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ISLAMIC BANKING EFFICIENCY: A CROSS-COUNTRY ANALYSIS OF AFRICA AND ASIA

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Abstract

The Islamic banking system has been adopted by many countries, as a veritable alternative to interest-based banking in the area of intermediation and inclusive finance. However, the efficiency of the system which is fundamental to the competitiveness of the banks is currently being questioned. This study, therefore, made a country-wise analysis of Islamic banking efficiency in selected countries of Africa and Asia from 2012 to 2019. Fifty-Six Islamic banks were selected from Seventeen Countries and data were collected from annual reports of the banks. Data Envelopment Analysis (DEA) was used to estimate the technical efficiency scores of the banks. Country-level average efficiencies were then used for the analysis. The study found that the selected Islamic banks were not fully efficient. It was also found that the observed inefficiencies were majorly pure technical. The study concluded that Islamic banking systems in the selected countries were technically inefficient due to pure technical inefficiencies (managerial underperformance- lack of skills, competence) in Islamic banking operations. Employment of competent managerial staff is therefore recommended to boost the technical efficiency of the banks and enhance their competitive positions in the market.

Keywords: Africa, Asia, Efficiency, DEA, Islamic Banking.

JEL Classification: G24, O22

Introduction

Islamic banking is a veritable alternative to the interest-based banking system in the area of intermediation and inclusive finance. Many countries across the globe, have embraced the initiative in recognition of the banking model (Hussain, Shahmoradi & Turk, 2015). Countries like Malaysia, Bangladesh and Indonesia pioneered the banking system in Asia in an attempt to meet people's demand for *Shariah*-compliant products or services (Komijani & Taghizadeh-Hesary, 2018). Today, the Asian market leads in the provision of such services as Islamic banking dominates the entire Islamic financial market in the region. On the global scale, Asia

accounts for more than 22% of the global Islamic financial assets (Komijani&Taghizadeh-Hesary, 2018). The success recorded so far in Asia was due to the contributions of countries like Malaysia, Iran and Saudi Arabia which collectively hold about 60% of global Islamic banking assets (Li, 2016). This means that Islamic banking now constitutes a major part of the Asian banking market.

In Africa, Abdu, Jibri, Abdullah and Rabiou (2018) stated that Islamic banking was adopted following the Asian model, due to people's perceptions about interest (*riba*). Several countries (across Eastern, Western, Northern and Southern parts) of Africa now operate Islamic banking either from full-fledged banks or as windows of conventional banks. Sudan has the highest number of full-fledged Islamic banks with a hundred percent *shariah*-compliant services. Countries like Algeria, Djibouti, Egypt, Nigeria, Kenya, Tanzania, and Tunisia, among others are playing different roles deepening in the financial sector and promoting financial inclusion via Islamic banking in Africa (Faye, Triki & Kangoye, 2013). It should however be noted that the African market for Islamic banking is still evolving with a market share of 0.85% in 2018 (IFSB, 2019).

Although it has been established that countries from Africa and Asia have contributed immensely to the growth of the Islamic banking system, the banking market still occupies a small position in the entire commercial banking sector. According to Goh (2018), the ratio of Islamic banking to total commercial (domestic) banking assets was around 30%, while that of Africa was even not up to 10% of domestic banking assets in the region. The small market share of Islamic banks in the two regions may affect their competitiveness and the developmental efforts of the countries, in this regard, may not yield expected results except the banks are efficient despite the smallness of their market share. In other words, these banks should be efficient technically for them to remain in the market. Several studies have examined the efficiency of Islamic banks (Altun-Ada & Dalkilic 2014; Bahrini, 2017; Tahir & Haron, 2012; Wanke, Hassan & Gaviao, 2017). Country-level comparison is however missing in the literature, particularly among African and Asian countries. This study, therefore, contributes to the literature by making a country-wise analysis of Islamic banks' efficiency in some selected countries of Africa and Asia.

Literature Review

Concept of Efficiency

According to Kumar and Gulati (2010), efficiency means the allocation of resources to alternative uses in a manner that a given level of output is achieved with minimum resource input. It is a measure of an organization's ability to get maximum results in terms of output from a given input or use minimum input to produce a given level of output. Efficiency is the ability of a production or a decision-making unit to use available inputs (resources) for the production of a maximum or optimal output. In other words, the most efficient technique of making a product or discharging a service is that which utilizes the minimum (least) resources (Ogunyinka & Ajibefun, 2003).

