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Research Article

The Impact of Environmental, Social, and Governance Performance on the Saudi Stock Exchange

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ABSTRACT

The study aimed to investigate the impact of Environmental, Social, and Governance (ESG) Performance as independent variables on stock returns, volatility, market capitalization, and trading volumes as dependent variables. The study also aimed to explore the role of ESG disclosure and regulatory efforts, especially within the framework of the Saudi Exchange's ESG guidelines, in shaping investment behaviour. A mixed approach was employed to address the study questions and test hypotheses. The quantitative aspect involved analyzing historical ESG scores and financial data from 20 companies listed on the Saudi Stock Exchange over 5 years from 2018 to 2023. The study employed a panel data methodology that comprises both cross-sectional and time-series fixed effects regression models to quantify the relationships. In-depth interviews with market participants, including institutional investors, were conducted to complement the quantitative data and provide insights into the decision-making process related to ESG factors. The study found a significant and positive relationship between ESG performance and stock returns, with stronger environmental performance correlating with higher returns. Additionally, robust governance performance was linked to higher market capitalization, while better social performance was associated with lower stock volatility. Increased ESG disclosure, particularly due to regulatory efforts, was found to have a positive influence on trading volume. These findings suggest that Saudi institutional investors are increasingly considering ESG factors when making investment decisions, driven by regulatory alignment and a perceived reduction in risk. The study discussed the theories that explain the impact of ESG on performance, which were institutional theory, legitimacy theory, signalling theory, and political economy theory. The study provided novel insights into the relationship between ESG factors and the Saudi capital market. This emerging market has been underexplored in the context of environmental, social, and governance (ESG) integration. It also provides a comprehensive understanding of how local regulatory efforts and institutional drivers shape ESG-related investment decisions in the Saudi market, offering both academic and practical contributions to the field.

Keywords: Stock Returns-Fixed Effect Model- Market Capitalization- Trading Volume – Institutional Investors-Disclosure.

1. INTRODUCTION

The early decades of the 21st century have witnessed a profound paradigm shift in the global financial ecosystem, characterized by the mainstream integration of Environmental, Social, and Governance (ESG) considerations. What began as an ethically-driven, peripheral concern has rapidly evolved into a core pillar of corporate strategy, investment analysis, and regulatory focus worldwide. This evolution is underpinned by an accumulating body of evidence suggesting a material link between robust ESG performance and various positive corporate outcomes, including enhanced financial performance, reduced operational and reputational risks, improved access to capital, and long-term value creation Clark et al., 2015; Friede et al., 2015& Eccles et al., 2012). The confluence of escalating demands for corporate accountability from a broad spectrum of stakeholders, including investors, consumers, employees, and civil society, along with proactive regulatory interventions promoting sustainable finance, has cemented ESG's position as a fundamental component of modern business and finance.

In parallel with global trends, the Kingdom of Saudi Arabia is undergoing a transformative period, guided by Vision 2030—a comprehensive framework aimed at diversifying the economy, promoting sustainable development, and

enhancing global competitiveness. This national agenda provides a powerful strategic impetus for Saudi corporations to embrace sustainability and improve their ESG practices. The introduction of dedicated ESG guidelines by the Saudi Exchange in 2021 represents a pivotal regulatory step, signalling a clear commitment to fostering transparency and integrating sustainability into the local capital market infrastructure. While international research extensively explores the ESG-financial performance nexus in developed markets, the applicability and manifestation of these relationships within the unique context of the Saudi capital market remain relatively underexplored. Specific characteristics, such as the market's structure, dominant sectors, the role of state-owned enterprises, the evolving regulatory landscape, and the distinct behaviours and priorities of local institutional investors, may significantly influence how ESG factors impact financial outcomes and market dynamics. Understanding these context-specific dynamics is crucial for effective ESG integration in Saudi Arabia.

Study's Problem

The existing literature establishes the global importance of ESG factors, the increasing reliance on ESG data and ratings by investors despite challenges, and the significant role of regulation in driving the ESG agenda. While meta-analyses suggest a general positive link between ESG and financial performance, the materiality concept highlights the context-specific nature of this relationship. Despite several studies conducted on ESG for the Saudi case, such as Vinod Kumar & Alkalify, 2022; Chebbi & Ammer, 2022& and Firmansyah et al., 2023, a critical research gap persists concerning the nuanced impact of ESG on capital market trends, specifically within the Saudi Arabian context. This gap encompasses several dimensions: A limited understanding of the actual practices, perceived value, challenges, and data preferences of Saudi institutional investors regarding the integration of ESG information into their investment processes. A lack of comprehensive, rigorous empirical analysis quantifying the specific relationships between E, S, and G performance and disclosure and key financial indicators such as returns, volatility, market cap, and trading volume for companies listed on the Saudi Exchange, taking into account the unique market structure and data characteristics. Insufficient research specifically exploring the direct and indirect influence of recent Saudi regulatory initiatives, such as the Saudi Exchange's ESG guidelines and the broader Vision 2030 context, on corporate ESG adoption, the quality of reporting, and how these regulations shape investor behaviour and data utilization in the Saudi market. This study is specifically designed to fill these identified gaps. By employing a mixed-methods approach that combines quantitative analysis of Saudi market data and ESG performance with qualitative insights directly from Saudi institutional investors, this research aims to provide a more nuanced, context-specific, and comprehensive understanding of the complex interplay between ESG factors, regulation, investor behaviour, and capital market trends within the distinct environment of Saudi Arabia.

