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COMPARING THE FINANCIAL PERFORMANCE OF ISLAMIC BANKS IN 10 COUNTRIES: NEW EVIDENCE USING ENTROPY AND WASPAS METHODS

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ABSTRACT

This research aims to determine the most crucial financial performance indicators for Islamic banks and to rank Islamic countries according to their financial performance. In line with the purpose of the research, entropy and Weighted Aggregated Sum Product Assessment (WASPAS) methods were used to examine 10 selected Islamic countries (Turkey, Malaysia, Bangladesh, Indonesia, Jordan, Kuwait, Nigeria, Oman, Pakistan, and the UAE) using annual data for the 2013–2020 period. The results of the entropy method showed that the financial performance of Islamic banking is mostly affected by the net non-performing loans ratio and profitability ratios. The results of the WASPAS method indicated that the country with the highest financial performance was Bangladesh. It was followed by Jordan, Turkey, Pakistan, the United Arab Emirates (UAE), Malaysia, Indonesia, Kuwait, and Nigeria, respectively. The lowest financial performance was that of Oman. A low non-performing loan ratio leads to higher financial performance and is of greater importance than profitability ratios, as expected. This study offers a way for the managers of Islamic banks to enhance their financial performance by determining effective financial performance indicators. It also reveals the differences among the selected Islamic countries in terms of financial ratios. The research represents a preliminary study that provides evidence for a selected country group using entropy and WASPAS methods.

Contribution/Originality: The study reveals the effect of Islamic banking on the financial system by comparing the financial performance of banks operating in 10 selected Islamic countries with the entropy and WASPAS methods. Its sampling and methodology are innovative, and its findings contribute to the literature.

1. INTRODUCTION

Islamic finance and banking are based on the principles of Islamic law (shariah). Nonetheless, they support risk and profit-sharing (risk/profit sharing), asset-based transactions, and ethical investments (Shamsuddin, 2014). Over the last two decades, the Islamic finance sector has proved itself one of the fastest-growing sectors in the world, with a market value of $2.4 trillion dollars in 2017. This value is expected to increase to $3.4 trillion dollars in 2024 (Anadolu Agency (AA), 2020; Reuters, 2020). With the rapid growth of Islamic financial markets, scholars, bank managers, and policymakers have shown increasing interest in the Islamic finance industry (Samitas, Papathanasiou, & Koutsokostas, 2021). One of the most debated issues among academics and practitioners in the financial performance literature is the question of what the key performance indicators are that most affect financial

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performance and overall bank performance (Ledhem & Mekidiche, 2020; Yıldız, 2020). In the developing Islamic financial markets, Islamic institutions and banks must compete effectively while embracing new strategic components (Nawaz & Haniffa, 2017). According to Hidayat, Sakti, and Al-Balushi (2021), the three main components of a bank's performance are profitability, efficiency, and risks. Badreldin (2009) stated that when analyzing the performance of Islamic banks, most research used conventional performance indicators rather than sharia-based performance measures.

In the 2008 global financial crisis, the conventional banking system took excessive risks, and easy loans negatively affected the markets. For this reason, Islamic banks have again come to the forefront as an alternative tool, and their financial performance has been the subject of research (Chapra, 2011; Kayed & Hassan, 2011). Many empirical studies on the global financial crisis have revealed that Islamic banks are more resistant to and less affected by crises (Mohammed & Muhammed, 2017; Zarrouk, El Ghak, & Al Haija, 2017). In this context, the crisis has increased the interest in the profitability, risk management, and effectiveness of Islamic banks as an alternative to conventional banks (Bourkhis & Nabi, 2013). The performance and stable structure of Islamic banks during the global financial crisis revealed their importance to national economies. In addition, the number of studies examining the relationship between Islamic finance and economic growth has increased in recent years. Empirical findings in the literature show that Islamic banking increases macroeconomic efficiency and accelerates economic growth (Boukhatem & Moussa, 2018; Gheeraert & Weill, 2015). For instance, Mensi, Hammoudeh, Tiwari, and Al-Yahyaee (2020) showed that there is a non-linear positive relationship between the development of Islamic banking and economic growth in Islamic countries. In this context, Islamic banking emerges as an important key driver of economic activities due to its asset-based structure and direct financing of the real sector. It is expected that the development of the Islamic finance and banking sector and the improvement of its financial performance will increase financial efficiency and economic growth in Islamic countries.

