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The Nexus between Environmental and Financial Performance: Evidence from GCC Banks

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Abstract

The recent Climate Change Conference (COP26) emphasize the role of the finance industry to contribute to the net-zero transition. This paper, therefore, examines the impact of banks environmental performance on their financial and market performance. We collect data from fifty-six banks operating in the GCC region for the period 2010-2019. We apply OLS, fixed effect and GMM estimation techniques and show that GCC banks' environmental performance negatively affect their accounting performance. The results, however, exhibit no significant impact of banks' environmental performance on market performance. Moreover, conventional banks have better environmental performance than their Islamic counterparts. Our results are consistent across different estimation techniques after controlling for endogeneity issues. The findings of the study are unique and offer important policy implications for management, regulatory authority, and environmental activists.

Keywords: Green banking, commercial banks, environmental performance, financial performance, GCC

JEL Classification: G21, Q56

1. Introduction

This research aims to study the impact of banks' environmental performance on accounting and market-based performance of the gulf cooperative council (GCC) countries. Although an emerging line of recent research attempts to examine the effects of banks' environmental performance on their financial and market performance, the results are mixed and inconclusive. Buallay et al. (2020), Kartadjumena and Rodgers (2019) show the negative effects of banks' environmental performance on their financial performance. On the other hand, Cornett, Erhemjamts and Tehranian (2016), Coulson and Monks (1999), Coulson (1997), Forgione (2019) and Shakil et al. (2019) show a unidirectional positive relationship between banks' environmental and financial performance. Some studies, however, document a bidirectional relationship between banks' environmental and financial performance (Weber, 2017), whereas

Fijałkowska et al. (2018) find no significant relationship between environmental and financial performance.

The inconclusive results of the existing literature and the unique financial environment that prevails in GCC countries entail that research findings based on the global data may not appropriately represent the GCC banking sector. Unlike banks in developed economies, there is a higher degree of state ownership in the GCC banking sector (Boulanouar, Alqahtani, & Hamdi, 2021). Although financial deregulation has been underway in the past few years, state's control through significant public and quasi-public sector ownership on banks remains in place (Al-Hassan, Oulidi, & Khamis, 2010). Second, banks in the GCC countries are highly concentrated which is unlikely for banks in emerging and developed economies (Miah & Uddin, 2017). The top 10 GCC banks hold about a 50 per cent share of the banking industry (Boulanouar, Alqahtani & Hamdi, 2021). In some countries (Bhutan for example), the concentration is more intense. The largest bank in Oman, Bank Muscat, holds about a 40 per cent share of the banking sector's assets.

Moreover, banks in the GCC region rely decisively on the extracting industries including oil and gas. This leads GCC banks to a unique environmental risk exposure that is unlikely for banks in other regional blocks. Third, GCC countries do not have a uniform green banking guideline. Some countries have uniform environmental reporting guidelines for listed companies. However, the guideline is uniform for carbon-intensive and carbon non-intensive firms, and its implementation is voluntary. Consequently, environmental performance varies significantly among banks. Few banks in the GCC countries have initiated significant efforts to keep their activities carbon-free. For instance, the National Bank of Abu Dhabi and the National Bank of Qatar has already issued a substantial amount of green bonds for the first time in the region. Bank Muscat, in collaboration with the International Finance Corporation (IFC), also introduced Oman's first Green Finance scheme for environment-friendly homes.

Doha Bank has a complete green-banking platform named 'Doha Green Bank' that maintain environmental codes in all banking operations. Similarly, Kuwait Finance House (KFH), the second-largest bank in Kuwait, brands itself 'KFH is Green' by adopting various strategies to mitigate carbon footprint. Contrary to the above examples, not all banks in the GCC region show discernible attempts toward greening the environment. This variation in the environmental performance of banks in GCC provides a strong rationale to examine if banks can harvest financial gain by being environment-friendly.

Furthermore, GCC countries have gone through various regulatory policy changes in the recent past that have important ramifications for corporate environmental and financial performances. For instance, all the six GCC countries are the signatories of the Paris Climate agreement and acceded to the Kyoto Protocol. The emission reduction agreements recommended by these agreements requires GCC countries to formulate national visions for net-zero carbon transition. For instance, UAE has committed to producing 50 per cent clean energy in its total energy mix by 2050. Saudi Arabia has also committed to reaching net-zero emission by 2030. Similarly, Oman and Qatar aim to enhance renewable energy to 20 per cent of the total energy mix by 2030. Kuwait and Bahrain aim to increase renewable energy by 15 per cent and 10 per cent in their energy mix by 2030 and 2035, respectively.

Considering the distinctive features and the recent changes in regulatory regimes in the GCC region, it is imperative to examine the relationship between the bank's environmental and financial performance. Some studies attempt to unfold various aspects of banks' environmental performance in the GCC region (Harun, Hussainey, Kharuddin, & Al-Farooque, 2020; Buallay and Al-Ajmi, 2019; Miah, Rahman, & Mamoon, 2020; Al-Haija, Kolsi & Kolsi, 2021); Menassa and Dagher, 2020; Al-Naimi, Hossain, & Momin, 2012; Buallay, Fadel, Al-Ajmi, & Saudagaran, 2020). These studies, however, focus extensively on determining the factors that affect banks' environmental, social, and governance (ESG) performance as well as corporate

social responsibility (CSR) disclosure. CSR and ESG, although insightful, encompass various dimensions and does not provide a solid and focused picture as to the effects of banks' environmental performance on their financial and market performance. Furthermore, we have limited evidence to conclude if environmental performance varies between conventional and Islamic banks. Therefore, this study aims to fill this research gap.

We collect data for fifty-six banks for the period 2010-2019 from the Datastream Asset4 database. We employ pooled Ordinary Least Square (OLS), fixed effect and Generalised Method of Moments (GMM) analytical technique to analyse the collected data. Results show a negative impact of banks' environmental performance on accounting performance, measured by return on asset, cash-flow margin, fee revenue, earnings per share, loan growth and sales growth. The relationship between banks' environmental performance and market performance, measured by Tobin's Q and market value ratio, is insignificant. Our analysis further shows that conventional banks have superior environmental performance compared to Islamic banks.

Our research has some important contributions to the literature. To the best of our knowledge, this is the first study that investigates banks' environmental performance and its impact on their accounting and market performance in the GCC region. The findings of the research provide economic grounds for banks to be environment-friendly. In addition, investment opportunities particularly, in renewable and sustainable energy sectors and the development of clean technologies, are going to set their mark remarkably in the years to come. The right environmental regulations could offer banks risk management opportunities and allow them to capitalise on investment opportunities in the renewable and sustainable energy sector. Our research helps banks understand if it is economically viable to be environment-friendly. Second, the findings of our research provide pragmatic tools for policymakers to restrict banks' carbon footprint through enacting various rules. GHG emission in the GCC region has been rising at an increasing pace. Greenhouse gas emissions increased by 412 per

cent in Qatar and 304 per cent in Oman during the period 2000-2018. In terms of ecological footprint, it takes 14.6 global hectares compared to the global average of 2.75 hectares, to support life in Qatar, and 8.9 global hectares per person in UAE. The Kingdom of Saudi Arabia has the lowest ecological footprint in the region, which is double the world average. Moreover, GCC countries account for 3.2 per cent of the global CO_2 emission for a habitat of 0.68% of the world's population. Nonetheless, the recent decline in oil price has resulted in huge budget deficits in the GCC region that could force countries to pump up a larger volume of hydrocarbons, leaving more scars on the natural environment. More importantly, the GCC region, as an economic block, retains a high profile in the global economic landscape by meeting a significant share of the world's energy demand. Hence, the environmental sustainability of the region is a global concern.

Third, our research contributes to the field not only by providing new evidence on the nexus between banks' environmental and financial performance but also by advancing the debate as to what could be the suitable form of 'carrot and stick' policy for a cleaner GCC region. Fourth, the timeliness of the research is crucial given the backdrop of the contemporary debate concerning climate change as well as the uncertainty about policy instability (Safiullah, Miah & Alam, 2021). The recent Climate Change Conference (COP26) sets new global carbon reduction targets. Contrary to the expectation, the atmosphere absorbed record-level carbon emissions in the last few decades. Therefore, the result of this study provides valuable insights on the economic, ethical, and moral grounds for all stakeholders to act environmentally.

We structure the rest of the paper as follows: section two presents a short review of the relevant literature. Section three extends the discussion from a theoretical perspective based on which we develop hypotheses. Section four details the data and methodology, whereas section five analyses the findings and interprets the results. Section six provides a discussion on the study findings. Section seven concludes the paper by offering some policy recommendations.

2. Literature Review

The impact of environmental performance on firm financial performance remained almost silent until the late 1970s. Sharfman and Fernando (2008) claim that Spicer's (1978) study was one of the early works that drew evidence from paper and pulp industries to show that firms with better pollution management tend to have higher profitability. Moreover, investors were not interested in firm-level carbon footprints until the beginning of the new millennium. Lee and Tweedie (1975) found that private investors showed very little understanding of the information published by companies in their annual reports on firms' environmental and social performance. Similarly, Hines (1982) report that shareholders show no interest in the environmental performance of firms.

This scenario has changed gradually, partly due to an increase in shareholder activism but mainly due to the rise of stakeholder concern on firm-level bio-degrading activities. Firms in the United Kingdom (Chithambo et al., 2020) and in the European Union (Camilleri, 2020) face greater stakeholder pressure to operate sustainably. Fernandez-Feijoo and Romero (2014), for a large sample of international corporate firms, confirm the findings of Chithambo et al. (2020) and Camilleri (2020). This may have an important implication for firm performance. Porter (1996) argues that strict environmental regulations harness a firm's competitive advantage. In line with this argument, Gerged (2021), Bose et al. (2021), Miah et al. (2021) and Sharmeen, Hasan and Miah (2019) find that firms' environmental performance increases their market value by reducing regulatory and litigation risks (Blacconiere & Patten, 1994), increasing credit ratings (Safiullah & Shamsuddin, 2021), and lowering funding cost (El Ghoul, Guedhami, Kim, & Park, 2018).

