Strategic ESG Discussions in Earnings Calls:

Measurement, Managerial Incentives, and Market Consequences

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A Thesis Submitted to the School of Graduate Studies in Partial Fulfillment of the Requirements for the Degree of DOCTOR OF PHILOSOPHY

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#### Abstract

This thesis explores three questions in separate chapters: 1) What's the patterns and informativeness of ESG discussions in conference calls? 2) How do CEOs use strategic ESG discussions to address their career concerns? 3) How do analysts, as professional market participants, react to ESG discussion in earnings calls?

The first chapter develops a systematic methodology to measure material and nonmaterial ESG discussions in earnings calls. This four-step approach involves: (1) extracting ESG content using an established keyword dictionary, (2) categorizing sentences into 26 ESG metrics with ESG-BERT, (3) classifying topics as material or non-material based on SASB industry standards, and (4) quantifying discussion intensity through word counts. The empirical analysis reveals that material ESG discussions positively correlate with firm value, while non-material discussions inadvertently increase information asymmetry, underscoring the importance of SASB's materiality standards.

The second chapter investigates how CEOs' career concerns influence strategic ESG discussions. Using a prediction model for CEO dismissal probabilities, the study identifies a positive association between heightened career concerns and increased ESG discussions, particularly on material topics. The findings demonstrate that CEOs strategically increase material ESG discussions without corresponding performance improvements, often employing complex language and positive tone. This suggests CEOs leverage ESG discussions to secure their positions by diverting attention from potential career-damaging factors to ESG commitments.

The third chapter examines analysts' responses to ESG discussions through forecast accuracy and dispersion metrics. Material ESG discussions significantly reduce forecast accuracy and increase dispersion, while non-material discussions primarily increase dispersion without affecting accuracy. The linguistic complexity of ESG content, especially non-material discussions, further reduces accuracy and increases dispersion. These findings indicate that despite their theoretical value-relevance, the strategic nature and complexity of ESG discussions create substantial processing challenges for analysts.

Overall, this thesis provides valuable insights into how companies communicate ESG information, their underlying motivations, and market participants' responses. The findings contribute to academic discourse while offering practical implications for improving ESG communication and analysis in financial markets.

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#### Introduction

The growing emphasis on Environmental, Social, and Governance (ESG) factors has influenced ESG disclosure in corporate communications, particularly in earnings calls where managers have considerable discretion in their disclosures. While existing research has extensively examined structured ESG reporting through sustainability reports and regulatory filings (e.g., Dhaliwal et al., 2011, 2012; Muslu et al., 2019), less attention has been paid to how managers strategically discuss ESG topics during earnings calls and how market participants process this information. This thesis addresses this gap by examining three interconnected aspects of ESG discussions in earnings calls: their measurement and informativeness, their use as a strategic tool by CEOs facing career concerns, and their impact on analyst response.

The first chapter develops a systematic methodology for measuring material and non-material ESG discussions in earnings calls and provides the patterns and informativeness of these discussions. While previous research has examined ESG disclosures in structured reports such as sustainability reports and 10-K filings, earnings calls provide a unique setting where managers have considerable discretion in what they discuss and how they frame it (Brown et al., 2004; Heinrichs et al., 2019; Jung et al., 2018). This high level of discretion necessitates effective methodologies for analyzing such communications to accurately capture their ESG content. The chapter introduces a novel four-step approach that combines established ESG keyword dictionaries (Baier et al., 2020) with state-of-the-art machine learning techniques to identify, categorize, and quantify material and non-material ESG discussions. Using a comprehensive sample of 158,990 earnings call transcripts from 2005 to 2022, my study reveals that while ESG discussions constitute about 22% of earnings call content, non-material issues (17% of total content) significantly outweigh material ones (5% of total content). Moreover, material ESG discussions are positively associated with firm value, while non-material ESG discussions crowd out material financial information that is valuable to stakeholders, increasing information asymmetry. This chapter establishes a novel methodology for exploring the incentives and consequences of strategic ESG discussion in subsequent chapters and provides empirical evidence supporting the importance of ESG materiality standards.

The second chapter examines how CEOs strategically use ESG discussions to address career concerns. This investigation is motivated by the growing societal and regulatory pressure for ESG engagement, which may incentivize CEOs to use ESG discussions as a strategic tool to address career concerns rather than a reflection of genuine commitment. Using the methodology developed in Chapter 1 and a prediction model for CEO dismissal, I examine how career concerns influence both the quantity and quality of ESG discussions. The findings reveal that CEOs with greater career concerns have significantly more material ESG discussions. Moreover, these material ESG discussions are often accompanied by the use of complex language or a positive tone without corresponding improvements in future ESG performance. This suggests that CEOs strategically use ESG discussions, particularly material ones, to divert attention from performance concerns, instead of signaling genuine commitment to sustainability initiatives. These findings provide important insights into how managerial incentives shape voluntary ESG communications in earnings calls.

The third chapter examines how analysts, as sophisticated information intermediaries, process and respond to strategic ESG discussions in earnings calls. I chose analysts as the focus for reasons. They play a crucial role in interpreting and disseminating information to investors, making their response to ESG discussions particularly important for market efficiency (Dhaliwal et al., 2012; Gao et al., 2016). Understanding analyst responses provides insights into the consequences of strategic ESG communications. The study examines two dimensions of analyst response: forecast accuracy and dispersion. The findings reveal that material and non-material ESG discussions affect analyst behavior differently. Material ESG discussions significantly reduce forecast accuracy and increase forecast dispersion, while non-material ESG discussions increase dispersion without significantly affecting accuracy. Further analysis shows that the linguistic complexity of ESG discussions, particularly non-material ESG discussions, reduces forecast accuracy and increases dispersion. However, a firm's actual ESG performance does not moderate the effect of ESG discussions on analyst forecast properties. These patterns suggest that while material ESG information should theoretically improve forecast accuracy by providing value-relevant information, the strategic usage and complexity of these discussions create significant processing challenges for analysts facing limited attention constraints. The findings enhance our understanding of how key market intermediaries

process different types of ESG information and highlight the challenges in incorporating ESG discussions into financial forecasts.

This thesis makes several important contributions to both academic literature and practice. First, it establishes a comprehensive methodology for measuring ESG communications in earnings calls, providing researchers with tools to examine strategic disclosure in various contexts. Second, it enhances our understanding of ESG materiality by demonstrating how material and non-material ESG discussions differently affect firm value, managerial behavior, and market participants. Third, it provides new evidence on the strategic usage of ESG communications, revealing how managers may use such discussions to address personal career concerns rather than signal genuine commitment. Finally, it offers insights into how key market intermediaries process and respond to different types of ESG information in earnings calls, highlighting the challenges in incorporating ESG factors into financial analysis.

The findings also have significant implications for various stakeholders. For investors and analysts, my results underscore the importance of distinguishing between material and non-material ESG discussions and recognizing potential strategic motivations behind ESG communications. For regulators and standard setters, they validate the importance of materiality frameworks while highlighting the need for continued development of ESG disclosure standards. For companies, they suggest the need to balance strategic communications with genuine ESG commitment to maintain credibility with stakeholders. The rest of the thesis is organized as follows. Chapter 1 develops and validates a comprehensive methodology for measuring material and non-material ESG discussions in earnings calls. Chapter 2 examines how CEO career concerns influence strategic ESG discussions. Chapter 3 investigates how analysts respond to different types of ESG discussions. The final section concludes with implications for research and practice.

#### Chapter 1: Strategic ESG discussions in earnings call

# 1.1 Introduction

The growing emphasis on ESG issues in corporate communications has led to an increase in ESG-related disclosures during earnings calls. While these disclosures can provide valuable insights into a firm's ESG commitment, the distinction between material and non-material ESG information remains a critical challenge for stakeholders (Grewal et al., 2021; Khan et al., 2016). This study follows SASB's materiality framework to develop a methodology for measuring and analyzing material and non-material ESG discussions in earnings calls, addressing a significant gap in our understanding of voluntary ESG communications.

This study introduces a four-step methodology for analyzing ESG discussions in earnings calls: (1) extracting ESG content using an established keyword dictionary (Baier et al., 2020), (2) categorizing sentences into 26 ESG metrics using ESG-BERT, (3) classifying ESG topics as material or non-material based on SASB industry standards, and (4) quantifying discussion intensity through word counts. Using this framework, I analyze a comprehensive sample of 158,990 earnings call transcripts from 2005 to 2022, providing new insights into the patterns and implications of material versus non-material ESG discussions.

The empirical findings reveal several important patterns. First, material ESG discussions are positively associated with firm value. Second, non-material ESG

discussions crowd out material financial information that is valuable to stakeholders, increasing information asymmetry. Third, there is significant variation in ESG emphasis across industries, with some sectors showing notable gaps between their ESG relevance and communication focus. Last, the analysis demonstrates that firms have increased their material ESG disclosures over time, particularly following the introduction of SASB standards in 2018.

This chapter makes several contributions to literature. First, it extends the growing body of research on ESG disclosures by providing a systematic approach to measuring and differentiating between material and non-material ESG communications in earnings calls. While previous studies have focused primarily on structured reports and financial statements (Dhaliwal et al., 2011, 2012; Muslu et al., 2019), this study offers new insights into ESG communications through earnings calls. Second, it contributes to our understanding of ESG materiality by empirically investigating the relevance of SASB's materiality classification in the context of voluntary disclosures. Given the mixed evidence regarding the impact of material ESG disclosures on firm performance (e.g., Burzillo et al., 2023; Grewal et al., 2021), this study provides new evidence in the context of earnings call communications. Third, the methodology developed in this study offers a robust framework for future research examining the strategic usage of ESG communications in various corporate settings.

The findings have important implications for both research and practice. For researchers, the methodology provides a replicable framework for analyzing ESG

communications across different contexts. For practitioners, including investors and analysts, the results highlight the importance of distinguishing between material and nonmaterial ESG disclosures when evaluating firm communications. Moreover, the findings suggest that regulators and standard setters should continue to emphasize the importance of material ESG disclosures while being mindful of the potential for information noise from non-material ESG discussions.

The rest of the chapter is organized as follows. Section 1.2 reviews the literature regarding ESG disclosures materiality and measurement. Section 1.3 develops a four-step methodology for measuring ESG discussions. Section 1.4 presents statistics of ESG discussions in earnings call. Section 1.5 empirically validates the measures through tests of value relevance and information asymmetry. Section 1.6 discusses the implications for research and practice.

#### **1.2** Literature review

#### **1.2.1 ESG disclosures in earnings calls**

Earnings calls have become a popular direct communication channel between corporate executives and outside investors and analysts since the 2000s. A substantial body of literature has demonstrated that earnings calls significantly reduce information asymmetry over the long term for market participants, including investors and analysts (Brown et al., 2004; Heinrichs et al., 2019; Jung et al., 2018). Unlike formal ESG disclosures in CSR reports and periodic SEC filings, ESG information provided in earnings calls is subject to managerial discretion and much less likely influenced by third-party ESG ratings and regulatory mandates.

Recent advancements in textual analysis enable the extraction and processing of nuanced information from earnings calls, such as tone, sentiment, and specific ESG-related insights that go beyond numerical data. Many studies on particular ESG-related topics (e.g., climate risk exposure) either manually create comprehensive keyword dictionaries or employ machine learning algorithms to assess climate risk by analyzing the frequency of related bigrams within the transcripts (Lin et al., 2024; Sautner et al., 2023). However, relatively few studies have explored the overall ESG disclosures in earnings calls.

#### **1.2.2 Measurement of ESG disclosures**

The measurement of ESG disclosure has evolved considerably over time in academic literature. Early studies primarily employed binary measures to capture whether firms make voluntary or mandatory ESG disclosures. Seminal examples include Dhaliwal et al. (2011, 2012), who measure ESG disclosure through the presence of standalone sustainability reports. Several studies have examined mandatory disclosure regimes, for example, Bernardi and Stark (2018) analyze the impact of South Africa's Integrated Reporting requirements on analyst forecast accuracy, Chen et al. (2018) study the impact of China's mandatory CSR disclosure on firm profitability and social externalities, and Krueger et al. (2024) investigate the mandatory ESG disclosure effects globally.

The literature then progressed to more nuanced measurement approaches using standardized ESG disclosure scores from third-party ESG rating agencies. The most widely

used measure is the Bloomberg ESG disclosure score (e.g., Tan et al., 2020; Yoo & Managi, 2022), though researchers also utilize other data sources like the GRI database (e.g., Rezaee & Tuo, 2019) and country-specific ratings such as those provided by the Netherlands' Ministry of Economic Affairs (e.g., Gao et al., 2016).

Another common approach in recent years involves content analysis of corporate reports and financial statements, which has evolved from manual to automated techniques. Early content analysis relied on manual coding of ESG-related information (e.g., Al-Tuwaijri et al., 2004; Ingram & Frazier, 1980; Ryou et al., 2022). This approach has been complemented by various computer-assisted textual analysis techniques. These include developing disclosure indices based on characteristics like tone, readability, and length (e.g., Muslu et al., 2019), as well as advanced machine learning approaches ranging from basic bag-of-words methods (Sautner et al., 2023) to more sophisticated techniques like word embedding (Lin et al., 2024) and BERT-based classification (Kölbel et al., 2024). As Li (2025) summarizes, these computer-assisted textual data from sources such as annual reports, earnings calls, and other corporate disclosures to create quantitative measures of ESG-related information.

#### **1.2.3 Disclosure of Material ESG**

Although there is abundant research on ESG disclosures, evidence of the determinants and consequences of disclosing material ESG is relatively limited. Several studies have examined this area basing on SASB's ESG materiality frame work with mixed

results. Khan et al. (2016) find that firms with strong performance on material ESG issues deliver higher one-year-ahead stock returns than those with poor performance. Building on this, Grewal et al. (2021) constructed a material ESG disclosure score based on SASB classification and Bloomberg ESG disclosure scores, observing greater stock price informativeness associated with material ESG disclosures. Similarly, Serafeim and Yoon (2023) report that stock prices increase in response to good news about material ESG issues. Singh et al. (2023) discovered a positive association between firm value and the disclosure of material ESG issues in earnings calls, while noting a negative association for the disclosure of non-material ESG issues. However, some contradictory evidence exists. Interviews conducted by Campbell and Slack (2011) suggest that investment professionals, such as analysts, tend to treat environmental narratives as perfunctory. Burzillo et al. (2023) find no stock market reactions to SASB-compliant sustainability reports. They argue from another perspective that it may be too narrow to focus only on financial materiality in ESG disclosures.

Overall, the current literature on ESG disclosures has primarily focused on structured reports, such as annual and sustainability reports, leaving a notable gap in understanding the distinction between material and non-material ESG information in earnings calls. Since earnings calls provide managers with significant discretion and face minimal regulatory oversight, investigating the determinants and consequences of material versus non-material ESG disclosures in this context presents an important research opportunity.

# 1.3 Measuring ESG discussion

I implement the following steps to construct my ESG discussion measures: 1) identify and extract ESG-related content in sentences from earnings call transcripts, 2) label sentences into one of the 26 ESG metrics, 3) identify material and non-material ESG metrics for firms in each industry, and 4) calculate the proportion of words from material and non-material ESG-related sentences relative to the total word count of the earnings call transcripts.

#### **1.3.1** Extracting ESG-related content

Step 1 involves identifying and extracting ESG-related content from earnings call transcripts. Since these transcripts often contain a diverse range of topics, it is crucial to isolate and focus on ESG-specific content to enhance the efficiency and effectiveness of my analysis. For this purpose, I employ the widely used keyword identification method developed by Baier et al. (2020). Baier et al. (2020) developed an ESG keyword dictionary consisting of 491 terms derived from textual analyses of 10-K reports and proxy statements. <sup>1</sup> This dictionary categorizes keywords into three primary themes—environmental, social, and governance—and further divides them into 10 categories and 40 subcategories. This comprehensive dictionary has been widely used in prior ESG disclosure research (e.g., Loughran et al., 2023; Preuss & Max, 2023). In my application

<sup>&</sup>lt;sup>1</sup> Baier et al. (2020) originally created a list with 482 ESG keywords. In 2022, they updated the list to 491 keywords by incorporating additions from Loughran et al. (2023). The ESG dictionary is available at: https://docs.google.com/spreadsheets/d/1HIB41wwdlOtci-DtPvfXSeWBM\_Or5PT/edit#gid=308108779

of Baier et al. (2020)'s method to identify ESG-related content in earnings call transcripts, I use a stringent selection criterion that a sentence must include at least one exactly matched term from the ESG dictionary. This minimizes noises in content filtering and enhances the performance of text classification because basic substring checks often capture irrelevant content based on my own review of the selection outcome.

#### **1.3.2 Identifying ESG metrics**

Step 2 classifies the filtered ESG-related earnings call content into more detailed metrics based on a comprehensive framework defined by the Sustainability Accounting Standards Board (SASB). The SASB's standards identify a broad range of sustainabilityrelated risks and opportunities, and group them into five categories: Environment, Social Capital, Human Capital, Business Model and Innovation, and Leadership and Governance. These categories are further delineated into 26 ESG metrics by the SASB (as shown in Appendix 1A) that are applicable across various industries.

I use ESG-BERT, a fine-tuned pre-trained language model, to categorize each extracted sentence into one of the 26 ESG metrics. Originally developed for sustainable investing, ESG-BERT is a derivative of Google's BERT model but is specifically trained on a large corpus of unstructured sustainability texts.<sup>2</sup> ESG-BERT adeptly handles the unique vocabulary associated with sustainability issues and achieves accurate text

<sup>&</sup>lt;sup>2</sup> The authors do not specify the training text they used. However, according to the article, sustainability reports and news articles might be employed. The ESG-BERT model is available at: <u>https://huggingface.co/nbroad/ESG-BERT</u>

classification with an F-1 score<sup>3</sup> of 0.90. This performance is noteworthy when compared with the general BERT model, which scored 0.79, and the sci-kit learn approach—a popular NLP model for textual analysis—with a score of 0.67 (Mukherjee, 2020). It provides investors with deeper and more accurate insights into ESG-related issues (Mukherjee, 2020; Singh et al., 2023) and, therefore, is a powerful tool for analyzing sustainability-related textual content.