The financial performance of Islamic banks and countries differ during different periods (Hidayat et al., 2021). Also, since Islamic finance and banking systems are still new, Islamic banks have numerous difficulties measuring their performance across banking sectors or countries in the absence of universal regulators (Badreldin, 2009). Numerous comparative financial performance analyses have been conducted by researchers in the Islamic finance literature (Ajili & Bouri, 2018; Ledhem & Mekidiche, 2020; Mohammed & Muhammed, 2017; Yıldız, 2020). In addition to these studies, world-leading organizations such as Reuters (2020) have also drawn attention to the development of Islamic banking in various countries; for example, they noted that Malaysia had the best Islamic banking and financial performance. According to the State of the Global Islamic Economy Report 2019/20 (2020) Saudi Arabia is the fourth-best Islamic finance country, Brunei and Indonesia have improved their financial performance, and Turkey is also ranked in the top 15 Islamic finance countries. In addition, many studies that have analyzed the financial performance of Islamic banks and compared their financial performance to that of conventional banks have been country-based (Hanif, 2014; Hasan & Dridi, 2010; Rashid & Jabeen, 2016).

This study differs from previous studies in the following aspects:

- It covers more Islamic countries and ranks these countries according to their financial performance.
- In previous studies, t-tests and panel regression analysis are mostly used because financial performance comparisons are made between country groups. However, unlike other studies, this research determines the most important financial performance indicators at the first stage using the entropy method. In the next step, the WASPAS method is used to rank the financial performance of the countries based on the financial performance indicators of the countries.
- The countries selected in the research can represent Islamic finance markets, as they have a high volume of Islamic banking and finance.
- More financial performance indicators are used than in previous studies, and the ratios affecting the overall financial performance are analyzed in more detail.

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- Return on assets and return on equity are the most frequently used financial performance indicators, but nine indicators are used in the research.
- This research guides managers in identifying critical financial performance indicators and improving their decision-making processes. Making the right decisions for financial performance will enable managers to gain a competitive advantage in the market.

The major motivation of this research is twofold. First, it is intended to provide a ranking of Islamic countries' financial performance. Secondly, this research aims to define which financial performance measure is the most effective in measuring Islamic banks' financial performance. The main objectives of the research can thus be defined as follows:

- To determine the financial performance indicators that affect Islamic banks' financial performance.
- To rank Islamic countries' performance using WASPAS and entropy methods.
- To analyze the financial performance differences among countries.

The next part of the paper presents the literature review and hypothesis development. The data, method, and model of the research are introduced in the third part. In the fourth part, the empirical findings of the research are laid out, and the last part sums up the conclusions.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Islamic Banks' Financial Performance

There is abundant literature that has focused on Islamic banks, financial performance measures, and performance evaluation (Bashir, 2003; Rashid & Jabeen, 2016; Siddiqui, 2008; Siraj & Pillai, 2012). However, it has not yet been firmly established which financial performance indicators should be used to measure the financial performance of Islamic banks. In the last decade, scholars have tended to use financial performance indicators similar to traditional banks, such as profitability and liquidity ratios, capital structure, and share in performance (Ibrahim, 2015; Siraj & Pillai, 2012). However, some academics have suggested that Islamic banks differ from conventional banks in their business models, organizations, and operational activities. Thus, it has been stated that the financial performance of Islamic banks cannot be measured with the financial performance indicators of conventional banks (Mohammed & Muhammed, 2017). Badreldin (2009), on the other hand, adopted return on equity as a financial indicator, claiming that the adapted model was suitable for Islamic banking. In addition, Badreldin (2009) stated that previous research on the financial performance measurement of Islamic banks needed reconfirmation and increased reliability due to faulty measurement methods. Moreover, studies have indicated that ratios such as capital/assets and debts/assets show success in liquidity and risk management, that these ratios can indicate high profitability, and that they are good performance indicators, comparable with the return on assets and return on equity ratios (Bashir, 2003; Siddiqui, 2008).

Islamic banks not only aim to achieve high profitability but also ensure employment, the equal distribution of wealth and income, economic growth, and socio-economic justice (Chapra, 1995; Hassan & Mervyn, 2007). Rehman and Askari (2010) stated that in the evaluation of Islamic banking, it is necessary to evaluate not only a bank's financial performance but also whether it operates according to Islamic law. In consequence, Ibrahim, Wirman, Alrazi, Nor, and Pramono (2004) developed the Islamicity financial performance index as an alternative performance measurement model for Islamic banks. The index includes six different financial performance indicators and is considered to offer reliable performance measurement within the framework of Islamic law (Andraeny & Putri, 2017). Kevser (2021) analyzed the performance of different types of banks in Turkey using 13 different financial performance indicators. The results showed that Islamic banks were the type of bank with the highest ratio of non-performing loans in total assets, while liquid assets in total assets were at a low level. Ika and Abdullah (2011) compared Islamic and conventional banks using liquidity, risk, solvency, efficiency, and profitability ratios. There were no significant differences between bank groupings, according to the findings; however, Islamic banks were more liquid. Ariss (2010) used return on assets, return on equity, loans to assets ratio, and equity to assets ratios to compare the financial

performance of Islamic banks and conventional banks. According to the results, capitalization was higher in İslamic banks, thus increasing profitability with market power. However, this situation does not guarantee better profitability. Although the studies found different results, many researchers today acknowledge that Islamic banks are more resistant to and less affected by crises and fluctuations than traditional banks (Hanif, 2014).

