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Empirical investigation of the associations among sustainability disclosure, sustainability performance and firm value in the context of stakeholder theory: Insights from an emerging market

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التحقق الميداني للعلاقة بين الإفصاح عن الاستدامة وأداء الاستدامة وقيمة الشركة في إطار نظرية أصحاب المصلحة: دليل ميداني من الأسواق الناشئة

الملخص:

الهدف من هذه الدراسة هو الحصول علي دليل ميداني في الأسواق الناشئة لأثر استراتيجية إدارة العلاقات مع أصحاب المصلحة على كل من الإفصاح عن الاستدامة وأداء الاستدامة وقيمة الشركة.

وتستخدم الدراسة منهج المتغيرات التفسيرية لمعالجة التجانس الداخلي (endogeneity) لمتغيرات الدراسة، بالإضافة إلى قياس متغيرات الدراسة من خلال إدخال التباطؤ الزمني بين المتغيرات. كما تعتمد الدراسة على بناء نماذج المعادلات الآنية ذات المربعات الصغرى ذو المرحلتين (2SLS).

وتشير نتائج الدراسة إلى وجود علاقة إيجابية معنوية بين الإفصاح عن الاستدامة وأداء الاستدامة. كما توصلت الدراسة إلى وجود علاقة إيجابية بين الإفصاح عن الاستدامة في السنة الحالية وأداء الاستدامة في السنة السابقة، بالإضافة إلى أن مستوى الإفصاح عن الاستدامة في الفترة السابقة يشكل أساسًا لأداء الاستدامة في الفترة الحالية. بالإضافة إلى وجود تأثير سببي إيجابي لأداء الاستدامة والإفصاح على قيمة الشركة. كما تظهر تلك النتائج كيف أن ممارسات تنمية الاستدامة في الشركات تحقق تأثيرات إيجابية (مالية وغير مالية).

وتوفر تلك الأدلة الميدانية قوة التفسيرية لأهمية بناء نماذج مستقبلية للتنبؤ بأثر المتغيرات الشرطية لكل من ضغوط أصحاب المصلحة، والموقف الاستراتيجي للشركة، والأداء الاقتصادي على الإفصاح عن استدامة الشركات وأدائها.

Empirical investigation of the associations among sustainability disclosure, sustainability performance and firm value in the context of stakeholder theory: Insights from an emerging market

Abstract

The purpose of this study is to investigate how management's strategy for managing stakeholder relations jointly affects sustainability disclosure, sustainability performance, and firm value in an emerging market after explicitly considering the endogeneity problem. The study uses an instrumental variables approach to treat the endogeneity of three variables. The study's variables are measured in a temporal sequence by introducing a time lag. The study specifies the three variables in two-stage least square (2SLS) simultaneous equations models. The study findings indicate a significant positive relationship between sustainability disclosure and sustainability performance. The study also finds a positive relation between current sustainability disclosure and past sustainability performance and document that the level of sustainability disclosure in the prior period sets a base for sustainability performance in the current period. The study finds a positive causal effect of sustainability performance and disclosure on firm value. The findings clarify how corporate sustainability development practices generate financial and non-financial rewards. The empirical evidence in this study may enhance the explanatory power of future models designed to predict corporate sustainability actions by providing insights into the contingency factors' stakeholder power, firm's strategic posture, and economic performance that influence corporate sustainability disclosure and performance.

Key words Sustainability disclosure, Sustainability performance, Stakeholder theory, Two-stage least square regression (2SLS), Endogeneity problem, instrumental variables

1 .Introduction

Concerns about the economic benefits of overtly supporting societal and environmental causes have been argued since the 1970s. However, the formation and evolution of stakeholder theory by Freeman (1984) and its instrumental considerations (Donaldson and Preston, 1995) set the foundation for corporate sustainability. Companies engage in corporate sustainability to satisfy stakeholders. Financial and non-financial gains are expected to help build and maintain valuable intangible assets (Lourenço et al., 2012). It is a response to stakeholder expectations. Thus, corporate sustainability disclosure is either a supplement to or a replacement for managing stakeholder relations.

The primary objective of this study is to investigate how management's strategy for managing stakeholder relations jointly affects (i) sustainability disclosure, (ii) sustainability performance, and (iii) firm value. The link between sustainability disclosure, sustainability performance, and firm value has not been studied in emerging markets. However, one dimension of sustainability practices has received considerable attention.

A considerable amount of literature in strategic management, marketing, environmental economics, business ethics, and finance has empirically investigated many different angles regarding the extent to which corporate sustainability development can lead to demonstrably superior firm financial performance or not.

However, most accounting studies related to corporate sustainability practices have concentrated mainly on providing empirical evidence on how sustainability activities and their disclosure are reflected in the market value equity (e.g., Fatemi et al., 2018; Mirralles-Quiros et al., 2107; Lourenço et al., 2012; Buallay et al., 2020; Buallay, 2020; Buallay, 2019; Gillan et al., 2021; Azmi et al., 2021). Other studies focused on whether higher corporate sustainability disclosure levels reflect more sustainability performance (e.g., Herbohn et al., 2014; Acar and Temize, 2020; Papoutsi and Sodhi, 2020; Gillan et al., 2021). Furthermore, because these disclosures are mainly voluntary in emerging markets, some studies focused on the determinants of corporate sustainability disclosures (e.g., Naser et al., 2006; Naser and Hassan, 2013; Kolsi and Attayah, 2018; Ng and Rezaee, 2020).

More recently, literature has emerged that offers contradictory and unreliable findings of the three variables' pair-wise relationships. We find all kinds of explanations in the literature related to sampling problems, issues related to validity and reliability of the measurements of the variables, the omission of controls, opportunities to test mediating mechanisms and moderating conditions, or a need for causal theory to interpret the link between variables (Margolis and Walsh, 2003).

Despite their usefulness, these explanations are unsatisfying since the fundamental issue is that managers make strategic decisions based on expectations of future performance (Hamilton and Nickerson, 2003; Garcia-Castro et al., 2010). In other words, management actions affect predicted performance. These expectations stem from managers' internal characteristics, but external researchers do not (Garcia-Castro et al.,2010). Unobserved variables (if not included as control variables in the model specification) can lead to erroneous coefficient estimates and, more significantly, faulty causal theory conclusions—omitted factors connected with strategic choice and company performance cause biases (Hamilton and Nickerson, 2003). In other words, management's decision to increase sustainability disclosure and performance is endogenous and presumably associated with firm-specific characteristics. This issue is called a classic endogeneity problem[1].

This study will address this issue by examining the literature on sustainability disclosure, performance, and firm value. Apart from the study by Al-Tuwaijri et al. (2004)[2], there is a general lack of research on this issue. Al-Tuwaijri et al. (2004) examine the link between environmental disclosure, environmental performance, and economic performance within simultaneous cross-sectional equations approach using US data, finding that estimates of the relationship can be severely biased if the endogeneity is not accounted for, possibly explaining the mixed results in previous examinations of the (pair-wise) links between the three variables. Taking endogeneity into consideration enables them to capture the effect of the overarching management strategy. Al-Tuwaijri et al. (2004) find that the three variables are strongly positively related.

[1]. The definition of endogeneity includes common econometric problems such as simultaneity bias, correlated variables, reverse causality, and omitted variables (Wooldridge, 2002).

[2]. Al-Tuwaijri et al. (2004) limit their investigation to environmental issue as a subset of corporate sustainability development.

This study aims to address the following research questions: First, how are sustainability disclosure, sustainability performance, and firm value interrelated after the endogeneity of these three variables is explicitly considered? Second, how can we ensure that our econometric model is not underspecified?
We first specify sustainability disclosure, sustainability performance, and firm value in two-stage least squares (2SLS) simultaneous equations models to address these questions. Also, the study uses direct measures of sustainability disclosure and sustainability performance as the dependent and independent variables in the econometric model. The study uses an instrumental variable approach[3] to solve the problem of endogeneity. The model's instrumental variables are adopted from Ullmann's (1985) contingency framework for predicting corporate social responsibility activity and disclosure levels. By adopting Ullmann's (1985) conceptual framework, the firm's strategic management process directs sustainability performance and sustainability disclosure as endogenous variables.

After controlling for endogeneity, the results show that "good" corporate sustainability disclosure (top 30 Egyptian companies by ESG index) is positively associated with "good" corporate sustainability performance, and most proxies of instrumental variables are positively associated with both. The study found a link between present sustainability disclosure and prior performance. However, the past period's sustainability disclosure level sets the stage for the current period's performance. Also, both sustainability performance and disclosure are linked to corporate value. The findings suggest that fulfilling stakeholder expectations and norms can boost a firm's performance on several internal and external levels.