# 1.3.3 Classifying material and non-material ESG content

In Step 3, I distinguish between material and non-material ESG content for further analysis. Based on the 26 ESG metrics, the SASB further defines industry-level material ESG metrics, that is, sustainability-related risks and opportunities that are most likely to affect cash flows, access to finance, and cost of capital for respective industries.<sup>4</sup> The SASB employs the Sustainable Industry Classification System (SICS), which contains 77 industries. However, a direct mapping between the SASB's SICS and other common industry classification systems does not exist. Following prior literature (e.g., Ahn et al., 2024; Singh et al., 2023), I manually map the SICS to the Global Industry Classification Standard (GICS). GICS is a contemporary and globally oriented framework designed to improve research and asset management processes in the financial sector and is relevant

<sup>&</sup>lt;sup>3</sup> The F-1 score has a value between 0 and 1, with 1 indicating perfect performance. This score is commonly used in classification tasks to assess a model's accuracy and precision.

<sup>&</sup>lt;sup>4</sup> Detailed information on SASB standard is available at: <u>https://sasb.ifrs.org/standards/materiality-finder/.</u>

for investors and businesses focusing on sustainability issues.<sup>5</sup> I verify the mapping by cross-referencing the sample firms' GICS codes using the SASB standard company search engine, ensuring accurate and relevant categorization of the industries for the purpose of my research.<sup>6</sup>

I use the materiality map provided by the SASB to determine which of the 26 ESG metrics are material for each specific industry. The SASB offers a materiality finder tool<sup>7</sup>, which facilitates the identification of material ESG metrics for different industries. Using this materiality finder, I label ESG-related sentences as either material or non-material for a firm within its respective industry. Appendix1B lists some examples of material and non-material ESG content examples for different industries.

#### **1.3.4 Quantifying ESG-related content**

In Step 4, I quantify the intensity of ESG-related discussions in earnings calls while differentiating material and non-material ESG-related sentences. Since short sentences and long sentences differ significantly in content substance, I use word count to account for the varying impact of short versus long sentences in addition to sentence count. I calculate the proportions of words from material and non-material ESG-related sentences in an earnings

<sup>6</sup> The SASB standard company searching engine is available at: <u>https://sasb.ifrs.org/standards/download/</u>

<sup>&</sup>lt;sup>5</sup> Information on GICS is available at <u>https://www.spglobal.com/spdji/en/landing/topic/gics/ and the detailed</u> GICS structure is available at <u>https://www.spglobal.com/spdji/en/documents/index-policies/2023-gics-structure-english.xlsx</u>.

<sup>&</sup>lt;sup>7</sup> https://sasb.ifrs.org/standards/materiality-finder/find/

call transcript, respectively, and scale them by the total word count in the entire transcript for the call, presented as a percentage.

Finally, I compute the total ESG discussion score for each earnings call as follows:

 $Total ESG = \frac{word \ counts \ in \ sentences \ identified \ as \ ESG \ related}{total \ word \ count},$ 

the score for material ESG discussions as follows:

 $Material ESG = \frac{word \ counts \ in \ sentences \ identifed \ as \ material \ ESG \ related}{total \ word \ count},$ 

and the score for non-material ESG discussions as follows:

Nonmaterial ESG

# $= \frac{word \ counts \ in \ sentences \ identifed \ as \ nonmaterial \ ESG \ related}{total \ word \ count}.$

# **1.4** Sample description

I collected earnings call transcripts from Seeking Alpha, which covers approximately 4,500 company calls each quarterly earnings season<sup>8</sup>. This comprehensive coverage includes most publicly traded U.S. companies, o offering a clear advantage over audio formats as the transcripts are quicker to consume, accessible at any time, and searchable. From the Seeking Alpha transcript website, I extracted a total of 287,761 conference calls. After removing audio and slides resources, as well as calls that failed to parse HTML, my sample was left with 205,383 transcripts. Since Seeking Alpha uses the

and

<sup>&</sup>lt;sup>8</sup> The SA transcripts are available at: <u>https://seekingalpha.com/author/sa-transcripts</u> <u>https://about.seekingalpha.com/transcripts</u>

company ticker as the sole identifier, and considering that company tickers can change over time, I matched the transcripts with Compustat data using both the ticker and the date, to minimize errors in the matching process. This process resulted in a total of 186,003 conference call transcripts. Focusing solely on earnings calls, I further excluded other types of conference calls, such as those related to leadership transitions and technology conferences. This refinement yielded a final sample of 158,990 earnings calls from the period between Q4 2005 and Q4 2022, averaging 2,773 calls per quarter.

#### 1.4.1 SASB 26 ESG metric distribution

Figure 1.1 illustrates the average emphasis on each of the 26 ESG metrics defined by the SASB during earnings calls within my sample<sup>9</sup>. Notably, the top five metrics— Management of Legal and Regulatory Framework (9%), Systemic Risk Management (6.2%), Business Model Resilience (6%), Competitive Behavior (4.7%), and Product Design and Lifecycle Management (2.3%)—predominantly pertain to the categories of Business Model and Innovation or Leadership and Governance. Conversely, the metrics receiving the least emphasis—Ecological Impacts (0.21%), Waste and Hazardous Materials Management (0.2%), Air Quality (0.14%), and Selling Practices and Product Labeling (0.12%)—fall under Environment and Social Capital categories, with the exception of Critical Incident Risk Management (0.16%) within Leadership and Governance. The Human Capital category generally garners more emphasis compared to

 $<sup>^9</sup>$  The statistic in this figure is based on the sentence proportion instead of word counts in sentence proportion. 17

Social Capital and Environment. These findings suggest a prevailing trend in earnings calls: despite the growing presence of ESG discourse, companies predominantly concentrate on governance-related metrics, rather than on social or environmental metrics.

[Insert Figure 1.1 Mean of ESG 26 Metrics in Earnings Call by Categories]

#### 1.4.2 Material or non-material ESG emphasis

Next, Figure 1.2 shows the long-term trends in ESG emphasis within earnings calls, differentiating between material and non-material concerns. An upward trend is evident across all three categories, with non-material ESG discussions expanding at a more pronounced rate than material ones. On average, ESG topics constitute about 22% of earnings call content, with non-material issues accounting for 17% and material issues for 5%. It indicates that although firms discuss ESG in earnings call, most of their discussions are not material to their own industrial operation based on the SASB standard. A significant peak occurred in 2020, which aligns with an analyst research report<sup>10</sup> that indicates an uptick in ESG discussions in recent years. This surge is possibly attributable to the uncertainties due to the pandemic, which may have spurred more extensive disclosures of ESG information.<sup>11</sup>

[Insert Figure 1.2 Material, Non-material and Total ESG Emphasis Over Time in Earnings Call]

<sup>&</sup>lt;sup>10</sup> The Goldman Sachs Research report is available at: <u>https://www.goldmansachs.com/intelligence/pages/gs-sustain-corporate-commotion-f/report.pdf</u>

<sup>&</sup>lt;sup>11</sup> <u>https://www.irmagazine.com/reporting/opinion-why-you-should-discuss-esg-earnings-call</u>

Figure 1.3 provides a more detailed breakdown by separating ESG discussions across three distinct components of earnings calls – presentations, questions, and answers. This separation is particularly meaningful because the presentation part is prepared in advance by management and allows for greater discretion in strategic communication, whereas the Q&A portions, partially driven by external participants such as analysts and investors, are less prepared, providing less room for manipulation. The patterns reveal striking differences between material and non-material ESG discussions. Most notably, in the material ESG panel, the presentation portion exhibits a sharp upward trend beginning in 2018, aligning with the issuance of ESG materiality standard by the SASB. This timing suggests that managers may have strategically increased their emphasis on material ESG topics in response to the new standardization of ESG materiality. The presentation line shows consistently higher emphasis than both questions and answers, particularly during the post-2018 period, indicating potential strategic behavior in how managers communicate material ESG information. In contrast, the non-material ESG panel shows more consistent levels across all three components, with less pronounced differences between prepared remarks and Q&A sessions, suggesting that non-material ESG discussions face less strategic manipulation and reflect more organic dialogue between management and market participants.

[Insert Figure 1.3 Material and Non-material ESG Emphasis Over Time in Three Parts of Earnings Call]

#### **1.4.3 ESG emphasis industrial distribution**

Further, Figure 1.4 illustrates ESG emphasis across various GICS sectors, highlighting distinct industry approaches to ESG topics during earnings calls<sup>12</sup>. The Utilities sector shows one of the highest total ESG emphases at 28%, with a notably high proportion of non-material ESG discussions (22%), which may reflect the sector's heavy regulation and public service orientation. Similarly, the Health Care sector demonstrates substantial ESG emphasis (29% total), with the highest proportion of material ESG discussions (11%) among all sectors, suggesting strong alignment between ESG factors and core business operations<sup>13</sup>.

Interestingly, the Energy sector, contrary to what might be expected given its environmental impact, the data shows relatively moderate levels of ESG discussion (19% total), with material ESG topics comprising only 6% of discussions. This proportion of material ESG discussion is similar to sectors like Consumer Discretionary and Communication Services, despite the Energy sector facing arguably more direct ESGrelated operational challenges. This pattern might suggest a potential disconnect between the sector's actual ESG impacts and its communication practices in earnings calls.

It is particularly noteworthy that although both academic and industry research indicate that the banking sector is heavily regulated and influenced by ESG issues (e.g., Wang, 2023), the Financials sector in the sample exhibits minimal discussion on material

<sup>&</sup>lt;sup>12</sup> There are 11 sectors under the GICS classification. I combine the Real Estate sector into Financials sector due to their close operational interdependence.

<sup>&</sup>lt;sup>13</sup> <u>https://www.stern.nyu.edu/experience-stern/about/departments-centers-initiatives/centers-of-</u> research/center-sustainable-business/research/research-initiatives/integrating-esg-quarterly-earnings-call

ESG matters (3%). This could imply a gap between regulatory expectations and actual communication practices or perhaps a need for more robust ESG regulatory frameworks within the sector.

These patterns underscore how sectoral differences in ESG emphasis may not always align with the presumed ESG risk exposure of different industries, raising questions about the factors driving ESG communication strategies in corporate earnings calls.

[Insert Figure 1.4 Material, Non-material, and Total ESG by Sector]

# **1.5** Value relevance and informativeness of the measures

After constructing the ESG discussion measures, I examine their impact on firm value and information asymmetry to understand their economic relevance. Prior literature suggests earnings call disclosures serve as important signals to investors about firms' future prospects and risks (Brown et al., 2004). In the context of ESG, material ESG discussions should signal to investors that they are focusing on factors that genuinely impact the firm's model and finances (Singh et al., 2023), while non-material ESG discussions may create noise that impedes price discovery. Testing these relationships provides an assessment of the relevance of the measures while offering new insights into how different types of ESG communications affect market outcomes.

# **1.5.1** Sample statistics

Earnings call transcripts were collected from Seeking Alpha as introduced in Section 3.2. I match the earnings call transcripts data with other data of financial performance from Compustat, analyst following from I/B/E/S, and ESG performance from Refinitiv. The final sample consists of 65,016 firm-year-quarter observations from Q4 2005 to Q4 2022. Table 1 presents the descriptive statistics and correlations of the main test sample. The statistics are comparable with those in previous literature. The average ESGrelated discussion score of an earnings call is 0.211, indicating that, on average, 21.1% of the transcript text for an earnings call is related to ESG topics. With respect to specific material and non-material ESG discussions, about 5.5% of earnings call discussions are related to material ESG topics while 15.6% are related to non-material ESG topics. This indicates that CEOs tend to discuss more non-material ESG topics than material ones in earnings calls.

#### [Insert Table 1.1 Descriptive statistics]

#### 1.5.2 Firm value and ESG discussions

I followed Singh et al. (2023) to test the effect of material and non-material ESG communication on firm value, which is measured by industry-adjusted Tobin's Q (*Tobin's Q\_next*). The test model controls a series of fundamental characteristics including firm size (*Firm Size*), leverage (*Leverage*), loss or not (*Loss*), earnings volatility in the previous twelve quarters (*EPS\_vol*), earnings surprise (*Surprise*), analyst following in the current quarter (*Analyst*), and the ESG score (*ESG\_Score*) in the past fiscal year. The definitions of these variables are listed in detail in Appendix 1C. I also controlled for industry and year-quarter fixed effect, as the material and non-material ESG issues are industry-based classifications. The results in Table 1.2 show that material ESG discussions have a

significant positive association with firm value. A one percent increase in material ESG discussion is associated with a 5.55% increase in Tobin's Q after controlling for firm characteristics. In contrast, non-material ESG discussions show a significant negative relationship with firm value, with a coefficient of -0.79. The larger magnitude of the material ESG coefficient suggests that while markets reward informative ESG disclosures, they penalize non-material discussions less severely. This result is consistent with Singh et al. (2023) that material ESG discussions in earnings call are positively associated with firm value while non-material ESG discussions are negatively associated with firm value. When firms emphasize ESG factors material to their industry, they signal to stakeholders that management are focusing on ESG elements that substantively affect their business model and financial performance, thereby enhancing investor confidence and expectations. Conversely, emphasis on non-material ESG issues may introduce noise that impedes efficient price discovery and suggests suboptimal resource allocation. I will further examine the multifaceted consequences of varying types of ESG disclosures and their implications for market efficiency in Chapter 3.

[Insert Table 1.2 Firm value and ESG discussions]

# 1.5.3 Information asymmetry and ESG discussions

To further examine the value relevance of ESG communications, I investigate their impact on firms' information asymmetry. According to SASB's definition, material ESG information directly impacts a firm's financial position or operational performance, carrying material financial risks. Therefore, material ESG information should provide valuable insights to stakeholders and reduce information asymmetry. In contrast, nonmaterial ESG information, which does not significantly influence a firm's financial position, tends to be redundant and perfunctory. Given the time constraints of earnings calls, non-material ESG discussions may crowd out material financial information that is valuable to stakeholders. Consequently, such non-material ESG discussions may contribute to information noise and increase information processing burden, thus decreasing market efficiency due to investors' and analysts' limited attention.

I use the illiquidity measure constructed by Amihud (2002) to proxy the information asymmetry (see, e.g., Bushee et al., 2018) to examine the roles of material and non-material ESG communication. The illiquidity measure is calculated as follows:

$$Illiquidity_{t+1} = \frac{|R_{t+1}|}{DVolume_{t+1}},\tag{3}$$

where  $R_{t+1}$  is the daily return in next quarter and  $DVolume_{t+1}$  is the daily dollar volume (in millions) in next quarter. I also controll for firm size (*Firm Size*), leverage (*Leverage*), loss or not (*Loss*), earnings volatility in the previous twelve quarters (*EPS\_vol*), and earnings surprise (*Surprise*), and analyst following in the current quarter (*Analyst*), and the ESG score (*ESG\_Score*) in the past fiscal year. The firm value in the current quarter (*Tobin's Q\_cur*) and industry and year-quarter fixed effects are also controlled. The result is presented in Table 1.3. The results reveal that non-material ESG discussions significantly increase information asymmetry, while material ESG discussions show no significant effect. This finding supports the argument that non-material ESG discussions crowd out
material financial information that is valuable to stakeholders, creating information noise that impedes price discovery.

[Insert Table 1.3 Information asymmetry and ESG discussions]

Collectively, these results demonstrate that the nature of ESG discussions matters significantly for market outcomes. Material ESG discussions appear to enhance firm value without increasing information asymmetry, suggesting they provide valuable information to market participants. In contrast, non-material ESG discussions not only reduce firm value but also impair market quality by increasing information asymmetry.

# 1.6 Discussions

This chapter provides a comprehensive examination of ESG discussions in earnings calls, offering several important insights about how firms communicate ESG information and its value implications. The methodological framework effectively identifies and differentiates between material and non-material ESG communications, revealing several key patterns in corporate disclosure practices.

First, the descriptive analysis shows that companies emphasize material and nonmaterial ESG issues differently in their earning call communications, with notable variations across the environmental, social, and governance categories. While firms provide extensive non-material ESG discussions, they are also increasing their material ESG disclosures over time, likely in response to evolving regulatory standards and investor demands. The findings reveal that governance-related topics (such as Management of Legal and Regulatory Framework, Systemic Risk Management, and Business Model Resilience) dominate earnings call discussions, while environmental metrics receive relatively less attention. This pattern suggests a potential misalignment between firms' communication focus and the growing regulators' and investors' demand for environmental and social information. Moreover, industry-level distribution reveals notable gaps between firms' actual ESG relevance and their communication focus, highlighting the need to examine sector-specific disclosure practices.

Second, the empirical analysis validates that material and non-material ESG discussions show differential value relevance. Material ESG discussions have a strong positive association with firm value, suggesting that investors value relevant ESG information that directly impacts financial performance. This finding supports the argument that effective communication of material ESG information helps investors better assess firm value and future prospects. In contrast, non-material ESG discussions are associated with lower firm values, indicating that markets penalize firms for focus on non-material ESG topics. This negative market reaction likely reflects investor concerns about management distraction and resource misallocation.

Third, the information asymmetry analysis provides novel insights into how different types of ESG discussions associate with market efficiency. The finding that nonmaterial ESG discussions significantly increase stock illiquidity while material ESG discussions show no such effect suggests that the nature of ESG discussion matters for market efficiency. This result supports the theoretical argument that non-material ESG discussions can create information noise that crowds out more valuable information, making it harder for market participants to assess firm value. The absence of a significant relationship between material ESG discussions and illiquidity indicates that providing relevant ESG information does not impair market quality, suggesting managers can meet stakeholder demand for ESG information through focused and material disclosures.

