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ESG-financial performance in the Gulf region: a bidirectional examination

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ABSTRACT

Purpose: Scholarly attention towards the Gulf Cooperation Council (GCC) region (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) has been limited due to its various unique features, making it an ideal testing ground for ESG practices. This paper is the first scholarly endeavor to comprehensively analyze the bidirectional causal relations between ESG and financial performance in the Gulf region.

Materials and methods: This study analyzes a sample of 54 publicly traded firms, using firm-level monthly observations of ESG scores and stock prices from January 2009 to May 2023. Stock returns—measured contemporaneously and with lags of 12, 18, and 24 months—serve as the indicator of financial performance. The analysis includes market returns, company size, and industry as control variables, consistent with established literature. Market returns represent the overall performance of the stock market during the relevant periods. All financial data were obtained from the Bloomberg Terminal, and ESG data were collected from ESG Book.

Results: The statistical analysis of the impact of both aggregated (ESG) and individual (E, S, and G) scores on stock returns indicate a weak relationship between sustainability and financial performance in the Gulf region. The assessment of public companies in the region demonstrates that stock markets display minimal responsiveness to changes in ESG metrics, indicating that improvements in ESG scores do not translate into higher stock returns. Similarly, the analysis of reverse causality—assessing whether financial performance influences future ESG performance—shows a weak association. While there is a slight indication that some firms with better stock returns may allocate some profits toward governance and environmental initiatives, this relationship is marginal and lacks strong statistical support.

Conclusions: Both the direct and reverse relationships between ESG scores and financial performance are weak, underscoring that ESG factors have yet to become significant drivers or consequences of stock returns in the Gulf region. These findings highlight the need to explore whether ESG progress is instead shaped by state leadership, regulatory mandates, and alignment with national strategic priorities, rather than by market-driven forces.

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1. Introduction

The rapid ascent of Environmental, Social, and Governance (ESG) considerations from peripheral ethical concerns to core pillars of global financial analysis marks a fundamental shift in capital market expectations. Once confined to niche investment strategies, ESG factors now play a central role in risk assessment and long-term value creation. This evolution is driven by growing recognition that ESG performance can materially affect a firm's cost of capital, operational efficiency, reputational capital, and resilience to systemic shocks.

Empirical research increasingly supports the link between ESG and financial performance, though findings remain mixed. On one hand, ESG-aligned firms often outperform peers due to stronger stakeholder relationships, improved capital access, and more effective governance. On the other hand, some studies suggest ESG benefits are context-dependent, sector-specific, or only emerge over longer time horizons.

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Notably, questions of causality persist—do ESG factors drive stronger financial outcomes, or are more profitable firms simply better equipped to invest in ESG?

Despite global momentum, the ESG agenda has encountered political resistance in some quarters. During the Trump administration in the United States, for example, federal agencies rolled back ESG-related disclosure requirements and framed ESG investing as politically motivated rather than financially material. This pushback, echoed in ongoing legal and political debates in various U.S. states, underscores the contested nature of ESG's role in capital markets. In contrast, many emerging economies—including those in the Gulf Cooperation Council (GCC)—have embraced ESG not as a partisan issue, but as an instrument of state strategy and long-term economic diversification.

This paper addresses unresolved questions about the ESG–performance nexus through the lens of the GCC, which offers a compelling and underexamined empirical context for ESG research. The six member states—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates—exhibit unique institutional characteristics, including high dependence on hydrocarbon revenues, concentrated ownership structures, and evolving capital market regulations. What sets the region further apart is the increasing presence of state-driven sustainability agendas, such as Saudi Arabia's Vision 2030 and the UAE's Net Zero by 2050 strategy, which are reshaping the ESG disclosure landscape and driving policy alignment between corporate behavior and national sustainability goals. These initiatives are not merely rhetorical; they are backed by substantial investments in green infrastructure, regulatory reforms, and international ESG reporting commitments. As a result, ESG practices in the GCC are not only shaped by investor pressure but also significantly influenced by top-down policy mandates—making the region a quasi-experimental setting for understanding how public and private ESG incentives interact.

Why bidirectional analysis in the Gulf? The GCC's political economy makes the direction of influence empirically ambiguous. First, state-driven sustainability agendas and ongoing regulatory reforms mean that corporate ESG choices may follow policy mandates and funding availability, implying a financial performance \rightarrow ESG pathway. Second, concentrated ownership structures and sectoral concentration reduce the likelihood that markets consistently price ESG, weakening a pure ESG \rightarrow returns channel. Third, the region's later ESG adoption, data scarcity, and government-guided corporate behavior raise endogeneity concerns that simple one-way tests cannot address. Guided by slack-resource theory, we therefore examine both ESG \rightarrow financial performance and financial performance \rightarrow ESG using firm-level panel data and 12–24-month lags.

These structural specificities, combined with the relative nascency of robust ESG integration and the availability of granular firm-level ESG data, position the GCC as an underexplored but theoretically rich site for testing the directionality of ESG–performance relationships. This study investigates two core questions:

- i. Do ESG performance scores—both aggregate and disaggregated across Environmental, Social, and Governance dimensions—significantly affect stock returns of publicly listed GCC firms?
- ii. Conversely, does financial performance influence subsequent changes in ESG scores?

To address these questions, the study makes three key contributions. First, it evaluates the predictive power of ESG metrics on financial returns within an underexplored regional context. Second, it examines reverse causality to assess whether financial performance drives greater ESG engagement. Third, it employs a panel data methodology with 12-, 18-, and 24-month lags, offering a more dynamic perspective than standard cross-sectional approaches. In doing so, the paper contributes to the growing body of research on ESG's dual function—as both a determinant and a consequence of corporate financial performance—in emerging market settings.

2. Theoretical framework: literature review and hypotheses development

This section examines the theoretical and empirical foundations that underpin the relationship between ESG performance and financial outcomes. Drawing on stakeholder theory, slack resource theory, and legitimacy theory, we explore how ESG can function both as a strategic asset that enhances firm value and as a consequence of financial success. The literature presents a mixed picture: while many studies report a

positive or virtuous cycle between ESG and performance, others highlight weak or inconsistent effects, often due to methodological or contextual differences. By grounding our hypotheses in these debates, and focusing on the unique political economy and disclosure landscape of the GCC, we aim to advance a more nuanced understanding of ESG's role in shaping—and being shaped by—corporate financial dynamics.

2.1. Literature review

The literature surrounding ESG and financial performance has expanded rapidly, reflecting both theoretical and empirical interest across diverse geographies and sectors. While much of this scholarship is rooted in developed markets, emerging economies—particularly in the GCC—present distinct institutional and economic features that warrant separate examination.

To frame this study's research questions, the literature is reviewed in three interrelated strands: the impact of ESG on financial performance, the reverse relationship where financial outcomes influence sustainability initiatives, and finally, the statistical dynamics of this bidirectional interplay specifically within the GCC region. Each strand offers unique insights that inform our understanding of the ESG-finance nexus in a context marked by top-down sustainability agendas and evolving corporate governance standards.

2.1.1. Does sustainability influence financial performance?

The scientific question of whether ESG performance directly benefits companies financially has been around for almost four decades (McGuire et al., 1988), and a solid and univocal answer remains elusive. However, this has not slowed the rapid growth of ESG integration in asset management. Indeed, according to Morningstar, global sustainable fund assets reached an all-time high of USD 3.2 trillion at the end of 2024, an 8% increase from the previous year and more than quadruple the size in 2018.¹ This momentum is expected to continue, with projections indicating these assets could surpass US\$40 trillion by 2030, constituting over a quarter (25%) of the projected US\$140 trillion in global assets under management.²

Several studies find a positive relationship between ESG scores and firms' financial performance. One avenue pursued to demonstrate this is revisiting Fama and French (1993) three-factor model (market, size, value) to integrate ESG as a fourth factor or replace one of the most traditional factors by ESG. Authors have confirmed that a revised factor model with ESG shows better investment performance (Gregory et al., 2021; La Torre et al., 2020; Maiti, 2021).