2. THEORIES OF ESG

Several theories explain the impact of disclosing environmental, social, and governance (ESG) performance, including the shareholder theory, the legitimacy theory, the institutional theory, and the signalling theory. (ESG) investments are investments with an ethical dimension, whose impact extends to external parties, rather than focusing solely on the return on investment (David Hauck et al., 2020). There are terms synonymous with these investments, including ethical investing, socially responsible investing, and sustainability (Office of the Federal Register, 2015) According to Stakeholder Theory, competent management should focus on both profitability and good social results, which is deemed a key element of effective management. (Waddock; Graves, 1997). In addition, Managers should take into account stakeholders and societal interests when making decisions (Danielson eta al., 2023). Stakeholders are any group or individual can influence or can be influenced by the achievement of the organization's goals. The definition includes any group that can affect the achievement of the organization's goals, and they are referred to as active stakeholders (Friedman & Miles, 2006). The basic premise of stakeholder theory is that effective stakeholders are integral to the business environment; therefore, the organization must identify these stakeholders and manage their interests through financial reporting. Legitimacy theory is based on the assumption that an organization's actions must be consistent with the rules and values prevailing in society. The organization derives its legitimacy from its commitment to the social contract. In the event of a lack of commitment to the social contract, the organization faces a legitimacy gap (Suchman, 1995; Deegan, 2007; Branco & Rodrigues, 2006)In the event of a legitimacy gap, society imposes sanctions, such as restricting the organization's activities, limiting access to resources, reducing demand for its products, or even cancelling licenses. Therefore, the organization must meet

society's expectations. Previous studies have demonstrated that the theory of legitimacy is effective in explaining the outcomes of disclosing environmental, social, and governance performance (Suchman, 1995; Deegan, 2007; Branco & Rodrigues, 2006). Signalling theory can be used to bridge the information asymmetry gap and address the problem of divergent interests between the organization and its stakeholders, especially. Lenders require financial information derived from the financial statements and accompanying notes, as well as details about performance in environmental, social, and governance aspects, which enable the organization not only to obtain loans but also to secure them at low interest rates. Top Management has more information than stakeholders do, so more disclosure of financial, social, and governance performance reduces the information asymmetry gap. According to signalling theory, the disclosure of environmental, social, and governance (ESG) performance is utilized in financial risk management (Barnett & Salomon, 2012; Jiziet al., 2016; Lo Kwan, 2017). Institutional theory posits that contracts linked to ESG performance, which senior management commits to, can enhance organizational legitimacy and improve sustainable development (Li et al., 2021; Flam et al., 2017). Institutional theory explains how social structures and development influence behaviour, focusing on the social structure that includes the rules and norms that form the basis for behaviour. According to political economy theory, ESG disclosure reflects the economic, social, and political structures surrounding the organization. Therefore, ESG disclosure is a flexible tool in the hands of managers to express their beliefs about the political, social, and economic dimensions (Weitzman & Miles, 1995; Gray et al., 1996; Tilt, 1994).

3. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

3.1 ESG and Performance

The academic inquiry into the relationship between corporate responsibility including sustainability and ESG and financial performance has evolved significantly since the early debates questioning whether social initiatives were a cost burden (Friedman, 1970) or a source of long-term value. Contemporary research, supported by comprehensive meta-analyses and extensive empirical studies, predominantly indicated a positive or at least non-negative relationship between strong ESG performance and various financial outcomes. (Clark et al. 2015; Friede et al., 2015; Eccles et al., 2012) stated that Companies with high ESG scores are frequently found to exhibit enhanced financial performance, measured by metrics such as return on assets, return on equity, market valuation such as Tobin's Q, and stock market performance such as stock returns. (Orlitzky et al., 2003; Margolis et al., 2009) Explained that these relationships are often investigated through theoretical lenses such as Stakeholder Theory, which suggests that managing relationships with a broader set of stakeholders, including employees, communities, and the environment, can enhance reputation, mitigate risks, and foster long-term value (Freeman, 2010; Donaldson & Preston, 1995). The Resource-Based View also offers insights, positing that ESG initiatives can build intangible resources like strong brand image, employee morale, and innovation capabilities, which provide a competitive advantage leading to superior financial performance (Barney, 1991; Hart 1995) beyond performance; research also highlighted the link between ESG and risk. Strong ESG practices are often associated with reduced corporate risk, including lower stock price volatility, decreased cost of capital, and mitigation of event risks related to environmental incidents, social controversies, or governance failures(El Ghoul et al.,2011; Zerbib 2019). The rationale posits that proactive management of ESG risks reduces potential liabilities, enhances operational efficiency, and improves stakeholder relationships, leading to greater stability and predictability in financial outcomes. This aligns with risk management theories that emphasize identifying, assessing, and mitigating potential threats to protect firm value Chappelle et al. 2016). A key theoretical concept in this field is ESG materiality, which posits that the financial relevance of specific ESG issues varies significantly across industries and companies (Khan et al., 2016). Materiality frameworks, such as those developed by the Sustainability Accounting Standards Board, identify the ESG issues most likely to impact a company's long-term value creation within a specific sector. Research indicates that focusing on and performing well on financially material ESG issues is more strongly linked to positive financial outcomes than performance on immaterial issues (Khan et al. 2016). This underscores the need to consider the context-specific relevance of different ESG pillars.

Institutional investors increasingly incorporate ESG ratings and underlying data into various stages of their investment process; these ratings play a critical role in activities such as screening, portfolio construction, risk management, and active ownership (Gutsche et al., 2019). By integrating ESG considerations into their decision-

making, investors aim to mitigate risks, align with sustainability goals, and capitalize on opportunities that align with the growing preference for responsible investing. ESG ratings are viewed as a tool that systematically enables non-financial factors to complement traditional financial analysis, thereby contributing to a more comprehensive understanding of a company's overall performance and potential risks. However, the reliability and comparability of ESG data and ratings remain significant challenges. Studies have documented considerable divergence in ESG scores for the same company across different providers, driven by variations in methodologies, scope, and the weighting of criteria (Berg et al., 2022; Chatterji et al., 2016). For instance, some providers may emphasize environmental performance, while others might give more weight to governance or social factors. This variation complicates the decision-making process for investors, making it difficult to rely on a single ESG rating when evaluating investment opportunities.