Efficiency is therefore a measure of association between inputs and outputs as well as the degree of success achieved in the transformation of the inputs into outputs (Low, 2000). The degree of success measured by efficiency means that the firm is successful in the process of resource utilization which might not necessarily transform into market performance. The concept of efficiency is better understood when the term is decomposed into technical, pure technical and scale efficiencies.

Technical Efficiency

Zieba (2011) defines technical efficiency as managerial ability which is demonstrated in deriving the maximum amount of output from the resources available to a firm, using the existing production technology. Also Watkins, Hristovska, Mazzanti, Wilson & Schmidt (2014) state that technical efficiency measures the ability of a decision-making unit (like a bank) to employ a set of inputs in the production of maximum feasible output (output-oriented) or obtain a given level of output by utilizing the minimum amount of inputs (input-oriented).

The implication of the above definition of technical efficiency is that the utilization of available resources to produce maximum output depends on the skills, expertise and capability and as a matter of fact, willingness of the management. In the words of Shanmugam and Venkataramani (2006), technical efficiency represents both the ability and willingness of a firm to produce the maximum possible output from a given amount of input, under the existing technological and environmental conditions. In measuring the economic profitability of a firm, technical efficiency is a key element because it shows the ability of the firm to achieve maximal output from the few resources at the firm's disposal (Giroh, 2012).

Technical efficiency is a measure of the process that an organization follows in converting its input to output as compared to its maximum potential of doing the same as assumed by the production possibility frontier (Barros & Mascarenhas, 2005). In this context, a technically efficient firm is a firm that operates on the production frontier while any firm operating below the frontier is technically inefficient. Inefficiency could be corrected either by putting more effort to increase output with the same input (reduction of wastage) or by using fewer inputs to produce the same amount of output (Rukwe & Zubair, 2019). Production frontier analysis of technical efficiency indicates that the closer a production unit (firm) moves to the frontier, the better in terms of technical efficiency (Rahman, Ajayi & Gabriel, 2005).

Pure Technical Efficiency

A further decomposition of technical efficiency is what brings about pure technical and scale efficiencies. According to Kumar and Gulati (2008), pure technical efficiency is obtained by measuring technical efficiency with no consideration for scale efficiency. Pure technical efficiency shows the extent to which the inputs of a firm can be proportionally reduced with no effect on its status on the variable return to scale (VRS) frontier (Diacon et al., 2002). This implies that pure technical efficiency is normally estimated under the variable return to scale (VRS) assumption. The resultant efficiency measure is pure technical which shows the level of managerial performance in organizing the available inputs to achieve the maximum output in the production process (Kumar & Gulati, 2008). In a nutshell, pure technical efficiency is a measure of managerial performance. If a firm is pure technically inefficient, it means there is managerial underperformance in the resource utilization of the firm.

Scale Efficiency

Scale efficiency is defined as the kind of relationship which exists between the level of output and average cost. It thus relates to the firm's size of operation (Abel & Bara, 2017). Scale efficiency, according to Kumar and Gulati (2008), measures the ability of management in selecting the optimum size of resources for the firm's operation. That is the selection of production scale required for the expected level of production. Such selection requires some managerial skills because an inappropriate size of operation may lead to technical inefficiency (Iqbal & Awan, 2015). The scale efficiency operates under three possibilities which are constant returns to scale (CRS), increasing returns to scale (IRS) and decreasing returns to scale

(DRS). For the CRS, change in output results from proportional change (increase or decrease) in inputs and any firm operating on CRS is assumed to be scale efficient.

When a firm is found to be operating at the IRS, such that the output increases more than the input, it means that the firm is not efficient in terms of the scale of operation. There is a need to increase its size as the firm is operating below the optimal size. Lastly, a firm which operates at a DRS will have a change (increase) in its output far less than the increase in input. The implication is that the firm operating above the optimal size, also implying scale inefficiency. A firm is therefore said to be scale efficient if it operates at a constant return to scale. Operating at either increasing returns to scale or decreasing returns to scale means, that the firm is characterized by scale inefficiency (Abel & Bara, 2017).

