Is Islamic Banking Sustainable in Terms of Financial Performance? Empirical Evidence from GCC Countries

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Abstract: The aim of this study is to evaluate the Islamic banking sector with the help of financial performance criteria and to reveal whether the sector is sustainable or not. The sustainability analysis uses the latest unit root tests that take into account Fourier expansions. The study uses unit root tests, which are generally used to analyze the sustainability of public debt, with updated versions that differ from the literature and with the help of financial performance indicators of the banking sector for sustainability analysis. The study uses the data of the Islamic banking sector operating in the member countries of the Gulf Cooperation Council (GCC) for the 4th quarter of 2013 and the 2nd quarter of 2022. The quarterly data of "ROA, ROE and Net Profit Margin" are considered as financial performance indicators for sustainability analysis. Although the results of the empirical analysis show different results for each of the financial indicators of Islamic banking in the analyzed countries, in general it shows that the Islamic banking sector operating in all GCC countries except the UAE is sustainable in terms of the financial indicators used in at least one category. These results show that the development of Islamic banking is real and promising for the future. Therefore, the development of projects that contribute to the development of the Islamic financial sector and the support of this sector is an important responsibility for the relevant parties. It is expected that these results will provide important signals to the policymakers of the respective countries and contribute to the healthy development of the Islamic banking sector.

Keywords: Islamic banking, Financial Performance, Sustainability, GCC countries

JEL Classification: G21, C22, L25, Z12

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Introduction

The banking sector and capital markets, which act as intermediaries in the transfer of financial resources in the development process of a country, emerge as two important areas. In order for firms to continue their economic activities, they must create a resource with a mixture of equity and debt capital at various ratios. While capital markets are important in finding long-term or continuous funding sources, the banking sector is important in solving short-term and instantaneous funding needs. Banks, which function as financial intermediaries, are indispensable for the economy's survival and growth. As a sector that has existed since ancient times and in parallel with the increasing financial developments, the banking sector has been increasing its importance and strengthening its position. The banking system is the sector most exposed to financial risks due to its structure. There have been many banking crises in the historical process, and countries have had to improve their banking systems to overcome these crises continuously. Institutional supervision and regulation infrastructure in the form of "banking regulatory and supervisory agencies" are being tried to be established in particular countries. At the international level, "The Basel Committee on Banking Supervision", established in 1974, fulfills a crucial function in this sense. It was initially established with the participation of G10 countries as a platform for member countries to share their knowledge and experience in the banking sector and to benefit from each other's experiences.

Over time, the committee has become a crucial function with the publication of various compromises to bring an international standard to the banking sector. "With the full, timely, and consistent adoption and implementation of Basel standards, the objectives of increasing the resilience of the global banking system, increasing confidence in prudential ratios, and promoting a predictable and transparent regulatory environment for internationally active banks will be achieved" (BIS, 2023). After the publication of the first Basel Capital Accord (Basel-I) in 1988, the Basel IV Accord was published in 2017, and standard development activities continue. The implementation date of the standards, also called "Basel IV", which is the final stage of Basel III standards finalized in December 2017, was postponed by one year to January 1, 2023, due to the COVID-19 pandemic (GHOS, 2020). All these developments aim to enable the banking system to perform its expected functions safely and securely nationally and internationally. Islamic banking, which is a sub-heading within the banking sector, is directly affected by all these developments. Islamic banking is a structure that has emerged out of necessity as

a field shaped by the Islamic prohibition of interest and other restrictions (gharar, maysir, etc.) and regulations.

The last fifty years have witnessed the emergence of Islamic banking as a promising sub-sector with its alternative to conventional banking and structure that emphasizes humanitarian values. Although Islamic banking is not yet at the desired level, it is a constantly growing sector. Islamic banking has shown its superiority over conventional banking both during normal operations (Čihák & Hesse, 2010) and during crisis periods (Hasan & Dridi, 2011; Bourkhis & Nabi, 2013; Beck et al., 2013; Pappas et al., 2017) with its structure based on risk sharing, its systemic structure that avoids manipulative transactions and emphasizes justice. Some other studies in the literature indicate that conventional banks are more advantageous than Islamic banks during crisis periods or that there is no significant difference between the two sectors (Doumpos et al., 2017; Alqahtani & Mayes, 2018). As a result, considering all these developments, it can be said that Islamic banking has developed rapidly after the 2008 global financial crisis (Cevik & Charap, 2015). The volume of the Islamic finance sector (Islamic banking, Sukuk, Islamic funds and Sukuk) has reached $3 trillion by the end of 2022. The Islamic banking sector is nearly $2 trillion(S&P, 2023).

The sustainability of the Islamic banking sector, which has found a place in the financial markets and has reached an important level in terms of financial performance indicators, is important for its future position. Financial performance indicators ensuring continuity and sustainability are important in both conventional and Islamic banking sectors. ROA, ROE, and net profit margin have an important position among financial performance indicators. These financial indicators are often used predominantly in the assessment of financial sustainability. Many studies in the literature have addressed the impact of various factors on these financial performance indicators (Aebi et al., 2012; Battaglia & Gallo, 2015; Phan et al., 2020; Aduba et al., 2023).

This study focuses on the sustainability of the Islamic banking sector, a significant player in financial markets, analyzing critical financial performance indicators: Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin. These indicators, crucial for assessing financial sustainability, have been extensively studied in the literature for both conventional and Islamic banking sectors.