In the literature, Islamic banks are not only compared with conventional banks but financial performance evaluations are also made among Islamic banks. Multi-criteria decision-making methods such as TOPSIS and GRA have frequently been used in these studies (Esmer & Bağcı, 2016; Gündoğdu, 2018; Tetik & Sahin, 2020). For example, Çilek and Karavardar (2020) analyzed Islamic banks' financial performance in Turkey using the Multi-Moora method. Capital adequacy ratio, equity to assets ratio, financial assets to total assets ratio, debts to funds ratio, non-performing loans ratio, liquid assets to total assets ratio, current ratio, return on assets, and return on equity were used to measure the banks' financial performance. The results revealed that the return on assets ratio, return on equity ratio, current ratio, capital adequacy ratio, and non-performing loans ratio were the most effective ratios to measure financial performance. In addition, state Islamic banks showed the best financial performance. Karakaya (2020) showed that the return on assets ratio, return on equity ratio, non-performing loans ratio, equity, and risk-adjusted equity ratio were the most important financial performance criteria for Islamic banks. Rahahleh, Akguc, and Abalala (2021) showed that Dow Jones Islamic Index (DJII) firms were more profitable than non-DJII firms. Moreover, DJII firms were less affected by the financial crisis than non-DJII firms.

Thus, according to the literature reviewed above, there are two basic approaches to measuring Islamic banks' financial performance. The first is to analyze the financial performance of Islamic banks in comparison with that of conventional banks. The second approach is to compare the financial performance of different Islamic banks. This research determines the indicators that are effective to measure the overall financial performance, analyzes Islamic banks and countries within the framework of financial performance indicators, and ranks the countries.

2.2. Hypothesis Development

Based on the review of relevant literature, several hypotheses can be developed. Profitability is a key metric used to evaluate performance. The most commonly used indicators in the measurement of financial performance are the net profitability ratio, return on assets ratio, and return on equity ratio (Siraj & Pillai, 2012). On the other hand, Islamic banking is still very new to the world stage and faces many problems in financial markets (Rashid & Jabeen, 2016). In particular, it is very difficult to access the financial performance indicators of Islamic banks (Ajili & Bouri, 2018). For this reason, the financial performance of Islamic banks may differ between countries due to differences. In this context, the following basic hypothesis is developed in the research:

H₁: The Financial Performance of Islamic Banks Differs among Countries.

The financial performance of Islamic banks varies between countries, and these differences can be explained by many factors. Economic size, the proportion of the Muslim population, and investment climate are the key factors behind different financial performances. In addition, differences in the profitability of Islamic banks can be explained by different portfolio sources (Badreldin, 2009; Nawaz & Haniffa, 2017). These differences may cause inconsistencies when analyzing the financial performance of Islamic banks comparatively. Given this fact, taking the aforementioned differences into account when assessing Islamic banks' financial performance will allow for a more reliable assessment.

3. METHODOLOGY

3.1. Aim of the Study

This research aims to measure and compare the financial performance of Islamic banks operating in 10 different Islamic countries. In the research, a country-based comparison was made using data from 2013–2020 and the most effective ratios in the measurement of the performance of Islamic banks were revealed. In this context, following the literature (Akçakanat, Eren, Aksoy, & Ömürbek, 2017; Ural, Demirelli, & Güler, 2018; Wang & Lee, 2009), the multi-

criteria decision-making modeling techniques entropy and WASPAS were used. While the most effective financial ratio in the measurement of the performance of participating banks was determined by the entropy method, the financial performance of the countries was ranked using the WASPAS method.

3.2. Data and Variables

In the research, a multi-criteria decision-making method was used to rank the financial performance of Islamic banks. Data from Bangladesh, Indonesia, Jordan, Kuwait, Malaysia, Nigeria, Oman, Pakistan, Turkey, and the United Arab Emirates was used, covering the 2013–2020 period. The period was chosen based on the availability of all data series. Long-term measurements provide robust results in financial performance measurement. Therefore, to calculate the variables of the countries, a single variable was created by taking the average of the years 2013–2020. Nine ratios were used to measure financial performance. The financial performance indicators used in the research are generally accepted ratios that are frequently used to measure the financial performance of banks (Hidayat et al., 2021; Ledhem & Mekidiche, 2020; Nawaz & Haniffa, 2017; Zouhaier, 2015). In this context, the selected ratios strongly indicate the financial performance of banks. Table 1 presents the definitions and abbreviations of the ratios used in the study.