Empirical Review

Several empirical studies have analysed the efficiency of Islamic banks in many countries of Africa and Asia. Hussein (2003) reported inefficiencies for Islamic banks in Sudan as the study found that the Islamic banks had sub-optimal performance in resource utilization. This means that the Sudanese Islamic banks were not efficient. Yudistira (2004) included Algeria, Egypt, Gambia and Sudan in a cross-country analysis of the efficiency of Islamic banks in the Middle East and non-Middle East countries. The efficiency of the Middle East banks was found to be higher than that of the Non-Middle East. Islamic banks in Gambia and Sudan were also found to be inefficient.

Ahmad, Noor and Sufian (2010) studied bank efficiency of Islamic banks along the World Bank economic classification of countries. The study selected a sample of seventy-eight Islamic banks from high-income and low-income countries and data extracted from their annual reports and bank scope database. Using the Data Envelopment Analysis (DEA), Islamic banks from high-income countries were found with higher efficiency. Contrarily, Tahir and Haron (2010) employed a stochastic frontier approach (SFA) to analyse the efficiency of Islamic banks in countries of Africa, Asia and Europe. One Hundred and Ninety-Three banks were selected for which data were obtained from Bankscope. A higher level of efficiency was reported for Islamic banks in Africa and they were found to be more efficient than those in Asia.

In a study involving Islamic and conventional banks, Ahmad and Abdulrahman (2012) selected eight conventional banks and two Islamic banks in Malaysia. The banks' efficiency was estimated with Data Envelopment Analysis (DEA). The result of the analysis showed that Islamic banks were less efficient technically in comparison with conventional banks. However, Yahya, Muhammad and AbdulHadi (2012) found that Islamic banks were more technically efficient than conventional banks. A similar result was reported by Ismail, Abdulmajid and Abdulrahim (2013) for scale efficiency. In terms of pure technical efficiency, however, Ismail et al. (2013) found that conventional banks were more efficient.

In another comparative study, Qureshi, Norway and Shaikh (2012) estimated the efficiency levels of banks in Pakistan using DEA. It was revealed that Islamic banks were more cost-efficient than their conventional counterparts but less efficient in the area of revenue. This contradicted Al-Khasawneh, Bassedat, Aktan and Thapa (2012) who found that conventional banks are less efficient than Islamic banks in terms of revenue generation. Similar to Ismail et al. (2013), Naeem-Ullah (2013) found that the technical efficiency of Islamic banks is lower than conventional banks in Pakistan. In a related study of Asian banks, Saeed, et al. (2013) reported that conventional banks are more efficient than Islamic banks. Fakarudin, Nordin,

Muhammad and Abdulhamid (2014) found that, in GCC countries, conventional banks recorded higher efficiency than Islamic banks in terms of cost, revenue and profit.

Rozzani and Abdulrahman (2013) assessed the profit efficiency of Islamic and conventional banks in Malaysia from 2008 to 2011. Stochastic Frontier Analysis was used to measure the efficiency of the banks. The study could not differentiate between Islamic and conventional banks in terms of profit efficiency. Considering only Islamic banks, Ab-Rahim et al. (2013) studied the efficiency of full-fledged Islamic banks in Malaysia. The selected Islamic banks were found to be inefficient. The study of Altun-Ada and Dalkic (2014) also found a higher efficiency for Islamic banks in Malaysia than in Turkey.

Decomposing the efficiency of the banks, Abdulsamad (2015) revealed that Bangladeshi Islamic banks have higher scale efficiency than pure technical efficiency scores. Also, Effendi (2016) reported that Islamic rural banks in Indonesia were technically efficient. Like Fakarudin et al. (2014), Alharbi (2016) examined the cost and revenue efficiency of Islamic and conventional banks in the OIC countries. Islamic banks were found with higher cost efficiency but lower revenue efficiency than conventional banks. Following Abdulsamad (2015), Bahrini (2017) decomposed efficiency into pure technical and scale for Islamic banks in the MENA and GCC countries. The study found that MENA Islamic banks were more scale efficient. Also, Yildirim (2017) reported that Islamic banks in QISMUT countries were neither pure technically nor scale efficiently.

The above empirical review shows that there is still a dearth of research on the country-wise analysis of the efficiency level of Islamic banks.