While the impact of firms' environmental initiatives on their financial performance is widely explored for manufacturing and extracting industries, we know very little about the carbon profile of financial institutions. There are limited studies on the environmental performance of banks due to the perception that banks are clean or non-polluters. Richardson

(2010), however, argues that financial institutions are the unseen polluters, contributing in obscured ways to environmental troubles. For instance, banks provide finance to various high carbon-emitting enterprises including cement, chemical, garments, paper, and extracting industries. Hence, they can impose various restrictions in financing carbon-intensive projects to limit carbon emission (Gangi, Meles, D'Angelo, & Daniele, 2019). However, banks should dedicate efforts to know the carbon footprint of their clients for the sustainability of businesses because banks' environmental risk is positively linked to higher credit risk (Cui et al., 2018). On the other hand, banks that fail to tap opportunities created by clean technology is likely to lag behind their competitors.

Motivated by the factual evidence presented above, we examine the impact of banks' environmental performance on their financial and market performance. Maqbool and Zameer (2018) show a positive correlation between the financial and environmental performance of Indian banks. For instance, Gangi, Meles, D'Angelo and Daniele (2019) document a positive impact of corporate governance on banks' environmental engagement. Birindelli et al. (2019) and Atif, Alam and Hossain (2020) identify that female chief executive officer is one of the key determinants of bank-level environmental sustainability. Bose et al. (2018) show that board size and institutional ownership positively affect banks' environmental performance and disclosure.

The burgeoning literature, however, provides limited evidence as to the impact of GCC banks' environmental performance on the financial and market performance of GCC banks. Harun et al. (2020) show that board size positively and CEO duality negatively influence corporate social responsibility (CSR) disclosure of GCC Islamic banks. Similarly, Arayssi, Jizi and Tabaja (2020) document a positive relation between board independence and environmental, social, and governance (ESG) disclosure of GCC listed financial and non-financial firms. Buallay and Al-Ajmi (2019) exhibit a negative association between financial

expertise and sustainability reporting of GCC banks. Some studies also provide evidence from a single country perspective. For instance, Miah, Rahman and Mamoon (2020) analyse various environmental initiatives adopted by Omani banks and argue that these initiatives are still rudimentary and limited only to soft disclosures. Similarly, Al-Haija, Kolsi and Kolsi (2021) for Abu Dhabi Islamic banks and Menassa and Dagher (2019) for UAE Islamic and conventional banks find that banks focus more on social aspects than environmental aspects. In the context of Qatari financial and non-financial firms, Al-Naimi, Hossain and Momin (2012) conclude that companies hardly report environmental issues in their annual reports. For a larger sample, Buallay, Fadel, Al-Ajmi and Saudagaran (2020) find that ESG scores of conventional banks in the Middle East and North African (MENA) countries positively affect financial performance.

The scarce literature in the GCC context focuses particularly on CSR and ESG disclosure either for Islamic banks or for conventional banks or both clusters of banks in a single country context. These studies conclude that banks pay less attention to environmental aspects than social and governance aspects. Such behaviour of GCC banks deserves a convincing explanation. One potential explanation is that the environmental endeavour of banks may affect their performance. However, no study yet explores this issue for GCC banks. Our study contributes to both banking and sustainability literature by examining if banks' environmental performance significantly affects their financial performance

3. **Theoretical consideration and hypothesis development**

3.1.Banks' environmental and financial performance

Firms' environmental performance is argued from two contrasting views. The first view relies on the new classical 'stockholder theory' influenced mainly by Milton Freidman. Friedman (2007) argued that the only social responsibility of a corporation is to increase profits for

shareholders. Firms' executives are simply the employees who do not possess sufficient mandate to decide the level of corporate social responsibility at the expense of firms. Managers should concentrate on maximizing profits within the legal and ethical boundaries and distribute profits to shareholders who can undertake socially responsible activities on their own. For Friedman, pursuing socially responsible activities at the firm level is equivalent to imposing a tax on shareholders because such activities may erode firms' financial strength. Moreover, executives may maximize their benefits in the guise of CSR activities (Krüger, 2015). Preston and O'Bannon (1997) contend that managers tend to cut expenditures for the environment and social causes to boost short-term profit when managerial compensation is linked with firm performance. On the contrary, when financial performance is poor managers attempt to boost social expenditures to cover up managerial inefficiencies. Moreover, corporate executives may undertake social and environmental projects merely to build their reputation instead of creating values for shareholders (Barnea & Rubin, 2010). This suggests that firms' attempt to be environment-friendly reduces firm value. El-Khoury, Nasrallah & Alareeni (2021), Kartadjumena & Rodgers (2019) show a negative association between banks' environmental and financial performance.

In contrast, the 'stakeholder theory' posits that firms' interaction with society is constantly perceived as a critical element of corporate legitimacy. Resources on the planet are owned by society. Corporate entities use these resources to add value and make them more useful for human consumption. This interdependence between firms and society forms an implicit contract that entails that business entities should follow socially accepted values and norms (Farache & Perks, 2010). Environment-friendly behaviour is an act that displays firms' willingness to comply with the social contract. In addition, environmental awareness is a critical means by which corporate entities can earn social endorsement and legitimacy. This means that banks with a better green profile face subdued pressure from the stakeholders which

results in long-term sustainability. Preston and O'bannon (1997) rely on the 'social impact hypothesis' to argue that meeting the social requirements helps firm boost their financial performance because the benefits derived from the environmental awareness often outweigh the cost (Waddock and Graves, 1997). This argument underlies the logic that a firm's focus on environmental practices helps save production costs by reducing environmental risks and compliance costs. Weber (2012) documents that financial institutions, which lend funds to high emitting firms, are legally liable to participate with their clients in decarbonizing the atmosphere. Else, they are likely to face legal consequences. This implies that incorporating an environmental clause in corporate lending helps banks mitigate environmental liabilities, environmental risk, and litigation costs (Thompson and Cowton, 2004). In line with this argument, Wu and Shen (2013) and Simpson and Kohere (2002) for international data and Bătae, Dragomir and Feleagă (2021) for European banks find a positive impact of banks' environmental performance on financial performance. Based on the above contrasting arguments, we draw the following non-directional hypothesis-

H_1: Banks' environmental performance affects financial performance

3.2. Banks' environmental performance and market value

Stockholders in most developed countries are increasingly concerned about firms' environmental performance. Hence, they incorporate firms' environmental activities into overall portfolio risk. Moreover, investors require a higher return from high-emitting firms. Matsumura, Prakash and Vera-Munoz (2014) estimate that S&P 500 firms' value declines, on average, by US$212,000 for every additional thousand metric tons of carbon emission. Similarly, Konar and Cohen (2001) find that a 10 per cent reduction in emissions of toxic chemicals results in a $34 million increase in market value. In a similar vein, Yadav, Han and Rho (2016) show that investors perceive the announcement of firms' environmental strategy

as positive news, eventually leading to significant positive abnormal returns in the US firms. Al-Najjar and Anfimiadou (2012) show that eco-efficient UK firms have higher market values.

However, shareholders in developing and emerging economies lag their Western counterparts in terms of showing appropriate reactions to firms' environmental awareness. Luo, Wang, Raithel and Zheng (2015) exhibit that firms' environmental and social performance is ambiguous to general investors. Although environmental regulations are mandatory for firms to comply, voluntary emission reductions are found to have a significant negative market reaction (Jacobs, Singhal, & Subramanian, 2010). Yamaguchi (2008) drawing evidence from Japanese firms shows that market reaction to corporate environmental performance has a positive effect on the higher frequency of ranking and a negative effect on the lower frequency of ranking. Konar and Cohen (2001) illustrate that the environmental performance of Swedish firms is correlated with intangible asset values only in high-risk industries. Similarly, Brammer and Millington (2008) find that social performance indicators are negatively related to the stock returns of UK firms. Hence, the impact of banks' environmental performance on their market performance in the GCC countries cannot be known *a priori*. Based on the above analysis, we frame the following non-directional hypothesis-

H_2: Banks' environmental performance affects firm value

4. Methodology

4.1 Sample selection

Our study examines the environmental performance of 56 (out of 67) banks in the GCC region available in the Datastream database. We exclude 11 banks from our sample due to a lack of available environmental performance data. However, our sample is representative of the GCC region as it covers 83 per cent of the banking industry worth US$3.5 billion (approximately). Table 1 provides information on our sample.

[INSERT TABLE 1 HERE]

After case-wise deletion, our study reports environmental performance and bank performance relationship of 56 banks for ten years starting from 2010. The rationale for choosing the period from 2010 to 2019 is that majority of the banks in the GCC region, apart from banks in Oman and Saudi Arabia, did not disclose enough environmental information in their annual reports before 2010. Therefore, we limit our analysis from 2010 to 2019 which allows us to control for missing data issues.

We identify some extent of survivorship bias in our final sample which is more relevant in mutual fund studies. Banks operating in Oman, Saudi Arabia and Qatar do not report environmental performance-related information in their financial report. We adopt an aggregation method following Rohleder, Scholz and Wilkens (2011) to study the impact of environmental performance and financial performance of banks operating in the GCC region. One of the requirements of this method is the availability of the relevant data up to a certain length to generate a reliable regression estimate. As reported in Table 1, we ensure that we have data for both conventional and Islamic banks that range from 2010 to 2019.

Table 1 describes the sample. In addition, we provide environmental performance across year and country in Appendix C. The mean environmental performance for the full sample and each bank is available in Tables 2 and Appendix B, respectively. We use Datastream and World Bank database to collect bank-level and country-level data, respectively.

4.2 Empirical model

We construct empirical model 1 to test the impact of environmental performance on both the accounting and market performance of GCC banks.

$$Performance_{i,t} = \beta_0 + \beta_1 Environmental\ performance_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + Year\ fixed\ effect_t + Bank\ fixed\ effect_t + \epsilon_{i,t} \quad \text{---------- (1)}$$

Here, performance represents both accounting and market performance. We use *return on asset* and *cash flow margin* as proxies of accounting performance in our baseline model. For robust checks, we use *fee income, earnings per share, loan growth and sales growth* as alternate measures of accounting performance. Our market performance proxies include *Tobin's Q* and *market value ratio*. We find that past studies (Darayseh & Chazi, 2018) rely primarily on *return on asset, return on equity* and *earnings per share* while investigating the impact of environmental performance on financial performance.

Our empirical, however, the model considers additional dimensions of a bank's performance following the latest development in the literature. We introduce cash flow margin following Yan, Hall, and Turner (2014) to examine the impact of an environment-friendly approach on the liquidity of GCC banks. *Fee income* has a link with non-traditional banking activities, in particular (Vozková & Teplý, 2018) and we introduce this performance variable to test if environment-friendly banks can charge more fees to their customer in the GCC region. Following the literature (Konar and Cohen, 2001; Xuea, Lia and Zhanga, 2017), we apply *Tobin's Q* as a proxy for market performance. We also include the *market value ratio* to test the robustness of our study findings.