The structure of the paper involves an examination of the econometric model and literature in the second section, presentation of data and empirical methodology in the third section, evaluation of analysis results in the fourth section, and concluding remarks and policy recommendations in the fifth section.

Econometrics Background and Literature Review

The sustainability analysis considered in this study was first used by Hamilton & Flavin (1986) to test the sustainability of public debt. Since then, many studies have conducted sustainability analyzes using unit root tests (Wilcox, 1989; Fukuda & Teruyama, 1994; Olekalns, 2000; Jarmuzek, 2005; Bravo & Silvestre, 2002; Olaoye & Olomola, 2022; Afonso & Coelho, 2023). All these studies have focused on analyzing the sustainability of government debt and budget values.

Unlike the studies mentioned earlier, financial sustainability is analyzed in this study. Some financial indicators are used for sustainability analysis. In the literature, the relationship between financial performance and sustainability has been addressed in many studies, and the effect of financial performance on sustainability has been theoretically and empirically revealed. Since sustainability is often measured by corporate sustainability performance (CSP) in the literature, many studies have addressed the relationship between CSP and corporate firm performance (CFP) (Nollet et al., 2016; Trumpp & Guenther, 2017; Jha & Rangarajan, 2020; Lu, 2021). In these studies, the direction of the relationship, its shape, and its change over time, and the changing causality in the form of U or inverted U have been discussed in many aspects, such as the relationship between them. When the essence of these studies is considered in general, it has been revealed in all these studies that organizations and companies that are considered sustainable have higher financial performance and that this financial performance is not short-term (Callan & Thomas, 2009; Shamil et al., 2012; Ameer & Othman, 2012).

When the studies in the literature are examined, a group of studies have focused on the factors affecting the sustainability of macroeconomic indicators on banking profitability (Stubelj & Dolenc, 2013; Fakhri et al., 2019; Etorbia et al., 2020; Osifo & Obainoke, 2021; Muliani & Seftarita, 2022). Another group of studies is on the impact of corporate governance performance on banking profitability in terms of sustainability (Oghojafor et al., 2010; Erin et al., 2018; Niţescu & Cristea, 2020; Naveed et al., 2020; A. A. Jan et al., 2021; Alam et al., 2021). Another group of studies is on the effects of sustainability efforts on bank performance (Ameer & Othman, 2012; Platonova et al., 2018; A. Jan et al., 2019; Nizam et al., 2019). Yet another group of studies is the impact of intellectual capital and human resources on bank financial performance in terms of sustainability (Vo & Tran, 2021; Neves & Proença, 2021; Rehman et al., 2022; Nguyen et al., 2022). In all these and similar studies, the factors affecting the financial performance of banks have been discussed and evaluated.

In the literature, GCC countries have an important place in studies on banking performance. Although the GCC countries are initially considered as oil and gas exporters, their developing economic structures have also made a name for themselves with their tourism, large infrastructure projects and financial services sectors. Financial systems in the Gulf region are primarily bank-based and capital markets are relatively less developed (Mohanty et al., 2016). This puts the GCC countries in an important position in terms of banking. Most of the studies conducted in the GCC countries compare Islamic banks with conventional banks in terms of financial performance indicators (Zeitun, 2012; Khediri et al., 2015; Karim et al., 2017; Alqahtani et al., 2017; Farah, 2020; M. Hassan et al., 2020; Buallay et al., 2021; El-Chaarani et al., 2022; Alshehri, 2023).

In the study by Khediri et al. (2015), 61 banks (18 Islamic and 43 Conventional) from the GCC economy were analyzed and the two types of banks were compared using various financial ratios. According to the results of the empirical analysis, Islamic banks are more profitable, more liquid, have lower credit risk and more qualified capital structure than conventional banks. However, classification models show that the two types of banks do not differ in terms of profitability and liquidity. Another important finding shows that both sectors' profitability are affected during crisis periods.

Alqahtani et al. (2017) compared the performance of conventional and Islamic banks during the economic crisis periods by considering 101 banks from the GCC economy. The results of the empirical analysis showed that although Islamic banks outperformed conventional banks in terms of some financial performance indicators in the early stages of the crisis, the performance reversed in the later stages. These results suggest that Islamic banks are not immune to large economic shocks.

El-Chaarani et al. (2022) compared the financial performance of Islamic and conventional banks in GCC countries during the COVID-19 crisis. The results of the empirical analysis revealed that conventional banks exhibited higher financial performance than Islamic banks in terms of performance and liquidity.

Another important group of studies on GCC countries in the literature is on sustainability practices. In many of these studies, it has been revealed that sustainability practices generally have a positive impact on financial performance (A. Jan et al., 2019). In some of these studies, it has been concluded that the environmental dimensions of sustainability have no impact on financial performance (Moufty et al., 2021). Another sub-heading on the same topic is the evaluation of corporate

sustainability practices. Similarly, the relationship between corporate sustainability practices and financial performance has been addressed in these studies. In most of these studies, it has been revealed that corporate sustainability practices have a positive impact on financial performance (Grassa & Matoussi, 2014; Platonova et al., 2018; Siueia et al., 2019; A. A. Jan et al., 2021; A. Jan et al., 2023).