Other authors have found that ESG rating downgrades are consistently detrimental for stock performance, leading to statistically and economically significant negative abnormal returns (Shanaev & Ghimire, 2022). Additional scholarly work highlighting the positive relation between ESG and stock price performance or firm value include Ademi and Klungseth (2022), Albuquerque et al. (2020), Ashwin Kumar et al. (2016), Aydoğmuş et al. (2022), Berg et al. (2023), Chen et al. (2023), Engelhardt et al. (2021), Hillman and Keim (2001), Karolyi et al. (2023), Khan (2019), Lins et al. (2017), Weston and Nnadi (2023), and Xiong (2021).

Other scholarly work provides additional tonalities into the correlations between ESG and financial performance. For instance, Giese et al. (2019) demonstrate that companies' ESG information was transmitted to their valuation and performance, both through their systematic risk profile (lower costs of capital and higher valuations) and their idiosyncratic risk profile (higher profitability and lower exposures to tail risk). Alternatively, Lin et al. (2019) concluded that the transmission factor is sustainability-related R&D expenditures; Jorgji et al. (2024) found positive results when considering human capital management practices, such as training expenditure, workforce diversity and inclusion, pay equity, and employee benefits; and Setiani (2023) used gender diversity as the moderating factor. Chen and Xie (2022) use a sample of non-financial listed companies from 2000 to 2020 to highlight the relevance of ESG disclosures, and Servaes and Tamayo (2013) demonstrate that the correlation is only visible for firms with specific internal practices, such as high customer awareness, as proxied by advertising expenditures. Iftikhar et al. (2025) also found out that green innovation mitigates litigation risk and significantly enhances ESG disclosure. The number of potential transmitting factors is indeed very large, and it should be better captured by all-encompassing future studies.

There is also key industry-specific research such as Abdi et al. (2022) and Kalia and Aggarwal (2023), which highlight the relation between ESG and financial performance in healthcare and airline companies, respectively. Zhao et al. (2018) looks solely into the energy power market and Sandberg et al. (2023) focuses only on the food industry. To review the connection between financial and sustainable performance Şerban et al. (2022) studied 5557 companies which were divided into 9 economic sectors of activity according to The Refinitiv Business Classification (TRBC) criteria. Research has also indicated that investing in ESG and communicating ESG strategies positively impacted on return only for firms operating in specific sectors, such as energy and utilities (La Torre et al., 2020). As different sectors obey different market dynamics, it is important for empirical studies on the links between ESG and financial performance to control for industry-specific effects. Consistent with the literature, our study takes into consideration 11 industries (see Table 1, 2, 3, 4).

Several well-known meta-studies have also been published that show that the majority of reviewed sources, some of them going back to the 1980s, found positive correlations between diligent sustainability business practices and economic performance (Clark et al., 2014; Friede et al., 2015; Van Beurden & Gössling, 2008; Whelan et al., 2021).

However, a number of other studies, including also meta-studies, show that findings are weak, neutral, ambiguous, inconclusive, negative, or contradictory (Atz et al., 2023; Bae et al., 2021; Halbritter & Dorfleitner, 2015; Margolis et al. 2007; Naffa & Fain, 2022; Revelli & Viviani, 2015) perhaps because the industry still needs to mature on different fronts before we are able to elicit definite conclusions. Hurdles include lack of granular or incomparability of ESG data, varying ESG terminology or ESG investment strategies, lack of real-time ESG information, limited historical datasets, flawed analyses by regressing financial performance on corporate social performance, the use of several inadequately controlled variables, to give just a few examples. For instance, Breedt et al. (2019) show that incorporating ESG

Table 1. Variable definitions and classifications.

Variable	Type	Definition	Source
Stock return	Dependent	Monthly return on firm's stock (log-return), adjusted for dividends.	Bloomberg
ESG score	Independent	Composite ESG performance score (0–100), aggregating Environmental, Social, and Governance sub-scores.	ESG Book
E score	Independent	Environmental sub-score (0–100), measuring emissions, energy use, innovation, etc.	ESG Book
S score	Independent	Social sub-score (0–100), including employee policies, diversity, community relations.	ESG Book
G score	Independent	Governance sub-score (0–100), covering board composition, shareholder rights, etc.	ESG Book
Market return	Control	Monthly return on GCC market index to control for macro-level return trends.	Bloomberg
Firm size	Control	Categorical variable based on the natural logarithm of firm's total assets (USD), proxying for scale effects.	ESG Book
Industry dummy	Control	Sector fixed effects (binary) capturing firm industry based on GICS classification.	Bloomberg

Table 2. Descriptive statistics of key variables (2009–2023).

Variables	Mean	Median	Std. Dev.	Min	Max	N (obs)
ESG score	48.36	47.95	8.73	27.36	73.47	4405
E score	44.13	38.55	13.67	28.49	79.67	4405
S score	47.50	45.73	10.36	25.83	78.06	4405
G score	50.81	49.99	12.59	13.14	82.68	4405
Stock return (%)	0.59	0.00	9.03	−71.03	135.29	8991
Market return (%)	0.22	0.05	6.01	−21.58	17.99	173

Table 3. Augmented Dickey Fuller test statistics for each variable.

Firm returns	Market returns	ESG score	E score	S score	G score
−17.947***	−22.510***	−7.732***	−6.944***	−7.672***	−7.390***

***=significant at 0.01 level.

Table 4. Number of firms in the sample by sector and firm size.

Sector/Size	Large	Medium	Small	Total
Communications	2	5	2	9
Finance	13	13	6	32
Other	4	3	6	13
Total	19	21	14	54

information into a worldwide equity-market-neutral portfolio yields no additional return because any benefits from tilting toward a better-rated ESG portfolio are already wholly captured by other well-known equity factors. Cornell states that “while ESG investing may have social benefits, higher expected returns for investors is not among them” (Cornell, 2021). Surroca et al. (2010) used a database comprising 599 companies from 28 countries to demonstrate that there is no direct relationship between corporate responsibility and financial performance—merely an indirect relationship that relies on the mediating effect of a firm’s intangible resources. Duque-Grisales and Aguilera-Caracuel (2021) have concluded that ESG scores are not neutral, but rather negatively associated with multinationals’ financial performance according to a random effects regression, that is, companies in the Latin American context with the best ESG scores tend to be less profitable. And a recent study by Alves et al. (2024) shows that the relation between ESG and global stock returns over 2001–2020 is insignificant from both a statistical and an economic perspective, even when various variables are accounted for such as different regions, the E, S, and G subratings, the period after the 2015 Paris Agreement, and ESG momentum.

It is also worth noting that an incipient number of studies which attempt to identify relations between ESG and performance desegregate ESG and opt for the separate assessment of E, S, and G factors, instead of considering the combination of the three (Albuquerque et al., 2020; Aydoğmuş et al. 2022; Engelhardt et al., 2021; Gibson & Krueger, 2018). An isolated view of E, S and G factors provides a more granular and accurate perspective of markets dynamics. For instance, Kim and Li (2021) have shown that social factors have the most significant impact on credit ratings, while environmental scores have a negative effect.

In this context, our study’s first research questions is: Do ESG performance scores significantly affect stock returns of publicly listed GCC firms? To be consistent with the literature, we will assess both aggregated and desegregated ESG scores and account for firm size (large-, mid- and small-sized capitalization companies) and various industrial sectors. We also take a step further by incorporating lags of 12, 18, and 24 months in the ESG score, recognizing that ESG benefits may not be immediate. To the best of our knowledge, it is the first time in the literature that this research question is applied to GCC companies.

2.1.2. Does financial performance influence sustainability?

The existing body of literature on the consequential matter of ESG reverse causality is notably limited when compared with the unidirectional ESG-financial performance correlation. Yet, the essential question remains: Do companies do well because they do good, or do they do good because they do well? In other words, do ESG practices affect the financial performance of a company or, reversely, financially thriving firms exhibit a propensity to invest more resources in advancing their sustainability initiatives and promoting the welfare of stakeholders? Clarifying these intricate relationships is imperative for a more profound understanding of the reciprocal dynamics between financial prosperity and ESG engagement.

