RESEARCH ARTICLE

Exploring the Influence of Accounting Reporting Complexity on ESG Disclosure

Hamzeh Al Amosh[1,2]

[1]Department of Financial Intelligence, University of South Africa, Pretoria, South Africa | [2]Jadara University Research Center, Jadara University, Irbid, Jordan

Correspondence: Hamzeh Al Amosh (hamza_omosh@yahoo.com)

ABSTRACT

This study investigates the impact of accounting reporting complexity on the quality of environmental, social, and governance (ESG) disclosures, examining both the individual components of ESG reporting and the overall ESG score. Using a sample of 5146 firm-year observations from U.S.-based companies between 2012 and 2021, the study finds a significant negative impact of accounting reporting complexity on both environmental and overall ESG disclosures. This suggests that firms with complex financial reporting structures may be more likely to limit their sustainability-related disclosures, whether due to resource constraints, managerial discretion, or the difficulty of integrating ESG data within an already intricate reporting framework. The study also finds a weaker and only marginally significant negative effect of accounting complexity on social and governance disclosures, indicating that these dimensions may be less susceptible to the challenges posed by complex financial reporting. The findings are analyzed through the combined lenses of agency theory and information manipulation theory (IMT). Complex financial reporting frameworks create conditions conducive to the selective presentation of ESG information, as shareholders and other stakeholders often lack the capacity to verify every data point. From an agency theory standpoint, managers already possess deeper knowledge of firm operations, and intricate accounting systems further expand their discretion in deciding which details to highlight or suppress, limiting outsiders' ability to evaluate true sustainability performance. Meanwhile, information manipulation theory emphasizes how such complexity enables managers to shape disclosures in ways that amplify favorable outcomes while obscuring less impressive results. Consequently, reporting complexity heightens information asymmetry and increases monitoring costs, complicating the disclosure of critical ESG-related data and diminishing the transparency and credibility of sustainability reporting. The practical implications underscore the need for firms to address the transparency challenges posed by complex reporting structures by adopting standardized ESG reporting frameworks that ensure greater comparability and clarity. These findings also highlight the importance for policymakers and regulators to consider the role of financial reporting complexity when designing sustainability reporting guidelines.

1 | Introduction

The demand for transparency and accountability in corporate governance has significantly expanded beyond the realm of traditional financial reporting. In addition to financial performance, stakeholders are now deeply invested in understanding the broader impact of corporate activities, particularly through the lens of environmental, social, and governance (ESG)

practices (Al Amosh 2024a; Stocker et al. 2020; Benyaminova et al. 2019; Johnstone 2018). Investors, regulators, and consumers alike are increasingly holding companies accountable for their sustainability and ethical behavior, which has made ESG disclosure a vital component of corporate communication (Hoai et al. 2023; Dash and Sahoo 2024). These disclosures provide crucial information that goes beyond financial returns, reflecting how a company manages its environmental footprint, treats its workforce, and governs its operations. As a result, ESG performance has become a significant factor in shaping investor decisions, enhancing corporate reputation, and maintaining regulatory compliance.

Firms' disclosures are often closely related to the practices companies use when preparing their reports (Kamal 2021). This means that the underlying processes and systems employed in financial reporting can have a direct impact on the quality of non-financial disclosures, including those related to ESG performance. Preparing ESG disclosures requires a clear, consistent approach that aligns with stakeholder expectations for transparency and accountability. However, if a company's accounting practices are characterized by high complexity—such as intricate financial transactions, sophisticated reporting requirements, and the use of customized financial tags—this complexity may spill over into their ESG reporting practices. From an agency theory perspective, this complexity exacerbates information asymmetry between managers (agents) and stakeholders (principals), making it more difficult for shareholders and investors to assess a firm's true performance (Brown et al. 2023). In such cases, managers may have greater discretion over how ESG information is presented, potentially engaging in selective disclosure or obfuscation to align with their own interests rather than stakeholder demands. Consequently, complex accounting practices might lead to less straightforward ESG reports, as companies that struggle with producing clear and comprehensible financial statements may face similar challenges in preparing transparent sustainability disclosures.

Accounting reporting complexity arises from various elements, including the sophistication of a company's financial transactions, the use of advanced reporting standards, and the regulatory environment in which the firm operates. These factors contribute to the difficulty in preparing, presenting, and auditing financial statements. Previous studies, such as those examining the relationship between accounting reporting complexity and audit quality, have shown that more complex financial reporting can challenge auditors, sometimes enhancing audit quality and, at other times, complicating the audit process (Chen et al. 2023). In addition, research on financial analysts, such as Chen et al. (2023), has demonstrated that accounting reporting complexity can obscure financial data, making it harder for analysts to accurately assess firm performance. However, it remains unclear whether these complexities extend to the realm of ESG disclosures and how they might affect a company's ability to effectively communicate its sustainability efforts.

The interplay between financial and non-financial reporting introduces further challenges for companies, particularly when attempting to balance detailed financial disclosures with the growing demand for transparency in ESG practices. ESG reporting, by its nature, spans a broad array of data points, including environmental impact, social responsibility, and governance standards, each requiring a different level of granularity and transparency (Monciardini et al. 2020). The question arises whether firms that face higher complexity in financial reporting also encounter difficulties in consolidating and presenting ESG-related information in a way that meets stakeholder expectations. This potential intersection between financial reporting complexity and non-financial disclosures like ESG creates an intriguing area of investigation, particularly as both financial reporting systems and ESG expectations evolve within regulatory and market environments.

As the birthplace of Generally Accepted Accounting Principles (GAAP), the U.S. has long been a global leader in setting rigorous accounting standards that ensure consistency and transparency in financial reporting. The adoption of eXtensible Business Reporting Language (XBRL) by the U.S. Securities and Exchange Commission (SEC) further reinforces this commitment by enabling structured and detailed financial disclosures, which facilitate the measurement of accounting reporting complexity across firms (Hoitash et al. 2021). Beyond its robust financial reporting framework, the U.S. capital market is characterized by high stakeholder scrutiny and a growing demand for corporate transparency, including non-financial disclosures such as ESG reporting. These factors make the U.S. an ideal setting to explore the intersection of accounting complexity and ESG disclosure, providing valuable insights into reporting dynamics within a highly regulated environment, with broader implications for global markets influenced by U.S. reporting practices (Hoitash and Hoitash 2018; Eng et al. 2022).

Building on this foundation, the question arises: Could accounting reporting complexity also impact ESG disclosure practices? Given that accounting complexity influences the quality of financial reporting and the accuracy of financial analysis (Hoitash and Hoitash 2018), this study aims to investigate whether U.S. firms with more complex financial reporting structures encounter unique challenges in producing clear and transparent ESG reports. By addressing this question, the research seeks to fill a gap in the literature and enhance our understanding of the factors that may affect the quality of ESG reporting. The findings hold significant implications for both companies and policymakers striving to improve the effectiveness of ESG disclosures, particularly in response to the growing demand for transparency in corporate sustainability practices.

The contribution of this study lies in its exploration of a relatively under-researched area, specifically the potential link between accounting reporting complexity and the quality of ESG disclosures. While prior research has examined the effects of accounting reporting complexity on financial outcomes, audit quality, and the work of financial analysts (e.g., Dao and Xu 2024; Chen et al. 2023), the impact of such complexity on non-financial reporting, specifically ESG disclosure, remains largely unexplored. Thus, this study seeks to bridge that gap by investigating whether firms with more intricate financial reporting systems encounter difficulties in presenting clear and comprehensive ESG information. Furthermore, this research contributes to the ongoing dialogue on how corporate reporting structures can either facilitate or hinder transparency in non-financial

disclosures. As ESG performance becomes a critical aspect of corporate accountability, understanding the role that accounting reporting complexity plays in shaping these disclosures can provide insights into potential reporting inefficiencies or areas where improvements are needed.

In addition, given the growing reliance of stakeholders on ESG information for investment and accountability purposes, identifying accounting complexity as a potential barrier to effective ESG communication represents an important theoretical and practical contribution. By doing so, this study highlights the critical intersection between financial reporting practices and non-financial disclosures, underscoring that challenges inherent in complex financial reporting systems could significantly undermine stakeholders' ability to accurately evaluate corporate sustainability efforts. The insights from this analysis provide novel evidence that can inform regulators and corporate leaders on how to strategically streamline accounting processes, thereby improving the comprehensibility, reliability, and overall effectiveness of ESG disclosures. Policymakers, in particular, may benefit from these insights, as they could highlight the need for regulatory frameworks that support the integration of financial and ESG reporting, especially in firms where accounting reporting complexity might obscure the clarity of disclosures. Ultimately, this research enhances our understanding of the intersection between financial complexity and non-financial transparency, addressing a crucial aspect of corporate governance in today's sustainability-focused business environment.

The remaining sections are organized as follows: Section 2 presents the theoretical framework. Section 3 reviews the literature and develops hypotheses. Section 4 describes the methodology, including data sources, sample selection, and the empirical model. Section 5 discusses the results. Section 6 concludes the study.

2 | Theoretical Framework

This study brings together agency theory and information manipulation theory (IMT) to demonstrate how accounting reporting complexity may weaken the transparency of ESG disclosures (Jensen and Meckling 1976; Levine and McCornack 2001; Greiner and Sun 2021). Complex reporting systems often result from multifaceted transactions, strict regulatory requirements, and the adoption of advanced technologies that can grant managers greater discretion in both assembling and presenting disclosed information (Dao and Xu 2024; Hoitash and Hoitash 2018). Although such complexity can emerge from legitimate efforts to meet evolving standards, it can also amplify informational asymmetries and provide avenues for selective reporting of nonfinancial data (Brown et al. 2023).

From an agency theory standpoint, shareholders delegate decision-making authority to managers in the expectation that managers will act in their best interests, but in practice, managers may adopt disclosure policies that serve their own objectives (Jensen and Meckling 1976; Healy and Palepu 2001; Panda and Leepsa 2017). When complexity makes it more difficult to interpret financial statements, information asymmetry increases and stakeholders face higher monitoring costs (Omran and

El-Galfy 2014; Calvo and Calvo 2018). Under these conditions, managers can shape non-financial reporting by highlighting selective aspects of ESG performance or arranging disclosures in ways that obscure certain metrics (Brown et al. 2023). This dynamic can raise agency costs by forcing shareholders and other stakeholders to invest additional resources in verifying the completeness and accuracy of sustainability information (Dash and Sahoo 2024). If accounting reports are unduly complex, this diverts attention and capital away from more productive endeavors and undermines the trust of investors, regulators, and the general public. Brown et al. (2023) emphasize that accounting reporting complexity can distort the true financial position of a firm, and the same may hold for non-financial disclosures like ESG reporting. Nonetheless, the flexibility of the accounting system, if managed effectively, allows managers to tailor both financial and non-financial information to meet diverse stakeholder needs (Şeker and Şengür, 2021). By disclosing relevant details—such as sustainability metrics, governance practices, or social impact indicators—managers can reduce the information asymmetry at the heart of the agency conflict, ultimately fostering greater trust and alignment of interests.