Other studies on the banking sector in GCC countries have examined the relationship between financial performance and intellectual capital (Ousama et al., 2020; Akkas & Asutay, 2022; Farooque et al., 2023), market power (Harrathi, 2019), Sharia supervision and corporate governance (Srairi et al., 2022; Tashkandi, 2023b, 2023a),, capital structure (Moustapha & Benziane, 2022), globalization of financial services (Bankole & Kareem, 2017), Basel standards (Al-Hares & Saleem, 2017), disclosures under social responsibility (Al-Khouri & Basith, 2022), and others.

The originality and contribution of this study to the literature is to analyze the financial sustainability of Islamic banks by applying the sustainability analysis introduced to the literature by Hamilton & Flavin (1986) on some ratios representing bank financial performance. To the best of the authors' knowledge, this is the first study in the literature in this respect. Therefore, it makes a crucial contribution to the literature.

Data and methodology

Data

Within the scope of the study, the Islamic banking sector of the countries that are members of the GCC Countries for the period 2013-Q4 and 2022-Q2 is discussed. Within the scope of the study, only Qatar was excluded from the scope of the study because Qatar's data could not be fully accessed.

Table 1

Definition Table of Variables Used in Analyses

Variables	Description	Source
UAE ROA	United Arab Emirates Return on Asset	
UAE ROE	United Arab Emirates Return on Equity	
UAE NPM	United Arab Emirates Net Profit Margin	
BHR ROA	Bahrain Return on Assets	
BHR ROE	Bahrain Return on Equity	
BHR NPM	Bahrain Net Profit Margin	
KWT ROA	Kuwait Return on Assets	
KWT ROE	Kuwait Return on Equity	www.ifsb.org
KWT NPM	Kuwait Net Profit Margin	
SAU ROA	Saudi Arabia Return on Assets	
SAU ROE	Saudi Arabia Return on Equity	
SAU NPM	Saudi Arabia Net Profit Margin	
OMN ROA	Oman Return on Asset	
OMN ROE	Oman Return on Equity	
OMN NPM	Oman Net Profit Margin	

The descriptive statistics of the variables are as follows:

Table 2

Descriptive Statistics

	Mean	Median	Max	Min	Skew.	Kurtosis	Sum
UAE ROA	0.014377	0.015254	0.018303	0.008397	-0.68051	2.475666	0.503184
UAE ROE	0.114078	0.12168	0.145573	0.060586	-0.6261	2.248197	3.992733
UAE NPM	0.323857	0.346686	0.452036	0.165792	-0.66201	2.992042	11.33498
BHR ROA	0.009538	0.008772	0.039132	-0.0084	1.474495	7.097626	0.333813
BHR ROE	0.077556	0.070381	0.311633	-0.0628	1.580287	7.873081	2.714453
BHR NPM	0.260238	0.286626	0.392967	-0.21091	-2.21518	8.699596	9.108331
KWT ROA	0.011173	0.01151	0.018351	0.001627	-0.7044	3.672591	0.391055
KWT ROE	0.100858	0.103426	0.16664	0.01562	-0.55833	3.872519	3.530044
KWT NPM	0.243718	0.229548	0.477572	0.0336	0.594428	4.672355	8.530125
SAU ROA	0.022535	0.022332	0.028095	0.017728	0.071368	2.176656	0.788741
SAU ROE	0.164715	0.153351	0.334207	0.12586	2.474308	11.14118	5.765033
SAU NPM	0.497219	0.49362	0.67875	0.270506	-0.50537	5.710418	17.40267
OMN ROA	-0.00764	0.000357	0.010053	-0.05775	-1.17264	3.061115	-0.2673
OMN ROE	0.002375	0.002007	0.074094	-0.08664	-0.15543	1.431799	0.083111
OMN NPM	-0.28038	0.011441	0.313717	-2.7378	-1.6696	5.034107	-9.8133

When descriptive statistics are evaluated, it is seen that the highest value is in Saudi Arabia NPM and the lowest value is in Oman NPM variable. Among the series, Oman ROE, Saudi Arabia ROA are normally distributed; Bahrain ROE, Bahrain ROA, Kuwait NPM and Saudi Arabia ROE are right skewed, and the others are left skewed and all of the series exhibit a pointed distribution.