The study adds to the body of accounting research concentrating on the market consequences of sustainability performance-disclosure relationships in emerging markets. First, this study uses instrumental variables to deal with the endogeneity of sustainability performance, sustainability disclosure, and firm value. The study reveals that including instrumental variables in the model specification considerably influences the statistical significance of inferred interrelations. Second, the findings show that using instrumental stakeholder theory in the empirical examination of sustainability performance, disclosure, and firm value relationships can yield valuable insights. This study presents empirical data on how and when management's strategy for managing stakeholder relationships influences sustainability disclosure, sustainability performance, and firm value. Thus, empirical evidence may help future models predict or explain corporate sustainability activities by offering insights into stakeholder power, a firm's strategic posture, and economic performance. Third, the study adds to emerging market accounting literature by examining the economic implications of sustainability disclosure performance in Egypt. An example of the Egyptian market and institutional environment contributes to the current sustainability disclosure-performance link.

The study has been divided into four parts. The first part reviews the theory and the related literature and frames the testable hypothesis; the second introduces the methodological approach taken in this study and simultaneous equations model (2SLS) and describes the variables and sampling selection; the third part provides the empirical results; The final part summarizes the study's conclusions, implications, and limitations.

[3]. Instrumental variables are also used to mitigate measurement error in the independent variables.

2. Theory and hypotheses development

We analyze previous studies on sustainability disclosure, performance, and financial performance to frame our study. Few studies have attempted to conceptually combine social/environmental disclosure, performance, and financial performance (e.g., Freedman and Jaggi, 1982; Al-Tuwaijri et al., 2004). Most studies focus on one or two of these links.

2.1 Social/Environmental disclosure - Social/Environmental performance

Much of the current research on sustainability disclosure and performance focuses on the environmental disclosure-performance relation. Several studies have investigated the relationship between environmental disclosures and environmental performance. According to recent findings, there is no systematic and statistical significance link between environmental disclosures and environmental performance in the research literature. Some studies found no relationship (Ingram and Frazier, 1980; Wiseman, 1982; Freedman and Wasley, 1990), others found a negative relationship (e.g., Deegan and Gordon, 1996; Deegan and Rankin, 1996; Brown and Deegan, 1998; Hughes et al., 2001; Cowan and Deegan, 2011), others a positive relationship (e.g., Al-Tuwaijiri et al., 2004; Clarkson et al., 2008; Clarkson et al., 2011; Acar and Temize, 2020; Azmi et al., 2021).
The conflicting results make drawing solid conclusions concerning environmental disclosure and performance complex. According to Patten (2002), the inconsistent data on environmental disclosure – performance can be related, at least in part, to the researchers' choice of measuring environmental performance and disclosure.

Both Acar and Temize (2020) and Clarkson et al. (2008) suggest that two theories explain further evidence for the connection between voluntary environmental disclosure and environmental performance. They claim that economic theories of disclosure anticipate a positive association between the two because good environmental performers will want to convey a signal to investors that is difficult for inferior performers to emulate.

On the other hand, legitimacy and stakeholder theories would lead to a negative correlation, arising more from political and sociological than economic perspectives. Weak performers have more significant incentives to disclose to enhance their legitimacy and persuade stakeholders that their actual behavior is better than perceived. These trade-offs are likely to vary by industry and with company characteristics such as size, management structure, and approach (e.g., Cormier and Magnan, 1999), and with the value of a firm's reputational capital and the strength of its media presence (e.g., business to business versus business to customer firms – see Brown and Deegan, 1998), and with debt-to-equity ratio (leverage), listed and unlisted firms, and cross-country differences in reporting patterns.

Overall, evidence suggests that including external stakeholders in sustainability disclosure increases sustainability performance (Topping, 2012; Papoutsi and Sodhi, 2020; Gillan et al., 2021; Azmi et al., 2021). So, we expect more significant results with more transparency. Using the lens of stakeholder theory and given the institutional settings of the Egyptian context, hypothesis one stated in the alternative form is:

H1: Corporate sustainability disclosure is positively and significantly associated with its sustainability performance.

2.2 Social/Environmental performance-financial performance

According to the meta-analysis by Horváthová (2010) and Orlitzky et al. (2003), many studies found a positive relationship between social/environmental performance and financial success, while others found a negative one. There are three different arguments in the literature supporting different empirical outcomes. Some claim that socially conscious managers can better manage their firms' finances (Alexander and Buchholz, 1978). Sharfman and Fernando (2008) show that improving company environmental performance leads to "a shift from equity to debt financing and larger tax savings associated with the flexibility to increase debt." From a shareholder standpoint, such socially responsible enterprises are at a competitive disadvantage because of the increased costs (Vance, 1975). The third theory is the efficient market hypothesis, which supports the quick integration of new information, thereby neutralizing the impact of corporate social performance on financial performance (Fama, 1970; Alexander and Buchholz, 1978).

As a result, many articles now support synergetic, "Win-Win," or "Lose-Lose" strategic outcomes, rather than the traditional view of an inevitable tradeoff between corporate social/environmental performance and corporate financial performance (e.g., McWilliams and Siegel, 2011; Orlitzky et al., 2003; Wagner and Schaltegger, 2004; Ng and Rezaee, 2020). Jiao (2010) demonstrates that corporate social responsibility may raise the market value by improving employee welfare and environmental performance. In contrast, Kumar et al. (2016) discovered that failing to achieve primary or secondary stakeholder expectations results in poor financial performance.

Thus, early study results on the link between social/environmental success and financial performance sparked substantial controversy. Overall, there appears to be overwhelming evidence linking business social/environmental performance to financial performance, and this study evolved to explore that relationship in greater detail. Using the lens of stakeholder theory and based on the characteristics of the Egyptian context, hypothesis two stated in the alternative form is:

H2: Corporate sustainability performance is positively and significantly associated with its financial performance.

2.3 Social/Environmental disclosure-financial performance

A growing amount of research has examined the information contained in environmental disclosures using value relevance methodology (e.g., Cormier et al., 2011; Qiu et al., 2016; Aureli et al., 2020). Internal stakeholders, particularly present and future employees, are likely to be more concerned about social disclosures. The lack of evidence may be due to the difficulties in gathering appropriate data rather than environmental concerns. There was no simultaneous association between social/environmental disclosure and financial performance measured narrowly using profitability in early research (e.g., Abbott and Monsen, 1979; Belkaoui and Karpik, 1989; Freedman and Jaggi, 1988).

Socially/environmentally irresponsible company activities, formerly normal, have increasingly become unacceptable among stakeholders as both the regulatory environment and public demands have raised expectations. According to Cormier and Magnan (2007), voluntarily reporting on environmental concerns improves a firm's perceived transparency to investors and helps them to anticipate future profitability more precisely. Thus, even such disclosure is predicted to improve the relationship between earnings and stock market valuation.

An analysis of the relationship between CSR disclosures and stock returns was carried out by Murray et al. (2006) using the CSEAR database. Stock returns and CSR disclosure have no

relationship. Researchers found a strong link between high (poor) returns and high (low) disclosure using longitudinal data.

Other scholars have investigated the value of CSR disclosure (Schadewitz et al. 2010; De Klerk et al. 2012). The researchers found that the GRI standards are essential in explaining the firm's market value.

Recent research by Carnevale and Mazzuca (2014) and Buallay (2019) for a sample of European banks shows that releasing a sustainability report boosts stock values. In the Canadian context, Berthelot et al. (2012) revealed that investors appreciate sustainability reporting when it is included in the valuation model. Cardamone et al. (2012) investigated the value relevance of issuing a sustainability report for a sample of Italian-listed firms. They found a negative correlation between a firm's market worth and sustainability reports. Buallay et al. (2020) observed that ESG has a considerable beneficial influence on performance and economic advantages to shareholders in MENA.

For the Egyptian setting, one study by Aboud and Diab (2018) investigated the impact of firms' listed and ranking in the sustainability index (Standard & Poor's S&P)/ EGX (ESG) index on firm value. They found a positive association between the firm's higher rankings in the index and firm value. In the same vein, Eldomiaty et al. (2016) examined the financial aspects of high vs. low-ranked firms in Egypt's sustainability index. Using a sample of firms listed in EGX30, they found that higher-ranked firms are characterized financially by solid bargaining power with suppliers, financing growth in the fixed assets using debt mainly.