These findings have important implications for multiple stakeholders. For managers, the results suggest a need to carefully balance ESG communication strategies material ESG discussions can enhance firm value, and more focus on non-material issues may be counterproductive. For investors, the findings highlight the importance of distinguishing between material and non-material ESG disclosures when evaluating firm communications. And for policymakers, the results underscore the necessity for ESG materiality standards of SASB, supporting the continued development of materiality-based frameworks while suggesting caution about broader ESG disclosure mandates that might incentivize non-material discussions.

Overall, this chapter advances our understanding of how firms communicate ESG information by developing comprehensive measures that distinguish between material and non-material ESG discussions in earnings calls. The subsequent chapters build on this framework to investigate the determinants for strategic ESG discussions during earnings calls and their impact on stakeholder perceptions.

### Chapter 2: Strategic ESG discussion and CEO career concerns

# 2.1 Introduction

Societal demand and regulatory pressure have increasingly compelled companies to address Environmental, Social, and Governance (ESG) issues. Recent regulations encourage firms to disclose more ESG information, thereby promoting greater engagement in ESG issues<sup>14</sup>. Beyond structured ESG information disclosures, such as sustainability reports and ESG components in annual reports, the literature shows an overall increase in ESG-related discussions during earnings calls (Tsang et al., 2023). While such discussions may signal a firm's commitment to long-term ESG strategies, they can also devolve into mere rhetoric, providing limited information to stakeholders (Bingler et al., 2024). This study posits that CEOs strategically increase ESG discussions during earnings calls to enhance job security. Elaborate but insubstantial ESG discussions allow CEOs to shift investors' attention away from unimpressive short-term financial performances to a perceived commitment to long-term, sustainable strategies, thereby deflecting stakeholder scrutiny and securing their own positions. In this study, I explore the relationships between

<sup>&</sup>lt;sup>14</sup> Over the past two decades, several initiatives and regulations have emerged to encourage firms to disclose more ESG information. In 2004, the Global Reporting Initiative (GRI) was founded to promote sustainability reporting. In 2013, the International Integrated Reporting Council (IIRC) proposed the Integrated Reporting Framework to foster the integration of sustainability and financial reporting. The Financial Stability Board established the Task Force on Climate-related Financial Disclosures (TCFD) in 2015, which published its recommendations in 2017. In 2018, the Sustainability Accounting Standards Board (SASB) introduced its framework for disclosing financially material ESG information. Most recently, in March 2024, the Securities and Exchange Commission (SEC) adopted a rule requiring public companies to disclose specific climaterelated information in their annual reports. This progression demonstrates the increasing emphasis on ESG disclosure in corporate reporting practices.

ESG discussions during earnings calls and CEOs' career concerns, particularly whether these discussions are strategic.

I focus on earnings call ESG communications and CEOs' career concerns for two reasons. First, examining how CEOs discuss ESG issues in light of career concerns reveals potential strategic manipulation in ESG disclosures. While various stakeholders and regulators advocate for enhanced ESG disclosures, excessive ESG information might lead to information noise and deteriorate the corporate information environment (Krueger et al., 2024). A better understanding of the motivations behind ESG disclosures helps investors and analysts verify whether a firm's ESG initiatives are authentic and truly enhance transparency, responsibility, and accountability. Second, earnings calls provide a powerful setting to explore CEOs' incentives and behaviors in ESG communications. They offer firsthand ESG information that is largely at the discretion of CEOs. ESG discussions in earnings calls are much less structured compared with ESG information in periodic SEC filings or CSR reporting, e.g., disclosures of carbon emissions and extreme local weather events (Sautner et al., 2023). Moreover, unlike third-party ESG ratings and regulatory mandates, earnings call discussions provide more direct and unfiltered insights into CEOs' ESG disclosure strategies (Berg et al., 2022).

Using up-to-date textual analysis techniques, I extract ESG-related contents from earnings call transcripts and classify them as material and non-material based on the Sustainability Accounting Standards Board (SASB) standards. The material ESG issues, as defined by the SASB for each industry, are those factors most likely to impact the financial condition or operating performance of a company. I then use the information to investigate CEOs' ESG discussion behavior during earnings calls. I use a predicted probability of CEO dismissal to quantify the risk that CEOs perceive regarding their job security and use this measure as a proxy for CEOs' career concerns. I use the combined data to investigate the impact of CEO career concerns on their strategic ESG communications.

The results show that CEO career concerns positively correlate with their ESG discussions during earnings calls, particularly those on material ESG topics. This suggests that CEOs strategically use material ESG discussions as a shield when facing heightened career concerns, potentially diverting stakeholders' attention from suboptimal financial performance to the CEO's commitment to ESG in the long run. For robustness, I use the System GMM method to tackle endogeneity concerns and also control for industry peer effects. Further tests suggest that CEOs' elaborate ESG discussions are not driven by a genuine dedication to ESG improvement. Additionally, I find that when discussing ESG, especially material ESG issues, CEOs increase linguistic complexity and adopt a positive tone to mitigate potential concerns about corresponding financial risks.

This study extends the literature on ESG disclosure and has practical implications for industry practices. Despite the growing stream of research on ESG disclosures in structured reporting (e.g., SEC filings, sustainability reporting), evidence of voluntary ESG disclosures in earnings calls and their role in the corporate information environment remains scarce. Given that voluntary ESG disclosures are not extensively regulated, this study provides evidence that CEOs use ESG-related discussions strategically to address their career concerns. This finding highlights the importance for market participants to discern between superficial managerial strategies and genuine ESG engagements.

Furthermore, this study enriches the existing research on ESG materiality, a concept emphasized by the SASB and other regulators, but its relevance has not been extensively examined. By separating material and non-material ESG discussions, this study reveals that CEOs indeed discuss more material ESG issues during earnings calls, despite the associated financial risks. These findings not only support the relevance of the SASB's materiality classification but also suggest that both firms and stakeholders should prioritize these material ESG disclosures.

The study also contributes to the literature on CEO career concerns. Prior research has shown that career concerns may drive CEOs to invest in ESG and use voluntary ESG disclosures as a signaling tool to obtain higher compensation and a better reputation (Chen et al., 2023; Ness & Mirza, 1991). This study contributes to this line of research by directly measuring ESG communications in a setting where CEOs have substantial discretions. The findings show that in the presence of heightened career concerns, CEOs elaborate ESG disclosures without genuine efforts for ESG improvement. This provides further insights into CEOs' disclosure practices under career concerns.

The rest of this chapter is organized as follows. Section 2.2 reviews literature on managerial incentives for ESG disclosures. Section 2.3 develops hypotheses about the relationship between CEO career concerns and ESG discussions. Section 2.4 describes the research design, including the measurement of CEO career concerns and empirical models.

Section 2.4 presents empirical results including baseline test and additional tests. Section 2.6 discusses implications for understanding strategic ESG communications.

### 2.2 Literature review on managerial incentives to ESG disclosures

Managerial incentives to ESG disclosures are explained by three theoretical frames. The resourced-based theory suggests that managers disclose ESG information to gain sustainable competitive advantage. Firms engage in ESG or CSR activities and disclosures to boost corporate reputation and attract ESG-conscious customers and investors (Blacconiere & Patten, 1994; Branco & Rodrigues, 2006; McWilliams & Siegel, 2011).

Agency theory argues that managers may use ESG disclosures in pursuit of selfinterest (Ness & Mirza, 1991). CEOs, especially in their early tenure, may use voluntary CSR reporting as a signaling mechanism to gain investor confidence and personal benefits such as higher compensation and job security (Chen et al., 2023; Chen et al., 2019). Moreover, CEOs encounter less criticism for financial underperformance when emphasizing CSR activities (Shin et al., 2022). Managers facing negative events or poor financial performance have incentives to disclose more or even overstate their ESG commitments, leveraging the positive aspects of ESG disclosures as a buffer against financial setbacks (Blacconiere & Patten, 1994; Chakravarthy et al., 2014; Holder-Webb et al., 2009; Jia et al., 2020).

Impression management theory suggests that managers modify their behavior to align with the industry's norm and the expectations of stakeholders who influence or determine their career advancement (Hooghiemstra, 2000; Merkl-Davies & Brennan, 2007). ESG commitments help improve their relationship with board members, investors, and regulatory authorities who increasingly prioritize sustainability and ethical considerations when evaluating corporate leadership.

### 2.3 Hypothesis development

I propose that CEOs with career concerns have incentives to increase ESG related discussions in earnings calls based on two distinct hypotheses. The signaling hypothesis proposes that ESG discussions in earnings calls is a simple signaling mechanism to gain investor confidence (Chen et al., 2023; Lys et al., 2015). CEOs facing career concerns may use these discussions to demonstrate their competencies and commitment to social responsibility. This effort aims to signal their prospect of future performance and gain a sustainable competitive advantage, thereby addressing their career concerns. On the other hand, the greenwashing hypothesis suggests that ESG discussions in earnings calls is a strategy by CEOs to temporarily earn investors' confidence and avoid punishment due to the current financial underperformance. Both impression management theory and agency theory suggest that CEOs may portray a commitment to ESG to foster relationship with stakeholders who can influence their career advancement, despite not planning to uphold these commitments in future operations. In this context, ESG discussions are leveraged merely as a greenwashing tool to mitigate career concerns. Therefore, following either genuine signaling or strategic greenwashing, CEOs with greater career concerns are likely to engage in more ESG discussions during earnings calls.

However, empirical evidence also points to the potential risk for CEOs who overprioritize ESG initiatives. Hubbard et al. (2017) show that financial performance remains the dominant consideration in CEO evaluations, with CSR playing a secondary role. An excessive focus on CSR in the presence of financial underperformance may paradoxically increase the likelihood of CEO dismissal. Moreover, Burke (2022) documents an elevated dismissal risk for CEOs when firms fail to fulfill their ambitious ESG commitments, underscoring the delicate balance CEOs must strike between financial and ESG priorities. Given the competing arguments, I present my first hypothesis on CEO career concern and ESG discussions in earnings calls in the null form:

**H1:** There is no significant relationship between the level of CEO career concern and the extent of their ESG discussions in earnings calls.

Regarding specific ESG topics, material ESG issues are more likely to directly impact a firm's operational, financial, and strategic aspects than non-material ESG issues. Therefore, discussions about material ESG issues can theoretically provide more valuable insights to stakeholders. These discussions can either more effectively signal a CEO's ability to manage traditional business operations alongside emerging challenges such as sustainability, or they can serve as a more potent greenwashing tool to enhance stakeholders' confidence and address CEOs' career concerns. However, in practice, CEOs can also have incentives to withhold such information. Since material ESG issues usually have material financial risk implications (Freiberg et al., 2020), discussing material ESG issues may reveal vulnerabilities that firms would prefer to withhold from competitors. When a CEO

has career concerns, discussing ESG-related financial risks can exacerbate investors' concerns about performance and lead to further stock price declines, increased cost of capital, or even loss of investor confidence (Flammer et al., 2021). This aligns with Hu (2023), who finds that CEOs with greater career concerns provide less voluntary disclosure to protect their job security. Therefore, I propose the second hypothesis in the null form as follows:

**H2:** There is no significant relationship between the level of CEO career concerns and the extent of their material ESG discussions in earnings call.

### 2.4 Research Design

#### 2.4.1 Measurement of CEO Career Concern

Although previous literature typically uses CEO tenure or compensation contracts to proxy for CEO career concerns, I estimate the probability of CEO dismissal as a measure of career concerns following Çolak and Korkeamäki (2021)'s approach in predicting CEO mobility, which is based on the actual instances of CEO dismissal and provides a more reliable estimate. It effectively addresses challenges such as the small sample size of actual CEO dismissals (only 2.8% in the final sample). Moreover, this approach avoids the potential sample selection bias inherent in actual dismissal measure, which overlooks CEOs who face career concerns but successfully retain their positions. Instead of using the full sample, I use CEO dismissal data over the period from 1992 to 2004 (the estimation period) to estimate this probability and apply the prediction model to the test sample over

the period of 2005 to 2021 (the prediction period). I select 1992-2004 as the estimation period because earnings call data and ESG disclosure both surge around 2005. Since the 2000s, earnings calls have increasingly become a vital tool for corporate communication. Concurrently, the year 2005 marked a pivotal moment for ESG disclosure. This shift was significantly influenced by the "Who Cares Wins" report published by the United Nations Global Compact, which brought ESG issues to the forefront for investors and companies. Therefore, taking the period before 2005 as a training sample for CEO dismissal probability mitigates the concern that CEO dismissal probability is affected by ESG disclosure in earnings call in the estimation period.

$$Log(\frac{CEO\ dismissal_{t}=1}{CEO\ dismissal_{t}=0}) = \alpha + \beta_{1}Firm\ Size_{t-1} + \beta_{2}MTB_{t-1} + \beta_{3}ROA_{t-1} + \beta_{4}CapInvest_{t-1} + \beta_{5}R\&D_{t-1} + \beta_{6}StkComp_{t-1} + \beta_{7}Institutional_{t-1} + \beta_{8}Block_{t-1} + \beta_{9}Duality_{t-1} + \beta_{10}Tenure_{t-1} + \varepsilon_{t}$$
(1)

I use a logistic model to estimate the CEO dismissal following previous literature<sup>15</sup> (Hubbard et al., 2017; Shin et al., 2022), controlling for several determinants identified in previous literature, including firm size, industry-adjusted ROA, market-to-book ratio, capital expenditure, R&D expenditure, CEO stock compensation, CEO duality, CEO tenure, block holding, and institutional holding. The result is reported in Table 2.1. The model shows significant predictive power with a  $\gamma$ 2-value of 129.24.

<sup>&</sup>lt;sup>15</sup> I have also estimated the CEO dismissal probability using hazard model, as used in studies by Hubbard et al. (2017) and Shin et al. (2022). However, since the forecast accuracy of the logistic model surpasses that of the hazard model, I have chosen to use the estimates from the logistic model in my subsequent tests.

[Insert Table 2.1 Forecasting CEO dismissal (*CareerConcern*)]

After estimating CEO dismissal using the training sample from the estimation period, I examine the out-of-sample accuracy of the model. Table 2 reports the percentage of CEO dismissal incidents located in each decile of CEO dismissal probability. The results show that 24.4% of actual CEO dismissal firms have the highest predicted CEO dismissal probability from the logistic model. The model provides a consistent and smooth gradation in the percentage of actual dismissals across probability deciles, showing a gradual increase from 6.4% in the first decile to a significant 24.4% in the 10<sup>th</sup> decile. The result demonstrates the model's ability to effectively differentiate cases with low and high dismissal risk.

[Insert Table 2.2 Forecast Accuracy]

### 2.4.2 Test model

I use the following OLS regression to test my hypotheses:

 $ESG\_discussion_{i,t} = \alpha + \beta \times CareerConcern_{i,t} + \gamma \times Control_{i,t} + Year FE + Industry FE + \varepsilon_{i,t}, \quad (2)$ 

where  $ESG\_discussion_t$  represents total ESG discussion score (*Total\_ESG*), material ESG discussion (*Material\_ESG*), or non-material ESG discussion score (*Nonmaterial\_ESG*) of a firm *i* in year *t*. The details of these measurement constructions are introduced in Chapter 1. Since executive data is available only on an annual basis, I convert the ESG discussion variables to yearly measures by computing the average scores

for total, material, and non-material ESG discussions using all earnings call transcripts for a firm over each fiscal year. CareerConcern<sub>i,t</sub> represents the level of CEO career concern, proxied by the predicted probability of CEO dismissal described in Section 2.4.1. Control<sub>t</sub> represents a series of control variables. I control for three sets of variables that may influence the ESG discussion in earnings calls. First, I include firm fundamentals to control for a series of factors that may influence firm's ESG disclosure, such as firm size (Firm Size), leverage (Leverage), market-to-book ratios (Market-to-book), loss or not (Loss), and earnings per share volatility in the past three years (EPS volatility). Second, I include variables measuring monitoring on firms' voluntarily disclosure, such as sustainable institutional holding (Sustainable inv) and analyst following (Analyst). Previous literature shows that firms with greater institutional ownership and analyst coverage are more likely to have more and higher-quality disclosures due to the increased monitoring (e.g., Ajinkya et al., 2005; Bushee et al., 2010). Therefore, I expect higher monitoring will influence the ESG conversation through influencing manager incentives. Last, I control the firm's ESG performance (ESG Score) in the regression, as CEOs may intend to talk more about ESG in the earnings call if they have a better ESG performance. Finally, I control for both year and industry fixed effects.

#### 2.4.3 Data and sample

# Data

Earnings call transcripts were collected from Seeking Alpha as introduced in Chapter 3. I got a sample of 158,990 earnings call transcripts from the period between Q4 2005 and Q4 2022, averaging 2,773 calls per quarter. Since CEO dismissal is an annual data, I convert the ESG discussion measure to a yearly basis by averaging ESG discussion measures from a firm's earnings calls throughout a fiscal year. This process generates a sample of 44,869 firm-year observations to further incorporate managerial and financial data.

I collect CEO dismissal data from an open-sourced database constructed by Gentry et al. (2021)<sup>16</sup>. This dataset covers involuntarily CEO turnover for S&P 1500 firms during the period of 1992 and 2022. I match the CEO dismissal data with earnings call transcript data, along with all other data of financial performance from Compustat, analyst following from I/B/E/S, ESG performance from Refinitiv, other managerial information from ExecuComp, and institutional investor from Thomson Reuters Institutional (13F) Holdings database. To further investigate the effect of sustainable investors on the relationship between CEO job concern and ESG discussion, I manually match institutional investors with the Principles for Responsible Investment (PRI) signatory list to create the sustainable investor data. After removing all missing values, my training sample for predicting CEO dismissal contains 16,333 firm-year observations during the period of 1992 and 2004. Since my institutional data is only available up to 2020, my final main test sample covers 13,730 firm-year observations through 2005 to 2020.

