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Article

The Impact of Environmental, Social, and Governance Disclosure on the Performance of Saudi Arabian Companies: Evidence from the Top 100 Non-Financial Companies Listed on Tadawul

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Abstract: This study aimed to analyse the relationship between environmental, social, and governance disclosure (ESG disclosure) and the performance of Saudi Arabian companies. Looking at the Saudi Arabian context, ESG disclosure guidelines were issued in 2018 to encourage Saudi companies to disclose their ESG practices. Grounded in the frameworks of agency and signalling theory, this study bears profound implications for stakeholders, decision makers, policymakers, and academics alike. Our findings underscore the paramount significance of ESG disclosure practices in enhancing corporate performance and creating long-term value for stakeholders within the Saudi Arabian context. The analysis is based on panel data spanning from 2017 to 2022. Rigorous econometric methods, including fixed effects (FEs), random effects (REs), the Hausman test, and the Generalised Method of Moments (GMM), were employed in the analysis. Furthermore, to evaluate corporate performance, we also used vital indicators, such as the return on assets (ROA), return on equity (ROE), and Tobin's Q. To score companies' sustainability practices, we created an ESG index that was obtained through a principal component analysis of individual environmental, social, and governance scores using a sample extracted from the annual reports of the top 100 non-financial listed companies in the Saudi Arabian stock exchange (Tadawul). The results of this study provide a strong confirmation of the significantly positive relationship between ESG disclosure and companies' key performance variables. These results are consistent with stakeholder theory, which argues that companies that actively manage their stakeholders through comprehensive ESG practices have better financial performance; this is also in agreement with signalling theory, which argues that the positive relations found in this study can be a signal sent to policymakers and decision makers. This finding should instil confidence in the potential of ESG practices to drive companies' success. Recommendations include strengthened regulatory frameworks, awareness-raising campaigns for ESG philosophies among investors and potential target companies, capability enhancement programs, arrangements for engagement with stakeholders, and effective reward/confirmation mechanisms in credit/debit plans, if possible, to encourage more companies to adopt ESG disclosure and to help stakeholders, decision makers, policymakers, and academics improve their awareness. These measures, if implemented, can significantly enhance the ESG landscape in Saudi Arabia, inspiring a more sustainable and responsible business environment. This research sheds light on the complex processes by which ESG considerations and corporate strategy remain integrated by using advanced econometric methodologies that suggest important policy implications. The findings of this study underscore the critical role of sustainable business practices in enhancing corporate performance, fostering societal development, and ensuring sustainability within the context of Saudi Arabian enterprises.

Keywords: ESG disclosure; generalised method of moments (GMM); Saudi stock exchange; sustainability practices; stakeholder engagement

1. Introduction

The relationship between environmental, social, and governance (ESG) disclosure and the financial performance of businesses has emerged as a critical area of interest in the contemporary global business environment. As companies increasingly adopt sustainable practices and prioritise corporate responsibility, it is crucial to understand how these efforts impact their performance. This study focuses on investigating the association between ESG disclosure and a company's performance in the Kingdom of Saudi Arabia (KSA), a country at the forefront of the transition towards sustainable investment.

Since it originated in 1987 with the World Commission on Environment and Development (WCED), sustainable development has gained increasing visibility around the world [1]. As societal pressures for better living standards rise, businesses are increasingly turning towards ESG practices—a development that reshapes the idea of corporate social responsibility (CSR) [2]. By 2018, over 80% of the world's leading companies actively adopted ESG strategies, illustrating their growing importance [3]. Even though these initial signs of change may appear minimalist on the surface, if closer attention is paid to what is happening in businesses in one's environment, then it can be seen that ESG integration is complex [4,5]. ESG disclosure has become a central point of focus for companies seeking to demonstrate their commitment to sustainability and attract investors who prioritise responsible investing [6,7]. This trend is mainly influenced by increased investor interest in corporate performance and its effects on returns. ESG is an effective tool for judging operational efficiency and generating profitable long-term returns [8]. By 2018, over 80% of the world's leading companies had actively adopted ESG strategies, illustrating their growing importance [3]. Thus, companies endeavour to differentiate themselves and attract responsible investors by demonstrating sound ESG practices and their benefits.

In some countries, companies are required by law to adopt ESG practices, whereas others are still adopting voluntary ESG disclosure. From the corporation's perspective, this changes an undertaking that was charitable or optional into one that brings mutual advantage [8,9]. It is not just about managing environmental risks and being a good steward of the environment; ESG generates sustainable value [10]. As a witness to this mounting trend, a 2019 Global Reporting Initiative (GRI) report revealed that 93% of companies have incorporated an ESG framework, with particular attention to greenhouse gas (GHG) emissions [11,12]. In addition, an Allianz report from 2018 showed that 79% of Americans contemplated investing in ESG. Furthermore, 84% of the companies profited from ESG operations, of which 74% had positive effects on their bottom line, and 69% brought about an increase in governance [13,14]. However, shifting to ESG operations requires resources, skills, and strategic planning.

ESG disclosure is a critical element of sustainable investment and corporate performance. It shows how companies advocate for sustainability inside an ESG framework [7,15]. ESG disclosure involves stakeholder engagement, co-prosperity, and partnership frameworks [16,17]. It seeks to satisfy investors and stakeholders through the degree, mode, and form of incorporation [2,7,18].

More data are needed to demonstrate ESG disclosure's widespread acceptance among Saudi enterprises. However, today's real economy focuses on numbers rather than the broader questioning of operations, which assures stakeholders' continued patronage [6,19].

In today's global business environment, ESG is a critical determinant of success. It determines how large sums are invested and the relationships between stakeholders [5]. Positioned at the forefront of this trend because of its established economic dynamism and tradition of international engagement, Saudi Arabia is also undergoing a rapid change regarding corporate responsibility and environmental best practices [6,17,18,20,21]. Stakeholder theory posits that the adoption of sustainable business practices can serve as a catalyst for organisations to enhance their performance

by fostering a favourable reputation and augmenting their goodwill. Consequently, this theory contends that such initiatives tend to exert a largely positive influence on financial outcomes and a company's capacity to create value for the firm [22,23]. This theoretical framework elucidates a direct relationship between sustainability initiatives and the extent to which businesses incorporate them in alignment with the interests of shareholders [24].

Congruent with this paradigm, an ESG score has emerged as a metric designed to encapsulate the extent to which a firm has integrated sustainability concerns into its operational paradigms. Given that ESG encompasses factors that are critical for informing investment decisions and monitoring companies' non-financial performance, the theoretical underpinnings posit that stakeholders exhibit a heightened proclivity for evaluating firms based on the degree to which they embrace sustainable practices [25,26]. Signalling theory postulates that the disclosure of ESG practices by a firm is anticipated to engender positive ramifications for its public image, consumer trust, and relationships with shareholders, customers, and other key stakeholders [27]. In essence, signalling theory posits that an organisation transmits signals that mitigate information asymmetry between itself and its external environment, thereby enabling it to convey its organisational intentions, image, behaviour, and performance [28].

A recent report by Cuadrado-Ballesteros and Ríos [29] concluded that communication transparency, defined as the reduction in information asymmetry, diminishes shareholders' transaction costs, consequently facilitating enhanced returns for firms. This transparency fosters the efficient utilisation of resources while concomitantly reducing transaction costs and mitigating potential conflicts among stakeholders concerning the optimal allocation of resources and the exploitation of natural resources [23,26].