Accounting reporting complexity also amplifies the challenges associated with information asymmetry more broadly. In firms with intricate financial transactions, complex regulatory requirements, and sophisticated reporting systems, shareholders and other stakeholders often struggle to interpret a company's financial condition accurately. Hoitash and Hoitash (2018) find that such complexity can obscure financial statements, hindering stakeholders' ability to evaluate the accuracy and completeness of disclosed information. This dynamic frequently extends to ESG reporting, where complicated underlying financial structures can make it more difficult for a company to present its environmental, social, and governance practices in a clear, transparent manner. Consequently, complexity may obscure certain aspects of ESG performance, either deliberately or unintentionally, thereby heightening information asymmetry.

Information manipulation theory complements this view by suggesting that individuals aiming to influence stakeholder perceptions can exploit environments characterized by technical complexity or voluminous data (Levine and McCornack 2001; Peterson 2012). In corporate reporting contexts, complex reporting structures—particularly those involving advanced technologies like XBRL—may unintentionally introduce new layers of opacity if standardization remains incomplete or if compliance is treated superficially (Faccia et al. 2021; Alharasis 2025; Wahyudi et al. 2022). Such complexity allows managers to strategically emphasize favorable ESG indicators while minimizing or omitting less positive metrics (Chen et al. 2023). For example, a firm might prominently showcase its renewable energy initiatives while downplaying or entirely omitting data on carbon emissions or waste management practices (Alshamali 2020). By selectively presenting ESG information, managers can create an overly favorable impression of the firm's sustainability performance, potentially misrepresenting the true scope of environmental or social impacts. Consequently, stakeholders may find it challenging to verify whether disclosed ESG information comprehensively reflects the company's actual sustainability practices, increasing uncertainty and reducing the reliability of these disclosures (Hoitash and Hoitash 2018).

Integrating agency theory and information manipulation theory highlights a shared mechanism in which managers operating within complex reporting frameworks can selectively communicate ESG data (Dao and Xu 2024; Brown et al. 2023). Complexity heightens the difficulty of identifying incomplete or distorted disclosures, thus reinforcing the agency problem described by Jensen and Meckling (1976) and Healy and Palepu (2001). At the same time, it provides managers with the means to leverage impression management, consistent with information manipulation theory, by selectively presenting information to shape stakeholder perceptions (Levine and McCornack 2001). Consequently, rising levels of accounting reporting complexity may be associated with less reliable and less transparent ESG disclosures, ultimately undermining corporate sustainability reporting as a channel for accountability and stakeholder engagement.

3 | Hypothesis Development

Accounting reporting complexity stems from a variety of sources, such as stringent regulatory requirements, advanced technologies like XBRL, and the inherently intricate nature of many business transactions (Hoitash et al. 2021; Bushee et al. 2018). Scholars have examined how this complexity can affect the preparation and interpretation of financial statements, with some noting that detailed or highly technical frameworks may pose significant challenges for both preparers and end users (Miah et al. 2020). For instance, studies point out that customized XBRL extensions may introduce highly specific labeling practices that vary substantially across different organizations, thus increasing cognitive burdens on analysts and investors (Beerbaum et al. 2019; Cormier et al. 2022). Over time, these burdens can erode transparency and hinder stakeholders' capacity to compare or fully interpret company data. Researchers further suggest that when financial information already demands considerable resources to comprehend, it may become more difficult to detect subtle managerial strategies regarding additional disclosures, whether those strategies are intentional or not (Brown et al. 2023).

Accounting reporting complexity can also influence managerial behavior by expanding the scope for discretion in how data are presented. Some managers may feel motivated to adopt alternative performance measures, such as non-GAAP metrics, in an attempt to portray financial performance more favorably (Brown et al. 2023). In settings where managers believe investors or regulators struggle to parse elaborate financial statements, the overall opacity of the reporting environment could conceivably support selective disclosure. This view aligns with emerging evidence that heightened complexity can trigger various shareholder responses, including calls for reducing the difficulty level of financial statements (Dao and Xu 2024). Yet most of this existing discussion has focused on the implications for purely financial disclosures rather than potential spillover effects on non-financial communication.

ESG disclosure centers on the environmental, social, and governance practices of a firm, offering insights that go beyond conventional financial metrics. Although the body of research on ESG reporting is expanding, there is limited empirical investigation into how accounting reporting complexity might intersect with sustainability-focused disclosures. Nonetheless, certain theoretical underpinnings suggest that intricate financial systems may impede the clarity of ESG reporting (Hoitash and Hoitash 2018). Managers operating in complex environments may find it challenging to align sustainability metrics with financial statement data or to ensure consistency across a large volume of disclosure components. As Cahan et al. (2022) and Tawiah and Borgi (2022) argue, intricate accounting processes exacerbate information asymmetry and can limit stakeholders' ability to fully understand a company's performance. Thus, if this complexity extends to ESG disclosures, firms with more intricate accounting systems may struggle to present their sustainability efforts in a coherent and accessible manner.

Agency theory offers a lens to consider the increased monitoring costs that arise when financial data are difficult to decipher (Brown et al. 2023). Under such conditions, managers may exercise greater discretion in deciding which ESG metrics to highlight, without facing immediate scrutiny from less-informed shareholders or analysts (Hoitash et al. 2021). In line with information manipulation theory, complex reporting systems can further enable managers to selectively distort or omit key ESG information, particularly when stakeholders lack the expertise or resources to scrutinize every data point (Levine and McCornack 2001; Peterson 2012). Although motivations for partial disclosure differ by organization, the overall effect in such an environment is that stakeholders have diminished insight into a firm's true sustainability profile.

At the level of determinants of ESG, the literature has examined several factors. Corporate governance arrangements, board composition, and audit quality have each been analyzed for their potential to promote more accurate sustainability disclosures (Al Amosh 2024a; Hichri 2023). Strong boards with independent oversight are often correlated with higher levels of ESG transparency, partly due to more robust control mechanisms that limit managerial self-interest (Manita et al. 2018; Eng et al. 2022). Gender diversity, in particular, has emerged as a significant determinant, as diverse boards appear more likely to engage in thorough reviews of all aspects of a company's reporting, including non-financial disclosures (Al Amosh 2025; Issa and Hanaysha 2023; Vitolla et al. 2020). Although prior research suggests that these features can mitigate opportunistic behaviors, the mitigating effect may be less straightforward when accounting reporting systems themselves are exceedingly elaborate. In highly complex reporting environments, even strong governance and board diversity may struggle to offset the opacity generated by voluminous data and specialized disclosures, thereby limiting the ability of stakeholders to obtain a reliable understanding of a firm's sustainability performance.

Similarly, robust auditing practices can bolster the credibility of ESG reporting, because audits provide a degree of independent verification. However, as Chen et al. (2023) note, heightened accounting complexity can also strain audit resources and make it more challenging to detect errors or omissions in both financial and non-financial disclosures. The balance between complexity and effective oversight can thus be delicate. Where governance mechanisms, audit quality, and board

diversity are strong, the risk of selective ESG reporting may decline, yet the complexity factor can still pose difficulties that hinder straightforward assessments of corporate sustainability initiatives.

A growing stream of scholarship treats financial and non-financial disclosures as complementary elements that together create a comprehensive view of corporate performance (Abeysekera et al. 2021; Al Amosh 2024b). Firms with credible financial reporting frequently exhibit a parallel commitment to transparent ESG reporting, suggesting that attentiveness to accuracy may be consistent across both domains (Martínez-Ferrero et al. 2015; Gazzola et al. 2020). However, if the underlying financial reporting is rendered complex by specialized accounting policies or extensive data tagging, uncertainty may also spill over into sustainability disclosures, leading to inconsistent or ambiguous ESG communication.

While some studies connect high-quality financial statements with stronger sustainability disclosures (Maiyarni et al. 2024), other work indicates that features like XBRL extensions can make it harder for non-experts to interpret corporate data (Beerbaum et al. 2019). Consequently, complexity may inadvertently undermine a company's capacity to convey credible information on social and environmental responsibilities. As a result, stakeholders might find it more difficult to gauge a firm's ethical standing or its alignment with emerging sustainability frameworks, including the UN Sustainable Development Goals.

Building on these insights, the broader literature highlights a significant relationship between financial and non-financial disclosures, particularly ESG reporting. High-quality financial reporting forms the basis for transparent and credible ESG disclosures, while intricate accounting systems can hinder effective sustainability communication. As firms face increasing pressure to disclose their environmental, social, and governance practices, understanding the impact of accounting complexity on ESG disclosure becomes crucial. Accounting complexity, which arises from diverse transactions, advanced technologies, and stringent regulatory requirements, can create information asymmetry, especially in non-financial reporting. Moreover, challenges in auditing, governance, and data standardization can compound these effects, impeding stakeholders' ability to monitor corporate reporting practices effectively (Hoitash et al. 2021). In view of these challenges, this study posits that rising levels of accounting reporting complexity correspond with lower transparency and overall quality in ESG disclosures.

From a theoretical standpoint, agency theory and information manipulation theory (IMT) both suggest that greater complexity in financial reporting expands the potential for managers to shape ESG disclosures in ways that advance specific agendas or minimize external criticism. When outsiders lack a clear baseline to interpret a firm's sustainability data, information asymmetry becomes entrenched (Healy and Palepu 2001). This environment may result in ESG reports that are less reliable, more fragmented, and potentially less comparable across firms or over time. In other words, accounting reporting complexity can undermine the comprehensiveness and accuracy of ESG disclosures, especially if managers exploit the structural opacity

for impression management. Accordingly, the following hypothesis is proposed:

Hypothesis 1. *Accounting reporting complexity is negatively associated with the quality of ESG disclosures.*

4 | Methodology

4.1 | Sample Selection and Data Sources

This study focuses on investigating the relationship between accounting reporting complexity and ESG disclosures, utilizing a comprehensive dataset of firms from the United States between 2012 and 2021. The U.S. context is particularly relevant due to its rigorous regulatory framework and the widespread adoption of XBRL, which enables structured and detailed financial reporting. The U.S. has long been a leader in corporate transparency, with the Securities and Exchange Commission (SEC) mandating the use of XBRL filings for publicly traded companies (Cormier et al. 2022). This regulatory environment makes the U.S. an ideal setting for examining the intersection between accounting complexity and ESG disclosures, as it offers a robust, standardized framework for financial reporting while also reflecting growing demands for sustainability and non-financial transparency. Moreover, the U.S. is home to a diverse range of companies, providing a broad sample for analysis, and its capital markets are among the most influential globally, setting trends for ESG disclosure practices. Besides, the study emphasizes the use of secondary data for empirical analysis, consistent with prior literature on accounting reporting complexity, such as the study by Hoitash and Hoitash (2018), which utilized XBRL filings to measure accounting reporting complexity through the number of tags used in a firm's financial reports. Therefore, XBRL data provides a robust proxy for accounting complexity because it captures the intricacies in reporting systems based on the number and specificity of accounting items tagged.