The changes in ROA, ROE, and Net Profit Margin values of the countries analyzed in the study are shown in the figures below.
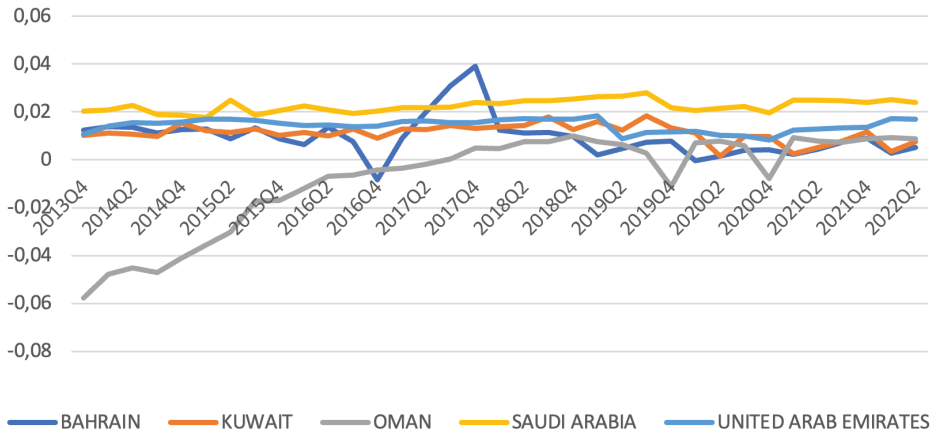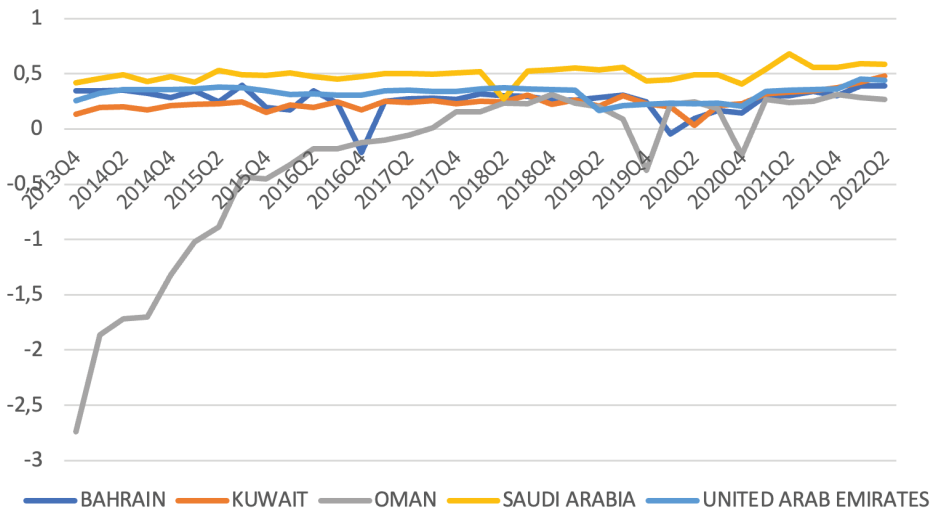

Figure 1: Return on assets (ROA)

When the course of the ROA financial indicator by countries and years is analyzed, it is seen that except for Oman and Bahrain, the other countries have followed a similar course over the years. Oman started at -0.06 and turned positive as of the 3rd quarter of 2017, and although it turns negative from time to time, it follows a course close to zero. The Bahrain variable, on the other hand, exhibits extreme volatility.
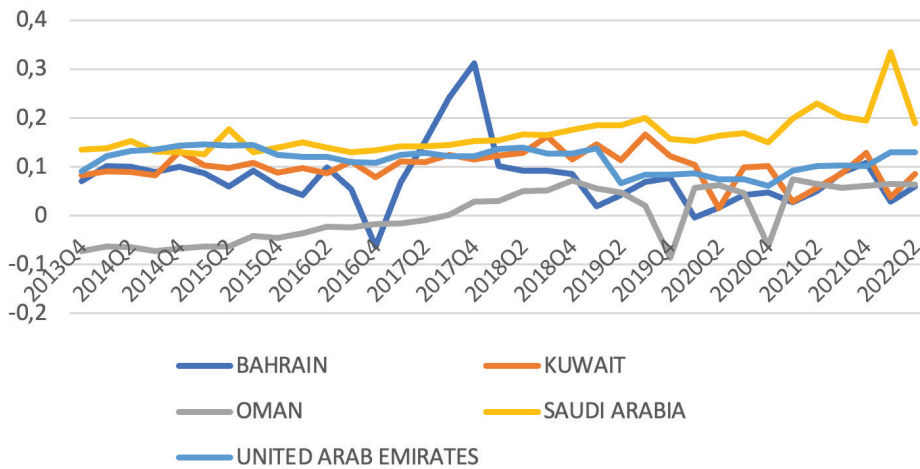
Figure 2: Return on Equity (ROE)

When the course of the ROE financial indicator by countries and years is analyzed, it is observed that except for Oman and Bahrain, the other countries have generally followed a similar course over the years. Only Saudi Arabia has fluctuations different from other countries from time to time. Oman and Bahrain follow a different fluctuation and course as stated in the ROA financial indicator.

Figure 3: Net Profit Margin (NPM)

When the course of the NPM financial indicator by countries and years is analyzed, it is observed that except for Oman, other countries have generally followed a similar course over the years. Oman started at -2.73, turned positive as of the 3rd quarter of 2017, and although it turns negative from time to time, it follows a course close to zero.

Methodology

In the study, some financial indicators are evaluated in terms of sustainability. ROA, ROE, and Net Profit margin variables were used as financial performance indicators. The main rationale for using these indicators is that these indicators are the most widely and frequently used indicators in the financial performance evaluation of the banking sector in the literature (Hidayat & Abduh, 2012; Paul et al., 2013; Abduh & Alias, 2014; Ramlan & Adnan, 2016; Daly & Frikha, 2017; Mukhibad & Khafid, 2018; A. Jan et al., 2023).