Environment performance is our main explanatory variable, and we follow the Environmental, Social and Governance (ESG) index available in the Datastream ASSET4 database to measure the environmental performance scores of GCC banks. It should be noted that environmental performance related disclosure, like many jurisdictions, is voluntary for the banks operating in the GCC region. We only consider the environmental items applicable for the banks present in the ESG index to align the index components with our study objectives. We provide a detailed description of the environmental performance index development in Appendix A.

We agree with Halbritter and Dorfleitner (2015), Semenova and Hassel (2015) and find that index scores provided by these databases lack convergence and are not consistent across individual pillars. Therefore, we make several modifications to our index which used the data available in the Datastream Asset4 database. The ASSET4 ESG index contains sixty (60) items covering various aspects of environmental performance. However, the scope of the original index is very broad and is not exclusive to the banking industry. Therefore, we modify the index by following the suggestions of Hassan (2012).

First, we review the original environmental index content along with the environmental risk framework for banks operating in the Gulf region (KPMG, 2021) and remove items that do not relate to the banking sector. Second, we remove items that GCC banks do not report in their annual report. Our final environmental index has only thirty (30) items and is similar to past indices used in a similar context (Azmi et al., 2021; Buallay, 2019). We perform Chronbach's alpha test to assess the reliability of our modified index and find the alpha score is 0.754 which assures a fairly robust measurement of the environmental performance (Engle & Lemos, 2010).

Zhang and Vigne (2021) indicate that the age and size of firms have a significant impact on environmental policy adoption. Buchanan, Cao and Chen (2018) also report the influence of institutional shareholders on corporate social responsibility decisions. However, the role of institutional ownership requires careful exploration in the context of environmental performance. Therefore, we bring this control into our empirical model. Harjoto, Jo and Kim (2017) report a positive association between firms operating leverage and corporate social responsibility initiatives. Therefore, we control the impact of operating leverage in our empirical model. Finally, we control for corporate investment using capital expenditure as a proxy, following Jiraporn et al. (2014).

Wen et al. (2016) explore the influence of government ideology on environmental performance and report that a political party with an anti-growth economy policy prefer better environmental performance. Therefore, we control for GDP growth and inflation in our regression model to ensure our results hold when we control for governmental ideology in the GCC region.

[INSERT TABLE 2 HERE]

4.3 Endogeneity issues

Endogeneity has become an important issue in quantitative research since its recent identification in accounting and finance research (see for example Core, 2001). According to Crane et al. (2017), our empirical model in equation 1 could suffer from endogeneity issues due to: (1) omitted variables, (2) simultaneity and (3) inadequacy in selecting measurement instruments (Chenhall & Moers, 2007).

The omitted variable could affect our empirical model if we fail to select an important variable that could explain environmental performance and financial performance relationship. We relied on theory to identify relevant variables in our study. In addition, we perform the "Ramsey RESET" test (Alkhamisi, Khalaf, & Shukur, 2008) available in STATA 16 to check if our empirical model suffers from omitted variable bias. We can reject the null hypothesis "Model has no omitted variables" for all market performance based empirical models. This is only true when we use cash-flow margin as an accounting-based performance measure.

Simultaneity bias can affect the empirical model if the causal relationship between explanatory and exploratory variables runs both ways. We apply Two-Stage Least Square (2SLS) based simultaneous equation model to solve the problem of simultaneity in our empirical model, following the suggestions of Chenhall and Moers (2007). However, it is difficult to adequately identify the instrument that could capture the perfect relationship between environmental performance and financial performance among banks operating in the

GCC region. Therefore, we can not ignore potential endogeneity problems limiting the reliability of our study findings. We also found a possible solution for potential endogeneity problems in empirical models in past literature (Chenhall & Moers, 2007).

The instrumental variable has often been used in past studies as a possible solution for endogeneity problems. We have applied 2SLS regression in our study and report the results in Table 8. However, 2SLS suffers from several limitations and recent studies (Lahouel, Gaies, Zaied, & Jahmane, 2019) have applied the system Generalised Methods of Moments (GMM) estimators to account for the over-identification bias in 2SLS. Also, GMM is more appropriate for a small sample size (Ferson & Foerster, 1994). Blundell & Bond (1998) proved that the system GMM is more efficient and robust than GMM in difference, highlighting the asymptotically efficient estimation ability of a two-step GMM estimation. As such, we revise our empirical model (in equation 1) for the two-step system GMM estimation as follows:

$$Performance_{i,t} = \beta_0 + \beta_1 Performance_{i,t-1} + \beta_2 Environmental\ performance_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Bank\ level\ controls + \mu_i + \nu_{i,t} \quad \text{----------(2)}$$

Where, $\mu_i$is an observed bank-specific time-invariant effect, which allows for heterogeneity in the means of $Performance_{i,t}$ series across banks. $\nu_{i,t}$ is the disturbance term which is independent across banks.

5. Results

5.1 Descriptive statistics

Country-wise data (please see Table A1 in Appendix A) shows that Bahrain has the best environmental performance in the GCC region for both conventional and Islamic banks. On the other hand, we find that Saudi Arabia has the lowest environmental performance in the

GCC region. Banks in Saudi Arabia began environmental protection initiatives in 2015, which could have resulted in a lower score. We also report that environmental performance for Saudi banks has increased throughout the years. These findings provide further justification for our research question, what trigger GCC banks to care for the environment?

Table 2 presents the descriptive statistics of samples. We use secondary data for our analysis and expect the data could have an outlier. To control for any outliers, we winsorize all continuous variables at the 1 per cent level. Banks' average environmental score is 0.188, with a minimum score of 0.001 and a maximum score of 0.493. The standard deviation of the environmental performance is 0.162, suggesting there are sufficient variations in the performance among selected banks. Our baseline model uses *return on assets* and *cash-flow margin* as proxies for the accounting performance. The average return on asset and cash-flow margin for our sample banks are 1.6 per cent and 44.40 per cent respectively. Tobins'Q and market value ratio on average are 1.048 and 0.314 respectively.

We present correlation scores in Table 3 and report that independent variables are not highly correlated with each other. The highest correlation among independent variables exists between GDP growth and environmental performance score (-0.329). This, suggests that multicollinearity is not an issue for our sample. Moreover, we conduct a further check for possible multicollinearity using the variance inflation factor (VIF). In all instances, the VIF score is below the recommended level of 10 for any of the explanatory variables (Hair et al., 2006).

[INSERT TABLE 3 HERE]

5.2 Main results

Table 4 reports the results for the performance hypothesis. We develop equation 1 to test whether environmental performance affects banks performance. In Table 4, we explore the accounting performance of GCC banks with *return on asset* and *cash-flow margin* as proxies.

We find that the coefficient for environmental performance score is negative and significant (-0.007) for *return on asset* with a t-statistic -1.885. Our results are consistent with the GMM estimations. Therefore, we conclude that GCC banks' environmental performance negatively affects their *return on assets*. Such findings are consistent with Iwata and Okada (2011) for Japanese firms and we confirm that GCC bank's profitability (measured using ROA) does not improve with environmental performance.

We continue our estimation by changing the proxy of accounting performance to cash-flow margin. As discussed earlier, we expect that environmental performance hurts a bank's cash management efficiency. The coefficient of environmental performance is negative (-0.235) with a t-statistics of -2.763. We find the negative impact of environmental performance on cash-flow margin is significant for both the fixed effect and GMM estimations. However, the negative association is significant for the fixed-effect model. Our results are consistent with Samet and Jarboui (2017) that corporate social responsibility initiatives do not ameliorate free cash flow problems. Therefore, we conclude that GCC banks focusing on environmental issues find it difficult to efficiently manage cash-flows.

[INSERT TABLE 4 HERE]

We continue to explore the impact of environmental performance on banks' market performance. We test this hypothesis using Tobin's Q as the proxy for the market value of GCC banks. Tobin's Q allows us to incorporate the book value of liabilities while calculating the market value of banks. Table 5 provides consistent positive, significant results for all empirical models (OLS, fixed effect and GMM). However, the coefficient is insignificant for all regression models. We further test the sensitivity of our analysis by introducing the market value ratio as a proxy for market performance.

We measure the market value ratio by taking the difference between the market and book value of equity and dividing it with the book value of equity. Our results show a consistent insignificant association between environmental performance and market performance for GCC banks. These findings suggest that socially responsible finance has not yet attracted investors in the GCC region compared to the advanced economies. Our results are consistent with Kao, Yeh, Wang, & Fung (2018) that banks' CSR initiatives do not have a significant impact on market performance in emerging markets.

[INSERT TABLE 5 HERE]

5.3 Robust results

To ensure the robustness of our findings, we replace performance measures with fee revenue, earnings per share, loan growth and sales growth. Robust regression results are available in Table 6. We find the coefficient for environmental performance is significant and negative for all alternative performance proxies, except for earnings per share. We report a significant negative impact of environmental performance on fee revenue, loan growth and sales growth. Our results confirm the findings of Andrikopoulos and Kriklani (2013).

[INSERT TABLE 6 HERE]

We perform propensity score matching and instrumental variable techniques in our study to control for potential endogeneity problems (please see our earlier discussion in section 4.3). Following the suggestions of Casu, Clare, Sarkisyan and Thomas (2013), we begin the propensity matching process with the probit regression: $P(E_{i,t} = 1 | F_{it}, C_{it})$, where $E_{i,t}$is the economic performance dummy (High economic performance>Median is 1, 0 otherwise), F_{it} is a vector of firm-level controls and $C_{it}$are country dummies. After deriving the propensity scores, we priced to the nearest neighbour matching. The treatment group in our PSM model

are banks with above industry median environmental performance. As such, we can control for banks that do have poor environmental performance when compared to the overall GCC banking industry.

Table 7 provides the post-matching sample regression results. The regression results with propensity score-matched sample are consistent with the full sample results and we confirm that environmental performance has a significant negative impact on accounting performance (return on asset and cash-flow margin), but such impact is insignificant for market performance (Tobin's Q and market value ratio).

[INSERT TABLE 7 HERE]

We report instrumental variable regression using a two-stage least square (2SLS) estimation method in Table 8. We introduce all measures (both baseline and robust) of bank performance in our 2SLS regression results. Following Fang, Lee, Chung, Lee and Wang (2020) we adopt a dummy for environmental performance as an instrument for our 2SLS regression. The dummy takes a value of 1 for high environmental performance and 0 otherwise. Our results are consistent with the full sample and propensity-matched sample results.

