2019. Data were collected for input and output variables from annual reports of the banks. The input variables are labour (personnel) cost, book value of non-current asset and total deposit while output variables are total financing, other earning assets and other income. Technical efficiency scores were estimated and analysed via the Data envelopment Analysis (DEA). The DEA model was specified as follows.

$$Max\ a_r = \frac{\sum_{j=1}^{l} u_j\ y_{jr}}{\sum_{j=1}^{k} v_i\, x_{ir}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .1$$

Subject to the following constraints:

$$\sum_{i=1}^{k} v_i\ \ x_{ir} = 1, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

$$\sum_{j=1}^{l} u_j\ \ y_{jr} - \sum_{i=1}^{k} v_i\ \ x_{ir} \leq 0, \ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

$$u_j,\ v_i \geq 0, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4$$

$$j = 1, 2, \ldots\ldots l,\ i = 1, 2, \ldots\ldots k \text{ and } r = 1, 2, \ldots\ldots s.$$

Where: $i = i^{th}$ input, $i = 1,\ldots,k$; $j = j^{th}$ output, $j = 1\ldots\ldots, l$; $r = r^{th}$ bank, $r = 1,\ldots,s$; a_r = objective measure of efficiency for r^{th} bank; r= a specific bank to be analysed; y_{jr} = amount of output j from bank r; x_{ir} = amount of input i to bank r; u_j= weight of output j; v_i = weight of input i; s= number of banks; l= number of outputs, k= number of inputs.

Efficiency score (a_r) for bank r, was obtained by providing a linear programing solution to the CCR model, where $0 \leq a_r \leq 1$. It should however be noted that efficiency score obtained from CCR model is the overall technical efficiency (OTE) on the assumption of constant return to scale. Decomposition of the efficiency to pure technical efficiency (PTE) and scale efficiency (SE) calls for the estimation of BCC model under the variable return to scale (VRS) assumption.

The only difference between the two models lies in the addition of another constraint for the BCC model as:

$u_j, v_i = 1$…….*5*

In other words, overall technical efficiency (OTE) is estimated with CCR model while the pure technical efficiency (PTE) is determined with BCC model. The next is the determination of scale efficiency (SE). Scale efficiency is the ratio of overall technical efficiency to pure technical efficiency scores and it is computed as $SE = a_r^{CCR}/a_r^{BCC}$.

RESULTS

Table 1. Descriptive Analysis of Efficiency Estimates

Estimator	Obs	Mean	Std. Dev.	Min.	Max.
OTE	288	0.764	0.1803	0.250	1
PTE	288	0.850	0.1597	0.260	1
SE	288	0.896	0.1150	0.510	1

Source: Author's computation

In Table 1, summary statistics on technical efficiency of Islamic banks in Africa are presented. The banks recorded mean efficiency scores of 76.4%, 85.0% and 89.6% for overall technical efficiency (OTE), pure technical efficiency (PTE) and scale efficiency (SE) respectively. This means that on average, Islamic Banks in Africa are not fully efficient as each of the estimates is less than 1. The standard deviation of each of the efficiency estimator (OTE, PTE, SE) for all the selected Islamic banks are 18.03%, 15.97% and 11.50% respectively. The standard deviation represents the spread around the mean efficiency scores. That is, the actual efficiency level for each bank could increase or decrease from the estimated figures by the percentages of standard deviation. For the periods under consideration, the minimum efficiency scores of 25.0% (OTE), 26.0% (PTE) and 51.0% (SE) indicate high level of technical inefficiencies in some of the banks selected for the study. Remarkably however, some of the banks were fully technically efficient with maximum efficiency score of 1 (100%).

Table 2. Average Efficiency Scores for Islamic banks in Africa

Year	OTE	PTE	SE
2012	0.699	0.792	0.876
2013	0.707	0.808	0.872
2014	0.733	0.845	0.870
2015	0.684	0.825	0.830
2016	0.767	0.835	0.913
2017	0.838	0.888	0.943
2018	0.841	0.903	0.933
2019	0.843	0.906	0.934
Mean	**0.764**	**0.850**	**0.896**

Source: Author's computation

Table 2 presented the average efficiency scores for the selected Islamic banks for a period of eight (8) years from 2012 to 2019. The OTE of 0.764 which is less than 1 indicates that, on the average, the banks were not technically efficient. This means that inefficiency of about 23.6% (1-0.764) exists in banks' resources utilization. The inefficiency could be traced to managerial underperformance (pure technical efficiency) and mismatch of operating scale (scale efficiency). This assertion is being supported by the PTE of 0.850 (<1) and SE of 0.896 (<1) as reported in Table 2.

The trend analysis of technical efficiency of the selected Islamic banks shows a growing trend in overall technical efficiency of the banks. In 2012, OTE was about 69.9% and increased to 70.7% in 2013 representing 1.14% growth in the banks' level of technical efficiency. It also increased by about 4.9% to OTE of 73.3% in 2014. Although a slight fall occurred in 2015 with OTE of 68.4%, it later picked in 2016 and the banks' technical efficiency as measured by the OTE improved steadily from 2017 upward. Analysis of efficiency of the banks by year shows that best overall result was achieved in 2019 with OTE of 84.3%. Scale efficiency formed the larger portion of technical efficiency with average value of 93.4% in 2019. The value of PTE was about 90.6%, and lower than SE (90.6% <93.4%) indicating that the observed inefficiency in 2019 was resulted largely from pure technical inefficiencies.