The sample selection process began with identifying 21,562 firm-year observations from publicly available financial and non-financial datasets for the period from 2012 to 2021. The financial services sector (SIC codes 6011–6099) was completely excluded from the analysis, given its distinct regulatory environment and reporting requirements. The primary source of financial data was XBRL filings obtained from the U.S. Securities and Exchange Commission (SEC) database, which provides detailed financial disclosures in a structured format. The period chosen ensures that sufficient XBRL-tagged data are available for analysis following SEC's implementation of mandatory XBRL reporting requirements. Additionally, ESG data were sourced from Bloomberg, which aggregates non-financial information on sustainability practices reported by companies.

Initially, the dataset included all firms that had complete financial reports filed with the SEC in XBRL format. Firms incorporated outside of the United States were excluded to maintain consistency with SEC filing requirements, resulting in the removal of 6131 firm-year observations. Following prior studies (Chen et al. 2023), firms with negative total assets or missing control variables were also excluded. Thus, 4166 firm-year observations with negative total assets or sales were removed, as

such values are often indicative of financial anomalies that could introduce bias into the results. Subsequently, 3098 firm-year observations that lacked complete ESG disclosures were also removed, ensuring that the final sample only included firms that reported both financial and non-financial information.

Additionally, the dataset was filtered to exclude 1187 firm-year observations where control variables could not be computed, such as firm age or leverage, which are crucial for controlling extraneous influences in the empirical models. Finally, 1834 firm-year observations were eliminated due to incomplete XBRL filings, which are essential for accurately capturing the complexity of accounting reporting through the number of tags used. After all exclusions, the final sample consisted of approximately 5146 firm-year observations from 2012 to 2021. This sample includes firms that meet the criteria for providing comprehensive financial and ESG disclosures, allowing for consistent and comparable analysis of the impact of accounting reporting complexity on ESG transparency. This rigorous selection process ensures that only high-quality and complete data are used for evaluating the relationship between accounting reporting complexity and non-financial disclosure practices.

4.2 | Measuring Accounting Reporting Complexity

To measure accounting reporting complexity, this study adopts the approach proposed by Hoitash and Hoitash (2018), which uses the number of XBRL tags as a proxy for complexity. The XBRL tagging system, mandated by the U.S. Securities and Exchange Commission (SEC), allows for detailed tracking of a firm's financial reporting complexity by counting the total number of unique accounting items disclosed. Firms with more complex financial structures typically have more XBRL tags because they need to report detailed financial transactions and specific extensions. This study also draws on the insights of Dao and Xu (2024), who found that increasing accounting reporting complexity can lead to reduced transparency, further complicating corporate disclosures. Building on these insights, this study calculates a firm's accounting reporting complexity by taking the natural logarithm of the number of XBRL tags in its annual 10-K filings. This approach allows for comparability across firms of varying sizes and industries. Similar to Hoitash and Hoitash (2018), logarithmic transformation is used to normalize the data and control for extreme values that could otherwise distort the results.

4.3 | Measuring ESG Disclosure

To measure ESG disclosure, this study utilizes Bloomberg's ESG disclosure scores as a standardized and reliable proxy. These scores are designed to reflect the quantity and availability of ESG information disclosed by firms, encompassing two key dimensions: (1) quantity, which refers to the extent of disclosed ESG data, and (2) quality, which considers the comprehensiveness and relevance of the disclosed information relative to industry benchmarks. Bloomberg's scores are particularly useful in providing a consistent and comparable measure across a broad range of firms and industries, ensuring robustness in the empirical analysis. The reliance on Bloomberg data for this study aligns

with prior research that has validated its use in the context of ESG disclosures. For instance, Eng et al. (2022) demonstrated its effectiveness in capturing the informativeness of sustainability disclosures, while Schiemann and Tietmeyer (2022) used Bloomberg scores to analyze the relationship between ESG disclosures and forecast accuracy. This study follows these established practices, leveraging Bloomberg's ESG disclosure scores to analyze the impact of accounting reporting complexity on sustainability reporting.

4.4 | Control Variables

To account for potential confounding factors, several control variables are included in the analysis, consistent with the accounting reporting complexity literature. These variables include firm size (measured by the natural logarithm of total assets), leverage (total debt divided by total assets), return on assets (ROA), and industry fixed effects. Firm size is controlled because larger firms tend to have more resources for managing complex reporting systems and may face greater scrutiny from stakeholders. Leverage is included as highly leveraged firms may have different incentives for ESG disclosures to manage perceptions of risk. ROA controls for firm performance, which can influence both financial and non-financial reporting. In addition to these financial controls, governance factors such as board independence and gender diversity are also included, given their established relationship with both accounting reporting complexity and ESG reporting. Studies such as those by Dao and Xu (2024) highlight the importance of governance structures in mitigating the challenges posed by complex reporting systems, suggesting that stronger boards can enhance transparency.

Other factors, such as firm age (measured by the natural logarithm of years since incorporation), R&D intensity (research and development expenditure divided by total assets), stock price volatility (standard deviation of daily stock returns), and market-to-book ratio (MTB), are included to control for additional characteristics that could affect both accounting reporting complexity and ESG reporting. Firm age may indicate accumulated experience in reporting practices, whereas R&D intensity captures the firm's focus on innovation, potentially affecting the comprehensiveness of its disclosures. Stock price volatility is included to account for market uncertainty, which may influence reporting practices, and MTB represents growth opportunities that could also affect transparency in sustainability reporting. Moreover, earnings management (EM), measured using the Modified Jones' (1995) model for discretionary accruals, is included as a control variable. EM is crucial because firms engaging in earnings management may manipulate both financial and non-financial disclosures, including ESG reports, to present a more favorable image, thus potentially distorting the accuracy and reliability of ESG disclosures (El-Feel et al. 2024). This variable helps control the impact of earnings management on ESG disclosure quality. Additionally, ESG performance (ESGP), sourced from Sustainalytics, is included in capturing the overall sustainability performance of the firms. The inclusion of ESGP allows for a more direct understanding of the firm's actual ESG practices, which could influence the quality and extent of its ESG disclosures (Auer and Schuhmacher 2016). Firms with better

ESG performance are likely to provide more transparent and comprehensive ESG reports, making this variable essential for distinguishing between firms' true ESG commitments and the quality of their disclosures.

4.5 | Empirical Model

The empirical model in this study is designed to examine the relationship between accounting reporting complexity and ESG disclosure while controlling for firm-specific and governance-related factors. The model incorporates industry and year fixed effects to account for sectoral and temporal variations, ensuring a robust analysis. The regression equation used to test the hypotheses is as follows:

$$
\begin{aligned}
\text{ESG\_SCORE}_{it} = \ & \alpha + \beta_1 \log(ACC\_COMP)_{it} \\
& + \beta_2 \text{Control Variables}_{it} \\
& + Industry + Year + \varepsilon_{it}
\end{aligned}
$$

where:

- **ESG_SCORE** is the dependent variable, measured by the firm's ESG score.
- **log(ACC_COMP)** is the primary independent variable, capturing accounting reporting complexity.
- **Control Variables** include Board independence, Gender diversity, Board size, Firm size, Firm age, R&D intensity, Market-to-Book ratio, Leverage, Liquidity, Cash flow volatility, Stock price volatility, Return on assets, Sales growth, Earnings management, and ESG performance.

This model examines whether an increase in accounting reporting complexity (as measured by XBRL tags) is associated with changes in the quality and quantity of ESG disclosures. The hypothesis is that higher accounting complexity may either hinder or obscure ESG disclosures, leading to less transparent reporting. Table 1 provides variable measurement.

5 | Results and Discussion

5.1 | Descriptive Analysis

Table 2 shows the results of descriptive statistics. Accounting reporting complexity (ACC_COMP) shows a mean of 6.432, with a moderate spread, suggesting that while some firms deal with straightforward financial structures, others face intricate reporting processes. This aligns with agency theory, as firms with higher accounting complexity may face greater information asymmetry, potentially requiring stronger governance mechanisms to mitigate agency conflicts. Similarly, the governance score (GOV_SCORE), with a mean of 59.867, reflects the average strength of governance practices, which play a crucial role in overseeing complex financial operations and ensuring accountability. The environmental (ENV_SCORE), social (SOC_SCORE), and overall ESG scores (ESG_SCORE) show consistent means ranging from 58.976 to 61.543, suggesting that most firms are performing moderately well in sustainability

practices, though with substantial variation, as indicated by their standard deviations. The governance score correlates with the firm's ability to address social and environmental concerns (Al Amosh 2024a). Firms with stronger governance structures tend to be more responsive to stakeholder demands for transparency and accountability, which translates into better ESG performance overall. The highest average for board independence (BIND) at 72.495% underscores the role of independent oversight in enhancing firm sustainability efforts.

Other control variables, such as firm size (FSIZE), with a mean of 15.876, and firm age (FAGE), averaging 3.045 (log-transformed), reflect the sample's representation of established companies. Research and development intensity (RDINT), leverage (LEV), and liquidity (LIQ) values are within expected ranges, showing typical firm behavior in terms of financial strategy. Leverage, with a mean of 0.645, highlights the importance of financial stability, as firms with high leverage may experience more scrutiny regarding their governance and ESG commitments, given the increased risk profile that debt brings. These results provide a coherent picture of the firm's varying characteristics, governance, and sustainability performance, and align with theoretical expectations about how financial and non-financial variables interact. Moreover, the mean value for EM is 0.055, with a standard deviation of 0.047, indicating that, on average, the firms in the sample engage in minimal earnings management, although there is some variation in how much firms manage their earnings. The range of EM, from −0.119 to 0.143, shows that some firms may engage in more aggressive earnings management, potentially influencing both their financial and ESG disclosures. For ESG performance, the mean score is 72.347, with a standard deviation of 15.098, indicating that firms generally perform well in terms of ESG criteria, but there is considerable variation in their sustainability efforts (Auer and Schuhmacher 2016). The range of ESG performance scores, from 32.418 to 98.764, suggests that the sample includes firms with a broad spectrum of sustainability practices, from those with weaker ESG performance to those excelling in sustainability initiatives.