# **Descriptive statistics**

<sup>&</sup>lt;sup>16</sup> The CEO dismissal database is available at: https://zenodo.org/records/4543893

Table 2.3 displays the descriptive statistics and correlations of the main test sample. The average ESG-related discussion score of an earnings call is 0.253, indicating that, on average, 25.3% of the transcript text for an earnings call is related to ESG topics. With respect to specific material and non-material ESG discussions, about 5.8% of earnings call discussions are related to material ESG topics while 19.4% are related to non-material ESG topics. This indicates that CEOs tend to discuss more non-material ESG topics than material topics in earnings calls.

Table 2.3 also shows that the probability of CEO dismissal is significantly positive associated with all three ESG discussion measures in the earnings call. This result is consistent with the notion that CEOs may provide more ESG related discussions when they have greater career concerns. Regarding control variables, the correlations show that a poor performance, such as loss or high EPS volatility, has a positive association with CEOs' ESG discussions in earnings calls. Sustainable investors have a positive association with total ESG and material ESG discussion variables. This result implies that when monitored by ESG conscious investors, CEOs use ESG-related discussions, especially those about material ESG topics. The result also shows that analyst following is negative associated with total ESG and non-material ESG discussions, indicating that analysts, who primarily focus on financial metrics, may not prioritize non-material ESG issues. Lastly, better ESG performance is related to more ESG discussions in earnings calls in all three dimensions. In summary, the univariate association shows some initial evidence consistent with my hypotheses.

[Insert Table 2.3 Descriptive statistics]

# 2.5 Empirical analysis

### 2.5.1 Baseline results

I first examine the relationship between CEO career concerns and their ESG discussions in earnings calls. I run Model (2) using three ESG discussion measures (Total ESG, Material ESG, and Nonmaterial ESG) and report the results in Table 4. Column (1) reports the results of how CEOs manage their ESG discussions in earnings calls with heightened career concerns. After controlling year and industry fixed effects, the coefficient of CEO career concerns on total ESG discussion in earnings calls is positive at 10% significant level. This is consistent with both the greenwashing hypothesis and signaling hypothesis that CEOs facing greater career concerns are more likely to emphasize ESG topics in earnings calls. Columns (2) and (3) of Table 4 report the result of how CEO career concerns influence discussions of material and non-material ESG topics, respectively. Recall that material ESG issues directly impact a firm's operational, financial, and strategic aspects and should be more informative to stakeholders than non-material ESG issues. After controlling firm characteristics and fixed effects, the coefficient of CEO career concerns on material ESG discussion is significantly positive at 1% level (column (2)), while the significance disappears for non-material ESG discussion (column (3)). The results suggest that the positive effect of career concerns on ESG discussion is driven by discussions of material ESG topics. Although discussing material ESG issues may reveal vulnerabilities of firms, CEOs are still likely to use it either as a signaling or greenwashing tool to earn stakeholders' support and alleviate their career concerns.

Across the three columns in Table 4, the regression on material ESG discussion has an adjusted  $R^2$  of 0.622, which is significantly higher than that for total ESG discussion (0.360) and non-material ESG discussion (0.370). This suggests that my predictors in the regressions, i.e., CEO career concerns, firm characteristics, and year and industry fixed effects, better explain material ESG discussions than non-material ESG discussions in earnings calls. This is consistent with SASB's rationale that material ESG issues are closely associated with a firm's core strategic and operational factors. Overall, the baseline results reject both null hypotheses and support the notion that CEOs facing career concerns will provide more ESG-related discussions, especially material ESG topics, to enhance their job security by directing stakeholders towards their social responsibilities and long-term strategical capabilities and thus gaining support from stakeholders who are increasingly prioritizing sustainability and social considerations in their evaluations of company leadership.

[Insert Table 2.4 Baseline regression - CEO career concern and ESG discussions]

#### 2.5.2 Robustness check

#### **Endogeneity concerns**

I further take several steps to verify the robustness of the baseline findings in Table 2.4. In particular, the baseline results can be affected by endogeneity if there is an omitted variable that simultaneously determines a CEO's career concern and their ESG discussion

strategies in earnings calls (Coles et al., 2012). To address this concern, I follow Arellano and Bover (1995) and Blundell and Bond (1998), employing the system generalized method of moments (GMM) as an alternative estimation method. This method is recommended in corporate governance research (Wintoki et al., 2012) and is appropriate in this setting for two main reasons. First, endogeneity bias in the baseline regression might originate from explanatory variables other than the CEO career concern measure. The system GMM method can deal with multiple endogenous regressors by using lagged values of the explanatory variables as instruments for current potentially endogenous variables (Colak & Korkeamäki, 2021). Second, endogeneity bias might originate from the potential link between career concern and prior ESG discussions. For example, empirical evidence shows that when firms have poor financial performance, greater past investments in CSR will increase the likelihood of CEO dismissal (Hubbard et al., 2017). In my setting, CEOs' previous ESG discussion behaviors in earnings calls may adversely affect their career concern and then their future ESG discussion strategy. The system GMM method can resolve this by efficiently estimating models with one or more lagged dependent variables as regressors.

In implementing the system GMM method, I require two types of instruments. For the GMM style instruments, I add the lagged value of dependent variable as a control variable in the regression and treat all of the right-hand-side variables as sources of endogeneity. These variables' one- to three-period lagged values are treated as GMM style instruments. For the IV style instruments, I choose two exogeneous variables that capture

the industry level CEO dismissal rate and the supply of CEO candidate on the labor market. The industry level CEO dismissal rate (CEO dismissal industry) may reflect broader economic, regulatory, and market pressures that affect individual firms' CEO dismissal probability within that industry. Meanwhile, the industry level CEO dismissal rate is exogenous to a specific firm's ESG discussion strategy in earnings calls, leading to the variables as a good option for IV-style instrument in this study. Another variable that serves as IV-style instrument is the supply of executives of certain age that have potential to become a CEO in labor market. Following Colak and Korkeamäki (2021), I construct this measure by counting the number of top five executives that close to the median age of an individual becoming a CEO in the SIC 2-digit industry in a given year. Specifically, the median age when an executive becomes a CEO in an industry in my sample is 53. Therefore, the instrument variable Supply CEO is the total number of top five executives who have an age between 48 to 58, inclusively, in the same industry in a year. The measure is scaled by the total number of firms in the industry to account for the relative size of each industry. A larger Supply CEO indicates a higher supply of potential CEOs within that industry, leading to higher pressure for current CEOs. The supply of potential CEO candidates is not expected to influence a firm's ESG discussions in earnings calls, making the variable a good instrument for this research setting.

The results using system GMM estimation method are reported in Table 5. I report the results of the Hansen test, which checks whether the instruments used in the model are valid, at the bottom of the table. The *p*-value of the Hansen test for the three regressions are all above 0.1 but firmly below 1, suggesting that there is not enough statistical evidence to doubt the validity of the instruments. After employing the system GMM method, the CEO career concern remains positively associated with the overall ESG discussion and material ESG discussion in earnings call. This suggests that the baseline results are robust after addressing the potential endogeneity problems.

[Insert Table 2.5 Endogeneity concern - System GMM method]

# **Industry peer control**

The SASB develops the classification for material and non-material ESG issues specific to each industry to emphasize the diverse focal points and concerns across sectors. For instance, while environmental issues might be of paramount importance and deemed material for industries like manufacturing or energy due to their direct impact on operational sustainability and regulatory compliance, social capital issues might be more consequential for financial institutions. Given these variations, it is important to account for industry influences in empirical research. Empirical studies, such as Seo (2021), also indicate that a firm's voluntary disclosure strategies are substantially shaped by the disclosure behaviors of their industry peers. Although I include industry fixed effects in my baseline regressions, I further incorporate the mean ESG discussions of GICS industry peers in a given year as a control to enhance the robustness of my findings. This refinement helps to isolate firm-specific factors influencing ESG discussion intensity, mitigates the impact of potential peer influence, and controls for common omitted variables within the industry. As reported in Table 6, the baseline findings hold after introducing the industry peer's mean ESG discussion intensity as a control.

# [Table 2.6 Robustness Check - Industry peer control]

### 2.5.3 Additional tests

The baseline findings suggest that CEOs facing career concerns are more likely to provide ESG discussions, especially those on material topics, during earnings calls. However, it remains unclear whether these findings align with the signaling or greenwashing hypotheses. Building on this, this section will delve deeper to fortify these initial results. The subsequent tests aim to examine whether CEOs genuinely signal their capabilities and engage in ESG commitments, or if they merely use ESG discussions as a greenwashing tool to divert stakeholders' attention from the firm's financial underperformance, thereby alleviating their career concerns.

# Disparity between ESG "talking" and "walking"

If CEOs genuinely prioritize ESG issues and discuss ESG-related topics to signal the prospects of future performance, an improvement in future ESG performance should be observed. Conversely, according to the greenwashing hypothesis, a disparity between CEOs' ESG discussions and their future ESG performance should be evident. To explore this, I develop a metric to evaluate the disparity between ESG discussion ("talking") and future actual ESG implementation ("walking") in three steps. First, I sort firms into deciles based on their ESG discussion scores by industry and year. I then sort firms into deciles based on their actual ESG performance in the subsequent year. Finally, I compute the

disparity measure using the decile of ESG discussion minus the decile of future actual ESG performance. This approach enables a systematic assessment of whether these discussions are substantively translated into action in the future or primarily function as rhetorical devices for managing reputation and addressing career concerns. The results, detailed in 2.7, utilize three specific disparity measures: Total ESG disparity, Table Material ESG disparity, and Nonmaterial ESG disparity. These are based on, respectively, the total, material, and non-material ESG discussion deciles of the current year compared with the firm's ESG performance score the following year (ESG Score next). Table 7 shows a positive and statistically significant association between career concerns and the disparity measures based on total and material ESG discussions. This suggests that CEOs who are concerned about their job security and career prospects engage in greenwashing disclosure in earnings calls. That is, on the one hand, they intensify discussions on material ESG issues during earnings calls to project themselves as sustainability-concerned and responsible leaders; on the other hand, they fail to translate such rhetoric into substantive actions or improvements in actual future ESG performance. This outcome supports the hypothesis that under career pressures, CEOs are more likely to extend ESG discussions as a strategic tool to enhance their reputation and mitigate risks of dismissal rather than a commitment to actual ESG improvements. Their ESG discussions on such occasions serve more as a greenwashing distraction for stakeholders than a genuine effort to advance corporate sustainability.

[Table 2.7 Additional test - CEO career concern and Disparity between "talking" and "walking"]

# **ESG linguistic characteristics**

Finally, I investigate the linguistic characteristics of CEOs' ESG discussions during earnings calls, particularly how CEO career concerns influence the linguistic characteristics of these discussions. As previously noted, if CEOs use ESG discussions as a signaling tool to demonstrate their capability and firm's prospective performance, they are likely to reduce information friction during communication. Conversely, if they use ESG discussion as a greenwashing tool to redirect stakeholders' attention, they may manipulate disclosures by increasing linguistic complexity or employing a more positive tone to obfuscate facts and mislead investors (Huang et al., 2014; Li, 2008; Lo et al., 2017). Therefore, I examine the influence of CEO career concerns on the complexity and tone of their ESG discussions.

I use the *FOG* index, constructed following Li (2008), to measure earnings call ESG linguistic complexity. It consists of two components: the number of words per sentence and the number of syllables per word. Specifically, the FOG index of a text is calculated as follows:

$$FOG = \left(\frac{\text{total words}}{\text{total sentences}} + 100 \times \frac{\text{complex words}}{\text{total words}}\right) \times 0.4,$$

where *complex words* are defined as words consisting of three or more syllables; *total* words is the word count in a text; *total sentences* is the number of sentences in a text. This

metric implies that, with all other factors constant, texts become harder to read as the number of syllables per word and sentence length increases. The *FOG* index is calculated for total ESG (*Total\_ESG\_fog*), material ESG (*Material\_ESG\_fog*), and non-material ESG discussions (*Nonmaterial\_ESG\_fog*) within each earnings call, respectively. Similar to other discussion metrics, I use the annual average of the *FOG* indexes from all earnings calls within a fiscal year.

Table 2.8 presents the results of the linguistic analysis. As shown in column (2), *CareerConcern* has a significant positive coefficient on *Material\_ESG\_fog*. This result indicates that CEOs not only increase discussions of material ESG topics, but also enhance the linguistic complexity of these discussions. This pattern suggests CEOs attempt to balance two objectives: diverting investors' attention from financial underperformance by discussing more ESG related topics while mitigating potential risks from disclosing sensitive ESG information. Rather than signaling genuine commitment to ESG improvement, their complex ESG discussions appear to serve primarily as a strategy to distract stakeholders and address their career concerns.

[Insert Table 2.8 Additional test - CEO career concern and ESG linguistic complexity]

The tone of ESG discussion is calculated by the difference between the number of positive words and negative words, scaled by total word count using the Loughran and Mcdonald (2011) word lists, which are preferable for financial communications due to their comprehensive nature and relevance over other word lists like Harvard GI or Diction (Loughran & Mcdonald, 2016). The ESG discussion measures, *Total\_ESG\_tone*,

*Material\_ESG\_tone*, and *Nonmaterial\_ESG\_tone*, are derived from this approach, averaging across all earnings calls within a fiscal year. Presented in Table 2.9, the regression results reveal that coefficients on *CareerConcern* are significantly positive at the 5% level, indicating that CEOs under pressure from career concerns adopt a more positive tone when discussing material ESG issues in earnings calls. Similar to the use of linguistic complexity, this strategic use of positive tone likely aims to counterbalance the potential risks associated with discussing ESG issues by emphasizing successes and aspirations over current deficiencies or challenges. The combination of expanded discussion and positive tone allows CEOs to use ESG discussion as a greenwashing tool to enhance job security.

[Insert Table 2.9 CEO career concern and ESG discussion tone]

#### 2.6 Discussions

This chapter examines the relationship between CEO career concerns and their ESG related discussions in earnings calls. Using textual analysis and a fine-tuned ESG-Bert model, I construct measures to identify ESG discussions and further differentiate material and non-material ESG discussions based on the SASB's classification. The findings indicate that CEOs facing greater career concerns include more discussions of ESG related topics in earnings calls, especially those classified as material issues. The results were held after I employ the System GMM method for endogeneity and controlled for industry peer effects. Additionally, evidence suggests that CEOs increase linguistic complexity and adopt

a positive tone in discussions about ESG, especially material ESG topics, when facing greater career concerns. Further test on future ESG performance reveals that CEOs' elaborate ESG discussions are likely a strategic tool to enhance their reputation and mitigate risk of dismissal because such discussions are not associated with a genuine dedication to ESG improvement.

Together, these findings imply that CEOs' discussions of ESG issues serve as a strategic tool to alleviate personal career concerns instead of signaling true sustainable engagement. This highlights the need for market participants to discern managerial strategy and substantial ESG engagement for better ESG assessment. By separately examining the material and non-material ESG discussions, this study reveals that, despite the associated financial risks, CEOs are more inclined to discuss material ESG issues during earnings calls. The contrast between material and non-material ESG discussion in earnings calls also supports the SASB's materiality classification.

### Chapter 3: Strategic ESG discussion and analyst reaction

### 3.1 Introduction

The growing importance of ESG information has influenced how market participants process and respond to corporate disclosures. As key information intermediaries in capital markets, financial analysts play a crucial role in interpreting and disseminating ESG information to investors. While prior research has examined how ESG performance and disclosure affect analyst forecast accuracy (e.g., Dhaliwal et al., 2012; Muslu et al., 2019), we know relatively little about how analysts process and respond to different types of ESG information discussed during earnings calls, particularly when distinguishing between material and non-material ESG topics.

The SASB standard distinguishes between material and non-material ESG issues based on industry, with material issues being those most likely to directly impact a firm's operational, financial, and strategic aspects.<sup>17</sup> Findings in Chapter 1 reveal that discussions of material ESG information in earnings calls are positively associated with firm value, while discussions of non-material ESG topics tend to increase information asymmetry. This distinct impact of ESG materiality suggests that analysts may process and respond to material and non-material ESG discussions differently. Moreover, as established in Chapter 2, CEOs may strategically use ESG discussions as a greenwashing tool, increasing ESG discussions with greater complexity. Understanding how analysts respond to these

<sup>&</sup>lt;sup>17</sup> Detailed information on SASB standard is available at: <u>https://sasb.ifrs.org/standards/materiality-finder/.</u>

potentially strategic disclosures provides insights into the consequences of such communication strategies and their impact on the information environment.

This chapter investigates how material and non-material ESG discussions during earnings calls affect two key dimensions of analyst response: forecast accuracy and dispersion. These dimensions are important because they capture how analysts process and interpret ESG information. Forecast dispersion indicates the level of uncertainty and disagreement among analysts in interpreting ESG information (Abarbanell et al., 1995; Barron & Kim, 1998), while forecast accuracy reveals whether ESG discussions enhance or impair analysts' ability to predict future firm performance (Dhaliwal et al., 2012).

Using a comprehensive sample of earnings call transcripts from 2005 to 2020, I classify ESG discussions as material or non-material based on the SASB standards and examine their differential impacts on analyst forecast accuracy and dispersion. The results suggest that material and non-material ESG discussions affect analyst forecasts differently. Material ESG discussions significantly reduce forecast accuracy and increase forecast dispersion, while non-material ESG discussions increase forecast dispersion without significantly affecting accuracy. The linguistic complexity of ESG discussions, regardless of materiality, further reduces forecast accuracy and increases dispersion. Additional tests reveal that a firm's actual ESG performance does not moderate the effect of ESG discussions on analyst forecast accuracy and dispersion.

This chapter makes several important contributions to both literature and practice. First, it extends the growing literature on ESG disclosure by providing new evidence on how analysts—key information intermediaries—process and respond to different types of ESG information. While previous research has focused primarily on structured ESG disclosures (e.g., ESG reports and ratings), this study offers insights into how analysts handle more discretionary ESG communications by management during earnings calls. Second, it contributes to our understanding of ESG materiality by showing that material and non-material ESG information are processed and interpreted differently by market participants. Third, it enhances our knowledge of analyst behavior by examining how they process complex ESG information when facing cognitive limitations.

