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The Impact of Environmental, Social, and Governance (ESG) Practices on Firm Value: The Moderating Role of Board Characteristics

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Abstract

This paper investigates the impact of environmental, social, and governance disclosure (ESGD) on firm value (FV) within the Egyptian context, further exploring the moderating effect of board characteristics on this relationship. The analysis is based on a sample of 56 listed companies during the period from 2015 to 2022. The findings reveal that firms with higher ESG disclosure scores exhibit a greater firm value, supporting the value creation theory. Furthermore, there is a significant positive impact of board size and board gender diversity on ESG disclosure for Egyptian listed firms. In contrast, a curvilinear relationship exists between board independence and ESG disclosure. Moreover, both board size and board independence positively moderate the effect on the relationship between ESGD and FV. However, board gender diversity does not impact this relationship when firm value is measured using Tobin's Q (TQ).

Keywords

ESG, Sustainability, Firm value, Board characteristics, S&P/EGX ESG index.

Article history

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1. Introduction and Research Problem

The world is currently experiencing challenges related to a rapid increase in population, water usage, and energy demands. The globalization of production requires a company to manage its operations ethically and eco-efficiently, while pursuing a profit in order to remain successful. Thus, corporate environmental and social responsibility have become fundamental for business survival, accompanied by a lack of non-financial disclosure, such as environmental, social, and governance (ESG) information (Li et al., 2018).

The term 'sustainability' evolved from the concept of corporate social responsibility (CSR). AICPA (2013) defines sustainability as a term that has emerged over time from the "triple-bottom-line" consideration of (1) economic viability, (2) social responsibility, and (3) environmental responsibility. While environmental considerations are often emphasized, the triple- bottom-line definition of sustainability is a broad concept. In addition to the preservation of the physical environment and stewardship of natural resources, sustainability considers the economic and social context of business operations and further encompasses the business systems, models, and behaviors necessary for long-term value creation (AICPA, 2013).

As a result, with the growth of social and environmental concerns, there is an increasing demand for the development of sustainability reporting (Uyar, 2017). It is no longer sufficient for companies to address social or environmental concerns in isolation. Companies are expected to follow comprehensive sustainability strategies to disclose their efforts and actions, and prove their effective sustainability performance.

According to stakeholder and agency theories, companies must adopt a more sustainable and long-term value perspective, as stakeholders are concerned with a company's ESG practices in order to understand its investments and business operation (Atan et al., 2018; Eccles et al., 2014). For example, the environmental concerns of stakeholders may include natural environment protection, climate change, and the environmental impacts of a business operation. In addition, social factors such as human rights, equality and diversity in the workplace, and contribution to society are significant to stakeholders. Furthermore, ownership structure, board independence, minority shareholders' rights, transparency and disclosure quality are all considerations pertaining to governance. Moreover, by 2030, all firms are expected to disclose information on their environmental and social impact, as outlined by the United Nations Sustainable Stock Exchange Initiative (Sustainable Stock Exchanges [SSE], 2015).

Therefore, companies derive significant benefits from the practice of corporate sustainability. For instance, a company gains support from many stakeholders, receives beneficial government treatment, earns legitimacy within the community, reduces costs through efficient utilization of resources, and consequently lowers business risk, thereby improving firm value. Conversely, if corporations fail to respond proactively to sustainability, they could face loss of business, legitimacy, and profit due to fines and penalties, and may ultimately struggle to exist.

ESG is a widely researched concept, which has been regarded as a crucial part of a firm's strategy due to its significant influence on firm performance (FP) (Aboud and Diab, 2018; Aouadi and Marsat, 2018; Baldini et al., 2016; El Ghoul et al., 2017; Fatemi et al., 2017; Nekhili et al., 2017). Its integration has become a critical concern for investors, governments, regulators, firms, and non-governmental organizations (Lee et al., 2013). Numerous previous studies have analyzed the relationship between ESGD and FV (Cho et al., 2006; Garay and Font, 2012; Madsen and Rodgers, 2015; Revelli and Viviani, 2015; Bernardi and Stark, 2018; Li et al., 2018). Nevertheless, the findings are inconclusive, and there remain ongoing debates and conflicting perspectives regarding the relationship between ESGD and firm value. Moreover, the majority of these studies have investigated ESG in developed contexts (Harjoto & Jo, 2015; Plumlee et al., 2015; Yadav et al., 2016), while limited studies have focused on emerging markets (Malarvizhi & Matta, 2016; Siagian et al., 2013).

Given these gaps, the researchers aim to investigate the combined impact of ESG disclosures on firm value in the Egyptian context, to gain a more comprehensive understanding of the influence of ESG practices in an emerging market. The ESG disclosure score is derived from the Egyptian ESG index 'S&P/EGX ESG,' which applies corporate governance (CG) and corporate social responsibility (CSR) norms and standards to evaluate the practices and programs of the listed firms. Most studies addressing Egyptian CG and social practices have primarily focused on the level of adherence to standards and codes (Eldomiaty et al., 2016). Nevertheless, the market consequences of ESG disclosures remain unclear, especially in the Egyptian context.

The researchers examine whether companies with greater emphasis on ESG practices exhibit better performance compared to those that do not prioritize such practices. Specifically, this paper aims to address whether ESG disclosures impact firm value or are irrelevant in the context of an emerging market such as Egypt. This investigation will consequently assist in revealing whether the context and hence the

culture (whether developed or emerging), plays a role in the influence of ESG disclosures on firm value.

In addition, governance mechanisms significantly participate in the relationship between ESG disclosures (ESGD) and firm value (FV). The board of directors (BOD), as the main entity responsible for making strategic decisions, including engagement in sustainability, raises the question of how the board's characteristics might influence ESG disclosure. Studies in the fields of sustainability and corporate governance are typically conducted separately, with limited attention given to the interaction between both areas.

Accordingly, the relationship between ESGD, firm value, and BOD characteristics requires further investigation within the context of Egypt as a developing country. Thus, this paper extends prior research by jointly examining corporate governance and corporate sustainability performance. In particular, it explores the role of three governance mechanisms in the ESGD–FV nexus, namely, board size, board independence, and board gender diversity.

This study contributes to the extant literature in several aspects. First, it extends prior research by connecting the three sustainability dimensions: environmental, social, and governance (ESG), with different indicators of business performance: financial performance, measured by return on equity (ROE); and market performance, measured by Tobin's Q (TQ). This approach provides further insights into ESG's impact on the value of Egyptian listed companies and fills the gap in prior studies that relied either on accounting-based or market-based measures of firm value. Second, it uses a longer period, spanning from 2015 to 2022, to obtain more reliable results. Third, it investigates the combined effect of ESG disclosures on firm value in Egypt, rather than examining each dimension individually. Finally, it is likely to enrich the existing literature on emerging countries and to situate the Egyptian context in relation to other emerging as well as developed contexts. The Egyptian context represents a unique setting for contributing to the ongoing debate on the economic consequences of ESG disclosure. Awareness of this context is being developed and remains underexplored by researchers focusing on ESG dimensions.

This investigation is crucial in light of the recent decree issued by the Financial Regulatory Authority (FRA), which requires EGX-listed companies to file mandatory annual ESG reports, disclosing their performance across key environmental, social, and governance (ESG) metrics each year when submitting their annual financial statements.

