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ESG ACTIVITIES AND BANK EFFICIENCY: ARE ISLAMIC BANKS BETTER?

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ABSTRACT

In this paper, we investigate the differential impact of ESG activities on banks' technical efficiency for conventional and Islamic banks. We employ a Data Envelopment Analysis (DEA) technique to determine the efficiency scores of the banks. Based on a sample of 14 conventional and 11 Islamic banks from 4 countries over the period 2011 - 2019, we find that average DEA-generated efficiency of conventional (Islamic) banks is about 38.8% (42.45%). Baseline Tobit regressions suggest that ESG has an overall positive impact on banks' efficiency. Further, we analyze the relationship for conventional and Islamic banks separately. We find that the positive effect sustains for conventional banks but turns out to be insignificant for Islamic banks. Our individual ESG dimension-wise analyses suggest that environmental activities positively influence the efficiency of both conventional and Islamic banks, whereas social activities strengthen the efficiency of conventional banks only. We do not find any significant result in favor of governance-related initiatives. Our baseline results survive the robustness test based on Simar and Wilson (2007) two-stage efficiency analysis. Based on our findings, we argue that Islamic banks lack sufficient investment on ESG friendly initiatives. We recommend that Islamic banks increase their awareness of the benefits of ESG practices and pay attention to improve their overall and dimension-wise ESG scores with a goal to improve their banking efficiency.

Keywords: ESG, DEA efficiency, Islamic banks, Tobit regression.
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I. INTRODUCTION

The impact of ESG on firm efficiency is a relatively new topic in empirical finance. Prior studies mostly focus on the effect of ESG on firm performance. A large strand of literature documents that ESG benefits firm performance. For example, Gillan, Hartzell, Koch & Starks (2010) study the relationship between ESG and firms' operating performance, efficiency, and valuation. They find that high ESG performance increases firm value, efficiency, and operating performance. Based on a new quantitative model, Kumar et al. (2016) argue that firms with high ESG activity exhibit higher return and lower volatility of their stock prices. Cao, Titman, Zhan & Zhang (2018) examine the association between ESG preference and market efficiency and argue that ESG preference increases stock return predictability.

Another strand of literature focuses on the influence of ESG on banks. Azmi, Hassan, Houston & Karim (2021) find that ESG performance strengthens bank value, but the relationship is rather non-linear, i.e., high levels of ESG activity negatively influence bank value. Further, they argue that ESG activity reduces banks' cost of equity and strengthens their cash flow and efficiency. Miralles-Quiros et al. (2019) suggest that market values the three individual ESG dimensions separately and banks from common law countries experience high value relevance of ESG performance after the financial crisis of 2007-2008. Mure et al. (2020) investigate the effect of ESG practices on the reputation of Italian banks and the probability of sanctions for them. They find that bank sanctions are positively related to ESG but the increased ESG practices stem from the necessity of banks to improve their reputation.

Prior studies offer plenty evidence on the impact of ESG on firm and bank performance, but literature on ESG and bank efficiency is still very limited. Recently, Alam, Banna & Hassan (2021) empirically examine the influence of ESG performance on bank efficiency from a global perspective. Based on a large sample of 578 banks from 57 countries over the years 2011-2019, they find that high ESG performance leads to reduced bank efficiency. They also find that the relationship is non-linear, i.e., banks with very high ESG scores exhibit increased efficiency. Their findings remain consistent across the social (S) and governance (G) dimensions (pillars) of ESG and across various bank characteristics such as size, specialization, and geographic location of the banks' headquarters. Searching for potential channels, they argue that high ESG performance significantly reduces bank loans and other earning assets, leading to reduced bank efficiency.

Literature on ESG and bank efficiency is limited (Tasnia, Alhabshi & Rosman, 2021), however, literature on ESG and efficiency of Islamic banks is non-existent. In this paper, we try to uncover this area of the literature. Our main objective is to conduct a differential analysis of the impact of ESG activities on banking efficiency between conventional and Islamic banks. Based on the principles of Shari'ah, Islamic financial institutions differ significantly in multiple aspects from their conventional counterparts. This difference is also prevalent in the areas of sustainability performance and impact investing. Prior studies suggest that firms with an "Islamic" label exhibit stronger environmental and social practices (Qoyum et al., 2021). Offering a wide range of products/schemes that exclusively support climate-friendly investments, such as *Green Sukuk*, Islamic banks are expected to perform well in the environmental dimension of ESG. In addition, prohibition

of *Riba* (i.e., interest), profit/loss and risk sharing, and assurance of social equity, justice and inclusion through zakat and other similar schemes make Islamic banks stronger advocates of social responsibility. Lastly, having an additional level of governance by the Shari'ah board, which is independent of the management, ensures better governance mechanism and institutional quality of Islamic banks, as compared with their conventional peers. Existing empirical evidence explains whether and why Islamic banks may outperform traditional banks in terms of sustainability performance and responsible investing, but the effects of better sustainability (i.e., higher ESG scores) on the technical efficiency of Islamic banks need to be revealed. Using a small sample of 25 banks (14 conventional and 11 Islamic) from four MENA countries (i.e., Kuwait, Qatar, Saudi Arabia, and United Arab Emirates (UAE)) over the period from 2011-2019, we empirically investigate whether Islamic and conventional banks exhibit significantly distinct impact of ESG on banking efficiency, as they do in terms of their ESG practices and sustainability performances.

Following Alam et al. (2021), we apply a data envelopment analysis (DEA) method to estimate the efficiency scores of our sample banks. We collect ESG data from Thomson Reuters Datastream and bank-related variables from Bank Focus (formerly, Bankscope) database of global banks and financial institutions. We control for numerous bank characteristics, such as bank size, liquidity, loan to deposit ratio, and capital adequacy. We also control for a number of macroeconomic variables, such as GDP growth rate, inflation, and unemployment rate. Further, we incorporate country governance indicators to rule out their influence on the ESG-efficiency relationship. Following Alam et al. (2021), we develop a new governance index score (*GOV*) and study the impact of ESG on the efficiency of banks below and above average *GOV*. Our macro data and country-wise governance indicators are obtained from World Bank's open database.

Our analyses are based on two hypotheses. The *stakeholder hypothesis* suggests that firms engage in ESG practices as a mean to achieve their goal to maximize stakeholders' benefits. Contrarily, the *trade-off hypothesis* argues that firms investing on ESG activities are likely to suffer from inefficient use of resources and these investments could actually be used for other profitable opportunities.

Our baseline tests are divided into three steps. First, we regress efficiency on overall ESG score of all banks (conventional + Islamic) in our sample. Next, we run the same test on conventional banks separately. Finally, we isolate the Islamic banks and run our baseline model only on them to see if they exhibit any different result than the conventional banks. Following Alam et al. (2021), we run Tobit regressions for our baseline analyses. Our baseline results suggest that ESG performance has a significantly positive influence on bank efficiency in general, supporting the stakeholder hypothesis. The estimated coefficient on ESG is 0.0029 with a p-value of 0.011. In terms of economic effect, a 1% increase in ESG score leads to a 0.2855% increase in bank efficiency in general. Tests only on conventional banks exhibit similar results. On average, a 1% increase in overall ESG score of conventional banks results in a 0.2358% increase in their efficiency. However, the ESG-efficiency relationship does not hold when we test Islamic banks separately. The estimated coefficient on ESG score is 0.001 with a p-value of 0.730. These results indicate that the positive relationship between ESG and bank

efficiency is mainly due to the positive connection between ESG and efficiency of conventional banks.