For practitioners, this chapter offers valuable insights for both companies and investors. The findings suggest that companies should carefully consider how they present ESG information during earnings calls, as material and non-material discussions have different impacts on analyst forecasts. While increased complexity in ESG discussions may serve CEOs' strategic greenwashing goals, it degrades the information environment by reducing forecast accuracy and increasing disagreement among analysts.

The rest of this chapter is organized as follows. Section 3.2 reviews literature on ESG disclosure and analyst forecasts and develops hypotheses about how material and nonmaterial ESG discussions affect analyst responses. Section 3.3 details the research design, including sample selection and variable measurement. Section 3.4 presents empirical results on how analysts process different types of ESG discussions and examines additional factors such as ESG complexity and the moderating role of firms' ESG performance. Section 3.5 discusses implications for understanding analysts' processing of ESG information and potential benefits from standardization in ESG reporting.

# 3.2 Literature review and hypothesis development

# **3.2.1 ESG discussions and analyst forecast accuracy**

### Material ESG discussions and forecast accuracy

Existing literature suggests that ESG disclosure can increase analyst forecast accuracy. Research shows that ESG controversies significantly increase forecast errors, but firms can mitigate this negative effect through enhanced ESG disclosure, suggesting the importance of ESG transparency in improving analyst information environments (Schiemann & Tietmeyer, 2022). Dhaliwal et al. (2012) also finds that the issuance of stand-alone CSR reports is positively associated with analyst forecast accuracy. Moreover, the adoption of integrated reporting frameworks strengthens the positive relationship between ESG disclosure and forecast accuracy, demonstrating how structured ESG information enhances analysts' assessment capability (Bernardi & Stark, 2018). Muslu et al. (2019) further demonstrate that ESG reports with greater readability, length, numerical and horizon content, and less optimistic tone are associated with more accurate forecasts. Since material ESG information directly addresses factors that significantly impact a firm's financial performance, the disclosure of such information theoretically should provide analysts with more additional information about firms' long-term risks and opportunities to assess future firm performance. Therefore, when material ESG information is disclosed,

it potentially increases transparency and helps analysts better assess firm value and predict earnings.

However, when managers provide more material ESG discussions in earnings calls, it introduces additional complexity and uncertainty into analysts' forecasting environment, as even ESG rating agencies have significant disagreements in their assessments due to different measurement methods and scope divergence (Berg et al., 2022). The lack of standardization or comparability in ESG disclosures makes it challenging for analysts to compare across firms or integrate consistently into their valuation models (Amel-Zadeh & Serafeim, 2018). Moreover, as established in my previous chapter, material ESG discussions can be employed as greenwashing tools, particularly when CEOs face heightened career concerns. In such cases, these discussions are accompanied by greater complexity, which may introduce additional processing challenges for analysts.

Moreover, limited attention theory suggests that analysts are constrained in their capacity to process information (Driskill et al., 2020; Hirshleifer et al., 2019). When faced with more material ESG discussions that might require more processing resources in ESG expertise, analysts may struggle to effectively incorporate this information into their forecasts. The limited attention constraints become particularly relevant in the context of earnings calls, where analysts must rapidly process large volumes of information (Driskill et al., 2020). Therefore, material ESG discussions may increase cognitive processing demands, potentially leading analysts to either overlook important information or make

errors in its integration, decreasing forecasts accuracy despite the theoretical relevance of the information.

Given these competing theoretical predictions for material ESG discussions on analyst forecast accuracy, I state my first hypotheses in null form:

H1a: The quantity of managers' material ESG discussions in earnings calls does not significantly affect analyst forecast accuracy.

# Non-material ESG discussions and forecast accuracy

For non-material ESG information, it may reduce forecast accuracy by introducing noise and complexity while consuming limited time during earnings calls, without providing value-relevant information. Literature shows that analysts view environmental disclosures are irrelevant and immaterial and only incorporate financial information into their valuation model (Campbell & Slack, 2011). Given limited attention theory, nonmaterial ESG discussions may worsen forecast accuracy by diverting analysts limited cognitive resources away from financially material information.

An alternative perspective suggests that even seemingly non-material ESG disclosures might provide incremental contextual information that helps the market better understand a company's long-term sustainability commitment. Such information could offer insights into stakeholder relationships and reputational capital, which could indirectly affect financial performance (Ioannou & Serafeim, 2015).

Given these competing theoretical predictions for non-material ESG discussions on analyst forecast accuracy, I state the hypothesis in null form: **H1b:** The quantity of managers' non-material ESG discussions in earnings calls does not significantly affect analyst forecast accuracy.

# 3.2.2 ESG discussions and analyst forecast dispersion

# Material ESG discussions and forecast dispersion

Analyst forecast dispersion reflects the joint effect of overall uncertainty and the differences in analysts' opinions or lack of agreement (e.g., Abarbanell et al., 1995; Barron & Kim, 1998; Barry & Jennings, 1992). Therefore, empirical studies usually employ observed forecast dispersion as a proxy for uncertainty and disagreement in analysts' beliefs. Research demonstrates that more informative corporate disclosures decrease analyst forecast dispersion (Lang & Lundholm, 2000). Specifically, previous literature has found that corporate social responsibility disclosure and voluntary integrated reporting are associated with increased consensus among analyst forecasts (Cormier & Magnan, 2014; Rossignoli et al., 2022). Since material ESG information directly addresses factors that significantly impact a firm's financial performance, this information should be informative. Therefore, with additional material ESG information, analysts may better assess key business risks and opportunities, which likely results in more consistent earnings forecasts.

However, material ESG discussions may introduce new uncertainties around firm performance and risks that require expert interpretation (Bolton & Kacperczyk, 2021; Christensen et al., 2021). As noted by Aerts et al. (2008), environmental disclosure increases analyst forecast dispersion in environmentally sensitive industries, as the financial impact of environmental factors is more complex and uncertain. The complexity of material ESG information, particularly when used as a greenwashing tool as established in my previous chapter, creates further interpretative challenges even for experienced analysts. When analysts face more material ESG discussions with high processing demands, their limited cognitive resources may lead to selective attention and information filtering (Hirshleifer et al., 2019; Driskill et al., 2020). Moreover, since ESG analysis represents a relatively new domain for many analysts, some analysts may lack the expertise to quickly incorporate this information into their forecasts. Different analysts may focus on different aspects of the complex ESG information based on their individual expertise, priorities, or cognitive capacity at that moment, leading to greater forecast dispersion. Therefore, when material ESG information is presented in a strategic way in quantity and complexity, it may exacerbate these interpretative differences across analysts, leading to greater forecast dispersion.

Given these competing theoretical predictions for material ESG discussions on analyst forecast dispersion, I state the hypothesis in null form:

H2a: The quantity of managers' material ESG discussions in earnings calls does not significantly affect analyst forecast dispersion.

### Non-material ESG discussions and forecast dispersion

For non-material ESG information, competing theoretical perspectives also exist regarding its impact on forecast dispersion. Non-material ESG discussions may increase analyst dispersion due to additional processing effort without clear financial implications. They may represent a form of information overload that depletes analyst' cognitive resources. When facing such cognitive constraints, analysts may vary in how they filter and prioritize this peripheral information, with some potentially ignoring it entirely while others attempt to incorporate aspects that they deem potentially relevant (Driskill et al., 2020; Schipper, 2007). This heterogeneity in information processing across analysts could lead to greater forecast dispersion. For example, Harjoto and Jo (2015) find that voluntary ESG initiatives (defined as beyond firm's interests) increase forecast dispersion as analysts face uncertainty in evaluating their financial implications and may diverge in their interpretations.

Conversely, stakeholder theory suggests that even non-material ESG information can potentially reduce forecast dispersion. Non-material ESG information can build reputation from long-term sustainability commitment and meet the needs of diverse stakeholders, reducing stock return volatility (Jo & Na, 2012). Therefore, such information may also help analysts assess the overall quality of management and corporate governance, potentially leading to more consistent evaluations of the firm's future prospects.

Given these competing theoretical predictions for non-material ESG discussions on analyst forecast dispersion, I state my hypotheses in null form:

**H2b:** The quantity of managers' non-material ESG discussions in earnings calls does not significantly affect analyst forecast dispersion.

### 3.3 Research design

3.3.1 Model and measurements
I use the following model to test my hypotheses:

 $Analyst\_Response_{i,t} = \alpha + \beta \times ESG\_discussion_{i,t} + \gamma \times Control_{i,t} + Year\_Quarter FE +$  $Industry FE + \varepsilon_{i,t},$ (3.1)

where  $ESG_discussion_{i,t}$  represents the total ESG discussion score (*Total\_ESG*), material ESG discussion score (*Material\_ESG*), or non-material ESG discussion score (*Nonmaterial\_ESG*) in earnings call's presentation for firm *i* in year-quarter *t*. The details of these measurement constructions are introduced in Chapter 1. In additional tests, I examine the impact of the complexity of material and non-material ESG discussions on analyst forecast. To measure the linguistic complexity of ESG discussions, I use the log of *FOG* index, constructed following Li (2008). It consists of two components: the number of words per sentence and the number of syllables per word. Specifically, the *FOG* index of a text is calculated as follows:

$$FOG = \left(\frac{\text{total words}}{\text{total sentences}} + 100 \times \frac{\text{complex words}}{\text{total words}}\right) \times 0.4,$$

where complex words are defined as words consisting of three or more syllables; total words is the word count in a text; total sentences is the number of sentences in a text. This metric implies that, with all other factors constant, texts become harder to read as the number of syllables per word and sentence length increases. The complexity measure is calculated for material ESG (*Material\_ESG\_fog*), and non-material ESG discussions (*Nonmaterial\_ESG\_fog*) within each earnings call, respectively.

Analyst\_Response<sub>i,t</sub> represents the analyst forecast accuracy ( $ACCURACY_{i,t}$ ) and dispersion ( $DISP_{i,t}$ ). Analyst forecast accuracy ( $ACCURACY_{i,t}$ ) is measured as negative 61

one times the average absolute difference between a firm's actual performance for the next quarter and analyst forecasts issued after the earnings call, scaled by the firm's stock price prior to the earnings call. Analyst forecast dispersion  $(DISP_{i,t})$  is measured as the standard deviation of analyst forecasts for the next quarter issued after the earnings call.

Control<sub>i,t</sub> represents a series of control variables. Following prior literature, I control for four sets of variables that may influence the analyst response in earnings calls. First, I include firm fundamentals, such as firm size (Firm Size), leverage (Leverage), bookto-market ratios (Book-to-market). Second, I include variables measuring firm's earnings news, such as loss or not (Loss), earnings per share volatility in the past 12 quarters (EPS VOL), negative unexpected earnings in current quarter (BNEWS), and if the quarter is the fourth quarter of the fiscal year (QTR4). Prior literature suggests that loss firms, and firms having higher historical earning volatility and negative unexpected earnings will indicate greater uncertainty and cause more difficulties in analyst forecasting, leading to delayed analyst response, lower forecast accuracy, and higher dispersion (Dichev & Tang, 2009; Heflin et al., 2003; Zhang, 2008). Fourth quarter earnings are expected to receive more analyst attention and faster responses due to their importance for annual results and greater information content (Mendenhall & Nichols, 1988). Third, I control for firm's information environment, such as analyst coverage (COV) and the institutional holding (INST). Greater analyst coverage is associated with faster analyst responses and lower forecast dispersion due to increased competition among analysts and higher quality information environment (Cooper et al., 2001; Zhang, 2008). Higher institutional

ownership is linked to faster analyst responses and greater forecast accuracy because institutional investors demand higher quality research and more timely updates from analysts (O'Brien & Bhushan, 1990). Firms with greater institutional ownership also tend to have lower forecast dispersion due to enhanced disclosure quality and information environment (Ajinkya et al., 2005). Lastly, I control for variables that may affect CEO's ESG discussions in earnings calls, such as firm's past year's material and non-material ESG performance (MESG\_SCORE/NMESG\_SCORE) and CEO tenure (TENURE). I follow Ahn et al. (2024) to manually classify MSCI/KLD ESG score into material and non-material scores based on SASB standards. When a firm achieves a better ESG performance, managers are likely to provide more related discussions. CEO's career concern is also expected to influence their ESG related discussions in earning call, as proved in Chapter 2. The definitions of these variables are listed in detail in Appendix 3A. Finally, I control for both year-quarter and industry fixed effects in the model.

#### **3.3.2** Data and sample

Earnings call transcripts were collected from Seeking Alpha as introduced in Chapter 3. I got a sample of 158,990 earnings call transcripts from the period between Q4 2005 and Q4 2022, averaging 2,773 calls per quarter. Analyst forecast and actual values are from I/B/E/S detail database. I match the analyst forecast data with earnings call transcript data, along with all other data of financial performance from Compustat, trading date information from CRSP, ESG performance from KLD database<sup>18</sup>, managerial information from ExecuComp, and institutional investor from Thomson Reuters Institutional (13F) Holdings database. After removing all missing values, my final main test sample covers 42,999 firm-year-quarter observations through Q4 2005 to Q2 2020<sup>19</sup>.

Table 3.1 displays the descriptive statistics for the sample. The mean value of analyst forecast accuracy (*ACCURACY*) is -0.004 with a standard deviation of 0.012, while analyst forecast dispersion (*DISP*) averages 0.055 with a standard deviation of 0.079. These values align with those reported in prior studies. Regarding ESG discussions in earnings calls, the average material ESG discussion score (*Material\_ESG*) is 0.056, indicating that approximately 5.6% of earnings call content relates to material ESG topics. In contrast, non-material ESG discussions (*Nonmaterial\_ESG*) average 0.190, suggesting that 19.0% of earnings call content addresses non-material ESG topics. This pattern indicates that firms tend to discuss non-material ESG topics more extensively than material ESG topics during earnings calls. The log of the linguistic complexity of these discussions, measured by Fog index, averages 2.434 for material ESG discussions (*Material\_ESG\_fog*), suggesting that managers are prone to use more complex language when they discuss non-material ESG information.

[Insert Table 3.1 Descriptive statistics]

<sup>&</sup>lt;sup>18</sup> I use MSCI/KLD ESG data in this chapter because it offers more detailed ESG categories than Refinitiv's 10 categories, enabling a more precise classification of material and non-material ESG scores following Ahn et al. (2024). I use Refinitiv ESG data in robustness tests to validate the main findings.

<sup>&</sup>lt;sup>19</sup> The final sample ends in 2020 because my institutional data is only available up to 2020.

# 3.4 Empirical analysis

#### **3.4.1 ESG discussions and analyst forecast accuracy**

Table 3.2 presents how material and non-material ESG discussions in earnings calls affect analyst forecast accuracy. The dependent variable is the analyst forecast accuracy (*ACCURACY*), measured as negative one times the average absolute difference between a firm's actual performance for the next quarter and analyst forecasts issued after the earnings call, scaled by the firm's stock price prior to the earnings call.

For material ESG discussions, Column (1) shows that *Material\_ESG* has a negative (-0.0043) and statistically significant coefficient at the 5% level. This result suggests that as managers increase material ESG discussions in earnings calls, analysts' forecast accuracy actually decreases. This result appears to contradict the traditional view that material ESG disclosures should improve forecast accuracy by providing value-relevant information. Material ESG discussions in earnings calls are more discretionary and might be a strategic impression management tool to distract analysts' attention from poor financial performance, as demonstrated in Chapter 2. Therefore, material ESG information in earnings calls can actually reduce forecast accuracy due to the added complexity in interpreting and incorporating this potentially strategic information into valuation models. Notably, I also control for material ESG performance (*MESG\_Score*), which shows a negative (-0.0057) and statistically significant coefficient at the 5% level, suggesting that

even after accounting for a firm's material ESG performance, the quantity of material ESG discussions still negatively impacts forecast accuracy.

For non-material ESG discussions, Column (2) shows that *Nonmaterial\_ESG* has a negative (-0.0005) but statistically insignificant coefficient. This finding suggests that non-material ESG discussions do not significantly affect analyst forecast accuracy, consistent with the view that non-material ESG information has limited financial relevance and therefore minimal impact on analysts' ability to forecast earnings accurately. The lack of significant effect also suggests that analysts have the ability to recognize the limited financial relevance of non-material ESG discussions and adjust their forecasting approaches accordingly, allowing them to maintain their overall accuracy despite the presence of such information. I also control for non-material ESG performance (*NMESG\_Score*), which shows a small negative (-0.0004) but statistically insignificant coefficient, further supporting the view that non-material ESG aspects have limited relevance for analyst forecast accuracy.

The other control variables in both models largely show the expected relationships with forecast accuracy. Firm size (*Firm Size*) is positively associated with forecast accuracy, consistent with larger firms having more stable earnings and better information environments. Leverage (*Leverage*) and book-to-market ratio (*Book-to-market*) are negatively associated with forecast accuracy, suggesting that firms with higher financial risk and greater growth opportunities present more challenging forecasting environments. Fourth-quarter earnings (*QTR4*) are associated with lower forecast accuracy, consistent

with the greater complexity of year-end financial reporting. Earnings volatility (*EPS\_Volatility*) and negative earnings surprises (*BNEW*) are negatively associated with forecast accuracy, reflecting the challenges of forecasting for firms with less predictable earnings. Analyst coverage (*Coverage*) is positively associated with forecast accuracy, consistent with the view that greater analyst following improves the information environment.

[Insert Table 3.2 Material and non-material ESG discussion and analyst forecast accuracy]

# 3.4.2 ESG discussions and analyst forecast dispersion

The empirical results in Table 3.3 reveal similar patterns regarding how material and non-material ESG discussions during earnings calls affect analyst forecast dispersion. The dependent variable is the standard deviation of analyst forecasts for the next quarter (*DISP*), measured as the standard deviation of analyst forecasts for the next quarter issued after the earnings call.