2. Theoretical Background

Despite the existence of many theories that analyze the motivation of firms to report sustainability information, sustainability reporting motives are frequently associated with legitimacy, standards, regulations, and stakeholders. Therefore, this section provides different theoretical perspectives addressing the link between ESG, firm value, and the board of directors. Each theory offers an explanation of the companies' motives or barriers for engaging in ESG practices and how these practices can directly or indirectly impact firm value.

First, agency theory, which reflects the conflict between company owners and shareholders, presents two contradicting views. The first view, supported by Jensen et al. (1976), argues that considering social responsibilities may lead companies to incur additional costs, which would be borne by the shareholders, and consequently results in the depletion of shareholder wealth and the creation of competitive disadvantage, ultimately lowering firm value. In contrast, the second view, supported by Jones (1995), argues that agency costs incurred due to sustainability disclosures, which is used as a communication tool with stakeholders, may decrease if companies engage transparently and ethically with the stakeholders. This approach may assist in reducing the information asymmetry between shareholders and management, fostering competitive advantages through establishing a strong reputation with shareholders, and consequently increasing firm value.

Hence, to ensure that managers act in the best interests of stakeholders, agency theory explains the boards' duty to protect owners' interests and maintains that agency conflicts can be reduced with the appropriate composition of board members.

Second, stakeholder theory posits that the principle of this theory, according to Freeman (2004), is the attempt to create value for stakeholders. Freeman (2004) emphasized that commitment to sustainable responsibilities may strengthen the relationship between the company's management and stakeholders, ultimately enhancing firm value and creating competitive advantage (Camilleri, 2016). In addition, Simoni et al. (2020) found that sustainability reporting is highly driven by the company's need to maintain positive relationships with stakeholders. Therefore, Firms can develop and maintain satisfactory relationships with their stakeholders through appropriate sustainability reporting and disclosure.

Therefore, the board of directors should consider not only shareholders' interests but also the interests of other stakeholders, as well as the multidimensional aspects of corporate sustainability performance. From this perspective, it could be argued that stakeholder theory extends agency theory to encompass various stakeholders, as shareholders are not the only stakeholders impacted by the company's operations.

Third, legitimacy theory provides a society-oriented explanation for corporate behavior. Companies may operate in a manner that satisfactorily addresses social norms, values, beliefs, and expectations of society (Frostenson, 2015) to be perceived as legitimate (Hartwig, 2018). Therefore, legitimacy theory is usually employed to explain sustainability-related disclosure (Deegan & Unerman, 2011).

Consequently, companies may be motivated to engage in sustainability activities in order to protect their legitimacy and maintain their positive reputation and confidence among stakeholders, thereby creating an appropriate environment for investment (Frynas et al., 2016).

Furthermore, legitimacy theory suggests that companies may employ sustainability disclosure to present a favorable view of their sustainability performance to the public. As a result, some companies may attempt to mislead their stakeholders by communicating positively about their environmental performance, despite their actual inadequate environmental performance. In addition, companies with inadequate sustainability performance may prefer to disclose low-quality sustainability information that lacks reliability and comparability, in order to conceal their true sustainability performance and thereby protect their legitimacy (Hummel & Schlick, 2016). This type of misinformation is referred to as 'greenwashing,' implying that the sustainability disclosure is considered mere propaganda (Cong et al., 2020).

Fourth, accountability theory explains how governmental authority affects a firm's behavior. Thus, sustainability disclosure results from the governmental control driven by political strategies and agendas (Bramwell, 2011). This theory supports the implementation of mandatory sustainability reporting (Gillet-Monjarret, 2015; Wong & Millington, 2014). As argued by Gray (2007), the lack of mandatory regulations associated with sustainability reporting is regarded as a barrier to improving the quality

of such reporting. When sustainability reporting is a voluntary practice, firms are likely to undertake serious actions related to accountability. Accordingly, laws mandating sustainability reporting are viewed as a basic element in assuring the credibility and reliability of disclosures (Faisal et al., 2012; Haider & Kokubu, 2015).

Fifth, signaling theory, as a complement to accountability theory, suggests that firms attempt to signal positive behavior through sustainability disclosure (Verrecchia, 2001). In other words, firms seeking to demonstrate that they are 'good corporate citizens' disclose more information regarding their ESG practices. Similarly, if sustainability disclosure is enforced by law, society will perceive the significance of ESG.

Finally, slack resource theory defines slack resources as excess resources that a firm may use to adopt practices beyond its core business function. Based on this theory, firms with strong financial performance may have a surplus of monetary or non-monetary slack resources, which can be allocated to environmental and social initiatives (McGuire et al., 1988; Waddock & Graves, 1997). Therefore, only financially strong firms are capable of adopting sustainability practices (Soana, 2011). Conversely, if a firm is struggling financially, the implementation of sustainability practices may have an adverse effect on its financial performance.

3. Literature Review and Hypotheses Development

3.1. ESG and Firm value

Several studies have found a positive relationship between ESG and firm value. For example, Aboud and Diab (2018) examined the impact of ESG practices on firm value in the Egyptian context through assessing the effect of firms' listing and ranking in the Egyptian Corporate Responsibility Index. Their results indicated a higher firm value, as measured by Tobin's Q, for companies listed in ESG index compared to those in the EGX100 and all listed companies in the Egyptian stock market. Additionally, Khemir et al. (2019), through conducting a field experiment, highlighted the significant influence of ESG information on the investment allocation decisions of Tunisian investors. Furthermore, the results demonstrated that social and corporate governance information had greater influence on investment decisions than environmental information. Moreover, in the Indonesian context, Shalihin et al. (2020) showed that corporate sustainability has a positive impact on the market-based value of Indonesian companies, measured using Tobin's Q. Similarly, Ismai et al. (2020) revealed that sustainability performance has a positive and significant influence on the profitability of public listed companies (PLCs) in Malaysia, as measured by ROA.

In contrast, some studies have shown a negative relationship between ESG and firm value. For instance, Buallay et al. (2020) stated that firms may experience a competitive disadvantage when allocating resources to support social programs and initiatives, compared to institutions that are less socially responsible. Similarly, Ruan and Liu (2021) indicated that firms may develop into a substantial cost burden due to

ESG investing, inevitably leading to a certain decline in firm performance over time as a result of the low degree of protection by investors.

Other studies have demonstrated mixed or no relationship between ESG and firm value. Based on data from Malaysian listed companies, Johari et al. (2019) found that sustainability reporting has a positive impact on firm performance, as measured by return on assets and earnings per share. However, a negative and weak relationship was observed between sustainability reporting and firm performance using ROE. Moreover, the relationship between sustainability reporting and dividend per share does not exist or is very weak. Similarly, Buallay (2019) reported that ESG positively affected market performance, as measured by TQ, while financial performance (ROE) and operational performance (ROA) were negatively affected. In another study, Taiwo et al. (2021) found that sustainability reporting does not significantly affect market value growth of quoted companies in Nigeria. Furthermore, Rahi et al. (2021), investigating the Nordic financial industry, observed a negative relationship between total ESG and financial performance (FP) at the aggregate level. However, at the disaggregate level of sustainability proxies, a positive relationship was identified between the governance dimension only and FP.