Further, we extend our analyses to individual ESG dimensions. We use individual ESG pillar scores as the main independent variables. Our findings suggest that environmental and social activities positively affect banks' efficiency in general, but governance activities seem to have no significant effect. We find similar results when we examine conventional banks separately. As far as Islamic banks are concerned, our findings suggest that Islamic banks gain efficiency by increasing their environmental initiatives, but we do not find any significant role of social and governance practices in the efficiency of Islamic banks.

Based on these findings, we argue that Islamic banks lack sufficient concentration and investment on ESG-friendly initiative. This is also reflected on the ESG performance of Islamic banks as compared with conventional banks. We strongly recommend that Islamic banks follow the footprints of conventional banks in this regard and pay attention to the benefits of ESG and increase their investments on ESG friendly business practices, which will lead them to higher efficiency and greater profitability and value.

The remainder of the paper proceeds as follows: Section 2 provides a brief review of relevant literature and identifies the testable hypotheses. Section 3 presents a brief description of the data, variables, and methods. Section 4 discusses the main empirical results. Finally, Section 5 concludes.

II. LITERATURE REVIEW AND HYPOTHESES

2.1. Background Theory

The relationship between ESG activities and firm performance is based upon a number of theories. Each theory is supported by considerable amount of empirical evidence, offering inconclusive results and leading to further empirical investigations. Azmi et al. (2021) provide an excellent review of the background theories of ESG and corporate performance. Broadly, there are two major theories of ESG and firm performance: a) the *stakeholder theory* (Freeman, 1984), suggesting that firms with a goal to maximize the value or benefits of their stakeholders are more likely to engage in ESG friendly activities and in reducing the costs associated with non-compliance with ESG regulations, and b) the *trade-off theory* (Friedman, 1970), arguing that ESG activities lead firms to inefficiency as the funds invested toward ESG could otherwise be used for projects with higher profitability. The stakeholder theory is further supported by *resource-based theory* (Russo & Fouts, 1997), considering ESG activities as strategic investments allowing firms to gain competitive advantage over their peers, and *stewardship theory*, suggesting managers acting as stewards to improve the relationship among firms' stakeholders by investing in ESG-friendly initiatives. On the other hand, the trade-off theory is backed by the *agency theory* (Jensen, 1986; Jensen & Meckling, 1976), implying that managers, as agents of the firms' owners, do not work for the best interest of the shareholders and rather invest in socially responsible business projects to gain non-pecuniary managerial benefits at the cost of the shareholders' profits.

2.2. Previous Studies

Literature on ESG and corporate performance dates back as early as in 1970 (Friede, Busch & Bassen, 2015). Prior research on ESG and firm performance offers mixed evidence. A large strand of literature advocates the positive role of ESG in firm performance. According to Albuquerque, Durnev & Koskinen (2012), high ESG scores are positively (negatively) associated with corporate profits (systematic risk). Studying U.S. firms, Sharfman & Fernando (2008) argue that firms with high performance in the environmental dimension of ESG are subject to stronger economic performance. In particular, they document that firms with strong environmental risk management exhibit low cost of equity capital and low business risk. Gillan et al (2010) study the association between ESG and firm valuation. They report that high ESG firms exhibit high operational efficiency and high firm value. Studying the stock return – volatility channel, Kumar et al (2016) introduce the ESG-risk premium model. They find that ESG is positively (negatively) related to stock return (volatility of stock return). Based on a sample of 7,446 IPOs over a period from 2008 to 2018, Baker et al. (2021) suggest that ESG has a negative impact on IPO underpricing and this negative relationship is stronger in countries with better financial disclosure and higher investor protections.

On the other hand, some researchers claim that ESG has negative or no effect on firm performance. According to Cao et al. (2018), high ESG performance reduces the risk-adjusted return of firms with overpriced stocks. Fatemi, Glaum & Kaiser (2018) find that ESG disclosure hurts firm valuation and reduces the positive effects of ESG activities on firm value. La Torre et al. (2020) argue that firms' ESG efforts do not have any impact on their performance. Duque-Grisales & Aguilera-Caracuel (2021) report that ESG score is negatively related with firm financial performance. Further, they argue that all three dimensions of ESG are negatively associated with firm performance.

The role of ESG in bank performance gained research attention following the global financial crisis of 2007-2008. However, literature on ESG and bank performance is also divided. Numerous studies find that ESG activities positively affect bank performance and value. For example, Buallay (2019) argues that bank performance is positively influenced by ESG performance and disclosure. Nizam et al. (2019) empirically assess the role of environmental and social sustainability on banks' financial performance and document a significantly positive influence of banks' environmental financing on their return on equity (ROE), lending, and managerial quality. Studying Italian banks over a sample period from 2008 to 2018, Mure et al. (2020) suggest that ESG practices strengthen banks' reputation and reduce their likelihood of receiving sanctions.

According to Miralles-Quiros et al. (2019), ESG has a positive impact on banks' value measured by Tobin's Q. In a similar study, Azmi et al. (2021) examine the impact of ESG activities on bank value. Employing System GMM estimation on a large sample of 251 banks from 44 emerging countries over the period 2011 – 2017, they find that ESG has a significantly positive and non-linear association with bank value. In particular, they claim that banks with low (high) levels of ESG activities exhibit a positive (negative) relationship between ESG score and Tobin's Q. Further, they suggest that environmental dimension of ESG has the greatest impact on bank value. Investigating potential channels, they report that banks

with high ESG scores are subject to higher cash flow and efficiency and lower cost of equity capital.

Contrarily, a large body of literature suggests that ESG activities vandalize bank performance and value. According to Forgione, Laguir & Stagliano (2020), environmental and social initiatives negatively affect bank efficiency. Buallay (2019) examines a large sample of European banks over a period from 2007 to 2016 and finds that banks' disclosure of their social and governance initiatives reduces their profitability. Based on a sample of 46 listed banks from MENA countries during 2007 to 2019, El Khoury, Nasrallah & Alareeni (2021) find that bank performance is negatively related with ESG investments, and the relationship is non-linear. Shair et al. (2021) claim that despite banks' attempt to reduce carbon emissions, banking sector development is negatively associated with environmental sustainability.