Cormier et al. (2009) evaluated the influence of precision social and human capital disclosures on stock market information asymmetry assessed by company market value. Investors are likely to favor objective and more exact voluntary disclosures in these areas since social and human capital is a fundamental generator of firm value. On the other hand, they observed a positive correlation between social disclosure information precision and firm market value.

In line with Cormier et al.'s (2009) findings, we argue that broad and objective sustainability disclosure can help generate goodwill and confidence among key stakeholders while lowering transaction costs. As a result, according to stakeholder theory, objective and broad sustainability disclosures should improve financial performance. Based on these arguments and the contextual factors of the Egyptian settings, hypothesis three stated in the alternative form is:

H3*:* Corporate sustainability disclosure is positively and significantly associated with its financial performance.

3. Methodology

3.1 Theoretical model

We hypothesize that financial performance (e.g., firm value) is affected jointly by its sustainability performance and the intensity of its sustainability disclosure. We expect a positive association between the firm’s sustainability disclosure and its sustainability performance, given extant findings. We also expect a positive relationship between sustainability performance, disclosure, and firm value.

However, considering that different managerial motives can drive sustainability disclosure, we do not form directional expectations regarding the first-order relationship between sustainability disclosure and performance with firm value or the interaction terms between sustainability performance and sustainability disclosure.

Examining the associations between sustainability disclosure, sustainability performance, and firm value requires that we first address the potential endogeneity of the interaction terms between sustainability disclosure and sustainability performance. We must further consider the possible endogeneity of the interaction between sustainability disclosure and firm value resulting from correlated variables, omitted variables, reverse causality, or simultaneity bias. If, for example, firm value affects sustainability disclosure, then the latter will be correlated with the error term in a regression of firm value on sustainability disclosure, and the estimated coefficient will be biased and inconsistent.

Thus, the study uses an instrumental variable approach. In specifying our model, we use three instrumental variables for our potentially endogenous variables—the three instrumental variables will adopt from Ullmann's (1985) contingency framework. Ullmann (1985) presented a three-dimensional model (stakeholder power, firm's strategic posture, and economic performance) as contingency factors to explain almost all correlations among social disclosure and social and economic performance. Therefore, depending on Ullmann's three dimensions' configuration, a firm will use either sustainability performance or sustainability disclosure or both mechanisms to manage its relationship with its stakeholders. Thus, our basic theoretical model is as follows:

Sustainability disclosure =

f (Sustainability performance and Instrumental variables and Controls variables)

Sustainability performance =

f (Sustainability disclosure and Instrumental variables and Controls variables)

Firm value =

f (Sustainability performance and Sustainability disclosure and Control variables)

The relationships between sustainability disclosure and sustainability performance with the firm value could be a result of a causal effect of corporate sustainability performance on sustainability disclosures or a causal effect of both sustainability performance and disclosure on firm value (e.g., positive effects of sustainability activities and disclosure on meeting the long- and short-term interests of stakeholders) (Van der Stede, 2014). Consequently, the study measures variables in a temporal sequence by introducing a time lag (subsequent measurement) to find evidence that allows for an inference of causation. Besides the temporal sequence of measured events, another important aspect that needs to be considered is the temporal distance of the variable's measurements (Mitchell and James, 2001). As stakeholder power, firm's strategy posture, and economic performance, representing instrumental variables for sustainability performance and disclosure on firm value, can be considered to induce short or mid-term effects, a time frame of at least one year seems adequate.

For this study, using 2SLS allows us to estimate each of the equations of the simultaneous-equation model separately. The 2SLS method effectively simplifies the analysis to a single-equation model. This single equation setting allows us to examine other econometric issues, such as omitted variables, that can be addressed using instrumental variables (Chenhall and Moers, 2007).

Larcker and Rusticus (2010) argued that, besides providing some theoretical arguments for why the instruments are expected to be relevant and exogenous, specification tests need to be

performed to collaborate this argument. The specification tests for relevance are the first-stage exclusion restriction and Shea's partial R^2, which examine whether the instruments are significantly related to the endogenous explanatory variables and how much variance is explained by the instruments. The specification test for the exogeneity is the overidentifying restriction, which can only be used if the number of instruments exceeds the number of endogenous variables (overidentification).

3.2 Variable definitions and measurements

Table 1 shows variable definitions and measurements.

Table 1. Variables' definition and measurements

Variables	Definition and measurement	Predicted sign
Endogenous variables		
Sustainability disclosure (SUSDIS)	S&P/EGX ESG index.	N/A
Sustainability performance (SUSPEF)	SUSPEF index is calculated based on IFC framework: total score of indicators for five factors divided by total of raw score of indicators for five factors.	N/A
Exogenous variable		
Firm value (Tobin Q)	The ratio of the firm market value (total debt + market value of equity) over the value of total assets.	N/A
Instrumental variables		
Stakeholder power Proxy 1 (PSHCO)	The percentage of corporation owned by management and by individuals' shareholders owning more than 5% of outstanding shares in 2013-2017.	-
Proxy 2 (DEBEQU)	Average debt to equity ratio 2013-2017.	+
Strategic posture Proxy (PHIFOU)	PHIFOU=1 if corporation sponsors a philanthropic foundation in 2013-2017, else PHIFOU = 0.	+
Economic performance Proxy (AACROE)	Average annual change in return on equity 2013-2017.	+/-
Control variables		
Firm size (LNSALES)	Natural logarithm of sales.	+/-
Asset intensity (ASSETSAL)	Ratio of assets to sales.	-
Research and development intensity (R&D)	R&D expenditures scales by sales.	+
Asset age (NPPEGPPE)	Ratio of net property plant, and equipment to gross property, plant, and equipment.	+

Endogenous Variables

Sustainability disclosure (SUSDIS)

Thomson Reuters, Bloomberg ESG ratings, and Kinder, Lyndenberg, and Domini (KLD) sustainability scores are three extensively used sustainability disclosure proxies. Nevertheless, Egypt's data is not available on these sites, unlike other emerging countries. So, this study uses the S&P/ EGX ESG Index[4] scores to assess ESG practices. ESG factors are compared to the

[4]. S&P Dow, Jones Indices partners with the Egyptian Exchange (EGX) and the Egyptian Corporate Social Responsibility Center (ECRC) to provide investors with objective benchmarks for managing their ESG investment portfolios.

S&P/EGX Environmental, Social, and Governance index. In the index are 30 companies (companies) from a pool of 100 Egyptian firms. The universe's 100 firms were selected via a screening procedure. As part of the screening process, ESG indicators are used to assess the company's transparency and disclosure procedures. There are two screens, one for environmental and social indicators and the other for corporate governance indicators[5].
After the screening procedure, a score or rating is assigned to each company in the universe. These include yearly reports, online bulletins, and stock exchange filings. A company's transparency on any of the ESG screening system's indicators is assessed in this way.

A three-stage index building process First, a quantitative score is awarded to each company listed on the EGX based on three factors: corporate governance, environmental practices, and social governance transparency and disclosure. Each index company's raw value for each factor is computed separately. Then they are standardized. The three standardized values are added together, and the firms are rated. Second, the qualitative score; the top firms from the T&D process are chosen for the qualitative process. The actual performance of each firm is assessed using independent sources of information, news items, websites, and CSR filings. In the end, each firm's qualitative and quantitative scores are added up. It is from this pool that the top 30 stocks are picked. This list is updated annually. In this study, because the index includes the top 30 firms, the ranking was converted into a relative score; the maximum score of 30 is given to the best firm in the index, the second-best company is 29.

Sustainability performance (SUSPEF)
The second crucial methodological technique is measuring sustainability performance. Since much earlier research primarily focuses on narrowly defined environmental or social performance elements, we attempted to construct a proxy for overall sustainability performance that incorporates multi-facets of sustainability performance.
The US EPA's Toxic Release Inventory (TRI) is one of the most widely used environmental performance measures (TRI). It is essential for researchers who only study the environmental aspect of CSR. Also available for use is the Kinder, Lyndenberg, and Domini database (KLD). When using a broader definition of CSR, KLD ratings dominate. Aktas et al. (2011) suggested using Intangible Value Assessment (IVA) to quantify CSR, which is less common.

As a result, we adapt and operationalize the IFC's (IFC, 2002) "Measuring Sustainability: A Framework for Private Sector Investments" to create a sustainability performance index. This approach seeks to clarify what "added value" or "doing good" implies regarding environmental, social, and governance impacts on overall development. Table 2 shows the framework's three major sections, each with eight components. Positive environmental, social, and corporate governance effect is not binary problem. The framework can be quite beneficial for better, more subtle impact evaluations than a traditional technique. The four performance levels indicate a progression of sustainable practices:
Level 1: shows compliance with IFC's required standards where they exist.
Level 2: indicates the creation of local or global environmental, social, or corporate governance value, either by reducing resource use, emissions, or waste; by broadening the beneficiaries of economic activity; or by positively affecting the views of potential investors.