Numerous studies have explored the relationship between ESG disclosure and companies' performance, yielding mixed results. Some researchers have found a positive correlation, suggesting that companies with better ESG disclosure tend to perform better financially [8,9]. Others have reported a neutral or even negative relationship, highlighting the complexities and challenges associated with ESG implementation [4,5]. However, the specific context of the KSA remains understudied, presenting a significant research gap.

Investigating the links between ESG disclosure and Saudi Arabian corporate financial performance is relevant even today. It also carries enormous significance for corporate governance, investor confidence, and the social results of corporate operations. Indeed, the dynamic and resource-rich nature of the Saudi business landscape could form the basis for an alternative hypothesis (i.e., companies with solid financial performance do not necessarily prioritise ESG transparency). Nevertheless, the implied link between ESG disclosure and financial performance must still be tested. This requires empirical research into whether such a relationship exists within Saudi society. This study proposes filling that gap by investigating the link between ESG disclosure and financial performance in leading companies listed on the Saudi stock exchange (Tadawul). We employed several research designs and methodologies, utilising numerous quantitative techniques and tools. Our inquiry goes beyond the simple question of whether or not a company has ESG disclosure. We explore further, examining the details of ESG disclosure (including environment, society, and governance) and how it correlates with critical financial performance indicators such as profitability, risk management abilities, and market value [19,30].

This study holds substantial importance for several reasons. First, it addresses the lack of empirical research on the relationship between ESG disclosure and companies' performance in the unique context of the KSA. As a major player in the global economy and a hub for international cooperation, understanding the dynamics of sustainable investment in the KSA is crucial. Second, the findings of this study will have significant implications for corporate governance, investor confidence, and the social outcomes of corporate operations in the Kingdom. Finally, this research contributes to the growing body of knowledge on ESG and its impact on theoretical frameworks in education and firm performance, offering valuable insights for academics and industry professionals alike.

In an empirically based approach, we aim to produce actionable knowledge for various groups of stakeholders. Corporate managers may exploit our findings to fine-tune their ESG disclosure strategies, ensuring that they are transparent and responsible when attracting investments and being scrutinised. Policymakers can find valuable data to provide input into the creation of solid regulatory frameworks for encouraging sustainable business practices nationwide. Lastly, investors can use our conclusions to make informed investment choices that dovetail their financial goals and commitment to ESG principles.

The central research question guiding this study is: What is the relationship between ESG disclosure and the financial performance of businesses in the KSA?

In the following sections, we present a more complex detailed examination of the following topics. Our findings are discussed in Section 2; there, we show how research on ESG disclosure and financial performance has progressed from a review of the existing literature to our results. The Research design and methodology section describes in great detail the research design, methodology, and data used for our empirical analysis. The Results and discussion section discusses the implications for corporate governance, investor confidence, and the overall picture of sustainable investment in Saudi Arabia. Finally, suitably nuanced commentary on the ongoing dynamics of sustainable investment in the Saudi context concludes this article. This work should form a platform for further research on this theme, and many avenues remain interesting to explore.

Furthermore, the present in-depth probe may greatly assist the body of work involving empirical testing in the interest of new data. Our results open a space for actors at any level to improve things for themselves or others; the potential scenarios range across an axis that extends well into Saudi Arabia's future to meet the requirements of Vision 2030.

2. Literature Review and Development of Hypotheses

Given the growing focus on sustainability, new research studies that link ESG disclosure to business performance have appeared. No comprehensive studies have been published in peer-reviewed journals, but there have been studies at universities and schools. The available literature on this topic was reviewed. Currently, there are two differing views of ESG disclosure, from the point of view of the importance of ESG disclosure. One view might see it as crucial for attracting investors, decision making responsible, and driving positive change. The other might view it as a costly burden with unproven benefits. Also, from other point of view which is the methods of ESG disclosure there might be disagreements on what should be disclosed, how it should be measured, and the level of detail required. Also, from the impact of ESG disclosure, the two views might differ on how ESG disclosure affects business performance, with some believing it leads to tangible benefits while others remain sceptical. Presented in this section, as well as its potential, benefits and challenges.

In a recent contribution, Alsayegh and Ditta [31] substantiated the notion that superior sustainability performance, characterised by robust environmental, social, and governance practices, tends to engender more judicious investment decisions and, consequently, increases a firm's value. Intriguingly, their findings highlight the profound influence on corporate outcomes exerted by the social dimension of sustainability, such as the ethical treatment of stakeholders.

In addition to the above studies, there is research that assumes there is a negative relationship between sustainable practices and corporate performance [32,33]. For instance, Orlitzky and Schmidt [34] and Sahut and Pasquini-Descomps [35] suggested that sustainability practices do not improve company performance, and Stein Smith and Stein Smith [36] stated that there is a negative relationship between the two. In addition, Crisóstomo and de Souza Freire [37] focused on the relationship between corporate social responsibility practices and firm performance in Brazil. The authors concluded that there is a statistically significant negative relationship between the two and pointed to the fact that there is an insignificant link between a company's CSR and its financial accounting performance.

2.1. Impact on Operational Performance Using the Return on Assets (ROA)

Despite the back-and-forth discussion on the financial ramifications of ESG disclosure, how it affects firms' operations is still an area that needs further exploration. Achim and Borlea [38] suggested that good ESG can mean better operational performance. They suggested creating an environment where cooperation could attract professional talent to some extent as a result of ethical and sustainable practices. This would, in turn, lead to increased productivity. Efficient environmental practices can result in resource optimisation and cost savings. These factors can be incorporated into a model to achieve a higher return on assets (ROA) if a company with strong ESG disclosure practices operates effectively during a bull market, potentially increasing equity market performance.

Accordingly, we hypothesise that if the ESG disclosure will impact companies' operational performance, as determined via the ROA, positive relation will occur.

H1. *There is a positive relationship between ESG disclosure and companies' operational performance, as determined via the ROA.*

2.2. Impact on Financial Performance using the return on equity (ROE)

A recurring theme in the literature is the financial benefit of ESG disclosure. Duque-Grisales and Aguilera-Caracuel [39] and Bao and Sun [5] found that ESG disclosure is positively correlated with financial performance indicators, such as the return on equity (ROE). This is attributed to several factors, including an improved brand reputation resulting from better behaviour. As a result, protection against risks means lowering costs. Secondly, environmentally and socially sensitive investors may provide funds more smoothly to companies that disclose good environmental practices.

Hence, our second hypothesis is as follows:

H2. *There is a positive relationship between ESG disclosure and companies' financial performance, as determined via the ROE.*

2.3. Impact on Market Performance using Tobin's Q

Investors' perception of ESG disclosure may also affect a company's market performance. Alsayegh, Ditta [31] suggested that robust ESG practices may attract investments, elevating the Tobin's Q ratio for more officially favoured companies. This ratio is used to evaluate a company's value relative to other companies in the stock market. As such, the following could be true: a firm with strict ESG standards has the potential for long-term sustainability and has forward-looking management that attracts, to a greater or lesser extent, institutions seeking these characteristics.

Hypothesis 3. *There is a positive relationship between ESG disclosure and companies' market performance, as determined via the Tobin-Q.*

Countless studies have examined the relationships between the disclosure of ESG and companies' performance, but the existing literature concentrates mainly on developed countries. With its special regulatory regime and cultural background, Saudi Arabia presents a valuable field for further study. In the present situation and local context, an exploration of how ESG disclosure affects the performance of companies can provide much-needed insights for Saudi companies that are trying, even today, to further articulate what they value and its effects on their business.