Table 1. Variables and abbreviations used in the research.

Variables	Definition	Abbreviation
Return on Assets	Net Income divided by Total Assets	ROA
Return on Equity	Net Income divided by Shareholders' Equity	ROE
Net Profit Margin	Net Income divided by Gross Income	NPM
Capital Adequacy Ratio	Total Regulatory Capital divided by Risk-Weighted Assets	CAR
Gross Non-Performing Financing	Gross Non-Performing Financing divided by Total Financing	G_NPF
Net Non-Performing Financing	Net Non-Performing Financing divided by Total Regulatory Capital	N_NPF
Capital to Assets Ratio	Tier 1 Capital divided by Total Assets	CAP_ASS
Liquid Assets Ratio	Liquid Assets divided by Total Assets	LIQUID

The ROA, ROE, and NPM variables show the profitability of banks; the CAR and CAP_ASS variables measure the capital structure. In addition, the G_NPF and N_NPF variables present asset quality, and the LIQUID and LIQ_STL variables show liquidity. The data used in the study were obtained from the website of the Islamic Financial Services Board (IFSB) (www.ifsb.org).

3.3. Entropy Method

The concept of entropy was explained by Shannon as a discrete probability distribution and later began to be used as a measure of uncertainty (Zhang, Gu, Gu, & Zhang, 2011). The entropy method enables the criterion weights to be determined objectively in decision-making problems involving many criteria. Using the entropy method to make the weightings ensures that the ranking of the results is more reliable. In the entropy method, the calculation of the weights of the criteria in decision problems is made possible by using the data in decision matrices. In this respect, the fact that there is no need for subjective evaluations facilitates the application of the entropy method. The implementation of the entropy method is carried out in five stages (Karami & Johansson, 2013; Wang & Lee, 2009).

Step 1: Creating the decision matrix:

In Step 1, a decision matrix with m alternatives and n criteria $D[x_{ij}]mxn$ is created. x_{ij} values are the evaluation of the i'th alternative according to the j'th criterion. Here i=1, 2,…,m is the number of decision alternatives, and j=1,2,…,n is the number of evaluation criteria.

$$D = \begin{array}{c} \\ A_1 \\ A_2 \\ \ldots \\ A_m \end{array} \begin{array}{cccc} C_1 & C_2 & \ldots & C_a \\ \begin{pmatrix} x_{11} & x_{12} & \ldots & x_{1n} \\ x_{21} & x_{22} & \ldots & x_{2n} \\ \ldots & \ldots & \ldots & \ldots \\ x_{m1} & x_{m2} & \ldots & x_{mn} \end{pmatrix} \end{array}$$

$$W = \begin{bmatrix} w1 & & w2 & & w_n \end{bmatrix} \tag{1}$$

Step 2: Normalization of the decision matrix:

Equation 2 presents the normalization of the decision matrix. In Step 2, to convert the values of the criteria to common units, they are normalized according to the benefit and cost criteria and standardized to take values in the range of [0,1] using the normalization process. The normalization process is performed with the following equation.

$$P_{ij} = \frac{x_{ij}}{\sum_{j=1}^{m} x_{ij}} \quad i=1,2,\ldots,m \quad j=1,2,\ldots,n \tag{2}$$

The p_{ij} value in the equation is the normalized value of the i'th alternative according to the j'th evaluation criterion.

Step 3: Calculating entropy values for criteria:

Equation 3 presents the equation used to calculate the entropy values for criteria. In this step, the entropy values of the criteria are calculated with the help of the equation below.

$$e_j = -k \sum_{j=1}^{m} P_{ij} ln P_{ij} \tag{3}$$

The k value in the equation shows the entropy coefficient $k = (ln(m))-1$ and takes a value of $0 \leq ej \leq 1$. e_j is the entropy value, and p_{ij} presents normalized values.

Step 4: Calculating degrees of differentiation:

Equation 4 presents the calculation of degrees of differentiation. By using the entropy values calculated in the third step, the d_j values with the degrees of differentiation are calculated for each criterion as shown below. High values indicate that the distance or differentiation between alternative scores is large.

$$d_j = 1 - e_j \quad j = 1,2,\ldots,n \tag{4}$$

Step 5: Calculation of entropy criterion weights:

Equation 5 presents the calculation of entropy criterion weights. In the last step of the method, entropy criterion values are calculated. To do this, the degree of differentiation of each criterion is proportional to the degree of differentiation of the total, and the weight values (w_j) of the criteria are calculated. w_j weights indicate the importance of the j criterion.

$$w_j = \frac{d_j}{\sum_{s=1}^{n} d_s} \quad j = 1,2,\ldots,n \tag{5}$$

Equation 6 presents the sum of the entropy probability. The sum of the entropy probability values is always equal to 1 (Catı, Es, & Özevin, 2017).