For the periods under review (2012-2019), scale efficiency (SE) scores were higher than those of pure technical efficiency (PTE). This means that the larger part of any observable inefficiency is caused by pure technical inefficiencies in the banks, while scale inefficient accounted for a small portion of such inefficiencies.

Table 3. Target Increase (amount) in Output to be fully efficient

YEAR	OTE	PTE	SE
2012	0.301	0.208	0.124
2013	0.293	0.192	0.128
2014	0.267	0.155	0.130
2015	0.316	0.175	0.170
2016	0.233	0.165	0.087
2017	0.163	0.113	0.057
2018	0.159	0.097	0.067
2019	0.157	0.094	0.066
Mean	**0.236**	**0.150**	**0.104**

Source: Author's computation

It is clear from the analysis that on average, the selected Islamic banks were technically inefficient. The inefficiencies need to be improved upon to make the banks lie on the efficiency frontier. The estimates of what is needed to reach full efficiency are presented in Table 3 above. The target increase in the amount of output on yearly basis are reported in the Table for OTE, PTE and SE which indicate the amount of efforts (in percentage) required to bring the banks to full efficiency technically.

On OTE, the banks were not efficient to the tune 23.6% on average meaning that the output should be increased by 23.6% to attain 100% efficiency. The mean inefficiency scores of 15.0% and 10.4% represent the estimated amount of output needed to attain pure technical and

scale efficiencies respectively. The implication of the mean scores is that on average, the selected Islamic banks require an increase of about 23.6% in its output capacity in the area of intermediation for it to achieve fully efficiency and locate itself on the efficiency frontier. The overall efficiency can be achieved by improving its pure technical and scale efficiencies by 15% and 10.4% respectively.

DISCUSION

Result of data analysis shows that the overall technical efficiency (OTE) is less than 1 (0.764) indicating that, the selected Islamic banks were not technically efficient. This means that the outputs (services) are not being maximized from the available input or resources. The implication is that the cost of intermediation does not commiserate with the services being provided by the banks. In other words inefficiency exists in the provision of bank services to various customers. The finding of this study is in line with Ahmad and Sufian (2010), Onour and Abdalla (2011) that Islamic banks were technically inefficient. Similar reports have also been given by Abdulrahim et al. (2013), Said (2013), and Hassine and Limani (2014) on technical efficiency of Islamic banks in different countries of Africa and Asia. The low efficiency levels in Africa could be traced to different environmental factors like underdevelopment of financial markets, un-Islamic banking environment that manifested in fiduciary trust deficit, poor corporate governance and unethical behavior of bank staff and customers. The mean score of 23.64% means the inefficiency attributable to the technical efficiency of the banks. It is therefore output maximization deficit that must be put back to be fully efficient technically.

Tracing the source(s) of the observed inefficiencies in the banks, the technical efficiency was decomposed into pure technical efficiency (PTE) and scale efficiency (SE) components. It was found that PTE of 0.850 (<1) and SE of 0.896 (<1) means that the banks were not efficient in terms of both pure technical and scale efficiencies. This implies that the observed inefficiency could be traced to managerial underperformance (pure technical efficiency) and mismatch of operating scale (scale efficiency). However, the study revealed scale efficiency to be higher than pure technical efficiency of the banks. This means that substantial part of technical inefficiency identified was caused by managerial underperformance in terms of skills, expertise and even the willingness of management to maximize the output from the available inputs. This finding is in tandem with Bahrini (2017) on the higher scale efficiency scores for Islamic banks. Ismail et al. (2013), and Abdulsamad (2015) reported that Islamic banks in Asia were more scale efficient. Contrarily, Yildrim (2017) reported scale efficiency score to be lower than pure technical efficiency.

Therefore, the findings of this study indicate that Islamic banks in Africa are technically efficient and such inefficiency needs to be addressed for the banks to be able to withstand competition in the domestic and international banking market as enshrined in the efficient structure hypothesis

CONCLUSION

The study assessed the overall, pure technical and scale efficiency of Islamic banks in Africa. It was found that each of efficiency scores for the three estimates (OTE, PTE and SE) is less than 1 on average. This means that the banks were not technically efficient and that the inefficiency associated with the banks resulted majorly from pure technical inefficiencies. The study therefore concluded that Islamic banks in Africa were technically inefficient due to poor managerial performance. The poor performance could be traced to lack expertise and knowledge

of Islamic banking and finance as well as willingness on part of management of Islamic banks in Africa. Based on the above conclusion, the study recommends employment and training of staff with requisite skills and knowledge of Islamic banking and finance, to enhance managerial performance and boost their technical efficiency of the banks.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests.

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All authors contributed equally to the conception and design of the study.

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