Efficient Structure Hypothesis

According to Demsetz (1973), the hypothesis proposed that only efficient firms survive the market competition and achieve sustainable growth. Surviving such competition will lead to an increase in the size and market share of the firms. Homma et al. (2014) opined that the larger the firms become the greater the opportunity for more profitable activities. In other words, the hypothesis held that an increase in size and market share, as well as higher profitability, are products of the high-efficiency level of the firm. Profitable firms tend to have long-run survival and growth and this is basically due to the cost reduction capability of an efficient firm (Chortareas et al., 2011). In summary, increased size, market power and market share and profitability are the necessary ingredients for a firm's survival and growth. The efficacy of these ingredients in achieving long-term growth depends largely on the efficiency level of the firm (Chortareas et al., 2011).

The theoretical relationships between efficiency, competition and profitability as established by the efficient-structure hypothesis have been validated in past empirical studies like Mensi and Zouari (2010), Seelanatha (2010), Kasman et al. (2011) and Ferrouhi (2018). Many of these studies reported results confirming of efficient structure hypothesis.

The efficient structure hypothesis serves as the theoretical underpinning for this study because the efficiency of Islamic banks tends to improve the competitiveness, profitability and long-term growth of the banks. A high level of efficiency will enable Islamic banks to compete favourably with conventional ones in the area of financial intermediation. Thus the efficient structure hypothesis is used to explain the country-level technical efficiency of Islamic banking in Africa and Asia.

1. Methodology

This study selected 56 full-fledged Islamic banks from 17 countries across Africa and Asia. The World Bank economic classification of countries was used as the yardstick for the selection and thus the study was restricted to the Low-income economies of Africa and Asia. The sample of the 56 banks was conveniently selected from a population of eighty (80) full-fledged Islamic banks collated from the countries' Central bank's websites. The sample selection was made up of those banks whose annual reports are readily available in the public domain. Based on these facts, 36 banks were selected from 10 African countries while 20 banks were selected from 7 Asia countries. Therefore, the scope of this study is on 17 Low-income countries that adopt the Islamic banking system for 8 years period from 2012-2019 (Appendix 1).

Data were collected from the annual reports of the banks and efficiency scores were estimated with DEA. The DEA model is stated as follows:

$$\text{Max } a_r = \frac{\sum_{j=1}^l u_j y_{jr}}{\sum_{i=1}^k v_i x_{ir}} \quad \dots \dots \dots 1$$

Subject to the following constraints:

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

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

$$u_j, v_i \geq 0, \quad \dots \dots \dots 4$$

$$u_j, v_i = 1, \quad \dots \dots \dots 5$$

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

Based on the above model, the efficiency score (a_r) for bank r , was via the CCR model, where $0 \leq a_r \leq 1$. The BCC model was estimated for the purpose of PTE and SE estimations. The SE was given as $SE = a_r^{CCR} / a_r^{BCC}$. For the purpose of country-wise analysis, efficiency scores for OTE, PTE and SE were estimated for each bank from all the selected countries and country-level averages were calculated and reported appropriately.

2. Results

Table 1 provides a description of estimators of overall technical efficiency (OTE), pure technical efficiency (PTE) and scale efficiency (SE) for Islamic banks in the low-income countries of Africa and Asia over a period of eight years from 2012 to 2019.

Table 1: Descriptive Analysis of Efficiency Estimates

Estimator	OTE	PTE	SE
Mean	0.7875	0.8663	0.9076
Max	1.0000	1.0000	1.0000
Min	0.2500	0.2600	0.4500
Obs	448	448	448

Source: Authors' computation (2022)

From Table 1, the overall technical efficiency (OTE) of the selected banks showed a mean value of 0.7875 indicating that on average the banks were not technically efficient. This is because the OTE score is less than 100% ($a_r = 0.7875$; $a_r < 1$) for all the selected banks over the period of the study. Both the purely technical and scale efficiency score was also less than 1. The PTE shows a mean score of 0.8663 while that of SE is 0.9076. According to Kumar & Gulati, (2008) pure technical shows the level of managerial performance in organizing the available inputs to achieve the maximum output in the production process. That is, pure technical inefficiency indicates managerial underperformance in resource utilization.

The banks could not also achieve full efficiency in the scale of operation with the average of the banks' SE being less than 1. This also means that the inability of the banks to reach the technical efficiency frontier could also be traced to poor selection of operating scale as opined by Iqbal and Awan (2015). Therefore the above results indicate that the banks were not efficient and their inability to reach full efficiency resulted from managerial inefficiency and scale of operation.