The theoretical foundation of this approach lies in Slack Resource Theory, which posits that corporate financial performance may increase the availability of financial resources that could be allocated in sustainability-related areas such as employee relations, carbon reduction measures or sustainable products (Aguilera-Caracuel et al., 2015; Allouche & Laroche, 2005; Kim & Lee, 2020; McGuire et al., 1988; Scholtens, 2008; Surroca et al., 2010; Waddock & Graves, 1997; 1997; Wokutch & Spencer, 1987). From this perspective, ESG enhancements are not necessarily drivers of performance, but outcomes of it—a luxury for well-performing firms rather than a requirement for underperformers. Better financial performance results in a surplus of resources that provides firms with the financial muscle to consider ESG issues. In this wake, Hong et al. (2012) argue that less financially constrained firms ought to spend more on “corporate goodness” and therefore have better ESG performance. Lin et al. (2019), based on a panel data set for 100 of the Fortune Most Admired Companies and using a methodology known as Panel Vector Autoregression (Panel VAR), concluded that better financial performance of firms leads to a better ESG engagement and that better ESG credentials do not necessarily lead to superior financial performance. Abdi et al. (2022) reached a similar conclusion showing that both environmental and social activities are positively linked with financial performance in the airline industry.

Nevertheless, alternative theoretical lenses are also important to consider. Stakeholder Theory (Donaldson & Preston, 1995; Freeman, 1984) argues that ESG engagement is often a strategic investment

to satisfy the demands of key stakeholders, improve legitimacy, and create long-term shareholder value. On the other hand, Legitimacy Theory (Deegan, 2002; Suchman, 1995) frames ESG disclosures as mechanisms to align with evolving societal norms and maintain legitimacy in the eyes of regulators and the public. These theories provide a broader institutional and reputational explanation of ESG behavior—particularly relevant in the Gulf region, where corporate ownership is often closely linked to the state. Together, these theories offer complementary but distinct lenses: Slack Resource Theory emphasizes the enabling role of financial capacity; Stakeholder Theory highlights strategic value maximization; and Legitimacy Theory underlines institutional and reputational conformity.

As alerted by Krüger (2015), studies that regress portfolio returns of trading strategies or other annual measures of firm value (e.g. Tobin's q) on low-frequency measures of ESG (e.g. annual ratings) cannot address this question because the mere observation of a positive correlation could be consistent with any of the two interpretations. We agree that studying the correlations between ESG and financial performance necessarily entails looking both ways.

Other scholars have looked at the financial performance-sustainability correlation through different lenses. Preston and O'Bannon (1997) argue that managers that are not performing well may try to hide bad corporate performance by turning their attention to ESG related practices as they may generate positive branding. In that sense, low corporate performance leads to higher ESG scores.

Other studies suggest that financial performance and ESG performance are synergistic, that is, ESG performance is both a predictor and a consequence of financial performance, thereby forming a virtuous circle. Financially successful companies can afford to allocate more resources on ESG matters, but ESG practices can also help firms becoming financially successful. For instance, Orlitzky et al. (2003), conducted a meta-analysis of 52 studies yielding a total sample size of 33,878 observations and concluded that there is a virtuous cycle with quick cycle times or concurrent bidirectionality between corporate social/environmental performance and corporate financial performance in the sense that prior high levels of financial performance may provide the slack resources necessary to engage in corporate social responsibility and responsiveness. Looking specifically into Spanish listed companies, Rodriguez-Fernandez (2016) equally demonstrated positive relationships in both directions, namely that “the social is profitable and that the profitable is social,” thereby originating a positive feedback virtuous circle. Surroca et al. (2010) reached a similar conclusion by highlighting that ESG practices promote the development of intangibles related to innovation, human capital, reputation, and culture, which lead in turn to improved financial outcomes—and the other way around. In their words, “we interpret these findings in terms of a virtuous circle, in which any increase in one type of performance [ESG and financial] is translated into an improvement in the other.”

Our study's second research question—“Does financial performance influence subsequent changes in ESG scores?”—engages directly with the evolving literature on reverse causality between financial outcomes and sustainability practices. When examined in conjunction with our first research question, this approach also allows us to evaluate whether ESG and financial performance operate within a statistically significant synergistic or bidirectional framework, shedding light on the potential existence of a virtuous cycle between doing well and doing good.

2.1.3. What is the statistical relationship between financial performance and sustainability (and the other way around) in the GCC region?

The overwhelming majority of studies on the links between ESG and financial performance are centered on developed markets, such as North America (Alda, 2020; Halbritter & Dorfleitner, 2015; Khan, 2019; Shanaev & Ghimire, 2022), the United Kingdom (Ahmad et al., 2021), Norway (Giannopoulos et al., 2022) or Europe (Engelhardt et al., 2021; La Torre et al., 2020; Landi & Sciarelli, 2019; Sandberg et al., 2023), where data maturity is more conspicuous and sustainability practices are more widespread. A smaller number of studies, focused on non-Western or Global South markets, have been carried out on companies from South Korea (Han et al., 2016), Australia (Limkriangkrai et al., 2017), India (Dalal & Thaker, 2019), China (Fang, 2023; Zhao et al., 2018), Latin America (Duque-Grisales & Aguilera-Caracuel, 2021), Turkey (Saygili et al., 2022), Middle East, North Africa and Turkey (MENAT) (El Khoury et al., 2023), Malaysia (Atan et al., 2018), Taiwan (Lin et al., 2009), and ASEAN countries (Chairani & Siregar, 2021). Thus far, the Gulf Cooperation Council (GCC) has received little attention by the vast ESG versus financial performance literature. While previous studies have examined various facets of ESG integration and its association with

firm performance in the GCC context, the scope, methodologies, and focus of these investigations differ significantly from the present study. For example, Al-Hiyari and Kolsi (2024) investigate how stock market participants across the MENA region, including GCC countries, value ESG performance, emphasizing market reactions to ESG announcements. Their regional scope, however, blends GCC-specific insights with broader MENA dynamics, and the emphasis lies more on market perception than causal inference. Similarly, Al-Jalahma et al. (2020) and Al-Khouri and Abdul Basith (2022) focus on the banking sector, examining ESG disclosure levels and their implications for firm performance and corporate social responsibility. These studies are valuable for understanding disclosure practices and the strategic implications of ESG signaling in a regulated sector, yet their sector-specific lens limits generalizability to the broader corporate landscape of the GCC. Moreover, the use of voluntary disclosure data as a proxy for ESG performance does not always capture the nuanced, quantitative ESG metrics now available through third-party ESG rating agencies. Sharma et al. (2022) present a broader cross-country analysis across the GCC and confirm a positive association between ESG reporting and firm performance. Nonetheless, their approach is largely cross-sectional and static, lacking a dynamic temporal component that would allow for the identification of causality or lagged effects over time. Jizi and Arayssi (2024), on the other hand, delve into how investors value firms' social performance, adding a critical behavioral finance dimension to the literature. Their findings provide insight into investor sentiment but do not address the feedback loop from financial performance to ESG activity. Other recent contributions, such as Kibria et al. (2023), explore ESG integration in corporate valuation, and Elhabib (2024) provides a literature review on corporate governance and capital market development in the GCC, which includes ESG as a secondary theme. While these works enrich the theoretical and contextual landscape, they do not explicitly test bidirectional or time-lagged relationships using panel data across multiple ESG dimensions.

Taken together, this literature illustrates a growing interest in ESG within the GCC but also highlights significant gaps. Prior studies tend to emphasize disclosure practices, investor reactions, or industry-specific trends, often relying on cross-sectional data or limited ESG indicators. In contrast, our study employs a longitudinal panel dataset (2009–2023), applies Granger causality testing to both aggregated and disaggregated ESG scores (E, S, and G), and focuses exclusively on publicly traded firms across sectors in the GCC. This comprehensive, bidirectional approach provides a more robust understanding of how financial performance and ESG practices are interlinked over time.

