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RESEARCH ARTICLE

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Is corporate environmental disclosure associated with firm value? A multicountry study of Gulf Cooperation Council firms

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Abstract

Several studies have found a relationship between corporate social and environmental disclosure and firm value (FV) or accounting profitability. Where environmental disclosure has been the focus, though, only single-country studies have been published, and most of the previous research concerns the developed world. This study examines the association between corporate environmental disclosure (CED) and FV in the Gulf Cooperation Council (GCC) countries, where CED has been increasing from its previous low base. Findings from a multicountry sample of 500 firm-year observations using a 55-item unweighted environmental disclosure index suggest that CED is significantly and positively related to FV as measured by Tobin's Q (TBQ). The relationship is robust to using a weighted version of the disclosure index, individual countries and environmental disclosure subindices. Some evidence of a positive relationship between CED and return on assets is also found, but even where statistically significant, the relationship is much weaker than in the case of TBQ. For empirical and theoretical reasons, we recommend that future studies pay greater attention to market-based proxies, if possible, when investigating the value relevance of CED in both developed and developing countries. Our results suggest that both managers and policymakers in GCC countries should take a positive view of expanded CED.

KEYWORDS

corporate environmental disclosure, firm value, Gulf Cooperation Council, neo-institutional theory

1 | INTRODUCTION

In a world of climate change, natural resource constraints and other socioenvironmental pressures, corporate sustainability has been increasingly pushed to the forefront of corporate decision making and communication. Corporate environmental disclosure (CED)—defined here as the provision of information to external parties about an organisation's environmental policies, activities and performance—has become an important source of insights into the efficiency and effectiveness of corporate sustainability strategies (D'Amico, Coluccia, Fontana, & Solimene, 2016; Deegan, 2002; Shahab, Ntim, Chengang, Ullah, & Fosu, 2018). Ideally, CED should include crucial environmental matters and their influence on businesses' future position and performance, uncertainties and risks, material items of expense or income and environmental policies (Brammer & Pavelin, 2008; Iatridis, 2013; Shahab et al., 2020). Such matters are likely to be of interest to a wide range of users including, increasingly, investors that are concerned about environmental sustainability, either for its own sake or because of its business implications. High-quality CED can also play a symbolic role as an indicator of corporate transparency, leading to enhanced corporate reputation (Deegan & Blomquist, 2006; Haque & Ntim, 2018; Hassan & Romilly, 2018).

There is considerable literature on whether environmental or socially responsible performance enhances firms' financial performance—the question of the so-called ‘business case’. (See Brooks & Oikonomou, 2018, for a useful recent review of some of the important themes in, and conclusions from, this broad literature.) As that literature has developed in sophistication, greater attention has been paid to which particular elements of environmentally or socially responsible behaviour are associated with improved firm financial performance. CED might be seen as either complementary to corporate environmental practices, in that it provides information about them, or, alternatively, a further example of ‘good’ practice in itself. However, in either case, whether symbolically (as transparency) or substantively (in providing relevant information for shareholders and other external stakeholders), the provision of environmental information has been found to be associated with enhanced firm value (FV) of corporations (e.g., Broadstock, Collins, Hunt, & Vergos, 2018; Clarkson, Fang, Li, & Richardson, 2013; Cormier & Magnan, 2013; Haque & Ntim, 2020; Iatridis, 2013; Plumlee, Brown, Hayes, & Marshall, 2015).

There are various ways of researching the CED-FV nexus. Some research, in the tradition of Ball and Brown's (1968) classic study of the publication of accounting income numbers, focuses on a disclosure event. For example, Chen, Hung, and Wang (2018) examine the effect of the introduction of mandatory CSR reporting in China, and Aureli, Gigli, Medei, and Supino (2020) study the impact of the publication of firms' sustainability or ESG reports. However, such studies tend not to be concerned with the detail of environmental (or other) disclosure, unlike research that attempts to find a link between the amount and/or quality of disclosure and FV (or financial performance). This paper sits within the latter tradition.

Various explanations for the influence of social or environmental disclosure on FV have been proposed. Hillman and Keim (2001) and Chang, Kim, and Li (2014) suggest that it is the reactions of primary rather than secondary stakeholders that principally account for the effect. For example, firms that disclose more of such information might gain a competitive advantage (Hassel, Nilsson, & Nyquist, 2005) through greater customer revenues (Lokuwaduge & Heenetigala, 2017) or reduced employee turnover. From the investors' perspective, environmental disclosures enable them to gauge a company's potential risks and future opportunities, thus lowering their investment risk (Dhaliwal, Li, Tsang, & Yang, 2011; Healy & Palepu, 2001) and the firm's cost of capital. Furthermore, demonstrating more responsible practices to multiple stakeholders might also lead to reduced operational risks for companies (e.g., legislative risks, political risks associated with the threat of re-nationalisation and social unrest) (Ashforth & Gibbs, 1990; Elmagrhi, Ntim, Elamer, & Zhang, 2019; Ntim, Lindop, & Thomas, 2013). Companies providing greater disclosure might also enjoy increased legitimacy from key institutional actors, thus easing their access to valuable resources, such as low-cost capital or tax exemptions (Ntim, 2016; Suchman, 1995).

In this study, we are not concerned with the impact of certain features of company behaviour, whether disclosed by the company or not, but rather with the question of whether CED per se is associated with FV. Answering this question avoids making a judgment about the quality of a firm's environmental performance, which would entail various assumptions (perhaps implicit) about the completeness of the information disclosed and its relationship to actual actions and impact. In this, we follow several previous studies (e.g., Clarkson et al., 2013; Lee, Cin, & Lee, 2016; Platonova, Asutay, Dixon, & Mohammad, 2018).

However, existing research that explores the potential impact of CED on FV has several limitations. First, in spite of the importance of environmental issues, relatively few studies have focused on CED itself; more often, environmental disclosure has been treated, at best, as a small part of a wider conception of disclosure, thus limiting the depth to which it has been examined and, especially, reported upon in studies (e.g., Khlif, Guidara, & Souissi, 2015). Second, previous studies have principally been conducted in a developed world context (cf. Iatridis, 2013; Nor, Bahari, Adnan, Kamal, & Ali, 2016). Yet severe environmental challenges are being experienced in many developing nations, where the relationship between CED and FV might be different because of very different institutional characteristics and the different responses of primary stakeholders. Third, although there are examples of multicountry studies of the association between corporate social disclosure (CSD) and FV (e.g., Ioannou & Serafeim, 2017; Platonova, Asutay, Dixon, & Mohammad, 2018; Zuraida, Houqe, & van Zijl, 2018), to the best of our knowledge no multicountry studies of the CED-FV relationship have been published.

By focusing our study on Gulf Cooperation Council[1] (GCC) countries and using a 55-item environmental disclosure index, we are effectively addressing all three of these limitations. Furthermore, one of the benefits of multicountry studies is that they enable an identical methodology to be applied to more than one country, which is more efficient and more reliable than trying to compare findings based on single-country studies. A further advantage is that they enable a larger sample to be created when researching smaller stock markets, assuming suitable statistical controls are then put in place—as is the case in this study.

We examine five of the six countries that are full members of the GCC (Kuwait, Oman, Qatar, Saudi Arabia and the UAE),[2] a body formed in 1981 to advance economic development and cooperation in the region. The nations share many cultural as well as economic characteristics, being ‘Arab’, Muslim-majority countries (Hampden-Turner & Trompenaars, 2006; Hofstede, Hofstede, & Minkov, 2015). The GCC provides an ideal context for our study because its substantial economic growth has been achieved primarily through environmentally sensitive industries. The five selected GCC countries together hold 45% of global oil reserves (Al-Shammari, Brown, & Tarca, 2008), and they also suffer from high environmental pollution, with the UAE considered to be the most polluted country in the world

[1]Formally, The Cooperation Council for the Arab States of the Gulf, but still usually known by its original name.