According to Table 1, the banks, once in a while, reach the efficiency frontier (full efficiency) in all three estimators (OTE, PTE, SE). This is indicated by the maximum score of 1.000 as reported in the Table. The minimum values showed the highest level of inefficiencies attributed to the selected banks for the period under consideration.

Table 2: Average Efficiency Scores

Year	OTE	PTE	SE
2012	0.786757	0.865442	0.907631
2013	0.786538	0.865747	0.907136
2014	0.786591	0.865824	0.90712
2015	0.787072	0.866126	0.90733
2016	0.787551	0.866427	0.90754
2017	0.788027	0.866726	0.907748
2018	0.788501	0.867025	0.907955
2019	0.788929	0.867299	0.908139
Average	0.787496	0.866327	0.907575

Source: Authors' computation (2022)

Table 2 showed technical efficiencies (OTE, PTE, SE) of selected Islamic banks in Africa and Asia from 2012 to 2019. The mean score of 0.787 shows that averagely, the banks were technically inefficient. The average scores of purely technical and scale efficiencies were 0.866 and 0.907 respectively. The average score for OTE means that for any of the banks to achieve full efficiency, efforts must be made to increase its output (financing contracts) by (1-0.79) 21%. For PTE and SE, the such bank will only be efficient by increasing its PTE and SE by (1-0.87) 13% and (1-0.91) 9% respectively. The implication is that the banks were more scale efficient and the inefficiencies observed overall, resulted largely from pure technical inefficiencies. Also, the highest efficiency for all the banks was recorded in 2019 across the three estimators (OTE, PTE, SE).

Table 3: Average Efficiency Measures by Country

S/N	Country	OTE	PTE	SE	Number of banks
1	Afghanistan	0.75	0.86	0.86	1
2	Bangladesh	0.84	0.91	0.93	9
3	Djibouti	0.80	0.89	0.89	3
4	Egypt	0.85	0.89	0.95	3
5	Gambia	0.82	0.87	0.94	1
6	Indonesia	0.79	0.89	0.89	2
7	Jordan	0.95	0.97	0.98	1
8	Kenya	0.81	0.90	0.90	2
9	Mauritania	0.75	0.85	0.88	3
10	Nigeria	0.78	0.86	0.91	1
11	Pakistan	0.81	0.84	0.96	2
12	Palestine	0.90	0.95	0.94	1
13	Senegal	0.67	0.75	0.89	1
14	Sudan	0.73	0.82	0.89	18
15	Tanzania	0.73	0.83	0.88	1
16	Tunisia	0.87	0.95	0.91	3
17	Yemen	0.82	0.89	0.92	4

Authors' computation (2022)

Table 3 presents the 17 countries and the number of banks selected from each country. From the Table, 18 Islamic banks were selected from Sudan. This represents about 32% of the sample. The selection was possible because the Sudanese banking system is *shariah*-based. In Bangladesh, 9 banks were selected while 4 Islamic banks were chosen from Yemen. The study featured 3 banks each from the African countries of Djibouti, Egypt, Mauritania and Tunisia. Also, 2 banks each were selected from Indonesia, Kenya and Pakistan. Other countries- Afghanistan, Gambia, Jordan, Nigeria, Palestine, Senegal, and Tanzania had 1 bank each within the sample. Efficiency scores were estimated for each bank from all the selected countries and country-level averages were reported in Table 3 for the three estimators. The country-wise analysis was made using Figure 1 presented below.