3. Materials and Methods

3.1. Sample

To conduct the empirical analysis, a comprehensive dataset encompassing the top 100 listed companies on the Saudi Arabian stock exchange during the period from 2017 to 2022 was curated [40]. The dataset incorporated ESG disclosure metrics in conjunction with performance indicators for the respective companies. The selection process prioritised non-financial industries to ensure a distinct focus on fundamental business operations and to eliminate financial organisations from the sample, financial firms were excluded due to their unique regulatory environment, distinct capital

structures, and different risk profiles, which could introduce confounding factors and skew results. This exclusion ensures a more homogeneous sample, preserving comparability and allowing for a clearer analysis of ESG disclosure's impact on core business performance across non-financial industries. The top 100 companies were chosen based on the availability of extensive financial data and sustainability reporting, enabling the concurrent examination of their financial performance and ESG aspects.

The top 100 companies were selected as the sample for this study due to their substantial market capitalisation, which reflected their economic significance and impact on the nation's economy. Moreover, they represented a significant segment of the total market value [8,41,42]. It was expected such entities were more likely to possess comprehensive and reliable financial data and sustainability reporting, thereby rendering them optimal for the current study [5,43,44]. The focus on these companies aligns with the interests of investors who utilise market capitalisation as a crucial metric for assessing a company's size and value. Furthermore, while the sample size was small, focusing on the largest firms could still provide sufficient statistical power if these firms accounted for a large portion of market activity [44–47]. Finally, selecting a sample based on market capitalisation ensures comparability with other studies in the field, both within the Saudi context and internationally [8,45,48,49].

To ensure the robustness and credibility of the data, diverse repositories of retrieved data were utilised, including company annual reports, sustainability reports, and corporate governance reports. Information pertaining to financial statements was acquired from leading databases such as Eikon, Bloomberg, and the Tadawul.

3.2. Data Description

Unravelling the intricacies of the multi-faceted relationship between ESG practices and corporate outcomes is a daunting task. While ESG scoring is an essential tool for gauging a company's overall sustainable practices, including its ecological, social, and governance disclosures, it is far from perfect, and analysing each of the dimensions separately is necessary in order to ensure that one does not accidentally obscure the reality [7,50–53]. As such, seeking to correct this flaw, we analysed the connections of the aggregate ESG scores and the environmental (ENV), social (SOC), and governmental (GOV) sub-scores with performance to further untangle the influences of the different metrics. Hence, our analysis measured corporate performance across the metrics of achievement and operational, financial, and market performance.

The dependent variables included in our regression models were the ROA, ROE, and Tobin-Q to illuminate the connections between the variables of interest. Additionally, we controlled for firm size, leverage, asset efficiency, and growth, which were found in prior work to impact assessments of the linkage between ESG and performance [35,42,53,54]. By accounting for these contextual factors, we aimed for a comprehensive analysis and robust conclusions regarding the relationship between sustainable practices and outcomes. The operationalisation of the variables is described in full in Table 1.

Table 1. Description of the variables.

| Variable Symbols | Full Name | Definition and Description |
|-----------------------|------------------|--|
| Dependent Variables | | |
| ROA | Return on Assets | Return on assets is the calculation of the profitability as a percentage of the net earnings in proportion to all the assets owned by the company. |
| ROE | Return on Equity | Return on equity determines the benefit as a proportion of the net income to the shareholder equity. |
| Q | Tobin-Q | Tobin's Q compares the overall market value of a business with the book value of its tangible assets. |
| Independent Variables | | |

| | | |
|-------------------|---|--|
| ESG Index | The ESG index, which was created through principal component analysis (PCA), is a single measure that combines environmental, social, and governance metrics so that firms can be effectively assessed in terms of their compliance to sustainability- and governance-related issues. It determines the ESG compliance of firm i during a period. | |
| Control Variables | | |
| Size | Firm Size | Firm size = natural log of total assets of firm (i) in period (t), which reflects the firm's capital and resources during that period. |
| Age | Firm Age | Firm age = the duration from the establishment of firm (i) to period (t), which shows the market experience. |
| LEV | Financial Leverage | Financial leverage = the proportion of the total liabilities to the total assets of firm (i) during period (t), which is a control variable. |
| Tan | Tangibility | The amount of assets that are physical in nature as compared to the overall assets of a company. |
| Liq | Liquidity | The capacity of a company to fulfil its short-term obligations with relative ease. |

3.3. The Model and Estimation Technique

Accurate specifications are crucial for an econometric model. It is vital to capture the effect of the discussed ESG disclosure indicator on companies' financial performance in the model within a panel data regression framework that accounts for relevant firm-specific characteristics and industry-level factors. Therefore, the following may be entered into an estimation procedure.

In the first instance, we provide the functional form of the model followed by econometric specifications. The functional form is as follows:

$$ROA = f(\text{ESG disclosures, } X_i),$$

$$ROE = f(\text{ESG disclosures, } X_i),$$

$$\text{Tobin-Q} = f(\text{ESG disclosures, } X_i),$$

where CP denotes companies' performance as measured through different proxies, and X_i is a vector of the control variables that have strong implications for companies' performance.

$$ROA_{it} = \beta_0 + \beta_1 ESG_{it} + \delta_0 X_{it} + \mu_{it} \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1 ESG_{it} + \delta_0 X_{it} + \mu_{it} \quad (2)$$

$$Q_{it} = \beta_0 + \beta_1 ESG_{it} + \delta_0 X_{it} + \mu_{it} \quad (3)$$

Here, ESG represents the ESG indices. ε is the error term.

Now, for the control variables, we have the following specifications:

$$X_{it} = \gamma_0 + \gamma_1 SIZE_{it} + \gamma_2 LEV_{it} + \gamma_3 AGE_{it} + \gamma_4 Z_{it} + \epsilon_{it} \quad (4)$$

where SIZE, LEV, and AGE represent the control variables, while Z represents some other variables that can be used for sensitivity analysis, and ϵ is the error term.

Now, we incorporate Equation (2) into Equation (1) to obtain the final model that will be used to find the implications of the ESG for companies' performance in Saudi Arabia. The general specifications are as follows:

$$CP_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 AGE_{it} + \beta_5 Z_{it} + \mu_{it} \quad (5)$$

In the context of our analysis, several key variables are crucial for the assessment of company performance and disclosure practices. The variable CP, which measures the performance of a company, is mostly dependent on the applied measures, which are the return on assets, the return on equity, and Tobin's Q. The ESG disclosure index is dependent on the measurement approach, and

it usually comprises the environmental, social, and governance disclosure indices for each company over time [15,25]. However, we will use an ESG index calculated through principal component analysis. We can divide this model as follows:

$$ROA_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 AGE_{it} + \beta_5 Z_{it} + \mu_{it} \quad (5.1)$$

$$ROE_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 AGE_{it} + \beta_5 Z_{it} + \mu_{it} \quad (5.2)$$

$$Q_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 AGE_{it} + \beta_5 Z_{it} + \mu_{it} \quad (5.3)$$

Another set of variables is company-specific and does not vary according to the approach. The SIZE variable describes the size of a company, while AGE measures the time period since a company's foundation. Finally, LEV characterises the financial leverage used by companies in a given year.