$$w_1 + w_2 + w_j + \ldots w_n = 1 \tag{6}$$

WASPAS method:

The WASPAS method, developed by Zavadskas, Antucheviciene, Saparauskas, and Turskis (2013), is a high-reliability method developed as a combination of WSM (Weighted Sum Model) and WPM (Weighted Product Model) and is used to evaluate and rank potential alternatives (Madić, Gecevska, Radovanović, & Petković, 2014; Zolfani, Aghdaie, Derakhti, Zavadskas, & Varzandeh, 2013). In this respect, it can give more precise results than other types of analysis, since it is both based on accuracy and confirms accuracy; in recent years, it has become a frequently used decision-making tool (Chakraborty, Zavadskas, & Antucheviciene, 2015; Zolfani et al., 2013).

The WASPAS method is applied in 6 steps. Chakraborty and Zavadskas (2014) stated that the method should be applied as follows (Akçakanat et al., 2017).

Step 1: Creating the decision matrix:

Multi-criteria decision-making methods start with the decision/evaluation matrix.

$$X = \begin{pmatrix} x_{11} & x_{12} & ... & x_{1n} \\ x_{21} & x_{22} & ... & x_{2n} \\ ... & ... & ... & ... \\ x_{m1} & x_{m2} & ... & x_{mn} \end{pmatrix} \tag{7}$$

Equation 7 presents the decision/evaluation matrix. In the matrix, m is the number of candidate alternatives, and n is the number of evaluation criteria, while X_{ij} is the performance of the i'th alternative according to the j'th criterion.

Step 2: Generating the normalized decision matrix:

After the decision matrices are created, to compare the performance measures, the matrix elements should be normalized with the help of the following two equations. Equation 8 generates the normalized decision matrix for beneficial criteria:

$$\bar{x}_{ij} = \frac{x_{ij}}{max_i \, x_{ij}} \qquad i=1,2,....,m \quad j=1,2,....,n \tag{8}$$

Equation 9 generates the normalized decision matrix for non-beneficial criteria:

$$\bar{x}_{ij} = \frac{min_i \, x_{ij}}{x_{ij}} \qquad i=1,2,....,m \quad j=1,2,....,n \tag{9}$$

In these equations, $\bar{x}_{ij}$ is the normalized value of X_{ij}.

Step 3: Calculation of the overall relative importance of the i'th alternative based on the weighted sum method (WSM):

In the WASPAS method, the best measurement/optimism criterion is sought simultaneously, based on two equality criteria. Based on the WSM method, the total relative importance of the i'th alternative is calculated as follows. Equation 10 presents the relative importance of the i'th alternative based on the weighted sum method.

$$Q_i^{(1)} = \sum_{j=1}^{n} \bar{x}_{ij} w_j \tag{10}$$

Here, w_j is the important weight of the j'th criterion.

Step 4: Calculation of the overall relative importance of the i'th alternative based on the weighted product method (WPM):

According to the WPM method, Equation 11 presents the calculation of the overall relative importance of the i'th alternative.

$$Q_i^{(2)} = \prod_{j=1}^{n} (\bar{x}_{ij})^{w_j} \tag{11}$$

Step 5: Calculation of the weighted common general criterion value of additive and multiplicative methods:

In the next step, a common generalized criterion for weighted aggregation of additive and multiplicative methods is proposed as follows. Equation 12 presents the calculation of the weighted common general criterion value of additive and multiplicative methods.

$$Q_i = 0.5Q_i^{(1)} + 0.5Q_i^{(2)} \tag{12}$$

Step 6: Calculation of grand total relative significance of alternatives:

To increase the ranking accuracy and efficiency of the decision-making process, a more generalized equation as below is developed to determine the total relative importance of the i'th alternative in the WASPAS method. Equation 13 presents the calculation of the grand total relative significance of alternatives.

$$Q_i = \lambda Q_i^{(1)} + (1 - \lambda)Q_i^{(2)} \qquad \lambda = 0, 0.1,...,1 \tag{13}$$

The alternatives identified at this stage are ranked according to their Q values; in this respect, the alternative with the highest Q value will be the best. When $\lambda=0$, the WASPAS method turns into WPM; when $\lambda=1$, it turns into the WSM method.

4. FINDINGS

This section reports the results of measuring the financial performance of Islamic banks in 10 different Islamic countries and determining the most effective ratios for measuring the performance of Islamic banks.

Table 2. Constructed decision matrix.