The impact of ESG on bank efficiency is a relatively new topic in the banking literature. Ouenniche & Carrales (2018) study the efficiency of a group of U.K. commercial banks. Employing a DEA method, they estimate bank efficiency and find that U.K. commercial banks with high ESG performance fail to achieve acceptable levels of technical and scale efficiency. Recently, Alam et al. (2021) empirically investigate the role of banks' ESG scores in their level of efficiency from a global perspective. Based on a large sample of 578 banks representing 57 countries from 2011 to 2019, they argue that high ESG performance reduces banks' efficiency, supporting the trade-off theory of ESG. Further, following Azmi et al. (2021), they find that the ESG-efficiency relationship is non-linear, i.e., banks with very high ESG scores experience increased efficiency. Using a DEA model, they use loans, other operating income, and other earning assets as bank outputs, and deposits, personnel expenses, and fixed assets as bank inputs. Their baseline findings remain unchanged across the individual dimensions of ESG as well as across various bank characteristics such as bank size, specialty, and geographic locations of their sample banks' headquarters.

2.3. Testable Hypotheses

Existing literature provides ample evidence on the effect of ESG on bank *performance* and little evidence on the effect of ESG on bank *efficiency*. However, the influence of ESG on the efficiency of Islamic banks is still subject to empirical investigation. In this paper, we attempt to bridge a connection between ESG performance of Islamic banks and the level of their technical efficiency, conducting a comparative analysis of ESG and bank efficiency for both Islamic banks and their traditional counterparts. Motivated by the stakeholder theory (Freeman, 1984; Jones, 1995; Azmi et al., 2021), we predict that ESG has a positive impact on bank efficiency, in general. We also examine whether the ESG-efficiency relationship sustains for both conventional and Islamic banks. In particular, we develop and test the following hypotheses:

H1: ESG performance has a positive impact on banks' technical efficiency.
H2: High ESG performance strengthens technical efficiency of conventional banks.
H3: High ESG performance increases technical efficiency of Islamic banks.

III. METHODOLOGY

3.1. Data

In this paper, we merge four different data sets to build the sample for our empirical analyses. Our ESG scores data are obtained from Thomson Reuters Datastream. Datastream offers a wide range of bank-related ESG data. In particular, it provides overall ESG score, ESG combined score, ESG controversies score, and dimension-wise ESG scores, i.e., environmental pillar score, social pillar score, and governance pillar score. It also provides banks' performance in numerous components under each dimension of ESG. In our baseline tests, we use the overall ESG score as the main independent variable. Our bank-related data are collected from Bank Focus database of global banks and financial institutions. We collect data on banks' total assets, equity, deposits and short-term funding, loans, and capital adequacy. We also obtain fixed assets, staff expenses, other operating assets, and other operating income.

Our macroeconomic variables are obtained from World Bank's (WB) open database. To control for macroeconomic effects, we obtain country-wise GDP growth rate, inflation, and unemployment rate. In addition to macro-economic variables, WB also provides data on governance or institutional quality of each country. In particular, WB database offers country-wise six governance indicators (WGI) such as *VAE* (voice and accountability estimate), *PVE* (political stability and absence of violence estimate), *RQE* (regulatory quality estimate), *RLE* (rule of law estimate), *GEE* (governance effectiveness estimate), and *CCE* (control of corruption estimate).

3.2. Model Development

Following Alam et al. (2021), we measure our main dependent variable, i.e., banks' technical efficiency, using an input-oriented DEA method. We use a DEA technique because our objective is to obtain the technical (production) efficiency of our sample banks, instead of obtaining the cost efficiency for which one may use the efficiency ratio or cost to revenue ratio directly provided by the data source. DEA is a non-parametric method used in economic and operations research to estimate production/operational efficiency of decision-making units (DMUs). In our study, each bank represents one single DMU. We use a specific set of bank inputs and outputs in our DEA model. Following Alam et al. (2021) and Ahamed et al. (2021), we use bank loans, other earning assets, and other operating income as bank outputs. On the other hand, we use total deposits and short-term funding, fixed assets, and staff expenses as bank inputs. Using a variable return to scale (VRS) assumption, our DEA model generates efficiency scores for each bank, i.e., DMU from 2011 to 2019. The efficiency scores estimated by the DEA range from 0 to 1.

Our main independent variable is banks' over ESG score, which we directly obtained from Datastream. We also use pillar-wise ESG scores to account for banks' performance in individual ESG dimensions and its impact on their technical efficiency. These pillar-wise scores are directly obtained from Datastream as well. We use a number of bank controls such as bank *SIZE* (natural logarithm of bank total assets), bank *LIQUIDITY* (total deposits and ST funding scaled by total

assets), *LOAN/DEPOSIT* (total loans to total deposits and ST funding ratio), and total *CAR* (total capital adequacy ratio). To take care of any outlier, we winsorise all ESG and bank-level variables at top and bottom 5%.

Following Alam et al. (2021), we develop a new index to measure the governance/institutional quality of each country in our sample. This new index, named *GOV*, is measured as the weighted average of the standard deviations of the six country-wise governance indicators that we collect from WB open database (WGI). This estimated governance measure is different than the "good corporate governance (GCG)" measure that is traditional in the corporate governance literature. The formula used to measure *GOV* is as follows:

$$GOV = [\sigma(VAE) + \sigma(PVE) + \sigma(RQE) + \sigma(RLE) + \sigma(GEE) + \sigma(CCE)] / 6 \quad (1)$$

All macro and governance variables are winsorized at top and bottom 5% as well. Table 1 provides definitions of our key variables.

In developing the sample, we get started with the ESG dataset that we collect from Datastream. We then merge the ESG data with our Bank Focus data based one bank ID (unique bank identifier) and year. Next, we merge ESG-bank data with WB's macroeconomic indicators and governance indicators datasets. At this stage, our merged data creates a sample of 578 banks from 57 countries around the world.

However, since our research objective is to examine the effect of ESG on the technical efficiency of both conventional and Islamic banks, we narrow down our sample and keep only those countries that have a formal Islamic finance and banking system. In particular, we have four MENA countries in our sample: Kuwait, Qatar, Saudi Arabia, and United Arab Emirates (UAE). We generate a dummy variable D that is equal to 1 if a bank is originated from one of these four MENA countries, 0 otherwise. Further, we generate a dummy variable IB that is equal to 1 if a bank's specialization is reported as "Islamic bank".