3.4. Estimation Technique

Panel data analysis has several advantages over cross-sectional or time-series analysis. It is more efficient because it has more degrees of freedom and greater variability and reduces cross-collinearity. By using panel data methods, any potential unobservable heterogeneity among the sample firms can be controlled. Additionally, endogeneity can be addressed using instrumental variables or estimation techniques, such as a random-effect model or fixed-effect model. In this study, a Hausman test was conducted to determine the best model to use in the analysis. This test, which is widely used in the literature, helps researchers choose between fixed-effect and random-effect models by checking whether the differences across individual entities are correlated with the explanatory variables. As such, it allows the identification of potential sources of endogeneity and helps in the choice of the most appropriate model.

Further, to avoid the problem of endogeneity, generalised method of moments (GMM) estimation techniques were used. By employing the GMM, we were able to estimate the relationship more robustly, as it uses instrumental variables and allows the elimination of potential biases that may result from endogeneity in the model. Thus, by using these sophisticated methods, we ensured that our panel data analysis was reliable and valid and that the descriptions of the nature of the relationship between ESG disclosure and corporate performance of Saudi Arabian companies were well established and credible.

3.5. ESG Index Construction

To construct the ESG index for the top 100 Saudi Arabian companies using principal component analysis (PCA), we first imported the required libraries and loaded the dataset. After that, we selected the relevant columns referring to the ESG disclosure indicators. Next, to use PCA, it was necessary to standardise the variables so that all of them were on the same scale. Then, we applied PCA to the standardised data. In this way, we were able to transform the original variables into a new set of variables that were not correlated; these were called principal components. The next step was to determine the value of the explained variance ratio. This was necessary to understand the weight of each component in the issue of ESG disclosure based on an exploratory factor analysis (EFA). Further steps included an EFA and a Shelby/NC weighting of principal components, which were then used together with the principal component analysis for the construction of the ESG indices. The normalisation of the resulting indices alongside the final grading of the companies to facilitate comparison made the index construction possible. In the end, an ESG index was constructed from individual environmental and social disclosure indicators, and it was used as a standard graded performance measure for the top 100 Saudi Arabian companies.

4. Results and Discussion

This section presents the empirical analysis and results and discusses their implications in relation to the hypotheses formulated earlier within the stakeholder and signalling theories. The

results reveal the relationship between the ESG disclosure and the performance of the top 100 Saudi Arabian companies under consideration [16,35]. Moreover, the regression analyses and statistical tests are described to demonstrate the relationship between the ESG disclosure and the top 100 companies' performance in terms of their ROA, ROE, and Tobin's Q [17,55]. The effects of the control variables on the relationships involving the firm size, financial leverage, and firm age are also discussed. Thus, the discussion explains the salient yet subtle implications of the findings in terms of how the ESG disclosure practices impact companies' performance and market valuation in Saudi Arabia. This study ultimately analyses these research results to guide actors such as policymakers, investors, and corporate practitioners in the use of ESG disclosure to navigate change in the country's realm of sustainable business.

Table 2 above, containing the descriptive statistics presents a complete overview of the key variables used to analyse the performance of the top 100 companies listed on the Saudi stock exchange during the period of 2017–2022. It focuses mainly on the influence of the ESG disclosure on companies' performance. The variable being analysed, ESG disclosure, is defined as a measure of the companies' environmental, social, and governance performance. The table of statistics shows that the mean ESG disclosure score was 32.166, implying a moderate performance among the sampled companies. However, variations in performance are apparent, with a standard deviation of 12.415 showing that the companies followed the principles of ESG to different degrees. The skewness value of 0.506 implies a slightly right-skewed distribution, with the kurtosis value of 2.493 suggesting a moderately peaked distribution.

Table 2. Descriptive statistics and normality test.

| Variables | Mean | SD | Max | Min | Skewness | Kurtosis | Jarque-Bera |
|------------------------|--------|---------|-----------|--------|----------|----------|-------------|
| Independent Variable | | | | | | | |
| ESG Disclosure | 32.166 | 12.415 | 75.349 | 11.397 | 0.506 | 2.493 | 0.000 |
| Dependent Variable | | | | | | | |
| ROA (Return on Assets) | 5.523 | 5.561 | 45.841 | 46.240 | -0.065 | 10.982 | 0.000 |
| ROE (Return on Equity) | 17.816 | 27.160 | 526.885 | | 6.221 | 98.624 | 0.000 |
| Tobin's Q | 1.800 | 1.050 | 8.697 | 0.615 | 2.478 | 11.936 | 0.000 |
| Control Variables | | | | | | | |
| Firm Size (Net) | 73,887 | 235,102 | 2,571,273 | 1011 | 6.891 | 56.005 | 0.000 |
| Financial Leverage | 2.994 | 3.370 | 78.422 | 1.045 | 6.635 | 85.760 | 0.000 |
| Firm Age | 0.683 | 0.577 | 3.792 | 0.028 | 2.001 | 8.232 | 0.000 |
| Tangibility | 0.514 | 0.806 | 0 | 11.913 | 3.891 | 46.013 | 0.000 |
| Liquidity | 2.117 | 2.171 | 0.111 | 27.646 | 4.635 | 55.760 | 0.000 |

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As for the dependent variables, the table covers three primary performance indicators: ROA, ROE, and Tobin's Q. The statistics indicate that the mean ROA is 5.523%, ranging from a minimum of -46.240% to a maximum of 45.841%. The ROE also has a mean of 17.816%, displaying a much wider range from -0.065% to 98.624%. The mean of Tobin's Q was 1.800, again displaying a high variation among the sampled companies. The control variables, on the other hand, pertain to firm characteristics, including the firm size, financial leverage, age, tangibility, and liquidity. The statistics show that the companies cover a diverse range of characteristics that may influence their performance. For example, firm size, financial leverage, and age indicate the companies' structures, while tangibility and liquidity display the nature of their assets. In conclusion, the table of statistics is a building block for understanding the analysed variables.

Table 3. Matrix of (linear) correlations.

| Variables | ENV | SOC | GOV | ESG Index | ROA | ROE | Tobin's Q | Firm Age | Firm Size | Financial Leverage |
|------------------------|--------|--------|--------|-----------|--------|--------|-----------|----------|-----------|--------------------|
| ENV (Environmental) | 1 | | | | | | | | | |
| SOC (Social) | 0.241 | 1 | | | | | | | | |
| GOV (Governance) | -0.142 | 0.328 | 1 | | | | | | | |
| ESG Index | 0.651 | 0.727 | 0.487 | 1 | | | | | | |
| ROA | 0.048 | 0.051 | 0.035 | 0.036 | 1 | | | | | |
| ROE | 0.043 | 0.147 | 0.026 | 0.064 | 0.83 | 1 | | | | |
| Tobin's Q | 0.098 | 0.002 | 0.129 | 0.01 | 0.224 | 0.079 | 1 | | | |
| Firm Age | 0.032 | -0.076 | 0.008 | 0.037 | 0.058 | 0.019 | 0.101 | 1 | | |
| Firm Size | 0.007 | -0.139 | 0.079 | 0.131 | 0.156 | 0.089 | 0.017 | 0.174 | 1 | |
| Financial Leverage | -0.024 | -0.196 | -0.019 | -0.089 | -0.031 | -0.038 | 0.202 | -0.025 | -0.032 | 1 |

The results of the correlation matrix reveal several important relationships between the measures of financial performance, the environmental, social, and governance disclosure variables separately, and the overall ESG disclosure [56]. Firstly, the ROA shows a modest positive correlation with ESG disclosure and environmental disclosure [57–59]. In other words, firms with high-quality environmental reporting practices are likely to exhibit higher returns on assets. Similarly, the weaker positive correlation between the ROE and ESG disclosure suggests that firms with better overall ESG performance are likely to experience higher returns on equity [8,15,17,37].