[INSERT TABLE 8 HERE]

5.4 Sub-sample results

Plumlee, Brown and Marshall (2008) find that the association between environmental performance and firm performance varies across firms' types. Such finding motivates us to perform further check on the association between environmental performance and profitability and market value by dividing our sample into Islamic and conventional banks. Moreover, given the augmented role of Islamic banks in the GCC countries, it is imperative to examine if environmental performance affects the accounting and market-based performance of Islamic and conventional banks differently. Table 9 provides the regression results for Islamic and

conventional banks. We run OLS regression with all performance proxies for both Islamic and conventional banks in Table 9. Results show a significant negative coefficient for the environmental performance of Islamic banks when we employ accounting performance proxies. The coefficient for all the market performance proxies is insignificant for Islamic banks. Therefore, we conclude that Islamic banks in the GCC region are less profitable by implementing environment-friendly policies.

Islamic banks follow Shari'ah rules in their business model that incorporate ethical issues such as environmental codes. Hence, we expect that the operating cost of Islamic banks is expected to be higher than their conventional peers. As a business practice, Islamic banks impose such costs on their customers who are mostly faith-based and religiously driven. Kuran (2004); Miah, Kabir and Safiullah (2020) argue that the majority of Islamic banks' customers tend to prioritize religiosity over other determinants, such as profitability, in choosing financial institutions as well as financial products. Moreover, as we reported earlier, Islamic banks' environmental score is less than their conventional counterparts. Hence, according to the law of marginal rate of efficiency, it can be argued that Islamic banks' environmental initiatives are still at a level that investors take positively.

We also find the coefficient of environmental performance for conventional banks is negative and significant when we measure a bank's performance with return on assets. The coefficient is negative but insignificant for all other performance proxies. Therefore, conventional banks' profitability reduces with the increase of environmental performance. Conventional banks are more profit-oriented and it is sometimes costly to become environment-friendly. Our results concerning the market value are indifferent to Islamic and conventional banks. Both banks lose market value with a higher level of environmental performance. This finding is consistent with our earlier finding reported in Tables 4 to 5. Such results indicate that GCC investors have not yet embraced the socially responsible investment

[PLEASE INSERT TABLE 9 HERE]

5.5 Additional tests

We perform additional tests to get better insights into environmental performance among banks in the GCC region. In Table 9, we show if environmental performance affects Islamic and conventional banks differently. Such comparison is important as it allows us to explore the possible impact of the business model on green practices. Islamic banks follow Shari'ah principles which require them to adopt ethical practices in their business operations. Therefore, we expect Islamic banks to have higher adoption of green practices. Bukhari et al. (2019) indicate that conventional banks have lower integration of green practices. Julia and Kassim (2019) made a similar comparison between Islamic and conventional banks in Bangladesh and report inconclusive findings. Therefore, we continue the analysis by investigating whether Islamic or conventional banks differ in terms of environmental performance. We do this with the following empirical model:

$$Environmental\ performance_{i,t} = \beta_0 + \beta_1 Bank\ dummy_{i,t} + \sum_t^i \begin{matrix} Firm\ level\ controls + \\ Bank\ level\ controls + \end{matrix} \sum_t^i \epsilon_{i,t} \quad \text{----------(3)}$$

Here, the bank dummy takes the value of 1 for conventional banks and 0 for Islamic banks. In Table 8, we report a positive and significant coefficient (0.080) for bank dummy with a t-statistics of 3.440. Therefore, conventional banks in the GCC region has better environmental performance compared to Islamic banks. However, Islamic banks (please see Appendix B for year-wise distribution of environmental performance scores) are gradually catching up with their conventional rivals.

[INSERT TABLE 10 HERE]

6. Discussion

The primary objective of this study is to provide empirical evidence on the association between environmental performance and bank performance. We use a robust environmental performance index in our study that satisfies the benchmark reliability scores. Also, we explore both the accounting and market performance of banks using multiple proxies that allow us to explore multiple dimensions of bank performance in the GCC region. Our findings consistently report that environmental performance put pressure on the accounting performance of GCC banks. However, the nexus between environmental performance and market performance are inconclusive.

Our findings contradict the past results of Platonova et al. (2018) for the GCC banking sector. However, we identify several reasons for such deviation. First, there are differences in the explanatory variable between the two studies. While we examine the environmental performance of GCC banks, Platonova et al. (2018) explore CSR disclosure which covers a wide variety of disclosure items. Second, Platonova et al. (2018) report that overall CSR disclosure has a significant positive impact on bank performance, but could not prove such a positive association between individual CSR dimensions and firm performance (measured using return on assets only). In comparison, our results are much more robust and consistent across all proxies of bank financial performance.

We find out findings are in line with Buallay, Hawaj and Hamdan (2020) as they also report a negative impact of integrated reporting and accounting performance. We consider the findings of Buallay, Hawaj and Hamdan (2020) are relevant as they cover environmental issues within the wider framework of integrated reporting for GCC banks. As such, our findings advances the earlier discussion of Buallay, Hawaj and Hamdan (2020) as we prove their earlier results are valid for the environmental performance and financial performance nexus among

GCC banks. We also advance the earlier debate of mixed results in environmental performance-related studies (Al-Tuwaijri, Christensen, & Hughes Ii, 2004)

7. Conclusion

The primary objective of this study is to explore the impact of environmental performance on the financial and market performance of banks operating in the GCC region. In so doing, we collect secondary data from the Datastream database for the period 2010-2019. We analyzed data using the GMM estimation technique, PLS and pooled fixed-effect models. We find that environmental performance does not affect banks' return on assets. We further document that banks augmented environmental initiatives reduce their cash flow and market value. Results also exhibit that environmental performance increases fee income of Islamic banks although conventional banks outperform their Islamic counterparts in terms of environmental performance.

Our results have some important policy implications. First, there are a shortage of responsible and impact (SRI) investments in the GCC region. Hence, conventional banks do not have enough natural impetus to be green. Since banks' environmental initiatives reduce cash flows, stock market investors react negatively. Moreover, stakeholders do not value low and high-carbon profile banks differently. This implies that SRI investment is to be encouraged by providing various incentives. For example, respective government bodies can arrange various schemes including rate subsidies for banks that finance renewable and green projects at a concessional rate. Moreover, government initiatives in the form of rewarding institutions, both in the financial and non-financial industries, for their effort in promoting a sustainable environment, could also attract the attention of key stakeholders.

Second, stakeholders' inertia and negative stock market reaction to banks' environmental performance entail that regulatory authority should devise sufficient policies

and guidelines to coerce banks to be accountable for their carbon footprint. Such an approach is likely to be more effective because GCC banks are highly regulated institutions.

Our study makes several important contributions. First, we provide empirical evidence on the environmental performance among banks operating in the GCC region. Second, we provide an environmental performance index applicable to the banking sector. Our index passes the reliability benchmark and we expect this index could allow future studies to explore environmental performance in various jurisdictions. Third, our findings provide regulators and industry practitioners' valuable insight into the current environmental practices and indicate necessary reforms to integrate sustainable development objectives in their business model. Future studies could explore various dimensions of environmental performance for the GCC region. However, we provide valuable evidence for the industry and regulators.

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Table 1: Sample description

Year	Conventional Banks	%	Islamic Banks	%	Total
2010	25	69.44	11	30.56	36
2011	25	69.44	11	30.56	36
2012	25	69.44	11	30.56	36
2013	25	69.44	11	30.56	36
2014	27	69.23	12	30.77	39
2015	32	69.57	14	30.43	46
2016	28	69.64	16	30.36	44
2017	28	68.29	13	31.71	41
2018	30	65.22	16	34.78	46
2019	27	65.85	14	34.15	41

This table reports a year-wise description of the sample banks examined in this study. Our final sample comprises forty-six banks operating in the Gulf Cooperation Council (GCC) region. The sample comprises 30 conventional and 16 Islamic banks. Table 1 indicates that our study has an unbalanced panel, covering the highest number of banks in the year 2018. We collect data from 2010 until 2019 to ensure our bank data reflects on the post-global crisis period.

Table 2: Variable definition and descriptive statistics

Variable	Definition	Source	Observations	Mean	Std. Dev.	Min	Max
Panel A – Performance Variables							
Return on asset	Income after tax / Average total asset	Data Stream	401	0.016	0.007	0.001	0.050
Cash-flow margin	Cash-flow / Total revenue	Data Stream	401	0.440	0.153	0.058	0.792
Fee revenue	This is the ratio of Commissions and fees for the fiscal period as a percentage of net revenue for the same period.	Data Stream	384	0.201	0.059	0.064	0.405
Earnings per share	This is the ratio of EPS excluding extraordinary items; avg. diluted shares outstanding for the fiscal year to fiscal period end price close for the same period and is expressed as a percentage.	Data Stream	390	0.093	0.043	0.004	0.288
Tobin's Q	The q ratio is calculated using the formula: (Market capitalization + Book value of liabilities)/Book value of asset.	Author calculation	401	1.048	0.081	0.784	1.400
Market value ratio	(Market Capitalization – Book Value of Equity) / Book Value of Equity	Author calculation	401	0.314	0.582	-0.787	2.506
Loan growth	Change in the total loan to the customer in the current year compared to the past year. The total loan is adjusted to the possible default losses and unearned interest income.	Data Stream and Author calculation	292	0.099	0.146	-0.288	0.735
Sales growth	(Current year sales – Past year sales) / Past year sales	Data Stream and Author calculation	292	0.083	0.126	-0.219	0.734
Panel B – Environment variable							
Environmental performance score	We use an index to measure the policies and practices adopted by GCC banks. The index consists of thirty items and we follow the recommendations of the broader Environment, Social and Governance (ESG) index while constructing the environmental performance index.	Data Stream and author calculation	401	0.188	0.162	0.001	0.493
Panel C - Firm-level control							
Bank size	Natural logarithm of market capitalization.	Data Stream	401	9.534	0.528	7.731	10.622
Bank age	The total number of years since incorporation.	Data Stream	381	29.530	15.797	1.000	64.000
Strategic shareholders	Represents the number of shares held by strategic investors (Corporations, Holding Companies, Individuals and Government Agencies).	Data Stream	401	9.021	0.396	7.628	9.681
Operating leverage	Book value of liabilities / Book value of equity	Data Stream	178	10.650	11.939	0.051	80.415
Capital expenditure	The company's actual value normalized to reflect the default currency and corporate actions.	Data Stream	387	0.187	0.215	0.011	1.903
Panel D - Country level controls							
Inflation	Consumer price index	World Bank	396	1.745	1.552	-2.425	4.839
GPG growth	Annual growth in the gross domestic product (GDP).	World Bank	401	3.367	3.487	-4.712	19.592
World governance indicator	Governance score calculated by the World Bank using six country-level governance indicators.	World Bank	401	0.899	2.281	-2.900	4.108
Fiscal stance	Fiscal surplus or deficit to GDP.	World Bank	294	9.782	14.645	-19.11	45.454