[5]. For more information, see appendix I & II in the S&P / EGX Environmental, Social and Governance (ESG) index methodology (January 2018).
https://www.spglobal.com/spdji/en/documents/methodologies/methodology-sp-egx-esg-index.pdf

Level 3: signifies that a firm's positive impact influences other firms' behavior, creating a further-reaching demonstration impact.
Level 4: describes a leadership position in which a firm has an extensive influence in driving best practices.

Following the same procedures in the Herbohn et al. (2014, p. 434) study, we pre-tested the IFC framework on six firms in ESG 30 in 2017. The test firms were selected based on their activities (Cement: 2 firms); (Chemicals: 1 firm); (Ceramics and Porcelain: 1 firm); (Steel: 1 firm); and (Food: 1 firm). During this iterative testing process, particular care was taken to develop decision rules to limit the variation in the scoring of the index.

As a result of the testing process, we modified the IFC framework by constructing five factors and 23 indicators as in appendix I. Firstly, factors three, five, and six were excluded. Factor three, "Accountability and transparency," was removed because it encompassed sustainability disclosure. Factor five, "environmental performance of products and services," was excluded because it is not possible to accurately measure the environmental performance for each end product of sample firms. Factor six, "local economic growth and partnerships," focuses on firms, commitment to local economic growth and partnerships and is more relevant in developed countries than in developing countries like Egypt. A further consideration was that at least some aspects of a firm's relationship with the local community and society at large were already captured by other factors in the sustainability performance index. Secondly, we included three additional sustainability performance indicators relevant to the Egyptian context. They relate to compliance with the Egyptian principles of corporate governance, which are obligatory by the Egyptian Stock Exchange (two indicators) and a firm's health and safety management system (one indicator). Thirdly, we replaced the four levels of performance used within the IFC framework with a binary coding scheme (0 or 1) for the indicators since testing highlighted considerable overlap and ambiguity between the four levels.

The total maximum score scales the total score for each factor to ensure that each of the five factors in the index is equally weighted. Thus, the sustainability performance score ranged from a minimum of zero to a maximum of five. We assess sustainability performance using the information provided by firms in their 2017 annual reports and websites and any information available from external sources.
$SUSPEF$ index is calculated for a particular company as follows:

$$SUSPEF\ Index = \sum_{i=1}^{n} \sum_{j=1}^{m} \frac{F_{ij}}{T_{ij}}$$

Where;
F_{ij} , is the total score of indicator j for factor i in a particular company.
j=1, 2,…,m; where (m) the number of indicators .
i=1,2,…,n; where (n) the number of factors.
T_{ij} is the total of raw score of indicator j for a factor i.

Table 2. Main categories and factors in IFC framework, Source: (IFC 2002)

Main Category	Factors
Management commitment and governance	• **Factor 1:** Environmental management, social development commitment, and capacity • **Factor 2:** Corporate governance • **Factor 3:** Accountability and transparency
Environment	• **Factor 4:** Eco-efficiency and environmental footprint • **Factor 5:** Environmental performance of products and services
Socioeconomic development	• **Factor 6:** Local economic growth and partnerships • **Factor 7:** Community development • **Factor 8:** Health, safety, and welfare of the labor force

Exogenous variable

Firm value (Tobin Q)

The study adopts Tobin Q as the exogenous variable to measure the firm's market value. Tobin Q represents the investor's perception of the market value of corporations compared to its book value. This measure is selected rather than using accounting measures [e.g., return on assets (ROA) and return on equity (ROE] because it reflects the future performance of corporations. Inoue and Lee (2011) noted that this measure had been used widely in previous CSR and financial performance. Inoue and Lee (2011, p.794) added that "this perception is a forward-looking risk-adjusted and more robust to accommodating changes than accounting practices." The Tobin Q in this study is calculated as follows:

$$\text{Tobin Q} = \frac{(\text{Total debt+market value of equity})}{\text{book value of total assests}}$$

Instrumental variables

Stakeholder power

The degree of a stakeholder's control over corporate resources is considered their power (Ullmann, 1985). A positive association between stakeholder power and sustainability performance and disclosure is expected if sustainability activities are seen as successful stakeholder management strategies (Roberts, 1992). A growing body of research shows that sustainable business practices benefit investors, creditors, and governmental authorities (Dierkes and Antal, 1985). Developing a company reputation for sustainability via performance and disclosure is part of a strategy for managing stakeholder relationships. So, we expect our first instrumental variable to be highly correlated with sustainability performance and disclosure.

Two proxies for stakeholder power are included in the study model. The first proxy (PSHCO) represents the percentage of outstanding common stock held by corporate management and other individuals who own 5% or more of the stock. The rationale for selecting this proxy and its relationship to corporate sustainability disclosure is illustrated by Keim (1978). Keim (1978) stated that as the distribution of ownership of a corporation becomes less concentrated, the demands placed on the corporation by shareowners become broader. So, disperse corporate ownership, especially by investors concerned with corporate sustainability activities, heightens pressure for management to disclose corporate sustainability activities (Ullmann, 1985).

As both Keim (1978) and Ullmann (1985) argued, it is hypothesized that the wider the dispersion of corporate ownership, the better the corporate's sustainability disclosures, and its sustainability performance. Thus, an inverse relationship is predicted between PSHCO and endogenous variables (SUSDIS and SUSPEF).

On the other hand, to assess whether the exogeneity condition is satisfied for the instrumental variable stakeholder power, the empirical evidence on the impact of ownership concentration (as a proxy for stakeholder power) on firm value is mixed. Some studies document a positive association (e.g., Sraer and Thesmar, 2007; Villalonga and Amit, 2006), a few find a negative association (e.g., Anderson and Reeb 2004), others document a nonmonotonic association (e.g., Anderson and Reeb, 2003) and some find no significant association at all (e.g., Perrini et al., 2008; Weiss and Hilger, 2012; Weleh, 2003).

The second proxy (DEBEQU) is defined as the corporate's average debt to equity ratio for 2013 to 2017. The debt-to-equity ratio (financial leverage) is chosen as a measure of creditor stakeholder power because it captures the importance of creditors as stakeholders relative to equity investors. Stakeholder analysis has been used in prior research to explain corporate decisions regarding financial policies. The analysis concluded that capital structure decisions are part of an overall corporate stakeholder strategy and that creditors are essential stakeholders whose influences should be managed (Cornell and Sharpiro, 1987; Barton et al., 1989).

Empirical evidence has shown a positive and significant relationship between the extent of CSR disclosures and the debt-to-equity ratio (Kolsi and Attayah, 2018). So, the higher the degree to which a corporation relies on debt financing to fund capital projects, the higher the degree to which corporate management would be expected to respond to creditor expectations concerning a corporation's role in sustainability activities. Thus, a positive relationship is predicted between (DEBEQU) and the endogenous variables (SUSDIS and SUSPEF).

Like Titman (1984), it was the first to recommend that critical stakeholder closely monitor a firm's financial leverage while deciding their degree of commitment to it. Others have argued that stakeholders are wary of doing business with highly leveraged corporations because high debt levels might impair firms' capacity to honor implicit obligations (e.g., Banerjee et al., 2008; Kale and Shahrur, 2007). In conclusion, increasing firms' financial leverage can boost the brand, employee, and channel-related advantages (disadvantages) created by their CSR initiatives. However, Mishra and Modi (2013) found that firms with lesser financial leverage are better positioned to profit from positive CSR risk-reduction advantages. Negative CSR and idiosyncratic risk are not affected by financial leverage.

Given these findings, we assume that it is likely that the stakeholder power (as proxied by PSHCO and DEBEQU) fulfills the instrumental relevance condition, but we cannot assert ex-ante whether it is likely that our first instrument satisfies the exogeneity condition. In this instance, we rely on the results of several post-estimation tests to assess whether the exogeneity condition is satisfied for the stakeholder power.

Firm's strategic posture

Strategic posture explains how a company's decision-makers respond to sustainability demands. Ullmann (1985) distinguishes between active and passive strategic posture. An engaged company's management seeks to influence essential stakeholders through sustainability (social and environmental) actions. A company's management is regarded as inactive if it does not constantly evaluate its stakeholder position and establish special initiatives to handle stakeholder influences.