However, the correlation with environmental disclosure is relatively weak. Thirdly, Tobin's Q displays weak positive correlations with ESG disclosure and environmental disclosure. Thus, firms that adopt stronger environmental disclosure practices are likely to have higher market valuations. Interestingly, market valuation also has a weak positive correlation with social disclosure [12,38,39] which suggests that companies adopting strong social disclosure practices are likely to be perceived more favourably in the market. In contrast, the correlation between Tobin's Q and governance disclosure is relatively weak [4]. Overall, the relatively high correlation between the financial performance metrics and various ESG disclosure measures is likely to be an important factor that influences the relationships between the quality of ESG disclosure and companies' outcomes in the context of the Saudi Arabian stock market.

The results of the regression analysis, a cornerstone of our study, shed significant light on the relationship between ESG disclosure (measured with the ESG index) and the ROA of companies listed on the Saudi stock exchange (2017–2022). This analysis not only validates our original hypothesis but also aligns with established theories of strong ESG practices leading to operational benefits [8,30,60]. Companies with higher ESG scores stand to earn more profits. The reasons may include the following. Cost cutting: The positive coefficient reveals that ESG-oriented companies can potentially save on expenses through improved resource efficiency [61]. Increased production: The positive correlation is consistent with the theory that an agreeable work environment—with ESG practices reinforcing this—will attract and retain capable employees who, in turn, will lead to higher productivity [38]. Better risk control: Robust ESG practices can mitigate operating risks associated with environmental problems or social unrest, leading to a higher ROA [60].

The random-effect model also shows a positive relationship, though it is not statistically significant. This suggests that industry- or company-specific factors may temper this association's strength [9]. Further research could delve into these nuances. Our findings add to the growing body of literature indicating an economic link between ESG compliance and firm performance [17,25,56]. Companies that embed ESG principles into their decision-making processes are in a position to create value over the long term. Sustainability is a source of competitive advantage that is of particular interest to socially responsible investors and raises brand reputation [56]. It diminishes risk and presents opportunities; by actively addressing environmental and social issues, companies may ward off risks and exploit fresh opportunities [58].

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Our results not only provide a strong economic rationale for incorporating ESG into corporate strategy but also align with the current understanding that "ESG makes good business sense" [39,61,62]. This further strengthens the credibility and relevance of our research.

In summary, our first hypothesis posited a positive relationship between ESG disclosure and firms' operational performance, as measured through the ROA. The results in Table 4 support this hypothesis, showing a positive and statistically significant coefficient for ESG disclosure ($\beta = 0.002$, $p < 0.01$) in the fixed-effect model. This finding aligns with the theoretical framework proposed by Achim and Borlea [39], suggesting that good ESG practices can lead to better operational performance. The positive relationship between ESG disclosure and ROA can be attributed to several factors.

1. Resource efficiency: Companies with strong environmental practices may optimise their resource use, leading to cost savings and improved operational efficiency[60,61].
2. Talent attraction and retention: Ethical practices and sustainability initiatives can create a positive work environment, attracting and retaining skilled employees who, in turn, can increase productivity [38].
3. Risk mitigation: Robust ESG practices can help companies better manage operational risks associated with environmental and social issues [60].

These findings are consistent with previous studies, such as those of Alareeni and Hamdan [8] and Zhou, Liu, and Luo [30], who also found positive relationships between ESG performance and ROA in different contexts. Table 4 below represents the effect of ESG disclosure and control variables on the ROA of the top 100 Saudi Arabian companies.

Table 4. Effect of ESG disclosure and control variables on the ROA of the top 100 Saudi Arabian companies, 2017–2022.

| Variable | Fixed Effect | Random Effect | GMM |
|--------------------|--------------|---------------|-----------|
| | ROA | | |
| Intercept | 0.134 * | 0.083 * | 0.022 |
| | (0.073) | (0.044) | (0.036) |
| ESG Disclosure | 0.002 *** | -0.001 ** | 0.002 ** |
| | (0.001) | (0.001) | (0) |
| Firm Size | 0.036 *** | 0.006 * | 0.004 *** |
| | (0.008) | (0.004) | (0.002) |
| Financial Leverage | -0.007 | -0.002 | -0.001 ** |
| | (0.007) | (0.003) | (0.001) |
| Firm Age | -0.177 *** | -0.02 | 0.018 ** |
| | (0.045) | (0.023) | (0.016) |
| Liquidity | 0.034 ** | 0.028 | 0.045 *** |
| | 0.012 | 0.011 | 0.015 |
| Tangibility | 0.056 * | 0.049 * | 0.063 *** |
| | 0.018 | 0.017 | 0.020 |
| Observations | 700 | 700 | 700 |
| R-square | 0.082 | . z | 0.035 |
| Hausman Test | | | |

Standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$. Generalized Method of Moments (GMM).

The results in Table 5, as per the three regression models, offer insights into how companies listed on the Saudi stock exchange performed in terms of the ESG disclosure between 2017 and 2022. These results support our initial hypothesis: A positive and statistically significant relationship exists between the ESG index and ROE in the fixed-effect model [17]. This aligns with theories claiming that vital ESG disclosure will lead to higher financial performance for a company [25].

Table 5. Effects of ESG disclosure and control variables on the ROE of the top 100 Saudi Arabian companies in 2017–2022.

| | Fixed Effect | Random Effect | GMM |
|--------------------|----------------------|---------------------|----------------------|
| | ROE | | |
| Intercept | 0.177 (0.231) | 0.186 (0.12) | 0.045 (0.099) |
| ESG Disclosure | 0.008 *** (0.002) | -0.003 (0.002) | 0.002 *** (0.001) |
| Firm Size | 0.132 *** (0.024) | 0.02 ** (0.01) | 0.005 ** (0.007) |
| Financial Leverage | -0.012 (0.024) | -0.004 (0.009) | -0.003 * (0.002) |
| Firm Age | 0.488 *** (0.142) | -0.072 (0.063) | 0.023 ** (0.05) |
| Liquidity | 0.014 ** (0.006) | 0.007 * (0.003) | 0.011 *** (.0002) |
| Tangibility | 0.024 *** (0.008) | 0.017 ** (0.005) | 0.013 ** (0.004) |
| Observations | 700 | 700 | 700 |
| R-square | 0.071 | .z | 0.057 |

Standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

In the fixed-effect model, a positive coefficient signifies that companies with higher ESG disclosure scores are more likely to achieve a higher ROE. This can be attributed to several factors. Notably, efficient resource utilisation and risk avoidance through ESG disclosure structures can lead to cost reductions [60,61]. These cost savings can then be translated into increased profitability, thereby boosting the ROE. Additionally, companies that prioritise ESG considerations can attract socially responsible investors who may be willing to pay a premium for their stock, thereby enhancing long-term value creation [56].

It is worth noting that the positive relationship in the random-effect model is not statistically significant. This suggests that industry- or firm-specific factors may influence the strength of this particular link [9]. Therefore, it is crucial for future studies to delve deeper into these variations to gain a comprehensive understanding of the relationship between ESG disclosure and the ROE.