Table 1.
Definition of Key Variables

Variable	Definitions	Data source
Dependent variables		
Efficiency	Bank efficiency scores generated by a data envelopment analysis (DEA) method using a set of three inputs and outputs. Bank inputs include fixed assets, staff expenses, and deposits and short-term funding; bank outputs include total loans, other operating assets, and other operating income. All efficiency scores range from 0 to 1.	Bankscope
ESG variables		
ESG score	Overall ESG score (out of 100) based on a bank's self-reported information on environmental, social, and governance pillars.	Datastream
ESG contro score	These scores are based on media materials that are based on past controversies or scandals of the bank such as lawsuits, legislation disputes or fines.	Datastream

Table 1.
Definition of Key Variables (Continued)

Variable	Definitions	Data source
ENV pillar score	ENV pillar score captures a bank's performance based on resource use, innovation, and emissions.	Datastream
SOC pillar score	SOC pillar score measures a bank's performance based on workforce, human rights, community, and product responsibility.	Datastream
GOV pillar score	GOV pillar score evaluates a bank's performance based on management, shareholders, and CSR strategy.	Datastream
Bank-related variables		
Size	Natural log of bank total assets	Bankscope
Liquidity	Total deposit and ST funding to total assets ratio	Bankscope
Loan-to-deposit	Total loans to total deposits & ST funding ratio	Bankscope
CAR	Total capital adequacy ratio of the bank	Bankscope
Macroeconomic variables		
GDP	Gross domestic product (GDP) growth rate	World Bank
INF	Inflation; annual percentage change in consumer prices	World Bank
UNEMP	Unemployment rate; percentage of total labor force that is unemployed	World Bank
GOV	Country-wise governance index measured by taking the weighted average of the standard deviation of six governance indicators: VAE, PVE, RQE, RLE, GEE, and CCE.	World Bank

3.3. Method

Following Alam et al. (2021), we apply a Tobit regression model in our baseline analysis. Tobit regressions are used to estimate linear relationship between variables when the dependent variable is censored in some way. Our dependent variable, which is the DEA-generated technical efficiency, is censored by a limit from 0 to 1, making it a suitable left-hand variable for a Tobit model. Use of Tobit regressions is conventional in the banking literature. Ahamed et al. (2021) employ a random-effect Tobit (RET) model and an IV-Tobit model to examine the relationship between financial inclusion and banking efficiency. Previously, Banna et al. (2019) use Tobit regressions, along with other methods, to study the importance of geographic location in the efficiency of Sino-ASEAN banks.

Our baseline analysis is divided into three steps: First, we consider the sample of all banks (conventional and Islamic) from the four MENA countries and regress bank efficiency on overall ESG score, while controlling for bank- and macro-specific variables. We also control for the country governance index, *GOV*. The regression is based on the following equation:

$$\text{Efficiency}_{i,t} = \alpha_i + \beta_1 * \text{ESG}_{i,t} + \beta_2 * \text{BANK}_{i,t} + \beta_3 * \text{MACRO}_{i,t} + \beta_4 * \text{GOV}_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where, $\text{BANK}_{i,t}$ is a vector of bank-specific control variables, i.e., size, liquidity, loan to deposit ratio, and total capital adequacy ratio (CAR). $\text{MACRO}_{i,t}$ is a vector of macroeconomic variables, such as GDP growth rate, inflation, and

unemployment rate. $GOV_{i,t}$ is the country governance index that we compute using the six country-wide governance indicators obtained from the WB open data source. $\varepsilon_{i,t}$ is the regression error term. We control for both year and country fixed effects. We predict to obtain a positive and statistically significant coefficient for $ESG_{i,t}$, supporting our stakeholder hypothesis.

Next, we separate the sample into two groups: conventional and Islamic banks. We do so by generating a dummy variable IB, which takes the value 1 if the bank is an Islamic bank, 0 otherwise. We run our baseline model (equation 2) separately for conventional and Islamic banks to see if they exhibit different relationship between ESG and bank efficiency. We use the same set of bank and macroeconomic controls. We also control for *GOV* index and include year and country dummies in our regressions. We also investigate the ESG-efficiency relationship for individual ESG dimensions (E, S, and G). In this regard, we repeat our baseline tests by regressing bank efficiency on individual ESG pillar scores each at a time, instead of using the overall ESG score as the main independent variable. We conduct Simar & Wilson (2007) two-step efficiency analysis as a robustness of our baseline findings.

IV. RESULTS AND ANALYSIS

4.1. Results

Table 2 reports the number of conventional and Islamic banks in each of our four sample countries. Saudi Arabia has the highest number of total (10), conventional (6) and Islamic (4) banks followed by UAE having 4 conventional, 3 Islamic, and 7 banks in total. Our final sample consists of a total of 25 banks (14 conventional and 11 Islamic) representing four countries over the period 2011 – 2019.

Table 2.
Number of Conventional and Islamic Banks by Country

Country Name	Number of Banks		Total
	Conventional	Islamic	
Kuwait	3	3	6
Qatar	1	1	2
Saudi Arabia	6	4	10
United Arab Emirates	4	3	7
Total	14	11	**25**

Table 3 presents the list of Islamic banks by country for each of the four countries. In particular, we report the name, mean total assets, and years available for all banks. Al Rajhi Banking and Investment Corporation from Saudi Arabia tops the list with an average total asset of USD 83,625 million. Kuwait Finance House and Dubai Islamic Bank, hold the 2nd and 3rd positions on the list with a mean total of USD 55,749.94 million and USD 45,046.62 million, respectively.

Table 3.
List of Islamic Banks by Country

Country	Bank Name	Total Assets	Years
Kuwait	Boubyan Bank	10,637.54	2011 – 2019
	Kuwait Finance House	55,749.94	
	Kuwait International Bank	5,972.61	
Qatar	Qatar International Islamic Bank	11,024.30	2011 – 2019
Saudi Arabia	Al Rajhi Banking & Investment Corporation	83,625.00	2011 – 2019
	Alinma Bank	23,592.43	
	Bank Albilad	13,833.31	
	Bank Aljazira	16,996.40	
United Arab Emirates	Abu Dhabi Islamic Bank	29,970.78	2011 – 2019
	Ajman Bank	3,764.768	
	Dubai Islamic Bank	45,046.62	

Panel A and B of Tables 4 report the summary statistics for conventional and Islamic banks, respectively. Average DEA-generated technical efficiency for conventional banks is 0.388 or 38.8%, whereas the average technical efficiency of Islamic banks is 0.4245 or 42.45%. However, looking at the ESG scores of the two groups, we see an opposite image, except for ESG controversies score. Conventional banks, on average, have an overall ESG score of 36.5042, whereas the average overall ESG score for Islamic banks is 26.40. In terms of environmental (ENV) pillar score, Islamic banks are lagging far behind as compared with conventional banks (a mean ENV pillar score of 4.63 for Islamic banks vs. 10.28 for non-Islamic banks) and clearly this is the category of ESG where the Islamic banks need to demonstrate significant improvements. Conventional banks have an average social (SOC) pillar score of 29.10 with min and max scores of 3.41 and 75.20, respectively, whereas the mean SOC pillar score for Islamic banks is only 18.97 with min and max scores of 2.57 and 61.40, respectively. Conventional banks outperform the Islamic banks in the governance (GOV) category as well. A conventional bank has an average GOV pillar score of 57.20, whereas the average GOV pillar score for the Islamic banks is only 45.35.