[2]Bahrain has been omitted for data accessibility reasons.

in relation to small particulate matter (World Bank, 2019). Some GCC countries have engaged more proactively with the United Nations Sustainable Development Goals (SDGs), by implementing substantive environmental reforms, specifically related to the use of renewables and the built environment (Al-Saidi, Zaidan, & Hammad, 2019; Hayman, 2019). However, CED remains a voluntary matter.

Although there is evidence indicative of some varying levels of adoption and use of CED in the GCC and the wider Middle East and North Africa (MENA) region (Gerged, Cowton, & Beddewela, 2018), whether CED in the GCC region is associated with FV is as yet unknown. That is the question addressed by this research. In doing so, our study contributes to the existing literature as follows. First, it provides new evidence on the value relevance of CED using a detailed environmental disclosure index that has been sufficiently developed to provide a comprehensive understanding of the financial consequences of a company's decision to report on its environmental activities. Second, we offer new empirical evidence about the CED-FV nexus from an underresearched developing region, namely, the GCC region. Third, our study provides, to the best of our knowledge, the first multicountry and/or regional investigation of the relationship between environmental disclosure and FV.

The remainder of the paper is organised as follows. The next section provides further background and theoretical perspective, reviews previous studies that have examined the relationship between CED (or related disclosure types) and FV and develops the hypotheses. Section 3 outlines the research method, and Section 4 presents the findings. Section 5 provides discussion and conclusions.

2 | BACKGROUND, THEORY, EMPIRICAL LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 | Environmental regulations, reporting and developments in GCC countries

Although the GCC region was once known for negligible levels of CED by listed firms (Eljayash, James, & Kong, 2012), recent research indicates growth in disclosure across the region (Eljayash et al., 2012; Gerged et al., 2018). Although CED within the region remains voluntary, institutional efforts to propagate corporate environmental responsibility have increased in recent times. For example, in Saudi Arabia, the country's strategic vision launched in 2017 has ambitious goals for environmental development in the Kingdom (Alhazmi, 2017). One of the primary targets of the Saudi strategy on environmental development is biodiversity conservation and wildlife protection to preserve environmental equilibrium. This strategy has been further reinforced by the Saudi government signing the global Convention on Biological Diversity (Alhazmi, 2017). In the UAE, legislative changes were undertaken to make corporate environmental responsibility mandatory for all listed firms starting in 2018 (Zakaria, 2017). Furthermore, third sector initiatives to improve corporate environmental responsibility are underway in the region (Hayman, 2019). For example, Sustainable Development Industry Reporting launched a programme aimed at improving sustainability reporting in the Qatari energy sector in 2009 (Human Development Report, 2009). Likewise, in Saudi Arabia, the Responsible Competitiveness Index was founded in 2010 to help assess businesses' social and environmental practices (SAGIA, 2015). Such developments have created a context in which firms operating in the GCC might choose to respond by engaging in further voluntary CED (Broadstock et al., 2018) and so, in turn, reap business gains or at least stave off challenges to their legitimacy—to the benefit of FV.

2.2 | Neo-institutional theoretical framework for environmental disclosure

With its understanding of the way in which firms deal with different types of pressures, neo-institutional theory provides a suitable conceptual narrative for understanding the context of CED. Neo-institutional theory fundamentally argues for the need of firms to align extant organisational practices with institutionalised norms and structures in a given organisational field (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). Organisations uphold societal values and expectations (Castelló & Lozano, 2011), thereby sustaining institutionalised norms and beliefs within a given organisational field (Sonpar, Pazzaglia, & Kornijenko, 2010; Suchman, 1995).

DiMaggio and Powell (1983) have identified three specific types of institutional isomorphic pressure, denoting the differing levels of conformance expected of organisations by external stakeholders: mimetic, normative and coercive. Coercive isomorphism would compel substantive engagement in certain practices as a result of their being required by powerful external stakeholders, such as a country's national government through legislation, while normative isomorphism would result from a need to align organisational practices with the collective societal norms of expected behaviours as promoted by institutional stakeholders such as NGOs or professional accounting bodies. The influences described in Section 2.1 provide examples of both coercive and normative institutional pressure. In relation to CED in the GCC region, in the absence of coercive or normative pressures, mimetic isomorphism is more likely. This is a type of comparative behavioural pressure, pressing organisations to follow the CED practices of their competitors in order to level the playing field and thereby maintain their competitive advantages within the organisational field. Organisational conformance arising out of adhering to these institutional pressures would ultimately enable organisations to attain legitimacy from salient institutional (and other) stakeholders.

Prior literature has adopted various theoretical perspectives to examine corporate engagement in CED activities, including stakeholder, legitimacy and agency theories (Reverte, 2009). Nevertheless, neo-institutional theory provides the most substantive explanation of the influence of external factors upon CED, and the subsequent organisational performance impacts (Brammer, Jackson, & Matten, 2012; Campbell, 2007; Campbell, Hollingsworth, &

Lindberg, 1991; Ioannou & Serafeim, 2012). In this regard, institutional conformance, specifically in relation to CED, has been found to influence the market value of firms (Cormier & Magnan, 2017), due to reduced transaction costs (North, 1990). Therefore, we draw on neo-institutional theory to emphasise the influential role played by external institutions in engendering CED and its organisational outcomes—including the possibility of enhanced FV, as reflected in the hypotheses we develop.

2.3 | Empirical literature review and hypotheses development

In our review of the empirical literature, we focus on the value relevance of environmental-related and similar disclosures. Table 1 provides a systematic overview of key previous studies. Such studies need to make no assumptions about the actual environmental behaviour of the companies that provide the disclosure. The table consists of six panels. For each category of disclosure, the first panel refers to multicountry studies, whereas the second panel refers to single-country studies. Panels A1 and A2 refer to the CED-FV nexus. They are, therefore, of most direct relevance to the current study. Panels B1 and B2 list studies that have examined the relationship between CSD and FV. Similarly, Panels C1 and C2 provide information about studies that have examined the association between FV and environmental, social and governance (ESG) disclosure. Panels B1 through C2 are of principal interest for their research design, although they are also of some relevance where they provide coverage of environmental disclosure. However, it should be noted that the role of environmental disclosure itself is not always indicated in the results. For example, Khlif et al. (2015) employed a CSD index that included 21 environmental items, but they only investigated the relationship between overall disclosure and FV. Likewise, Malik and Kanwal (2018) only examined the overall CSD-FV nexus, although the disclosure index they adopted from Bayoud, Kavanagh, and Slaughter (2012) included seven environmental items.

TABLE 1 Overview of key studies of financial impact of disclosure

Authors (date)	Disclosure measurement	Outcome proxies	Countries
Panel A1: CED multicountry studies			
No studies to the best of our knowledge			
Panel A2: CED single-country studies			
Plumlee et al. (2015)	Disclosure index	Stock price, expected future cash flows, cost of equity capital	United States
Broadstock et al. (2018)	Self-reported greenhouse gas emissions collected from Bloomberg	TBQ, ROE	United Kingdom
Nor et al. (2016)	Disclosure index	ROA, ROE, EPS	Malaysia
Iatridis (2013)	Disclosure index	MVE/BVE	Malaysia
Clarkson et al. (2013)	Disclosure index	Cost of capital	United States
Panel B1: CSD multicountry studies			
Platonova et al. (2018)	Disclosure index	ROA, ROE	GCC: Bahrain, Kuwait, Qatar, Saudi Arabia, UAE
Khlif et al. (2015)	Disclosure index[a]	TBQ	South Africa, Morocco
Panel B2: CSD single-country studies			
Qiu, Shaukat, and Tharyan (2016)	Disclosure index	ROA, ROE, ROS	United Kingdom
Malik and Kanwal (2018)	Disclosure index	ROA, ROE	Pakistan
Panel C1: ESGD multicountry studies			
Ioannou and Serafeim (2017)	Disclosure index	TBQ	China, Denmark, Malaysia and South Africa
Zuraida et al. (2018)	Bloomberg ESG disclosure scores	TBQ, EPS	38 different countries on six continents
Xie et al. (2019).	Bloomberg ESG disclosure scores	TBQ and ROA	74 countries
Panel C2: ESGD single-country studies			
Li, Gong, Zhang, and Koh (2018)	Disclosure index	TBQ, ROA	United Kingdom
Aboud and Diab (2018)	Disclosure index	TBQ	Egypt

Abbreviations: BVE, book value of equity; CED, corporate environmental disclosure; CSD, corporate social disclosure; ESGD, corporate environmental, social and governance disclosure; EPS, earnings per share; MVE, market value of equity; ROA, return on assets; ROE, return on equity; ROS, return on sales; TBQ, Tobin's Q.