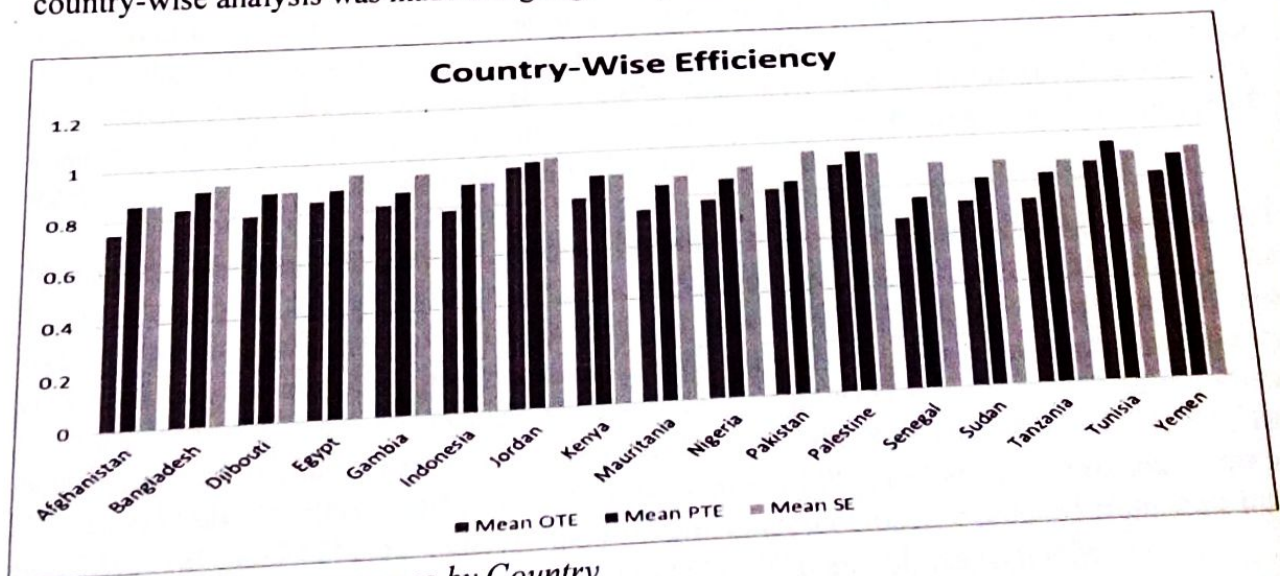


Figure 1: Efficiency measures by Country
Source: Authors' presentation (2022)

Average efficiency scores of all banks from each country were taken and reported as presented in the Figure 1 above. This allows some comparative inferences regarding the efficiency of Islamic banking in the selected countries. Figure 1 is the bar chart for country-level analysis of OTE, PTE and SE for comparative purposes. According to the chart, Jordan was found to be the only country with the most efficient Islamic banking system, having its efficiencies estimated to be close to 1. According to Table 3, which is represented by the chart, the OTE, PTE and SE were recorded as 95%, 97% and 98% respectively. This implies that the inefficiency in the country's Islamic banking is just around 5% overall and it is traceable to both pure technical and scale inefficiencies. Palestine comes second on the log with a 90% overall technical efficiency score over the period of the study. The result indicates that the efforts of Islamic banks in the country should be directed on how to improve their efficiency by 10% for it to be on the efficiency frontier. This may be achievable by working on both the purely technical and scale efficiencies which recorded average measures of 95% and 94% respectively.

Tunisia, an African country was found as the third most efficient in terms of the Islamic banking system. The average efficiency scores of the three Islamic banks selected from Tunisia show 87% OTE with PTE and SE of about 95% and 91% respectively. That is, overall, the most efficient country in Africa in the area of Islamic banking is far from the frontier of the best practice bank by about 13%. However, the purely technical and scale efficiencies show that the banking system is not doing badly when compared with a more efficient system in Palestine. According to Figure 1, the PTE of Tunisia and Palestine, which is the second most efficient system according to the study are the same.

Bangladesh, Egypt and Kenya also recorded high pure technical and scale efficiencies. Bangladesh recorded 91% pure technical efficiency (PTE) and 93% scale efficiency (SE). Egypt has a lower PTE of 89% but higher scale efficiency of 95%. This means that while Bangladesh from Asia is purely technically efficient than Egypt, the African country has a higher level of scale efficiency. Egypt was more scale efficient than Palestine which was found as the second with the most efficient Islamic banking system.

Countries like Pakistan, Gambia, Yemen, and Nigeria were found to have high-scale efficiency, though were not doing too well in the aspect of overall and pure technical efficiencies. Pakistan was found to be scale efficient to the tune of 96% but with inefficiencies of about 19% and 16% in the area of overall technical and pure technical efficiencies respectively. The Gambia is 2% lower than Pakistan on the scale efficiency measures. That is, the Gambia has 94% on a scale but 18% (82% efficiency) inefficiency overall. Yemen and Nigeria scored an average of 92% and 91% respectively on their scale efficiency measures.

However, Countries like Senegal, Sudan, Tanzania, Mauritania, Indonesia, Afghanistan and Djibouti exhibited low efficiencies over the periods of the study. According to Figure 1, the overall technical efficiency (OTE) for Senegal was 67% implying 33% inefficiency. The country also recorded 25% pure technical inefficiency (PTE, 75%). The highest efficiency estimate for Senegal was 89% which is in the operating scale (SE). In the case of Sudan whose banking system is 100% Islamic, efficiency scores were 73%, 82% and 89% for OTE, PTE and SE respectively. In other words, the Sudanese Islamic banks need to put efforts into ensuring that 28%, 18% and 11% are added to their intermediation outputs or reduced from their input resources to reach full efficiency in relation to OTE, PTE and SE respectively.