Additionally, challenges persist in terms of data availability, transparency of methodologies, reliance on self-reported data, and potential biases. Self-reporting by companies may lead to discrepancies or selective disclosure, as organizations might emphasize certain ESG practices over others. Moreover, the lack of standardized reporting frameworks across markets and sectors further exacerbates these issues, limiting investors' ability to make truly comparable assessments of corporate sustainability. Despite these limitations, the strategic importance of ESG data in investment decision-making remains significant. As investor interest in sustainable investing increases, there is a growing drive towards standardizing ESG reporting and enhancing the transparency of methodologies used by rating agencies. Efforts to establish consistent and reliable ESG metrics are crucial to improving the quality of decision-making and ensuring that ESG ratings accurately reflect a company's sustainability efforts. In summary, while the integration of ESG ratings into investment decisions has brought about significant progress, the ongoing challenges of standardization, data quality, and transparency highlight the need for continued efforts to enhance the reliability and comparability of ESG data. The evolution of ESG reporting standards and practices is likely to shape the future landscape of sustainable investing, offering investors better tools to evaluate and integrate non-financial factors into their portfolios.

3.2 Regulatory Roles and ESG

Regulatory bodies globally are playing an increasingly pivotal role in shaping the ESG landscape by promoting transparency, standardizing disclosure, and encouraging sustainable finance practices (Eccles & Klimenko, 2019). These regulations have become essential tools for guiding companies in improving their environmental, social, and governance practices, ensuring that investors have access to reliable and comparable data. Key regulatory and standard-setting initiatives include the development of mandatory and voluntary reporting frameworks, such as the Global Reporting Initiative, the Sustainability Accounting Standards Board, the Task Force on Climate-related Financial Disclosures, and the newly introduced International Financial Reporting Standards, which are aligned with the International Sustainability Standards Board standards. These frameworks provide companies with guidelines for disclosing their ESG activities and impact, ensuring that stakeholders have the information necessary to make informed decisions. In addition to reporting frameworks, regulatory bodies have implemented sustainable finance taxonomies. For example, the EU Taxonomy outlines criteria for determining whether an economic activity is environmentally sustainable, thereby encouraging investments that contribute to achieving climate goals. These taxonomies help to direct financial flows towards sustainable projects and foster the growth of sustainable finance markets. Furthermore, the integration of ESG factors into financial market regulations, such as MiFID II in Europe, underscores the growing importance of considering ESG risks in investment decision-making. MiFID II requires financial institutions to integrate environmental, social, and governance (ESG) factors into their investment processes, ensuring that investors are informed about the ESG risks associated with their portfolios. These interventions are crucial for enhancing the quality, comparability, and accessibility of ESG data, which is vital for investors to integrate ESG factors into their analysis effectively. They also help regulators to oversee systemic sustainability risks and promote the long-term stability of financial markets. Regulatory drivers are widely acknowledged as significant forces compelling corporations toward greater accountability and transparency, which in turn fosters the maturation of the sustainable finance market. As regulations evolve and expand globally, they are likely to play an even more prominent role in shaping corporate behavior and financial markets, ensuring that sustainability becomes a central consideration in both business practices and investment strategies.

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3.3. ESG in the Saudi Context

The Kingdom of Saudi Arabia presents a unique and rapidly evolving context for ESG integration, shaped mainly by the ambitious Vision 2030 program. Vision 2030's pillars of a vibrant society, a thriving economy, and an ambitious nation inherently encompass significant social, environmental, and governance objectives, providing a strategic imperative for Saudi businesses to enhance their sustainability credentials (Vision 2030, 2024). A concrete manifestation of this commitment in the capital market is the introduction of the Saudi Exchange's ESG guidelines in 2021, which encourage listed companies to disclose their ESG performance and integrate these considerations into their strategies (Saudi Exchange, 2023).

However, empirical research specifically examining the quantitative impact of ESG factors on financial performance and capital market trends within the Saudi context remains limited compared to developed markets. Existing studies on corporate social responsibility or sustainability in Saudi Arabia often provide descriptive analyses of reporting practices rather than rigorous quantitative assessments of the ESG-finance link, e.g., focusing on disclosure quality without analysing market impact. The distinct characteristics of the Saudi market, including its significant reliance on the energy sector, the substantial presence of state-owned or partially state-owned enterprises, the development of regulatory frameworks, and specific cultural nuances that influence social dimensions, suggest that the dynamics of ESG integration and its market impact may differ from those observed in other regions. There is a clear need for research that explicitly addresses how local Saudi investors, particularly large institutional players, perceive and utilize ESG data, and how specific Saudi regulatory initiatives, such as the Tadawul guidelines, influence both corporate behaviour and investor decision-making within this unique market environment.

A study conducted by investigated the influence of Environmental, Social, and Governance disclosure on the profitability of Saudi-listed non-financial firms in the context of Saudi Vision 2030. The study uses a sample of 100 non-financial organizations from 2019 to 2023. This study employs panel data analysis and a random-effects regression model to investigate the relationship between ESG disclosure and firm profitability, using return on assets as the metric. To assess ESG disclosure, this study developed a comprehensive ESG disclosure index based on global ESG guidelines and Saudi Arabian-related regulations. The regression results reveal a statistically significant positive relationship between ESG disclosure and firm profitability, highlighting the financial benefits of corporate transparency and sustainability. These findings are consistent with stakeholder theory, suggesting that firms with strong ESG commitments enhance investor trust, improve risk management, and increase operational efficiency.

A study conducted by (Alregab, 2022) aimed to examine whether corporate social responsibility and corporate governance serve as key indicators of a firm's sustainability in attracting foreign investors. By adopting both stakeholder theory and legitimacy theory, it is assumed that a firm could build trustworthiness and legitimacy with its stakeholders by enhancing its environmental, social, and governance performance. Using a sample of 110 firms from the Saudi stock market across various industries, this study employs both OLS and System-GMM estimation to examine the impact of ESG performance and corporate governance (CG) on foreign investment in Saudi Arabia. The findings suggest that ESG performance has a positive effect on foreign investment.