In financial performance measurement, ROE ratios are used to measure the returns accrued to shareholders and ROA ratios are used to measure the returns on assets utilized (White et al., 2002). ROA indicator is defined as net profit divided by total assets (Rist & Pizzica, 2014; Brigham & Houston, 2016; Okka, 2021). However, since the Islamic banking area is in question here, it will be expressed as follows (Okka & Kazak, 2021; IFSB, 2023):

Return on Assets (ROA)=Net income (before extraordinary items,taxes,and Zakat)/ Total Assets

The ROE indicator is defined as net profit divided by the total (Rist & Pizzica, 2014; Brigham & Houston, 2016; Okka, 2021). However, since the Islamic banking area is in question here, it will be expressed as follows (Okka & Kazak, 2021; IFSB, 2023):

Return on Equity (ROE)=Net income (before extraordinary items,taxes,and Zakat)/ Total Equity

Another important financial indicator is the net profit margin ratio. This ratio is calculated as net profit divided by total income (Rist & Pizzica, 2014; Brigham & Houston, 2016; Okka, 2021). Again, since the Islamic banking area is in question here, it will be expressed as follows (Okka & Kazak, 2021; IFSB, 2023):

Net Profit Margin=Net income (before extraordinary items,taxes,and Zakat)/Total Revenue

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In order to analyze the sustainability of ROA, ROE and NPM variables of selected gulf countries, the time evolved versions of the Augmented Dickey Fuller unit root test are used. The Augmented Dickey Fuller Unit Root test was first developed by D. Dickey and W. Fuller in 1979. The same authors finalized the test in 1981. The use of unit root tests in sustainability analysis has existed in the literature for a long time. The sustainability analysis considered in this study was first used by Hamilton & Flavin (1986) to test the sustainability of debt. Since then, many studies have analyzed sustainability using unit root tests (Wilcox, 1989; Fukuda & Teruyama, 1994; Olekalns, 2000; Jarmuzek, 2005; Bravo & Silvestre, 2002; Olaoye & Olomola, 2022; Afonso & Coelho, 2023). Recently, there are examples in the literature where unit root tests with Fourier functions are used for the same purpose (Phiri, 2019). In addition to debt sustainability, unit root tests are also used in convergence analyses (Erdogan & Solarin, 2021; Yilanci et al., 2022; M. K. Hassan et al., 2023), hysteresis analyses (Blanchard & Summers, 1986; Arestis & Mariscal, 2000; Üçler et al., 2023) and in analyzing different sustainability issues (Husein, 2020; Ilkay et al., 2021; Kiran Baygin & Çil, 2023). Although a significant portion of the studies in the literature are on analyzing the sustainability of government debt and budget values, different statistical analysis methods, especially unit root tests, are used to test different sustainability. In this study, ADF (1981), RALS-ADF (2009, 2014), Fourier ADF (2012) and Fractional Frequency Fourier ADF (2020) tests are used for financial sustainability analysis.

Table 3

Formulation Table

$$\Delta y_t = \alpha + \beta y_{t-1} + \sum_{j=1}^{p} \delta_j \Delta y_{t-j} + e_t , \quad t = 1,2,,,,T \tag{1}$$

$$\Delta y_t = \alpha + \beta y_{t-1} + \sum_{j=1}^{p} \delta_j \Delta y_{t-j} + W_t' Y' + e_t , \quad t = 1,2,3, \dots, T \tag{2}$$

$$\Delta yt = c_0 + c_1 \sin\left(\frac{2\pi k t}{T}\right) + c_2 \cos\left(\frac{2\pi k t}{T}\right) + c_3 y_{t-1} + \sum_{i=1}^{p} a_i \Delta y_{t-i} + e_t \tag{3}$$

$$y_t^* = \alpha_0 1_t^* + \beta_0 t_t^* + \lambda_1 \sin_{1,t}^* + \lambda_2 \cos_{1,t}^* + u_t, \quad t = 1,2,3, \dots, T \tag{4}$$

Equation 1 shows the model developed by Dickey & Fuller in 1981. To this model, Im et al. (2009) added the ($\hat{W}'_t$ Y) data obtained from the quotations to form equation 2, which is the equation of the RALS ADF test. The critical values accepted for this test are the same as the critical values of the original ADF test (Doğanlar et al., 2021; Esenyel İçen et al., 2022). However, when Fourier function versions of the tests are developed, the critical values also differ. With equation number 3, Enders & Lee (2012), who found the Fourier ADF test, also included new critical values in their study. Similarly, Bozoklu et al. (2020), who found "The Fractional Frequency Fourier ADF" test by dividing the frequencies in the Enders & Lee (2012) study into fractions with equation number 4 and making a more precise estimation, included separate critical values for each fractional frequency in their study.

Empirical Findings

The unit root tests used in this study are based on two hypotheses.

H_0 : Series contains unit root, not stationary and unsustainable.

H_1 : The series does not contain unit roots and is stationary and sustainable.

If the test statistic values are less than the critical limits in absolute value, the H_0 hypothesis is accepted. On the contrary, the H_1 hypothesis is accepted. Considering this information, ADF, RALS-ADF, FADF, and KFFADF test findings are interpreted.

Table 4

ADF Test Results

	ADF T STAT	%1 CV	%5 CV	%10 CV	P VAL
UAE ROA	-2.97375	-4.25288	-3.54849	-3.20709	0.154
UAE ROE	-2.84507	-4.25288	-3.54849	-3.20709	0.1921
UAE NPM	-1.91586	-4.25288	-3.54849	-3.20709	0.6244
BHR ROA	-3.10964	-4.25288	-3.54849	-3.20709	0.1203
BHR ROE	-3.18845	-4.25288	-3.54849	-3.20709	0.1036
BHR NPM	**-4.05286****	**-4.25288**	**-3.54849**	**-3.20709**	**0.0161**
KWT ROA	**-3.95021****	**-4.25288**	**-3.54849**	**-3.20709**	**0.0205**
KWT ROE	-2.31253	-4.30982	-3.57424	-3.22173	0.4145
KWT NPM	-2.46638	-4.33933	-3.58753	-3.22923	0.3405

SAU ROA	**–3.99026****	**–4.25288**	**–3.54849**	**–3.20709**	**0.0187**
SAU ROE	–2.39008	–4.30982	–3.57424	–3.22173	0.3766
SAU NPM	**–5.11811*****	**–4.25288**	**–3.54849**	**–3.20709**	**0.0011**
OMN ROA	–2.23686	–4.25288	–3.54849	–3.20709	0.4552
OMN ROE	**–4.70088*****	**–4.25288**	**–3.54849**	**–3.20709**	**0.0033**
OMN NPM	**–3.78781****	**–4.25288**	**–3.54849**	**–3.20709**	**0.0296**

Note: In the table, *** indicates significance level at 1% level, ** at 5% level and * at 10% level.