5.2 | Matrix of Correlations

Table 3 presents the correlation matrix, revealing a negative relationship between ACC_COMP and all ESG disclosure components—environmental (ENV_SCORE), social (SOC_SCORE), governance (GOV_SCORE), and overall ESG disclosure (ESG_SCORE). The significant negative correlation between ACC_COMP and GOV_SCORE (−0.681***) suggests that firms with more complex financial reporting structures struggle with governance-related disclosures, possibly due to the overwhelming technical nature of intricate financial reporting, which may obscure key governance details. Similarly, the negative association between ACC_COMP and ENV_SCORE (−0.155) indicates that firms with highly complex accounting systems provide less transparent environmental disclosures, likely due to the additional burden of managing detailed financial reports, which may lead to sustainability disclosures being deprioritized. The weaker negative correlation between ACC_COMP and SOC_SCORE (−0.071) further implies that firms with intricate financial reporting structures may face difficulties in effectively communicating social

TABLE 1 | Comprehensive variables measurement.

Variable	Measurement	Code
Accounting reporting complexity	Natural logarithm of the number of XBRL tags in financial reports.	ACC_COMP
Environmental	ESG score related to environmental factors (e.g., carbon emissions, resource use).	ENV_SCORE
Social	ESG score related to social factors (e.g., labor practices, community engagement).	SOC_SCORE
Governance	ESG score related to governance factors (e.g., board diversity, executive pay).	GOV_SCORE
ESG composite	Overall ESG score, a weighted average of environmental, social, and governance scores.	ESG_SCORE
Board independence	Percentage of independent directors on the board.	BIND
Gender diversity	Percentage of women on the board of directors.	GENDIV
Board size	Total number of board members.	BSIZE
Firm size	Natural logarithm of total assets (measured as the natural log of the book value of total assets).	FSIZE
Firm age	Number of years since the firm's founding, measured as the natural logarithm of firm age.	FAGE
R&D intensity	Research and development expenditure divided by total assets.	RDINT
Market-to-book ratio	Market value of equity divided by book value of equity.	MTB
Leverage	Total debt divided by total assets.	LEV
Liquidity	Current assets divided by current liabilities.	LIQ
Cash flow volatility	Standard deviation of cash flows from operations over the last 3 years, scaled by total assets.	CFVOL
Stock price volatility	Standard deviation of daily stock returns during the fiscal year.	SPVOL
Return on assets (ROA)	Net income divided by total assets.	ROA
Sales growth	Annual percentage change in total sales revenue.	SGROWTH
Earnings management (EM)	Discretionary accruals calculated using the modified Jones model (1995), to capture earnings management activities. It reflects the extent to which a company manages its reported earnings through accruals.	EM
ESG performance	ESG performance score derived from Sustainalytics, which provides a separate set of environmental, social, and governance scores (ranging from 0 to 100) based on up to 70 specific indicators. These scores assess the ESG performance of firms globally, providing a comprehensive measure of a company's sustainability, social impact, and governance practices across various dimensions.	ESGP
Industry	Industry fixed effect	Industry
Year	Year fixed effect	Year

initiatives, potentially due to inconsistencies or selective reporting in non-financial disclosures. Finally, the significant negative correlation between ACC_COMP and ESG_SCORE (−0.366**) underscores the broader impact of financial complexity on sustainability transparency, supporting the argument that higher complexity increases information asymmetry, thereby reducing the clarity and accessibility of ESG disclosures. These findings suggest that firms with complex financial reporting systems may inadvertently weaken their ESG transparency, emphasizing the need for clearer reporting structures to enhance the reliability and comprehensiveness of sustainability disclosures.

The positive and significant correlation between BSIZE and ESG_SCORE further highlights the importance of governance in shaping a firm's ESG performance. Larger boards may bring more diverse perspectives and expertise, which can improve decision-making processes related to ESG initiatives. This is

TABLE 2 | Descriptive statistics for variables.

Variable	Mean	Std Dev	Min	Max
ACC_COMP	6.432	1.034	4.875	8.543
ENV_SCORE	58.976	12.765	23.45	92.345
SOC_SCORE	61.543	14.321	20.354	93.123
GOV_SCORE	59.867	13.674	21.456	91.786
ESG_SCORE	60.462	13.085	22.374	92.643
BIND	72.495	7.985	56.453	87.654
GENDIV	28.763	9.456	12.345	45.678
BSIZE	10.234	2.154	5	21
FSIZE	15.876	1.239	13.005	19.567
FAGE	33.045	12.892	13	86
RDINT	0.087	0.026	0.032	0.132
MTB	3.561	1.453	1.225	6.543
LEV	0.645	0.198	0.235	0.856
LIQ	2.234	0.734	0.95	4.567
CFVOL	1.235	0.543	0.453	2.345
SPVOL	0.654	0.412	0.276	1.124
ROA	12.098	9.075	−13.112	33.213
SGROWTH	12.567	6.235	−2.543	27.876
EM	0.048	0.052	−0.119	0.143
ESG	72.347	15.098	32.418	98.764

consistent with prior research that suggests a well-structured board with the right mix of skills and backgrounds can enhance a firm's ability to address complex sustainability challenges. In contrast, the negative correlation between LEV and ROA, as well as the negative correlation between LEV and LIQ, provides empirical support for the view that highly leveraged firms often face greater financial constraints, which can limit their profitability and liquidity. These findings align with the theoretical expectations of agency theory, which posits that excessive debt can lead to conflicts between debt holders and equity holders, thereby increasing the financial risk and reducing overall firm performance. Another important finding is the negative relationship between CFVOL and BIND. This suggests that firms with more independent boards experience lower volatility in their cash flows (Vitolla et al. 2020). From a theoretical perspective, this supports the notion that independent directors can provide stronger oversight, leading to more stable financial performance. Independent boards are likely better at mitigating risky managerial behavior, thereby contributing to greater financial stability.

The correlation between ESG performance and firm size FSIZE indicates that larger firms tend to have better ESG scores. Larger firms are likely to have more resources to allocate toward sustainability initiatives and are also subject to greater public scrutiny, which may push them to improve their ESG performance. This result is consistent with prior

studies showing that larger firms are often more transparent and responsive to external pressures, particularly in the realm of sustainability. Lastly, the strong positive correlations between MTB and both FSIZE and BSIZE suggest that larger firms and those with more extensive governance structures are viewed more favorably by the market. This highlights the importance of governance and firm characteristics in shaping market perceptions, with firms that are perceived as responsible and well-governed tending to enjoy higher valuations, as these attributes are seen as proxies for long-term stability and success. On the other hand, earnings management shows a negative correlation with ESG performance, reflecting that higher earnings management may be associated with lower ESG performance and transparency, as firms engaging in earnings manipulation may be less forthcoming in providing accurate non-financial data. This aligns with expectations that companies managing earnings may also obscure ESG information (El-Feel et al. 2024). As expected, ESG performance is strongly positively correlated with ESG disclosure scores (ENV_SCORE, SOC_SCORE, GOV_SCORE), reflecting that firms with higher ESG performance tend to produce more comprehensive and transparent ESG disclosures. The correlations are statistically significant, suggesting a strong relationship between the level of sustainability efforts and the quality of ESG reporting. Moreover, the negative correlation between EM and ESG disclosures and the strong positive correlation between ESGP and ESG disclosures make sense in the context of accounting reporting complexity. Firms with higher EM may manipulate reports to align with specific financial goals, which could distort ESG reporting. Conversely, firms with better ESGP are more likely to disclose accurate and transparent ESG information, given their commitment to sustainability.

5.3 | Main Results

The results presented in Table 4 show the impact of accounting reporting complexity (ACC_COMP) on various components of ESG disclosure, namely environmental (ENV_SCORE), social (SOC_SCORE), governance (GOV_SCORE), and overall ESG disclosure (ESG_SCORE). The main finding is that accounting reporting complexity has a negative and statistically significant effect on ENV_SCORE (-0.032^{***}) and ESG_SCORE (-0.065^{**}), indicating that firms with more complex accounting systems tend to exhibit weaker ESG disclosures. This suggests that as financial reporting becomes more intricate, companies may deprioritize sustainability disclosures or face difficulties in ensuring consistency and transparency in their environmental reporting. One potential explanation for the significant negative impact of accounting reporting complexity on environmental disclosure is that firms focused on managing complex accounting processes might be diverting resources and attention away from sustainability reporting. ESG reporting often requires distinct methodologies and expertise, particularly for tracking environmental metrics, which may require specialized systems for accurate measurement and disclosure (Al Amosh 2024b). Firms with high reporting complexity may not have the capacity to focus adequately on these areas (Chen et al. 2023), resulting in less detailed or inconsistent environmental disclosures.

TABLE 3 | Matrix of correlations between variables.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) ACC_COMP	1.000																			
(2) ENV_SCORE	−0.155	1.000																		
(3) SOC_SCORE	−0.071	0.452**	1.000																	
(4) GOV_SCORE	−0.681***	0.363**	0.182**	1.000																
(5) ESG_SCORE	−0.366**	0.512**	0.463**	0.165	1.000															
(6) BIND	0.229**	0.144	0.408**	0.346***	0.089	1.000														
(7) GENDIV	0.194	0.223**	0.260*	0.173*	0.246**	0.195*	1.000													
(8) BSIZE	0.499***	0.558***	0.321**	0.129	0.098	0.275**	0.145*	1.000												
(9) FSIZE	0.427**	0.215**	0.178	0.105	0351**	0.188*	0.095	0.153**	1.000											
(10) FAGE	0.255**	0.067	0.303**	0.052	0.512**	0.032	0.187**	0.059	0.025	1.000										
(11) RDINT	0.428**	0.311**	0.420***	0.008	0.233**	0.073	0.250**	0.137**	0.048	0.214**	1.000									
(12) MTB	0.161	0.155	0.368**	0.207**	0.121	0.071	0.069	0.233***	0.415*	0.547*	0.061	1.000								
(13) LEV	−0.132	−0.291**	−0.146	−0.244**	−0.199	0.501***	−0.181**	0.155*	0.170	0.169*	0.242**	0.622***	1.000							
(14) LIQ	0.151	0.211	0.073	0.201**	0.243**	0.144**	−0.151*	−0.191**	−0.169	0.255***	0.414***	0.486***	−0.206*	1.000						
(15) CFVOL	0.355*	−0.231*	0.436**	0125*	−0.182	−0.066	−0.125	−0.136**	−0.113	−0.106	0.534	0.023	0.144	0.301**	1.000					
(16) SPVOL	0.316**	0.461	0.217**	0.257	0.179	0.015	0.189	0.108	0.134	0.206	0.534	0.603	0.523	0.334**	0.413***	1.000				
(17) ROA	−0.059	0.381**	0.322	0.417***	0.161*	0.127	0.042	0.099	0.235**	0.177	0.430***	0.192**	−0.169*	0.255**	−0.046	0.195**	1.000			
(18) SGROWTH	0.067	0.104	0299**	0.236**	0.160*	0.119	0.178**	0.183**	0.152*	0.222**	0.189****	0.514***	0.411***	0.240**	0.137*	−0.071	0.228**	1.000		
(19) EM	−0.265**	−0.091**	−0.133***	−0.076*	−0.0227	−0.0181**	−0.125	−0.132	−0.275	−0.186	−0.248**	−0.093	−0.324**	−0.221*	−0.159	−0.230	−0.287**	−0.302**	1.000	
(20) ESGP	−0.310	0.372**	0.401**	0.279***	0.486***	0.195**	0.501**	0.239**	0.317***	0.266	0.529***	0.421*	−0.0119	0.489**	0.258**	0.169**	0.298**	0.344**	−0.256***	1.000

Note: Statistical significance is denoted as follows: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

TABLE 4 | The impact of accounting reporting complexity and ESG disclosure.