Although the results of previous studies have often yielded inconclusive, contradictory, and inconsistent results, showing positive, negative, mixed, or no relationships, most studies suggest a positive relationship between ESG and firm value. Moreover, this positive relationship was more frequently observed with accounting-based measurements, and less observed when market-based measurements of firm performance were used. This may be attributed to the stability of accounting data over time, while market-based measurements are more volatile and noisier.

Conversely, other studies provided contradictory findings, suggesting a negative relationship between ESG and firm value. (Buallay (2019) attributed such findings to several factors: First, ESG practices are inherently costly and may be financially burdensome for certain businesses, reducing a corporation's present and future cash flows, which can sometimes place the entire organization at risk. Second, ESG practices may not be performed in the correct manner or may lack support from owners, leading to a dichotomy between the managers' and owners' perceptions of the corporation, which could negatively impact the firm's stock performance. Third, the negative results can be due to the different measurements used for assessing FV and ESG performance in different studies.

Some researchers have found no clear relationship between ESG practices and firm value (FV). Such findings could be attributed to the period of the study, the region of application, or the employed research methodology. Consequently, there is a need to account for misspecifications in research design. Another possible

explanation is that the effect of ESG activities requires time to be reflected in FV; the outcomes of investing in such activities may initially reduce FV but subsequently contribute to positive effects. Additionally, some studies have reported both positive and negative associations between sustainability dimensions and firm value, implying that shareholders may prioritize funding specific sustainability activities over others.

Given these ambiguous and inconclusive results, this paper seeks to contribute to the current debate regarding the influence of ESG disclosures on firm value. Therefore, the following hypothesis is proposed:

H1: ESG disclosure is positively associated with firm value.

3.2. Board Size and ESG Disclosure

From the stakeholder theory perspective, larger governing boards may have the advantage of representing the various interests of a broader group of stakeholders concerned with the activities of the company (Freeman, 1983; Freeman & Reed, 1983). Likewise, resource dependence theory suggests that larger corporate boards comprise members with diverse backgrounds, knowledge, skills, and expertise, as well as greater political and economic connections, required to access critical resources from the external environment (Reverte, 2009). However, according to agency theory, larger boards encounter a lack of coordination and teamwork, which impairs their decision-making (Jensen and Meckling, 1976; Yermack, 1996). Similarly, boards with fewer members experience fewer instances of miscommunication, resulting in better coordination (Post et al., 2011). Nevertheless, it has been argued that smaller boards are characterized by less diversified expertise and knowledge (Guest, 2009). Furthermore, as a consequence of a high workload, smaller boards may be less effective in controlling and monitoring (Hussain et al., 2018).

In this context, prior empirical studies present mixed findings regarding the relationship between board size and the extent of ESG disclosure. Some studies in corporate governance and accounting literature report a positive relationship (Allegrini and Greco, 2013; Khaireddine et al., 2020; Michelon and Parbonetti, 2012; Ntim et al., 2012; Ntim and Soobaroyen, 2013; Samaha et al., 2012), while other studies indicate a negative relationship (Alzead, 2017; Ntimet al., 2017). Samaha et al. (2015) conducted a meta-analysis of a sample of 64 empirical studies to identify the possible determinants of the relationship between corporate board characteristics, audit committee characteristics, and the extent of sustainability disclosure. Their findings recognized the existence of a positive and significant relationship between board size and the extent of voluntary ESG disclosure. In addition, Nguyen et al. (2021), in a study of heavily polluting firms in China, documented a positive association between board size and environmental performance.

In contrast, Alnabsha et al. (2018) identified a significant negative relationship between board size and the extent of voluntary disclosure. Given these conflicting findings, this study argues that firms with large-sized boards are likely to disclose more ESG information. Hence, the following hypothesis is formulated:

H2a: There is a positive association between board size and ESG disclosure.

3.3. Board Independence and ESG Disclosure

Agency theory posits that managers' actions can be controlled by independent monitoring through the appointment of outside board members (Walsh and Seward, 1990). Therefore, the greater independence of a corporate board's directors, the more effective its decisions and its encouragement of ESG disclosures (Holtz and Sarlo Neto, 2014). Unlike executive directors, independent directors do not personally invest in the company's human capital; therefore, their decisions may not always prioritize what is most beneficial for the company's shareholders.

In this regard, several empirical studies have found positive association between board independence and ESG disclosures (Jizi, 2017, Fahad and Rahman, 2020, Oluwatoyin et al., 2021, Agarwala et al., 2022). Independent directors contribute to increasing the market value of their company's stocks through directing management decisions toward profitable and sustainable business and activities (Ahmed et al., 2006). To protect their personal reputations, independent directors facilitate firms' disclosure related to ESG activities to signal to the market that the company focuses not only on enhancing financial performance but also on advancing social welfare, which assists in attracting investments locally and internationally (Arora and Dharwadkar, 2011; Donnelly and Mulcahy, 2008; Jizi, 2017; Li et al., 2008). In the same vein, Arayssi et al. (2020) supported the significance of board independence for ESG disclosure in Gulf countries. Moreover, Disli et al. (2022) investigated the sustainability performance of public-listed companies across 20 emerging countries, suggesting that independent boards have better sustainability performance. In contrast, empirical evidence from Ho and Shun Wong (2001); Prado-Lorenzo and Garcia-Sanchez (2010); said et al. (2009); indicates that independent directors have no impact on ESG disclosure of the firms in their respective study samples.

In view of the inconsistent findings, this paper argues that the greater the independence of a board, the more effectively it will be able to address and report ESG practices. Hence, we propose the following hypothesis:

H2b: There is a positive association between board independence and ESG disclosure.

3.4. Board gender diversity and ESG Disclosure

Since more women are entering the workforce, there has been an emphasis toward gender diversity and inclusion in top leadership positions. Moreover, a gender-diverse board contributes a broader range of perspectives, attitudes, and experiences to financial and non-financial decision-making (Liao et al., 2015).

Social support theory suggests that female executives differ from their male counterparts in terms of leadership style, career path, and the prioritization of organizational needs (Glass et al., 2016). It postulates that women are more communal, tending to engage in social and interpersonal environments, while men are more agentic, characterized by problem-solving, assertive, and independent behaviors, and

are more focused on financial achievements (Lin et al., 2016).Thus, companies with greater female representation on their boards are likely to engage in more ESG activities and disclose them in their annual reports.

A growing body of research indicates that an increased presence of women on boards leads to the adoption of ESG practices and more non-financial reporting. Conversely, another body of research suggests that having female directors can negatively influence sustainability reporting. For instance, Bear et al. (2010) conclude that a company's CSR score typically improves with greater female participation on the board. Similarly, Ciocirlan and Pettersson (2012) argue that females on boards primarily focus on environmental activities, as they are more concerned about pollution and climate change. Moreover, Liao et al. (2015) studied the impact of gender diversity on the voluntary disclosure of greenhouse gas emissions (GHGs) in a sample of 329 of the largest UK companies, and found that boards with more female directors provide significantly more extensive GHG disclosure. Additionally, Manita et al. (2018) investigated the effect of board gender diversity on ESG disclosure of the US equity market, concluding that when more women are appointed to the board, companies tend to exhibit higher levels of ESG disclosure.