Table 4.
Summary Statistics

Panel A: Non-Islamic banks					
Variable	**N**	**Mean**	**SD**	**Min**	**Max**
Efficiency	126	0.388	0.193	0.157	1.000
ESG score	61	36.504	12.659	14.215	70.185
ENV pillar score	61	10.283	16.893	0.000	59.186
SOC pillar score	61	29.098	16.894	3.408	75.200
GOV pillar score	61	57.197	17.494	18.296	90.048

Table 4.
Summary Statistics (Continued)

Panel B: Islamic banks					
Variable	**N**	**Mean**	**SD**	**Min**	**Max**
Efficiency	98	0.425	0.239	0.120	1.000
ESG score	44	26.400	11.875	6.844	59.403
ENV pillar score	44	4.628	7.984	0.000	27.108
SOC pillar score	44	18.970	12.104	2.565	61.397
GOV pillar score	44	45.347	22.435	4.921	82.500

Figure 1 depicts a comparative trend analysis of mean technical efficiency (panel A) and mean overall ESG scores (panel B) between conventional and Islamic banks. Clearly, Islamic banks exhibit more volatile efficiency and ESG scores. Islamic banks experienced a sharp decline in their efficiency over the periods 2012-2013, 2015-2016, and 2018-2019, whereas the efficiency of the conventional banks remains stable during the same period, except for the 2018-2019 period though the decline in efficiency was much less for conventional banks than for Islamic banks. In terms of overall ESG score, the Islamic banking industry exhibits a sharp increase in its mean overall ESG score from 2011 to 2013, however, their efficiency fell rapidly in the following two years. Contrarily, conventional banks exhibit an opposite picture, showing significant increase in their overall ESG performance over the years 2013-2016. Overall, the increasing technical efficiency of conventional banks are consistent with their increasing ESG performance, however, Islamic banks exhibit more volatile efficiency and ESG scores.

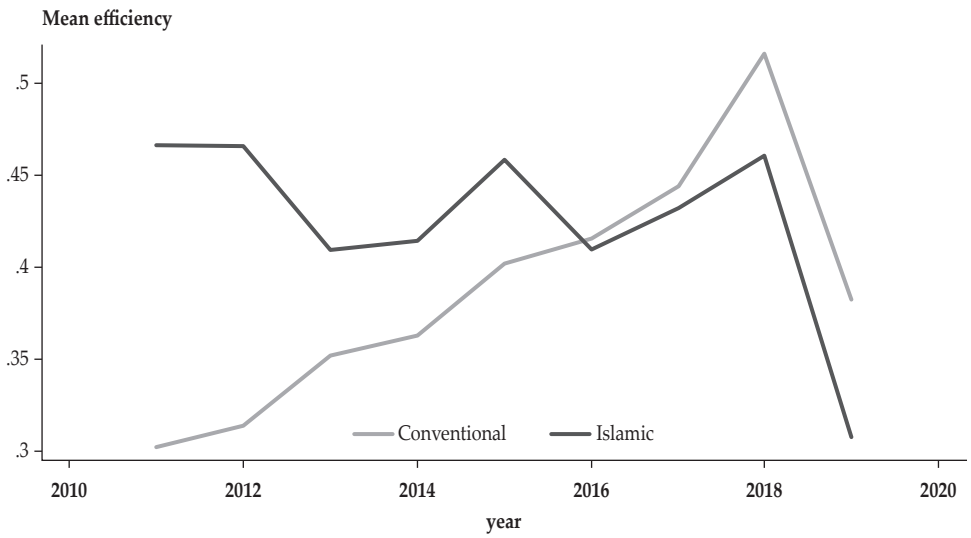

Figure 1.
Efficiency and ESG Scores of Conventional and Islamic Banks

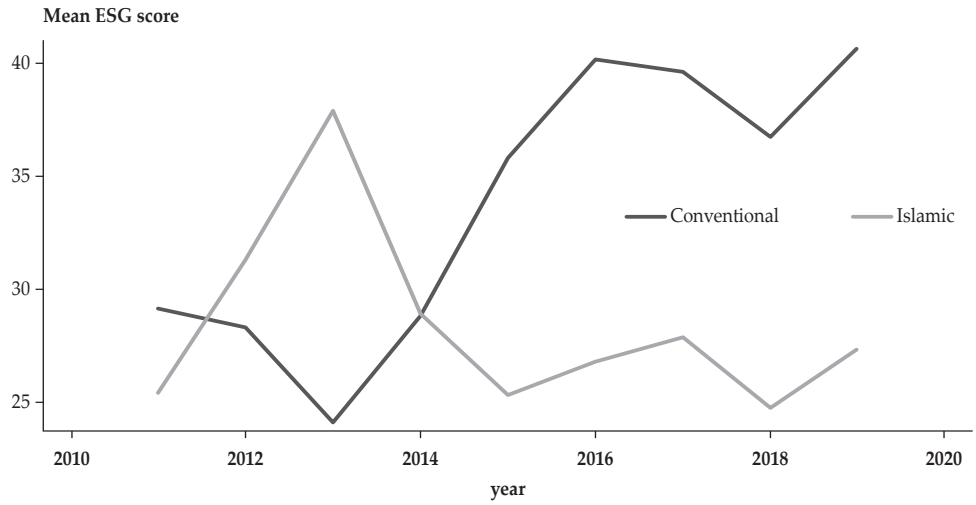

Figure 1.
Efficiency and ESG Scores of Conventional and Islamic Banks (Continued)

Figure 2 conducts a similar comparison between conventional and Islamic banks based on their performance in individual ESG dimensions, i.e., environmental pillar score (E), social pillar score (S), and governance pillar score (G). Both conventional and Islamic banking industry exhibit similar patterns in their performance in the environmental and social dimensions, although conventional banks outperform Islamic banks in all three dimensions in the years starting from 2015. As compared with conventional banks, Islamic banks demonstrate stronger performance in the environmental and social dimensions during the years from 2011-2013. Overall, Islamic banks demonstrate more volatile and deteriorating performance in all three ESG dimensions, especially in the second half of the sample period.