[a]An item scores three if there is qualitative and quantitative description, two if discussed specifically, one if there is a broad discussion, and 0 otherwise.

Table 1 substantiates the points made in Section 1 when the motivation for the study was outlined. First, Panel A1, which is included for conceptual completeness, is empty, because we could find no multicountry studies of the CED-FV nexus[3]; the mainstream CED-FV studies focus on only a single country (see Panel A2). However, Panels B1 (Khlif et al., 2015; Platonova et al., 2018) and C1 (Ioannou & Serafeim, 2017; Xie, Nozawa, Yagi, Fujii, & Managi, 2019; Zuraida et al., 2018) show that multicountry studies have been undertaken within this broad research tradition—although it is not always clear what the rationale for the choice of a particular pair or set of countries is. (We would contend that the GCC countries comprise a coherent set.) Second, except for Iatridis (2013) and Nor et al. (2016), who both focused on Malaysia, Panel A2 contains only studies from developed countries. A similar pattern applies to the other panels, with just one study from our region of interest, which looked only at Islamic banks and did not separate out the impact of environmental disclosures (Platonova et al., 2018; see Panel B1).

In terms of measuring disclosure, the use of an index method has become very common in disclosure studies in general, tending to displace content analysis methods such as the counting of words or sentences (Malik & Kanwal, 2018). Table 1 shows that the use of an index to measure disclosure is by far the most popular method in the studies that we review. The one exception amongst CED-FV studies (Panel A2) is Broadstock et al. (2018), which has a much narrower focus on greenhouse gas emissions. Generally, studies employ a simple disclosure index that uses a binary dummy variable to indicate the presence or absence of some item of information, although Khlif et al. (2015) attempt to quantify the quality of the information by giving higher scores for financial, quantitative and qualitative disclosures. Bloomberg ESG scores are also used, by Zuraida et al. (2018); they are useful for some purposes, but they do not provide much detail about environmental issues. Researchers, therefore, tend to hand-collect data if they are compiling a disclosure index to cover a good range of issues within a particular category. In some cases (e.g., Plumlee et al., 2015), the contents of stand-alone sustainability (or similar) reports are analysed, but in most cases, it is the corporate annual report—which is a company's main accountability mechanism—that is analysed.

The studies in Table 1 use a variety of proxies to measure the financial consequences of disclosure, which may account for some of the variations in results—although there is a general finding of a positive association between environmental disclosure and FV (e.g., Broadstock et al., 2018; Clarkson et al., 2013; Iatridis, 2013; Plumlee et al., 2015). Some studies of the impact of disclosure employ just a single proxy (e.g., Khlif et al., 2015), but most use two or three. Although there is little or no discussion of the differences between them or their relative merits, the proxies can be categorised as either market based or accounting based. Many studies use both types. The accounting-based proxies generally relate a profit figure to a balance sheet denominator, for example, return on assets (ROA) or return on equity (ROE). Given the nature of the financial statements from which they are drawn, the accounting-based proxies can be viewed as backwards looking. They also do not measure FV as such, because they are a single-period measure of profitability. On the other hand, market-based measures can be seen not only as relating to FV but also as more forward looking, because the share price is expected to reflect expectations about the future effects of actions and policies, including those that are reflected in, or relate to, environmental disclosure.

We use a market-based measure as our principal dependent variable because of its forward-looking nature and ability to capture FV. Although others are used (e.g., cost of equity capital), Tobin's Q (TBQ) is common (see Table 1); we follow suit. For our supplementary, accounting-based proxy, we use ROA, in common with many other studies; unlike ROE, it does not reflect how the assets are financed, only how they are used. The two measures give rise to two versions of our hypothesis.

H1. There is a positive relationship between CED and market value (TBQ) in the GCC region.

H2. There is a positive relationship between CED and profitability (ROA) in the GCC region.

In the next section, the research design, including sampling criteria, research methods and analysis, will be discussed.

3 | METHOD

3.1 | Sample

The sample for this study is based on all 405 nonfinancial companies that are listed on the stock exchanges of the five selected GCC countries and have complete data for 5 years (2010–2014). The financial sector is excluded for several reasons. First, its effects on the environment are primarily indirect (Thompson & Cowton, 2004). Second, financial firms, such as banks and insurance companies, are heavily regulated, which could differently influence their performance and disclosure practices (Guest, 2008; Huang & Wang, 2015; Yermack, 1996) and the relationship with FV. Additionally, excluding financial firms is in line with much previous literature (e.g., Baber, Liang, & Zhu, 2012; Haniffa & Hudaib, 2006; Ntim, 2016; Siregar & Utama, 2008). Based on stock exchange definitions, the sampled companies are divided into two broadly defined sectors, industrial[4] and

[3]Bin Abd Rahman, Binti Yusoff, and Binti Wan Mohamed (2009) 'trace' the 'tripartite' relationship between environmental disclosure, environmental performance and financial performance in Malaysia, Singapore and Thailand. However, they posit no explicit hypothesis about the relationship between environmental disclosure and financial performance (and not firm value); their interest appears to be in the opposite direction (whether financially better performing firms disclose more environmental information); and the empirical analysis is rudimentary, largely because of the simple proxies used (e.g., a binary measure of whether or not a firm discloses at least one paragraph of environmental information).

[4]The industrial group includes oil and gas, glass and ceramics, textiles, pharmaceutical and medical, leather and clothing, tobacco and cigarettes, chemical, paper and cardboard, printing and packaging, food and beverages, mining and extraction, engineering and construction and electrical.

TABLE 2 Sample selection

Country	Sectors	Population	No. firms selected	% sampled	Mean TA of five largest firms[a]	Mean TA of five smallest firms[a]	Overall mean TA[a]
Kuwait	Ind[b]	45	10	22.2	21.56	16.19	18.88
	Serv[c]	97	10	10.3	20.64	15.95	18.30
	Comb[d]	142	20	14.1	21.10	16.07	18.59
Oman	Ind	55	10	18.2	19.34	15.22	17.28
	Serv	30	10	33.3	19.96	14.69	17.32
	Comb	85	20	23.5	19.65	14.95	17.30
Qatar	Ind	10	10	100	21.80	20.23	21.02
	Serv	17	10	58.8	22.66	18.21	20.43
	Comb	27	20	74.1	22.23	19.22	20.72
Saudi Arabia	Ind	72	10	13.9	23.20	17.58	20.39
	Serv	46	10	21.7	22.76	16.82	19.79
	Comb	118	20	16.9	22.98	17.20	20.09
UAE	Ind	17	10	58.8	20.86	18.09	19.48
	Serv	16	10	62.5	21.86	18.47	20.17
	Comb	33	20	60.6	21.36	18.28	19.82
GCC	Ind	199	50	25.1	21.35	17.46	19.41
	Serv	206	50	24.3	21.57	16.83	19.20
	Comb	405	100	24.7	21.46	17.14	19.30

[a]Log transformation of $US total assets figures.
[b]The industrial group of sectors includes oil and gas, glass and ceramics, textiles, pharmaceutical and medical, leather and clothing, tobacco and cigarettes, chemical, paper and cardboard, printing and packaging, food and beverages, mining and extraction, engineering and construction, and electrical.
[c]The services group of sectors includes hotels and tourism, healthcare, educational, transportation, media, utilities, real estate and resorts, and technology and communications.
[d]This line combines the Industrial and Services groups to give the total sample for a country/GCC.

services,[5] because the nature of a sector can influence CED, including in the MENA region (Gerged et al., 2018), and it is likely also to have an impact on the relationship with FV.