Table 3: Correlation analysis

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Return on asset	1.00																	
2	Cash flow margin	0.75*	1.00																
		(0.00)																	
3	Fee revenue	-0.09	-0.20*	1.00															
		(0.09)	(0.00)																
4	Earnings per share	0.43*	0.40*	0.00	1.00														
		(0.00)	(0.00)	(0.99)															
5	Tobin's Q	0.47*	0.40*	-0.17*	0.19*	1.00													
		(0.00)	(0.00)	(0.00)	(0.00)														
6	Market value ratio	0.40*	0.36*	-0.18*	0.20*	0.94*	1.00												
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)													
7	Loan growth	0.10	0.10	-0.14*	0.11	0.10	0.11	1.00											
		(0.10)	(0.10)	(0.02)	(0.07)	(0.09)	(0.07)												
8	Sales growth	0.13*	0.11	-0.13*	0.03	0.04	0.04	0.53*	1.00										
		(0.02)	(0.07)	(0.02)	(0.66)	(0.50)	(0.45)	(0.00)											
9	Environmental performance	-0.10*	-0.02	-0.01	0.23*	0.02	0.03	-0.12*	-0.22*	1.00									
		(0.03)	(0.76)	(0.90)	(0.00)	(0.74)	(0.58)	(0.04)	(0.00)										
10	Bank size	0.32*	0.39*	0.08	0.50*	0.53*	0.54*	0.08	0.02	0.30*	1.00								
		(0.00)	(0.00)	(0.14)	(0.00)	(0.00)	(0.00)	(0.18)	(0.77)	(0.00)									
11	Bank age	0.07	0.03	-0.04	-0.02	-0.16*	-0.19*	0.01	0.03	0.12*	-0.06	1.00							
		(0.18)	(0.57)	(0.49)	(0.73)	(0.00)	(0.00)	(0.90)	(0.60)	(0.01)	(0.27)								
12	Strategic shareholders	0.00	0.09	-0.16*	0.36*	-0.16*	-0.14*	0.10	0.03	0.06	0.09	0.07	1.00						
		(0.98)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.08)	(0.59)	(0.23)	(0.06)	(0.15)							
13	Operating leverage	-0.10	-0.08	-0.08	-0.06	0.04	0.00	0.12	0.02	-0.08	-0.09	-0.18*	-0.03	1.00					
		(0.18)	(0.29)	(0.26)	(0.41)	(0.59)	(0.97)	(0.19)	(0.79)	(0.28)	(0.21)	(0.02)	(0.73)						
14	Capital expenditure	0.11*	-0.10*	-0.12*	-0.05	0.06	0.08	0.05	0.05	-0.09	-0.01	0.04	-0.10	0.02	1.00				
		(0.02)	(0.04)	(0.01)	(0.29)	(0.24)	(0.12)	(0.40)	(0.36)	(0.08)	(0.80)	(0.43)	(0.06)	(0.83)					
15	Inflation	0.15*	0.10*	-0.04	-0.01	0.13*	0.10*	0.05	0.06	-0.09	-0.07	0.02	-0.06	0.14	0.00	1.00			
		(0.00)	(0.04)	(0.41)	(0.83)	(0.01)	(0.04)	(0.42)	(0.35)	(0.08)	(0.16)	(0.75)	(0.21)	(0.07)	(0.95)				
16	GDP growth	0.04	0.05	0.03	0.03	-0.01	0.00	0.21*	0.17*	-0.33*	0.01	-0.12*	0.04	0.27*	0.13*	-0.10*	1.00		
		(0.42)	(0.34)	(0.51)	(0.52)	(0.81)	(0.96)	(0.00)	(0.00)	(0.00)	(0.85)	(0.01)	(0.41)	(0.00)	(0.01)	(0.03)			
17	Country governance	0.06	-0.05	-0.08	0.38*	0.01	-0.01	0.11*	0.06	0.10*	-0.02	-0.12*	0.20*	0.07	0.10*	0.07	-0.07	1.00	
		(0.24)	(0.31)	(0.12)	(0.00)	(0.90)	(0.82)	(0.05)	(0.29)	(0.04)	(0.68)	(0.02)	(0.00)	(0.32)	(0.04)	(0.17)	(0.16)		
18	Fiscal stance	0.08	0.03	0.01	0.11*	0.35*	0.39*	0.22*	0.13*	-0.29*	0.11*	-0.39*	0.05	0.06	0.09	-0.02	0.29*	0.05	1.00
		(0.17)	(0.56)	(0.91)	(0.05)	(0.00)	(0.00)	(0.00)	(0.05)	(0.00)	(0.05)	(0.00)	(0.36)	(0.51)	(0.13)	(0.80)	(0.00)	(0.38)	

We present correlation statistics for all variables in the study to ensure our results do not suffer from the auto-correlation problem. Figures in the parentheses are p-values. * indicate significance at 1 per cent level.

Table 4: Does environmental performance affect accounting performance?

	Return on asset			Cash-flow margin		
	OLS	Fixed effect	GMM	OLS	Fixed effect	GMM
Performance $_{t-1}$			-0.207			0.047
			(-1.489)			(0.365)
Environmental performance	-0.007*	-0.003	-0.009**	-0.235**	-0.154*	-0.245**
	(-1.885)	(-0.680)	(-3.080)	(-2.763)	(-1.568)	(-3.193)
Bank size	0.006***	0.003	0.007***	0.134***	0.013	0.110***
	(5.555)	(1.290)	(6.456)	(5.827)	(0.254)	(4.386)
Bank age	0.000	-0.001	0.000	0.000	-0.010	0.000
	(0.050)	(-1.824)	(1.001)	(0.352)	(-1.601)	(-0.132)
Strategic shareholding	-0.001	-0.005*	0.000	0.020	-0.046	0.028
	(-0.462)	(-2.225)	(0.025)	(0.852)	(-1.074)	(1.273)
Operating leverage	0.000	0.000	0.000	-0.002	0.000	0.000
	(0.455)	(0.388)	(0.479)	(-1.152)	(0.324)	(0.303)
Capital expenditure	-0.006	-0.002	-0.011***	-0.247***	-0.079	-0.261***
	(-1.655)	(-0.530)	(-4.392)	(-4.484)	(-1.076)	(-3.988)
Inflation	0.000	0.000	0.000*	0.001	0.002	0.003
	(0.867)	(0.163)	(2.127)	(0.212)	(0.287)	(0.522)
GDP Growth	0.000	0.000	0.000**	0.004	0.006	0.005
	(1.512)	(1.653)	(2.887)	(0.945)	(1.274)	(1.432)
Country governance	0.000	0.000	0.000*	0.014	-0.019	0.021**
	(0.756)	(0.212)	(2.103)	(1.884)	(-0.950)	(3.213)
Fiscal stance	0.000	-0.000*	0.000	-0.001	-0.003*	-0.001
	(0.406)	(-2.289)	(0.812)	(-0.606)	(-2.474)	(-1.355)
Intercept	-0.037**	0.045	-0.046***	-0.925**	1.106	-0.775**
	(-2.731)	(1.658)	(-4.079)	(-3.383)	(1.973)	(-2.730)
Year fixed effect	Yes	No	Yes	Yes	No	Yes
Bank fixed effect	Yes	No	Yes	Yes	No	Yes
Standard error	Robust	No	Robust	Robust	No	Robust
RESET (P<0.05)	Yes	Yes	-	Yes	Yes	-
Observations	120	120	101	120	120	101
R^2	0.264	0.293		0.298	0.295	
F/Wald statistics	4.94**	4.07**	2578.8***	9.60***	3.09**	2925.15***
Arellano-Bond statistics			-0.88			-0.88
Sargan test			62.16***			46.24
Hansen test			-			23.40

Note: We perform pooled OLS and fixed effect regression to analyse the impact of environmental performance on bank performance following equation: $Performance_{i,t} = \beta_0 + \beta_1 Environmental\ performance_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + \epsilon_{i,t}$ Besides pooled OLS and fixed effect regression, we perform two-step system GMM regression to control for endogeneity issues based on the equation: $Performance_{i,t} = \beta_0 + \beta_1 Performance_{i,t-1} + \beta_2 Environmental\ performance_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + \mu_i + \nu_{i,t}$. We measure accounting performance using return on asset (ROA) and cash-flow margin. The environmental performance score is the explanatory variable, measured using a self-developed index consisting of thirty items proposed in the wider Environmental, Social and Governance (ESG) framework. A brief description and measurement of these variables are present in Appendix A. We apply both firm and country-level controls in our empirical model. $\mu_i$is an observed bank-specific time-invariant effect, which allows for heterogeneity in the means of $Performance_{i,t}$ series across banks. $\nu_{i,t}$ is the disturbance term which is independent across banks. Figures in the parentheses represent t-statistics. ***, ** and * stands for significance level at 1, 5 and 10 per cent respectively.

Table 5: Does environmental performance affect market performance?