Creating and publicizing CSR initiatives is part of a firm's armory for interacting with a particular stakeholder group. Determining expected sustainability performance and disclosures is dependent on strategic posture. Given these findings, we assume that it is likely that the

strategic posture fulfills the instrument relevance condition. We use a philanthropic foundation (PHIFOU) as a proxy to measure the firm's strategic posture. The proxy (PHIFOU) equals one if the firm sponsors a foundation during 2013-2017.
The rationale for selecting PHIFOU is that corporate contributions to charity are generally considered social responsibility activities. Corporate charitable contributions are consistent with a profit maximization aim, according to Navarro (1988). Profit themes consistent with charitable giving include:

1. protecting the firm's image from harmful tax or regulatory policies,
2. educating employees to increase long-term labor supply,
3. increasing customer loyalty, and
4. other promotional considerations that may reduce operational and capital costs.

These topics reflect expected reactions from important stakeholders when corporate charity contributions are revealed. Corporate-sponsored charity foundations are set up for this purpose. Because corporate charitable giving is a strategic instrument for managing stakeholders and organized donations, it is an excellent way to manage these activities. Plewnia and Guenther (2017) questioned whether corporate giving was a kind of CSR that might benefit firms financially. The study discovered a statistically significant association between corporate generosity and future financial performance, implying a causal relationship. Plewnia and Guenther (2017) found that the positive benefits of corporate philanthropy outweigh the adverse effects in a range of study designs and sample circumstances.

Therefore, we assume that our instrumental variable directly affects firm value, meeting the exogeneity condition (exclusion restriction). Thus, a positive relationship is predicted between (PHIFOU) and the endogenous variables (SUSDIS and SUSPEF).

Economic performance
According to Ullmann (1985), a firm's past and current economic success are vital in two respects. First, economic performance defines the relative importance of social and environmental needs. Economic demands will trump social and environmental concerns in times of poor profitability and excessive debt. Second, economic performance affects the financial ability to execute costly social and environmental activities.
Numerous accounting-based measures have been used to proxy economic performance, such as return on equity, return on assets, and operating profit to total asset and profit margin. In this study, the average annual percentage change in a firm's return on equity (AACROE) from 2013 to 2017 includes the study model as a proxy for economic performance. Sustained growth in economic returns to equity investors is a primary goal that is common to all corporate managers. Trends in earnings-based measures of economic performance, such as return on equity, are frequently used to evaluate corporate managers' performance (Roberts, 1992).

Most prior research found a significant relationship between CSR disclosure and company financial performance. Moreover, Pava and Krausz (1996) found that firms with more remarkable social initiatives better economically. So high-performing businesses must reveal more about human resources and community services.

Hence, we expect economic performance to be highly correlated with sustainability and disclosure, thus satisfying the relevant condition. We will rely on the results of the post estimation tests to assess whether the exogeneity condition is satisfied for economic performance.

Control variables

To complete our model, we add several control variables that the literature has identified as intervening variables and should be controlled in the empirical test for the association between sustainability disclosure, sustainability performance, and firm value. We include four control variables related to corporate characteristics and have thought to directly influence sustainability performance and disclosure. The control variables are firm size [proxied by the natural logarithm of sales; (LNSALES)], asset intensity [proxied by the ratio of assets to sales; (ASSETSAL)], research and development intensity [proxied by R & D expenditures scales by sales; (R&D)], and asset age [proxied by the ratio of net property, plant, and equipment to gross property, plant, and equipment; (NPPEGPPE)].

3.3 Empirical model

The empirical form of the model is two-stage as follows:

First stage: (two regressors, one for each endogenous variable)

$$SUSDIS_{i,t} = B_0 + B_1 SUSPEF_{i,t-1} + B_2 PSHCO_{i,t-1} + B_3 DEBEQU_{i,t-1} + B_4 PHIFOU_{i,t-1} + B_5 AACROE_{i,t-1} + B_6 LNSALES_{i,t-1} + B_7 ASSETSAL_{i,t-1} + B_8 R\&D_{i,t-1} + B_9 NPPEGPPE_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

$$SUSPEF_{i,t} = B_0 + B_1 SUSDIS_{i,t-1} + B_2 PSHCO_{i,t-1} + B_3 DEBEQU_{i,t-1} + B_4 PHIFOU_{i,t-1} + B_5 AACROE_{i,t-1} + B_6 LNSALES_{i,t-1} + B_7 ASSETSAL_{i,t-1} + B_8 R\&D_{i,t-1} + B_9 NPPEGPPE_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

Second stage:

$$Tobin\ Q_{i,t} = B_0 + B_1 SUSDIS_{i,t-1} + B_2 SUSPEF_{i,t-1} + B_3 LNSALES_{i,t-1} + B_4 ASSETSAL_{i,t-1} + B_5 R\&D_{i,t-1} + B_6 NPPEGPPE_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

3.4 Sample selecting and data collection

The study data was gathered by analyzing the annual reports for the 30 most active companies in the Egyptian Stock Exchange as measured by the ESG 30 index. The sample begins in the financial year 2013 and ends in 2017. Table 3 shows the number of observations used in the regression analysis.

It may be worth noting, at this point, that it was considered necessary that the research should not be restricted entirely to annual reports published in English, as this might introduce a bias in the sample as the majority of public sector enterprises in Egypt only produce Arabic language annual reports.

Table 3. Sample size and number of observations.

Items	No. of observations	Sample percentage
Initial number of observations	1650	100
Missing observations	30	1.8
Number of observations used in regression	1620	98.2

4. Results

4.1 Instrument's validity

After discussing the theoretical plausibility of the instruments chosen based on stakeholder theory, we test in this section whether the instruments identified pass the commonly used instrumental variables (IV) validity tests to estimate models (1) and (2). Two essential

characteristics of a valid instrument are that (1) it reasonably predicts the endogenous variables SUSDIS and SUSPEF in our empirical models (weak instruments), and (2) it is not correlated with the disturbance terms in our main model in the second stage (orthogonality condition) (Gracia-Castro et al., 2010; Larcker and Rusticus, 2010).

In table 6 we report Shea's partial R^2 (Shea 1997) and the Kleibergen-Paap (Cragg-Donald) weak identification test statistic with Stock-Yogo's Critical values (Stock et al. 2002). The relatively high values of Shea's partial R^2 for the model (1) and (2)[6] (= 0.15; 0.17) and the corresponding partial F-statistic (=5.52; 3.42; $p<0.01$) evidence a strong predictive power of the instruments chosen. Based on the analysis by Stock et al. (2002), such a high Partial F-statistic indicates of the appropriateness of instruments. Such a high Shea's partial R^2 suggests that high variation in sampling can have low effects on the second-stage results causing low jumps in coefficients between samples and years (Larcker and Rusticus, 2010). Also, the values obtained for the Kleibergen-Paap's statistics (=13.83) were well above the Stock-Yogo Critical Values at the 30%, 20%, 10%, and 5% maximal IV relative bias levels with about 10% maximal IV size of a 5% wald test of $\beta = \beta_0$(null hypothesis). Overall, the results from Shea's partial R^2 and Kleibergen-Paap's statistics reported in table 6 lead us to reject the null hypothesis of IV under-identification (weak instruments) (1).

Although we cannot test the validity of the second characteristic's validity directly, we can assess the instruments' validity in an overidentified context with a test of overidentifying[7] restrictions using Hansen's test (Hansen, 1982). The Hansen's J statistics for firm market value (Tobin Q) (=10.673; non-significant) signal a non-rejection of the null hypothesis that the instruments finally used are uncorrelated with the error term. Therefore, the IV satisfies the orthogonality condition (2). Thus, our instrumental variables satisfy the exogeneity condition (Exclusion restriction). These empirical findings, in general, validate the selection of instruments based on the stakeholder theory.

4.2 Descriptive statistics

Table 4 provides descriptive statistics to describe the study variables. The mean value of Tobin Q is 1.85 (185 percent) (median 1.53), with a standard deviation of 1.001, ranging from 1.218 to 2.152. The mean sustainability disclosures (SUSDIS) of the firm is 15.5 (median 15), with a standard deviation of 8.8. The mean value of sustainability performance (SUSPEF) is 3.55 (median 3.5) with a standard deviation of 0.880, ranging from 2.1 to 5, suggests that on a scale of one to five, sample firms, on average have good performance in all of the five factors and 23 indicators in the index.

The mean value for the largest block of shares held by an individual shareholder and corporate management (PSHCO) is 10.79% (median 8.32), with a standard deviation of 6.23%, ranging from 6.9% to 12.4%, implies that in sample firms, both individuals' shareholders and management have a low strategic power as a stakeholder. The mean value for the ratio of average debt to equity (DEBEQU) is 42% (median 40%), ranging from 11.2% to 59.8%. The DEBEQU represents a measure for a strategy power for creditors as a stakeholder. The mean

[6]. The adjusted R^2 models (1) and (2) are 70.33% & 67.38%. However, this overstates the instruments' true explanatory power as the control variables also contribute to this adjusted R^2. After removing the control variables' contribution, Shea's partial R^2 is approximately 15% & 17%.