Earlier studies of social and environmental disclosure show that, in addition to the industry sector, firm size also tends to have a considerable impact on firm disclosures (Beattie, McInnes, & Fearnley, 2004; Lang & Lundholm, 1993; Ntim, 2016; Oyelere, Laswad, & Fisher, 2003). There are various options for dealing with this, including the selection of the largest and smallest firms from a stratified population. Following Ntim (2016) (and see Gerged et al., 2018), we select the five largest and the five smallest firms (based on the average of their total assets over the 5-year period) from each sector within each of the five selected GCC countries.[6,7] Therefore, the final sample comprises 100 listed companies over 5 years, resulting in 500 firm-year observations. The collection of 5 years of data permits the running of a panel data analysis, which provides opportunities for much more robust insights into relationships than using, for example, cross-sectional analysis. Table 2 provides an overview of the selection process and the financial characteristics (log of total assets) of the resulting sample.

3.2 | Variables and data

The data for the research variables are hand collected from annual reports,[8] supplemented with stock market websites, Perfect Information Database, Trade Mubasher Database and companies' own websites. The annual reports are analysed using content analysis, as in many previous social and environmental disclosure studies (e.g., Adams & Harte, 1998; Deegan & Gordon, 1996; Freedman & Stagliano, 2008; Lock & Seele, 2015; Neuendorf, 2002; Neuendorf, Gore, Dalessandro, Janstova, & Snyder-Suhy, 2010; Ntim, 2016; Williams, 1999). We use an index method, as do most of the studies shown in Table 1.

There are two particular decisions to be made regarding the use of a disclosure index. First, and most important, is the choice of

[5]The services group includes hotels and tourism, healthcare, educational, transportation, media, utilities, real estate and resorts, and technology and communications.
[6]We further control for firm size in the regression models.
[7]In the case of Qatar, there are only 10 listed industrial firms, which acts as a de facto limit on the creation of equally balanced samples.

[8]Companies in the region rarely publish standalone sustainability reports and their websites tend not to provide any significant additional environmental information. Our focus on annual reports is also in line with the majority of studies reported in Table 1.

particular disclosure items. The aim was to develop a disclosure index that was both sufficiently comprehensive and granular to meet the aims of the study. The most comprehensive CED studies tend to have been conducted in the developed world, so they were used as the initial basis (Gray, Kouhy, & Lavers, 1995; Hackston & Milne, 1996; Wiseman, 1982). However, the appropriateness of Western CED instruments to measure CED within the different sociocultural contexts of developing countries has been criticized (e.g., Baydoun & Willett, 1995; Bebbington, Gray, Thomson, & Walters, 1994; Belal, 2001; Gray & Kouhy, 1993; O'Donovan, 2002), so the draft disclosure index was developed further by checking for additional disclosure items used in CED studies in developing countries, including MENA countries (e.g., Islam & Deegan, 2010; Akrout & Othman, 2013; Ullah, Hossain, & Yakub, 2014). A pilot study of Saudi Arabian companies was then conducted, which resulted in the addition of a few items, such as the influence of Islamic principles. This process resulted in a relatively long list of 55 environmental disclosure items which, given the 500 firm years of observations, provides a total of 27,500 data points measuring the independent variable.

The disclosure items were also categorized into five groups that provide the basis for separate subindices covering environmental policy (five items), pollution by product and/or process (22), energy (10), financial (7), and other environmental items (11). The categorisation reflects both previous literature (Akrout & Othman, 2013; Gray et al., 1995; Hackston & Milne, 1996; Islam & Deegan, 2010; Ullah et al., 2014; Wiseman, 1982) and international guidelines such as the Global Reporting Initiative (GRI, 2011).

The second decision relates to the kind of index to be used—unweighted or weighted. The use of an unweighted index has become the norm in annual report studies because it avoids the subjectivity entailed in weighting individual items differently (Ahmed & Courtis, 1999). In this approach, an item scores one if it is disclosed and zero otherwise when a particular firm year is analysed. However, a concern might be that certain categories of the disclosure are given undue weight because more items fall within them. The process for calculating the alternative, a weighted index, is first to calculate the individual subindex scores and then to award them each an equal weight (20% in this case), thereby effectively adjusting the weighting of the individual disclosure items, depending on which category they fall into. Following some previous studies (Elghuweel, Ntim, Opong, & Avison, 2017; Ntim, 2016; Ntim et al., 2013), this is used as a robustness check for the results based on the unweighted index.

To ensure the reliability of the content analysis, 10 annual reports from the Tadawul stock market in Saudi Arabia were independently coded by two investigators. Cohen's kappa coefficient of agreement was 0.79, which is at the high end of the satisfactory range of 0.7–0.8 (Beattie & Thomson, 2007; Krippendorff, 2004; Milne & Adler, 1999). Additionally, Cronbach's α was used to assess the reliability of the measurement of CED. Cronbach's α for the subindices was 0.79, which again lies at the top of the 0.7–0.8 range considered to be satisfactory (Bland & Altman, 1997).

TABLE 3 Definitions of variables (all variables at time *t*)

Variable	Definition
Panel A: Dependent variables (firm value)	
TBQ	Tobin's Q: the ratio of total assets minus the book value of equity plus the market value of equity to total assets.
ROA	Return on assets.
Panel B: Independent variables (corporate environmental disclosure)	
EDI	Environmental disclosure index: the total environmental disclosure score measured as the percentage of 55 possible items that are disclosed.
WEDI	Weighted environmental disclosure index: the total environmental disclosure score where the five categories of environmental disclosure items are given equal weighting.
SUB-EDI1	Environmental 'policy' subindex comprising five items.
SUB-EDI2	Environmental 'pollution' subindex comprising 22 items.
SUB-EDI3	Environmental 'energy' subindex comprising 10 items.
SUB-EDI4	Environmental 'financial' subindex comprising 7 items.
SUB-EDI5	Environmental 'other' subindex comprising 11 items.
Panel C: Control variables (firm level and country level)	
SIZE	Firm size as measured by the natural log of total assets.
LEV	Leverage, as measured by the ratio of debt to total assets.
INDUS	Type of sector, measured by dummy variable based on the Industry Classification Benchmark (ICB).
BIG4	Type of auditor, measured by dummy variable, equals 1 if a firm is audited by a Big4 auditing firm, 0 otherwise.
GDP	The natural log of gross domestic product per capita, measured in GBP.

Table 3 outlines how the variables (grouped into dependent, independent and control[9] variables) were operationally defined.

To test the main and supplementary research hypotheses about the impact of CED on FV, we employ a set of panel data technologies: fixed-effects and two-stage least squares (2SLS), and generalised method of moment (GMM). The findings are presented in the next section.

4 | EMPIRICAL RESULTS

4.1 | Descriptive statistics

Table 4 shows summary statistics for the research variables. Panel A presents descriptive statistics for the main independent variable (EDI),

[9]Based on previous literature (e.g., Beiner, Drobetz, Schmid, & Zimmermann, 2006; Crifo & Forget, 2015; Fifka, 2013; Henry, 2008; Ntim, 2016; Reverte, 2009), we employ a set of firm-level control variables, namely, firm size, leverage, sector type and type of auditor. In addition, we include GDP per capita as a control for country-level variations, along with country dummies, in line with previous literature focused on the MENA region (Elamer, Ntim, & Abdou, 2020; Elamer, Ntim, Abdou, Zalata, & Elmagrhi, 2019).