	Tobin's			Market value ratio		
	OLS	Fixed effect	GMM	OLS	Fixed effect	GMM
Performance $_{t-1}$			0.341***			0.234**
			(3.938)			(3.088)
Environmental performance	0.003	0.005	0.014	0.065	0.064	0.204
	(0.068)	(0.102)	(0.589)	(0.191)	(0.182)	(0.608)
Bank size	0.099***	0.079**	0.067***	0.722***	0.658***	0.563***
	(8.947)	(3.028)	(6.864)	(10.616)	(3.550)	(5.302)
Bank age	0.000	-0.006	0.000	-0.004	-0.060*	-0.002
	(1.080)	(-1.817)	(0.204)	(-1.718)	(-2.615)	(-0.774)
Strategic shareholding	-0.053**	-0.031	-0.030***	-0.323*	-0.131	-0.262*
	(-3.001)	(-1.436)	(-3.832)	(-2.546)	(-0.858)	(-2.136)
Operating leverage	0.000	0.001	0.000	0.006	0.009*	0.002
	(0.914)	(1.579)	(0.150)	(1.397)	(2.534)	(1.004)
Capital expenditure	0.039	-0.067	0.002	0.377	-0.515	0.203
	(0.932)	(-1.808)	(0.115)	(1.242)	(-1.970)	(1.058)
Inflation	0.005	0.003	0.005*	0.030	0.014	0.031*
	(1.454)	(0.885)	(2.339)	(1.170)	(0.560)	(2.066)
GDP Growth	0.000	-0.003	0.000	0.007	-0.021	0.008
	(0.109)	(-1.099)	(-0.147)	(0.434)	(-1.172)	(0.987)
Country governance	0.003	0.009	0.001	0.038	0.058	0.045
	(0.727)	(0.839)	(0.480)	(1.296)	(0.809)	(1.715)
Fiscal stance	0.001**	0.001*	0.001***	0.011**	0.009*	0.009**
	(3.417)	(2.096)	(3.967)	(3.357)	(2.255)	(3.007)
Intercept	0.540**	0.753**	0.290***	-3.916**	-2.905	-3.037
	(3.299)	(2.664)	(2.964)	(-3.440)	(-1.454)	(-1.631)
Year fixed effect	Yes	No	Yes	Yes	No	Yes
Bank fixed effect	Yes	No	Yes	Yes	No	Yes
Standard error	Robust	No	Robust	Robust	No	Robust
RESET (P<0.05)	Yes	Yes	-	Yes	Yes	-
Observations	120	120	101	120	120	101
R^2	0.550	0.339		0.567	0.449	
F/Wald statistics	14.14***	3.90**	11.00***	15.58***	6.04***	33.87***
Arellano-Bond statistics			-1.30			-1.37
Sargan test			42.87			43.54
Hansen test			20.61			11.51

Note: We perform pooled OLS and fixed effect regression to analyse the impact of environmental performance on bank performance following equation: $Performance_{i,t} = \beta_0 + \beta_1 Environmental\ performance_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + \epsilon_{i,t}$ Besides pooled OLS and fixed effect regression, we perform GMM regression to control for endogeneity issues based on the equation: $Performance_{i,t} = \beta_0 + \beta_1 Performance_{i,t-1} + \beta_2 Environmental\ performance_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + \mu_i + \nu_{i,t}$. We measure market performance using Tobin's Q and market value ratio as proxies. The environmental performance score is the explanatory variable, measured using a self-developed index consisting of thirty items proposed in the wider Environmental, Social and Governance (ESG) framework. A brief description and measurement of these variables are present in Appendix A. We apply both firm and country-level controls in our empirical model. $\mu_i$is an observed bank-specific time-invariant effect, which allows for heterogeneity in the means of $Performance_{i,t}$ series across banks. $\nu_{i,t}$ is the disturbance term which is independent across banks. Figures in the parentheses represent t-statistics. ***, ** and * stands for significance level at 1, 5 and 10 per cent respectively.

Table 6: Robustness checks

	Fee revenue	Earnings per share	Loan growth	Sales growth
Environmental performance	-0.110**	0.020	-0.128*	-0.163*
	(-3.351)	(0.127)	(-1.716)	(-1.829)
Bank size	0.017*	0.266***	0.053*	0.029
	(1.840)	(4.416)	(1.906)	(1.054)
Bank age	0.000	-0.002	0.002*	0.000
	(0.873)	(-1.814)	(2.343)	(0.102)
Strategic shareholding	-0.036**	0.097*	0.023	0.013
	(-2.995)	(2.072)	(0.750)	(0.412)
Operating leverage	0.000	-0.001	0.002*	0.001
	(0.108)	(-0.608)	(2.234)	(1.753)
Capital expenditure	-0.065*	-0.208*	0.007	0.055
	(-2.335)	(-2.203)	(0.093)	(0.936)
Inflation	0.000	-0.002	-0.007	-0.01
	(-0.117)	(-0.095)	(-0.605)	(-0.776)
GDP Growth	-0.002	0.016	0.019*	0.013
	(-1.141)	(1.936)	(2.543)	(1.715)
Country governance	-0.003	0.084***	0.011	-0.001
	(-0.998)	(5.310)	(1.246)	(-0.139)
Fiscal stance	0.000	-0.001	0.000	0.000
	(1.068)	(-0.383)	(0.285)	(-0.299)
Intercept	0.407**	-2.922***	-0.718	-0.322
	(3.157)	(-3.723)	(-1.603)	(-0.959)
Year fixed effect	Yes	Yes	Yes	Yes
Bank fixed effect	Yes	Yes	Yes	Yes
Standard error	Robust	Robust	Robust	Robust
RESET (P<0.05)	Yes	Yes	Yes	Yes
Observations	118	120	85	85
R^2	0.282	0.461	0.341	0.226
F-statistics	5.84***	5.04***	4.41***	2.13*

Note: The table reports robust regression results with alternative measures of firm performance. We check the robustness of the results about the impact of environmental performance on bank performance following equation: $Performance_{i,t} = \beta_0 + \beta_1 Environmental\ performance_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + \epsilon_{i,t}$ We introduce new measures of performance in our robust regression model, i.e. fee revenue, earnings per share, loan growth and sales growth. The environmental performance score is the explanatory variable, measured using a self-developed index consisting of thirty items proposed in the wider Environmental, Social and Governance (ESG) framework. A brief description and measurement of these variables are present in Appendix A. We apply both firm and country-level controls in our empirical model. Figures in the parentheses represent t-statistics. ***, ** and * stands for significance level at 1, 5 and 10 per cent respectively.

Table 7: Propensity score-matched regression

	Return on asset	Cash-flow margin	Tobin's Q	Market value ratio
Environmental performance	-0.007*	-0.245**	-0.012	-0.044
	(-1.534)	(-2.638)	(-0.272)	(-0.131)
Bank size	0.007***	0.128***	0.098***	0.727***
	(5.784)	(5.188)	(8.147)	(8.209)
Bank age	0.000	0.000	0.000	-0.003
	(0.221)	(0.337)	(-0.748)	(-1.159)
Strategic shareholding	-0.001	0.030	-0.039**	-0.246*
	(-0.597)	(1.021)	(-2.740)	(-2.346)
Operating leverage	0.000	-0.002*	0.000	0.006
	(1.697)	(-2.130)	(0.774)	(1.528)
Capital expenditure	-0.006	-0.255**	0.042	0.417
	(-1.763)	(-3.194)	(1.083)	(1.450)
Inflation	0.000	0.005	0.005	0.025
	(1.121)	(0.551)	(1.217)	(0.817)
GDP Growth	0.000	0.003	0.001	0.011
	(1.442)	(0.522)	(0.387)	(0.552)
Country governance	0.000	0.021**	0.004	0.041
	(1.244)	(2.765)	(1.049)	(1.506)
Fiscal stance	0.000	-0.001	0.001	0.008*
	(0.421)	(-0.550)	(1.951)	(2.089)
Intercept	-0.038*	-0.914**	0.441*	-4.557***
	(-2.394)	(-2.635)	(2.592)	(-3.651)
Observations	106	106	106	106

Note: The table reports the impact of environmental performance on bank performance after we have matched the sample based on their propensity to care for the environment. Following the suggestions of Casu, Clare, Sarkisyan and Thomas (2013), we begin the propensity matching process with the probit regression: $P(E_{i,t} = 1 | F_{it}, C_{it})$, where $E_{i,t}$is the economic performance dummy (High economic performance>Median is 1, 0 otherwise), F_{it} is a vector of firm-level controls and $C_{it}$are country dummies. After deriving the propensity scores, we priced to the nearest neighbour matching. The treatment group in our PSM model are banks with above industry median environmental performance. As such, we can control for banks that do have poor environmental performance when compared to the overall GCC banking industry. We perform regression to analyse the impact of the environmental performance of the propensity-matched bank sample following equation: $Performance_{i,t} = \beta_0 + \beta_1 Environmental\ performance_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + \epsilon_{i,t}$ We measure market performance using Tobin's Q and market value ratio as proxies. The environmental performance score is the explanatory variable, measured using a self-developed index consisting of thirty items proposed in the wider Environmental, Social and Governance (ESG) framework. A brief description and measurement of these variables are present in Appendix A. We apply both firm and country-level controls in our empirical model. Figures in the parentheses represent t-statistics. ***, ** and * stands for significance level at 1, 5 and 10 per cent respectively.

Table 8: Instrumental variable (2SLS) regression

	Return on asset	Cash-flow margin	Tobin's Q	Market value ratio	Fee revenue	Earnings per share	Lean growth	Sales growth
Environmental performance	-0.003	-0.083**	0.001	0.023	-0.038**	0.007	-0.047	-0.060
	(-1.758)	(-2.614)	(0.080)	(0.216)	(-2.930)	(0.128)	(-1.395)	(-1.743)
Bank size	0.007***	0.146***	0.099***	0.719***	0.022*	0.265***	0.060	0.037
	(5.804)	(5.854)	(8.722)	(8.703)	(2.105)	(6.057)	(1.890)	(1.139)
Bank age	0.000	0.000	0.000	-0.004	0.000	-0.002	0.002*	0.000
	(0.213)	(0.020)	(0.851)	(-1.449)	(1.249)	(-1.752)	(1.989)	(0.009)
Strategic shareholding	-0.001	0.013	-0.053***	-0.321***	-0.039**	0.098	0.018	0.008
	(-0.655)	(0.452)	(-4.007)	(-3.335)	(-3.262)	(1.922)	(0.577)	(0.246)
Operating leverage	0.000	-0.002	0.000	0.006	0.000	-0.001	0.002	0.001
	(0.548)	(-1.416)	(0.875)	(1.657)	(0.320)	(-0.644)	(1.472)	(0.961)
Capital expenditure	-0.005	-0.235**	0.038	0.374	-0.061	-0.209	0.016	0.067
	(-1.510)	(-3.082)	(1.113)	(1.478)	(-1.907)	(-1.563)	(0.206)	(0.829)
Inflation	0.000	0.000	0.005	0.030	-0.001	-0.002	-0.007	-0.011
	(0.658)	(0.042)	(1.473)	(1.112)	(-0.242)	(-0.127)	(-0.792)	(-1.143)
GDP Growth	0.000	0.006	0.000	0.006	-0.002	0.016*	0.020***	0.015**
	(1.744)	(1.214)	(0.107)	(0.417)	(-0.823)	(1.969)	(4.296)	(2.997)
Country governance	0.000	0.014	0.003	0.038	-0.003	0.084***	0.011	-0.001
	(0.791)	(1.843)	(0.802)	(1.504)	(-0.931)	(6.215)	(1.189)	(-0.153)
Fiscal stance	0.000	-0.001	0.001**	0.011***	0.000	-0.001	0.000	0.000
	(-0.640)	(-0.968)	(3.283)	(3.551)	(0.546)	(-0.518)	(0.194)	(-0.374)
Intercept	-0.039*	-0.992**	0.541***	-3.898***	0.378**	-2.916***	-0.759*	-0.372
	(-2.476)	(-2.876)	(3.459)	(-3.408)	(2.644)	(-4.810)	(-2.082)	(-0.995)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard error	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust
Observations	120	120	120	120	118	120	85	85
R^2	0.247	0.278	0.545	0.567	0.280	0.463	43.64	0.196
Wald Chi^2	42.14***	49.56***	46.64***	157.24***	46.33***	103.03***	0.335	23.87***

Note: The table reports instrumental variable (2SLS) regression results for all proxies of performance as a measure to control for any potential endogeneity problem inherent in our empirical model. We check the robustness of the results about the impact of environmental performance on bank performance following equation: $Performance_{i,t} = \beta_0 + \beta_1 Environmental\ performance_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + \epsilon_{i,t}$. Following Fang, Lee, Chung, Lee and Wang (2020) we adopt a dummy for environmental performance as an instrument for our 2SLS regression. The dummy takes a value of 1 for high environmental performance and 0 otherwise. We apply both firm and country-level controls in our empirical model. Figures in the parentheses represent t-statistics. ***, ** and * stands for significance level at 1, 5 and 10 per cent respectively.