For material ESG discussions, Column (1) shows that *Material\_ESG* has a positive (0.0580) and statistically significant coefficient at the 1% level, indicating that more material ESG discussions are associated with greater forecast dispersion among analysts. This finding aligns with the theoretical perspective that material ESG information may increase forecast dispersion due to the complexity in quantifying ESG impacts. Similar to Aerts et al. (2008)'s findings regarding environmental disclosures, the results suggest that even when ESG information is material, analysts may diverge in their interpretations of how these factors affect future financial performance. For material ESG discussions in

earnings call, the interpretation complexity effect dominates any potential reduction in uncertainty that might come from additional material information. I also control for material ESG performance (*MESG\_Score*), which shows a negative (-0.0260) but statistically insignificant coefficient, suggesting that a firm's material ESG performance does not significantly affect analyst forecast dispersion directly, but rather it's the discussion of material ESG topics that drives analyst disagreement.

For non-material ESG discussions, Column (2) shows that *Nonmaterial\_ESG* also has a positive (0.0233) and statistically significant coefficient, though only at the 10% level and with a smaller magnitude compared to material ESG discussions. This result supports the theoretical argument that non-material ESG information increases analyst dispersion due to additional processing effort without clear financial implications. This finding is consistent with Harjoto and Jo (2015), who found that voluntary ESG initiatives increase forecast dispersion as analysts face uncertainty in evaluating their financial implications and may diverge in their interpretations. Additionally, I control for non-material ESG performance (*NMESG\_Score*), which shows a negative (-0.0420) but statistically insignificant coefficient. This suggests that similar to material ESG performance, a firm's non-material ESG performance does not directly affect analyst forecast dispersion, further emphasizing that it is the ESG discussions themselves, rather than the underlying performance, that influences analyst disagreement.

The control variables in both models show relationships with forecast dispersion that are generally consistent with prior research. Firm size (*Firm Size*) is positively associated with forecast dispersion, possibly reflecting the greater complexity of larger firms' operations. Leverage (*Leverage*) and book-to-market ratio (*Book-to-market*) are positively associated with forecast dispersion, suggesting that financial risk and growth opportunities create more divergent views among analysts. Loss firms (*LOSS*), firms with volatile earnings (*EPS\_Volatility*), and firms with negative earnings surprises (*BNEW*) show greater forecast dispersion, consistent with these factors creating more uncertainty in the forecasting environment.

Overall, both material and non-material ESG discussions appear to increase dispersion. Material ESG discussions increase analyst forecast dispersion primarily through interpretation complexity, as analysts may differ in how they evaluate and incorporate financially material ESG factors into their forecasts. In contrast, non-material ESG discussions may increase dispersion primarily through processing uncertainty, as analysts may expend effort processing this information without clear financial implications. [Insert Table 3.3 Material and non-material ESG discussion and analyst forecast dispersion]

### 3.4.3 Additional test: The complexity of ESG discussions and analyst forecast

In the hypothesis development, I argued that material and non-material ESG discussions might decrease analyst forecast accuracy and increase forecast dispersion. One key theoretical mechanism proposed was that the complexity of ESG information could pose significant processing challenges for analysts facing limited attention constraints (e.g., Aerts et al., 2008; Driskill et al., 2020; Hirshleifer et al., 2019). Given that ESG analysis represents a relatively new domain for many analysts, the cognitive burden of processing

complex ESG information could lead to selective attention and information filtering, potentially affecting the accuracy and consistency of their forecasts. To empirically investigate this mechanism, I examine how the linguistic complexity of ESG discussions, measured by the log of the fog index of material and non-material ESG discussions, affects analyst forecast accuracy and dispersion.

Table 3.4 examines how the linguistic complexity of ESG discussions affects analyst forecasts. The independent variables of interest are the fog index of material ESG discussions (*Material\_ESG\_fog*) and non-material ESG discussions (*Nonmaterial\_ESG\_fog*), which measure the readability and complexity of the language used in these discussions.

Columns (1) and (2) show similar patterns in how the complexity of material and non-material ESG discussions influence analyst forecast accuracy. Column (1) shows that the coefficient on *Material\_ESG\_fog* is negative (-0.0002) and statistically significant at the 1% level, indicating that more complex material ESG discussions are associated with lower forecast accuracy. After controlling for the quantity of material ESG discussions (*Material\_ESG*), which remains negative and significant at the 10% level, this finding suggests that the complexity of material ESG information represents an additional challenge for analysts beyond the mere presence of such information. This result supports the argument that complex material ESG discussions increase cognitive processing demands, potentially leading analysts to either overlook important information or make errors in its integration, ultimately resulting in less accurate forecasts. I also control for

material ESG performance (*MESG\_Score*), which maintains a negative (-0.0058) and statistically significant coefficient at the 5% level, consistent with the baseline results and suggesting that both ESG performance and the complexity of ESG discussions independently affect forecast accuracy.

Column (2) shows that the coefficient on Nonmaterial ESG fog is also negative (-(0.0012) and statistically significant at the 1% level, with a larger magnitude than for material ESG complexity. This suggests that complex language in non-material ESG discussions has a stronger negative effect on forecast accuracy than complex language in material ESG discussions. Interestingly, after controlling for complexity, the quantity of non-material ESG discussions (Nonmaterial ESG) remains negative but insignificant, suggesting that it is primarily the complexity rather than the quantity of non-material ESG discussions that reduces forecast accuracy. This finding suggests that although analysts have the ability to recognize the limited financial relevance of non-material ESG discussions and try to maintain their overall accuracy, such discussions with high linguistic complexity may still divert analysts' limited cognitive resources away from financially material information, leading to less accurate forecasts. I also control for non-material ESG performance (*NMESG Score*), which remains statistically insignificant (-0.0006), further supporting the view that it is the complexity of non-material ESG discussions, rather than the underlying non-material ESG performance, that affects forecast accuracy.

Columns (3) and (4) present results for analyst forecast dispersion. Column (3) shows that the coefficient on *Material ESG fog* is positive (0.0008) but statistically

insignificant, while the quantity of material ESG discussions (*Material\_ESG*) remains positive and significant at the 5% level. This suggests that it is primarily the presence rather than the complexity of material ESG information that drives disagreement among analysts. This finding is somewhat surprising given the significant effect of material ESG complexity on forecast accuracy, but it may indicate that complexity affects all analysts similarly, reducing their average accuracy without necessarily increasing disagreement among them. The model continues to control for material ESG performance (*MESG\_Score*), which remains statistically insignificant (-0.0257), consistent with the baseline results and reinforcing that it is the ESG discussions themselves, rather than the underlying material ESG performance, that primarily drives analyst disagreement.

Column (4) shows that the coefficient on *Nonmaterial\_ESG\_fog* is positive (0.0134) and statistically significant at the 1% level, indicating that more complex non-material ESG discussions are associated with greater forecast dispersion. The quantity of non-material ESG discussions (*Nonmaterial\_ESG*) also remains positive and significant at the 5% level, suggesting that both the quantity and complexity of non-material ESG discussions contribute to analyst disagreement. This finding supports the argument that when facing complex non-material ESG information, analysts may vary in how they filter and prioritize this peripheral information, with some potentially ignoring it entirely while others attempt to incorporate aspects that they deem potentially relevant. This heterogeneity in information processing across analysts could lead to greater forecast dispersion. The model also controls for non-material ESG performance (*NMESG\_Score*), which remains

statistically insignificant (-0.0403), further emphasizing that analysts' divergent interpretations are driven by the presence and complexity of non-material ESG discussions rather than by the firm's underlying non-material ESG performance.

These findings highlight the importance of considering not just what ESG information is disclosed, but how it is communicated. Complex language in ESG discussions appears to confuse analysts or divert their attention from more value-relevant information, with particularly strong effects for non-material ESG discussions. This suggests that firms seeking to improve their information environment should focus on providing clear, straightforward ESG information, particularly when discussing non-material ESG topics.

[Table 3.4 The Complexity of ESG discussion and analyst forecast]

#### 3.4.4 Additional test: The role of ESG performance

Prior literature suggests that firms' ESG performance can significantly influence how the market interprets their ESG disclosures (Dhaliwal et al., 2011; Gao et al., 2016). High ESG performers may have more credibility when discussing ESG topics, while low performers' ESG discussions might be viewed more skeptically as potential impression management (Merkl-Davies & Brennan, 2007). Given the baseline findings that material and non-material ESG discussions differently affect analyst forecast accuracy and dispersion, I further examine whether a firm's ESG performance moderates these relationships. For material ESG discussions, the interaction with ESG performance may be particularly relevant. While the main results show that material ESG discussions reduce forecast accuracy, this effect could be attenuated for high ESG performers whose material ESG discussions are likely viewed as more credible signals rather than strategic disclosures. This aligns with Dhaliwal et al. (2012) finding that the positive impact of ESG disclosure on forecast accuracy holds primarily for firms with superior ESG performance. Similarly, the relationship between material ESG discussions and forecast dispersion might weaken for high performers, as analysts may have more consistent interpretations of ESG information from firms with established strong ESG track records. For non-material ESG discussions, which were found to increase forecast dispersion without affecting accuracy, the moderating effect of ESG performance may be less pronounced. However, high ESG performers' non-material discussions might still be interpreted as more reliable signals of management quality and stakeholder relationships, potentially dampening their effect on forecast dispersion.

However, ESG performance may also not significantly moderate these relationships for several reasons. First, analysts appear to focus primarily on the material financial implications of ESG information rather than overall ESG performance levels, as evidenced by the baseline findings that only material ESG discussions affect analyst forecast accuracy. Second, significant disagreement among ESG rating agencies in their assessments (Berg et al., 2022) makes it difficult for analysts to rely on ESG performance metrics as credible signals. Finally, given that ESG analysis represents a relatively new domain, analysts may lack the expertise to effectively differentiate and incorporate ESG performance information.

Table 3.5 presents the effect of ESG performance on the relationship between ESG discussion and analyst reaction. I follow Ahn et al. (2024) to manually classify MSCI/KLD ESG score into material and non-material scores based on SASB standards in following analysis and add them as interaction terms in the main models.

The results reveal limited evidence of ESG performance's moderating effect. For material ESG discussions, the interaction terms between *Material\_ESG* and *Material\_ESG\_Score* are not statistically significant across all specifications. This suggests that the impact of material ESG discussions on analyst responses is not significantly influenced by firms' ESG performance, supporting the view that analysts focus primarily on the financial implications of ESG discussions rather than firms' ESG track records. The main effects of ESG discussions remain consistent with the baseline results. Material ESG discussions (*Material\_ESG*) significantly reduce forecast accuracy and increase forecast dispersion, while non-material ESG discussions (*Nonmaterial\_ESG*) significantly increase forecast dispersion but do not significantly affect forecast accuracy.

These findings generally support the perspective that analysts' reactions to ESG discussions are primarily driven by the materiality and complexity of the information itself rather than firms' ESG performance levels. This could reflect the challenges analysts face in assessing ESG performance given the significant disagreement among ESG rating agencies (Berg et al., 2022) or the limited expertise of analysts in ESG analysis.

[Insert Table 3.5 ESG performance on ESG discussion and analyst response]

#### 3.5 Discussions

This study provides evidence on how financial analysts respond to different types of ESG discussions in earnings calls. The findings reveal distinct patterns in how material and non-material ESG discussions affect analyst behavior. Material ESG discussions lead to reduced forecast accuracy and greater forecast dispersion, while non-material ESG discussions increase dispersion without significantly affecting accuracy. Additionally, the complexity of ESG discussions, particularly non-material ESG discussions, further reduces forecast accuracy and increases dispersion.

These findings connect with and extend the results from my previous chapter, which demonstrated that CEOs strategically use ESG discussions in earnings calls, particularly when facing career concerns. My earlier findings showed that CEOs with career concerns tend to increase material ESG discussions, which are characterized by greater complexity and more positive tone. The current chapter reveals the consequences of this strategic behavior for analyst forecasting. The negative relationship between material ESG discussions and forecast accuracy, coupled with the significant negative effect of material ESG complexity on accuracy, suggests that analysts struggle to effectively process and incorporate potentially strategic ESG disclosures into their forecasts. This finding is particularly noteworthy given that material ESG information should theoretically improve forecast accuracy by providing value-relevant information. The results suggest that analysts can distinguish between material and non-material ESG information, but face different challenges in processing each type. For non-material ESG discussions, the challenge lies in interpretation, leading to greater dispersion in forecasts as analysts take different views on their implications. For material ESG discussions, the challenge lies in quantification and incorporation into valuation models, resulting in reduced forecast accuracy and increased dispersion.

These findings contribute to our understanding of the evolving role of ESG information in capital markets and highlight the importance of clear, straightforward ESG communication for effective information processing by market participants. They also reveal a potential unintended consequence of the strategic use of ESG disclosures by managers: while increased complexity in ESG discussions may serve CEOs' impression management goals, it degrades the information environment by reducing forecast accuracy and increasing disagreement among analysts. This suggests potential benefits from standardization in ESG reporting and enhanced analyst training in ESG analysis to improve the incorporation of ESG information into financial forecasts and valuations, and to mitigate the potentially detrimental effects of strategic ESG disclosures.

## Conclusions

This thesis examines strategic ESG discussions in corporate earnings calls through three interconnected studies, focusing on measurement methodology, managerial incentives, and market consequences. It provides novel insights into three key aspects of ESG communications in earnings calls: first, how to measure and differentiate between material and non-material ESG discussions; second, how CEOs leverage ESG discussions strategically to address career concerns; and third, how financial analysts, as key market intermediaries, respond to these different types of ESG information.

The first chapter develops and validates a comprehensive methodology for measuring material and non-material ESG discussions in earnings calls using a combination of established ESG keyword dictionaries and state-of-the-art machine learning techniques. The analysis reveals that while ESG discussions constitute about 22% of earnings call content, non-material issues (17%) significantly outweigh material ones (5%). Material ESG discussions are found to be positively associated with firm value, while non-material ESG discussion crowds out material financial information that is valuable to stakeholders, leading to information asymmetry.

The second chapter examines how CEO career concerns influence strategic ESG communications during earnings calls. Using a predicted probability model for CEO dismissal, the research finds that CEOs with greater career concerns significantly increase their material ESG discussions. Further analysis finds that these discussions employ complex language and positive tone without corresponding improvements in future ESG

performance. This suggests that CEOs strategically use ESG discussions, particularly material ones, to divert attention from performance concerns rather than signal genuine commitment to sustainability initiatives.

The third chapter study investigates how analysts respond to different types of ESG discussions in earnings calls. The findings reveal distinct patterns in how material and nonmaterial ESG discussions affect analyst behavior. Material ESG discussions significantly reduce forecast accuracy and increase forecast dispersion, while non-material ESG discussions increase dispersion without significantly affecting accuracy. Additionally, the linguistic complexity of ESG discussions further reduces forecast accuracy and increases dispersion. These patterns suggest that the strategic usage and complexity of ESG discussions create significant processing challenges for analysts.

This thesis reveals a potentially concerning dynamic: CEOs with career concerns strategically increase material ESG discussions in earnings calls, using them as a greenwashing tool rather than reflecting genuine ESG commitment, while analysts struggle to effectively incorporate this material ESG information into their forecasts, leading to reduced accuracy despite its presumed financial relevance. This disconnect between the strategic usage of ESG disclosures and analysts' processing challenges suggests that even as ESG becomes important to corporate communications, the current ESG discussions in earnings calls may not be serving its intended purpose of improving market transparency and information quality. The limited moderating effect of firms' actual ESG performance on analyst responses, as demonstrated in Chapter 3, further highlights the challenges in the

current ESG disclosure landscape. Even when firms have strong ESG performance, the strategic usage and complexity of ESG discussions in earnings calls continue to impede effective information processing by analysts. This finding emphasizes the need for more standardized, verifiable, and straightforward ESG reporting frameworks that can bridge the gap between corporate communications and market understanding.

The findings of this thesis have significant implications for various stakeholders in financial markets. For companies, the research suggests the need to balance strategic communications with genuine ESG commitment and to present material ESG information in clear, straightforward language to maintain credibility with stakeholders and improve analyst understanding. For investors and analysts, the findings underscore the importance of distinguishing between material and non-material ESG discussions, recognizing potential strategic motivations behind ESG communications, and developing enhanced analytical capabilities to process complex ESG information. For regulators and standard setters, the research validates the importance of materiality frameworks while highlighting the need for continued development of ESG disclosure standards that can effectively capture and communicate material ESG information in a way that facilitates accurate market pricing and forecasting.

Overall, this thesis contributes to our understanding of strategic ESG communications in financial markets by developing robust measurement methodologies, identifying managerial incentives, and examining market consequences. The research reveals how ESG discussions serve as a strategic tool in corporate communication and how

this strategic behavior affects market participants' ability to process and incorporate ESG information. Future research could extend these findings by examining how the evolution of ESG reporting standards and increasing regulatory requirements affect strategic ESG communications, and how different types of investors respond to material versus non-material ESG discussions in earnings calls.