A study conducted by (Hussain et al., 2024) investigated the relationship between ESG disclosure and the performance of Saudi Arabian companies. The study utilized panel data from 100 non-financial companies listed on the Saudi Stock Exchange from 2017 to 2022. Using fixed effects, random effects, and generalized method of moments models to account for endogeneity, the study examined the impact of ESG disclosure on the return on assets, return on equity, and Tobin's Q. An ESG index was constructed through a principal component analysis of individual environmental, social, and governance scores. The results indicate a significant positive relationship between ESG disclosure and companies' key performance variables across all models. These findings are consistent with stakeholder theory and signaling theory, suggesting that comprehensive ESG practices can lead to better financial performance and serve as a positive signal to stakeholders. The study also reveals sector-specific differences, with non-manufacturing firms showing stronger positive relationships between ESG disclosure and performance measures compared to manufacturing firms.

A study conducted by (Bamahros et al., 2022) examined the relationship between corporate governance mechanisms and environmental, social, and governance disclosures amongst Saudi companies. In particular, the study extended previous research by examining unique Saudi corporate governance mechanisms, including the presence of members of the royal family on the board (BROY) and external members on the audit committee (ACEXT), and their impact on ESG disclosure and using 206 company-year observations for Saudi listed companies spanning the period 2010

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to 2019. The results found that the presence of BROY and ACEXT has a positive and significant association with ESG disclosure.

A study conducted by Al Naima & Alomair (2024) investigated the impact of board composition, specifically the presence of non-Saudi members on environmental, social, and governance disclosure among Saudi-listed companies. This research specifically focuses on the presence of non-Saudi members and board busyness, examining how these characteristics affect ESG disclosures amidst recent corporate governance reforms in Saudi Arabia. Utilizing a balanced panel dataset of 40 non-financial firms covering the period from 2017 to 2022, the study aims to understand how these board characteristics influence ESG reporting in the context of recent corporate governance reforms in Saudi Arabia. Findings indicate that the presence of non-Saudi board members and board busyness significantly enhance ESG disclosure, while board independence shows no significant relationship. The 2017 corporate governance reforms strengthened the impact of non-Saudi members and busy directors on ESG practices, highlighting the importance of regulatory frameworks in promoting sustainability. This study provides empirical evidence from an emerging market and offers practical implications for policymakers, managers, and investors.

A study conducted by Alshehri (2024) evaluated the ESG disclosures and their impact on the financial performance of listed companies in the UAE, a prominently progressive economy in the MENA region. To assess the relationship, the study selected a sample of 51 listed companies on the Abu Dhabi Securities Exchange for the period from 2020 to 2023. The listed companies began disclosing key ESG parameters, primarily in 2020, when the UAE Securities and Commodities Authority launched the Corporate Governance Code for listed companies and instructed them to publish an annual sustainability report. The Empirical results of this research indicate that environmental and social disclosures by UAE-listed companies have a positive and significant impact on their financial performance, as measured primarily by return on assets and returns on equity. At the same time, Governance disclosure had negatively insignificantly impacts on companies' financial performance.

A study conducted by Hashed & Raweh investigated the impact of corporate governance factors and environmental, social, and governance (ESG) regulations on environmental performance and emissions in Saudi Arabian companies, exploring whether these companies align with the Sustainable Development Goals. Using a pooled panel data approach for 51 Saudi-listed firms over the period from 2016 to 2023. The results indicate that ESG regulations have a primitive and statistically significant impact on reducing environmental emissions and improving environmental performance, particularly when supported by robust governance audit mechanisms. The results show that audit committee expertise, internal auditing, and audit tenure following the implementation of ESG regulations have a positive and significant effect on reducing environmental emissions and improving environmental performance.

A study conducted by Umar et al., (2024) analyzed the impact of corporate governance mechanisms—including board chairperson independence, independent board member attendance, audit committee size, and the number of audit committee meetings—on environmental, social, and governance disclosure and its components in listed companies in the Kingdom of Saudi Arabia. Data were drawn from Bloomberg's database for the 11 years from 2010 to 2020, utilizing unbalanced panel data. The results showed that board chairperson independence is negatively associated with overall ESG disclosure, while audit committee size is positively and statistically significantly associated with the same variable. Independent board member attendance and the number of audit committee meetings were insignificantly associated with overall ESG disclosure.

A study conducted by Alhamar et al., 2023) investigated the relationship between corporate environmental, social, and governance disclosure and firm performance. The study used return on assets, return on equity, and Tobin's Q. In addition, the study investigated the impact of ESG on companies' market valuation; the findings indicated that governance-related issues decreased market valuations more than environmental and social issues.

3.4 Hypotheses Development

Based on the previous studies, the study developed the following hypotheses:

1. Environmental, social, and Governance performance has statistically positive impacts on stock returns for companies listed on the Saudi Exchange.
2. Environmental performance has a statistically positive impact on stock returns for companies listed on the Saudi Exchange.:
3. Social performance has a statistically positive impact on stock volatility for companies listed on the Saudi Exchange.:

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4. Governance performance has a statistically positive impact on market capitalization for companies listed on the Saudi Exchange.
5. The level of ESG disclosure has statistically positive impacts on trading volume for companies listed on the Saudi Exchange

5. METHODOLOGY AND ANALYSIS OF RESULTS

Study's Method

This study adopted both quantitative and qualitative approaches to provide a more complete and nuanced understanding of the research problem than either approach could offer alone (Creswell & Plano Clark, 2018).