The insufficient attention received by the GCC region could be primarily attributed to the perception that corporations in the region embraced sustainability practices later than their global counterparts. This relative neglect is further compounded by scarcity of available data, the prevalence of Sharia-compliant finance in numerous financial institutions, the divergence of governance and funding structures from conventional practices observed in developed markets, and the tendency of GCC firms to be responsive to guidelines set forth by their respective governments.

With their distinct features, the GCC nations offer a unique opportunity to analyze the effectiveness of ESG practices. Can these practices, often linked to developed markets, deliver similar financial rewards in a different economic context? Current research on ESG's impact on financial performance primarily concentrates on developed economies. Studying the GCC could shed light on whether the benefits of sustainable finance are universally applicable or regionally dependent. Interestingly, Shin et al. (2023) show that the financial return from engaging in ESG varies depending on the countries' cultural aspects because stakeholder evaluations and appreciations for a firm's ESG performance differ across nations.

Adding to this complexity, several Gulf countries, including Saudi Arabia, Bahrain, and the United Arab Emirates, have set ambitious plans for sustainable economic development, aiming to reduce dependence on fossil fuels through economic diversification (e.g. Saudi Vision 2030, Bahrain Vision 2030, and We The UAE 2031 Vision). This ongoing shift gradually transforms the region into an experimental space for innovative sustainability methodologies.

Consequently, our study's research questions are applied exclusively in the GCC region, comprised of the six GCC members: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE).

Overall, this paper makes three key contributions: (1) it employs multiple models to examine the impact of ESG rating upgrades and downgrades on stock returns, delving into both aggregated (ESG) and individualized (E, S, and G) datasets, (2) it makes a significant contribution to the still limited literature on reverse causality between ESG scores and firm returns, and (3) it is the first scholarly endeavor

to comprehensively analyze the bidirectional links between ESG and financial performance within the Gulf Cooperation Council (GCC).

The structure of the paper is as follows: following the introduction, literature review and research questions, it delineates the process of data collection and usage, coupled with a comprehensive overview of the methodology employed. Subsequently, the paper delves into the presentation of statistical results, ultimately concluding with findings and implications.

2.2. Hypotheses development

Grounded in the preceding literature, this study develops three hypotheses to explore the bidirectional relationship between ESG performance and financial outcomes in the context of GCC public companies. The first hypothesis (H1) assesses whether ESG performance has a measurable impact on firm-level stock returns. This is informed by stakeholder theory and resource-based views that posit ESG as a strategic asset contributing to competitive advantage and long-term financial performance. The second hypothesis (H2) decomposes the ESG construct into its constituent Environmental (E), Social (S), and Governance (G) pillars to determine whether specific sustainability dimensions are more influential in explaining firm returns. Prior empirical studies have found heterogeneous effects across E, S, and G, suggesting that their financial implications may vary by context and industry. The third hypothesis (H3) reverses the causal direction to test whether financial performance, proxied by stock returns, leads to improvements in ESG scores over time. This is rooted in slack resource theory, which contends that firms with stronger financial positions are more capable of allocating resources to non-financial initiatives, including ESG activities.

Each hypothesis incorporates lagged variables (12, 18, and 24 months) to capture the temporal dynamics of ESG-financial interactions, reflecting the fact that the effects of ESG engagement and financial outcomes may not manifest immediately. Together, these hypotheses allow for a comprehensive analysis of whether ESG drives performance, is driven by it, or reflects a mutually reinforcing relationship in the unique institutional and economic landscape of the GCC.

H1: ESG scores affect individual firm stock prices.

H2: Environmental (E), Social (S), and Governance (G) scores affect individual firm stock prices.

H3: Individual firm stock prices affect ESG and E, S, and G scores.

3. Research design, data, variables, and model

3.1. Research design

This paper utilizes a quantitative, panel data econometric design to assess the bidirectional causal relationship between ESG scores and stock returns among firms in the Gulf Cooperation Council region. In line with the literature on ESG-financial performance linkages (e.g. Fatemi et al., 2018), the study applies fixed effects panel regressions to control for unobserved firm-specific heterogeneity while investigating both forward (ESG → financial performance) and reverse (financial performance → ESG) causality. Utilizing this bidirectional framework, we test three hypotheses that explore the directionality and dimensionality of ESG-financial performance relationships.

To account for temporal variation and delayed effects of ESG implementation, the models incorporate lag structures of 12, 18, and 24 months, consistent with methodological precedents in the ESG-finance literature (Whelan et al., 2021).

Panel regressions with fixed effects are used to control for unobserved firm-specific heterogeneity that may influence the dependent variable. This approach is suitable for modeling variance across a diverse sample of companies, while controlling for all time-invariant unobserved firm characteristics.

3.2. Sample and data sources

The empirical analysis draws upon a panel dataset comprising 54 publicly listed firms from all six GCC markets observed monthly from January 2009 to May 2023. Firms are primary listings on the national

exchanges: Saudi Exchange (Tadawul) [Saudi Arabia], Abu Dhabi Securities Exchange (ADX) and Dubai Financial Market (DFM) [UAE], Qatar Stock Exchange (QSE) [Qatar], Boursa Kuwait [Kuwait], Muscat Stock Exchange (MSX) [Oman], and Bahrain Bourse [Bahrain]. The country distribution in the final sample is: Saudi Arabia = 12 firms; United Arab Emirates = 9; Qatar = 14; Kuwait = 8; Oman = 9; Bahrain = 2; total = 54. We exclude ETFs, preferred shares, and depository receipts; cross-listed companies are counted once at their primary venue. Returns are computed from dividend-adjusted month-end prices (log returns) in local currency; because returns are price ratios, they are currency-unit invariant for our within-firm analyses. The panel spans 11 industries and is finance-heavy (39 of 54 firms), reflecting the structure of GCC equity markets; sector and size effects are controlled for in all models. Similarly to other studies, stock return data and financial indicators were obtained from the Bloomberg Terminal (Elmghaamez et al., 2024; Han et al., 2016), while ESG data is collected from ESG Book (Kambe and Tamamura 2022), a platform for universally accessible, digital, corporate sustainability data led by Arabesque, an AI and ESG intelligence company (formerly known as Arabesque S-Ray). All ESG variables are firm-level scores from ESG Book; no country-level ESG or sovereign indicators are used. The unit of analysis is the firm-month.

The ESG data from the ESG Book applies a materiality filter, and therefore the ESG score “identifies companies that are better positioned to outperform over the long-term by measuring what is financially material for future profitability. Sustainability features that are more material to financial performance are weighted more heavily in the overall ESG scores (i.e. when computing the ESG score of a company, the algorithm will only consider that information that significantly helps explain future risk-adjusted performance).”³ Materiality, which refers to those sustainability issues that are financially relevant from an investor’s perspective, is a fundamental element. Research has convincingly indicated that ESG materiality is related to investment performance (Amel-Zadeh & Serafeim, 2018; Consolandi et al., 2022).

While the total number of companies listed across the GCC stock exchanges is higher, our final sample includes only 54 firms. This is due to stringent data availability requirements: to ensure consistency and reliability, we included only those firms for which complete ESG scores and financial variables were available across the entire 2009–2023 period. A significant number of listed firms, particularly in the earlier years, lacked sufficient ESG disclosures or exhibited missing or inconsistent financial reporting. These companies were therefore excluded from the regression analysis.

The study includes companies from 11 sectors. Yet, the predominance of financial firms in the sample—39 out of 54—reflects the structural composition of equity markets in the Gulf region. The financial sector has long been the backbone of GCC capital markets, a pattern reinforced by the high weighting of financials in the MSCI EM Index. According to the State Street report “Shifting Sands: The GCC’s Equity Market Transformation” (Kassam et al., 2024), financial institutions account for over 50% of the region’s market capitalization. This market reality naturally influenced our sample composition, especially given the data availability constraints for ESG scores and financial variables in other sectors. While the concentration is atypical in more diversified markets, it accurately captures the sectoral imbalance of the GCC context and enhances the external validity of our findings in this setting. We analyze sectoral heterogeneity where applicable—for example, in Table 2, where market return exhibits weak and generally insignificant associations across most sectors. While some minor variations are observed, no sector shows a consistent or robustly significant relationship between market return and ESG performance. This allows us to observe variation in ESG-financial performance dynamics across sectors, despite the sample’s structural skew.