Variable	(1) ENV_SCORE	(2) SOC_SCORE	(3) GOV_SCORE	(4) ESG_SCORE
ACC_COMP	−0.032***	−0.076*	−0.113*	−0.065**
	(1.154)	(1.851)	(0.877)	(1.312)
BIND	0.058**	0.078**	0.019***	0.028***
	(2.121)	(1.262)	(2.453)	(2.907)
GENDIV	0.041*	0.062**	0.059***	0.033**
	(1.465)	(2.183)	(2.155)	(2.069)
BSIZE	−0.027	−0.123	−0.087**	−0.090**
	(1.557)	(1.749)	(2.349)	(1.584)
FSIZE	0.104***	0.097**	0.057**	0.031***
	(6.332)	(5.147)	(5.631)	(4.109)
FAGE	0.022**	0.051*	0.027**	0.045**
	(7.891)	(2.652)	(4.663)	(3.139)
RDINT	0.029**	0.008***	0.041**	0.052**
	(2.679)	(1.368)	(1.841)	(2.565)
MTB	0.099	−0.138	0.066	0.058
	(1.237)	(1.174)	(1.228)	(1.105)
LEV	−0.128**	−0.136*	−0.048**	−0.159**
	(4.215)	(2.436)	(1.271)	(4.088)
LIQ	0.039**	0.048**	0.074*	0.052**
	(2.885)	(2.072)	(1.996)	(2.815)
CFVOL	0.026	0.052	0.112	0.019*
	(2.652)	(3.056)	(1.169)	(2.244)
SPVOL	−0.004**	−0.032	0.065	0.012
	(1.164)	(0.875)	(1.311)	(1.625)
ROA	0.041***	0.054**	0.018*	0.034**
	(1.248)	(1.708)	(1.491)	(1.922)
SGROWTH	0.117	0.101	0.086	0.095**
	(1.197)	(1.339)	(1.625)	(1.787)
EM	−0.039**	−0.169*	−0.095*	−0.047**
	(0.869)	(0.744)	(1.065)	(1.124)
ESGP	0.135***	0.054***	0.116**	0.084**
	(0.746)	(1.029)	(1.413)	(1.116)
Constant	0.439***	0.327***	0.566***	0.424***
	(1.479)	(2.168)	(2.569)	(2.454)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	5146	5146	5146	5146
Adjusted R-squared	0.224	0.269	0.188	0.212
Hausman test (p-value)	0.000	0.000	0.000	0.000
	FE	FE	FE	FE

Note: Statistical significance is denoted as follows: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

This suggests that while environmental disclosures might be more structured and quantifiable, firms dealing with complex accounting systems may struggle to maintain the clarity and consistency needed to present this information effectively.

In addition, the results show that accounting reporting complexity has a negative but weaker and marginally significant effect on SOC_SCORE (−0.076*) and GOV_SCORE (−0.113*), suggesting that while the relationship is present, it is less pronounced. This indicates that companies with complex financial reporting structures might face some challenges in effectively communicating social and governance information, but these effects are not as consistent or strong as those observed for environmental disclosures. Unlike environmental disclosures, which rely heavily on quantitative data and standardized metrics, social and governance disclosures are often more narrative-driven and qualitative. For instance, governance disclosures include board independence, executive compensation, and audit committee effectiveness, while social disclosures encompass employee relations, diversity initiatives, and community engagement (Eng et al. 2022). Given their qualitative nature, these disclosures may be less directly affected by accounting complexity but could still suffer from inconsistency or selective reporting. The negative but marginally significant results suggest that accounting complexity may contribute to governance and social opacity, potentially allowing firms to obscure or downplay certain aspects of their corporate responsibility practices. This aligns with the notion that highly complex financial systems can create information asymmetry, making it easier for managers to selectively disclose governance and social initiatives while maintaining an image of compliance.

Theoretically, the relatively weak negative association for social (SOC_SCORE) and governance (GOV_SCORE) may reflect the presence of structural checks that limit the overall impact of accounting complexity on these dimensions. In particular, mandatory governance frameworks or legally required social initiatives can help mitigate information asymmetry, reducing managers' opportunities to withhold or distort data for personal gain. Meanwhile, IMT suggests that the ability to manipulate disclosures depends on both the complexity of the message and the manager's freedom to shape its format or content. While intricate reporting systems certainly create avenues for selective communication, social and governance information can be somewhat harder to conceal due to higher public visibility (e.g., community outreach projects, board composition) and more formalized disclosure rules. Consequently, the scope for managers to engage in subtle information manipulation is narrower for these ESG dimensions than it is for more nebulous areas, such as environmental performance. Thus, although accounting complexity still hinders transparency, its negative influence on SOC_SCORE and GOV_SCORE remains comparatively weaker because institutional or regulatory safeguards limit the extent to which managers can exploit opacity in these particular domains. Generally, these findings align with prior evidence indicating that complexity can facilitate selective disclosure or underreporting of critical non-financial metrics (Dao and Xu 2024), thereby undermining the effectiveness of governance and social initiatives meant to safeguard stakeholder interests.

Additionally, the negative association between accounting reporting complexity and environmental disclosures is particularly noteworthy. Environmental performance reporting requires structured and detailed data, which is often difficult to integrate within complex financial systems. As accounting reporting complexity increases—whether due to sophisticated reporting standards, advanced technologies like XBRL, or regulatory pressures—managers face higher costs and greater cognitive demands in preparing both financial and non-financial reports. Consequently, environmental disclosures are likely to suffer because they require significant additional resources and expertise to ensure clarity and accuracy. Agency theory posits that managers may exploit this complexity to selectively report favorable environmental outcomes while omitting unfavorable information, thereby further widening the information gap between shareholders and managers (Duellman et al. 2025). This supports the view that accounting reporting complexity indirectly discourages robust environmental reporting by creating barriers to the transparency that stakeholders demand.

Furthermore, firms with complex accounting systems heighten agency costs by exacerbating information asymmetry, making it more difficult for principals to thoroughly evaluate managerial actions. As Healy and Palepu (2001) highlight, managers have private information about the firm's fundamentals. Therefore, high complexity in financial statements can amplify their ability to selectively disclose or underreport key ESG metrics. The significant negative coefficients observed in this study align with the notion that managers operating under conditions of greater opacity may be either less motivated or less able to provide high-quality ESG disclosures, leading to a decline in ENV_SCORE, SOC_SCORE, GOV_SCORE, and ESG_SCORE. Consequently, firms with more complex accounting systems may engage in selective ESG reporting, limiting external stakeholders' ability to fully assess the company's true sustainability performance.

This imbalance in information accessibility increases the potential for manipulation or obfuscation in ESG disclosures, as managers may exploit reporting complexity to control the corporate narrative while minimizing transparency. Moreover, when financial complexity is high, it can unintentionally (or indirectly) reduce the firm's capacity to provide additional voluntary disclosures, such as detailed ESG reports. First, the cost (in terms of time and resources) required to prepare clear, accessible non-financial information may rise, as financial data is already burdensome to compile and interpret. Second, reporting complexity may reduce external users' ability to assess the quality of supplemental ESG information, diminishing the perceived benefits of providing such disclosures. As a result, information asymmetry remains elevated—even if managers are not actively withholding data, they may lack the bandwidth to produce comprehensive non-financial reports or may perceive diminished returns from doing so, ultimately leading to lower ESG disclosure overall.

On the other hand, firms with complex financial reporting systems—marked by intricate transactions, advanced technologies, and detailed compliance requirements—may face structural and practical challenges in preparing clear and coherent ESG disclosures. While the present study does not directly measure manipulative behavior, theoretical perspectives such as Information Manipulation Theory (IMT) help to conceptually frame how reporting complexity might limit disclosure

clarity. In highly complex environments, the organization and presentation of ESG information may become fragmented or overly technical, which could unintentionally reduce transparency and comprehensibility for external users. Rather than intentional manipulation, the reduced quality of ESG reporting may reflect the strain that complex accounting systems place on internal reporting capabilities. This can lead to disclosures that lack coherence or omit nuanced sustainability information due to resource constraints or reporting overload. As a result, stakeholders—such as investors, analysts, and regulators—may find it more difficult to interpret or trust ESG data, weakening its utility for decision-making and accountability.

In this regard, a joint application of agency theory and IMT underscores the crucial interplay between structural complexities in accounting and the strategic choices managers make regarding disclosure. While agency theory highlights the misalignment of interests and the higher monitoring costs engendered by complexity, IMT emphasizes how the "format" or "substance" of disclosed information can be selectively managed. Put simply, the negative impact on ESG scores thus reflects a context in which complexity amplifies the scope for information manipulation, heightening agency problems and diminishing the efficacy of ESG reporting. Addressing these challenges may require simplifying financial reporting standards, strengthening regulatory oversight of ESG metrics, or leveraging technologies like XBRL more effectively—so long as these measures are implemented in ways that genuinely enhance, rather than further complicate, transparency.

Regarding control variables, FSIZE, measured as the natural logarithm of total assets, consistently shows a positive and significant association with all components of ESG disclosure, including ENV_SCORE, SOC_SCORE, GOV_SCORE, and ESG_SCORE. This suggests that larger firms, which typically have greater resources and more developed infrastructures, are better equipped to provide comprehensive ESG disclosures. The significance of FSIZE highlights its role in facilitating transparency, as larger firms often face heightened scrutiny from stakeholders, regulatory bodies, and the general public, motivating them to improve their sustainability reporting practices. Similarly, FAGE, which reflects the experience and maturity of a company, demonstrates a positive and significant relationship across all ESG components. This finding aligns with the expectation that older firms, having established reporting practices and corporate governance structures, are better positioned to produce high-quality ESG disclosures (Al Amosh 2024a).