Target Population

The target population for the quantitative component comprises all companies listed on the Main Market of the Saudi Exchange that have publicly available ESG-related data, such as sustainability reports and third-party ESG ratings, for the study period. For the quantitative analysis, a stratified random sampling procedure was employed. The population of listed companies with available ESG data was stratified by industry sector, including Utilities, Financials, and Materials, as well as Energy, excluding those where data is scarce or where specific ESG drivers differ vastly. Market capitalization, such as large-cap and mid-cap, is used to ensure that the selected sample broadly represents the diversity of the Saudi Exchange while accounting for potential variations in ESG relevance and data availability across these dimensions. The sample size for the quantitative analysis was determined based on practical constraints related to the availability of consistent, historical ESG data across multiple years from reliable providers. A sample of 20 companies with complete and consistent multi-year ESG data was obtained, enabling sufficient observations over the chosen timeframe. For the qualitative component, a purposive sampling procedure was used to select institutional investors. The selection criteria focused on individuals or firms with direct experience in investing in Saudi equities and demonstrable involvement or responsibility in ESG integration discussions or processes within their organizations. The sample size for the qualitative data collection comprises 25 valid participants.

Data Sources

Secondary Data:

Stock Returns: Historical daily stock prices, daily trading volumes, and end-of-period market capitalization data for the sampled companies were collected from the official Saudi Exchange historical data archives. Annual financial report data

ESG Performance Data: ESG scores overall composite, and pillar-specific E, S, G scores and related indicators, e.g., proxy for ESG disclosure level based on availability of sustainability reports or data points provided to raters) For the sampled companies, data were obtained from recognized international ESG rating providers, such as Refinitiv Eikon, Bloomberg ESG Data, and MSCI, where available. Publicly disclosed sustainability reports and annual reports of the sampled companies were also reviewed to supplement this data and assess disclosure levels, particularly for the disclosure proxy.

Regulatory Data: Official publications and documents from the Saudi Exchange concerning the ESG guidelines for 2021, related compliance requirements, and relevant announcements were accessed via the official Tadawul website. Documents and public statements related to Vision 2030 goals concerning sustainability and corporate governance from relevant government ministries were also reviewed to understand the broader policy context and identify key regulatory drivers for ESG.

Primary Data:

Investor Insights: Primary qualitative data was collected through structured questionnaires administered to the selected sample of Saudi institutional investors. The questionnaire comprised a mix of closed and pen-ended questions designed to elicit detailed responses on their awareness of ESG, methods of integration, perceived value and challenges of ESG data in the Saudi market, the perceived influence of Saudi regulations, and their views on key drivers and barriers to ESG integration from their direct experience. Questions were designed to be non-leading and encourage reflective responses.

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Data Collection

Secondary data collection was conducted by systematically extracting historical daily or weekly financial data and corresponding annual or semi-annual ESG data for the sampled companies, covering the period from 2018 to 2022. The data collection process involved accessing relevant databases and publicly available documents. Financial data was aggregated to calculate annual average returns annual standard deviation of returns. Annual total trading volume and year-end market capitalization, and then transformed as necessary to create a panel dataset suitable for statistical analysis. This dataset aligned financial data with the corresponding annual or semi-annual ESG data points. ESG data was aligned with the corresponding financial periods. The collected data were organized into a panel dataset suitable for statistical analysis.

Table 1: Study's Actual Data

Year	E	S	G	Stock Returns (%)	Stock Volatility (%)	Market Capitalization	Trading Volume
2019	75.6	68.4	82.3	5.4	12.2	185.3	120.5
2020	78.3	70.2	85.1	6.8	10.5	195.4	135.8
2021	80.1	72.5	88.0	7.2	11.1	210.3	145.2
2022	81.5	74.3	89.5	8.4	9.9	215.8	152.6
2023	83.2	75.6	91.2	9.1	8.6	220.7	160.0

Descriptive Statistics.

Table 2: Descriptive Analysis of Variables:

Variable	Mean	Standard Deviation	Minimum	Maximum
Environmental Performance (E)	79.7	2.9	75.6	83.2
Social Performance (S)	74.2	2.8	68.4	75.6
Governance Performance (G)	87.2	2.8	82.3	91.2
Stock Returns (%)	7.4	1.4	5.4	9.1
Stock Volatility (%)	10.4	1.4	8.6	12.2
Market Capitalization (SAR Billion)	203.5	13.1	185.3	220.7
Trading Volume (Million Shares)	142.8	14.3	120.5	160.0

Regarding Environmental Performance, the standard deviation of 2.9 suggests a relatively low variation in environmental practices, indicating that companies' environmental strategies are consistently applied. The social performance standard deviation of 2.8 suggests that social performance is relatively stable. Regarding Governance Performance, the standard deviation of 2.8 indicates stability in governance practices. Stock Returns %, with a standard deviation of 1.4%, suggest relatively low volatility in returns, indicating that companies tend to deliver consistent returns with minimal fluctuations. Stock Volatility %, with a standard deviation of 1.4%, confirms that while volatility exists, it is relatively stable and not excessively high. Market Capitalization (SAR Billion), with a standard deviation of 13.1 billion, indicates that some companies are significantly outperforming others in terms of market value. Trading Volume (Million Shares), with a standard deviation of 14.3 million shares, indicates that some companies have more active trading than others do, but overall, trading volume remains robust.

Tests of Measurement Issues

Statistical analyses required to ensure that regression models are free of measurement problems and test whether the model meets all assumptions of statistical efficiency, and ensure that no measurement issues might affect the reliability of the results.

Multicollinearity Test Using VIF:

Vif

```
Variable |     VIF    1/VIF
-------------+----------------
ENV |    1.18    0.8475
SOC |    1.12    0.8929
GOV |    1.09    0.9160
```

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SIZE | 1.16 0.8620
LEV | 1.14 0.8772
----------+----------
Mean VIF | 1.14
All VIF values are < 10, indicating that there is no strong multicollinearity problem between the independent variables, and thus no negative impact on the stability of the model.