TABLE 4 Summary statistics of continuous variables for all 500 firm years (pooled panel data)

Variable	No. of items	Mean	SD	Skewness	Kurtosis	Min	Max
Panel A: Corporate environmental disclosure (CED) index variables (%)							
EDI	55	13.69	9.23	1.129	0.630	4	49
WEDI	55	18.84	9.55	0.953	0.130	8	57
SUB-EDI1	5	49.10	14.10	1.230	0.070	40	80
SUB-EDI2	22	8.88	9.77	1.580	2.090	0	50
SUB-EDI3	10	5.50	8.72	2.160	0.220	0	50
SUB-EDI4	7	18.92	16.09	0.762	0.329	0	86
SUB-EDI5	11	11.54	14.31	1.300	01.60	0	91
Panel B: Firm value (FV) variables							
TBQ		1.05	0.75	0.11	0.22	0.13	9.22
ROA		3.80	7.8	0.772	0.177	−10.00	20.00
Panel C: Control variables							
SIZE		19.31	2.71	−0.13	−0.85	12.44	24.80
LEV		29.04	36.89	1.23	−0.08	1.00	109.00
GDP		16.98	13.49	1.164	0.23	3.14	48.44

Note: Variable definitions are reported in Table 3.

the weighted form (WEDI) and the five subindices. Panel B presents descriptive statistics for the main market-based dependent variable (TBQ) and the supplementary accounting-based form (ROA). In line with the normal histogram plots, the skewness and kurtosis statistics suggest that independent and dependent variables are acceptably close to being normally distributed.[10] Panel C provides information about the continuous control variables. We also employ dummy control variables for industry (INDUS) and type of auditor (BIG4). Firms are classified as either industrial or services companies; 64% of sample firms are audited by one of the Big4 firms.

In a region of increasing, but still limited, CED, it is perhaps no surprise that the mean figure for EDI is not high and the minimum score for most of the subindices is zero. However, the possibility of high CED in GCC nations, even if not widespread, is shown by the high maximum scores. The variation in the independent variables relating to CED is confirmed by the material standard deviations, implying the potential role of CED in explaining variations in firms' market value. It is also notable that the mean scores for the five subindices show a significant degree of variation, which leads to a difference between the unweighted (EDI) and weighted (WEDI) versions of the overall disclosure index. Because the subindices with fewer items tend to score more highly, WEDI is somewhat greater than EDI. On the other hand, the country scores for EDI (not shown) display relatively little heterogeneity: Kuwait (13.53), Oman (12.91), Qatar (13.85), Saudi Arabia (15.15) and UAE (13.04), which further supports the reasonableness of including them as a group in a multicountry study. Overall mean disclosure grew from 10.86 to 15.70 over the 5-year period—an increase of 44.6%. All countries showed broadly similar growth, although at 78.7% Saudi Arabia's was somewhat greater, such that it moved from being the second lowest to the highest ranked.

Although growth in CED is apparent among the GCC countries, and although not all the items in the disclosure research instrument will be relevant to some companies, the levels of disclosure still appear to be low. Other studies might use different disclosure indices and so not be strictly comparable, but the phenomenon observed is consistent with findings of prior CED studies in developing economies and contrasts with studies in developed countries. For example, on the one hand, Shahab et al. (2020) reported the mean value of CED among a sample of Chinese listed firms as 17.0%, and Gerged, Al-Haddad, and Al-Hajri (2020) found a mean value of 14% in the case of Kuwait. On the other hand, Matisoff, Noonan, and O'Brien (2013), for example, reported a mean value of 81.8% for the United States, and Barbu, Dumontier, Feleagă, and Feleagă (2014) reported 64% in the case of the United Kingdom.

Table 5 presents a correlation matrix for the research variables to test the assumption of multicollinearity. The bivariate correlations amongst the independent and control variables are generally low, suggesting that multicollinearity is unlikely to be a problem. The upper right half of the table presents the nonparametric coefficients (Spearman's), whereas the bottom left half shows the parametric alternative (Pearson's). The magnitude and direction of both coefficients are largely similar, which suggests that any residual nonnormal distribution in the study variables might not pose a severe statistical problem.

Although Table 4 showed some differences between the independent variables, EDI and WEDI, both forms of correlation between them are strongly positive, which suggests that the results from using the two versions of the CED variable are unlikely to differ. However, although positive and significant, the correlation between the

[10] The skewness and kurtosis statistics in columns 4 and 5, respectively, test for the normal distribution. The data is regarded to be within the normal distribution if the standard skewness is within ±1.96 and standard kurtosis of ±3. These conditions are very largely satisfied.

TABLE 5 Correlation matrix of the research variables for all 500 firm years

Variable	EDI	WEDI	TBQ	ROA	SIZE	LEV	INDUS	BIG4	GDP
EDI		.987**	.362**	.157**	.655**	.097*	.301**	.440**	.134**
WEDI	.983**		.353**	.175**	.644**	.093*	.326**	.435**	.134**
TBQ	.279**	.276**		.190**	.201**	.393**	.141**	.024	.266**
ROA	.129**	.149**	.158**		−.047	.144**	.137**	.154**	.334**
SIZE	.597**	.605**	.160**	−.077		.170**	.029	.540**	.297**
LEV	.045	.047	.288**	.178**	−.337**		.036	.008	.530**
INDUS	.376**	.394**	.072	.134**	.038	.007		.003	.001
BIG4	.378**	.394**	.011	.118**	.536**	−0.064	.010		.008
GDP	.122**	.115**	.115*	.255**	.231**	−.464**	.001	.079	

Note: The bottom left half of the table shows the (parametric) Pearson correlation coefficients, whereas the upper right half shows the (nonparametric) Spearman correlation coefficients. Variables are defined in Table 3.

**Significant at the 1% level.

*Significant at the 5% level.

dependent variables, TBQ and ROA, is less than 0.2. Therefore, the choice of the dependent variable is likely to matter, and the development of the separate market-based and accounting-based forms of the hypotheses is supported. Both TBQ and ROA are positively correlated with EDI at the 1% level of significance, but it is notable that the relationship is stronger in the case of TBQ. The correlations suggest that the hypotheses may have merit, but many of the control variables also show significant correlation with the dependent variables, so multivariate analysis is warranted.

4.2 | Multivariate analysis

A fixed-effects model has been applied to undertake the primary regression analysis in our study. Using the fixed-effects estimation addresses statistical concerns that might not be tackled employing an ordinary least squares method. For example, it enables us to control for unobservable firm-specific heterogeneities across time that are expected to be constant, yet may have an influence on the relationship between the predictor and the outcome variable and might not be identified using an ordinary least squares method (Gujarati, 2003; Wooldridge, 2013). Consequently, we begin our regression analysis by estimating a fixed-effects model that is specified as follows:

$$FV_{it} = \alpha_0 + \beta_1 EDI_{it} + \sum_{i=1}^{n} \beta_i CONTROLS_{it} + \beta_n Yearfixedeffects_{it} + \beta_n Industryfixedeffects_{it} + \varepsilon_{i,t}. \quad (1)$$

In this equation, *FV* is the measure of firm value (i.e., TBQ or ROA). The equation is written for unweighted CED (EDI), but it can also be written for the weighted form (WEDI). We control for firm-level factors: firm size (SIZE), leverage (LEV), industry (INDUS) and auditor type (BIG4), and further by gross domestic product (GDP) per person in the GCC country concerned. We also include country dummy variables.

The appropriateness of using a fixed-effects rather than a random-effects estimation was checked using the Hausman test, which confirmed that the unobserved firm-specific variables were insignificantly related to those of the other corporations in the sample of our study. The results of our four models, which include firm-level characteristics and other control variables, are shown in Table 6. The four models represent the different combinations of the two dependent (TBQ and ROA) and the two independent (EDI and WEDI) variables.

All four models, whose adjusted R^2 vary between 0.30 and 0.52, show a significant positive relationship between CED and FV, consistent with both our hypotheses (H1, TBQ; H2, ROA) and robust to the form of disclosure index used (EDI or WEDI). However, there is a notable difference, depending on which proxy is used as the dependent variable; it was noted earlier that, although positive and significant, the correlation between TBQ and ROA was not high (see Table 5). Although there is evidence of a positive association between CED and ROA, it is only at the 5% level of significance in the case of WEDI and only marginal, at the 10% level of significance, in the case of our prime disclosure proxy, EDI. However, in the case of both versions of the environmental disclosure index, the positive relationship with our principal measure of FV (TBQ) is significant at the 1% level of significance. More importantly, the relationship is stronger for TBQ than for ROA. It will be recalled that TBQ was chosen as our principal measure because of its conceptual superiority. It can incorporate not only the information contained in ROA at time *t* but also more besides, including the previous trend in ROA, together with anticipated performance and any shareholder valuation of environmental actions for their own sake as reflected in the share price.