Country	ROA	ROE	NPM	CAR	G_NPF	N_NPF	CAP_ASS	LIQUID	LIQ_STL
Turkey	2.86	16.10	85.61	16.23	4.11	9.35	8.66	51.73	73.50
Malaysia	2.83	19.06	107.99	16.71	1.34	8.39	6.53	13.23	88.19
Bangladesh	3.23	27.28	99.38	11.42	4.84	28.81	5.44	27.55	86.74
Indonesia	2.81	13.38	77.42	17.57	4.11	16.20	9.35	13.57	17.81
Jordan	3.58	21.96	116.96	17.06	2.87	6.32	9.06	37.33	62.18
Kuwait	2.98	13.97	86.34	18.48	2.58	0.93	11.54	31.15	43.13
Nigeria	1.82	6.02	75.43	36.67	3.70	7.42	18.23	25.81	56.03
Oman	0.04	0.31	0.15	35.90	0.27	0.71	33.73	17.94	259.37
Pakistan	2.93	22.35	93.68	14.09	5.23	4.81	6.09	28.24	60.60
UAE	3.19	14.69	98.17	17.15	6.21	8.03	12.37	15.65	19.35

Table 2 represents the decision matrix of Islamic banks operating in 10 Islamic countries. In the matrix, 9 financial ratios for the years 2013–2020 were used.

4.1. Entropy Results

Here, the most effective financial performance indicator in the measurement of the financial performance of Islamic banks was determined using the entropy method.

Table 3. Normalized decision matrix.

Country	ROA	ROE	NPM	CAR	G_NPF	N_NPF	CAP_ASS	LIQUID	LIQ_STL
Turkey	0.11	0.10	0.08	0.08	0.12	0.10	0.07	0.20	0.10
Malaysia	0.10	0.13	0.17	0.08	0.04	0.09	0.05	0.05	0.11
Bangladesh	0.14	0.19	0.14	0.06	0.14	0.32	0.04	0.11	0.11
Indonesia	0.10	0.08	0.05	0.09	0.12	0.18	0.08	0.05	0.02
Jordan	0.17	0.15	0.21	0.08	0.08	0.07	0.07	0.14	0.08
Kuwait	0.12	0.09	0.08	0.09	0.07	0.01	0.10	0.12	0.06
Nigeria	0.01	0.02	0.04	0.18	0.10	0.08	0.15	0.10	0.07
Oman	0.00	0.00	0.00	0.18	0.01	0.01	0.28	0.07	0.34
Pakistan	0.11	0.15	0.11	0.07	0.15	0.05	0.05	0.11	0.08
UAE	0.14	0.09	0.13	0.09	0.18	0.09	0.10	0.06	0.03

Using the data in Table 2, 9 financial evaluation criteria for 10 Islamic countries were created. The results of the normalized decision matrix are provided in Table 3.

Table 4. Entropy values and objective weights.

Values	ROA	ROE	NPM	CAR	G_NPF	N_NPF	CAP_ASS	LIQUID	LIQ_STL
e_j	0.909	0.912	0.903	0.967	0.936	0.855	0.924	0.960	0.879
d_j	0.091	0.088	0.097	0.033	0.064	0.145	0.076	0.040	0.121
w_j	0.121	0.117	0.129	0.043	0.084	0.192	0.101	0.052	0.160

The entropy value (ej) measurement for all criteria used in the study was normalized using the determined entropy values ($P_{ij}lnP_{ij}$). Then, the degree of deviation (dj) and objective weight (w_j) values for each criterion were calculated using Equation 4 and Equation 5.

Table 4 shows the entropy values, degree of deviation, and objective weights for the 2013–2020 period. The results show that N_NPF (0.192) was the most effective ratio for measuring financial performance in the 10 Islamic

countries. This was followed by the liquid assets/current liabilities (LIQ_STL) ratio (0.160). Profitability ratios (NPM 0.129; ROA 0.121; ROE 0.117) had less impact on financial performance. In addition, the ratios that had the least effect on the performance of Islamic banks were the LIQUID (0.052) and CAR (0.043) variables.

4.2. WASPAS Results

This section reports on the ranking of the financial performance of 10 Islamic countries in terms of Islamic banking using the WASPAS method.

Table 5. Normalized decision matrix.

Country	ROA	ROE	NPM	CAR	G_NPF	N_NPF	CAP_ASS	LIQUID	LIQ_STL
Turkey	0.61	0.54	0.38	0.44	0.66	0.32	0.26	1.00	0.28
Malaysia	0.59	0.66	0.82	0.46	0.22	0.29	0.19	0.26	0.34
Bangladesh	0.81	1.00	0.65	0.31	0.78	1.00	0.16	0.53	0.33
Indonesia	0.58	0.43	0.22	0.48	0.66	0.56	0.28	0.26	0.07
Jordan	1.00	0.78	1.00	0.47	0.46	0.22	0.27	0.72	0.24
Kuwait	0.67	0.45	0.40	0.50	0.42	0.03	0.34	0.60	0.17
Nigeria	0.05	0.12	0.18	1.00	0.60	0.26	0.54	0.50	0.22
Oman	0.00	0.00	0.00	0.98	0.04	0.02	1.00	0.35	1.00
Pakistan	0.65	0.80	0.54	0.38	0.84	0.17	0.18	0.55	0.23
UAE	0.79	0.48	0.63	0.47	1.00	0.28	0.37	0.30	0.07

After determining the objective weights of the evaluation criteria with the entropy method, the WASPAS Method was used to rank Islamic banks according to their financial performance. Table 5 shows the normalized decision matrix of the Islamic countries in terms of nine financial evaluation criteria.