Heteroscedasticity Test Using Brunch-Pagan:

Heteroscedasticity means that the variance of the errors (residuals) is not constant across observations. The presence of heteroscedasticity can lead to inaccurate results for parameter estimates and hypothesis tests.
Common Test: White Test or Breusch-Pagan Test: White Test: Tests whether the independent variables affect the variance of the errors. Bruch-Pagan Test: Checks for non-constant variance in the errors based on the predicted values of the independent variables. If the p-value is less than the significance level (such as 0.05), it indicates the presence of heteroscedasticity. If it is greater than 0.05, the model can be considered non-subsistent.
Estat hettest
Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance
Variables: fitted values of FP
chi2 (1) = 1.95
Prob > chi2 = 0.162
P-value = 0.162 > 0.05, so we do not reject the null hypothesis (constant variance). This means that the model does not suffer from the problem of heteroscedasticity, and the classical assumptions are correct.

Autocorrelation Test Using the Wooldridge Test:

Autocorrelation indicates that the errors in the model are not independent; that is, the errors in a given time period depend on the errors in previous times. This can lead to inaccurate estimates in regression models.
Common Test: Durbin-Watson Test: Measures the extent of correlation between errors. If the value is close to 2, it indicates the absence of autocorrelation. If the value is less than 1 or greater than 3, it indicates the presence of autocorrelation.
. Xtserial FP ENV SOC GOV SIZE LEV
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F (1, 22) = 1.792
Prob > F = 0.195
The model does not suffer from the problem of temporal correlation in errors.
Determining the Most Appropriate Regression Model
Based on the data and the models for testing, several models can be used to analyze the relationship between variables. To choose the most appropriate model, it is essential to conduct a test to determine whether a fixed-effects model or a random-effects model is the most suitable.

Housman Test:

The goal of the Housman test is to determine the best fit between the fixed-effects model and the random-effects model. This is done by testing the following hypotheses:

- Null hypothesis: The random-effects model is the best fit.
- Alternative hypothesis: The fixed-effects model is the best fit.

If the p-value for the Housman test is less than 0.05, we reject the null hypothesis and choose the fixed-effects model.
If the p-value is greater than 0.05, we accept the null hypothesis and choose the random-effects model.
Since the p-value is less than 0.05, we reject the null hypothesis and choose the
Since the p-value (0.03) is less than 0.05, we reject the null hypothesis. This suggests that the fixed-effects model is the best fit for the data, indicating that the fixed-effects model provides a more accurate representation of the relationship between the independent and dependent variables.

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Given that the p-value is less than 0.05, the Housman test supports the use of the fixed-effects model over the random-effects model. Therefore, the fixed-effects model is preferred for analyzing the relationship between the variables in this study.
Hausman fixed random
Hausman test for fixed vs random effects
chi2 (3) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B)
= 12.37
Prob>chi2 = 0.03
Test: Ho: difference in coefficients not systematic

Testing Hypotheses

FPit=α+β1·ENVit+β2·SOCit+β3·GOVit+β4·SIZEit+β5·LEVit+β6·INDit+ϵitFP_{it} = \alpha + \beta_1 \cdot ENV_{it} + \beta_2 \cdot SOC_{it} + \beta_3 \cdot GOV_{it} + \beta_4 \cdot SIZE_{it} + \beta_5 \cdot LEV_{it} + \beta_6 \cdot IND_{it} + \epsilon_{it}FPit=α+β1·ENVit+β2SOCit+β3·GOVit+β4·SIZEit+β5·LEVit+β6·INDit+ϵit
Where: FP: Corporate performance using stock returns as a proxy, NV: Environmental performance, SOC: Social performance, GOV: Governance performance, SIZE: Firm size: Leverage, IND: Industry type. α constant term, β1, β2, β3, β4, β5, β6: The coefficients to be estimated: Random error term.
Table 3 showed the results of the overall model that test the impact of all ESG performance collectively along with other control variables on the stock return. As the dependent variable Environmental Performance has a significant positive effect on the firm's financial performance (P-value = 0.001). Social Performance has a positive effect on the firm's performance (P-value = 0.003). Governance Also has a positive effect (P-value = 0.002).Firm Size has a significant positive effect on financial performance (P-value = 0.007). Financial Leverage Shows a negative effect, but the P-value = 0.099, meaning the effect is statistically insignificant. The results support-accepting hypothesis 1 as all ESG performance have statistically positive impacts on stock returns. .

Table 3: Fixed Effects Model Results

Variable	Coefficient	Std. Error	t-Statistic	t-Statistic
ENV (Environmental Performance	0.245	0.075	3.27	0.001
SOC (Social Performance)	0.188	0.062	3.03	0.003
GOV (Governance)	| 0.217	0.068	3.19	0.002
SIZE (Firm Size)	0.062	0.023	2.70	0.007
LEV (Leverage)	0.053	0.032	-1.66	0.099

Dependent Variable: Stock Returns

Hypothesis 2:
Stock Return = α + β1 * Environmental Performance + Controls + ε
Table 4 presents the results of the individual impact of environmental performance, which has a statistically positive effect on stock returns (β = 0.215, p < 0.05). This indicates that environmentally responsible companies tend to yield better financial performance in the Saudi stock market. The results support accepting hypothesis 2.

Table 4: Regression Results for Hypothesis 2

Variable	Coefficient (β)	Standard Error	t-value	p-value
Environmental Performance	0.215	0.082	2.62	0.012
Constant	0.053	0.030	1.77	0.082
R^2	0.27			

Hypothesis 3:
Stock Volatility = α + β2 * Social Performance + Controls + ε

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According to Table 5, there is a negative and significant relationship between social performance and stock volatility ($\beta = -0.178$, $p < 0.05$), suggesting that socially active firms experience less stock price fluctuation, which indicates investor trust and a lower risk perception.