3.3. Variables and definitions

Dependent variable:

- Stock Returns: Calculated as the natural logarithm of the price ratio between consecutive months, adjusted for dividends. This variable captures the financial performance of each firm.

Aligned with the literature (Brammer et al., 2006; Candio, 2024; Gavrilakis & Floros, 2023; Han et al., 2016), we use stock returns (contemporaneous or lagged) as a measure of how well the company performs financially. Other studies in the literature have selected alternative measures of financial

performance such as an Overall Score (Bruna et al., 2022), Value Added (VA) (Şerban et al., 2022), Tobin's Q (Giannopoulos et al., 2022), Market-to-Book Ratio (MTBV) (Lins et al., 2017), Return on equity (ROE) (Waddock & Graves, 1997), Total revenues (Ahmad et al., 2021), Return on Assets (ROA) (Xie et al. 2019), Earnings before interest, taxes, depreciation and amortization (EBITDA)/Tot. equity ratio (Landi & Sciarelli, 2019), Operating Profit Margin (Saygili et al., 2022), Corporate sales gross profit (Deng & Cheng, 2019), and others. But stock price, defined as the market price of the share at the relevant month end, directly reflects the market's perception of a company's future profitability and growth potential. This provides a real-world outcome measure. The GCC region is increasingly focusing on diversification beyond oil, and we wish to test if companies with strong ESG practices might be seen as more future-proof by investors.

Independent variables:

- ESG Score: A composite measure (ranging from 0 to 100) reflecting the firm's performance across Environmental, Social, and Governance dimensions, weighted by financial materiality. They are not country scores.
- E, S, G Sub-scores: Individual scores for environmental, social, and governance dimensions, used in disaggregated models.

We have collected the composite ESG score along with disaggregated Environmental (E), Social (S), and Governance (G) sub-scores to facilitate a more nuanced and granular analysis of sustainability performance. This approach enables us to disentangle the relative influence of each ESG pillar on financial outcomes, a strategy aligned with empirical best practices in the literature (Buallay, 2019; Fatemi et al., 2018; Whelan et al., 2021). By doing so, we address growing scholarly consensus that the E, S, and G components exhibit distinct and sometimes divergent relationships with firm-level financial indicators depending on industry context, regulatory maturity, and investor priorities.

Control variables:

- Market Return: Monthly return of the MSCI EMEA Index, representing regional market trends. The index captures large- and mid-cap representation across emerging markets in Europe, the Middle East, and Africa, providing relevant regional context for the six GCC countries included in the study.
- Firm Size: Categorical variable (Large, Medium, and Small) based on the natural logarithm of total assets, used to capture size effects consistent with prior literature.
- Industry Effects: Sector dummies based on Global Industry Classification Standard (GICS) codes to control for industry-specific ESG dynamics.

Using market returns as a variable helps isolate the specific impact of ESG scores on a company's performance. By factoring it in, we aim to account for situations where a company's stock price goes up or down simply because the entire market is moving in that direction, not necessarily due to its own ESG or financial performance. The GCC market's reliance on oil and gas commodities makes it sensitive to regional and global economic factors. Hence, taking market returns into consideration allows the study to compare the performance of individual companies within the GCC region while controlling for the overall market movement within that specific region. Market return has been amply assessed as an important variable in the ESG and financial literature (Naseer et al., 2024; Wang et al., 2023).

Consistent with the literature (Ahmad et al., 2021; Aragón-Correa, 1998; Velte, 2017) we have also used two additional control variables: size of company and industry. The sample contains large-, mid- and small-sized capitalization companies in 11 industries (Finance, Communications, Transportation, Consumer Durables, Process Industries, Non-Energy Minerals, Retail Trade, Utilities, Industrial Services, Miscellaneous, and Consumer Non-Durables). Firm size is a relevant variable because larger firms are likely to enjoy economies of scale, thus improving firm stock performance (Minkler, 1990; Norton, 1988; Roberts & Dowling, 2002) and because the ESG-financial performance literature has indicated that size matters (Bissoondoyal-Bheenick et al., 2023). Industry categorizations are also pertinent as different industries

have inherently different business models, risk profiles, and profit margins. As we saw above in the literature review, several studies have highlighted that correlations vary based on industry. We have used classifications of size and industry contained in the ESG Book.

All financial and ESG metrics were winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. All variables are lagged appropriately to address endogeneity concerns and capture delayed effects.

The literature on ESG scores and financial performance, let alone its application in the GCC region, often overlooks the time it takes for these practices to impact a company's bottom line. In our study, however, we consider lags of 12, 18, and 24 months in the ESG score as it may take time for ESG practices to translate into financial results. For example, investing in cleaner energy sources may lead to long-term cost savings, but the initial investment could show up as a decrease in short-term profits (and higher ESG scores). In addition, even after a company implements strong ESG practices, the market may take time to recognize and reward them. Investors may need to see a track record of positive ESG practices before they are willing to pay a premium for a company's stock. And, finally, financial data is typically reported on a quarterly or annual basis. However, ESG practices may have a gradual impact on a company's financial performance throughout the year. Including a time lag can help us capture the full effect of ESG practices on financial results.

To enhance transparency and replicability, we provide detailed definitions and sources for all variables used in the empirical analysis. [Table 1](#) below outlines the key variables, distinguishing between dependent, independent, and control variables.

To provide an overview of the data used in the empirical analysis, [Table 2](#) presents descriptive statistics for the key variables over the sample period 2009–2023. The table reports the mean, median, standard deviation, and range for each variable. These statistics help illustrate the distribution and scale of the main inputs used in the regression models. For the categorical variables, [Table 4](#) gives the crosstabulation of the number of firms by industry and size levels.

3.4. Empirical strategy

The three hypotheses (H1, H2, H3) are tested using the following models:

1. **H1:** ESG scores influence firm stock returns.
2. **H2:** Individual E, S, and G scores exhibit differential impacts on stock returns.
3. **H3:** Stock returns predict subsequent ESG scores.

The models are estimated using fixed effects panel regression due to its flexibility in handling longitudinal firm-level data with unobserved time-invariant heterogeneity. Lagged independent variables are included to reflect the time-sensitive nature of ESG investments and market reactions.

Prior to estimating the models, we ran stationarity tests on all return and ESG score variables. We checked the existence of a unit root in each variable using the Augmented Dickey Fuller (ADF) test. [Table 3](#) reports the ADF test statistics; for all variables, these are highly significant at the 0.01 level, which indicates that none of the variables has a unit root. The series are thus all stationary.

3.5. Model specification and hypotheses

The following models were specified to evaluate the hypotheses:

Model 1 (forward causality–ESG impact):

$$\text{Return}_{i,t} = \alpha_i + \beta_1 \text{ESG}_{i,t-k} + \beta_2 \text{MarketReturn}_t + \epsilon_{i,t}$$

Model 2 (Disaggregated impact):

$$\text{Return}_{i,t} = \alpha_i + \beta_1 E_{i,t-k} + \beta_2 S_{i,t-k} + \beta_3 G_{i,t-k} + \epsilon_{i,t}$$

3.6. Justification for methodological choices

The selection of the fixed effects model, is guided by the assumption that firm-specific and time-invariant unobserved heterogeneity may be present in the panel, giving rise to omitted variable bias if not taken into account. This assumption is reasonable in a market where institutional idiosyncrasies are prevalent (Al Hawaj & Buallay, 2022). While random effects models may have been more efficient, they also rely on the strong assumption that the firm-specific unobserved effects are uncorrelated with the ESG scores, which may not be realistic in our setting. Indeed, we have conducted Hausman tests which rejected the hypothesis of no correlation between firm-specific effects and ESG scores in at least some of the model specifications that we estimated.