According to the ADF results, Bahrain NPM, Kuwait ROA, Saudi Arabia ROA, Saudi Arabia NPM, Oman ROE, and Oman NPM series do not contain unit roots and therefore are sustainable. The other variables are found to contain a unit root and are unsustainable.

Table 5

RALS ADF Test Results

	RALS-ADF T STAT	%1 CV	%5 CV	%10 CV
UAE ROA	-2,974	-4.25288	-3.54849	-3.20709
UAE ROE	-2,845	-4.25288	-3.54849	-3.20709
UAE NPM	-1,916	-4.25288	-3.54849	-3.20709
BHR ROA	-3,110	-4.25288	-3.54849	-3.20709
BHR ROE	-3,188	-4.25288	-3.54849	-3.20709
BHR NPM	**-4,053****	**-4.25288**	**-3.54849**	**-3.20709**
KWT ROA	**-3,950****	**-4.25288**	**-3.54849**	**-3.20709**
KWT ROE	**-4,338*****	**-4.30982**	**-3.57424**	**-3.22173**
KWT NPM	-1,107	-4.33933	-3.58753	-3.22923
SAU ROA	**-3,990****	**-4.25288**	**-3.54849**	**-3.20709**
SAU ROE	**-5,466*****	**-4.30982**	**-3.57424**	**-3.22173**
SAU NPM	**-5,118*****	**-4.25288**	**-3.54849**	**-3.20709**
OMN ROA	-2,237	-4.25288	-3.54849	-3.20709
OMN ROE	**-4,701*****	**-4.25288**	**-3.54849**	**-3.20709**
OMN NPM	-2,571	-4.25288	-3.54849	-3.20709

Note: In the table, *** indicates significance level at 1% level, ** at 5% level and * at 10% level.

According to the results of RALS ADF test, where residuals are also included in the calculation, Bahrain NPM, Kuwait ROA, Kuwait ROE, Saudi Arabia ROA, Saudi Arabia ROE, Saudi Arabia NPM and Oman ROE variables do not contain unit roots and are therefore sustainable. The other variables are found to contain a unit root and are unsustainable.

Table 6

Fourier ADF (FADF) Test Results

	FADF T STAT	%1 CV	%5 CV	%10 CV	F
UAE ROA	-2,7285	-4,95	-4,35	-4,05	1
UAE ROE	-2,7041	-4,95	-4,35	-4,05	1
UAE NPM	**-4,0619***	**-4,95**	**-4,35**	**-4,05**	**1**
BHR ROA	-2,8645	-4,95	-4,35	-4,05	1
BHR ROE	-2,8334	-4,95	-4,35	-4,05	1
BHR NPM	**-4,1083***	**-4,95**	**-4,35**	**-4,05**	**1**
KWT ROA	0,6492	-4,69	-4,05	-3,71	2
KWT ROE	0,4702	-4,69	-4,05	-3,71	2
KWT NPM	**-3,7657****	**-4,20**	**-3,56**	**-3,22**	**5**
SAU ROA	-3,5446	-4,69	-4,05	-3,71	2
SAU ROE	**-3,8562****	**-4,45**	**-3,78**	**-3,44**	**3**
SAU NPM	0,3212	-4,20	-3,56	-3,22	5
OMN ROA	-2,7220	-4,95	-4,35	-4,05	1
OMN ROE	-3,2478	-4,95	-4,35	-4,05	1
OMN NPM	-3,1626	-4,45	-3,78	-3,44	3

Note: In the table, *** indicates significance level at 1% level, ** at 5% level and * at 10% level.

According to the results of the FADF test, it is concluded that UAE NPM, Bahrain NPM, Kuwait NPM, and Saudi Arabia ROE variables do not contain unit roots and therefore are sustainable. The other variables are found to contain a unit root and are unsustainable.