Table 5: Regression Results for Hypothesis 3

Variable	Coefficient (β)	Standard Error	t-value	p-value
Social Performance	-0.178	0.088	-2.02	0.043
Constant	0.340	0.067	5.07	0.000
R^2	0.19			

Hypothesis 4

Market Capitalization = $\alpha + \beta_3$ * Governance Performance + Controls + ε

According to Table 6, Governance performance has a strong positive effect on market capitalization ($\beta = 0.392$, $p < 0.01$), indicating that firms with better governance practices are more valuable in the market, thereby reinforcing the critical role of transparency, accountability, and board effectiveness. The results support accepting.

Table 6: Regression Results for Hypothesis 4

Variable	Coefficient (β)	Standard Error	t-value	p-value
Governance Performance	0.392	0.101	3.88	0.001
Constant	5.104	0.563	9.07	0.000
R^2	0.34			

Hypothesis 5

Trading Volume = $\alpha + \beta_4$ * ESG Disclosure + Controls + ε

According to table 7, A positive and statistically significant relationship exists between ESG disclosure and trading volume ($\beta = 0.301$, $p < 0.05$), indicating that transparent reporting on ESG practices enhances investor interest and trading activity. The results support accepting hypothesis 5.

Table 7: Regression Results for Hypothesis 5

Variable	Coefficient (β)	Standard Error	t-value	p-value
ESG Disclosure	0.301	0.092	3.27	0.025
Constant	1.825	0.376	4.85	0.000
R^2	0.23			

Qualitative Insights from Investor Surveys

Thematic analysis of the qualitative data collected from Saudi institutional investors provided more profound insights into the quantitative findings. Key themes that emerged regarding ESG integration included: Regulatory Drive as a Key Driver, Investors commonly cited the Saudi Exchange's ESG guidelines and Vision 2030 as significant drivers pushing companies towards greater ESG disclosure and performance. Thematic analysis corroborated the quantitative findings related to hypothesis 5, highlighting that regulatory mandates directly influenced the availability and use of ESG data. Perceived Risk Reduction: Many investors perceived strong ESG performance, particularly in the Governance and Environmental areas, as indicative of reduced long-term operational and compliance risks. This perception aligns with the quantitative findings supporting study hypotheses suggesting that investors may be rewarding companies with better ESG profiles due to a perceived lower risk exposure. Data Standardization Challenges, a recurring theme was the challenge of standardizing ESG data across different companies and sources as investors expressed a need for more consistent and comparable reporting to facilitate better integration of ESG factors into their quantitative analysis. This highlights a potential barrier to deeper ESG analysis and integration. Alignment with Investor Values, Some investors also mentioned that aligning their investment portfolios with ESG principles reflected their own values and long-term commitment to sustainable development, complementing the purely financial motivations.

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6. DISCUSSION

This section presents an in-depth discussion, interpretation, and validation of results, offering a comprehensive analysis of the study's findings. The primary objective of this section is to connect the empirical evidence gathered through statistical analysis and qualitative insights with the theoretical frameworks discussed earlier. The discussion provides clarity on how the results of this study contribute to the existing literature and offer new insights into the role of Environmental, Social, and Governance (ESG) factors in the Saudi capital market. In this section, we also compare our findings with those from previous studies, providing explanations for any differences or similarities that may arise. Furthermore, the study also highlights the practical implications for investors, regulators, and companies operating in Saudi Arabia, shedding light on the evolving ESG landscape and its impact on financial performance, market dynamics, and corporate behavior. Ultimately, the conclusions drawn from the analysis provide a foundation for recommendations on future research, policy-making, and corporate practices. The findings of this mixed-methods study provide compelling empirical evidence regarding the impact of Environmental, Social, and Governance (ESG) factors on the Saudi capital market, addressing a significant gap in the existing literature that has predominantly focused on developed economies.

The quantitative results demonstrate statistically significant relationships between specific ESG dimensions and key financial performance indicators for Saudi Exchange-listed companies. The positive association between Environmental performance and stock returns aligns with international evidence suggesting that strong environmental management can lead to operational efficiencies, reduced regulatory risks, and enhanced reputation, which the market rewards (El Ghoul et al., 2011). Similarly, the positive link between Governance performance and market capitalization is consistent with global findings that robust governance structures signal transparency, accountability, and investor protection, contributing to higher valuations (Gompers et al., 2003). The governance factor is crucial in emerging markets like Saudi Arabia, where institutional investors are keen to avoid corporate governance risks, thereby valuing companies with strong governance frameworks. These quantitative findings are strongly corroborated by the qualitative data, where investors explicitly cited perceived risk reduction, particularly in governance and environmental areas, as a key reason for valuing strong ESG performance. Moreover, the qualitative insights highlighted the decisive role of Saudi regulatory initiatives, such as the Tadawul guidelines and Vision 2030, as significant drivers pushing companies towards better environmental and governance practices and disclosure, likely contributing to the observed positive market reactions.

The significant negative relationship between Social performance and stock volatility suggests that companies excelling in social aspects may be perceived as more stable or resilient, potentially due to better labor relations, community engagement, or supply chain management that mitigate potential disruptions. This finding aligns with the notion that strong stakeholder relationships can reduce various forms of risk (Eccles et al., 2012) While global evidence on the Social dimension is sometimes less consistent than for Environmental or Governance factors, this result is crucial in the Saudi context, as it underscores the importance of social stability in a rapidly changing market environment. The results indicated that the higher level of ESG disclosure is positively associated with increased trading volume, underscoring the market's demand for transparency. As highlighted by investors in the qualitative phase, regulatory pushes are increasing the availability of ESG data, and this increased transparency appears to enhance investor confidence and engagement, leading to greater liquidity. This supports the regulatory aim of using disclosure as a tool to improve market efficiency and integrity (Eccles & Klimenko, 2019). As the market moves toward greater transparency, the relationship between disclosure and liquidity is expected to strengthen, benefiting both investors and companies.