The estimation with the GMM backs this positive relationship between ESG disclosure and the ROE [16]. This finding correlates well with theories that high levels of ESG disclosure practices are related to macroeconomic indicators in terms of their positive influence on financial performance [35].

The regression analyses offer strong evidence for the financial advantages of sound ESG disclosure practices. Companies that prioritise ESG disclosure issues in their operations could yield greater returns and create more long-term value for shareholders. This is consistent with the growing idea of ESG disclosure as good business [61,62].

In summary, our second hypothesis predicted a positive relationship between ESG disclosure and companies' performance as measured through the ROE. The results in Table 5 support this hypothesis, with the fixed-effect model showing a positive and statistically significant coefficient for ESG disclosure ($\beta = 0.008$, $p < 0.01$). This finding is in line with the theoretical arguments presented by Duque-Grisales and Aguilera-Caracuel [38] and Bao and Sun [5]. The positive impact of ESG disclosure on the ROE can be explained by the following:

1. Enhanced brand reputation: Better ESG practices can improve a company's image, potentially leading to increased customer loyalty and sales [39].
2. Improved access to capital: Companies with strong ESG performance may attract socially responsible investors, potentially lowering their cost of capital [5].

3. Risk management: ESG practices can help mitigate various risks, potentially leading to more stable financial performance over time [60].

These results are consistent with those of studies by Tarmuji, Maelah, and Tarmuji [17] and Atan et al. [25], who also found positive relationships between ESG performance and ROE in different markets.

These regression analyses illuminate the impact of ESG disclosure on Tobin's Q, which depicts the market perception of a company's assets. It was found that, for the top 100 listed companies on the Saudi stock exchange between 2017 and 2022, these results strongly support our initial hypothesis; all three models used (fixed-effect model, random-effect model, and GMM) demonstrated a statistically significant positive relationship between ESG disclosure and Tobin's Q. This is consistent with the theory of ESG–performance models that suggest that an organisation's robust ESG disclosure practices can affect markets and investors [31].

Further inspection reveals that Tobin's Q is estimated to be 0.002 higher for one point in a company's ESG disclosure score in the fixed-effect model. This suggests that there may be linear connections between strong ESG performance and better market valuation.

Not only does this positive relationship occur in all three models, but the random-effect model reinforces the finding by suggesting that it still holds up under impact certification or company specifics [63]. Notably, our GMM estimate also has a positive coefficient, which is reflected elsewhere. When we analyse the potential for endogeneity by fitting the model using covered interest arbitrage, it is found to be 0.004 [17,64]. The strength of this result suggests that ESG disclosure is linked to perceptions of the market.

In summary, our third hypothesis suggested a positive relationship between ESG disclosure and firm market performance as measured through Tobin's Q. The results in Table 6 support this hypothesis, with all three models (fixed-effect model, random-effect model, and GMM) showing positive and statistically significant coefficients for ESG disclosure. The positive impact of ESG disclosure on Tobin's Q can be attributed to the following:

1. Investor perception: Companies with strong ESG practices are viewed as having better long-term prospects, leading to higher market valuations [37].
2. Risk premium: ESG-focused companies are perceived as less risky, potentially commanding a higher market valuation [21].
3. Future growth potential: Strong ESG practices will signal better management quality and potential for future growth, reflected in higher market valuations [31].

Table 6. Effects of ESG disclosure and control variables on Tobin's Q for the top 100 Saudi Arabian companies in 2017–2022.

| Dependent Variable | Fixed Effect | Random Effect | GMM |
|--------------------|----------------------|----------------------|----------------------|
| | Tobin's Q | | |
| Intercept | 1.02 *** (0.119) | 0.816 *** (0.097) | 0.471 *** (0.069) |
| ESG Disclosure | 0.002 ** (0.001) | 0.003 ** (0.011) | 0.012 *** (0.001) |
| Firm Size | 0.038 *** (0.013) | 0.029 *** (0.009) | 0.014 *** (0.005) |
| Financial Leverage | -0.026 ** (0.012) | -0.003 (0.008) | 0.022 *** (0.002) |
| Firm Age | -0.078 (0.074) | 0.002 (0.055) | 0.101 *** (0.033) |
| Liquidity | 0.031 ** (0.008) | 0.013 ** (0.006) | 0.017 *** (0.003) |
| Tangibility | 0.015 ** (0.007) | 0.012 ** (0.005) | 0.008 *** (0.002) |

| Observations | 700 | 700 | 700 |
|--------------|-------|-----|-------|
| R-square | 0.046 | .z | 0.074 |

Standard errors are in parentheses; *** $p < 0.01$ and ** $p < 0.05$.

These findings align with those of previous studies, such as those of Koundouri and Pittis [21] and Alsayegh et al. [31], who also found positive relationships between ESG performance and market valuation in different contexts.

Overall, these findings show that a company's ESG disclosure has significant real-world effects in financial/investor channels; more and more investors want ESG-friendly finance. Companies with strong ESG disclosure values may be viewed as less risky and more sustainable in a sense of long-term opportunity than their peers, resulting in higher estimates of the upper bound for their addressable market value.

In conclusion, our regression analyses provide compelling evidence for the significant role of ESG in financial markets. Companies that strategically incorporate ESG disclosure into their operations can potentially enhance their market value, attract long-term investors, and ultimately benefit their shareholders. This finding aligns with the emerging consensus [39,62,63] that "ESG disclosure makes good business sense", further underscoring the practical implications of our research.

Comparative Analysis of the ESG Disclosure

The process of constructing the ESG disclosure index via principal component analysis involved thorough procedures to standardise the critical variable—the ESG disclosure score—across the top 100 listed Saudi Arabian companies [4,65]. First, we standardised each variable in order to eliminate potential abnormalities and achieve interchangeability to facilitate sensible comparisons. Subsequently, based on a covariance matrix, we calculated eigenvectors and eigenvalues to determine the number of principal components that could explain issues surrounding the variance in our dataset. The derived principal components were created on the basis of the standardised variables and laid the foundation for the construction of the ESG disclosure index.

By aggregating the sum of the weights of the scores for the principal components produced, we compiled a holistic index by which sustainability practices and performance among the companies were assessed [66]. Through our endeavours, valuable information for stakeholders and investors is provided, facilitating responsible investment behaviour and decision making. In addition, the standardised variables allowed for a more comprehensive analysis and in-depth review, thus strengthening the validity and accuracy of the constructed index and the implications that it can have for the evaluation of corporate sustainability in Saudi Arabia [5,30,39]. Finally, due to the power of the GMM, we analysed potential endogeneity and provided robust estimates of ESG disclosure practices for companies' performance indicators. Thus, our initiative provides more valid results and improves consumers' understanding of the impact of buying from a particular firm.

When used as a key indicator, the coefficient of the ESG disclosure index tells us how environmentally friendly and socially responsible a company can be and what kind of governance that company possesses. It also tells us how this affects the financial, operational, and market performance of the top 100 listed companies in the Saudi stock market.

Though it was claimed that a well-managed attitude toward ESG disclosure could bring little or no extra achievement for firms [7,9,35,55,67,68], we determined that strong ESG disclosure performance has a definable positive effect on financial, operational, and market performance, which corresponds with the positive coefficients in our research.

Reversible company ROE [48] has a theoretical basis similar to that of the positive coefficient of ESG disclosure. Corporate strength in ESG disclosure correspondingly leads to superior shareholder returns; here, this is partly because investors prefer companies that stress sustainability and good corporate governance practices.