An efficiency pattern similar to that of Sudan was displayed for Tanzania. The overall technical efficiency for Tanzania was 73% requiring about a 27% increase in output for the country's Islamic banks to be fully efficient. Decomposing the technical efficiency, Tanzania shows 17% pure technical inefficiency (0.83) and 12% scale inefficiency (0.88). Tanzania's Islamic banking inefficiency was just about 2% lower than that of Mauritania in the area of OTE and PTE. Both countries recorded the same values for scale efficiency (0.88) and so, their scale inefficiency is 12%.

In Afghanistan, Islamic banks scored 75% overall technical efficiency on average. This distances the banks to the efficiency frontier of the best practice bank(s) by 25%. The inefficiency score recorded overall, could be traced to both managerial incompetence and the wrong choice of operating scale. That is, the PTE and SE each of which recorded an efficiency score of 86% Indonesia and Djibouti have the same scores (0.89) for PTE and SE while Djibouti is 1 % higher overall than Indonesia as could be rightly observed from the chart. It is also important to note from the above analysis that none of the selected banks is fully efficient over the selected periods.

3. Discussion

The study examined Islamic banking efficiency in some selected countries in the low-income economies of Africa and Asia. It was found that the banks were not technically efficient as average efficiency scores across the countries are less than 1. Thus, no country's Islamic banking was fully efficient during the period under consideration. This result was in line with Ahmad et al. (2010) who reported that low-income countries' Islamic banks were technically inefficient. The findings of Naeem-Ullah (2013) and Saeed et al. (2013) were also consistent with the result of this study. Conversely, Al-Khasawney, et al. (2012) reported a contradictory result regarding the technical efficiency of Islamic banks.

However, some countries were found to be more efficient than others as shown by the technical efficiency estimators (OTE, PTE, SE). The differences in the efficiency levels across the countries 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 behaviour of bank staff and customers. According to Alharbi (2019), the underdevelopment of the financial market in terms of market liquidity affects bank efficiency. It could also be implied from the findings that, in those countries with higher technical efficiency, Islamic banks would be able to compete favourably with conventional banks in the area of financial intermediation as suggested by the efficient structure hypothesis. The findings of this work also support the report of Altun-Ada and Dalklic (2014) on the efficiency of Islamic banks.

The study also revealed that the selected banks across the countries recorded higher efficiency scores for SE. This means that the countries with Islamic banks were more scale efficient. The implication is that the observed inefficiencies in the overall technical efficiency of the banks are majorly pure technical. Pure technical measured the level of managerial performance in organizing the available inputs to attain maximum output in the production process. For a bank, it has to do with how much financial services are provided from the available resources. That is, pure technical inefficiency indicates managerial underperformance in resource utilization. Also, reports by Abdulsamad (2015), Effendi (2016) and Bahrini (2017) were in tandem with high-scale efficiency recorded in most of the selected banks across the selected countries. The result however contradicted Yildirim (2017) who found low-scale efficiency for Islamic banks.

This implies that for the selected banks, scale inefficiency contributed less to the observed inefficiencies.

4. Conclusion

The study hinged upon the theoretical explanation provided by the efficient structure hypothesis to conduct a country-wise analysis of Islamic banking efficiency in some selected countries of low-income economies of Africa and Asia. Results of the analysis revealed that Islamic banking systems across the selected countries were technically inefficient though high efficiency was recorded in a few countries like Jordan and Palestine with overall efficiency scores above 90%. The study also reports that the scale efficiency was higher than pure technical efficiency in most of the countries with Islamic banks. It is based on these findings that the study concluded that Islamic banking systems in the selected countries were technically inefficient due to pure technical inefficiencies (managerial underperformance- lack of skills, competencies) in Islamic banking operations. Competent managerial staff are recommended for recruitment, to boost the technical efficiency of the banks and enhance their competitive positions in the market. Future research should increase the sample size and coverage period to have a more robust analysis as this study was restricted in these areas due to the inaccessibility of data for some Islamic banks.

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