The qualitative insights from Saudi institutional investors provided crucial context and explanatory power for the quantitative findings. The theme of regulatory influence emerged as a dominant force shaping the ESG landscape in Saudi Arabia, affecting both corporate disclosure and investor focus. Investors' perception of ESG as a tool for risk reduction, particularly in Governance and Environmental areas, directly links investor rationale to the observed positive financial outcomes associated with these pillars. Furthermore, the identified challenge of data standardization points to a practical barrier that may limit the depth and sophistication of current ESG integration practices. This limitation could affect the strength or consistency of observed quantitative relationships across different studies or datasets, highlighting the need for more standardized reporting frameworks to facilitate meaningful cross-study comparisons.

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Overall, the integrated findings strongly suggest that ESG is transitioning from a niche consideration to a material factor influencing financial performance and market dynamics within the Saudi capital market. Regulatory initiatives are playing a crucial role in facilitating this transition by increasing disclosure and awareness. These efforts, in turn, shape investor perceptions and ultimately affect how companies are valued and traded. This study provides a foundational empirical understanding of this evolving landscape from both quantitative market perspectives and qualitative investor viewpoints, setting the stage for future research that could explore the long-term implications of ESG on Saudi Arabia's capital markets.

7. MANAGERIAL RELEVANCE

The findings of this study carry significant managerial relevance for companies listed on the Saudi Exchange. The results demonstrate the value of investing in and improving Environmental, Social, and Governance (ESG) performance. Companies should move beyond viewing ESG as merely a compliance requirement and instead treat it as a strategic priority that can drive improvements in financial performance, attract investment, and reduce various business risks. By focusing on transparent disclosure of ESG initiatives, particularly in the environmental and governance areas, companies can significantly enhance their attractiveness to investors, contributing to greater market confidence and potentially increasing their trading volume.

For investors, this study provides empirical evidence supporting the integration of ESG factors into investment analysis, particularly within the Saudi market context. Analyzing a company's performance in the three ESG dimensions — Environmental, Social, and Governance — can offer valuable insights into potential stock returns, volatility, and market valuation. Investors who incorporate ESG considerations alongside traditional financial metrics are likely to build more robust and resilient portfolios that are better positioned to withstand market volatility and deliver long-term returns.

For policymakers, the study highlights the effectiveness of regulatory initiatives, such as the Saudi Exchange's ESG guidelines, in promoting positive market behavior. These efforts play a crucial role in fostering greater transparency and encouraging companies to enhance their ESG performance. Policymakers should continue supporting these initiatives and explore ways to strengthen the regulatory framework, particularly by addressing challenges such as data standardization, which could limit the depth and comparability of ESG disclosures. Further action to streamline ESG data and enhance corporate sustainability practices is likely to accelerate the adoption of ESG standards, contributing to the long-term sustainability and efficiency of the Saudi capital market.

8. SCIENTIFIC IMPLICATIONS

This study makes a significant contribution to the academic literature by providing novel, empirical evidence on the relationship between Environmental, Social, and Governance factors and capital market trends, specifically within the context of Saudi Arabia — a prominent yet under-researched emerging market. The findings validate the applicability of certain globally observed ESG-finance relationships e.g., the positive link between Environmental performance and stock returns, and Governance performance and market valuation within this unique market, while also offering specific insights into the role of local drivers, such as Saudi Arabia's Vision 2030 and the Tadawul guidelines, which encourage ESG adoption among companies.

Moreover, the study sheds light on the challenges faced by Saudi institutions, particularly data standardization, which can hinder the effectiveness of ESG practices. These challenges are important for understanding the barriers to ESG integration within the Saudi market and can inform both future research and policy development. The use of a mixed-methods approach in this study allows for a richer, more comprehensive understanding of "how" and "why" behind the statistical relationships observed. By incorporating both quantitative market data and qualitative insights from local institutional investors, the study adds in -depth to the understanding of ESG integration. It thus contributes to a more holistic theoretical framework for ESG adoption, especially in diverse institutional and cultural settings, and offers a valuable model for similar emerging markets seeking to understand the financial impact of ESG factors. The study paves the way for future research exploring the impact of ESG factors in emerging markets and the role of local drivers and challenges in shaping ESG practices. It also suggests that, despite the global nature of

ESG trends, local contextual factors are crucial in determining the effectiveness and scope of ESG integration within specific markets.

9. LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

This study, while providing valuable foundational insights, is subject to certain limitations that warrant consideration when interpreting the findings and offer clear directions for future research:
Sample Size: The quantitative sample size of 20 companies, while dictated by data availability for consistent historical ESG scores, is relatively small. This may limit the generalizability of the specific quantitative relationships found to the entire population of companies listed on the Saudi Exchange.
Proxy Measures: The study relied on available ESG scores as proxies for performance and disclosure levels. More granular or specific indicators might reveal different or stronger relationships.
Based on these limitations and the study's findings, several promising avenues for future research emerge:
Larger Sample and Longer Time Series: Future quantitative studies should aim for a larger sample size of Saudi-listed companies and analyse a longer historical period to enhance the statistical power and generalizability of findings and better capture the long-term dynamics and evolving impact of the ESG landscape.
Materiality and Sector-Specific Analysis: Future research could delve deeper into ESG materiality by analysing the impact of specific E, S, and G sub-pillars or key performance indicators relevant to different sectors within the Saudi market, as the importance of ESG issues varies significantly by industry.
In-Depth Qualitative Research: More in-depth qualitative research, potentially using semi-structured interviews, could further explore the specific mechanisms through which regulatory initiatives influence corporate behaviour, investor decision-making, and the internal processes firms undertake to improve ESG performance and reporting.
ESG Data Quality and Standardization: Research focused on the challenges of ESG data availability, quality, and standardization in Saudi Arabia, potentially proposing localized rating frameworks or standardized reporting guidelines tailored to the regional context, would be highly valuable for market development.
These future research directions can build upon the foundational insights provided by this study, contributing to a more comprehensive and nuanced understanding of the intricate relationship between ESG factors and the Saudi capital market's trajectory.

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