Table 7

Fractional Frequency Fourier ADF (KFFADF) Test Results

	FRE	MIN KKT	F KISIT TEST	KFFADF TEST STAT	%1 CV	%5 CV	%10 CV
UAE ROA	2.2	0,000000	3.984682	-2.38458	–4.64815	–3.97812	–3.62709
UAE ROE	2.3	0.006757	4.182293	-1.70624	–4.5805	–3.93425	–3.5945
UAE NPM	2.3	0.049487	4.398383	-2.0842	–4.5805	–3.93425	–3.5945
BHRROA	4.8	0.001369	1.887562	-2.88126	–4.22173	–3.57211	–3.2437
BHR ROE	4.7	0.085718	2.021264	-3.0829	–4.24192	–3.56275	–3.23561
BHR NPM	2.4	0.292801	10.9829	-5.95181***	–4.57925	–3.91711	–3.57015
KWT ROA	0.6	0.000301	2.925475	-3.23543	–4.91802	–4.29959	–3.99611
KWT ROE	1.5	0.023845	4.038092	-2.77423	–4.89476	–4.28233	–3.97792
KWT NPM	0.1	0.098413	3.593324	-1.03558	–4.87987	–4.26469	–3.95616
SAU ROA	0.8	0.000134	4.227693	-2.93875	–4.92747	–4.33115	–4.03156
SAU ROE	0.1	0.022428	8.642109	-3.77665	–4.87987	–4.26469	–3.95616
SAU NPM	0.1	0.117317	6.076711	-3.68216	–4.87987	–4.26469	–3.95616
OMN ROA	0.1	0.000932	1.234336	-2.16923	–4.87987	–4.26469	–3.95616
OMN ROE	0.1	0.036157	5.714214	-3.98482*	–4.87987	–4.26469	–3.95616
OMN NPM	0.1	1.061349	0.142908	-1.49953	–4.87987	–4.26469	–3.95616

Note: In the table, *** indicates significance level at 1% level, ** at 5% level and * at 10% level.

According to the results of the KFFADF test, it is concluded that only Bahrain NPM and Oman ROE variables do not contain unit roots and are sustainable. All other variables are found to contain a unit root and are unsustainable.

Since the results of different versions of the ADF series were included in the study, different results were encountered. For this reason, it is thought that it would be useful to show all the results in a single table.

Table 8

Aggregated Results Table

	ADF	RALS-ADF	FADF	KFFADF	
UAE ROA	-2.97375	-2,974	-2,7285	-2.38458	0
UAE ROE	-2.84507	-2,845	-2,7041	-1.70624	0
UAE NPM	-1.91586	-1,916	-4,0619*	-2.0842	1
BHR ROA	-3.10964	-3,110	-2,8645	-2.88126	0
BHR ROE	-3.18845	-3,188	-2,8334	-3.0829	0
BHR NPM	-4.05286**	-4,053**	-4,1083*	-5.95181***	4
KWT ROA	-3.95021**	-3,950**	0,6492	-3.23543	2
KWT ROE	-2.31253	-4,338***	0,4702	-2.77423	1
KWT NPM	-2.46638	-1,107	-3,7657**	-1.03558	1
SAU ROA	-3.99026**	-3,990**	-3,5446	-2.93875	2
SAU ROE	-2.39008	-5,466***	-3,8562**	-3.77665	2
SAU NPM	-5.11811***	-5,118***	0,3212	-3.68216	2
OMN ROA	-2.23686	-2,237	-2,7220	-2.16923	0
OMN ROE	-4.70088***	-4,701***	-3,2478	-3.98482*	3
OMN NPM	-3.78781**	-2,571	-3,1626	-1.49953	1

Note: In the table, *** indicates significance level at 1% level, ** at 5% level and * at 10% level.

According to the table where the results of the ADF, RALS-ADF, FADF and KF-FADF tests are shown in the same table, it is concluded that the variables UAE ROA, UAE ROE, Bahrain ROA, Bahrain ROE, and Oman ROA contain unit root and are unsustainable in all ADF, RALS-ADF, FADF and KFFADF tests. Bahrain NPM variable was found to contain no unit root and to be sustainable in all tests used for the Bahrain NPM variable, while the other variables were found to contain no unit root and to be sustainable for at least one test.

These results are very important for the finance literature. In fact, the first study by Hamilton & Flavin (1986), which deals with sustainability by evaluating stationarity, was used to analyze the sustainability of public debt. Their study empirically demonstrated that if public debt follows a stationary process, intertemporal budget balance will be achieved. After their study, many studies have addressed the stationarity and sustainability of public debt (Trehan & Walsh, 1988; Wilcox, 1989; Trehan & Walsh, 1991; Fukuda & Teruyama, 1994; Olekalns, 2000; Bravo & Silvestre, 2002; Olaoye & Olomola, 2022; Afonso & Coelho, 2023). Since then,

unit root tests have been used extensively in the literature for stationarity analysis (Trehan & Walsh, 1988; Buiter & Patel, 1992; Payne, 1997; Kalyoncu, 2006; Uctum et al., 2006; Lau et al., 2013; Magazzino & Mutascu, 2022). The most important contribution of this study to the literature is the adaptation of the analysis on the sustainability of public debt to finance. In the field of finance, financial sustainability has been addressed by focusing on macroeconomic indicators and factors affecting bank profitability. CSPis also one of the most studied topics in the literature. In this study, sustainability analyses are conducted by using important financial indicators for the banking sector with the help of current unit root tests.

When the situation in GCC countries is evaluated, many studies in the literature have revealed the financial performance of Islamic banks operating in GCC countries (Zeitun, 2012; Khediri et al., 2015; Karim et al., 2017; Alqahtani et al., 2017; Farah, 2020; M. ul. Hassan et al., 2020; Buallay et al., 2021; El-Chaarani et al., 2022; Alshehri, 2023). The main difference of this study from the studies in the literature is to reveal whether these financial performances are sustainable in terms of future projections. In this respect, the study reveals different and unique results from the studies in the literature.