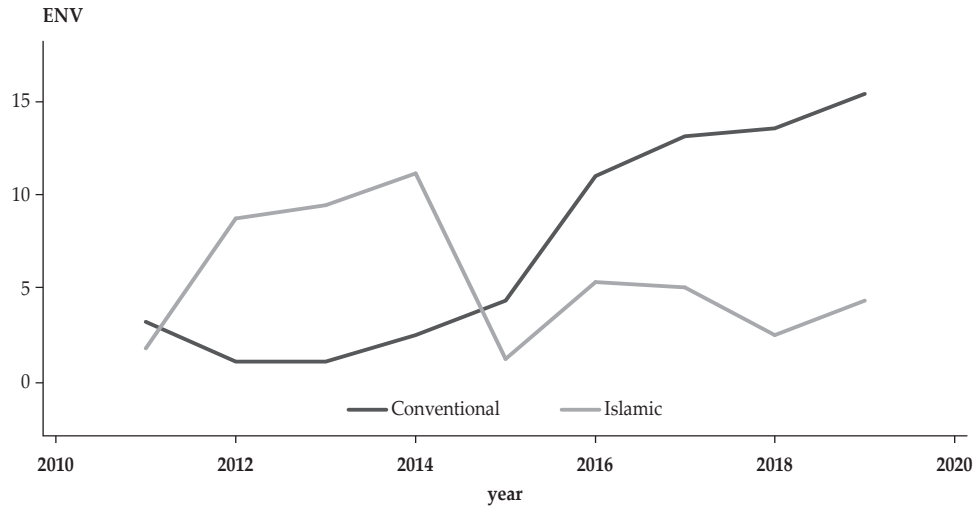

Figure 2.
ESG Pillar Scores of Conventional and Islamic Banks

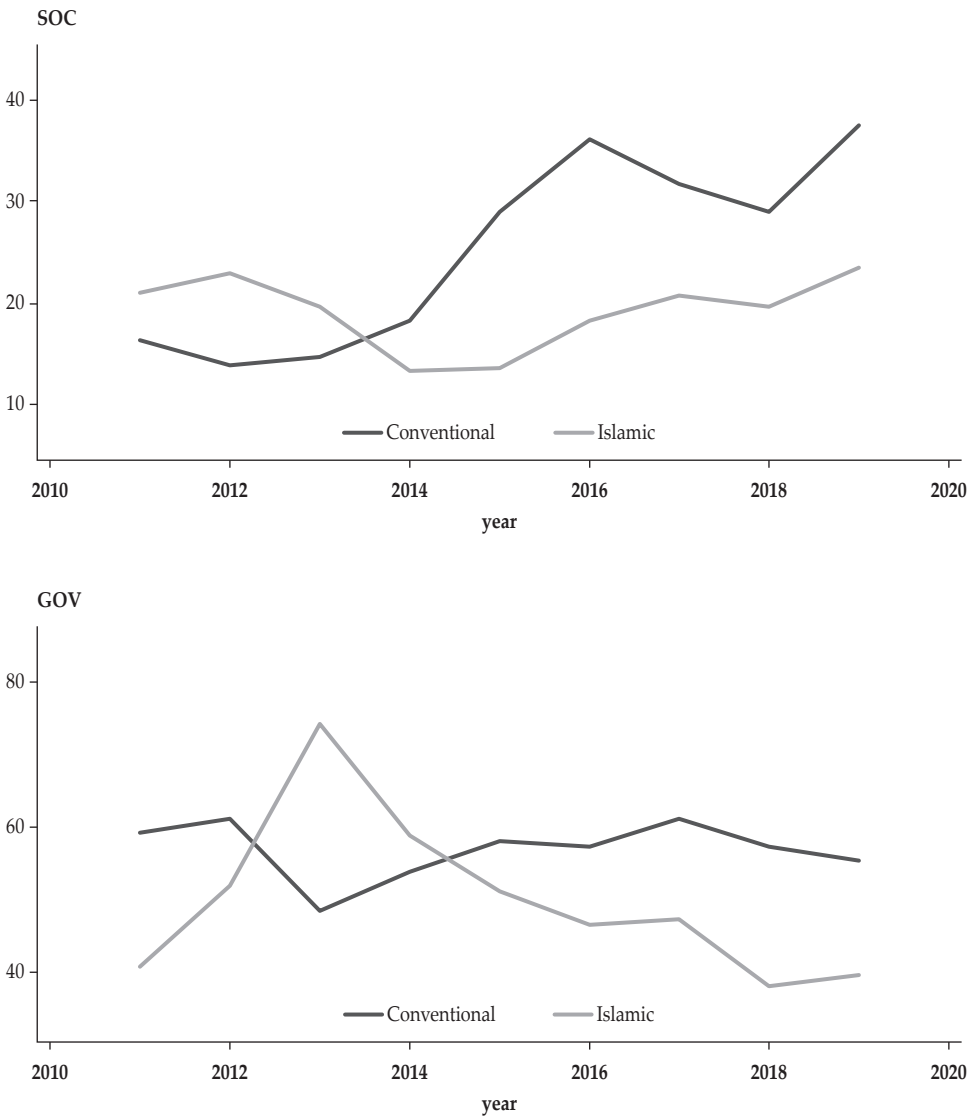

Figure 2.
ESG Pillar Scores of Conventional and Islamic Banks (Continued)

In Table 5, we report the correlations among efficiency and ESG variables for both conventional (panel A) and Islamic banks (panel B). For conventional banks, efficiency is strongly and positively correlated with overall ESG score, environmental pillar score, and social pillar score, and negatively correlated with governance pillar score. Contrarily, for Islamic banks, efficiency score seems to be negatively correlated with overall ESG score and all three ESG pillar scores. However, the magnitudes of these negative correlations are very small, leaving the ESG-efficiency relationship being inconclusive for Islamic banks.

Table 5.
Correlation Analyses

Panel A: Conventional banks					
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
(1) Efficiency	1.00				
(2) ESG score	**0.31**	1.00			
(3) ENV pillar score	**0.32**	0.68	1.00		
(4) SOC pillar score	**0.38**	0.86	0.72	1.00	
(5) GOV pillar score	**-0.01**	0.59	0.04	0.12	1.00

Panel B: Islamic banks					
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
(1) Efficiency	1.00				
(2) ESG score	**-0.05**	1.00			
(3) ENV pillar score	**-0.00**	0.47	1.00		
(4) SOC pillar score	**-0.14**	0.72	0.35	1.00	
(5) GOV pillar score	**-0.05**	0.84	0.28	0.25	1.00

Table 6 reports the baseline results from Tobit regressions. Column 1 presents the results for all sample banks (conventional + Islamic). The estimated coefficient on ESG is 0.0029 with a p-value of 0.011, indicating significance at 5%. In terms of marginal effects, a 1% increase in a bank's overall ESG score leads to a 0.2855% increase in its efficiency. Column 2 lays out the results for the sub-sample of conventional banks only. The coefficient on ESG is 0.0024 and highly significant with a p-value of 0.024. A 1% increase in a conventional bank's ESG scores results in a 0.2358% increase in their level of efficiency. Lastly, column 3 reports the results for Islamic banks. The coefficient on ESG is positive (0.001) but statistically insignificant (p-value = 0.730). Clearly, ESG does not have a strong influence on the efficiency of Islamic banks.

Table 6.
Tobit Regressions

Dep. var.: Efficiency	**(1)**	**(2)**	**(3)**
	All banks	**Conventional**	**Islamic**
ESG	0.0029**	0.0024**	0.0006
	(0.0011)	(0.0010)	(0.0017)
Size	0.0360**	0.0381**	0.0821***
	(0.0150)	(0.0154)	(0.0250)
Liquidity	-0.3038	0.2404	1.8711***
	(0.4766)	(0.5536)	(0.5731)
Loan/Deposit	0.0020	0.0012	0.0051***
	(0.0012)	(0.0021)	(0.0014)
CAR	0.0055	0.0218***	-0.0071
	(0.0064)	(0.0072)	(0.0088)
GDP	-0.0048	0.0306***	-0.0579***
	(0.0138)	(0.0112)	(0.0156)

Table 6.
Tobit Regressions (Continued)