Table 6. Normalized weighted matrix (WSM).

Country	ROA	ROE	NPM	CAR	G_NPF	N_NPF	CAP_ASS	LIQUID	LIQ_STL
Turkey	0.061	0.054	0.038	0.044	0.066	0.032	0.026	0.100	0.028
Malaysia	0.059	0.066	0.082	0.046	0.022	0.029	0.019	0.026	0.034
Bangladesh	0.081	0.100	0.065	0.031	0.078	0.100	0.016	0.053	0.033
Indonesia	0.058	0.043	0.022	0.048	0.066	0.056	0.028	0.026	0.007
Jordan	0.100	0.078	0.100	0.047	0.046	0.022	0.027	0.072	0.024
Kuwait	0.067	0.045	0.040	0.050	0.042	0.003	0.034	0.060	0.017
Nigeria	0.005	0.012	0.018	0.100	0.060	0.026	0.054	0.050	0.022
Oman	0.000	0.000	0.000	0.098	0.004	0.002	0.100	0.035	0.100
Pakistan	0.065	0.080	0.054	0.038	0.084	0.017	0.018	0.055	0.023
UAE	0.079	0.048	0.063	0.047	0.100	0.028	0.037	0.030	0.007

In Tables 6 and 7, the order of importance of the alternatives based on the weighted sum model (WSM) and the weighted product model (WPM) is given.

Table 7. Normalized weighted matrix (WPM).

Country	ROA	ROE	NPM	CAR	G_NPF	N_NPF	CAP_ASS	LIQUID	LIQ_STL	$Q_i^{(1)}$	$Q_i^{(2)}$	Q_i	Ranking
Turkey	0.95	0.94	0.91	0.92	0.96	0.89	0.87	1.00	0.88	0.45	0.49	0.47	3
Malaysia	0.95	0.96	0.98	0.92	0.86	0.88	0.85	0.87	0.90	0.38	0.42	0.40	6
Bangladesh	0.98	1.00	0.96	0.89	0.98	1.00	0.83	0.94	0.90	0.56	0.57	0.56	1
Indonesia	0.95	0.92	0.86	0.93	0.96	0.94	0.88	0.87	0.77	0.35	0.37	0.36	7
Jordan	1.00	0.98	1.00	0.93	0.93	0.86	0.88	0.97	0.87	0.52	0.53	0.52	2
Kuwait	0.96	0.92	0.91	0.93	0.92	0.71	0.90	0.95	0.84	0.36	0.35	0.35	8
Nigeria	0.73	0.81	0.84	1.00	0.95	0.87	0.94	0.93	0.86	0.35	0.31	0.33	9
Oman	0.47	0.36	0.34	1.00	0.73	0.69	1.00	0.90	1.00	0.34	0.03	0.18	10
Pakistan	0.96	0.98	0.94	0.91	0.98	0.84	0.84	0.94	0.86	0.43	0.45	0.44	4
UAE	0.98	0.93	0.95	0.93	1.00	0.88	0.90	0.89	0.77	0.44	0.44	0.44	5

Considering the λ value of 0.5 in Table 7, a common generalized criterion was established to determine the importance values of the financial performance indicators. The alternatives are ranked according to their Q_i values, and the alternative with the highest Q_i value is the best indicator, according to the set decision criteria. In the evaluation that considered all the criteria, it was concluded that the country with the highest financial performance was Bangladesh (0.56). Jordan (0.52), Turkey (0.47) and Pakistan (0.44), the United Arab Emirates (0.44), Malaysia (0.40), Indonesia (0.36), Kuwait (0.35) and Nigeria (0.33) followed Bangladesh, respectively. Oman (0.18) had the lowest financial performance among the studied countries.

Table 8. Effect of λ on ranking performance.