In contrast, Muttakin et al. (2015) examine the relationship between female directorship and CSR disclosures of listed Bangladeshi non-financial firms, reporting a negative association between female presence on boards and CSR disclosures. In addition, the results of a study conducted by Ismail et al. (2019) on public listed companies in Malaysia indicated that female directors were negatively associated with firm sustainability practices. However, Rao and Tilt (2016) did not find any significant association between female board presence and the level of social and environmental disclosures. In light of these conflicting findings, this paper argues that the presence of female directors on board can have a positive impact on ESG disclosure. Hence, the following hypothesis is formulated:

H2c: There is a positive association between board gender diversity and ESG disclosure.

In conclusion, despite the observed impact of board characteristics on ESG disclosure in previous studies, the results indicate uncertainty and yield different mixed outcomes. Hence, hypothesis 2 is formulated as follows:

H2: BOD characteristics are positively associated with ESG disclosure

3.5. Board characteristics, ESG and Firm Value

Logically, the mechanism through which ESG disclosures affect firm value may operate through the corporate governance (CG) mechanism, particularly the board of directors, as it could influence decisions on the company's policies regarding ESG.

Several studies were conducted on the moderating role of CG in the link between ESG and firm value. For example, Kabir and Thai (2017) investigated whether CG moderates the relationship between CSR and the financial performance of companies

listed on stock exchanges in Vietnam. The results revealed that foreign ownership, board size, and board independence have a significant positive moderating effect on this relationship. In addition, in the UK, Albitar et al. (2020) investigated the moderating effect of ownership concentration, gender diversity, and board size on the relationship between ESG disclosure (ESGD) and firm performance (FP). They observed that ownership concentration, gender diversity, and board size moderate the ESGD–FP relationship. Similarly, Lu (2021) examined the moderating effect of board size, board independence, CEO duality, and female directors on the relationship between corporate sustainability performance (CSP) and corporate financial performance. The findings revealed that firms with stronger corporate governance are more likely to exhibit higher CSP, and that corporate governance contributes additional value to firm performance. Additionally, in the Egyptian context, Hashad (2023) reported a significant positive effect of board independence on firm value, considering sustainability disclosure as an intermediate variable.

Conversely, Aebi et al. (2012) maintained that board size has no significant moderating effect on the relationship between CSR and firm performance. Moreover, in the Indonesian context, Nurlaily and Rahmi (2021) concluded that neither female nor independent director strengthen or weaken the effect of CSP on ROA.

Based on the preceding analysis, it can be observed that studies on the moderating effect of BOD on the relationship between ESG and firm value are limited, especially in the Egyptian context. Furthermore, the results of these studies were mixed. Thus, this study argues that BOD characteristics will enhance the ESG–FV relationship. Accordingly, the following hypotheses are proposed:

H3: BOD characteristics moderate the relationship between ESG disclosure and firm value.

- ***H3a: Board size moderates the relationship between ESG disclosure and firm Value.***
- ***H3b: Board independence moderates the relationship between ESG disclosure and firm Value.***

H3c: The presence of female directors on the board moderates the relationship between ESG disclosure and firm Value.

4. Research Methodology

4.1. Sample Selection

The initial sample comprises 100 firms listed on the EGX100 over the period 2015- 2022. The firms included must have been listed at least three times in the EGX100 during the research period to be assigned an ESG score. The final sample consists of 56 firms (368 firm years), divided into 9 sectors: materials, consumer staples, industrials, utilities, real estate, consumer discretionary, communication services, energy, and health care, after excluding financial institutions and firm-years

that lacked necessary data for the variables used in analysis. Table 1 presents the classification of the sample based on the mentioned sectors:

Table 1 *Sample Selection*

GICS Sector Name	Firms	Freq.	Percent
Communication Services	3	21	5.71
Consumer Discretionary	12	74	20.11
Consumer Staples	10	66	17.93
Energy	1	6	1.63
Health Care	3	18	4.89
Industrials	10	69	18.75
Materials	14	95	25.82
Real Estate	2	14	3.80
Utilities	1	5	1.36
Total	56	368	100.00

There are several reasons for focusing on the period from 2015 to 2022. During this time, sustainability issues received attention at both a national and international level. This is demonstrated by the 2030 Agenda for Sustainable Development, launched at the United Nations Summit in 2015, indicating an urgent call for action by all countries, developed and developing, including Egypt. In addition, in 2016, the third release of the Egyptian Corporate Governance Code was locally introduced by the Egyptian Institute of Directors (EIOD); moreover, the Egyptian Exchange issued 'Model Guidance for Reporting on ESG Performance and Sustainable Development Goals (SDGs).'

4.2. Data Collection

Secondary data was collected from multiple sources, namely, financial statements and published annual reports of the sample firms, board of directors' reports, and governance reports. In addition, ESG scores were obtained from the S&P/EGX ESG index over the period 2015-2022, which were available through the Thomson Reuter's global database, the Egyptian Stock Exchange website (www.egx.com.eg), and Mubasher Info (www.mubasher.info).

4.3. Variables Measurements

4.3.1. Dependent Variable: Firm Value

The dependent variable is firm value. To capture both the historical and potential value of the companies, this study relies on return on equity (ROE), as an accounting-based measure, and Tobin's Q, as a market-based measure of firm value.

4.3.2. Independent Variable: ESG Disclosure

ESG disclosure is used as a proxy for the independent variable, and is calculated as the relative score of listed firms based on the S&P/EGX ESG sustainability index. The Egyptian ESG index tracks the performance of the top 100 companies listed on the

Egyptian Exchange (EGX) that demonstrate leadership in environmental, social, and CG issues. Each company in the selection undergoes a scoring process that incorporates ESG indicators, against which the company's disclosure practices are evaluated. All EGX100 listed companies are evaluated on an annual basis to select the top 30 that are eligible for listing on the ESG index.

4.3.3. Moderating Variable: Board Characteristics

Board of director's characteristics serve as the moderating variable and are represented by three board characteristics: board size, board independence, and board gender diversity.

4.3.4. Control Variables

The researcher considers a number of firm-specific control variables commonly used in the literature to capture the effects of any omitted variables that may affect the relationship between the primary variables. These variables include firm size, leverage, tangibility, free cash flow to the firm, cash dividends, institutional ownership, illiquidity, and liquidity. Table 2 presents a summary of the definitions and measurements of all variables included in the present study.

Table 2 *Research Variables and Their Measurement*

Variable	Symbol	Measurement
Dependent variable (Firm value)	**FV**	
Return on Equity	**ROE**	Net income / Total equity
Tobin's Q	**TQ**	(Market value of equity + Book value of short-term liabilities) / Book value of assets
Independent variable (ESG disclosure)		
ESG Disclosure	**ESGD**	The relative score based on the ESG index
Moderating variable (Board characteristics)	**BOD**	
Board Size	**BSIZE**	Total number of directors on the board
Board Independence	**BIND**	Number of independent directors divided by total number of board members
Board Gender Diversity	**BGIND**	Number of female board members divided by total number of board members.
Control variables		
Firm Size	**SIZE**	The natural logarithm of total assets
Leverage	**LEV**	The total debt divided by total assets
Tangibility	**Tang**	Property, plant, and equipment / total assets
Free Cash Flow to Firm	**FCFF**	Cash flow from operations - Capital expenditures
Institutional Ownership	**InstitOwn**	Shares held by institutional investors divided by total number of firm shares
Cash Dividends	**Div**	Net income - Retained earnings
Illiquidity	**BAS**	Bid-ask spread
Liquidity	**VOL**	Trading volume

4.3.5. Research Models

To test the validity of the developed hypotheses, ordinary least squares (OLS) will be applied for multiple regression models using the STATA 17 software.