Table 9: Sub-sample analysis

	Islamic banks								Conventional banks							
	Return on asset	Cash-flow margin	Fee revenue	Earnings per share	Tobin's Q	Market value ratio	Loan growth	Sales growth	Return on asset	Cash-flow margin	Fee revenue	Earnings per share	Tobin's Q	Market value ratio	Loan growth	Sales growth
Environmental performance	-0.006	-0.313	-0.181**	0.152	0.141	1.072	0.107	-0.458	-0.005	-0.202*	-0.088	0.057	-0.037	-0.206	-0.214	-0.058
	(-0.525)	(-1.267)	(-2.909)	(0.466)	(1.816)	(1.482)	(0.461)	(-1.210)	(-1.158)	(-2.105)	(-1.845)	-0.289	(-0.724)	(-0.578)	(-1.970)	(-0.587)
Bank size	0.005	0.095	0.012	0.179	0.133***	0.859***	0.236	0.100	0.008***	0.151***	0.003	0.232***	0.106***	0.771***	0.047	0.013
	(1.543)	(1.366)	(0.658)	(1.946)	(6.115)	(4.230)	(1.671)	(0.433)	(6.279)	(5.609)	(0.216)	(4.204)	(7.478)	(7.720)	(1.090)	(0.332)
Bank age	0.000	0.001	0.001	-0.007	0.002	0.010	0.002	-0.004	0.000	-0.001	0.000	0.000	-0.001	-0.006	0.002	0.000
	(0.526)	(0.353)	(1.351)	(-1.478)	(2.076)	(1.013)	(0.225)	(-0.324)	(-0.778)	(-1.014)	(1.127)	(-0.273)	(-1.686)	(-1.930)	(1.555)	(0.271)
Strategic shareholding	0.000	0.083	0.003	0.493*	-0.113*	-0.366	0.054	0.009	0.002	0.050	-0.032*	0.061	-0.052**	-0.376***	-0.010	-0.028
	(0.039)	(0.589)	(0.086)	(2.644)	(-2.554)	(-0.886)	(0.384)	(0.040)	(1.191)	(1.691)	(-2.232)	(1.008)	(-3.368)	(-3.436)	(-0.289)	(-0.881)
Operating leverage	0.000	-0.005	0.000	-0.002	0.001	0.016	-0.004	0.005	0.000	-0.001	0.000	0.000	0.000	0.004	0.002	0.001
	(0.313)	(-1.765)	(0.097)	(-0.517)	(1.682)	(1.955)	(-0.605)	(0.496)	(-0.679)	(-0.449)	(0.759)	(-0.129)	(0.690)	(0.909)	(1.460)	(0.835)
Capital expenditure	-0.012	-0.388	-0.082	-0.173	-0.077	-0.508	-0.259	0.121	0.002	-0.161	-0.045	-0.079	0.085	0.562	-0.108	-0.007
	(-1.219)	(-1.870)	(-1.428)	(-0.631)	(-1.180)	(-0.837)	(-1.324)	(0.378)	(0.487)	(-1.561)	(-0.887)	(-0.372)	(1.558)	(1.474)	(-0.892)	(-0.062)
Inflation	-0.001	-0.043	-0.010	-0.023	0.010	0.026	-0.004	0.027	0.000	0.008	0.003	0.007	0.001	0.007	-0.011	-0.017
	(-0.738)	(-1.586)	(-1.404)	(-0.658)	(1.174)	(0.332)	(-0.174)	(0.785)	(1.098)	(1.006)	(0.646)	(0.425)	(0.196)	(0.228)	(-1.070)	(-1.873)
GDP Growth	0.000	0.003	0.002	0.023	-0.002	-0.016	0.022	-0.001	0.000	0.003	-0.004	0.012	0.001	0.013	0.021**	0.021***
	(0.697)	(0.234)	(0.579)	(1.377)	(-0.580)	(-0.440)	(2.296)	(-0.091)	(1.205)	(0.580)	(-1.435)	(1.142)	(0.358)	(0.675)	(3.340)	(3.637)
Country governance	0.000	-0.006	0.009	0.080*	0.001	0.011	-0.019	-0.033	0.001*	0.030**	-0.015**	0.069**	0.012*	0.109**	0.041**	0.041**
	(0.455)	(-0.280)	(1.422)	(2.812)	(0.105)	(0.178)	(-0.420)	(-0.443)	(2.079)	(2.968)	(-3.139)	(3.334)	(2.308)	(2.931)	(2.841)	(3.121)
Fiscal stance	0.000	-0.001	-0.001	-0.009*	0.002*	0.020*	0.009**	0.002	0.000	0.000	0.001	0.003	0.001*	0.010*	-0.002	-0.002
	(0.292)	(-0.247)	(-0.917)	(-2.396)	(2.782)	(2.396)	(3.428)	(0.535)	(0.323)	(-0.148)	(1.674)	(1.455)	(2.318)	(2.593)	(-1.332)	(-1.277)
Intercept	-0.031	-1.077	0.106	-5.520**	0.658	-5.357	-3.062*	-0.887	-0.072***	-1.337***	0.468*	-2.414**	0.490*	-3.734**	-0.250	0.271
	(-0.595)	(-0.965)	(0.377)	(-3.742)	(1.880)	(-1.642)	(-2.644)	(-0.469)	(-4.062)	(-3.512)	(2.500)	(-3.092)	(2.439)	(-2.644)	(-0.501)	(0.598)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard error	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust
Observations	33	33	32	33	33	33	20	20	87	87	86	87	87	87	65	65
R^2	0.019	0.311	0.585	0.725	0.620	0.490	0.727	0.305	0.304	0.244	0.206	0.213	0.538	0.562	0.217	0.235
F-statistics	1.06	2.31*	2.57**	8.96***	5.75***	3.80***	5.62***	1.76	4.41***	3.53***	3.00***	3.12***	10.11***	11.01***	3.17***	2.79***

Note: We perform pooled OLS regression to analyse the impact of environmental performance on bank performance by splitting the sample into Islamic and conventional banks. We use both baseline and robust regression performance proxies in this split-sample analysis. Environmental performance is the explanatory variable, measured using a self-developed index consisting of thirty items proposed in the wider Environmental, Social and Governance (ESG) framework. A brief description and measurement of these variables are present in Table 2. We apply both firm and country-level controls in our empirical model. Figures in the parentheses represent t-statistics. ***, ** and * stands for significance level at 1, 5 and 10 per cent respectively.

Table 10: Does environmental performance differ between Islamic and conventional banks?

	Full sample	Propensity matched sample
Bank dummy	0.060*	0.066*
	(2.190)	(2.288)
Bank size	0.082***	0.080**
	(3.946)	(3.193)
Bank age	0.000	-0.000
	(0.397)	(-0.097)
Strategic shareholding	0.038	0.049
	(1.090)	(1.515)
Operating leverage	0.001	0.002
	(1.757)	(1.706)
Capital expenditure	-0.031	0.002
	(-0.399)	(0.022)
Inflation	0.005	0.005
	(0.590)	(0.587)
GDP Growth	-0.023***	-0.026***
	(-5.406)	(-4.917)
Country governance	0.019**	0.019*
	(2.745)	(2.130)
Fiscal stance	-0.002	-0.03*
	(-1.931)	(-2.161)
Intercept	-0.848*	-0.925
	(-2.183)	(-2.555)
Year fixed effect	Yes	Yes
Bank fixed effect	Yes	Yes
Standard error	Robust	No
Observations	120	106
R^2	0.400	0.388
F-statistic	6.55***	5.41***

Note: We perform regression to analyse variations in environmental performance among Islamic and conventional banks in GCC. We perform regression based on the equation: $Environmental\ performance_{i,t} = \beta_0 + \beta_1 Bank\ dummy_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + \epsilon_{i,t}$ and GMM regression to control for endogeneity issues based on the equation: $Environmental\ performance_{i,t} = \beta_0 + \beta_1 Environmental\ performance_{i,t-1} + \beta_2 Bank\ dummy_{i,t} + \sum_t^i Firm\ level\ controls + \sum_t^i Country\ level\ controls + \mu_i + \nu_{i,t}$. Environmental performance is the explanatory variable, measured using a self-developed index consisting of thirty items proposed in the wider Environmental, Social and Governance (ESG) framework. Bank dummy takes a value of 1 for conventional banks, 0 otherwise. A brief description and measurement of these variables are present in Appendix A. We apply both firm and country-level controls in our empirical model. $\mu_i$is an observed bank-specific time-invariant effect, which allows for heterogeneity in the means of $Performance_{i,t}$ series across banks. $\nu_{i,t}$ is the disturbance term which is independent across banks. Figures in the parentheses represent t-statistics. ***, ** and * stands for significance level at 1, 5 and 10 per cent respectively.

Appendix A – Environment performance index development

First, we focus on the environmental aspect of the Environment, Social and Governance (ESG) index items. The environmental section of the ESG index incorporates elements relating to the firm-specific emission information. These items are general and we find that not all items are relevant for the banking sector.