A high and significant coefficient of ESG disclosure with return on assets [30] suggests that companies reasonably focusing on ESG disclosure are more efficient and profitable overall. This

efficiency may come from better resource use. At the same time, perhaps profitability could be linked to lower risks and good relationships with stakeholders, as indicated by a return on assets coefficient that is larger than that of asset utilisation [8,18,56].

The market also values companies with strong ESG disclosure practices. The positive coefficient of Tobin's Q for ESG disclosure [21] shows that the market has at least some understanding of this importance given the better prices for companies with good ESG disclosure performance. This reflects a positive market attitude toward companies exhibiting these characteristics. Businesses that behave responsibly may be regarded as less risky over time and more "sustainable" stewards, providing a higher yield and more long-lasting management in investment terms.

ESG disclosure is a valuable indicator of sustainability for Saudi Arabian companies when considering various factors such as financial and market performance and operational efficiency [17,25,69]. When combined with other variables in our research model, it can contribute to more considerable capital since higher investment will accumulate overtime and will become both financial and physical capital [70].

In summary, Table 7 presents the impact of ESG disclosure on various performance measures across the entire sample. The results show consistent positive relationships between ESG disclosure and companies' performance, supporting all of our hypotheses.

Table 7. Impacts of ESG disclosure on the performance of the top 100 companies listed on the Saudi stock exchange.

| Dependent Variables | ROE | ROA | Tobin's Q |
|---------------------|----------|-----------|-----------|
| Firm Size | 0.003 ** | 0.003 ** | 0.025 *** |
| S.E. | (0.008) | (0.003) | (0.006) |
| Firm Age | 0.027 ** | 0.016 * | 0.08 *** |
| S.E. | (0.051) | (0.016) | (0.027) |
| Manufacturing Dummy | 0.029 | 0.019 *** | 0.02 ** |
| S.E. | (0.019) | (0.006) | (0.016) |
| Financial Leverage | -0.002 * | -0.002 ** | -0.005 ** |
| S.E. | (0.002) | (0.001) | (0.005) |
| ESG Disclosure | 0.002 ** | 0.003 *** | 0.001 *** |
| S.E. | (0.001) | (0.002) | (0.001) |
| _cons | 0.042 | 0.034 | 0.519 *** |
| S.E. | (0.115) | (0.037) | (0.072) |
| Observations | 700 | 700 | 700 |
| R-square | 0.022 | 0.039 | 0.292 |

Standard errors (S.E.) are in parentheses; *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

The coefficients of the ESG disclosure index are positive and statistically significant for ROA ($\beta = 0.003, p < 0.01$), ROE ($\beta = 0.002, p < 0.05$), and Tobin's Q ($\beta = 0.001, p < 0.01$). These findings provide robust evidence that companies with higher ESG disclosure scores tend to outperform their peers across multiple measures of financial and market performance.

These results align with stakeholder theory [22–24], which suggests that addressing the interests of various stakeholders through ESG practices can lead to improved overall performance. They also support the resource-based view of firms [22], indicating that ESG capabilities can serve as valuable, rare, and inimitable resources that contribute to competitive advantage. Our findings are consistent with those of several previous studies.

1. Tarmuji, Maelah, and Tarmuji [17] found positive relationships between ESG scores and financial performance in emerging markets.
2. Alareeni and Hamdan [8] reported positive associations between ESG practices and firm performance among S&P 500 companies.
3. Zhou, Liu, and Luo [30] demonstrated that ESG performance positively impacts financial performance and market value in the Chinese context.

However, our results contrast with those of some studies that found negative or insignificant relationships between ESG and firm performance [17,25,32–35]. These differences may be attributed to variations in the market contexts, measurement approaches, or time periods studied, highlighting the need for continued research in this area.

For the top 100 Saudi companies in the manufacturing and non-manufacturing sectors from 2017 to 2022, our regression analysis in Table 8 explores how the ESG disclosure affects performance metrics such as the return on assets, return on equity, and Tobin's Q. The results reveal sector-specific trends.

Table 8. Sensitivity analysis showing the comparison of ESG in the manufacturing and non-manufacturing sectors and its impacts on all dependent variables in the context of the KSA.

| | Manufacturing | Non-Manufacturing | Manufacturing | Non-Manufacturing | Manufacturing | Non-Manufacturing |
|--------------------|-----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|
| Variable | ROA | ROA | ROE | ROE | Tobin's Q | Tobin's Q |
| Firm Size | 0.009 *** (0.002) | 0.003 (0.003) | 0.019 *** (0.007) | 0.013 (0.01) | 0.032 *** (0.008) | 0.007 (0.005) |
| Financial Leverage | 0.001 (0.001) | -0.003 ** (0.001) | -0.002 (0.002) | -0.002 (0.003) | 0.018 *** (0.002) | 0.031 *** (0.004) |
| Firm Age | 0.012 (0.015) | 0.009 (0.024) | -0.02 (0.054) | 0.063 (0.073) | 0.061 (0.05) | 0.082 * (0.044) |
| ESG Disclosure | -0.002 *** (0.001) | 0.001 ** (0.001) | -0.005 * (0.003) | 0.005 *** (0.001) | -0.008 *** (0.002) | 0.005 *** (0.001) |
| Intercept | 0.148 *** (0.031) | -0.005 (0.047) | 0.406 *** (0.136) | -0.051 (0.128) | 0.953 *** (0.119) | 0.298 *** (0.075) |
| Observations | 259 | 448 | 259 | 448 | 259 | 448 |
| R-square | 0.069 | 0.024 | 0.054 | 0.038 | 0.175 | 0.088 |

Standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Using the ROA and ROE as examples, we can see that in the manufacturing sector, the coefficient of ESG disclosure is negative, meaning that higher ESG scores are associated with lower profitability. This might be due to the high costs for earnings in one management area and low profits for small businesses. Companies with poor environmental or social performance are not profitable in the short run [17,25,35].

The scene in the non-manufacturing sector is quite different. Here, the coefficient of ESG disclosure is favourable for the ROA and ROE. In other words, high ESG disclosure scores are associated with higher profitability. It is possible to read this positive relationship in several ways. In non-manufacturing sectors, ESG disclosure initiatives are perhaps more effectively implemented or bring a greater return. Responsible business operations correlate more strongly with a positive brand image than in manufacturing sectors [17,38].

With Tobin's Q, which reflects the market value relative to the book value, ESG disclosure has a negative coefficient in both sectors. This result suggests that high ESG disclosure scores are not necessarily rewarded with better market valuations. One explanation could be that investors see companies with high ESG disclosure scores as less innovative or risky, requiring a lower market valuation in this sense.

In summary, Table 8 presents a sensitivity analysis comparing the impacts of ESG disclosure on firm performance between manufacturing and non-manufacturing sectors. The results reveal interesting sector-specific trends.

1. In the manufacturing sector, ESG disclosure shows a negative relationship with the ROA and ROE, which is contrary to our hypotheses. This could be due to the high initial costs of implementing ESG practices in manufacturing industries, which may negatively impact their short-term profitability [17,25].

2. In the non-manufacturing sector, ESG disclosure shows a positive relationship with the ROA and ROE, supporting our hypotheses. This suggests that ESG initiatives may be more effectively implemented or bring greater returns in non-manufacturing sectors [17,39].
3. For Tobin's Q, ESG disclosure shows a negative relationship in the manufacturing sector but a positive one in the non-manufacturing sector. This indicates that market perceptions of ESG practices may differ across sectors, which is possibly due to varying investor expectations or industry-specific challenges [13].