The models used to test the impact of ESG Disclosure on firm value are as follows:

- $ROE\,i,t = \beta 0 + \beta 1\ ESGD\,i,t-1 + \sum controls + £i,t$
- $TQi,t = \beta 0 + \beta 1\ ESGD\,i,t-1 + \sum controls + £i,t$

The model used to test the impact of board characteristics on ESG disclosure is formulated as follows:

- $ESGD\,i,t = \beta 0 + \beta 1\ BSIZE\,i,t + \beta 2\ BIND\,i,t + \beta 3\ BGIND\,i,t + \sum controls + £i,t$

The models used to test the moderating effect of board characteristics on the association between ESG disclosure and firm value are presented as follows:

- $ROE\,i,t = \beta 0 + \beta 1\ ESGDi,t-1 * BSIZE\,i,t + \beta 2\ ESGDi,t-1 * BIND\,i,t + \beta 3\ ESGDi,t-1 * BGIND\,i,t + \sum controls + £i,t$
- $TQ\,i,t = \beta 0 + \beta 1\ ESGDi,t-1 * BSIZE\,i,t + \beta 2\ ESGDi,t-1 * BIND\,i,t + \beta 3\ ESGDi,t-1 * BGIND\,i,t + \sum controls + £i,t$

5. Data Analysis Empirical Results

5.1. Qualitative Analysis

The statistical features of all continuous variables in the current research are shown in Table 3.

- Return of equity (ROE) and Tobin's Q (TQ) show high dispersion around the mean (overall, between, and within), reflecting high heterogeneity in the value of Egyptian listed firms. In contrast, the environmental, social, and governance (ESG) score shows low dispersion around the mean, reflecting low heterogeneity in ESG disclosure among Egyptian listed firms.
- On average, Egyptian listed firms report a board size of nine members (BOD_Size) and 68.8% independent board members (BOD_Indep), with low dispersion around the mean, indicating high homogeneity in board size and board independence. In contrast, these firms report 15.6% female board members, as a measure of gender diversity, with high dispersion around the mean, indicating high heterogeneity in gender diversity.
- The size shows an overall deviation of (1.4), which is very small relative to the overall mean of (21.72). In addition, the small range between the overall minimum value (19.2) and the overall maximum value (24.5) demonstrates the homogeneity in firm size. The overall mean of (0.551) for leverage suggests that firms have a balanced capital structure, with high dispersion around the mean (both overall and between), reflecting high heterogeneity in the capital structure

of Egyptian listed firms. The asset structure, as measured by the ratio of plant, property and equipment to total assets (Tang), and institutional ownership, show high dispersion around the mean (both overall and between), indicating high heterogeneity in asset structure and institutional ownership among the Egyptian listed firms. In contrast, within each firm, dispersion around the mean is low, reflecting high homogeneity in asset structure. Free cash flow, cash dividends, and illiquidity, as measured by the bid-ask spread, show high dispersion around the mean, indicating high heterogeneity among the Egyptian listed firms. Liquidity, as measured by trading volume, shows an overall mean of 13.152, with low dispersion around the mean, suggesting high homogeneity in stock liquidity among the Egyptian listed firms.

5.2.Pearson's Correlation Test

Pearson's correlation coefficient measures the direction and strength of the linear association between any two variables in the current research. Moreover, Pearson's correlation coefficients are used to detect potential multicollinearity between any two independent variables in the same regression model. Table 5 presents the Pearson's correlation coefficients for all the study variables.

Based on Table 5, the following observations can be identified:

- A positive direct linear association exists between ESG disclosure and both measures of firm value, ROE and Tobin's Q, for Egyptian listed firms.
- A positive direct linear association is observed between board size and ROE for Egyptian listed firms. In contrast, a negative direct linear association is found between board independence and ROE. However, no direct linear association is observed between gender diversity and ROE for Egyptian listed firms. Furthermore, no direct linear association exists between TQ and all proxies of board characteristics for Egyptian listed firms.
- A positive direct linear association exists between both board size and board gender diversity, and ESG disclosure for Egyptian listed firms. Conversely, no direct linear association exists between board independence and ESG disclosure.

A positive direct linear association is observed between ROE and three firm-specific variables: firm size, free cash flow to the firm, and cash dividends. In addition, a positive direct linear association is observed between TQ and five firm-specific variables: leverage, free cash flow, cash dividends, institutional ownership, and bid-ask spread.

Table 3 *Descriptive Statistics*

Variable		Mean	Std. dev.	Min	Max	Observations
ROE	overall	0.119	0.180	-0.319	0.508	N = 368
	between		0.131	-0.114	0.470	n = 56
	within		0.125	-0.351	0.698	T-bar = 6.57
TQ	overall	1.411	0.804	0.306	3.110	N = 368
	between		0.751	0.513	3.110	n = 56
	within		0.305	0.308	2.628	T-bar = 6.57
ESG	overall	122.060	8.978	101.707	145.748	N = 368
	between		7.400	110.435	138.402	n = 56
	within		5.050	107.806	138.327	T-bar = 6.57
BOD_Size	overall	8.479	2.975	3.000	17.000	N = 368
	between		2.809	3.500	15.875	n = 56
	within		0.924	4.908	12.879	T-bar = 6.57
BOD_WR	overall	0.156	0.410	0.000	4.000	N = 368
	between		0.206	0.000	0.869	n = 56
	within		0.360	-0.713	3.351	T-bar = 6.57
BOD_In~p	overall	0.688	0.243	0.000	1.000	N = 368
	between		0.169	0.143	0.940	n = 56
	within		0.177	-0.117	1.078	T-bar = 6.57
Size	overall	21.721	1.406	19.178	24.480	N = 368
	between		1.383	19.178	24.450	n = 56
	within		0.258	20.758	22.580	T-bar = 6.57
Lev	overall	0.512	0.237	0.169	1.072	N = 368
	between		0.216	0.169	1.072	n = 56
	within		0.094	0.147	1.033	T-bar = 6.57
Tang	overall	0.389	0.227	0.040	0.780	N = 363
	between		0.217	0.040	0.767	n = 56
	within		0.076	0.024	0.689	bar = 6.48214
FCFF	overall	0.020	0.100	-0.183	0.234	N = 367
	between		0.075	-0.183	0.230	n = 56
	within		0.067	-0.273	0.243	bar = 6.55357
Div	overall	0.031	0.050	0.000	0.178	N = 368
	between		0.044	0.000	0.178	n = 56
	within		0.025	-0.086	0.152	T-bar = 6.57
Instit~Q	overall	0.498	0.288	0.000	0.957	N = 368
	between		0.263	0.000	0.952	n = 56
	within		0.117	-0.234	0.996	T-bar = 6.57
BAS	overall	0.031	0.025	0.001	0.086	N = 368
	between		0.012	0.012	0.060	n = 56
	within		0.022	-0.028	0.087	T-bar = 6.57
Vol	overall	13.152	1.754	9.579	16.106	N = 368
	between		1.438	10.236	15.806	n = 56
	within		1.060	9.483	16.000	T-bar = 6.57