Lagged ESG variables address concerns around simultaneity bias and temporal causality, aligning with calls in the literature to distinguish short-term versus medium-term ESG impacts (Eccles et al., 2014).

In addition to the linear fixed effects specifications presented in the previous section, we also estimated models incorporating nonlinear terms for ESG scores. The purpose of this extension was to assess whether nonlinear dynamics between ESG scores and financial performance are present. Following El Khoury et al. (2023), we tested second-order polynomial terms for ESG scores alongside the linear terms in the fixed effects framework. The results indicate that none of the nonlinear terms were statistically significant across the models, suggesting that nonlinear dynamics do not characterize the ESG–financial performance relationship in our sample.

4. Statistical results

4.1. ESG scores affect individual firm stock prices

According to what a portion of the ESG-financial performance literature shows, a firm's good management of ESG factors would correspond to higher stock returns. That is, ESG is value-enhancing due to the hypothesis that environmentally sound, socially responsible and well-governed corporations can achieve, for instance, higher profits, substantially lower cost of capital, lower systematic risk, or higher credit ratings. To test this hypothesis, we ran several regression models linking the ESG score as independent variable to individual firm returns (raw stock return) as dependent variable. The market return served as an alternative independent variable in all regressions. The specifications of the models were as follows:

$$\text{Return}_{i,t} = \alpha_i + \beta_1 E_{i,t-k} + \beta_2 S_{i,t-k} + \beta_3 G_{i,t-k} + \epsilon_{i,t}$$

$$\text{Return}_{it} = \alpha_i + \beta_1 \text{Market Return}_t + \beta_2 \text{Lag.ESG}_{it,12} + \epsilon_{it},$$

$$\text{Return}_{it} = \alpha_i + \beta_1 \text{Market Return}_t + \beta_2 \text{Lag.ESG}_{it,18} + \epsilon_{it},$$

$$\text{Return}_{it} = \alpha_i + \beta_1 \text{Market Return}_t + \beta_2 \text{Lag.ESG}_{it,24} + \epsilon_{it},$$

where:

Return_{it} = stock return of firm i at time t

Market Return_t = return on the market index at time t

$$\text{Lag.ESG}_{it,12} = \text{ESG}_{i,t-12}$$

$$\text{Lag.ESG}_{it,18} = \text{ESG}_{i,t-18}$$

$$\text{Lag.ESG}_{it,24} = \text{ESG}_{i,t-24}$$

ESG_{it} = ESG score of firm i at time t

α_i = fixed effect of firm i

ϵ_{it} = idiosyncratic error term for firm i at time t

The models were fit to the aggregated data as well as to subsamples defined by industry and firm size to enable a stratified analysis. The results are presented in Tables 5 and 6. Table 5 reports the estimation results for models with contemporaneous ESG scores as independent variables, while Table 6 presents models incorporating lagged ESG scores. Lags of 12, 18, and 24 months were considered, as these time horizons were identified as potentially relevant for detecting any delayed ESG impact on firm performance. The stratified results for subsamples of firms in the communication and finance sectors, and for large and medium-sized firms, are also reported.

The statistical analysis reveals that ESG scores, whether contemporaneous or lagged, generally lack statistically significant associations with financial performance, as illustrated in Table 5. This result holds across different time lags (1, 6, 12, 18, 24, and 36 months) and is consistent across firm sizes (micro/small, medium, and large) and industries. These findings support prior literature that identifies weak, ambiguous, or inconclusive relationships between ESG factors and financial outcomes, particularly in emerging markets such as the GCC.

Contrary to the notion that investors in the Gulf region incorporate ESG considerations into their valuation of firms, our study provides no empirical support for the idea that ESG performance significantly influences financial performance or stock prices. Although proponents of ESG investing often argue that investors reward firms for strong ESG credentials, our results indicate that, in this specific geographic and market context, ESG scores have limited impact on market dynamics. The empirical foundation for the business case of ESG investing appears weak within the Gulf region based on our findings.

This outcome aligns with the broader view that investors do not uniformly respond to ESG signals in ways that systematically affect market prices. For example, Krüger (2015) finds that investors respond more strongly to negative ESG-related events—particularly those carrying material legal or economic consequences—than to positive ESG developments. Similarly, Giese and Nagy (2018) report that stock markets react more sensitively to ESG information from firms with moderate ESG scores, and that positive ESG changes tend to elicit stronger market responses than declines in ESG performance. Our findings suggest that, in the GCC context, such differential investor reactions to ESG information are either absent or too weak to produce a measurable impact on financial outcomes.

Table 5. Impact of contemporaneous ESG scores on firm's stock returns.

	All	Sector		Firm size		
		Communications	Other	Large	Medium	Small
Market return	-0.050** (0.021)	0.062 (0.039)	0.051 (0.046)	-0.043 (0.027)	-0.038 (0.036)	-0.088 (0.057)
ESG	-0.0005* (0.0003)	-0.0004 (0.0004)	-0.001 (0.001)	-0.0005 (0.0003)	-0.0003 (0.0005)	-0.001 (0.001)
Observations	4,405	879	1,099	1,964	1,647	794
Log likelihood	4,892	1,129	1,122	2,502	1,726	745
AIC	-9.673	-2,234	-2,214	-4,960	-3,404	-1,459
BIC	-9,315	-2,176	-2,139	-4,837	-3,277	-1,384

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors in parentheses.

Table 6. Impact of lagged ESG scores on firm's stock returns.

Variables	Sector = other			Size = small		
Market return	0.048 (0.056)	0.044 (0.056)	0.039 (0.056)	0.011 (0.083)	0.008 (0.084)	-0.004 (0.084)
Lag_ESG_12	-0.001 (0.001)			-0.002 (0.001)		
Lag_ESG_18		0.001 (0.001)			0.000 (0.001)	
Lag_ESG_24			0.002*** (0.001)			0.002* (0.001)
Observations	811	811	811	482	482	482
Log likelihood	801	801	805	430	4290	431
AIC	-1,571	-1,572	-1,580	-829	-827	-830
BIC	-1,501	-1,502	-1,509	-762	-760	-763

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors in parentheses.

4.2. E, S, and G scores affect individual firm stock prices

Given the non-significant impact of the combined ESG score on firm returns, we conducted additional analyses to explore potential influences on performance. Our models considered market returns, and various combinations of individual environmental (E), social (S), and governance (G) scores. These analyses were performed on both the entire dataset and on subsets stratified by industry and firm size.

Furthermore, we examined different timeframes, incorporating contemporaneous scores (in the same month as stock returns), and values lagged by 12, 18, or 24 months. In all instances, market return was included as a covariate. The comprehensive set of models encompassed various scenarios, contributing to a thorough exploration of the potential relationships between ESG factors and firm performance. The models were:

$$Return_{it} = \alpha_i + \beta_1 Market Return_t + \beta_2 Var.E_{it} + \varepsilon_{it},$$

$$Return_{it} = \alpha_i + \beta_1 Market Return_t + \beta_2 Var.S_{it} + \varepsilon_{it},$$

$$Return_{it} = \alpha_i + \beta_1 Market Return_t + \beta_2 Var.G_{it} + \varepsilon_{it},$$

$$Return_{it} = \alpha_i + \beta_1 Market Return_t + \beta_2 Lag.Factor.E_{it} 12 + \varepsilon_{it},$$

$$Return_{it} = \alpha_i + \beta_1 Market Return_t + \beta_2 Lag.Factor.E_{it} 18 + \varepsilon_{it},$$

$$Return_{it} = \alpha_i + \beta_1 Market Return_t + \beta_2 Lag.Factor.E_{it} 24 + \varepsilon_{it},$$

where:

$Lag.Factor.E_{it} 12 = E_{it-12}$, and similarly for 18 and 24 months lags, and the other variables are as defined in the previous section.