These findings point out that we must take account of industry-specific factors when studying the relationship between ESG disclosure and performance [13]. They also suggest that the costs and benefits of ESG initiatives may vary across industries, calling for further research on sector-specific ESG strategies and their impacts on firm performance [4,16,21].

The positive impact exhibited in the non-manufacturing sector stands in contrast to that in the manufacturing sector. This points to the need for further research exploring what causes them to vary, considering details such as the particular costs and benefits of different industries' initiatives for ESG disclosure. In addition, it would be helpful to investigate the effects of corporate strategies and organisational behaviours of ESG disclosure measures on firms' meanings and implications [4,17,20].

Our analysis also reveals interesting relationships between the control variables and firm performance.

1. Firm Size: This is consistently positive and significant across all performance measures, suggesting that larger firms tend to perform better. This aligns with theories of economies of scale and market power [38,51,53].
2. Firm Age: This is generally positive but with varying significance levels across models. This suggests that older firms may benefit from accumulated experience and established market positions [38].
3. Financial Leverage: This had mostly negative relationships with the performance measures, indicating that higher debt levels may constrain financial flexibility and performance [54].
4. Liquidity and Tangibility: These had positive relationships with performance measures, suggesting that firms with better liquidity and more tangible assets tend to perform better [51,53].

These findings underscore the importance of controlling for these factors when examining the relationship between ESG and performance, as they can significantly influence companies' outcomes.

5. Conclusions and Policy Recommendations

This research explored how ESG disclosure relates to companies' performance. The study surveyed the top 100 largest publicly listed companies on the Saudi Arabia stock market—all of them on the main board—from 2017 to 2022. After checking them with regression models, the interrelationships between ESG disclosure practices and selected key financial indicators, namely, the ROA, ROE, and Tobin's Q, were examined.

Our research confirmed that robust ESG disclosure and companies' performance are tightly linked. Companies with better ESG disclosure performed significantly better in terms of the ROA, ROE, and Tobin's Q, a measure of market value. This is consistent with theories that hold that profitability and shareholder value can be improved by integrating sustainable principles into a business's core strategy [60,61].

This research adds to the ever-growing knowledge base of ESG disclosure and its economic effects. By illustrating the profit potential of ESG disclosure practices in Saudi Arabia, our study can provide an impetus for their wider uptake and be valuable for many different groups. The findings should benefit regulators in advocating for rigorous rulemaking on ESG disclosure. They might also increase investor education programs that focus on profits and doing well [39]. Furthermore, this will have several important theoretical implications for stakeholder theory. The positive relationship between ESG disclosure and companies' performance supports the perspective of stakeholder theory that addressing the interests of various stakeholders can lead to improved financial outcomes [22–

24]. The positive impact of ESG disclosure on market performance (Tobin's Q) aligns with signalling theory, suggesting that ESG disclosures serve as credible signals of companies' quality and future prospects [27,28]. For businesses, this study underlines the strategic importance of the social aspect, meaning that considerations concerning ESG disclosure are included within decision-making structures. By acting on ESG disclosure issues, companies can improve their financial performance and gain a more favourable reputation. They can improve the skills of responsible investors and manage risks associated with environmental and social problems more effectively [7,55].

While our study presents valuable insights, there are still some substantial barriers. First, our focus was on listed companies within Saudi Arabia, and, as such, it may be necessary to go into greater depth and provide an entirely accurate reflection of ESG disclosure throughout all business operations. Secondly, an area ripe for future exploration is the identification of precisely which ESG disclosure factors underpin performance disparities across particular industries. Further studies might also examine the impact of ESG disclosure practices on Saudi Arabia in social and environmental terms. Comparing the effectiveness of various regulatory approaches against the returns sought through different investor education strategies would be valuable in promoting sustainable business practices.

Our findings have several practical implications for managers, investors, and policymakers. For managers, the positive relationship between ESG disclosure and firm performance suggests that investing in ESG practices and transparently disclosing them can lead to improved financial and market outcomes. However, managers should be aware of potential sector-specific differences and tailor their ESG strategies accordingly. For investors, the positive associations between ESG disclosure and various performance measures indicate that ESG information can be valuable for investment decision making. Investors may benefit from incorporating ESG factors into their analyses, particularly when considering long-term investments. For policymakers, the overall positive impact of ESG disclosure on firm performance supports the case for promoting ESG disclosure practices through regulation and incentives. However, policymakers should consider sector-specific differences when designing such policies.

While our study provides valuable insights, it has the following limitations that future research could address:

1. The sample should be expanded to include a broader range of companies, including non-listed firms.
2. Longitudinal studies should be conducted to examine the long-term impacts of ESG practices on firm performance.
3. The specific ESG factors that drive performance differences across industries should be investigated.
4. The impacts of ESG practices on non-financial performance measures, such as employee satisfaction and customer loyalty, should be explored.

This study examined the relationship between ESG disclosure and financial performance among the top 100 publicly listed companies in the Saudi Arabian stock market from 2017 to 2022. Our findings provide strong evidence of a positive link between ESG disclosure practices and various measures of financial and market performance. The key conclusions include the following:

1. ESG disclosure is positively associated with operational performance via the ROA, financial performance via the ROE, and market performance via the Tobin's Q.
2. The relationships between ESG disclosure and firm performance vary between the manufacturing and non-manufacturing sectors, highlighting the importance of the industrial context.
3. The impact of ESG disclosure on firm performance remains significant even after controlling for various firm characteristics.

These findings contribute to the growing body of knowledge on ESG and its economic effects, particularly in the context of Saudi Arabia. They provide empirical support for the strategic importance of integrating ESG considerations into business practices and decision-making processes.

Based on our results, we recommend the following policy actions:

1. Encouraging ESG disclosure: Regulators should continue to promote and potentially mandate comprehensive ESG disclosure practices among listed companies.
2. Sector-specific guidance: Industry-specific ESG disclosure guidelines that account for sector-specific challenges and opportunities should be developed.
3. Investor education: Programs should be implemented to educate investors about the importance and interpretation of ESG information in investment decision making.
4. Incentive structures: The creation of incentives for companies that demonstrate strong ESG performance and disclosure practices should be considered.
5. Long-term perspective: A shift towards long-term thinking in corporate governance and investment practices in alignment with the typically longer-term nature of ESG benefits should be encouraged.

In conclusion, this study underscores the importance of ESG disclosure in driving sustainable and responsible business practices in Saudi Arabia. By fostering transparency and accountability through ESG disclosure, Saudi Arabia can set an example for sustainable development in the region and beyond. Collaboration among policymakers, investors, and businesses will be crucial in realising this potential and creating long-term value for all stakeholders.

By cultivating transparency and responsibility through ESG disclosure, Saudi Arabia can set an example for sustainable and responsible development. Collaboration among policymakers, investors, and enterprises is crucial to achieving this goal. Giving priority to ESG disclosure practices is not just an environmental policy issue; it is a strategic decision that unlocks the potential for sustainable economic prosperity and social happiness in Saudi Arabia. Despite the issuance of a guideline from the Tadawul Commission, the official body for stock trading in the KSA, urging and guiding Saudi market companies to disclose their environmental, social, and governance activities in 2018, these attempts are considered to be in their infancy and require more sustained efforts to support them in seeing the light [71].

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