Table 5 *Pearson's Correlation Matrix*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) ROE	1.000													
(2) TQ	0.526***	1.000												
	(0.000)													
(3) ESG	0.188***	0.200***	1.000											
	(0.000)	(0.000)												
(4) BOD_Size	0.122**	0.003	0.311***	1.000										
	(0.019)	(0.960)	(0.000)											
(5) BOD_WR	0.075	0.054	0.162***	0.138***	1.000									
	(0.152)	(0.306)	(0.002)	(0.008)										
(6) BOD_Ind	-0.138***	-0.054	0.073	0.266***	-0.169***	1.000								
	(0.008)	(0.304)	(0.160)	(0.000)	(0.001)									
(7) Size	0.143***	-0.079	0.324***	0.345***	0.043	-0.131**	1.000							
	(0.006)	(0.128)	(0.000)	(0.000)	(0.413)	(0.012)								
(8) Lev	-0.040	0.142***	0.022	-0.202***	0.005	-0.152***	0.157***	1.000						
	(0.440)	(0.006)	(0.671)	(0.000)	(0.919)	(0.003)	(0.003)							
(9) Tang	-0.330***	-0.250***	-0.040	0.065	0.058	0.165***	0.040	-0.052	1.000					
	(0.000)	(0.000)	(0.450)	(0.219)	(0.267)	(0.002)	(0.451)	(0.326)						
(10) FCFF	0.373***	0.187***	0.159***	0.191***	0.038	0.024	0.233***	-0.356***	-0.072	1.000				
	(0.000)	(0.000)	(0.002)	(0.000)	(0.469)	(0.652)	(0.000)	(0.000)	(0.172)					
(11) Div	0.504***	0.438***	0.155***	0.187***	-0.016	-0.009	0.144***	-0.379***	-0.238***	0.557***	1.000			
	(0.000)	(0.000)	(0.003)	(0.000)	(0.759)	(0.863)	(0.006)	(0.000)	(0.000)	(0.000)				
(12) InstitOw	0.078	0.271***	0.097*	0.049	-0.108**	0.290***	0.099*	0.027	0.080	0.126**	0.201***	1.000		
	(0.136)	(0.000)	(0.063)	(0.349)	(0.038)	(0.000)	(0.058)	(0.611)	(0.128)	(0.015)	(0.000)			
(13) BAS	0.037	0.136***	0.045	(0.063)	-0.041	0.028	-0.161***	-0.036	0.126**	0.039	0.026	-0.045	1.000	
	(0.481)	(0.009)	(0.394)	0.045	(0.432)	(0.598)	(0.002)	(0.489)	(0.016)	(0.458)	(0.624)	(0.389)		
(14) Vol	0.015	0.002	0.043	0.009	0.006	-0.057	-0.071	0.092*	0.299***-	-0.222***	-0.183***	-0.177***	-0.310***	1.000
	(0.778)	(0.967)	(0.409)	(0.860)	(0.906)	(0.273)	(0.172)	(0.079)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	

5.3. Regression Analysis

5.3.1. The Impact of Board of Directors' Characteristics on ESG Disclosure

The validity of the developed hypotheses is tested by conducting an initial pooled OLS regression; however, some goodness-of-fit tests should be conducted first to confirm that the hypothesized model appropriately fits the sample data. These tests include multicollinearity, heteroskedasticity, omitted variables, and auto-correlation. If any of these issues are identified, they should be considered while estimating the final pooled OLS model.

Table 6 *OLS Goodness of Fit (Model 1) Impact of Board Characteristics on ESG Disclosure*

Variable		VIF
Div		1.807
FCFF		1.542
Lev		1.51
Size		1.467
BOD Size		1.44
BOD WR		1.092
BOD Indep		1.365
InstitOwnIQ		1.227
Tang		1.158
Mean VIF		1.401
Heteroskedasticity	Chi2 Statistics Prob > Chi2	2.51 0.1130
Omitted variables	F Statistics Prob > F	0.65 0.5848
Autocorrelation	F Statistics Prob > F	3.588 0.0636

Table 6 reveals the absence of multicollinearity among the explanatory variables. Furthermore, there is no heteroskedasticity problem. The functional form is appropriate, with no omitted variables in the model. Additionally, autocorrelation problems do not exist, suggesting that the model's residuals are not serially correlated. In conclusion, the researcher incorporates a year fixed effect and a quadratic term for board independence and cash dividends to address model specification errors, using GLS to test the final fitted model as presented in Table 7.

Table 7 demonstrates that board characteristics explain 28.5% of the variation in ESG disclosure for Egyptian listed firms using GLS. In addition, there is a positive significant impact of board size and board gender diversity on ESG disclosure for Egyptian listed firms. In contrast, a curvilinear relationship exists between board independence and ESG disclosure, indicating the existence of an optimal level of board independence to maximize ESG disclosure. Moreover, firm size and institutional ownership have a positive direct significant impact of on ESG disclosure for Egyptian listed firms. However, there is no direct significant impact of leverage and free cash flow on ESG disclosure. Finally, a curvilinear relationship exists between cash dividends and ESG disclosure.

Table 7 *Final Fitted Model of the Impact of Board Characteristics on ESG Disclosure*

ESG	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
B_Size	.617	.163	3.79	0	.297	.937	***
BOD_WR	3.817	1.255	3.04	.003	1.348	6.286	***
BOD_Indep	12.254	7.569	1.62	.106	-2.634	27.142	*
BOD_Indep2	-11.627	6.493	-1.79	.074	-24.397	1.143	*
Size	1.525	.355	4.30	0	.827	2.224	***
Lev	1.244	2.024	0.61	.539	-2.737	5.225	
Tang	-3.386	1.89	-1.79	.074	-7.105	.332	*
FCFF	2.433	5.331	0.46	.648	-8.053	12.919	
Std_Div	4.369	1.151	3.79	0	2.104	6.633	***
Std_Div2	-2.043	.493	-4.15	0	-3.012	-1.073	***
InstitOwnIQ	3.331	1.592	2.09	.037	.199	6.463	**
Year fixed effect	Included						
Constant	83.823	7.812	10.73	0	68.458	99.188	***

Mean dependent var	122.087	SD dependent var	8.990
R-squared	0.285	Number of obs	362
F-test	11.105	Prob > F	0.000
Akaike crit. (AIC)	2532.841	Bayesian crit. (BIC)	2606.782

*** $p<.01$, ** $p<.05$, * $p<.1$

5.3.2. The Moderating Impact of Board Characteristics on the Association between ESG Disclosure and Firm Value as Measured by ROE

Table 8 *OLS Goodness of Fit (model 2, 3, and 4) The Moderating Impact of Board Characteristics on the Association Between ESG Disclosure and ROE*