Empirical Results and Discussion

The Islamic banking sector has grown significantly over the last fifty years and represents the largest share of Islamic finance. The banking sector is one of the sectors most affected by financial crises and most sensitive to economic variables. Islamic banking is subject to the same influences as conventional banking. Within all these factors, Islamic banking is expected to have financially sustainable indicators to provide the expected benefits. The main purpose of this study is to analyze the current situation and present financial sustainability data in order for the Islamic banking sector to develop smoothly and provide the expected benefits.

The originality and contribution of this study to the literature is to analyze the financial sustainability of Islamic banks by applying the stationarity-based sustainability analysis, which was introduced to the literature by Hamilton & Flavin (1986) and later used in many studies, on some ratios representing bank financial performance. To the best of the authors' knowledge, this is the first study in the literature in this respect. A significant portion of the studies in the literature consists of studies on analyzing the sustainability of government debt and budget values. The literature also shows that unit root tests are used in convergence analysis (Erdogan & Solarin, 2021; Yilanci et al., 2022; M. K. Hassan et al., 2023; Alper

et al., 2023), hysteresis analysis (Blanchard & Summers, 1986; Arestis & Mariscal, 2000; Üçler et al., 2023) and in analyzing different sustainability issues (Richard, 2018; Husein, 2020; Ilkay et al., 2021; Kiran Baygin & Çil, 2023). In this study, ADF (1981), RALS-ADF (2009, 2014), Fourier ADF (2012) and Fractional Frequency Fourier ADF (2020) tests are used for financial sustainability analysis. Therefore, it makes a significant contribution to the literature.

According to the results of the analysis, UAE ROA, UAE ROE, Bahrain ROA, Bahrain ROE and Oman ROA variables are found to contain unit roots and are unsustainable in all unit root tests. The other variables were found to be sustainable in at least one unit root test. In only one variable (Bahrain NPM), all unit root tests found evidence that it does not contain a unit root and is sustainable. Again, according to the results of the analysis, there is no evidence that both ROA and ROE variables of the United Arab Emirates and Bahrain Islamic banking sector are sustainable in any unit root test. When these two countries are analyzed in terms of other variables, United Arab Emirates was found to be sustainable in terms of Net Profit Margin in only one test (FADF), while all tests for Bahrain were found to be sustainable in terms of Net Profit Margin. To the best of our knowledge, this is the first study in the literature to analyze the financial sustainability of Islamic banks by applying stationarity-based sustainability analysis on some ratios representing bank financial performance. However, among the studies in the literature that evaluate the financial sustainability of Islamic banks from different perspectives, it supports the studies that say that Islamic banking is financially stable and (Iqbal, 2001; Bader et al., 2008; Ika & Abdullah, 2011; Usman & Khan, 2012; Ab-Rahim et al., 2013; Ibrahim, 2015; Ahsan, 2016; Majeed & Zainab, 2021; Hidayat et al., 2021; Ali et al., 2021; Ghouse et al., 2022). When these results are evaluated together with the studies showing that Islamic finance supports economic growth (Tabash, 2019; Ledhem & Mekidiche, 2020; Kazak et al., 2023), it shows that supporting Islamic finance and Islamic banking in particular should be made an important state policy.

Conclusion

This study presents sustainability analyses that can be used as future projections of Islamic banking activities operating in GCC member countries using the latest Fourier expansion versions of unit root tests, which are commonly used in the literature for public debt sustainability analyses. In the analyses conducted using the 2013-Q4 and 2022-Q2 data of Islamic banks operating in GCC member countries, key financial indicators such as ROA, ROE and net profit margin are used as banking financial indicators. These indicators were preferred because they are the most

widely and frequently used indicators in the literature to evaluate financial performance. Although the results of the empirical analyses show different results for each of the financial indicators related to the Islamic banking sector on the basis of the countries studied, in general it has been revealed that the Islamic banking sector is sustainable in at least two financial performance categories and at least one test result in the GCC countries except for the UAE and BHR. In the case of Bahrain, it was found to be sustainable according to all the test results used, but only for one indicator (the NPM indicator). These results generally indicate that the Islamic banking sector operating in all GCC countries except the UAE is sustainable in at least one category of the financial indicators used. The result of the present study provides a strategic perspective for legislative bodies, government authorities, top banking structures such as the Central Bank and the Banking Regulation and Supervision Agency in general, and the practitioners of Islamic banks and financial institutions in particular, to implement Islamic corporate governance in order to achieve a higher sustainability performance in all countries where Islamic banking activities are conducted, especially in Islamic countries. The ever-increasing interest in the field of Islamic finance places important responsibilities on the parties involved. It is also important to draw attention to the importance of Islamic banking in achieving the global sustainability goals set by the United Nations.

In this study, the authors recommend the following measures as government policy. Firstly, when dealing with financial literacy, the title of Islamic financial literacy should be added. Special studies should be conducted especially for university students. The factors that have a negative impact on the Islamic banking sector in competition with conventional banks should be eliminated. To this end, the central bank may consider paying a fee for the required reserves in exchange for an instrument suitable for Islamic finance (such as sukuk) instead of interest. The economic administration should introduce new instruments to encourage Islamic banks to use funds based on partnership-based financial instruments other than Murabahah. The way should be paved for Islamic banks to cooperate with the international structures of state banks in the implementation of letter of credit transactions, which are an important element in exports and imports.

In the light of all these evaluations, it is important for the smooth development of the Islamic banking sector that the policymakers of the respective countries develop policies that take the necessary measures and corrections in the light of these results. It is believed that this study makes an important and original contribution to the literature and will contribute to the development of the Islamic banking sector.

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