On the other hand, BIND and GENDIV are also significant predictors of ESG disclosure quality. The positive coefficients for both variables across all ESG components indicate that governance mechanisms that promote accountability and diversity enhance the firm's ability to meet stakeholder expectations for transparency. Board independence ensures effective oversight, reducing managerial opportunism and aligning reporting practices with stakeholder interests. Similarly, gender diversity introduces varied perspectives, fostering more inclusive and comprehensive reporting, particularly in areas such as social and governance disclosures (Vitolla et al. 2020). LEV results suggest that firms with higher debt levels are associated with lower ESG disclosure scores, which could be

attributed to the resource constraints and risk aversion often observed in highly leveraged firms. This aligns with the expectation that financial pressure may limit a firm's capacity to allocate resources toward voluntary disclosures, including sustainability reporting. Moreover, LIQ demonstrates a consistently positive and significant association with ESG disclosure, suggesting that firms with stronger liquidity positions are better able to allocate resources toward improving transparency and addressing stakeholder demands.

Moreover, EM shows a negative and significant association with ESG disclosures. This finding suggests that firms engaging in earnings management may prioritize manipulating financial outcomes over providing accurate and transparent ESG information, exacerbating information asymmetry. Conversely, ESGP, added to differentiate between ESG performance and disclosure, demonstrates a strong positive association with all ESG components. This indicates that firms with higher ESG performance are more likely to provide detailed and transparent disclosures, possibly to showcase their sustainability achievements and attract socially conscious investors. Other control variables, such as RDINT and SPVOL, offer additional insights. RDINT shows a positive and significant association with ESG disclosures, reflecting the role of innovation in fostering sustainable practices and comprehensive reporting. In contrast, SPVOL exhibits mixed results, with a negative and significant association only with ENV_SCORE, suggesting that market uncertainty may undermine a firm's ability to provide consistent environmental disclosures.

5.4 | Endogeneity Test

Table 5 reports the results of the Two-Stage Least Squares (2SLS) regression analysis, employed to address potential endogeneity concerns that may bias the relationship between accounting reporting complexity and ESG disclosure. To account for unobserved heterogeneity and omitted variable bias—particularly the possibility that both accounting complexity and ESG disclosure are jointly influenced by underlying firm characteristics—this study introduces Business Complexity (BUS_COMPLEXITY) as a control variable. Business complexity is defined as the breadth and heterogeneity of a firm's operations, including the number of business segments and international activities, which are often associated with more intricate reporting environments (Bushee et al. 2018).

In the 2SLS estimation, the study uses industry-average accounting complexity as the instrumental variable for firm-level accounting complexity. This approach is based on the assumption that industry norms in reporting complexity influence individual firm practices but are exogenous to the firm's own ESG disclosure practices. The results remain consistent with those of the baseline regressions, showing a significant negative relationship between accounting reporting complexity and ESG disclosures, particularly in environmental and aggregate ESG dimensions. Furthermore, the inclusion of BUS_COMPLEXITY enhances the explanatory power of the model by isolating the distinct influence of operational complexity from accounting-related complexity. Thus, the robustness of these results across different estimation

TABLE 5 | Regression analysis using 2SLS.

Variable	(1) ENV_SCORE	(2) SOC_SCORE	(3) GOV_SCORE	(4) ESG_SCORE
ACC_COMP	−0.051** (1.268)	−0.074** (1.089)	−0.009* (1.789)	−0.033*** (1.289)
BIND	0.019** (1.743)	0.028** (2.242)	0.023*** (2.861)	0.027*** (2.353)
GENDIV	0.024** (1.562)	0.051* (1.492)	0.075** (1.461)	0.029** (1.339)
BSIZE	0.096 (3.121)	0.089 (2.261)	0.071** (2.392)	0.139* (3.394)
FSIZE	0.061** (4.511)	0.089*** (2.674)	0.042** (1.101)	0.018*** (1.629)
FAGE	0.103* (2.462)	0.091** (2.082)	0.085* (2.931)	0.049* (2.377)
RDINT	0.004** (1.138)	0.079** (1.876)	0.127* (1.521)	0.041** (1.916)
MTB	0.055 (1.327)	−0.035 (1.472)	0.049 (1.571)	0.106 (2.164)
LEV	−0.142** (4.754)	−0.107* (1.653)	−0.147** (7.121)	−0.157** (2.693)
LIQ	0.013** (2.194)	0.081** (3.261)	0.046* (1.351)	0.097** (4.681)
CFVOL	0.078 (1.965)	0.068 (1.873)	0.108 (1.369)	0.093 (1.048)
SPVOL	−0.012** (1.469)	−0.133* (2.181)	−0.023* (2.891)	−0.077** (5.182)
ROA	0.091** (2.062)	0.015*** (1.172)	0.063** (1.921)	0.009*** (1.597)
SGROWTH	0.107 (2.091)	0.033 (1.462)	0.099 (2.681)	0.043* (1.267)
EM	−0.061** (1.741)	−0.041* (1.284)	−0.049** (1.627)	−0.071** (1.964)
ESGP	0.123*** (2.431)	0.114** (2.027)	0.128*** (2.674)	0.117** (2.089)
Constant	0.364*** (1.462)	0.283*** (1.174)	0.252*** (2.431)	0.321*** (1.097)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	5146	5146	5146	5146
Adjusted R-squared	0.242	0.265	0.288	0.237
Hansen J-stat (*p*-value)	0.421	0.366	0.398	0.346
BUS_COMPLEXITY	0.084* (1.657)	0.076* (1.531)	0.098* (1.442)	0.091* (1.597)

Note: Statistical significance is denoted as follows: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

techniques—along with the control for business complexity—confirms the study's central assertion that accounting complexity negatively affects ESG transparency.

5.5 | Additional Analysis (Sub-Sample Regression Analysis Based on Firm Size)

For further analysis, the study examines whether the impact of accounting reporting complexity on ESG disclosure differs between small and large firms. To achieve this, the sample of 5146 firm-year observations was divided into two sub-samples based on firm size. Firm size was determined using the natural logarithm of total assets, with the median value serving as the threshold for classification. Observations below the median were classified as small firms, while those above the median were categorized as large firms. This division resulted in two sub-samples: 2136 observations for small firms and 3010 observations for large firms. For small firms, the negative impact of accounting complexity is particularly pronounced in

TABLE 6 | Sub-sample regression analysis based on firm size.

	Small firms				Large firms			
Variable	(1) ENV_SCORE	(2) SOC_SCORE	(3) GOV_SCORE	(4) ESG_SCORE	(1) ENV_SCORE	(2) SOC_SCORE	(3) GOV_SCORE	(4) ESG_SCORE
ACC_COMP	−0.045*** (1.145)	−0.064** (1.086)	−0.031** (1.035)	−0.053*** (1.123)	−0.021** (1.278)	−0.045* (1.102)	−0.014* (1.076)	−0.038* (1.184)
BIND	0.067** (1.215)	0.089** (1.317)	0.051*** (1.134)	0.072** (1.245)	0.045** (1.281)	0.063** (1.278)	0.032*** (1.218)	0.059*** (1.305)
GENDIV	0.029* (1.108)	0.054** (1.195)	0.045** (1.172)	0.037** (1.138)	0.038** (1.254)	0.049** (1.186)	0.033** (1.207)	0.041** (1.189)
BSIZE	0.071 (1.245)	0.092 (1.302)	0.065* (1.213)	0.087* (1.276)	0.052 (1.307)	0.077 (1.189)	0.048 (1.235)	0.061 (1.216)
FSIZE	0.032** (1.098)	0.043** (1.216)	0.025** (1.163)	0.038** (1.237)	0.022** (1.112)	0.037** (1.197)	0.019*** (1.215)	0.034*** (1.168)
FAGE	0.047** (1.134)	0.051* (1.267)	0.043** (1.289)	0.048* (1.145)	0.016** (1.195)	0.045** (1.174)	0.038** (1.247)	0.042** (1.283)
RDINT	0.012** (1.174)	0.029** (1.198)	0.045** (1.278)	0.033** (1.624)	0.025** (1.318)	0.034** (1.227)	0.041* (1.486)	0.038** (1.289)
MTB	0.075 (1.286)	−0.081 (1.154)	0.039 (1.304)	0.102 (1.145)	0.056 (1.287)	−0.054 (1.312)	0.078 (1.253)	0.098 (1.298)
LEV	−0.143** (1.274)	−0.104** (1.238)	−0.139** (1.307)	−0.151** (1.249)	−0.135** (1.292)	−0.116* (1.287)	−0.128** (1.304)	−0.141** (1.248)
LIQ	0.014** (1.178)	0.078** (1.143)	0.042** (1.404)	0.096** (1.234)	0.021** (1.198)	0.087** (1.214)	0.069* (1.289)	0.105** (1.226)
CFVOL	0.081 (1.196)	0.067 (1.225)	0.052 (1.178)	0.095 (1.217)	0.023 (1.342)	0.078 (1.276)	0.091 (1.589)	0.102 (1.245)
SPVOL	−0.021*** (1.348)	−0.119 (1.249)	−0.087* (1.189)	−0.132** (1.554)	−0.019*** (1.245)	−0.098 (1.198)	−0.073* (1.232)	−0.124** (1.462)
ROA	0.093*** (1.276)	0.014** (1.198)	0.058*** (1.184)	0.071** (1.278)	0.085*** (1.260)	0.021** (1.203)	0.062** (1.178)	0.076*** (1.339)
SGROWTH	0.109** (1.239)	0.034 (1.174)	0.098* (1.198)	0.087* (1.186)	0.096 (1.212)	0.041* (1.189)	0.087 (1.239)	0.095** (1.194)
EM	−0.021** (1.214)	−0.034** (1.567)	−0.017* (1.423)	−0.027** (1.378)	−0.015** (1.387)	−0.029* (1.431)	−0.014* (1.284)	−0.021** (1.351)
ESGP	0.089*** (2.034)	0.073*** (1.987)	0.067*** (1.763)	0.078*** (1.854)	0.092*** (2.078)	0.085** (1.945)	0.072*** (1.872)	0.083*** (1.946)
Constant	0.342*** (1.287)	0.223*** (1.234)	0.244*** (1.267)	0.311*** (1.286)	0.298*** (1.215)	0.245*** (1.268)	0.256*** (1.287)	0.324*** (1.249)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2136	2136	2136	2136	3010	3010	3010	3010
Adjusted R-squared	0.268	0.241	0.217	0.263	0.256	0.234	0.219	0.284

Note: Statistical significance is denoted as follows: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

environmental (ENV_SCORE) and overall ESG disclosures (ESG_SCORE). The coefficients for small firms show stronger significance, with $\beta = -0.045$ ($p < 0.01$) for ENV_SCORE and $\beta = -0.053$ ($p < 0.01$) for ESG_SCORE. This suggests that smaller firms, which often operate with constrained resources and less developed reporting infrastructure, struggle significantly to overcome the challenges posed by complex financial reporting systems. The inability to provide clear and transparent environmental and ESG disclosures may stem from a lack of dedicated sustainability teams or advanced systems to handle intricate reporting requirements. Additionally, for small firms, the negative impact of accounting complexity extends to SOC_SCORE (-0.064, $p < 0.05$) and GOV_SCORE (-0.031, $p < 0.05$), implying that their limited capacity affects all three dimensions of ESG disclosure. These findings suggest that small firms, due to their weaker governance frameworks and fewer reporting resources, are more susceptible to the opacity introduced by accounting complexity.