Country	λ = 0	λ = 0.1	λ = 0.2	λ = 0.3	λ = 0.4	λ = 0.5	λ = 0.6	λ = 0.7	λ = 0.8	λ = 0.9	λ = 1	Ranking
Turkey	0.49	0.49	0.48	0.48	0.48	0.47	0.47	0.46	0.46	0.45	0.45	3
Malaysia	0.42	0.41	0.41	0.41	0.40	0.40	0.40	0.39	0.39	0.39	0.38	6
Bangladesh	0.57	0.57	0.57	0.57	0.57	0.56	0.56	0.56	0.56	0.56	0.56	1
Indonesia	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.36	0.36	0.36	0.35	7
Jordan	0.53	0.53	0.53	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	2
Kuwait	0.35	0.35	0.35	0.35	0.35	0.35	0.36	0.36	0.36	0.36	0.36	8
Nigeria	0.31	0.32	0.32	0.32	0.33	0.33	0.33	0.34	0.34	0.34	0.35	9
Oman	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.25	0.28	0.31	0.34	10
Pakistan	0.45	0.45	0.45	0.45	0.44	0.44	0.44	0.44	0.44	0.44	0.43	4
UAE	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	5

A more comprehensive and general analysis was performed to determine the overall relative importance of the alternatives in Table 8. Accordingly, the table shows the effect of the changing λ values between 2013–2020 on the performance scores and rankings of Islamic countries. The results show that the performance scores and rankings of Islamic countries are the same as in the previous ranking, and a better ranking performance is predicted for higher λ values. In other words, the WASPAS method turns into a weighted sum model (WSM) when the λ value is equal to:

1. The results obtained in this context are consistent with the important values of the alternatives.

5. DISCUSSION AND CONCLUSION

Islamic finance is one of the world's fastest-growing financial industries. In some countries, Islamic banks have become mainstream financial institutions, and, in many others, Islamic institutions are developing rapidly. Several factors have contributed to the remarkable growth of Islamic finance. In particular, the global financial crisis was an important turning point around the world. The conventional financial system's excessive appetite for risk, insufficient legal regulations, and provision of sub-prime mortgage credits without adequate care led to disaster – many banks were driven into bankruptcy, and many companies faced financial difficulties.

In this context, this study aimed to determine the leading financial performance indicators for measuring the overall financial performance of Islamic banks in 10 Islamic countries over the period 2013–2020 using the entropy and WASPAS methods. First, we employed the entropy method to determine the financial ratio that had the greatest effect on the overall financial performance of Islamic banks. Second, after determining the most effective ratios for measuring the overall financial performance, we employed the WASPAS method to rank the selected countries according to their financial performance.

According to the results obtained from the entropy method, the most crucial financial performance indicator was Net Non-Performing Financing (N_NPF), with a result of 0.192 among Islamic countries. The financial performance indicators ranked in order of importance were the liquid assets to short-term liabilities ratio (LIQ_STL) (0.160), net profit margin (NPM) (0.129), return on assets (ROA) (0.121), and return on equity (ROE) (0.117). The Liquid Assets Ratio (LIQUID) (0.052) and the capital adequacy ratio (CAR) (0.043) were the least effective indicators of overall financial performance. In the country-specific evaluations, the results using the WASPAS method showed that Bangladesh had the highest financial performance, at 0.56. Jordan (0.52), Turkey (0.47), Pakistan (0.44), the United

Arab Emirates (0.44), Malaysia (0.40), Indonesia (0.36), Kuwait (0, 35), Nigeria (0.33) and Oman (0.18) followed Bangladesh.

This research has theoretical and managerial implications. The first point to consider is a theoretical one. The purpose of this study was to see whether there were any major differences in the financial performance of Islamic countries. The study's findings show that profitability, net profit margin, capital adequacy, and liquidity differed between Islamic countries. Furthermore, net non-performing financing (N_NPF) was revealed as one of the most important factors determining overall financial performance. Although it was expected that the most effective indicators of overall financial performance would be the profitability ratios, the result obtained points in a different direction.

Secondly, there are managerial implications. The study has demonstrated the importance of non-performing financing on overall financial performance. In this context, managers should not only focus on credit growth for profitability but also on controlled and supervised loan allocation. It should not be forgotten that the main factor behind the 2008 global financial crisis was excessive risk appetite and uncontrolled loan growth. In this respect, the effective management of credit risk and the resulting increase in profitability and productivity should be the main goals of Islamic bank managers.

Finally, a policy recommendation can be made. The results show that besides net non-performing financing, the liquid assets to short-term liabilities ratio (LIQ_STL) takes second place in the order of importance. Policymakers should revise their capital adequacy regulations in a way that will regulate the deficiencies in credit risk calculation and eliminate operational risks and short-term payment difficulties. Effectively managing risk in banks, increasing profitability accordingly, improving market discipline, increasing the efficiency of capital adequacy measurements, and thus creating a robust and effective banking system are the main factors policymakers should evaluate.

The study is limited in scope as it covers ten countries for the 2013–2020 period. Future research could be extended to include banks from more countries. Moreover, expanding the research to cover additional financial performance indicators and longer periods may affect the results obtained.

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