[7]. The over-identifying restriction test statistic can be obtained by a regression of the second-stage residuals on the exogenous variable. If the instruments are valid, the coefficients on the instruments should be closed to zero.

value for the philanthropic foundation (PHIFOU) is 0.05 (median 0.000), suggest that half of the sample firms sponsor a philanthropic foundation and possess an active strategic posture.

Table 4. Descriptive statistics of all variables

Variables (*)	Mean	Median	Maximum	Minimum	Standard Deviation
SUSSDIS	15.5	15	30	1	8.8
SUSPEF	3.52	3.5	5	2.1	0.880
Tobin Q	1.856	1.537	2.152	1.218	1.001
PSHCO	10.792	8.32	12.40	6.90	6.23
DEBEQU	0.423	0.404	0.591	0.112	0.598
PHIFOU	0.501	0.000	1.000	0.000	0.446
AACROE	0.092	0.07	0.128	0.063	0.077
LNSALES	8.512	8.012	9.342	7.617	1.191
ASSETSAL	2.932	2.001	2.436	1.964	1.143
R&D	0.02	0.01	0.025	0.015	0.057
NPPEGPPE	0.533	0.531	0.652	0.406	0.155

(*) Supplemental analysis reveals that the values for asymmetry and kurtosis were between -2 to +2, which were considered acceptable proof of normal univariate distribution. The median value was lower than the mean value, indicating that the distribution was slightly positively skewed to the right, which is consistent with prior research.

The mean value for the annual change in return on equity (AACROE) is 9.2% (median 7%), with a standard deviation of 7.7%, ranging from 6.3% to 12.8%, which shows that, sample firms, have the financial capacity to implement sustainability activities. Finally, the average values of our control variables also appear to be reasonable, with the natural log of sales (LNSALES) at 8.5, assets to sales (ASSETSAL) at 2.93, R & D expenditures at 2% of sales, and the ratio of net property, plant, and equipment to gross PPE (NPPEGPPE) at 53%.

To check the stationary of our time serious, we used the unit root test, which includes the parametric Augmented Dicky-Fuller (ADF) test. The ADF test was statistically significant at level 1%, which means that data in the time serious 2013-2017 were stationary. Testing for the autocorrelation problems, the value of the Dubin-Wastn (D-W) test was within 1.5-2.5 range, indicating that no autocorrelation in the empirical models.

To measure the collinearity[8]between the endogenous and exogenous variables, we used the correlation matrix. The Pearson correlation (Farror and Glauber, 1967) concluded that harmful levels of multicollinearity were not present until bivariate correlations reached 0.8 or 0.9. As shown in Table 5, the values of all variables were less than 0.8. In table 5 the study variables (endogenous and exogenous) are all positively correlated, but the strengths of these pair-wise linear relations are relatively weak (coefficients < 0.5). This signal a consistent with the mixed results knowledgeable by prior studies in testing these pair-wise relations. Positive correlations of medium strength are noted between endogenous variables (SUSDIS and SUSPEF) and the instrumental variables except the proxy for instrumental variable stakeholder power PSHCO. None of the other pair-wise relations in Table 5 represent apparent inconsistency to the theoretical clarification.

[8]. The variance inflation factor (VIF) values for all endogenous variables were less than 10, which means that we did not have collinearity problems in the empirical models.

4.3 Regression analysis (2SLS)

Table 6 presents the estimated results for our 2SLS model. The first and second columns model (1) and (2) of Table 6 shows the results for the first stage regression investigating the association between endogenous variables and instrumental variables. The last column model (3) of Table 6 shows the second stage regression results, which examines the influence of sustainability performance and sustainability disclosure on firm value.

In model (1), the coefficient on sustainability performance (SUSPEF) is significantly positively related to sustainability disclosure (SUSDIS) (=7.543; p=0.000). This result supports our first hypothesis (H1) and the predictions of instrumental stakeholder theory that good sustainability performers, on average, disclose more concerning their positive sustainability performance.

This result is consistent with prior research that has documented a positive relationship between sustainability (environmental) disclosure and performance (e.g., AL-Tuwaijiri et al., 2004; Clarkson et al., 2008; Clarkson et al., 2011; Papoutsi and Sodhi, 2020). The positive relation between sustainability disclosure and sustainability performance shows that the extent of sustainability-related disclosure is correlated more strongly with high sustainability performance than with low sustainability performance. One plausible explanation by Kim and Lyon (2015) is that, if the firm has high sustainability performance, high disclosure may signal that it is overinvesting in sustainability. Additionally, this result implies that the prior period's sustainability performance is positively related to sustainability disclosure in the current period. Thus, we can infer the level of sustainable disclosure in the current period depends on the sustainability activities in the prior period.

In terms of the instrumental variables, as can be seen by analyzing table 6. The stakeholder power variables (proxied by PSHCO and DEBEQU) has the expected signs. The coefficient related to the percentage of ownership held by management and principal shareholders (PSHCO) is negative (= - 0.536) and non-significant to conventual levels (p=0.473). The lack of significance for the stockholder power proxy (PSHCO) does not support the proposition that widespread stock ownership increases corporate incentives to make sustainability disclosures.

Table 5. Pearson correlation matrix coefficients

Variables	SUSDIS	SUSPEF	Tobin Q	PSHCO	DEBEQU	PHICO	AACROE	LNSALES	ASSETSAL	R&D	NPPEGPPE
SUSDIS (*)	1	-	-	-	-	-	-	-	-	-	-
SUSFEF	0.451***	1	-	-	-	-	-	-	-	-	-
Tobin Q	0.444***	0.391***	1	-	-	-	-	-	-	-	-
PSHCO	-0.153	-0.312***	0.291	1	-	-	-	-	0.273**	-	-
DEBEQU	0.631***	0.591***	0.576**	0.495	1	-	-	-	0.242**	-	-
PHIFOU	0.567***	0.675***	0.139	0.217	0.354	1	-	-	0.314**	-	-
AACROE	0.551**	0.678**	0.424***	0.239	0.156***	0.235***	1	-	0.531***	-	-
LNSALES	0.591***	0.612***	-0.123***	0.378**	0.198**	0.527***	0.617**	1	-	-	-
ASSETSAL	-0.128***	0.099***	-0.392***	0.473**	0.242**	0.314**	0.531***	-0.281***	1	-	-
R&D	0.181***	0.311***	0.271***	0.542**	0.183**	-0.251**	0.678***	0.119***	-0.129***	1	-
NPPEGPPE	0.039	0.478***	0.163	0.561**	0.317**	0.171	0.397***	0.231***	0.552***	-0.161***	1

Notes: ***, **, * significant at levels 1%, 5%, 10% respectively.

* see table 1 for a complete description of the variables.

Table 6. regression results (2SLS)

Variables	First stage		Second stage
	Model (1)[a] Coeff. (t-stat.) (P-value)	**Model (2)[a]** Coeff. (t-stat.) (P-value)	**Model (3)[b]** Coeff. (t-stat.) (P-value)
Intercept	4.52 (0.07) (0.332)	2.78 (1.21) (0.252)	5.832*** (8.07) (0.000)
SUSPEF	7.543*** (3.52) (0.000)		0.353*** (0.07) (0.000)
SUSDIS		5.725*** (1.82) (0.003)	0.274*** (1.07) (0.002)
PSHCO	-0.536 (-1.72) (0.473)	-1.752 (-0.487) (0.195)	
DEBEQU	0.277*** (6.571) (0.000)	0.776*** (1.561) (0.000)	
PHIFOU	10.235*** (4.541) (0.009)	3.871*** (2.751) (0.004)	
AACROE	3.73** (0.879) (0.023)	9.877*** (0.554) (0.000)	
LNSALES	6.983*** (4.232) (0.003)	8.544*** (3.781) (0.000)	-0.412*** (-9.21) (0.000)
ASSETSAL	-0.845*** (-6.782) (0.000)	6.312*** (2.591) (0.000)	-0.237*** (-4.72) (0.000)
R&D	4.941 (0.007) (0.06)	4.747*** (0.981) (0.000)	3.762*** (10.21) (0.000)
NPPEGPPE	6.782 (0.04) (0.08)	5.551*** (0.478) (0.000)	0.072 (1.92) (0.696)
F-value	13.42*** (0.000)	15.89*** (0.000)	30.33*** (0.000)
Adjusted R^2	70.33%	67.38%	65.46%
Partial F-stat	5.52***	3.42***	
Shea partial R^2	15%	17%	
Kleibergen-paaprk wald F statistic (Crit. Value at 10% max. IV size)[c] Hansen J-statistic X^2 (P-value)			13.83 (16.87) 10.673 (0.572)
N	1620	1620	1620

Note: ***, (**), (*) indicate that the estimated coefficient is statistically significant at the conventional levels 1%, 5%, 10%, respectively (two-sided test), t-statistic levels and p-values are given in parentheses.