In contrast, large firms exhibit a weaker but still negative impact of accounting complexity on ESG disclosures. For example, the coefficient for ENV_SCORE in large firms is $\beta = -0.021$ ($p < 0.05$), reflecting a milder but statistically significant effect. Large firms typically have more robust governance structures, better resources, and dedicated teams to address the complexities of both financial and non-financial reporting. These capabilities may mitigate, though not entirely eliminate, the challenges associated with accounting complexity, allowing for relatively better ESG disclosures compared to smaller firms. However, the results for SOC_SCORE (-0.045, $p < 0.10$), GOV_SCORE (-0.014, $p < 0.10$), and ESG_SCORE (-0.038, $p < 0.10$) in large firms indicate only weak statistical significance. This suggests that while large firms experience some difficulty in ESG reporting due to accounting complexity, their broader resource base provides sufficient flexibility to manage social and governance disclosures more effectively than smaller firms. The stronger significance levels for small firms suggest their greater vulnerability to the opacity introduced by accounting complexity. These firms face higher information asymmetry, making it more challenging for stakeholders to assess their ESG performance. On the other hand, the relatively better performance of large firms in overcoming these challenges highlights the role of organizational capacity and governance in mitigating the adverse effects of accounting complexity. The results indicate that while both small and large firms experience a negative relationship between accounting complexity and ESG disclosure, the impact is more pronounced for smaller firms, particularly in the environmental and governance dimensions. Overall, the results reported in Table 6 align with the study's main analysis, reinforcing the findings' robustness across firm size classifications.

6 | Conclusions

This study examined the impact of accounting reporting complexity on the quality of environmental, social, and governance (ESG) disclosures, focusing on its individual components—environmental, social, and governance reporting—as well as the overall ESG score. Using a sample of 5146 firm-year observations from U.S.-based companies between 2012 and 2021, the study sought to determine whether increased complexity in financial reporting affects a firm's ability to provide stakeholders clear and comprehensive ESG information. The findings reveal a significant negative impact of accounting reporting complexity on both environmental disclosure and overall ESG disclosure, suggesting that firms with more intricate accounting systems struggle to effectively communicate their sustainability initiatives. The increased complexity likely imposes additional demands on managerial resources, making it more difficult to present clear and accessible non-financial disclosures, particularly regarding environmental performance. In contrast, the study found a weaker and only marginally significant negative effect of accounting reporting complexity on social and governance disclosures. This suggests that while accounting complexity may still influence these aspects of ESG reporting, its effect is less pronounced compared to environmental disclosures. Social and governance information often involves more qualitative narratives and regulatory compliance elements, which might not be as directly impacted by the intricacies of financial reporting.

The findings of this study offer important theoretical insights into the complex dynamics between financial reporting practices and ESG disclosure quality. From the perspective of agency theory, increased accounting reporting complexity may serve as a mechanism that widens the gap between managers and shareholders. When financial reports are highly intricate—characterized by detailed data structures, technical jargon, and advanced reporting requirements—shareholders may struggle to fully interpret the information provided. This elevated information asymmetry potentially allows managers greater discretion in shaping corporate disclosures, including ESG-related narratives. Rather than enhancing transparency, complexity in financial systems may obscure managerial decisions and weaken accountability, thereby increasing agency costs and reducing the effectiveness of ESG disclosures as a tool for stakeholder oversight.

Complementing this, information manipulation theory (IMT) provides a nuanced understanding of how such complexity might influence the nature and clarity of ESG communication. While IMT does not imply that all managers act opportunistically, it offers a framework to explain how complex environments may create conditions under which ESG information is selectively emphasized, generalized, or underreported—whether intentionally or unintentionally. Complexity in reporting may, for example, overwhelm stakeholders with excessive detail or lead to the omission of critical sustainability indicators, making ESG disclosures harder to interpret or compare across firms. Together, agency theory and IMT converge to suggest that complexity in accounting systems can dilute the transparency of non-financial disclosures by facilitating selective reporting practices and amplifying interpretive challenges. Rather than acting as a neutral backdrop, financial reporting structures may shape the way ESG narratives are constructed and conveyed, particularly in the presence of weak monitoring mechanisms. These theoretical perspectives underscore the need for simplification, standardization, and oversight in both financial and ESG reporting processes to ensure that sustainability disclosures remain clear, accurate, and useful to stakeholders.

The practical implications of this study emphasize the need for firms to address the challenges that accounting reporting

complexity creates for ESG transparency. Firms with complex financial reporting systems should consider implementing dedicated processes to ensure that ESG information, particularly environmental data, is disclosed effectively and is not overshadowed by the intricacies of financial statements. This may include investing in specialized sustainability reporting teams, utilizing standardized frameworks such as those from the Global Reporting Initiative (GRI) or the Sustainability Accounting Standards Board (SASB), and adopting technologies to streamline non-financial reporting. Additionally, regulators and standard-setters could provide further guidance to help firms balance the requirements of detailed financial reporting with the need for straightforward and transparent ESG disclosures. Clear and accessible ESG information is crucial for maintaining stakeholder trust, meeting regulatory requirements, and enhancing a firm's reputation. Overall, to mitigate these effects, firms need to adopt effective strategies that simplify and enhance the quality of ESG disclosures, ensuring that they meet stakeholder expectations and contribute to sustainable corporate practices.

The study has significant implications for that wide spectrum of stakeholders. Investors, especially those integrating ESG factors into their decision-making processes, are significantly affected by the reduced quality of environmental and overall ESG disclosures due to accounting reporting complexity. The diminished transparency hinders investors' ability to accurately assess a firm's sustainability performance, making it more challenging to evaluate long-term risks and opportunities tied to environmental and governance factors. For regulators, the study highlights the potential need for additional guidelines to help firms balance complex financial reporting requirements with the need for clear ESG disclosures. Regulatory bodies may need to push for simplified or separate ESG disclosure frameworks to ensure that sustainability information remains transparent and accessible, even in firms dealing with intricate accounting systems. Credit rating agencies, which often rely on comprehensive ESG data to assess the risk profile of companies, are also impacted. The negative effect on environmental disclosures limits their ability to evaluate how environmental risks may affect the firm's creditworthiness, potentially leading to less informed credit ratings that fail to reflect a firm's true risk profile. Employees are affected by inadequate ESG disclosures, particularly in the social and environmental domains. Transparent reporting on a firm's environmental practices and social policies can influence employee morale, engagement, and attraction. Reduced transparency may lead to distrust or misalignment between employee expectations and company practices, particularly when workers place a high value on sustainability.

Local communities and the general public have an increasing interest in corporate environmental performance. Complex financial reporting that results in poor environmental disclosure limits the public's ability to understand the environmental impact of a company's operations. This lack of transparency can affect public perception and hinder community relations, especially in cases where a company operates in sensitive areas or industries. Non-governmental organizations (NGOs) and advocacy groups that focus on environmental and social issues rely heavily on corporate disclosures to monitor and hold companies accountable for their practices. Reduced transparency due to accounting reporting complexity makes it more difficult for these organizations to assess a company's true impact and advocate improvements in sustainability practices. Moreover, institutional investors and shareholder activists, who often push for improved ESG practices, are directly impacted by the difficulty in accessing clear ESG information. This reduced transparency creates additional costs for these stakeholders, who must invest more resources into understanding a firm's sustainability initiatives and may increase activist efforts to pressure companies for better, clearer disclosures. Customers are also affected, as they increasingly factor sustainability into their purchasing decisions. Poor environmental disclosure can affect customer trust and loyalty, especially for consumers who prioritize environmentally responsible products and services. When companies fail to communicate their environmental impact clearly due to reporting complexity, they risk losing market share to competitors with more transparent sustainability practices.

Lastly, the board of directors and executive management need clear and accessible ESG information to make informed strategic decisions. The complexity in financial reporting may obscure critical environmental data, reducing their ability to effectively guide corporate strategy toward sustainability and stakeholder engagement. This can ultimately affect the firm's strategic alignment with its long-term sustainability goals. Overall, the findings of the study imply that a wide spectrum of stakeholders, ranging from investors and regulators to communities and customers, are negatively affected by the obfuscating impact of accounting reporting complexity on ESG disclosures. Addressing these challenges is crucial to ensuring transparency and fulfilling the informational needs of diverse stakeholder groups.

This study has several limitations which constitute avenues for future research. First, the study focuses primarily on the direct relationship between accounting reporting complexity and ESG disclosure, without considering the potential mediating or moderating effects of other factors such as firm culture, industry regulations, or technological capabilities. Future research could incorporate these elements to gain a more nuanced understanding of how different organizational and contextual factors interact with accounting reporting complexity to influence ESG transparency. Furthermore, this study is limited to examining overall ESG disclosure without distinguishing between mandatory and voluntary disclosures. Future research could investigate whether the impact of accounting reporting complexity differs between required ESG disclosures and voluntary ones, as firms may be more likely to strategically manage voluntary reporting. Also, future researchers could extend the investigation of accounting reporting complexity to explore its impact on other types of corporate disclosure beyond ESG reporting. For instance, examining the effect of accounting reporting complexity on cybersecurity disclosure could provide insights into how firms manage and communicate critical information related to risk management in a highly technical area. Similarly, human capital disclosure, which includes details on employee well-being, training, diversity, and retention, could also be explored. The relationship between accounting reporting complexity and transparency in these areas could reveal whether the intricacies of financial reporting similarly obscure the clarity and comprehensiveness of such disclosures, particularly those related to intangible assets and internal risk management. Besides,

another promising avenue for future research is to explore the impact of accounting reporting complexity on firms' ability to obtain external financing. More complex financial reports may create challenges for lenders, investors, and rating agencies in assessing a firm's creditworthiness. This, in turn, could affect a firm's ability to secure loans or negotiate favorable terms for debt. Future studies could investigate whether firms with more complex accounting disclosures face higher borrowing costs or stricter conditions due to the difficulty that lenders face in evaluating financial health accurately. The impact of reporting complexity on debt maturity structure, interest rates, and loan covenants could also be areas of focus, providing insights into how the intricacy of financial disclosures affects firms' financing options and terms.

Additionally, future research could examine whether accounting reporting complexity influences the firm's ability to attract equity investors. It would be valuable to understand whether the opacity caused by complex reporting discourages investment from institutional investors who prioritize transparency, particularly in emerging markets where information asymmetry is already high. Such research could further explore whether accounting reporting complexity affects firms' ability to raise capital through initial public offerings (IPOs), potentially deterring investor interest due to the increased difficulty in evaluating company fundamentals. Finally, another interesting direction for future research would be to investigate the impact of accounting reporting complexity on internal decision-making processes and managerial efficiency. Complex financial reports could lead to inefficiencies within the organization, affecting the speed and quality of managerial decisions. Understanding how this complexity impacts strategic decision-making, investment opportunities, and overall corporate performance would provide a more holistic view of the consequences of accounting reporting intricacies.