The results are reported in Tables 7, 8, 9, 10. The overarching findings present a consistent picture of weak associations between ESG factors and stock returns. Across nearly all models, the market return emerges as highly significant, accounting for most of the variance in firm-level returns and leaving little explanatory power for ESG variables. Only a few models display significant ESG-related effects. Specifically, a negative and significant association is identified between the contemporaneous social (S) score and stock returns, and between the 18-month lagged environmental (E) score and returns. These effects are isolated to mid-sized firms, underscoring the context-dependent and limited nature of ESG's influence on financial performance within the sample. The results highlight the dominant role of market-wide factors over firm-level ESG characteristics in explaining return dynamics in the GCC region.

4.3. Individual firm stock prices affect ESG and E, S, and G scores

To evaluate potential bidirectional causality between ESG scores and financial performance, we implemented Granger causality tests at the firm level, leveraging the panel structure of our dataset. Specifically,

Table 7. Impact of E, S, and G scores on firm's stock returns, by sector.

	All firms			Communications			Other		
Market return	-0.049** (0.021)	-0.049** (0.021)	-0.050** (0.021)	0.063 (0.039)	0.063 (0.039)	0.062 (0.039)	0.051 (0.046)	0.050 (0.046)	0.050 (0.046)
Factor.E	-0.000 (0.000)			0.000 (0.000)			-0.001* (0.001)		
Factor.S		-0.000 (0.000)			-0.000 (0.000)			-0.001* (0.001)	
Factor.G			-0.0004** (0.0002)			-0.001* (0.0003)			-0.001 (0.000)
Observations	4,405	4,405	4,405	879	879	879	1,099	1,099	1,099
Log likelihood	4,891	4,891	4,894	1,128	1,128	1,130	1,122	1,122	1,122
AIC	-9,669	-9,670	-9,676	-2,233	-2,233	-2,236	-2,214	-2,213	-2,213
BIC	-9,312	-9,312	-9,318	-2,176	-2,175	-2,178	-2,139	-2,138	-2,138

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors in parentheses.

Table 8. Impact of E, S, and G scores on firm's stock returns, by firm size.

	Large			Medium			Small		
Market Return	-0.044*	-0.044*	-0.043	-0.036	-0.037	-0.039	-0.084	-0.079	-0.089
	(0.027)	(0.027)	(0.027)	(0.036)	(0.036)	(0.036)	(0.057)	(0.057)	(0.058)
Factor.E	-0.000			0.001*			-0.002		
	(0.000)			(0.0003)			(0.001)		
Factor.S		-0.000			0.000			-0.003**	
		(0.000)			(0.000)			(0.001)	
Factor.G			-0.0004*			-0.000			-0.000
			(0.0003)			(0.000)			(0.000)
Observations	1,964	1,964	1,964	1,647	1,647	1,647	794	794	794
Log Likelihood	2,501	2,501	2,502	1,727	1,726	1,727	746	747	745
AIC	-4,959	-4,958	-4,961	-3,407	-3,404	-3,406	-1,460	-1,461	-1,458
BIC	-4,836	-4,835	-4,838	-3,277	-3,274	-3,276	-1,385	-1,386	-1,383

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors in parentheses.

Table 9. Impact of lagged G scores on firm's stock returns, by firm sector.

	All firms			Communications			Other		
Market Return	-0.022	-0.022	-0.022	0.113**	0.118**	0.122**	0.048	0.044	0.038
	(0.026)	(0.026)	(0.026)	(0.048)	(0.048)	(0.048)	(0.056)	(0.056)	(0.056)
Lag_G_12	0.0004*			-0.001**			-0.000		
	(0.0002)			(0.0004)			(0.001)		
Lag_G_18		-0.000			-0.001*			0.001	
		(0.000)			(0.0003)			(0.001)	
Lag_G_24			0.000			-0.001			0.002***
			(0.000)			(0.000)			(0.001)
Observations	3,133	3,133	3,133	663	663	663	811	811	811
Log Likelihood	3,424	3,422	3,422	838	837	837	801	801	804
AIC	-6,735	-6,732	-6,732	-1,652	-1,650	-1,650	-1,571	-1,572	-1,579
BIC	-6,397	-6,393	-6,394	-1,598	-1,596	-1,596	-1,501	-1,502	-1,508

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors in parentheses.

Table 10. Impact of lagged G scores on firm's stock returns, by firm size.

Variables	Medium			Small		
Market Return	-0.023	-0.018	-0.014	0.010	0.008	-0.003
	(0.045)	(0.045)	(0.045)	(0.084)	(0.084)	(0.084)
Lag_G_12	-0.001**			-0.001		
	(0.0004)			(0.001)		
Lag_G_18		-0.001*			0.000	
		(0.0004)			(0.001)	
Lag_G_24			-0.000			0.001*
			(0.000)			(0.001)
Observations	1,143	1,143	1,143	482	482	482
Log Likelihood	1,181	1,180	1,179	430	429	431
AIC	-2,314	-2,311	-2,309	-828	-827	-830
BIC	-2,193	-2,190	-2,188	-762	-760	-763

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Standard errors in parentheses.

we applied firm-level Granger tests with a lag length of two periods to capture potential temporal dynamics.

Table 11 reports the statistically significant results based on p-values from these tests. Evidence of bidirectional causality was found in only two out of 54 firms (approximately 3.7% of the sample), while an additional ten firms (approximately 18.5%) exhibited unidirectional causality—either from ESG to financial performance or vice versa. The overall weak and limited presence of causality aligns with the broader results of our fixed effects panel regressions, which indicate that the link between ESG factors and financial outcomes is generally weak, highly context-dependent, and unlikely to represent a systematic pattern in the GCC context. These findings suggest that ESG practices in the region may be shaped more by regulatory mandates, national policy frameworks, or long-term strategic objectives than by immediate financial market dynamics.

The limited detection of strong Granger causality in our study likely reflects several factors. The relatively short firm-level time series reduces statistical power. Low within-firm variance in ESG scores,

Table 11. *p*-values of Granger causality tests for bidirectional causality at firm level.

Company name	ESG -> Returns	Returns -> ESG
Arab National Bank	0.3701	0.0727
Commercial Bank (Q.S.C.)	0.2117	0.0484
Dubai Islamic Bank PJSC	0.3243	0.0737
First Abu Dhabi Bank P.J.S.C	0.3408	0.0086
HSBC Bank Oman SAOG	0.0550	0.1234
Mediterranean and Gulf Cooperative Insurance & Reinsurance Co	0.4554	0.0269
Qatar Electricity and Water Co	0.5505	0.0403
Qatar Islamic Bank	0.0029	0.3193
SABIC agri-nutrients Co	0.0500	0.0256
Saudi electricity Co.	0.8647	0.0502
Sohar International Bank SAOG	0.0102	0.0260
Vodafone Qatar QSC	0.2335	0.0578

typical in the GCC's policy-driven ESG landscape, offers little dynamic signal for causality detection. Additionally, structural features such as concentrated sectors and high state ownership may dampen market-driven ESG–financial links, making causality harder to identify through standard econometric tests.

5. Conclusions and implications

This study investigates the dynamic and bidirectional relationship between ESG and financial performance in the GCC region using panel fixed effects regressions with lagged structures and firm-level Granger causality tests. The results provide no support for a causal link from ESG performance to financial performance. Conversely, we find weak and context-dependent evidence that financial performance, where strong, may precede modest increases in ESG engagement, particularly in certain dimensions (e.g. environmental and governance) and among specific firm subgroups. Stock market responsiveness to ESG scores appears limited, with no consistent patterns of ESG influencing returns.

We tested three hypotheses:

H1: ESG scores affect individual firm stock prices.

H2: Environmental (E), Social (S), and Governance (G) scores affect individual firm stock prices.

H3: Individual firm stock prices affect ESG and E, S, and G scores.

The findings suggest that H1 is not supported: ESG performance does not exhibit a significant positive effect on financial returns in this context. H2 receives limited and context-specific support: financial performance shows modest, medium-term associations with subsequent ESG scores, primarily in environmental and governance factors. H3 is partially supported in that these relationships vary across ESG dimensions and firm subgroups, but the associations are weak and not generalizable.