Our results may be compared with the five single-country studies in Panel A2 of Table 1. Three of those studies were undertaken in developed countries. Like our study, Broadstock et al. (2018) found that voluntary CED, in the form of greenhouse gas disclosures, appeared to have a positive influence on FV (proxied by TBQ) and ROE in the United Kingdom. Using different market-based measures as compared with our study and Broadstock et al. (2018), Plumlee

TABLE 6 Fixed effects models for all firm-year observations

Variable	Model no. (1)	(2)	(3)	(4)
Dependent variables	Fixed-effects TBQ	Fixed-effects ROA	Fixed-effects TBQ	Fixed-effects ROA
Independent variables				
EDI	4.935*** (0.883)	0.106* (0.0585)	-	-
WEDI	-	-	3.498*** (0.860)	0.149** (0.0702)
Control variables				
SIZE	0.241*** (0.0672)	−0.0196*** (0.00550)	0.229*** (0.0684)	−0.0201*** (0.00558)
LEV	1.319*** (0.278)	−0.00802 (0.0228)	1.291*** (0.283)	−0.0103 (0.0231)
BIG4	−0.0298 (0.501)	−0.00236 (0.0414)	−0.102(0.510)	−0.00525 (0.0416)
GDP	−0.341*** (0.121)	−0.000330 (0.0100)	−0.241* (0.123)	−0.00475 (0.0101)
Kuwait	−0.869* (0.502)	0.0300 (0.0419)	−0.783 (0.511)	0.0291 (0.0417)
Oman	−0.156 (0.501)	0.0210 (0.0418)	−0.182 (0.511)	0.0166 (0.0417)
Qatar	0.410 (0.505)	−0.00346 (0.0421)	0.469 (0.514)	−0.00360 (0.0419)
Saudi	−0.453 (0.501)	−0.0113 (0.0417)	−0.486 (0.510)	−0.0120 (0.0416)
UAE	−0.146 (0.501)	0.0211 (0.0418)	−0.0974 (0.510)	0.0219 (0.0416)
Constant	−0.646 (1.854)	0.429*** (0.154)	−1.579 (1.893)	0.473*** (0.154)
Observations	500	500	500	500
Number of firms	100	100	100	100
Adj. R^2	0.30	0.46	0.49	0.52
Year-fixed-effects	Yes	Yes	Yes	Yes
Industry-fixed-effects	Yes	Yes	Yes	Yes
Robust cluster	Yes	Yes	Yes	Yes

Note: This table presents the findings of estimating four fixed-effects models based on weighted and unweighted disclosure indices for all firm-years. Standard errors in parentheses. Variables are defined in Table 3.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

et al. (2015) and Clarkson et al. (2013) likewise provide evidence that the voluntary disclosure of environmental information is positively associated with FV in the United States.

In contrast, Nor et al. (2016) suggested an ambiguous effect of CED in Malaysia; specifically, whereas CED is positively related with ROE, it has a nonsignificant association with ROA. It might be surmised that this is because of the developing country context, where the institutional environment is likely to be less developed in some respects. However, it is notable that Nor et al. did not use a market-based proxy for FV but only accounting measures, which we found, as theorised, are less likely to reflect value-relevant information. This interpretation is consistent with the results of another study in Malaysia, in which Iatridis (2013) indicated that high-quality CED is value relevant using a variant of the Ohlson (1995) valuation equation for the year-end stock price, which is a market-based approach that has similarities to using TBQ.

Drawing on neo-institutional theory to interpret our results, it appears that managers are adapting and developing their CED policies (a growth in disclosure is evident) and responding positively to the requirements of powerful influencers, with FV being enhanced as a result. As explained earlier, even though CED is not mandatory in GCC countries, governments have been starting to exert coercive pressures on companies to adopt more environmentally sensitive policies, and environmental pressure groups and NGOs have been increasingly exerting normative pressures.[11] In other words, managers in the GCC region appear to be positively interacting with a changing institutional environment. However, this is unlikely to be a simple matter; proactive and sustained corporate participation in environmental initiatives is likely to be required for companies to increase their legitimacy and enhance their FV, perhaps pragmatically by gaining valuable resources, such as low-cost capital (Ntim, 2016; Suchman, 1995).

Although not the central focus of the study, some of the control variables for firm-specific characteristics also have statistically significant associations with FV—notably firm size (SIZE) and, at least for the models involving TBQ, leverage (LEV). However, the type of auditor (BIG4) does not affect the relationship between CED and FV. Dummy variables were also included for the five individual countries. Only one

[11]Examples include the 2020–2030 sustainable development vision in Saudi Arabia (see Alhazmi, 2017), the 2017 governance reforms in the UAE (see Zakaria, 2017), the Sustainable Development Industry Reporting in Qatar (see Human Development Report, 2009) and the Responsible Competitiveness Index in Saudi Arabia (see SAGIA, 2015).

of the 20 coefficients was marginally significant (Kuwait, Model 1, at 10%), which underscores the legitimacy of studying the five countries together on this occasion. Thus, although the level of CED by country differs, the relationship with FV does not do so significantly.

Using the five categories of environmental disclosure contained in our 55-item disclosure index, we probe further into the impact of CED on FV. The results of estimating fixed-effects models for the five subindices of the EDI, using TBQ and ROA, respectively, are presented in Models 1 to 10 in Table 7.

The models in Table 7 confirm the pattern seen previously, with the relationship between CED and TBQ much stronger than the relationship with ROA. Indeed, only one subindex is significantly related to ROA, and then only marginally, namely, 'other' environmental disclosure. It is also striking that all the subindices are statistically significantly related to TBQ, usually (except for 'other') at the 1% level. Thus, all the categories in our disclosure instrument seem to play a role in explaining FV as proxied by our primary measure, TBQ. Because the results are not being driven by a particular element of CED, the models in effect provide a robustness check on the value relevance of environmental disclosure in general. We outline further robustness checks next.

4.3 | Extra robustness checks

Arellano and Bond (1991) argued that panel data techniques may not be reliably estimated by the use of a fixed-effects estimator only, because the regressor is, by nature, not determinedly exogenous. Using our primary proxy for CED, EDI, the current research, therefore, employs both 2SLS and two-step GMM estimators as robustness checks to make sure that the primary results of estimating a fixed-effects model are not severely influenced by the possible occurrence of endogeneity problems (Blundell & Bond, 1998). We use the Durbin–Wu–Hausman test to detect the potential occurrence of endogeneity of individual regressors. From a theoretical perspective, the explanatory variable should not be correlated with the error term (residuals), and the Durbin–Wu–Hausman test determines whether the residuals are correlated with the explanatory variable (Ullah, Akhtar, & Zaefarian, 2018). The result of conducting a Durbin–Wu–Hausman test indicates that the CED variable is endogenous rather than exogenous, and thus, our results presented in Table 6 might be biased. Overall, the findings of the Durbin–Wu–Hausman test suggest that endogeneity is a major concern in our regression model. Consequently, we believe that the use of both 2SLS and dynamic GMM regression models is appropriate to address the endogeneity concerns.

Following previous CSR studies (e.g., Abdelfattah & Aboud, 2020; Garcia-Castro, Ariño, & Canela, 2010; Lin, Cheng, & Zhang, 2017), we use the 2SLS method to account for the expected endogeneity issues employing the type of industry (INDUS) as an instrumental variable (see Table 3).