Dep. var.: Efficiency	(1)	(2)	(3)
	All banks	Conventional	Islamic
INF	0.0151	-0.0029	0.0047
	(0.0151)	(0.0151)	(0.0161)
UNEMP	0.0599	0.1401	0.3052***
	(0.1033)	(0.1090)	(0.1045)
GOV	-0.1118	0.2436	0.1496
	(0.1427)	(0.1684)	(0.1615)
Constant	-0.4772	-1.2355*	-2.3696**
	(0.6144)	(0.6291)	(0.8747)
Sigma (constant)	0.1161***	0.0732***	0.0737***
	(0.0082)	(0.0068)	(0.0080)
N	105	61	44
Year dummies	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes

Standard errors are in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

Regression results based on individual ESG dimensions or pillars are furnished in Table 7. Here, we examine the association between bank efficiency score and all three ESG pillar scores using both full sample and sub-samples of conventional and Islamic banks. Columns 1-3 report the regression results for full sample, sub-sample of conventional banks, and sub-sample of Islamic banks, respectively, using ENV pillar score as the main independent variable. Taking all banks together (column 1), the coefficient on ENV pillar score is positive and highly significant at 1% with a p-value of 0.009. In terms of economic impact, on average, a 1% increase in the ENV pillar score raises bank efficiency by 0.30% for all sample banks. The coefficient on ENV pillar score in column 2 (conventional banks only) is 0.0017 and significant at 5%. In particular, on average, a 1% rise in the ENV pillar score of our sample conventional banks increases their efficiency score by 0.17%. Lastly, the coefficient on ENV pillar score in column 3 (Islamic banks only) is 0.0056, which is statistically significant at 5% with a p-value of 0.011. As far as economic effects are concerned, on average, a 1% increment in the ENV pillar score of Islamic banks raises their efficiency score by 0.56%.

Table 7.
ESG Pillar Scores and Bank Efficiency

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ENV pillar score	0.0030***	0.0017**	0.0056**						
	(0.0011)	(0.0008)	(0.0020)						
Size	0.0222	0.0251	0.0699***	0.0325**	0.0328**	0.0832***	0.0475***	0.0426**	0.0841***
	(0.0172)	(0.0172)	(0.0234)	(0.0150)	(0.0154)	(0.0250)	(0.0147)	(0.0166)	(0.0255)
Liquidity	-0.3817	0.2594	1.9337***	-0.2363	0.1814	1.8794***	-0.4055	0.4128	1.9005***
	(0.4749)	(0.5612)	(0.5279)	(0.4736)	(0.5501)	(0.5929)	(0.4899)	(0.5702)	(0.5839)

Table 7.
ESG Pillar Scores and Bank Efficiency (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Loan/Deposit	0.0015	0.0009	0.0063***	0.0014	0.0007	0.0051***	0.0019	0.0016	0.0050***
	(0.0012)	(0.0022)	(0.0013)	(0.0012)	(0.0021)	(0.0014)	(0.0013)	(0.0022)	(0.0014)
CAR	0.0046	0.0232***	-0.0030	0.0062	0.0203***	-0.0076	0.0051	0.0251***	-0.0073
	(0.0064)	(0.0072)	(0.0081)	(0.0064)	(0.0072)	(0.0093)	(0.0066)	(0.0073)	(0.0088)
GDP	-0.0064	0.0307***	-0.0616***	-0.0056	0.0321***	-0.0582***	-0.0062	0.0304**	-0.0585***
	(0.0138)	(0.0113)	(0.0144)	(0.0137)	(0.0111)	(0.0156)	(0.0142)	(0.0117)	(0.0157)
INF	0.0159	-0.0026	-0.0018	0.0145	-0.0046	0.0052	0.0144	-0.0048	0.0050
	(0.0151)	(0.0154)	(0.0150)	(0.0149)	(0.0149)	(0.0163)	(0.0155)	(0.0157)	(0.0161)
UNEMP	0.1287	0.1744	0.4158***	0.0473	0.1395	0.3112***	0.0530	0.1207	0.3147***
	(0.1070)	(0.1135)	(0.1025)	(0.1022)	(0.1084)	(0.1036)	(0.1063)	(0.1129)	(0.1057)
GOV	-0.0938	0.2298	0.2573*	-0.1079	0.2443	0.1318	-0.1559	0.2277	0.1296
	(0.1438)	(0.1714)	(0.1492)	(0.1412)	(0.1677)	(0.1624)	(0.1456)	(0.1744)	(0.1557)
SOC pillar score				0.0028***	0.0021**	-0.0000			
				(0.0009)	(0.0008)	(0.0015)			
GOV pillar score							0.0002	0.0005	-0.0001
							(0.0007)	(0.0008)	(0.0009)
Constant	-0.2744	-1.1651*	-2.5284***	-0.3683	-1.0088	-2.3970**	-0.4582	-1.4649**	-2.4290**
	(0.6168)	(0.6438)	(0.8039)	(0.6082)	(0.6356)	(0.8817)	(0.6384)	(0.6558)	(0.8906)
Sigma (constant)	0.1161***	0.0742***	0.0679***	0.1149***	0.0724***	0.0738***	0.1195***	0.0761***	0.0738***
	(0.0082)	(0.0069)	(0.0074)	(0.0081)	(0.0067)	(0.0080)	(0.0085)	(0.0071)	(0.0080)
N	105	61	44	105	61	44	105	61	44
Year FE	yes	Yes	Yes	Yes	yes	yes	yes	yes	Yes
Country FE	yes	Yes	Yes	Yes	yes	yes	yes	yes	Yes

Standard errors are in parenthesis; *** p<0.01, ** p<0.05, * p<0.1

Columns 4-6 of Table 7 report similar results for the social pillar score. The coefficients on SOC pillar score in columns 4 and 5 are 0.0028 and 0.0024, which are statistically significant at 1% and 5%, respectively. These results advocate that bank technical efficiency is significantly and positively affected by increased social activities of all banks taken together as well as for conventional banks separately. Considering economic effects, on average, a 1% increase in the SOC pillar score of full-sample banks raises their efficiency score by 0.28% and a 1% increment in the SOC pillar score of conventional banks increase their efficiency score by 0.21%. However, the estimated coefficient on SOC pillar score in column 6 is statistically insignificant and surprisingly, the coefficient appears to be negative.

Finally, columns 7-9 of Table 7 report the regression results for the governance dimension. None of the coefficients is statistically significant. Moreover, the coefficient on GOV pillar score appears as negative for Islamic banks.

4.2. Robustness Test

Following Alam et al. (2021), we rerun the baseline model using a Simar-Wilson regression to test the strength of our baseline findings in Table 6. Simar & Wilson

(2007) propose a two-stage regression analysis of DEA-generated efficiency scores. We report the results in Table 8. Columns 1-3 lay out the results for full sample, sub-sample of conventional banks, and sub-sample of Islamic banks, respectively. The coefficients on ESG in columns 1 and 2 are 0.0029 and 0.0018 and are statistically significant at 5% and 10% with p-values of 0.10 and 0.078, respectively. Coefficient on ESG score in column 3 is positive but statistically insignificant, indicating no relationship between efficiency of our sample Islamic banks and their overall ESG scores.