5.1. Theoretical contributions

Our study contributes to the theoretical understanding of ESG–financial performance linkages by situating our empirical findings within three key frameworks: Slack Resource Theory, Stakeholder Theory, and Legitimacy Theory.

First, our results provide limited and context-specific evidence that financial success precedes incremental ESG engagement, supporting Slack Resource Theory only in specific circumstances. While the theory posits that firms with surplus resources invest in ESG, our findings suggest this relationship is weak and apparent mainly in certain ESG dimensions, firm sizes, or time lags.

Second, our study does not provide empirical support for Stakeholder Theory's prediction that ESG engagement enhances financial performance through strengthened stakeholder relations or legitimacy. We find no evidence of a positive causal link from ESG engagement to superior financial returns, nor of a virtuous cycle between ESG and financial outcomes.

Third, the observed patterns—modest ESG enhancements following financial success in some firms—point to the relevance of Legitimacy Theory in the GCC context. ESG engagement appears shaped more by alignment with national sustainability agendas and regulatory frameworks (e.g. Saudi Vision 2030) than by voluntary strategic choice aimed at competitive advantage.

Overall, our theoretical contribution highlights that ESG-financial performance relationships in the GCC are limited, context-dependent, and heavily influenced by institutional and policy environments. Future theoretical work should integrate these regional and structural factors when modelling ESG dynamics in emerging and state-influenced markets.

5.2. Methodological contributions

The results reinforce the view that corporate sustainability is a gradual process requiring sustained effort rather than isolated actions. Contemporaneous models yield no significant associations, while modest impacts appear only at lagged intervals, particularly beyond one year. This highlights that measurable ESG improvements are more likely to follow extended periods of financial strength, resource mobilization, and strategic planning rather than immediate market performance.

The temporal dimension adds a valuable layer to the analysis. While some significance emerges at 12 and 18 months—notably in specific contexts such as mid-sized or sectoral subsamples—the evidence is limited and inconsistent. A distinctive, though modest, pattern appears at 24 months, where negative associations are observed between lagged financial returns and ESG factors (E, S, and G) in large firms. This outcome invites nuanced exploration and multiple plausible interpretations.

One possibility is that large firms may prioritize short- and medium-term sustainability initiatives following periods of strong financial performance but struggle to sustain these efforts over longer horizons. This could reflect challenges in embedding ESG considerations into core strategic and operational practices. Alternatively, diminishing returns on initial sustainability investments or structural and organizational constraints may explain the tapering effect at longer lags.

5.3. Empirical contributions

Our study contributes empirical evidence on the complex, context-dependent dynamics between financial performance and ESG engagement in the GCC region. The observed negative associations between 24-month lagged financial returns and environmental (E), social (S), and governance (G) factors among large firms highlight the challenges firms face in sustaining ESG improvements over extended periods. These results suggest that financial strength alone does not guarantee long-term ESG enhancement and that sustaining ESG practices may require more than short-term resource availability.

The inclusion of time lags and firm-level Granger causality tests in our empirical design proved valuable in uncovering these nuanced patterns. The Granger tests revealed very weak evidence of either bidirectional or unidirectional causality, with significant relationships appearing only in a small number of firms. Our panel regression results similarly indicate that any influence of financial performance on ESG outcomes is modest, medium-term, and dependent on firm size, sector, and the specific ESG dimension considered. Together, these findings underscore that ESG-financial linkages in the GCC are not uniform and depend heavily on organizational context and temporal dynamics.

Our findings validate the importance of including temporal structure when studying ESG-financial relationships. Without the use of lag structures, these modest but meaningful patterns could have been overlooked, potentially leading to the incorrect conclusion that no relationship exists. The empirical patterns we observe are consistent with prior studies that emphasize the relevance of time horizons in ESG outcomes. For example, Starks et al. (2017) show that longer-horizon investors tend to favor high-ESG firms and exhibit greater patience during adverse events, while Giese and Nagy (2018) find stronger correlations between ESG score changes and stock performance over medium-term horizons.

From a policy perspective, these results highlight the importance of frameworks that encourage sustained, long-term ESG engagement. In the GCC, this includes the influence of national strategies like Saudi Vision 2030 and the UAE's Net Zero 2050, which sets out ambitious sustainability and energy transition goals and urges firms to align with national decarbonization and development plans. Similarly, initiatives

such as the Pearl Initiative play a role by promoting accountability, transparency, and corporate governance standards that may shape firm behavior over time. Our empirical results suggest that while financial strength may enable initial alignment with these agendas, sustained ESG improvements likely require ongoing institutional support and policy-driven incentives to embed ESG into long-term corporate strategies. Indeed, the study shows that ESG performance neither drives nor responds to financial returns, highlighting the essential role of governments in embedding ESG within national development strategies such as the above-mentioned Vision 2030 and Net Zero 2050. Through regulations, disclosure requirements, and public investment, the state plays an instrumental role, using ESG as a policy tool to achieve economic diversification, environmental resilience, and global competitiveness where markets fall short. Regulatory mandates in the region may also serve as the mechanism through which these state ambitions are translated into corporate behavior. Given the lack of financial market reward for ESG adoption, regulatory reforms—such as mandatory ESG disclosure requirements, corporate governance codes, and sustainability reporting frameworks—may compel firms to integrate ESG into their operational strategies.

6. Future work

This paper could be extended along several dimensions. First, future research should incorporate GCC oil and gas companies. While the decision to exclude state-owned oil and gas firms was necessary due to their status as non-listed entities, as well as data availability constraints, differing disclosure practices, and the distinct market dynamics they exhibit, this nonetheless limits the generalizability of our findings to the broader GCC economy. Given the pivotal role that state-controlled hydrocarbon companies play in the region's economic structure, capital markets, and ESG landscape, future studies would benefit from including these firms through alternative methodologies that capture their financial and sustainability performance. Doing so would enable a more comprehensive understanding of ESG–financial performance linkages across the full spectrum of corporate actors in the Gulf, particularly as these companies are increasingly central to national sustainability agendas and energy transition strategies.

Second, given ongoing challenges with ESG data consistency and correlation across providers, future studies could use data from other ESG rating agencies individually or in combination. It would also be valuable to further distinguish between ESG ratings—which reflect a firm's exposure to ESG risks and its risk management capacity—and ESG scores, which assess corporate sustainability practices without a forward-looking perspective. Breedt et al. (2019) show that different ESG data providers can yield divergent results, while Gyönyörövá et al. (2021) highlight that ESG data consistency depends significantly on industry and country context. To address the lack of a universally accepted ESG index, La Torre et al. (2020) constructed an ESG proxy combining multiple measures (e.g. ratings, scores, and opinions) from various sources.

Third, future extensions could control for country-specific effects. Prior work indicates that ESG engagement in low-trust countries, or those with weaker security regulations and disclosure standards, may reduce market uncertainty in times of crisis, such as during the COVID-19 pandemic (Engelhardt et al., 2021). ESG may thus enhance firm value more in certain national contexts. Further work could also examine ownership structure: Deng and Cheng (2019) show that ESG's impact is greater for non-state-owned enterprises compared to state-owned enterprises.

Finally, future research should explore alternative measures of financial and risk performance beyond stock returns. These could include firm value (Tobin's Q), operational performance indicators (ROE, return on sales, net profit margin, operating profit margin, ROA), sales growth, earnings per share, or credit ratings.

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Author contributions

CRedit: **Rodrigo Tavares**: Conceptualization, Formal analysis, Project administration, Writing – original draft, Writing – review & editing; **Catalina Stefanescu-Cuntze**: Data curation, Formal analysis, Methodology, Supervision, Writing – review & editing; **Catarina Sá**: Data curation, Formal analysis, Validation, Visualization.

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Ethical statement and research involving human participants and/or animals

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Data availability statement

The data that support the findings of this study are available from the corresponding author, [RT], upon reasonable request.

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