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# Appendix

Appendix 1A. 26 ESG	Metrics in	SASB Standards
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Environment	Social Capital	Human Capital	Business Model and Innovation	Leadership and Governance
GHG Emissions	Human Rights &	Labour Practices	Product Design &	Business Ethics
GITO Emissions	Relations	Lubbul Huetlees	Management	Dusiness Lunes
Air Quality	Customer Privacy	Employee Health & Safety	Business Model Resilience	Competitive Behaviour
Energy Management	Data Security	Employee Engagement, Diversity & Inclusion	Supply Chain Management	Management of the Legal & Regulatory Environment
Water & Wastewater Management	Access & Affordability		Materials Sourcing & Efficiency	Critical Incident Risk Management
Waste & Hazardous Materials Management	Product Quality & Safety		Physical Impacts of Climate Change	Systemic Risk Management
Ecological Impacts	Customer Welfare			
	Selling Practices & Product Labeling			

# Appendix 1B. Example of Material and Non-material ESG Content

Earnings call title	Sentences	ESG metrics	Industry	
InterOil Managemer	nt (IOC) Discusses Q2 2013			
Material	And as I always like to report our safety record, at the end of the second quarter of 2013, our total safe time without a lost time incident is now just over 9 million man-hours for our InterOil employees and staff, with the refinery making up 5.3 million of that.	Employee Health and Safety	Oil, Gas & Consumable Fuels	
Non-material	And we have an opportunity here, where we have existing seismic, good logistics, to get a well in and test the models that we have for this trend.	Systemic Risk Management	T dells	
Cache (CACH) Man	agement Discusses Q2 2013			
Material	The way we've done staffing test, we've had an amazing result in terms of 5% to 10% better than how the whole chain is working by having just the right people in the right place at the right time.	Employee Engagement Inclusion and Diversity	Specialty Retail	
Non-material	Moving forward, you will also see us more rigorous see us use more rigorous testing, which I have applied in my previous positions to gain insight into the strong sellers for upcoming seasons.	Business Model Resilience		
e-Future Information	n Technology's (EFUT) CEO Discusses Q2 2013			
Material	Some of these risks are beyond the company's control and could cause actual results to differ materially from those mentioned in today's press release and this discussion.	Systemic Risk Management	Software	
Non-material	Our ongoing customer engagement and marketing efforts to strengthen the brand and support the sales team continues to gain momentum.	Business Model Resilience		
Aratana's (PETX) C	EO Discusses Q2 2013			
Material	We achieved this by targeting certain key attributes, one, safety data in at least one target species, two, human or mammalian efficacy data, and three, appropriately scale manufacturing.	Product Quality and Safety	Pharmaceuticals	
Non-material	It really is helping us to get to the potential partners and bring in the best molecules and develop these innovations for these members of our family.	Product Design and Lifecycle Management		

# Appendix 1C. Variable Definition

Variable	Definition
Dependent variables	
Total_ESG	The proportion of total ESG-related words in the presentation sections of a firm's earnings calls in the current fiscal quarter.
Material_ESG	The proportion of material ESG-related words in the presentation sections of a firm's earnings calls in the current fiscal quarter.
Nonmaterial_ESG	The proportion of non-material ESG-related words in the presentation sections of a firm's earnings calls in the current fiscal quarter.
Independent variable	
Tobin's Q_Next	Tobin's Q in the next quarter. Tobin's Q is calculated by (total asset + market value of shares - book value of equity)/total assets, adjusted at industry level
Illiquidity	Illiquidity in the next quarter, calculated by firm's return divided by daily volume
Controls	
Firm Size	The natural logarithm of the firm's total assets
Leverage	Leverage ratio
Tobin's Q_cur	Tobin's Q in current quarter, calculated by (total asset + market value of shares - book value of equity)/total assets, adjusted at industry level
Loss	The indicator equals 1 if loss, otherwise 0
EPS_Volatility	EPS's volatility in the past 12 quarters
Surprise	The difference between the firm's actual EPS and analysts forecast, scaled by firm's stock price and presented as percentage
Analyst	The number of analysts that report forecast for the firm in current fiscal quarter
ESG_Score	ESG performance score

Appendix 2A. V	ariable Definition
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Variable	Definition
Dependent variables	
Total_ESG	The mean proportion of total ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year.
Material_ESG	The mean proportion of material ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year.
Nonmaterial_ESG	The mean proportion of non-material ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year.
Total_ESG_peer	The mean of <i>Total_ESG</i> of a firm's industry peer within a year
Material_ESG_peer	The mean of <i>Material_ESG</i> of a firm's industry peer within a year
Nonmaterial_ESG_peer	The mean of <i>Nonmaterial_ESG</i> of a firm's industry peer within a year
Total_ESG_fog	The mean fog index of the total ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year.
Material_ESG_fog	The mean fog index of the material ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year.
Nonmaterial_ESG_fog	The mean fog index of the non-material ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year.
Total_ESG_tone	The tone of the total ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year, calculated by the difference between positive and negative words scaled by total words of ESG related content.
Material_ESG_tone	The tone of the material ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year, calculated by the difference between positive and negative words scaled by total words of material ESG related content.
Nonmaterial_ESG_tone	The tone of the non-material ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year, calculated by the difference between positive and negative words scaled by total words of non-material ESG related content.

Total_ESG_disparity	The difference between the industry-year deciles of a firm's Total ESG discussion <i>(Total_ESG)</i> in the current year and the industry-year deciles of its actual performance <i>(ESG_Score)</i> in the next year.
Material_ESG_disparity	The difference between the industry-year deciles of a firm's material ESG discussion <i>(Material_ESG)</i> in the current year and the industry-year deciles of its actual performance <i>(ESG_Score)</i> in the next year.
Nonmaterial_ESG_disparity	The difference between the industry-year deciles of a firm's non-material ESG discussion <i>(Nonmaterial_ESG)</i> in the current year and the industry-year deciles of its actual performance <i>(ESG_Score)</i> in the next year.

# Independent variable

CareerConcern	The estimated probability of CEO dismissal using a logit model	
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#### Controls

ESG_Score	Firm's ESG performance score from Refinitiv database
Firm Size	The natural logarithm of firm's total assets
Market-to-book	Market to book ratio
Adj ROA	Return of assets adjusted at industry level
EPS_Volatility	EPS's volatility in the past 4 quarters (in the past 3 years in Essay 2)
Leverage	Leverage ratio
Loss	The indicator equals 1 if loss, otherwise 0.
Surprise	The difference between the firm's actual EPS and analysts forecast, scaled by firm's stock price and presented as percentage
Analyst	The number of analysts that report forecast for the firm in the current fiscal year
Capital Investment	The total capital expenditure divided by total assets
R&D expense	The total R&D expenditure divided by total assets
CEO stock compenstation	The proportion of CEO's stock/option compensation in total compensation
Institutional	The ratio of institutional holding over the total shares
Block	The ratio of block holding over the total shares
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CEO duality	The indicator equals 1 if a CEO is also a director, otherwise 0.
CEO tenure	The length of time that an individual has served as CEO
Sustainable_inv	The ratio of sustainable institutional holding over the total shares
CEO_dismissal_industry	The mean of CEO dismissal in the SIC 2-digit industry in current fiscal year
CEO_supply	The total number of top five executives close to 53 years old within the SIC 2-digit industry in current fiscal year

Appendix 3A.	Variable	Definition
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Variable	Definition
Dependent variables	
DISP	The standard deviation of analyst forecasts for the next quarter issued after the earnings call
ACCURACY	Negative one times the average absolute difference between a firm's actual performance for the next quarter and analyst forecasts issued after the earnings call, scaled by the firm's stock price prior to the earnings call.
Independent variable	
Material_ESG	The proportion of material ESG-related words in the presentation sections of a firm's earnings calls in the current fiscal quarter.
Nonmaterial_ESG	The proportion of non-material ESG-related words in the presentation sections of a firm's earnings calls in the current fiscal quarter.
Material_ESG_fog	The log of the fog index of the material ESG-related content in the presentation section of a firm's quarterly earnings calls.
Nonmaterial_ESG_fog	The log of the fog index of the non-material ESG-related content in the presentation section of a firm's quarterly earnings calls.
Controls	
Firm Size	The natural logarithm of firm's total assets.
Leverage	Leverage ratio.
Book-to-market	Book to market ratio.
QTR4	An indicator equals 1 if the quarter is the fourth quarter of the fiscal year, otherwise 0.
Loss	The indicator equals 1 if loss, otherwise 0.
EPS_Volatility	EPS's volatility in the past 12 quarters.

BNEW	The indicator equals 1 if the firm has a negative unexpected earnings in the current quarter. Unexpected earning is calculated by the difference between analyst forecast and actual EPS.
Coverage	The number of analysts who provide forecasts for current fiscal quarter.
Tenure	CEO tenure.
Institutional	The proportion of institutional shareholders for the firm.
ESG_Score	ESG performance score
MESG_Score	Material ESG score classified based on SASB standards, following Ahn et al. (2024)'s method.
NMESG_Score	Non-material ESG score classified based on SASB standards, following Ahn et al. (2024)'s method.

### Figures

#### Figure 1.1 Mean of ESG 26 Metrics in Earnings Call by Categories

This figure illustrates the mean emphasis on 26 ESG metrics during earnings calls, categorized into five groups: Leadership and Governance, Business Model and Innovation, Human Capital, Social Capital, and Environment. The analysis is based on sentence proportions from a sample of 158,990 earnings calls between Q4 2005 and Q4 2022, averaging 2,773 calls per quarter. The metrics are defined by SASB standards and displayed as horizontal bars, with different colors representing each of the five ESG categories. The statistic on this figure is based on the sentence proportion instead of word counts in sentence proportion.



Mean of ESG 26 Metrics in Earnings Call by Categories

### Figure 1.2 Material, Non-material and Total ESG Emphasis Over Time in Earnings

Call

This figure shows the quarterly trends in ESG emphasis during earnings calls from 2005 to 2023, broken down into three categories: Material ESG Emphasis, Non-material ESG Emphasis, and Total ESG Emphasis. The three lines track the evolution of ESG discussions, with material ESG topics (red line) showing consistently lower emphasis compared to non-material ESG topics (blue line), while the total ESG emphasis (green line) represents the combined trends of both categories.



### Figure 1.3 Material and Non-material ESG Emphasis Over Time in Three Parts of

#### **Earnings Call**

This figure presents comparative quarterly trends in material and non-material ESG emphasis in earnings calls from 2005 to 2023, separated into two panels. Each panel tracks three distinct components of earnings calls: Presentation (red line), Questions (purple line), and Answers (orange line). The left panel shows the trends for material ESG topics, while the right panel displays non-material ESG topics.



Material and Non-Material ESG Emphasis Over Time

#### Figure 1.4 Material, Non-material, and Total ESG by Sector

This figure shows the ESG emphasis across various GICS sectors, broken down into three components: Material ESG (pink), Non-material ESG (blue), and Total ESG (green). It displays ten different sectors ranging from Energy to Utilities. There are 11 sectors under GICS classification. The Real Estate is combined into Financials sector due to their close operational interdependence. For each sector, three bars represent the relative emphasis on material, non-material, and total ESG topics, with the total values labeled above each green bar.



### Tables

### Table 1.1 Descriptive statistics

	Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Total_ESG	0.211	0.080	1												
2	Material_ESG	0.055	0.046	0.648	1											
3	Nonmaterial_ESG	0.156	0.061	0.816	0.094	1										
4	Tobin's $Q_Next$	0.620	1.703	0.093	0.101	0.046	1									
5	Illiquidity	0.005	0.022	0.100	0.066	0.081	-0.073	1								
6	Firm Size	8.278	1.778	-0.236	-0.233	-0.134	-0.229	-0.306	1							
7	Leverage	0.258	0.214	-0.038	0.044	-0.083	-0.050	-0.021	0.071	1						
8	Tobin's Q_cur	0.631	1.723	0.092	0.102	0.045	0.927	-0.072	-0.235	-0.059	1					
9	Loss	0.233	0.423	0.218	0.219	0.121	0.038	0.192	-0.337	0.059	0.044	1				
10	EPS_volatility	2.566	7.310	0.009	0.013	0.003	-0.079	0.045	-0.037	0.050	-0.078	0.114	1			
11	Surprise	0.039	3.662	-0.006	-0.007	-0.003	0.001	-0.052	0.016	-0.009	-0.004	-0.104	-0.009	1		
12	Analyst	11.010	7.409	-0.144	-0.032	-0.163	0.126	-0.220	0.514	-0.066	0.125	-0.149	-0.057	0.012	1	
13	ESG Score	0.416	0.190	-0.029	-0.032	-0.014	-0.055	-0.181	0.541	0.060	-0.063	-0.199	-0.023	0.026	0.338	1

Note: This table reports the mean, standard deviation, and Pearson correlations for dependent and independent variables in the main tests. Continuous variables are winsorized at top and bottom 1%. Bold numbers denote statistical significance. Variables are defined in Appendix 1A

	(1)	(2)
	Tobin's Q_next	Tobin's Q_next
Material	4.862***	3.443***
	(0.684)	(0.624)
Nonmaterial	-0.729**	-0.786**
	(0.354)	(0.329)
Firm Size		-0.462***
		(0.026)
Leverage		0.087
0		(0.153)
Loss		-0.275***
		(0.047)
EPS volatility		-0.014***
_ ,		(0.002)
Surprise		-0.003
1		(0.002)
Analyst		0.089***
·		(0.005)
ESG Score		0.282*
—		(0.153)
Constant	0.467***	3.357***
	(0.071)	(0.184)
Year-Quarter FE	Yes	Yes
Industry FE	Yes	Yes
N	65016	65016
adj. R-sq	0.114	0.218

### Table 1.2 Firm value and ESG discussions

*Note:* This table presents the relationship between material and non-material ESG discussions and firm value. The dependent variable is *Tobin's Q\_next*, which is the industry-adjusted Tobin's Q in the next quarter. The key independent variables are *Material* and *Nonmaterial*, representing the proportion of material and non-material ESG-related discussions in earnings call presentations, respectively. Column (1) shows the baseline model with only ESG discussion variables. Column (2) includes additional firm-level control variables. All variable definitions are detailed in Appendix 1C. Both specifications include industry and year-quarter fixed effects to control for industry-specific material ESG classifications and time-varying effects. Standard errors are clustered by firm and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)
	Illiauidity	(_) Illiauidity
Material	0.003	0.005
	(0,008)	(0,007)
Nonmaterial	0.022***	0.007**
10mmater tat	(0.004)	(0,003)
Firm Size		-0.005***
1 1111 5120		(0,000)
Lovarage		-0.001
Leveruge		(0,001)
Tobin's O cur		0.007***
Tobin's Q_cur		-0.002
Logg		(0.000)
LOSS		(0,000)
EDS and atility		(0.000)
EPS_volalility		0.000
a .		(0.000)
Surprise		-0.000****
		(0.000)
Analyst		-0.000
		(0.000)
ESG_Score		0.002*
		(0.001)
Constant	0.001*	0.041***
	(0.001)	(0.002)
Year-Quarter FE	Yes	Yes
Industry FE	Yes	Yes
Ν	65016	65016
adj. R-sq	0.065	0.169

#### Table 1.3 Information asymmetry and ESG discussions

*Note:* This table presents the relationship between material and non-material ESG discussions and information asymmetry. The dependent variable is *Illiquidity*, which is measured as follows:

$$Illiquidity_{t+1} = \frac{|R_{t+1}|}{DVolume_{t+1}},$$

The key independent variables are *Material* and *Nonmaterial*, representing the proportion of material and non-material ESG-related discussions in earnings call presentations, respectively. Column (1) shows the baseline model with only ESG discussion variables. Column (2) includes additional firm-level control variables. All variable definitions are detailed in Appendix 1C. Both specifications include industry and year-quarter fixed effects to control for industry-specific material ESG classifications and time-varying effects. Standard errors are clustered by firm and reported in parentheses. \*\*\*, \*\*, and \*

denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)
	Logit Model
Firm Size	-0.010
	(0.030)
Market-to-book	0.008
	(0.011)
Adjusted ROA	-2.517***
	(0.408)
Capital Investment	0.212
	(0.773)
R&D expenses	0.768
	(0.713)
CEO stock compensation	0.538***
-	(0.161)
Institutional holding	-0.400***
	(0.146)
Blocking holding	0.087***
	(0.022)
CEO duality	0.385
	(0.518)
CEO tenure	-0.030***
	(0.007)
_cons	-3.552***
	(0.584)
χ2	129.24***
N	16333

### Table 2.1 Forecasting CEO dismissal probability

*Note:* This table reports the estimation of CEO dismissal probability using Model (1). I use the results from this table to construct *CareerConcern* measure. The dependent variable is the *CEO dismissal*, which is 1 if during a given year the firm's CEO is dismissed, and equal to 0 otherwise. The control variables are the 10 variables that are previously identified by the literature as important determinants of CEO dismissal. These variables are defined in detail in Appendix 2A. The standard error is reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Decile of CareerConcern	Logistics Model
1	6.4
2	6.2
3	7.0
4	7.3
5	7.7
6	7.6
7	9.6
8	10.6
9	13.1
10	24.4

### Table 2.2 Forecast accuracy using logistics model

*Note:* This table reports the out-of-sample accuracy of the CEO dismissal estimations. The CEO dismissal probability is sorted into deciles. The percentage of actual CEO dismissal incidents are displayed for each decile.

	Variables	Mean	SD	4	5	6	7	8	9	10	11	12
1	Total_ESG	0.253	0.088									
2	Material_ESG	0.058	0.050									
3	Nonmaterial_ESG	0.194	0.074									
4	CareerConcern	0.033	0.014	1								
5	Firm Size	8.711	1.579	-0.099***	1							
6	Leverage	0.251	0.196	0.0741***	0.023***	1						
7	Market-to-book	3.539	7.561	0.080***	-0.061***	-0.032***	1					
8	Loss	0.143	0.351	0.335***	-0.146***	0.121***	-0.030***	1				
9	EPS_volatility	0.514	1.345	0.206***	-0.113***	0.005	0.004	0.343***	1			
10	Analyst	4.160	0.862	-0.092***	0.554***	-0.075***	0.0599***	-0.092***	-0.016*	1		
11	Institutiaonl	0.127	0.114	-0.187***	-0.075***	0.008	-0.022***	-0.048***	-0.054***	-0.136***	1	
12	ESG_Score	0.440	0.189	-0.023***	0.512***	0.044***	0.032***	-0.092***	-0.078***	0.320***	-0.016*	1

 Table 2.3 Descriptive statistics and correlations (2005-2020)

*Note:* This table reports the mean, standard deviation, and Pearson correlations for dependent and independent variables in the main tests. Continuous variables are winsorized at top and bottom 1%. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Variables are defined in Appendix 2A.