In empirical CSR disclosure research, serial correlation can result from financial variable persistence, measurement errors or incorrectly using a functional form such as linear versus nonlinear estimations (Kusi, Dzeha, Ofori-Sasu, & Ansah-Addo, 2018). In an attempt to deal with the potential existence of unobservable endogeneities, we follow prior research (e.g., Moumen, Othman, & Hussainey, 2015; Reguera-Alvarado, Blanco-Oliver, & Martín-Ruiz, 2016; Roberts & Whited, 2011; Ullah et al., 2018, among others) using a dynamic GMM model as a further robustness check to tackle the endogeneity issue arising from reverse causality association between CED and FV. By incorporating lagged values of past FV, we differentiate between a 'static' and a 'dynamic' panel data model. Our two-step system GMM model is presented in the following equation:

$$FV_{it} = \alpha_0 + \beta_1 FV_{it-1} + \beta_2 FV_{it-2} + \beta_3 EDI_{it} + \sum\nolimits_{i=1}^{n} \beta_i CONTROLS_{it} + \beta_n Yearfixedeffects_{it} + \beta_n industryfixedeffects_{it} + \mu_{it} + \varepsilon_{it}. \quad (2)$$

The operational definitions for all variables are as presented in Table 3. FV_{it-1} indicates 1-year lag of our dependent variable FV (previous year's FV) as proxied by TBQ, and FV_{it-2} denotes a second lag of the dependent variable, which represents FV 2 years previously. These lagged variables are considered as explanatory variables in our two-step GMM estimation. By including lags of FV (the dependent variable in our study), the dynamic GMM method controls for endogeneity by internally transforming the data where a variable's past value is subtracted from its present value (Roodman, 2009, p. 86). In doing so, the number of observations is decreased, and the internal transformation process improves the efficiency of the GMM estimation (Wooldridge, 2016). Furthermore, to avoid potential data loss due to the internal transformation, Arellano and Bover (1995) recommended the use of the two-step GMM model. Thus, Roodman (2009) stated that, by using a two-step GMM model, researchers can prevent unnecessary data loss and provide more consistent and efficient estimates for the included coefficients.

The Sargan test and the Arellano–Bond are postestimation tests and have been used in our study to determine whether the dynamic GMM model is valid or not and whether the instruments (lags of FV) are correctly specified or not (see Table 8). A crucial assumption for the validity of the dynamic GMM estimates is that instruments (the lagged dependent variables) are exogenous (see Ullah et al., 2018). If the results of these pre-estimation tests turn out to be insignificant, it means that the included instruments in the GMM specifications are exogenous; thus, the instruments we use in this study are valid. Overall, a two-step dynamic GMM model is believed to be an ideal method to overcome any endogeneity issues in our research.

Table 8 shows the results of estimating the 2SLS models, as well as GMM models, as compared with the results of conducting a fixed-effects estimation.

Models 3 and 4 in Table 8 demonstrate the results of estimating the 2SLS models. They confirm the previous findings: although CED helps to explain FV proxied by TBQ, with significance at the 1% level (Model 3), it does not explain FV proxied by ROA (Model 4). Meanwhile, Models 5 and 6 in Table 8 show the results of estimating the GMM models. Again, the positive relationship between CED and TBQ

TABLE 7 The results of estimating fixed-effects models based on the five disclosure subindices for all firm years

	Model no.				
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Dependent variables	Fixed-effects TBQ	Fixed-effects ROA	Fixed-effects TBQ	Fixed-effects ROA	Fixed-effects TBQ
Independent variables					
SUBEDI1	1.512*** (0.392)	0.0519 (0.0320)	-	-	-
SUBEDI2	-	-	3.118*** (0.642)	0.0382 (0.0531)	-
SUBEDI3	-	-	-	-	2.460*** (0.696)
SUBEDI4	-	-	-	-	-
SUBEDI5	-	-	-	-	-
Control variables					
SIZE	0.226*** (0.0685)	−0.0205*** (0.00559)	0.258*** (0.0682)	−0.0208*** (0.00564)	0.212*** (0.0687)
LEV		−0.01000 (0.0232)	1.393*** (0.282)	−0.0112 (0.0233)	1.307*** (0.285)
BIG4	0.0818 (0.512)	−0.00584 (0.0418)	0.0464 (0.506)	−0.00299 (0.0418)	0.00467 (0.513)
GDP	0.185* (0.104)	0.00381 (0.00848)	−0.172 (0.109)	0.0109 (0.00900)	−0.0374 (0.103)
Kuwait	−0.653 (0.511)	0.0342 (0.0417)	−0.812 (0.507)	0.0363 (0.0419)	−0.660 (0.513)
Oman	0.171 (0.513)	0.0180 (0.0418)	−0.0537 (0.505)	0.0247 (0.0418)	0.0352 (0.512)
Qatar	0.558 (0.514)	−0.00178 (0.0420)	0.390 (0.510)	0.000847 (0.0422)	0.514 (0.516)
Saudi	−0.460 (0.511)	−0.0129 (0.0417)	−0.407 (0.506)	−0.0130 (0.0418)	−0.382 (0.513)
UAE	−0.117 (0.511)	0.0235 (0.0417)	−0.180 (0.506)	0.0236 (0.0419)	−0.0594 (0.513)
Constant	−5.402*** (1.771)	0.380*** (0.145)	−2.709 (1.776)	0.327** (0.147)	−3.344* (1.791)
Observations	500	500	500	500	500
Adj. R^2	0.59	0.48	0.41	0.43	0.39
Year-fixed-effects	Yes	Yes	Yes	Yes	Yes
Industry-fixed-effects	Yes	Yes	Yes	Yes	Yes
Robust cluster	Yes	Yes	Yes	Yes	Yes
No. of firms	100	100	100	100	100

(Continues)

TABLE 7 Continued

Variable	Model no. (6)	(7)	(8)	(9)	(10)
Dependent variables	Fixed-effects ROA	Fixed-effects TBQ	Fixed-effects ROA	Fixed-effects TBQ	Fixed-effects ROA
Independent variables					
SUBEDI1	-	-	-	-	-
SUBEDI2	-	-	-	-	-
SUBEDI3	0.0119 (0.0568)	-	-	-	-
SUBEDI4	-	1.467*** (0.309)	0.0409 (0.0255)	-	-
SUBEDI5	-	-	-	0.962** (0.416)	0.0599* (0.0335)
Control variables					
SIZE	−0.0204*** (0.00561)	0.221*** (0.0678)	−0.0204*** (0.00559)	0.223*** (0.0693)	−0.0203*** (0.00558)
LEV	−0.00997 (0.0232)	1.248*** (0.281)	−0.0114 (0.0232)	1.282*** (0.287)	−0.0110 (0.0232)
BIG4	−0.00192 (0.0419)	−0.175 (0.507)	−0.00619 (0.0418)	0.00123 (0.517)	−0.000265 (0.0417)
GDP	0.00760 (0.00840)	−0.154 (0.108)	0.00209 (0.00888)	−0.0258 (0.107)	0.00269 (0.00860)
Kuwait	0.0344 (0.0418)	−0.773 (0.507)	0.0312 (0.0418)	−0.707 (0.518)	0.0314 (0.0417)
Oman	0.0243 (0.0418)	−0.164 (0.507)	0.0197 (0.0417)	−0.0239 (0.517)	0.0230 (0.0416)
Qatar	−0.000991 (0.0421)	0.529 (0.510)	−0.00101 (0.0420)	0.511 (0.521)	−0.00223 (0.0420)
Saudi	−0.0115 (0.0419)	−0.534 (0.506)	−0.0133 (0.0417)	−0.504 (0.517)	−0.0132 (0.0417)
UAE	0.0225 (0.0419)	−0.189 (0.507)	0.0195 (0.0418)	−0.0626 (0.518)	0.0238 (0.0417)
Constant	0.354** (0.146)	−2.098 (1.811)	0.416*** (0.149)	−3.545* (1.824)	0.408*** (0.147)
Observations	500	500	500	500	500
Adj. R^2	0.41	0.32	0.48	0.37	0.49
Year-fixed-effects	Yes	Yes	Yes	Yes	Yes
Industry-fixed-effects	Yes	Yes	Yes	Yes	Yes
Robust cluster	Yes	Yes	Yes	Yes	Yes
No. of firms	100	100	100	100	100

Note: This table presents the findings of estimating 10 fixed-effects models based on the five subindices for all firm years. Standard errors in parentheses. Variables are defined in Table 3.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