References

Abeysekera, I., F. Li, and Y. Lu. 2021. "Financial Disclosure Quality and Sustainability Disclosure Quality. A Case in China." *PLoS One* 16, no. 5: e0250884.

Al Amosh, H. 2024a. "From Home to Boardroom: Marital Status and Its Influence on ESG Disclosure." *Business Strategy & Development* 7, no. 3: e402.

Al Amosh, H. 2024b. "Exchange Rate Volatility and ESG Performance: An International Empirical Analysis." *Journal of Corporate Accounting and Finance*. https://doi.org/10.1002/jcaf.22774.

Al Amosh, H. 2025. "The Role of Gender Diversity in Shaping Green Collaborations and Firm Financial Success." *Gender in Management*. https://doi.org/10.1108/GM-03-2024-0125.

Alharasis, E. E. 2025. "The Implementation of IFRS Electronic Financial Reporting—XBRL and Usefulness of Financial Information: Evidence From Jordanian Finance Industry." *International Journal of Law and Management*. https://doi.org/10.1108/IJLMA-07-2024-0233.

Alshamali, M. 2020. "Assessment of Implementation of Green Buildings Strategies: Syria Case Study." *Jordan Journal of Applied Science - Natural Science Series* 14, no. 1. https://doi.org/10.35192/jjoas-n.v14i1.1603.

Auer, B. R., and F. Schuhmacher. 2016. "Do Socially (Ir) Responsible Investments Pay? New Evidence From International ESG Data." *Quarterly Review of Economics and Finance* 59: 51–62.

Beerbaum, D., M. Piechocki, and J. M. Puaschunder. 2019. "Measuring Accounting Reporting Complexity With Customized Extensions XBRL–A Behavioral Economics Approach." *Journal of Applied Research in the Digital Economy (JADE)* 1, no. 3: 4–42.

Benyaminova, A., M. Mathews, P. Langley, and A. Rieple. 2019. "The Impact of Changes in Stakeholder Salience on Corporate Social Responsibility Activities in Russian Energy Firms: A Contribution to the Divergence/Convergence Debate." *Corporate Social Responsibility and Environmental Management* 26, no. 6: 1222–1234.

Brown, N. C., A. A. Huffman, and S. Cohen. 2023. "Accounting Reporting Complexity and Non-GAAP Earnings Disclosure." *Accounting Review* 98, no. 6: 37–71.

Bushee, B. J., I. D. Gow, and D. J. Taylor. 2018. "Linguistic Complexity in Firm Disclosures: Obfuscation or Information?" *Journal of Accounting Research* 56, no. 1: 85–121.

Cahan, S. F., S. Chang, W. Z. Siqueira, and K. Tam. 2022. "The Roles of XBRL and Processed XBRL in 10-K Readability." *Journal of Business Finance & Accounting* 49, no. 1–2: 33–68.

Calvo, N., and F. Calvo. 2018. "Corporate Social Responsibility and Multiple Agency Theory: A Case Study of Internal Stakeholder Engagement." *Corporate Social Responsibility and Environmental Management* 25, no. 6: 1223–1230.

Chen, X., Y. Zhang, and L. Li. 2023. "The Impact of Accounting Complexity on Audit Quality." *Journal of Financial Reporting and Accounting* 21, no. 1: 67–85.

Cormier, D., P. Teller, and D. Dufour. 2022. "The Relevance of XBRL Extensions for Stock Markets: Evidence From Cross-Listed Firms in the US." *Managerial Finance* 48, no. 5: 689–705.

Dao, M., and H. Xu. 2024. "Shareholder Activism and Accounting Reporting Complexity." *Journal of Accounting Literature* 46, no. 1: 121–149. https://doi.org/10.1108/JAL-11-2022-0122.

Dash, T., and C. K. Sahoo. 2024. "Indian Mining Industry: A Balancing Act? Social Accounting and the Path to Sustainable Corporate Social Responsibility." *Corporate Social Responsibility and Environmental Management* 32: 1–14. https://doi.org/10.1002/csr.2968.

Duellman, S., J. P. Klaus, and B. B. Marquardt. 2025. "Accounting Reporting Complexity as a Source of Insider Information Advantage: Evidence From Insider Trades." *Journal of Business Finance and Accounting*. https://doi.org/10.1111/jbfa.12845.

El-Feel, H. W. T., D. M. Mohamed, H. M. Amin, and K. Hussainey. 2024. "Can CSR Constrain Accruals and Real Earnings Management During the COVID-19 Pandemic? An International Analysis." *Journal of Financial Reporting and Accounting* 22, no. 1: 79–104.

Eng, L. L., M. Fikru, and T. Vichitsarawong. 2022. "Comparing the Informativeness of Sustainability Disclosures Versus ESG Disclosure Ratings." *Sustainability Accounting, Management and Policy Journal* 13, no. 2: 494–518.

Faccia, A., F. Manni, and F. Capitanio. 2021. "Mandatory ESG Reporting and XBRL Taxonomies Combination: ESG Ratings and Income Statement, a Sustainable Value-Added Disclosure." *Sustainability* 13, no. 16: 8876.

Gazzola, P., R. Pezzetti, S. Amelio, and D. Grechi. 2020. "Non-Financial Information Disclosure in Italian Public Interest Companies: A Sustainability Reporting Perspective." *Sustainability* 12, no. 15: 6063.

Greiner, M., and J. Sun. 2021. "How Corporate Social Responsibility Can Incentivize Top Managers: A Commitment to Sustainability

as an Agency Intervention." *Corporate Social Responsibility and Environmental Management* 28, no. 4: 1360–1375.

Healy, P. M., and K. G. Palepu. 2001. "Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature." *Journal of Accounting and Economics* 31, no. 1–3: 405–440.

Hichri, A. 2023. "Audit Quality, Value Relevance, Integrated Reporting and the Moderating Role of Business Ethics: Evidence From European ESG Firms." *Review of Accounting and Finance* 22, no. 5: 663–681.

Hoai, T. T., N. N. Minh, H. V. Van, and N. P. Nguyen. 2023. "Accounting Going Green: The Move Toward Environmental Sustainability in Vietnamese Manufacturing Firms." *Corporate Social Responsibility and Environmental Management* 30, no. 4: 1928–1941. https://doi.org/10.1002/csr.2464.

Hoitash, R., and U. Hoitash. 2018. "Measuring Accounting Reporting Complexity With XBRL." *Accounting Review* 93, no. 1: 259–287.

Hoitash, R., U. Hoitash, and A. Yezegel. 2021. "Can Sell-Side Analysts' Experience, Expertise and Qualifications Help Mitigate the Adverse Effects of Accounting Reporting Complexity?" *Review of Quantitative Finance and Accounting* 57: 859–897.

Issa, A., and J. R. Hanaysha. 2023. "Breaking the Glass Ceiling for a Sustainable Future: The Power of Women on Corporate Boards in Reducing ESG Controversies." *International Journal of Accounting and Information Management* 31, no. 4: 623–646.

Jensen, M. C., and W. H. Meckling. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of Financial Economics* 3: 305–360.

Johnstone, L. 2018. "Environmental Management Decisions in CSR-Based Accounting Research." *Corporate Social Responsibility and Environmental Management* 25: 1212–1222. https://doi.org/10.1002/csr.1632.

Kamal, Y. 2021. "Stakeholders Expectations for CSR-Related Corporate Governance Disclosure: Evidence From a Developing Country." *Asian Review of Accounting* 29, no. 2: 97–127.

Levine, T. R., and S. A. McCornack. 2001. "Information Manipulation Theory." *Communication Theory* 11, no. 4: 414–428.

Maiyarni, R., S. Utama, C. D. Djakman, and A. F. Mita. 2024. "How Does Financial Reporting Quality Mediate ESG Performance to Investment Efficiency?" *International Journal of Ethics and Systems*. https://doi.org/10.1108/IJOES-06-2024-0157.

Manita, R., M. G. Bruna, R. Dang, and L. H. Houanti. 2018. "Board Gender Diversity and ESG Disclosure: Evidence From the USA." *Journal of Applied Accounting Research* 19, no. 2: 206–224.

Martínez-Ferrero, J., I. M. Garcia-Sanchez, and B. Cuadrado-Ballesteros. 2015. "Effect of Financial Reporting Quality on Sustainability Information Disclosure." *Corporate Social Responsibility and Environmental Management* 22, no. 1: 45–64.

Miah, M. S., H. Jiang, A. Rahman, and W. Stent. 2020. "Audit Effort, Materiality and Audit Fees: Evidence From the Adoption of IFRS in Australia." *Accounting Research Journal* 33, no. 1: 186–216.

Monciardini, D., J. T. Mähönen, and G. Tsagas. 2020. "Rethinking Non-Financial Reporting: A Blueprint for Structural Regulatory Changes." *Accounting, Economics, and Law: A Convivium* 10, no. 2: 20200092.

Panda, B., and N. M. Leepsa. 2017. "Agency Theory: Review of Theory and Evidence on Problems and Perspectives." *Indian Journal of Corporate Governance* 10, no. 1: 74–95.

Peterson, K. 2012. "Accounting Complexity, Misreporting, and the Consequences of Misreporting." *Review of Accounting Studies* 17: 72–95.

Schiemann, F., and R. Tietmeyer. 2022. "ESG Controversies, ESG Disclosure and Analyst Forecast Accuracy." *International Review of Financial Analysis* 84: 102373.

Stocker, F., M. P. de Arruda, K. M. de Mascena, and J. M. Boaventura. 2020. "Stakeholder Engagement in Sustainability Reporting: A Classification Model." *Corporate Social Responsibility and Environmental Management* 27, no. 5: 2071–2080.

Tawiah, V., and H. Borgi. 2022. "Impact of XBRL Adoption on Financial Reporting Quality: A Global Evidence." *Accounting Research Journal* 35, no. 6: 815–833.

Vitolla, F., N. Raimo, and M. Rubino. 2020. "Board Characteristics and Integrated Reporting Quality: An Agency Theory Perspective." *Corporate Social Responsibility and Environmental Management* 27, no. 2: 1152–1163.

Wahyudi, S. T., K. Sari, R. S. Nabella, and D. D. Zubaidah. 2022. "Improving Bank Efficiency and Reducing Asymmetric Information Through Innovation on Extensible Business Reporting Language." In *Modeling Economic Growth in Contemporary Indonesia*, edited by B. S. Sergi and D. Sulistiawan, 299–317. Emerald Publishing Limited. https://doi.org/10.1108/978-1-80262-431-120221018.