Model 2			**Model 3**		**Model 4**	
Variable		VIF	Variable	VIF	VIF	VIF
Div		1.812	Div	1.805	ESGLIndex BSize	4.984
Size		1.55	ESG BSize	1.573	ESGLIndex BInd	4.069
FCFF		1.545	FCFF	1.543	Div	1.803
Lev		1.512	Lev	1.502	FCFF	1.546
B Size		1.471	Size	1.499	Lev	1.415
BOD Indep		1.379	ESG BInd	1.398	Size	1.411
ESG		1.239	InstitOwnIQ	1.235	ESGLIndex BGD	1.216
InstitOwnIQ		1.23	Tang	1.154	InstitOwnIQ	1.185
Tang		1.165	ESG BGD	1.1	Tang	1.145
BOD WR		1.122	Mean VIF	1.423	Mean VIF	2.086
Mean VIF		1.402				
Heteroskedasticity	Chi2 Statistics Prob>Chi2	2.03 0.1546	1.55 0.2135		2.33 0.1266	
Omitted variables	F Statistics Prob>F	0.34 0.7981	0.27 0.8456		0.36 0.7823	
Autocorrelation	F Statistics Prob>F	3.588 0.0636	90.877 0.000		70.512 0.000	

Table 8 reveals no multicollinearity among the explanatory variables, no heteroskedasticity problem, and no omitted variables for all models. Furthermore,

autocorrelation problems do not exist for model 2 but exist for models 3 and 4. In conclusion, the researcher included a year fixed effect and a quadratic term of board size and leverage to address model specification errors using GLS to test the final fitted model as shown in Table 9.

Table 9 shows that board characteristics and ESG disclosure, as well as their interaction can explain 40.3%, 37.5%, and 36.9% of the variation in ROE for Egyptian listed firms in models 2, 3 and 4, respectively, using GLS. Furthermore, there is a positive, direct, and significant impact of ESG disclosure on firm value, as measured by ROE for Egyptian listed firms.

In addition, a curvilinear relationship exists between board size and ROE, signifying the presence of an optimal level of board size to maximize ROE. The turning point in this relationship equals 10 members, indicating that board size from 1 to 10 members has a positive association with ROE. However, board size exceeding 10 members negatively impacts ROE. In contrast, there is a negative significant impact of board independence on ROE for Egyptian listed firms. Finally, board gender diversity exhibits a positive, direct, and significant impact on ROE for Egyptian listed firms.

Table 9 *Hypothesis Testing*

The Moderating Impact of Board Characteristics on the Association Between ESG Disclosure and ROE

ROE	**Model 2**	**Model 3**	**Model 4**
ESG	0.001*	--	--
B_Size	0.0499***	--	--
B_Size2	-0.0026***	--	--
BOD_WR	0.0289*	--	--
BOD_Indep	-0.0730**	--	--
ESG_BSize	--	0.0004***	--
ESG_BSize2	--	-0.0000***	--
ESG_BGD	--	0.0002**	--
ESG_Bind	--	-0.0006*	--
ESGLIndex_BSize	--	--	-0.002
ESGLIndex_BSize2	--	--	0.000
ESGLIndex_BGD	--	--	0.0293*
ESGLIndex_BInd	--	--	0.024
Size	0.005	0.007	0.012
Lev	-0.4338**	-0.4048**	-0.3529*
Lev2	0.4449**	0.4241**	0.3862**
Tang	-0.1606***	-0.1731***	-0.1724***
FCFF	0.3734***	0.3725***	0.3759***
Div	1.2255***	1.2540***	1.3703***
InstitOwnIQ	-0.029	-0.032	-0.036
Cons	-0.197	-0.098	-0.056
Obs	362	362	362
R2	0.4033	0.3754	0.3689
Legend: * p<.1; ** p<.05; *** p<.01			

There is a negative and significant impact of tangibility on ROE for Egyptian listed firms. Conversely, FCFF and Cash dividends positively and significantly impact ROE for Egyptian listed firms. Moreover, firm size and institutional ownership exhibit no direct or significant impact on ROE. However, a curvilinear relationship exists between leverage and ROE.

Moderating Effect of Board Characteristics on the Association between ESG Disclosure and ROE:

- Board size mitigates the positive impact of ESG disclosure on ROE.
- Board gender diversity mitigates the positive impact of ESG disclosure on ROE.
- Board independence mitigates the positive impact of ESG disclosure on ROE

5.3.3. The Moderating Impact of Board Characteristics on the Association between ESG Disclosure and Firm Value as Measured by TQ

Table 10 demonstrates no multicollinearity among the explanatory variables. However, a heteroskedasticity problem exists in models 5 and 7. In contrast, there is no heteroscedasticity problem in model 6. In addition, the functional form is correct, and no omitted variables are present for all models. Moreover, autocorrelation problems exist for all models. In conclusion, the researcher included a year fixed effect and a quadratic term for board size and independence to address model specification errors, using GLS to test final fitted model as demonstrated in Table 11.

Table 10 *OLS Goodness of Fit (Models 5, 6, and 7)*
The Moderating Impact of Board Characteristics on the Association Between ESG Disclosure and TQ

Model 5			Model 6		Model 7	
Variable		VIF	Variable	VIF	VIF	VIF
Div		1.866	Div	1.858	ESGLIndex BSize	5.051
Size		1.625	ESG BSize	1.595	ESGLIndex BInd	4.101
FCFF		1.572	FCFF	1.57	Div	1.859
Lev		1.519	Size	1.552	FCFF	1.576
B Size		1.483	Lev	1.51	Size	1.441
BOD Indep		1.38	ESG BInd	1.398	Lev	1.423
Vol		1.373	Vol	1.36	Vol	1.351
Tang		1.33	Tang	1.32	Tang	1.303
ESG		1.277	InstitOwnIQ	1.257	ESGLIndex BGD	1.217
InstitOwnIQ		1.253	BAS	1.172	InstitOwnIQ	1.208
BAS		1.2	ESG BGD	1.102	BAS	1.176
BOD WR		1.129	Mean VIF	1.427	Mean VIF	1.973
Mean VIF		1.417				
Heteroskedasticity	Chi2 Statistics Prob>Chi2	47.25 0.000	27.33 0.3298		35.52 0.000	
Omitted variables	F Statistics Prob>F	1.06 0.3678	1.15 0.3298		1.14 0.3344	
Autocorrelation	F Statistics Prob>F	45.051 0.000	44.110 0.000		44.217 0.0000	

Table 11 *Hypothesis Testing*
The Moderating Impact of Board Characteristics on the Association Between ESG Disclosure and TQ

TQ	Model 5	Model 6	Model 7
ESG	0.01199**	--	--
B_Size	0.14326***	--	--
B_Size2	-0.00703***	--	--
BOD_WR	0.078	--	--
BOD_Indep	0.98839**	--	--
BOD_Indep2	-1.24337***	--	--
ESG_BSize	--	0.00022**	--
ESG_BGD	--	0.001	--
ESG_BInd	--	-0.00276**	--
ESGLIndex_BSize	--	--	-0.008
ESGLIndex_BSize2	--	--	0.000
ESGLIndex_BGD	--	--	0.167
ESGLIndex_BInd	--	--	0.476
ESGLIndex_Bind2			-0.283
Size	-0.12954***	-0.10826***	-0.09828***
Lev	0.91910***	0.91639***	1.11649***
Tang	-0.260	-0.52340***	-0.32806**
FCFF	0.626	0.74676**	0.665
Div	7.32414***	6.20808***	8.07260***
InstitOwnIQ	0.58066***	0.88194***	0.53031***
BAS	5.97924***	5.93994***	5.07464***
Vol	0.04826**	0.08014***	0.05117**
Cons	0.105	1.024	1.68954***
Obs	362	362	362
R2	0.47634	0.56908	0.41574
Legend: * p<.1; ** p<.05; *** p<.01			