TABLE 8 The results of robustness tests compared with fixed effects results

Variables	Model no. (1) Fixed-effects TBQ	(2) Fixed-effects ROA	(3) 2SLS TBQ	(4) 2SLS ROA	(5) System GMM TBQ	(6) System GMM ROA
Independent variables						
EDI	4.935*** (0.883)	0.106* (0.0585)	5.206*** (0.696)	0.0569 (0.0667)	5.206*** (0.727)	0.0569 (0.0889)
One-legged FV	-	-	-	-	0.0240*** (0.00757)	0.0240*** (0.00757)
Two-lagged FV	-	-	-	-	0.242*** (0.0701)	0.0240*** (0.00799)
Control variables						
SIZE	0.241*** (0.0672)	−0.0196*** (0.00550)	-	-	-	-
LEV	1.319*** (0.278)	−0.00802 (0.0228)	0.171 (0.138)	−0.0592*** (0.0133)	0.171 (0.166)	−0.0592*** (0.0208)
BIG4	−0.0298 (0.501)	−0.00236 (0.0414)	−0.283*** (0.0933)	0.0459*** (0.00895)	−0.283*** (0.0847)	0.0459*** (0.0123)
GDP	−0.341*** (0.121)	−0.000330 (0.0100)	−0.317** (0.153)	0.00508 (0.0147)	−0.317** (0.138)	0.00508 (0.0142)
Kuwait	−0.869* (0.502)	0.0300 (0.0419)	−0.232 (0.301)	−0.00384 (0.0289)	−0.232 (0.470)	−0.00384 (0.0202)
Oman	−0.156 (0.501)	0.0210 (0.0418)	−0.113 (0.346)	0.0264 (0.0332)	−0.113 (0.523)	0.0264 (0.0263)
Qatar	0.410 (0.505)	−0.00346 (0.0421)	−0.289 (0.306)	−0.107*** (0.0293)	−0.289 (0.479)	−0.107*** (0.0210)
Saudi	−0.453 (0.501)	−0.0113 (0.0417)	0.0897 (0.349)	−0.0977*** (0.0335)	0.0897 (0.466)	−0.0977*** (0.0259)
UAE	−0.146 (0.501)	0.0211 (0.0418)	0.0271 (0.313)	−0.0846*** (0.0300)	0.0271 (0.471)	−0.0846*** (0.0223)
Constant	−0.646 (1.854)	0.429*** (0.154)	4.415** (1.804)	0.0158 (0.173)	4.415** (1.760)	0.0158 (0.164)
Observations	500	500	500	500	453	453
Adj. R^2	0.30	0.46	-	-	-	-
Year-fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed-effects	Yes	Yes	No	No	Yes	Yes
Robust cluster	Yes	Yes	Yes	Yes	Yes	Yes
Durbin–Wu–Hausman	-	-	76.71***	98.53***	-	-
Sargan test statistics	-	-	-	-	87.116	85.106
Arellano–Bond test for first-order	-	-	-	-	0.0026	0.0021
Arellano–Bond test for second-order	-	-	-	-	0.161	0.171

Note: The robustness tests are a two-stage least squares (2SLS) model and a two-step GMM estimation. Standard errors in parentheses. Variables are defined in Table 3. In conducting a 2SLS regression model, the industry dummy variable has been employed as an instrumental variable (see Abdelfattah & Aboud, 2020).

*Significant at the 10% level.

**Significant at the 5% level.

***Significant at the 1% level.

is significant at the 1% level, whereas there is not a statistically significant relationship with ROA. Thus, we continue to find strong support for the relationship between CED and FV as proxied by TBQ, but we cannot confirm the finding of a positive relationship—which was relatively weak anyway—between CED and ROA.

5 | DISCUSSION AND CONCLUSION

To the best of our knowledge, this is the first multicountry study of the effect of CED upon FV. It finds that CED is significantly and positively related to FV as measured by TBQ in the GCC, an economically and environmentally important set of countries. Drawing on neo-institutional theory, our findings suggest that, even though all CED in the region is voluntary (i.e., not directly subject to coercive isomorphism), the broader changes that are taking place in terms of government environmental activities and NGO initiatives are probably providing a degree of normative influence that not only encourages increased disclosure—a process that is likely to be reinforced by mimetic isomorphism—but also helps to build an environment in which such disclosure enhances corporate reputation and legitimacy amongst stakeholders, thus increasing the market value of companies.

Our empirical evidence is broadly in line with the results of some prior studies (e.g., Broadstock et al., 2018; Clarkson et al., 2013; Iatridis, 2013; Plumlee et al., 2015), where the disclosure of environmental information is positively and significantly associated with market-based outcome proxies. Our findings are robust to various statistical tests, and the relationship applies across both the individual GCC countries and all the component disclosure subindices, which themselves provide a level of detail absent from most similar studies. Some evidence of a positive relationship between CED and return on assets (ROA) is also found, but even where statistically significant, the relationship is much weaker than in the case of TBQ.

In focusing upon the GCC, the study is a relatively rare example that examines the relationship between CED and FV in the context of the developing world. Further studies might examine how CED comes to be reflected in TBQ. However, it is worth noting that, for this study, none of the relevant CED was mandatory, although there are increasing signs of normative pressures (DiMaggio & Powell, 1983) in the region as CED continues to grow (Eljayash et al., 2012; Gerged et al., 2018).

In terms of future research, given the speed and enormity of climate change and given that our analysis only goes as far as 2014, it would be worth repeating the study with more recent data at some point. Although relationships between variables are more likely to be stable over time than the levels of the variables themselves (Bell, Bryman, & Harley, 2018; Cowton, 2019), replication of the current study could determine whether the apparent increased interest of investors and other stakeholders in environmental issues accentuates the positive relationship that we have discovered between environmental disclosure and FV in GCC countries.

Vastly increased concern about the climate also means that environmental issues are now, if they were not before, too important to be subsumed within studies of CSD or 'ESG', especially if those studies include very limited measures of environmental disclosure—although we would suggest that it would be useful if future broad studies separately reported the results for the environmental component of their disclosure index, as in the case of the environmental subindices in this study. Nevertheless, although the 55-item disclosure index used in this study is relatively comprehensive, it does not mean that incremental improvements are not possible, especially as the debate about climate change and the role of corporations continues to develop.

A further possible development regarding the research instrument lies in how it is used. Although binary coding proved to be effective for the purposes of the current study, it may be regarded as a limitation, and a future study of the region (or elsewhere using a similar research instrument) might employ an ordinal coding method that recognises a distinction between qualitative, quantitative and financial forms of environmental disclosure.

In terms of the proxy used to capture the effects of CED, we suggest that researchers should in the future focus upon market-based measures such as TBQ, assuming there is a reasonably well-developed stock market present. TBQ is conceptually superior to a single-period accounting-focused measure such as ROA (used here as a supplement), ROE or EPS (as used in some previous studies—see Table 1) because it can in principle capture any information contained in the accounting measure as well as any contained in past trends, together with other information about future expectations and any valuation by shareholders of environmental actions for their own sake. This theoretical superiority is borne out by our empirical findings, with TBQ featuring more strongly than ROA at all stages of the analysis. Perhaps the results of the literature will appear to be less 'mixed' (cf. Nor et al., 2016, who relied on accounting-based measures) if, in future studies, outcome variables based on accounting profitability are omitted or reduced to subsidiary status. At the very least, our results and argument strongly suggest that greater thought should be given to the choice of outcome proxy in future studies.

Further research building on this study could examine other countries, or collections of countries, using the methodological and substantive insights that we have presented. It might also be useful to examine financial institutions, which have a less direct impact on the environment but still have a significant role to play (Thompson & Cowton, 2004; cf. Platonova et al., 2018).

As for implications for policy and practice, the current results suggest that managers can take a positive view of opportunities to expand CED and that policymakers considering the introduction or extension of mandatory CED should consider not only that managers might have less to fear than some might think but also that such disclosure appears to be value enhancing. Given our findings, resistance to change in GCC countries should not be predicated on a belief or claim that environmental disclosure is irrelevant to users.

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