Table 8.
Robustness Analysis

	(1)	(2)	(3)
ESG	0.0029**	0.0018*	0.0008
	(0.0011)	(0.0010)	(0.0015)
Size	0.0388**	0.0396***	0.0886***
	(0.0152)	(0.0150)	(0.0241)
Liquidity	-0.4404	0.0875	1.6587***
	(0.4812)	(0.5432)	(0.5614)
Loan/Deposit	0.0024*	0.0008	0.0061***
	(0.0013)	(0.0021)	(0.0014)
CAR	0.0059	0.0193***	-0.0060
	(0.0063)	(0.0070)	(0.0081)
GDP	-0.0048	0.0335***	-0.0577***
	(0.0140)	(0.0111)	(0.0147)
INF	0.0215	-0.0068	0.0107
	(0.0154)	(0.0154)	(0.0148)
UNEMP	0.0460	0.1666	0.2720***
	(0.1058)	(0.1209)	(0.0969)
GOV	-0.0195	0.3617*	0.1516
	(0.1578)	(0.1886)	(0.1505)
Constant	-0.3134	-0.9275	-2.3342***
	(0.6277)	(0.6362)	(0.8305)
Sigma (constant)	0.1139***	0.0715***	0.0691***
	(0.0085)	(0.0065)	(0.0074)
N	101	58	43
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes

Standard errors are in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

4.3. Analysis

Overall, our empirical analysis suggests that bank efficiency is positively and significantly associated with ESG performance for all banks taken together as well as for conventional banks separately, supporting our hypotheses H1 and H2. This positive impact of ESG is consistent with previous literature (Azmi et al., 2021; Nizam et al., 2019; Miralles-Quiros et al., 2019). However, we do not

find any evidence in favor of our hypothesis H3 (Islamic banks separately). One explanation of the insignificant relationship between ESG activities and efficiency of Islamic banks may be that Islamic banks have already incorporated the ESG aspects in their existing investments, neutralizing the standalone impact of their ESG scores on their technical efficiency. However, we suspect that Islamic banks still lag behind the non-Islamic banks in terms of ESG initiatives and investments which is strongly evident in the overall as well as pillar-wise ESG scores of our sample Islamic banks.

High ENV pillar score significantly improves the efficiency of all banks, either conventional or Islamic. Improved performance in the social dimension of ESG positively influences the technical efficiency of conventional banks, but it does not have any significant impact on the efficiency of Islamic banks. Finally, governance related activities do not have any significant effect on bank efficiency in general.

Results based on Simar-Wilson (2007) two-stage efficiency analysis indicate that high ESG score significantly increases bank efficiency for our full-sample banks as well as for sub-sample of conventional banks. These findings are consistent with our baseline findings (columns 1 and 2 of Table 6) and support the stakeholder hypothesis of ESG and banking performance. Results for Islamic banks suggest a positive but statistically insignificant association between ESG and banks' technical efficiency, which is consistent with our baseline findings in column 3 of table 6. Overall, the results from our Simar-Wilson regressions support the baseline findings in table 6 and strengthen our primary evidence in favor of hypotheses H1 and H2. In addition to Simar-Wilson regressions, we also conduct further robustness check based on fractional Probit regressions (unreported) and confirm robustness of our primary results. Further, to check for auto-correlation, we incorporate lagged efficiency in our model to redo the baseline tests and we find consistent results (unreported) in all cases, except for the sub-sample of conventional banks.

In an unreported test, we check for the suitability of our DEA-generated technical efficiency for the sub-sample of Islamic banks. In particular, we examine the impact of Islamic banks' ESG scores on their cost efficiency, using the *efficiency ratio* directly obtained from Bank Focus. We find a negative coefficient, suggesting that high ESG performance increases the cost efficiency of our sample Islamic banks, however, as in our primary result based on DEA-generated technical efficiency, the coefficient on cost efficiency (efficiency ratio) is also statistically insignificant.

V. CONCLUSION AND RECOMMENDATION

5.1. Conclusion

Literature on ESG and bank efficiency is very limited. Prior studies mostly focus on the impact of ESG on various aspects of bank performance. Furthermore, the impact of ESG on the efficiency of Islamic banks is still an empirical issue. In this paper, we try to uncover this new area of ESG and Islamic finance literature by presenting a comparative analysis of the ESG-efficiency relationship for conventional and Islamic banks.

We use a small sample of 14 conventional and 11 Islamic banks from 4 MENA countries: Kuwait, Qatar, Saudia Arabia, and UAE. We employ a DEA method to generate technical efficiency scores of our sample banks. We examine how overall and pillar-wise ESG scores influence the technical efficiency of conventional and Islamic banks. We find that overall ESG score has a significantly positive impact on the technical efficiency of conventional banks, supporting the stakeholder theory of ESG, but no significant impact on the technical efficiency of Islamic banks. Using individual ESG pillar scores, we find that environmental activities strongly and positively influence the technical efficiency of both conventional and Islamic banks, whereas social activities seem to have significant effect for conventional banks only. We find no evidence of any influence of banks' governance activities on their technical efficiency. Our results survive the robustness analysis based on Simar & Wilson (2007) two-stage regression analysis of DEA-generated efficiency and numerous other examinations.

Our study encounters a number of limitations. First, since our main purpose is to conduct a comparative analysis of the effect of ESG activities on banking efficiency for both conventional and Islamic banks, we had to limit our sample only to those countries where conventional and Islamic banking systems coexist. Such selection significantly reduces the sample size, i.e., number of banks. Second, our bank-level ESG data runs from 2000 to 2019, however, the banking variables obtained from Bank Focus span only from 2011 to 2020, leading to a final sample period from 2011 to 2019 after we merged the two data sets. Finally, due to unavailability of board-related and other corporate governance data, we could not use the traditional firm-level GCG measure for good governance and rather had to rely on country-wise governance quality measure that we estimated based on WB governance indicators.

5.2. Recommendation

Based on our findings in this paper, we conclude that the overall positive impact of ESG on bank efficiency stems from the significant positive association between ESG performance and the efficiency of conventional banks. Based on our findings related to Islamic banks, we assume that Islamic banks lack sufficient concentration and investment on ESG friendly activities, which is also evident in their overall and pillar-wise ESG scores, as compared with those of their non-Islamic peers.

We recommend that Islamic banks pay greater attention to the growing concern of ESG friendliness of banking activities and follow the footprints of conventional banks to be able to improve their overall and dimension-wise ESG performances. In this regard, Islamic banks may focus on individual components under each dimension of ESG. In a recent study, Pradhan et al. (2021) document that certain environmental practices such as environmental innovation, green building, e-waste reduction and ENV partnership, social practices such as workforce quality, human rights policy and CSR sustainability reporting, and governance-related factors such as average board tenure, board member compensation and internal promotion significantly improves banking stability and risk profile. To improve their performance in the overall as well as pillar-wise ESG ratings, Islamic banks need to increase their investments on projects that facilitate and are related to

these individual components under each ESG dimension. Improved performance in overall and dimension-wise ESG activities may not only increase technical and cost efficiency of Islamic banks, but also improve their performance and value and strengthen their banking stability.

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