Therefore, in the second step, we make a careful evaluation of the relevance of an environmental performance item for the banking sector and only keep relevant items in our environmental performance index. After the final evaluation, we find thirty performance items relevant to our environment performance index for the banking sector.

In the final step, we apply a scoring mechanism to find environmental performance scores for individual banks. Banks contributing to less emission to the environment as compared to the overall industry median emission receives a score of 2, 1 if emission score is equal to the industry median and 0 if emission score is above the median. However, we only have 11 items that follow this scoring criterion. The rest of the 19 index items follow a dichotomous scale where a score of 1 is awarded to banks if they have a favourable environmental protection initiative, 0 otherwise. We have the following explanation for our scoring mechanism:

- 2 = Firm is doing more than the industry to protect the environment.
- 1 = Firm is meeting industry standards to protect the environment.
- 0 = Firm is falling behind the industry standards or does not have an adequate policy to protect the environment.

Based on the above scoring mechanism, a bank can score a maximum of 41 points in our performance index. The full list of items and related scores are present in Table A1. We follow the formula in the equation to calculate the final performance score:

$$Environmental\ performance = \frac{\sum Invididual\ bank\ environmental\ performance\ Score}{\sum Maximum\ environmental\ performance\ score}$$

The above equation allows us to present the environmental performance score as a percentage where the minimum and maximum scores can be 0 and 1 respectively.

Table A1: Environmental Reporting Index Items

Code	Items	Scores	Maximum score
ENV 1	Policy Emissions	1 if a bank has an emission policy, 0 otherwise.	1
ENV 2	Targets Emissions	1 if a bank has an emission target, 0 otherwise.	1
ENV 3	Biodiversity Impact Reduction	1 if a bank has a policy of biodiversity impact reduction, 0 otherwise.	1
ENV 4	Total CO_2 Equivalent Emissions to Revenues	2 if total CO_2 equivalent emission to revenue is below industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 5	CO_2 Equivalent Emissions Total	2 if total CO_2 equivalent emission is below industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 6	CO_2 Equivalent Emissions Direct, Scope 1	2 if direct (scope 1) CO_2 equivalent emission is below industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 7	CO_2 Equivalent Emissions Indirect, Scope 2	2 if indirect (scope 2) CO_2 equivalent emission is below industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 8	CO_2 Equivalent Emissions Indirect, Scope 3	2 if indirect (scope 3) CO_2 equivalent emission is below industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 9	Estimated CO_2 Equivalents Emission Total	2 if estimated CO_2 equivalent emission is below industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 10	CO_2 Estimation Method	1 if a bank has a CO_2 estimation method, 0 otherwise.	1
ENV 11	Emissions Trading	1 if the bank follows an emission trading policy, 0 otherwise.	1
ENV 12	Climate Change Commercial Risks Opportunities	1 if bank address commercial risk opportunities due to climate change, 0 otherwise.	1
ENV 13	NOx and SOx Emissions Reduction	1 if the bank follows a NOx and SOx reduction policy, 0 otherwise.	1
ENV 14	VOC Emissions Reduction	1 if a bank follows a VOC reduction policy, 0 otherwise.	1
ENV 15	Particulate Matter Emissions Reduction	1 if a bank follows a particulate matter emissions reduction policy, 0 otherwise.	1
ENV 16	Total Waste To Revenues	2 if total waste to revenue is below industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 17	Waste Recycled To Total Waste	2 if waste recycled to total waste is above the industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 18	Waste Total	2 if total waste is below industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 19	Waste Recycled Total	2 if waste recycled total is above the industry mean, 1 if the score is equal to mean and 0 otherwise.	2
ENV 20	Waste Recycling Ratio	2 if the waste recycling ratio is above the industry mean, 1 if the score is equal to the mean and 0 otherwise.	2
ENV 21	Waste Reduction Initiatives	1 if a bank takes waste reduction initiatives, 0 otherwise.	1
ENV 22	e-Waste Reduction	1 if a bank takes e-waste reduction initiatives, 0 otherwise.	1
ENV 23	ISO 14000 or EMS	1 if a bank has ISO 14000 certification, 0 otherwise.	1
ENV 24	Environmental Restoration Initiatives	1 if a bank takes environment restoration initiatives, 0 otherwise.	1
ENV 25	Staff Transportation Impact Reduction	1 if a bank has staff transportation impact reduction, 0 otherwise.	1
ENV 26	Environmental Expenditures Investments	1 if a bank has environmental expenditure investment, 0 otherwise.	1
ENV 27	Environmental Investments Initiatives	1 if a bank has environment investment initiatives, 0 otherwise.	1
ENV 28	Environmental Partnerships	1 if a bank has environmental partnerships, 0 otherwise.	1
ENV 29	Internal Carbon Pricing	1 if a bank follows internal carbon pricing, 0 otherwise.	1
ENV 30	Policy Nuclear Safety	1 if a bank follows a nuclear safety policy, 0 otherwise.	1
		The maximum total index score	41

Appendix B – Environment reporting scores across banks and year

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Bahrain												
1	Ahli United Bank	0.317	0.317	0.350	0.350	0.350	0.000	0.317	0.333	0.333	0.350	0.335
2	Al Baraka Banking Group	0.000	0.000	0.000	0.000	0.317	0.333	0.317	0.333	0.333	0.333	0.328
3	Al Salam Bank Bahrain	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.383	0.383	0.383
4	Bahrain Islamic Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.367	0.367	0.367	0.000	0.367
5	Bank of Bahrain and Kuwait	0.000	0.000	0.000	0.000	0.000	0.317	0.000	0.000	0.000	0.000	0.317
6	Ithmaar Holding	0.000	0.000	0.000	0.000	0.000	0.317	0.000	0.000	0.000	0.000	0.317
7	National Bank of Bahrain	0.000	0.000	0.000	0.000	0.000	0.417	0.333	0.333	0.333	0.333	0.175
Kuwait												
8	Ahli United Bank	0.000	0.000	0.000	0.000	0.317	0.000	0.317	0.317	0.317	0.333	0.267
9	Burgan Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	Commercial Bank of Kuwait	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	Gulf Bank	0.317	0.317	0.317	0.317	0.317	0.383	0.317	0.367	0.367	0.367	0.338
12	Kuwait Finance House	0.000	0.000	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.000	0.033
13	Kuwait International Bank	0.383	0.383	0.350	0.367	0.383	0.333	0.350	0.350	0.333	0.333	0.357
14	Kuwait Projects Company Holding	0.000	0.000	0.000	0.000	0.000	0.383	0.000	0.000	0.000	0.000	0.383
15	National Bank of Kuwait	0.000	0.000	0.000	0.000	0.000	0.317	0.333	0.333	0.333	0.367	0.168
16	Warba Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.333
Oman												
17	Ahli Bank	0.000	0.000	0.000	0.000	0.317	0.333	0.317	0.333	0.333	0.333	0.197
18	Bank Dhofar	0.000	0.000	0.000	0.000	0.000	0.383	0.333	0.333	0.333	0.000	0.154
19	Bank Muscat	0.000	0.000	0.000	0.000	0.000	0.000	0.333	0.333	0.333	0.000	0.111
20	Bank Nizwa	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.333	0.350	0.342
21	HSBC Bank Oman	0.000	0.000	0.000	0.000	0.000	0.000	0.333	0.317	0.333	0.000	0.109
22	National Bank of Oman	0.000	0.000	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.000	0.333
23	Sohar International Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Qatar												
24	Ahli Bank	0.000	0.000	0.000	0.000	0.317	0.450	0.317	0.333	0.333	0.350	0.350
25	Al Khalij Commercial Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.333	0.333	0.333	0.333	0.267
26	Commercial Bank	0.000	0.000	0.000	0.000	0.433	0.333	0.467	0.500	0.500	0.500	0.273
27	Doha Bank	0.000	0.000	0.000	0.000	0.000	0.317	0.000	0.000	0.000	0.000	0.032
28	Masraf Al Rayan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29	Qatar International Islamic Bank	0.317	0.317	0.317	0.317	0.317	0.317	0.383	0.400	0.483	0.483	0.365
30	Qatar Islamic Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.333	0.033
31	Qatar National Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Saudi Arabia												
32	Al Rajhi Banking & Investment Corporation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	0.333	0.065
33	Alinma Bank	0.000	0.000	0.000	0.000	0.000	0.433	0.000	0.000	0.000	0.000	0.043
34	Arab National Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.317	0.317	0.333	0.333	0.130
35	Bank Albilad	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
36	Bank Aljazira	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.383	0.417	0.080
37	Banque Saudi Fransi	0.000	0.000	0.000	0.000	0.000	0.000	0.417	0.450	0.433	0.450	0.175
38	National Commercial Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39	Riyad Bank	0.000	0.000	0.000	0.000	0.000	0.400	0.000	0.000	0.000	0.317	0.072
40	Samba Financial Group	0.000	0.000	0.000	0.000	0.000	0.317	0.317	0.317	0.317	0.317	0.158
41	Saudi British Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
42	Saudi Investment Bank	0.000	0.000	0.000	0.000	0.000	0.317	0.000	0.000	0.333	0.350	0.100
United Arab Emirates												
43	Abu Dhabi Commercial Bank	0.000	0.000	0.000	0.000	0.500	0.000	0.400	0.483	0.500	0.500	0.265
44	Abu Dhabi Islamic Bank	0.400	0.417	0.433	0.433	0.383	0.500	0.450	0.450	0.467	0.000	0.437
45	Ajman Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.450	0.483	0.517	0.517	0.197
45	Al Salam Bank Sudan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	0.333	0.325
47	Bank of Sharjah	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	0.333	0.325
48	Commercial Bank International	0.000	0.000	0.000	0.000	0.367	0.000	0.450	0.450	0.450	0.450	0.217
49	Commercial Bank of Dubai	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	0.333	0.065
50	Dubai Islamic Bank	0.367	0.383	0.367	0.350	0.417	0.000	0.467	0.417	0.417	0.417	0.360
51	Emirates Islamic Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.317	0.317	0.317	0.333	0.321
52	Emirates NBD Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.333	0.333	0.067
53	First Abu Dhabi Bank	0.000	0.000	0.000	0.000	0.000	0.433	0.000	0.000	0.000	0.000	0.043
54	Invest Bank	0.000	0.000	0.000	0.000	0.000	0.317	0.000	0.000	0.000	0.000	0.317
55	National Bank of Fujairah	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
56	United Arab Bank	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Appendix C - Environment-friendly performance score across years