[a] Variables are defining as in table I. Columns 1&2 present the estimation results for the first-stage regression for the endogenous regression sustainability disclosures (SUSDIS) and sustainability performance (SUSPEF). The existence of percentage of ownership held by management and principal shareholders (PSHCO), average debt to equity (DEBEQU), corporate sponsorship of a philanthropic foundation (PHIFOU), and average annual change in return on equity (AACROE) are used as instruments for the endogenous regressors sustainability disclosures (SUSDIS) and sustainability performance

(SUSPEF). [b] Column 3 presents the estimation results for the second-stage regression for the exogenous variable, firm value (Tobin Q); $Tobin\ Q_{i,t} = \alpha_0 + B_1 SUSDIS_{i,t-1} + B_2 SUSPEF_{i,t-1} + Controls$, where SUSDIS&SUSPEF are instrumented by PSHCO, DEBEQU, PHIFOU, and AACROE.

[c] Stock-Yogo critical values based on maximal IV relative bias (Significance level is 5%) {5%:11.04};{10%: 7.56}; {20%:5.57};{30%:4.73}.
Stock-Yogo critical values based on maximal IV size (Significance level is 5%) {10%:16.87};{50%: 9.93}; {20%:7.54};{25%:6.28}.

The limitations of the PSHCO measure may explain the finding that the dispersion of stock ownership is not significantly related to the sustainability disclosure level. Other measures of dispersion of stock ownership could produce a different outcome.

As expected, the coefficient related to DEBEQU is positive (= 0.277) and is significant at conventional levels (t=6.571; p=0.000), confirming our predictions. The significance of DEBEQU complements the empirical findings of Barton et al. (1989) regarding stakeholder considerations in planning corporate financial policy. Besides, it supports the contention that sustainability disclosure may be viewed by management as a way to meet certain creditor stakeholder expectations.

The strategic posture variable (as proxied by PHIFOU) has the expected positive relationship to sustainability disclosures and significant at the conventional levels (t=4.541; p=0.009).

The significance of the strategic posture proxy representing corporate sponsorship of a philanthropic foundation (PHIFOU) implies that an active posture toward sustainability leads to more significant sustainability disclosures. This finding supports arguments that were based on Navarro (1988).

The economic performance variable (as proxied by AACROE) have the expected positive relationship to sustainability disclosures and significant at the 0.05 and 0.01 level, respectively (t=0.879; p=0.023). The results are consistent with Ullmann's (1985) notion that an acceptable level of economic performance is necessary before company resources will be devoted to meeting the stakeholder's demands.

Of the model's four control variables, the natural logarithm of sales (LNSALES) as a proxy for firm size has the expected positive relationship to sustainability disclosures and is significant at the conventional levels (t=4.234; p=0.003). Since they have resources, larger companies are expected to hire big international audit firms that are likely to force better disclosure policy than smaller firms. They are also subjected to the scrutiny of the public. Furthermore, larger companies are more closely monitored by the stock market actors than smaller ones. They tend to disclose more voluntary data to reduce agency costs resulting from potential conflicts between managers and stakeholders and to reduce political costs, as they are usually more publicly visible than small companies.

As expected, the coefficient related to asset intensity (ASSETSAL) is negative, (=- 0.845), and is significant at conventional levels (t=-6.782; p=0.000).

Research and development intensity (proxied by R&D) and asset age (proxy by NPPEGPPE) have the expected positive coefficient (=4.94 and 6.782) and are non-significant at conventional levels (t=0.007, 0.04; p=0.06, 0.08).

Suggesting that firm size (LNSALES) and asset intensity (ASSETSAL) may act as intervening variables in empirical tests regarding sustainability are supported by the results presented in this study. These findings may be explained in part by the arguments that firm size and asset

intensity are macro-level proxies for aspects of stakeholder power, strategic posture, or economic performance. Additional work is needed to improve our understanding of the empirical associations between firm size and asset intensity and sustainability disclosures.

In model (2), the coefficient on sustainability disclosure (SUSDIS) is significantly positively related to sustainability performance (SUSPEF) (= 5.725; p=0.003). This result is consistent with the prior argument in a model (1) that sustainability disclosure in the prior period is positively related to sustainability performance in the current period. We can infer that the level of disclosure in the prior period sets a base for performance in the current period. This positive and significant relation consistent with the results of both the studies Al-Tuwaijiri et al. (2004) and Acar and Temize (2020).

Also, the instrumental variables' coefficients are significant positive as predictive, except the proxy (PSHCO) of stakeholder power. This result implies that firms with moderate stakeholder power and good strategic posture and high economic performance have high sustainability activities. The four control variables are positively and significantly related to sustainability performance.

Turning to the third column (model 3) of table 6 shows the second stage regression results investigating the association between endogenous variables and exogenous variable. As shown in Table 6 , the model (3) globally significant (F=30.33, P=0.000), the explanatory power of the model (3) (Adjusted R^2) is about 65.46%. Our primary interest lies in the estimates of B_1 and B_2 in the model (3), the regression coefficients of sustainability performance (SUSPEF), and sustainability disclosures (SUSDIS).

Consistent with H2, the coefficient (B_1) related to sustainability performance is positive (=0.353), and significant at conventional levels (t=0.07; p=0.000), suggesting that sustainability performance directly affect firm market value (measured by Tobin Q). This result confirms those of Lourenço et al. (2012), Garcia-Castro et al. (2010) and Ng and Rezaee (2020), and consistent with synergic “Win-Win” strategic outcome.

The coefficient (B_2) of sustainability disclosures is positive (=0.274) and significant at conventional levels (t=1.07 and p=0.002), suggesting that sustainability disclosures have an impact on the firm market value and supporting H3. This result confirms those of Miralles–Quiras et al. (2017), Aboud and Diab (2018) and Buallay (2020), who find a positive relationship between the firm's contribution to sustainable development and valuation of the market.

Our findings suggest that capital market participants on the Egyptian Stock Exchange value the sustainability disclosure mechanism measured by the ESG 30 index. The findings also demonstrate that the market compensates those firms that integrated corporate sustainability activities into management control systems as sustainability performance exerted a positive and significant coefficient on the firm's market value.

Of the model’s four control variables, the coefficient of firm size (as proxied by the natural log of sales LNSALES is negative (= -0.412), and significant at conventional levels (t=-9.21; p=0.000). Also, the coefficient of asset intensity (as proxied by ratio of assets to sales ASSETSAL) is negative (= -0.237), and significant at conventional levels (t= -4.72; p= 0.000).

The coefficient of R&D intensity (as proxied by R&D expenditures sales by sales) is positive (= 3.762) and significant at conventional levels (t=10.21; p=0.000). The coefficient of asset age variable (as proxied by the ratio of net property plant and equipment to gross PPE

(NPPEGPPE) is positive (= 0.072, and non-significant at conventional levels (t=1.92; p=0.696).

The findings may be explained in part by the arguments that firm market value (Tobin Q) is increased by research and development intensity. It is decreased by firm size and asset intensity. Additional work is needed to improve our understanding of the empirical associations between firm size, asset intensity, research and development intensity, and firm market value.

5. Sensitivity analysis

5.1 Using ordinary least square (OLS)

Given the potential problems associated with the instrumental variables approach, especially selecting instrumental variables that satisfy the relevance and exogeneity conditions; Larcker and Rusticus (2010) recommend that the second stage estimates be compared to those obtained from simple ordinary least square regression (OLS), "unconstrained" the second stage.

The model is an OLS regression of firm market value on all the independent variables (instrumental variables). For ease of comparison, each independent variable is replaced by the product of its original value and its associated first-stage coefficients in model (1). Each instrument is treated as the only instrument, and the rest of the instruments are treated as control variables. If the instruments are valid, the instruments' resulting coefficients should be close to each other, and therefore close to the 2SLS estimate (which is the weighted average of these estimates)—the results in table 7 consistent with the results from 2SLS estimation presented in table 6. The sensitivity test supports our argument that our instruments used in this study are well predictors of the firm market value.