Table 11 shows that board characteristics, ESG disclosure, and their interaction explain 47.6%, 56.9%, and 41.6% for models 5, 6 and 7, respectively, of the variation in TQ of Egyptian listed firms, using GLS. There is a positive direct significant impact of ESG disclosure on TQ for Egyptian listed firms. In addition, a curvilinear relationship exists between board size and TQ, signifying the existence of an optimal level of board size to maximize TQ, with a turning point in the association = 10 members. Similarly, a curvilinear relationship is observed between board independence and TQ, where the turning point in association is 39.7%. Additionally, no direct significant impact of board gender diversity on TQ is found for Egyptian listed firms. However, a positive, significant, and direct impact of firm size, leverage, free cash flow, cash dividends, institutional ownership, bid-ask spread, and trading volume is observed on TQ. In contrast, there is a negative, significant, and direct impact of tangibility on TQ for Egyptian listed firms. **The Moderating effect of board characteristics on the association between ESG disclosure and TQ:**

- Board size mitigates the positive effect of ESG disclosure on TQ for Egyptian listed firms.
- Board gender diversity has no effect on the association between ESG disclosure and TQ.
- Board independence mitigates the positive effect of ESG disclosure on TQ for Egyptian listed firms.

A summary of the empirical study results and their implications for the research hypotheses are presented in Table 12.

Table 12 *Summary of the Empirical Study Results*

The Tested Hypotheses	Variables Tested	Type & Strength of the relation	Accepted or Rejected
H1: ESG Disclosure is positively associated with firm value	ESG Disclosure & ROE	+ Significant	Accepted
	ESG Disclosure & TQ	+ Significant	Accepted
H2: BOD characteristics are positively associated with ESG disclosure	Board Size & ESG Disclosure	+ Significant	Accepted
	Board Independence & ESG Disclosure	curvilinear relationship	Accepted
	Board Gender diversity & ESG Disclosure	+ Significant	Accepted
H3: BOD characteristics moderate the relationship between ESG disclosure and firm value.	ESG Disclosure and ROE through Board size	_ Significant	Accepted
	ESG Disclosure and ROE through Board Independence	_ Significant	Accepted
	ESG Disclosure and ROE through Board Gender Diversity	_ Significant	Accepted
	ESG Disclosure and TQ through Board size	_ Significant	Accepted
	ESG Disclosure and TQ through Board Independence	_ Significant	Accepted
	ESG Disclosure and TQ through Board Gender Diversity	No relation	Rejected

6. Conclusion and Recommendations

The literature presents two arguments regarding sustainability reporting. The first argument, the value creation perspective, views ESG as a tool for generating competitive advantage and as a result, enhances firm value, and the cost-of-capital reduction perspective, suggests that investing in ESG increases costs and leads to economic consequences, resulting in lower firm value. Given the presence of two opposing theories, this study empirically investigated the impact of ESGD on several indicators of firm value within the Egyptian context. It further explored the potential moderating effect of board size, board independence, and board gender diversity on this relationship, using a sample of 56 listed firms over the period 2015-2022.

The findings indicate that firms with higher ESG disclosure scores exhibit higher firm value, supporting the value creation theory and signaling theory, which implies that ESGD can be used as a long-term corporate strategy for enhancing a firm's image and reputation, with the expectation of long-term value creation. This result is consistent with Aboud and Diab (2018) and Shalihin et al. (2020), who reported a positive impact of ESG disclosure on firm value, as measured by Tobin's Q, and with Johari and Komathy (2019), who observed a positive impact of sustainability reporting on ROA. However, it contrasts with Johari et al. (2019) and Buallay (2019), who found a negative relationship between sustainability reporting and firm performance, as measured using ROE.

Furthermore, the findings of this paper reveal a significant positive impact of board size on ESG disclosure for Egyptian listed firms. It is consistent with Samaha et al. (2012) and Khaireddine et al. (2020), while contradicting with Alzead (2017) and Ntimet al. (2017), who reported a negative relationship between board size and ESG disclosure. Moreover, the study shows a significant positive impact of board gender diversity on ESG disclosure for Egyptian listed firms, aligning with Manita et al. (2018), who concluded that as more women are appointed to boards, the company tends to demonstrate higher ESG disclosure. However, it contradicts Ismail et al. (2019), who observed that women directors were negatively associated with firm sustainability practices.

In contrast, a curvilinear relationship exists between board independence and ESG disclosure, demonstrating the existence of an optimal level of board independence that maximizes ESG disclosure for Egyptian listed firms. This finding contradicts Prado-Lorenzo and Garcia-Sanchez (2010), who concluded that independent directors have no influence on ESG disclosure. A possible explanation for such result could be attributed to the presence of a larger board size, which provides more resources for consulting and monitoring roles, consequently enhancing firm value. Moreover, board independence increased the efficiency of BOD in overseeing the management of the firm and facilitated its decision-making regarding socially responsible investments, thereby maximizing firm value. Similarly, board gender diversity fosters creative thinking and introduces new ideas on qualitative issues such as social responsibility, and consequently leads to improved firm value. Finally, the results of this paper indicate that both board size and board independence have a positive moderating effect

on the ESGD – FV relationship. However, board gender diversity does not strengthen or weaken the effect of ESGD on firm value, as measured by TQ.

This study has practical implications for regulators, investors, and firm managers in the Egyptian stock market. For instance, firms may improve ESGD while integrating their ESG information into their financial reports, which may assist investors to more accurately value firms based on ESG indicators and make more informed investment decisions. Additionally, the findings suggest that Egyptian regulators should raise awareness of the significance of corporate sustainability, develop more effective enforcement mechanisms for listed companies to mandatorily disclose ESG practices within their annual reports, and enforce compliance with sustainability guidelines. Finally, it is recommended that Egyptian companies establish a 'Sustainability Committee' with adequately qualified members to oversee companies' sustainability activities, thereby improving overall sustainability practices and contributing to sustainable development in Egypt.

7. Suggestions for Future Research

First, future research could explore external corporate governance mechanisms, such as institutional ownership and legal systems, and consider other board characteristics, including foreign directors, board education, and board experience. Second, this study focuses on firms listed on EGX, which are large firms. Future research could investigate ESG performance for small-and-medium enterprises (SMEs), which also encounter sustainable development issues but address them in an unobservable way. Third, the results of this study are based on an Egyptian sample; thus, they cannot be generalized to other countries with different corporate governance settings. Therefore, future research could replicate this study in different contexts. Specifically, comparative studies between several countries or sectors, such as manufacturing and service sectors, are strongly recommended. Finally, the empirical results of this study are limited to a specific set of identified control variables. Future research could add more control variables related to governance, firm characteristics, and the COVID-19 pandemic, which would enhance the credibility of the findings.

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