Table 7. regression results – OLS

Variables	**"Unconstrained" Second stage**
	Model (3) Coeff. (t-stat.) (P-value)
Intercept	4.732*** (9.65) (0.000)
PSHCO	-0.642 (-2.82) 0.323)
DEBEQU	0.482*** (7.522) (0.000)
PHIFOU	12.327*** (5.379) (0.000)
AACROE	5.83** (0.982) (0.043)
LNSALES	-1.892*** (-7.78) (0.000)

ASSETSAL	-2.978***
	(-6.32)
	(0.000)
R&D	5.891***
	(9.82)
	(0.000)
NPPEGPPE	3.227
	(2.781)
	(0.237)
F-value	20.92***
	(0.000)
Adjusted R^2	55.67%
N	1620

Note: ***, (**), (*) indicate that the estimated coefficient is statistically significant at the conventional levels 1%, 5%, 10%) respectively (two–sided test), t-statistic and p-values are given in parentheses. Variables are defined as in table 1.

5.2 Instrumental variables and sustainability disclosure ratings

To test whether high levels of sustainability disclosure ratings by ESG 30 (top 30 ranked firms, according to the index) associate with high levels of instrumental variables. We test this proposition by ranking firms by their levels of instrumental variables and measuring the pair-wise correlation between their rankings and the corresponding sustainability disclosure ratings by ESG 30. The correlation coefficients are significantly positive for all the instrumental variables. The sensitivity test indicates that the market mechanism will compensate those firms that are more engaged in corporate sustainability activities and disclosure to meet stakeholders' expectations. Additionally, the instrumental variables in this study have reasonable inference about sustainability disclosure.

6. Conclusions, implications, and limitations

The study investigates the association between sustainability disclosure, performance, and firm value after explicitly considering the endogeneity of these three variables. The study uses an instrumental variable approach to solve the problem of endogeneity. The model's instrumental variables adopted from Ullmann's (1985) contingency framework predict corporate social responsibility activity and disclosure levels.

The study hypothesizes that the mixed results reported by prior empirical research that has been carried out on the strength of pair-wise associations between two of the three variables may have arisen because researchers did not allow these variables to be endogenous.

This study's findings contribute to the current accounting literature focusing on the market consequences of sustainability performance-disclosure relationships in emerging markets.

One of the more significant findings to emerge from the study is that using an instrumental variable approach in the model's specification as a methodological approach to deal with the endogeneity associated with specifying the three variables affects the statistical significance of estimated interrelations. Finding our proxies for instrumental variables, the evidence from the instrument's validity tests suggests that the instrumental variables reasonably predict the endogenous variables in our empirical models (relevant condition). It is not correlated with the error term in our model for estimating firm market value (exogeneity condition). However,

using the ordinary least square (OLS) as a sensitivity test supports our arguments that our instrumental variables used in this study are well predictors of firm market value.

The second major finding was that the significant positive relationship between sustainability disclosure and sustainability performance is consistent with instrumental stakeholder theory. In this theory, sustainability disclosure can be seen as part of the overall management strategy to manage stakeholder relations, bringing both non-financial and financial rewards. The study also documents a positive relation between current sustainability disclosure and past sustainability performance. We measure variables in a temporal sequence by introducing a time lag. Sustainability disclosure is measured in one year after the corporate sustainability performance was measured (subsequent measurement). A statistical correlation between the two measures can plausibly imply that sustainability activities affect sustainability disclosure. On the other hand, the study documents the level of sustainability disclosure in the prior period setting a base for sustainability performance in the current period.

The most prominent finding to emerge from this study is the positive causal effect of sustainability performance and firm market value. An implication is that engaging with stakeholders by meeting their expectations and norms can improve a firm's performance on several internal and external levels. The instrumental stakeholder theory supports the idea that firms view their stakeholders as part of an environment that must be managed to assure revenues, profits and ultimately return to shareholders. Concentration on stakeholder concerns may help a firm avoid decisions that might prompt stakeholders to undercut or thwart its objectives. This prospect emerges because the stakeholders control resources that can enhance the implementation of corporate sustainability activities.

The empirical evidence is traceable to the present study examining an emerging market. Therefore, the current finding of positive economic consequences of sustainability performance-disclosure relationship is ascribable to the progress of Egypt's market and institutional environment. Both contingency factors (market development and institutional environment) are critical in determining the relationship between corporate sustainability processes and economic conditions. Besides, these factors affect the organized dialogues between firms and their stakeholders.

The key strengths of this study are utilizing new indexes for sustainability performance and sustainability disclosure. In contrast to studies that rely on the narrowly defined environmental performance or social performance elements, in this study, we develop an index for overall sustainability performance that encompasses multi facts of sustainability performance based on the international finance corporation's framework (IFC, 2002). The study exploits the S&P/EGX ESG index to gauge practices for sustainability disclosure measurement. This index is the first in the Middle Eastern and North African (MENA) region. Our empirical evidence in this study provides indicators to regulators and all participants in the Egyptian market and institutional environment on the outcomes of introducing the sustainability index.

The findings of this study are subject to three limitations. First, while this study makes extensive efforts to develop accurate proxies for the three dimensions of the contingency framework for predicting sustainability disclosure and performance, data constraints limited the construct validity of the selected proxies. Second, we recognize that our sample drawn from the 30 companies in the S&P/EGX ESG index induces a size bias and may limit the

generalizability of the findings. Also, we cannot analyze each industry separately because of the sample limitation. Given the market and institutional environment's exceedingly complex nature, a final limitation is that there are inherent limits in the ability of positive empirical research to capture all the dimensions that influence corporate sustainability decision-making. Notwithstanding these limitations, we also believe that we have used these econometric tests most relevant in assuring that our 2SLS simultaneous equations models are correctly specified. Future research might explore the value relevance of sustainability disclosure by further analyzing the direct effects of sustainability disclosure ratings on firm market value and its indirect effects through its interaction with main accounting variables (earnings and book value of equity). A future empirical investigation is needed to investigate the associations between sustainability disclosure, sustainability performance, and firm value in different socio-political theories.

The findings of this study have an important implication for the future practice of corporate sustainability development. Non-financial measures (indicators) of sustainability performance index may be excellent prospects for utilization in the firm's "balanced scorecard" used to evaluate managerial and firm performance. Managers evaluated in this manner should be increasingly motivated to introduce new processes that enhance corporate sustainability development.

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Appendix I: Factors and indicators of the sustainability performance index

Factors and indicators	Raw score
Factor 1: *Environmental management, social development commitment, and capacity.* 1.1 Existence of an environmental management system. (0-1) 1.2 Existence of board committee deal with social environmental and safety issues. (0-1) 1.3 Assignment od senior manager with day to day responsibilities for environmental and social issues. (0-1) 1.4 Incorporation of environmental and social goals into CEO and executives' remuneration targets. (0-1) 1.5 Staff training on business principles, environmental management and social development is provided. (0-1) 1.6 Firm's performance is identified through industry leadership, including membership of industry bodies and external awards on sustainability performance. (0-1)	0-6
Factor 2: *Corporate governance*. 2.1 firm complies with Egypt's principles of corporate governance. (0-1) 2.2 Existence of board governance committee. (0-1) 2.3 Global leader in corporate governance evidence by external awards for corporate governance. (0-1)	0-3
Factor 3: *Eco-efficiency and environmental footprint*. 3.1 Existence of policy regarding eco-efficiency and environmental footprint (e.g. policies in the area of resource use, recycling, emission). (0-1) 3.2 Adoption of technology designed to improve performance in areas such as resource use, emission reduction, by-product recycling. (0-1) 3.3 Commitment to environmental research and development. (0-1) 3.4 Establishment of future environmental performance target. (0-1) 3.5 Voluntary disclosure by firms of waste emission to external parties. (0-1) 3.6 Joint efforts with industry partners involving sharing knowledge and sponsoring research and development. (0-1)	0-6
Factor 4: *Community development.* 4.1 Firm's support of community charities. (0-1) 4.2 Existence of community support programs. (0-1) 4.3 Participation of firm's employees in community development activities. (0-1) 4.4 Funding of community development project by firm. (0-1)	0-4
Factor 5: Health, safety, and welfare of the labor force. 5.1 Existence of health and safety management system. (0-1) 5.2 Availability of specific health and safety plans. (0-1) 5.3 Provision of safety training for employees. (0-1) 5.4 Processes for employees to raise issues with management. (0-1)	0-4

Source: Adopted from (Herbohn *et al.* 2014, pp.446-447) with edition of researcher