	(1)	(2)	(3)
	Total ESG	Material ESG	Nonmaterial ESG
CareerConcern	0.165*	0.105***	0.062
	(0.089)	(0.039)	(0.075)
Firm Size	-0.006***	-0.001	-0.005***
	(0.001)	(0.001)	(0.001)
Leverage	-0.029***	-0.008**	-0.020***
	(0.008)	(0.003)	(0.006)
Market-to-book	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Loss	0.007**	0.002*	0.005**
	(0.003)	(0.001)	(0.002)
EPS volatility	0.001	0.000	0.001
_ ,	(0.001)	(0.000)	(0.001)
Analyst	0.006***	0.005***	0.002
2	(0.002)	(0.001)	(0.002)
Sustainable inv	0.001	0.002	-0.002
—	(0.014)	(0.006)	(0.012)
ESG Score	0.036***	0.015***	0.023***
—	(0.009)	(0.004)	(0.007)
Constant	0.261***	0.038***	0.223***
	(0.011)	(0.005)	(0.009)
Year F.E.	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes
N	13730	13730	13730
adi. R-sa	0.360	0.622	0.370

### Table 2.4 Baseline regression – CEO career concern and ESG discussions

*Note:* This table reports the results of baseline regression. The independent variable of interest is *CareerConcern*, an estimation of CEO dismissal probability as illustrated in Section 2.3.1. The dependent variable in Column (1) is the mean proportion of total ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year (*Total\_ESG*). The dependent variable in Column (2) is the mean proportion of material ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year (*Material\_ESG*). The dependent variable in Column (3) is the mean proportion of non-material ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year (*Material\_ESG*). The dependent variable in Column (3) is the mean proportion of non-material ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year (*Nonmaterial\_ESG*). All control variables are defined in detail in Appendix 2A. *Year FE* and *Industry FE* are year and industry fixed effect, respectively. Standard errors are clustered by firms to account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)	(3)
	Total_ESG	Material_ESG	Nonmaterial_ESG
CareerConcern	0.212*	0.125**	0.090
	(0.128)	(0.053)	(0.112)
Firm Size	-0.006	-0.001	-0.006**
	(0.004)	(0.002)	(0.003)
Leverage	-0.027*	-0.003	-0.020
C	(0.016)	(0.008)	(0.014)
Market-to-book	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Loss	0.008***	-0.001	0.010***
	(0.003)	(0.001)	(0.002)
EPS volatility	0.001	-0.000	0.001
_ ,	(0.001)	(0.000)	(0.001)
Analyst	0.006	0.004*	0.004
	(0.004)	(0.002)	(0.004)
Sustainable inv	-0.011	0.002	-0.020*
—	(0.013)	(0.006)	(0.011)
ESG Score	0.007	-0.000	0.000
—	(0.015)	(0.007)	(0.013)
Total ESG Lag	0.436***		
0	(0.027)		
Material ESG Lag		0.292***	
0		(0.037)	
Nonmaterial ESG Lag			0.372***
0			(0.025)
Constant	0.106**	0.054**	0.086**
	(0.048)	(0.026)	(0.041)
Year F.E.	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes
N	11673	11673	11673
Sargan-Hansen (p-val)	0.417	0.140	0.599

Table 2.5 Endogeneity concern - System GMM method

*Note:* This table reports the results of baseline regression using system GMM estimation method. The independent variable of interest is *CareerConcern*, an estimation of CEO dismissal probability as illustrated in Section 2.3.1. The dependent variable in Column (1) is the mean proportion of total ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year (*Total\_ESG*). The dependent variable in Column (2) is the mean proportion of material ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year (*Material\_ESG*). The dependent variable in Column (3) is the mean proportion of non-material ESG-related words in the presentation

sections of a firm's quarterly earnings calls within a fiscal year (*Nonmaterial\_ESG*). The lagged value of dependent variable is added as a control. The GMM-style instruments are one to three lagged values of all right-hand-side variables. The IV style instruments are the industry level CEO dismissal rate (*CEO\_dismissal\_industry*) and the supply of executives of certain age that have potential to become a CEO in labor market (*Supply\_CEO*), and are defined in detail in the text and Appendix 2A. The *p*-values from Sargan-Hansen test are also provided ( $H_0$  is "the instruments as a group are exogenous"). All control variables are defined in detail in Appendix B. *Year FE* and *Industry FE* are year and industry fixed effects, respectively. Standard errors are clustered by firms to account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)	(3)
	Total ESG	Material ESG	Nonmaterial ESG
CareerConcern	0.174*	0.106***	0.067
	(0.089)	(0.039)	(0.075)
Firm Size	-0.006***	-0.001*	-0.005***
1 1111 5120	(0.002)	(0.001)	(0.001)
Leverage	-0.028***	-0.008**	-0.020***
Leveluge	(0.008)	(0.003)	(0.006)
Market-to-book	0.000	0.0000	0.000
	(0.000)	(0.000)	(0.000)
Loss	0.007**	0.002*	0.005**
2000	(0.003)	(0.001)	(0.002)
EPS volatility	0.001	0.000	0.001
	(0.001)	(0.000)	(0.001)
Analvst	0.006***	0.005***	0.001
	(0.002)	(0.001)	(0.002)
Sustainable inv	0.003	0.001	-0.001
	(0.014)	(0.006)	(0.012)
ESG Score	0.036***	0.015***	0.023***
—	(0.009)	(0.004)	(0.007)
Total ESG peer	-0.215***		
	(0.047)		
Material ESG peer		0.161***	
		(0.042)	
Nonmaterial ESG peer			-0.159***
			(0.061)
Constant	0.314***	0.029***	0.246***
	(0.017)	(0.005)	(0.013)
Year F.E.	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes
N	13628	13628	13628
adj. R-sq	0.362	0.625	0.370

### Table 2.6 Robustness check – Industry peer control

*Note:* This table reports the results of robustness check by adding firm's industry peers' ESG discussion. The independent variable of interest is *CareerConcern*, an estimation of CEO dismissal probability as illustrated in Section 2.3.1. The dependent variable in Column (1) is the mean proportion of total ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year (*Total\_ESG*). The dependent variable in Column (2) is the mean proportion of material ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year (*Material\_ESG*). The dependent variable in Column (2) is the mean proportion of non-material ESG-related words in the presentation sections of a firm's quarterly earnings calls within a fiscal year (*Material\_ESG*). The dependent variable in Column (3) is the mean proportion of non-material ESG-related words in the presentation

sections of a firm's quarterly earnings calls within a fiscal year (*Nonmaterial\_ESG*). The mean ESG discussion of GICS industry peers in a given year are controlled in each column. All control variables are defined in detail in Appendix 2A. *Year FE* and *Industry FE* are year and industry fixed effect, respectively. Standard errors are clustered by firms to account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)	(3)
	Total_ESG_disparity	Material_ESG_disparity	Nonmaterial_ESG_disparity
CareerConcern	6.929*	8.164**	3.131
	(3.905)	(3.861)	(3.822)
Firm Size	-0.285***	-0.171***	-0.230***
	(0.062)	(0.063)	(0.058)
Leverage	-1.090***	-0.769**	-1.327***
0	(0.336)	(0.335)	(0.321)
Market-to-book	0.003	0.009*	-0.002
	(0.006)	(0.005)	(0.006)
Loss	0.317**	0.205	0.504***
	(0.130)	(0.125)	(0.127)
EPS volatility	0.059	0.056	0.054
_ ,	(0.039)	(0.035)	(0.039)
Analyst	0.103	0.234**	-0.438***
2	(0.099)	(0.098)	(0.096)
Sustainable inv	-0.481	-0.889	-0.732
—	(0.586)	(0.563)	(0.573)
ESG Score	-11.463***	-11.389***	-11.586***
—	(0.397)	(0.373)	(0.386)
Constant	6.835***	5.190***	8.900***
	(0.477)	(0.457)	(0.453)
Year F.E.	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes
N	11673	11673	11673
adj. R-sq	0.342	0.310	0.371

### Table 2.7 Additional test – CEO career concern and Disparity between ESG

discussions and future performance

*Note:* This table reports the results of additional test on the correlation between CEO career concern and the disparity between ESG discussions and actual future performance. The independent variable of interest is *CareerConcern*, an estimation of CEO dismissal probability as illustrated in Section 2.3.1. The dependent variable in Column (1) is the difference between the industry-year deciles of a firm's Total ESG discussion (*Total\_ESG*) in the current year and the industry-year deciles of its actual performance (*ESG\_Score*) in the next year (*Total\_ESG\_disparity*). The dependent variable in Column (2) is the difference between the industry-year deciles of a firm's material ESG discussion (*Material\_ESG*) in the current year and the industry-year deciles of a firm's non-material ESG discussion (*Material\_ESG\_disparity*). The dependent variable in Column (3) is the difference between the industry-year deciles of a firm's non-material ESG discussion (*Nonmaterial\_ESG\_disparity*). All control variables are defined in detail in Appendix 2A. *Year FE* and *Industry FE* are year and industry fixed effect, respectively. Standard errors are clustered by firms to

account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)	(3)
	Total_ESG_fog	Material_ESG_fog	Nonmaterial_ESG_fog
CareerConcern	2.608	12.750***	2.999
	(1.838)	(3.659)	(1.997)
Firm Size	0.025	0.023	0.036
	(0.027)	(0.058)	(0.030)
Leverage	0.163	-0.407	0.2561
-	(0.164)	(0.309)	(0.173)
Market-to-book	0.001	-0.007	0.001
	(0.002)	(0.006)	(0.003)
Loss	0.166***	0.138	0.211***
	(0.055)	(0.103)	(0.060)
EPS volatility	-0.001	-0.015	0.006
_ ,	(0.012)	(0.022)	(0.013)
Analyst	-0.075*	-0.007	-0.070
	(0.042)	(0.092)	(0.045)
Sustainable inv	-0.421	-2.335***	-0.249
—	(0.286)	(0.541)	(0.315)
ESG Score	-0.081	0.671*	0.014
—	(0.179)	(0.346)	(0.198)
Constant	13.577***	13.235***	13.382***
	(0.210)	(0.454)	(0.231)
Year F.E.	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes
N	13730	13730	13730
adj. R-sq	0.176	0.271	0.168

### Table 2.8 Additional test – CEO career concern and ESG linguistic complexity

*Note:* This table reports the results of additional test on the correlation between CEO career concern and ESG linguistic complexity. The independent variable of interest is *CareerConcern*, an estimation of CEO dismissal probability as illustrated in Section 2.3.1. The dependent variable in Column (1) is the mean fog index of the total ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year (*Total\_ESG\_fog*). The dependent variable in Column (2) is the mean fog index of the material ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year (*Material\_ESG\_fog*). The dependent variable in Column (3) is the mean fog index of the non-material ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year (*Nonmaterial\_ESG\_fog*). All control variables are defined in detail in Appendix 2A. *Year FE* and *Industry FE* are year and industry fixed effect, respectively. Standard errors are clustered by firms to account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*,

and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)	(3)
	Total_ESG_tone	Material_ESG_tone	Nonmaterial_ESG_tone
CareerConcern	0.020**	0.044***	0.011
	(0.008)	(0.016)	(0.008)
Firm Size	0.000**	0.000	0.0003**
	(0.000)	(0.000)	(0.000)
Leverage	-0.001	-0.001	-0.001
-	(0.001)	(0.001)	(0.001)
Market-to-book	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)
Loss	-0.001***	-0.001**	-0.001***
	(0.000)	(0.001)	(0.000)
EPS volatility	-0.000*	-0.000*	-0.000
_ ,	(0.000)	(0.000)	(0.000)
Analyst	0.001***	0.001	0.001***
	(0.000)	(0.000)	(0.000)
Sustainable inv	-0.001	-0.003	0.000
—	(0.001)	(0.003)	(0.001)
ESG Score	0.003***	0.004***	0.002***
_	(0.001)	(0.001)	(0.001)
Constant	0.002*	0.006***	0.001
	(0.001)	(0.002)	(0.001)
Year F.E.	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes
Ν	13730	13730	13730
adj. R-sq	0.188	0.067	0.209

## Table 2.9 Additional test – CEO career concern and ESG discussion tone

*Note:* This table reports the results of additional test on the correlation between CEO career concern and ESG discussion tone. The independent variable of interest is *CareerConcern*, an estimation of CEO dismissal probability as illustrated in Section 2.3.1. The dependent variable in Column (1) is the tone of the total ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year, calculated by the difference between positive and negative words scaled by total words of ESG related content (*Total\_ESG\_tone*). The dependent variable in Column (2) is tone of the material ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year, calculated by total words of material ESG related content (*Material\_ESG\_tone*). The dependent variable in Column (2) is tone of the material words of material ESG related content (*Material\_ESG\_tone*). The dependent variable in Column (3) is tone of the non-material ESG-related content in the presentation section of a firm's quarterly words scaled by the difference between positive and negative words scaled by total words of material ESG related content (*Material\_ESG\_tone*). The dependent variable in Column (3) is tone of the non-material ESG-related content in the presentation section of a firm's quarterly earnings calls within a fiscal year, calculated by the difference between positive and negative words scaled by total words of a firm's quarterly earnings calls within a fiscal year, calculated by the difference between positive and negative words scaled by total words of a firm's quarterly earnings calls within a fiscal year, calculated by the difference between positive and negative words scaled by total words of non-material ESG related content (*Nonmaterial\_ESG\_tone*). All control variables are defined in detail in Appendix 2A. *Year FE* and *Industry FE* are year

and industry fixed effect, respectively. Standard errors are clustered by firms to account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	ACCURACY	-0.004	0.012	1.00																	
2	DISP	0.055	0.079	-0.35	1.00																
3	Material_ESG	0.056	0.056	0.00	0.07	1.00															
4	Nonmaterial_ESG	0.190	0.084	0.02	-0.02	-0.06	1.00														
5	Material_ESG_fog	2.434	0.893	-0.02	0.04	0.36	-0.02	1.00													
6	Nonmaterial_ESG_fog	2.657	0.155	-0.06	0.09	0.07	-0.17	0.05	1.00												
7	MESG_Score	0.013	0.036	0.06	0.00	0.03	0.05	0.01	-0.03	1.00											
8	NMESG_Score	0.013	0.039	0.06	0.02	0.01	0.08	0.00	-0.02	0.17	1.00										
9	Firm Size	8.361	1.658	0.02	0.16	-0.03	-0.09	-0.04	0.08	0.21	0.37	1.00									
10	Leverage	0.228	0.194	-0.06	0.12	0.13	-0.13	0.09	0.10	0.02	0.01	0.13	1.00								
11	Book-to-market	0.471	0.383	-0.32	0.13	-0.09	-0.03	-0.07	0.06	-0.10	-0.01	0.20	-0.19	1.00							
12	QTR4	0.255	0.436	-0.01	0.03	-0.01	0.02	0.02	-0.01	-0.01	-0.01	0.00	-0.02	0.00	1.00						
13	LOSS	0.143	0.350	-0.23	0.14	0.06	0.05	0.06	0.02	-0.03	-0.08	-0.13	0.07	0.15	0.05	1.00					
14	EPS_Volatility	2.197	6.366	-0.09	0.07	0.02	0.00	0.04	0.01	-0.03	-0.04	-0.04	0.03	0.13	0.01	0.18	1.00				
15	BNEW	0.269	0.444	-0.12	0.13	-0.00	-0.04	0.00	0.07	-0.04	-0.05	-0.02	0.05	0.11	0.01	0.16	0.03	1.00			
16	Coverage	2.401	0.607	0.09	0.02	0.06	-0.02	0.03	-0.02	0.18	0.19	0.49	-0.01	-0.11	-0.02	-0.06	-0.04	-0.10	1.00		
17	Institutional	0.696	0.321	0.01	0.05	0.08	0.01	-0.01	-0.00	-0.11	0.00	-0.03	0.08	0.01	-0.00	0.02	0.04	0.01	-0.06	1.00	
18	Tenure	7.539	7.003	0.02	-0.01	0.01	0.01	-0.06	-0.05	-0.06	-0.07	-0.12	-0.09	-0.02	-0.00	-0.03	-0.04	0.01	-0.05	0.01	1.00

### Table 3.1 Descriptive statistics (Q4 2005 - Q2 2020)

*Note:* This table reports the mean, standard deviation, and Pearson correlations for dependent and independent variables in the main tests. Continuous variables are winsorized at top and bottom 1%. Bold number denote statistical significance. Variables are defined in Appendix 3A.

	(1)	(2)
	ACCURACY	ACCURACY
Material_ESG	-0.0043**	
	(0.0017)	
Nonmaterial_ESG		-0.0005
_		(0.0008)
MESG Score	-0.0057**	
_	(0.0024)	
NMESG Score		-0.0004
—		(0.0021)
Firm Size	0.0004***	0.0003***
	(0.0001)	(0.0001)
Leverage	-0.0080***	-0.0080***
C	(0.0009)	(0.0009)
Book-to-market	-0.0089***	-0.0088***
	(0.0009)	(0.0009)
QTR4	-0.0012***	-0.0012***
~	(0.0002)	(0.0002)
LOSS	0.0002	0.0002
	(0.0001)	(0.0001)
EPS Volatility	-0.0048***	-0.0048***
_ ,	(0.0004)	(0.0004)
BNEW	-0.0000**	-0.0000**
	(0.0000)	(0.0000)
Coverage	0.0006**	0.0006*
C	(0.0003)	(0.0003)
Institutional	0.0003	0.0003
	(0.0003)	(0.0003)
Tenure	-0.0000	-0.0000
	(0.0000)	(0.0000)
Constant	-0.0015**	-0.0015**
	(0.0008)	(0.0008)
Year-Quarter FE	Yes	Yes
$\tilde{\sim}$ Industry FE	Yes	Yes
N	42999	42999
adi. R-sa	0.206	0.205

### Table 3.2 Material and non-material ESG discussion and analyst forecast accuracy

*Note:* This table reports the results of tests on material and non-material ESG discussion and analyst forecast dispersion. The independent variable of interest is *Material\_ESG* and *Nonmaterial\_ESG*, representing the proportion of material and non-material ESG-related discussions in earnings call presentations, respectively.

The dependent variable is analyst forecast accuracy (ACCURACY), defined as negative one times the average absolute difference between a firm's actual performance for the next quarter and analyst forecasts issued after the earnings call, scaled by the firm's stock price prior to the earnings call. All control variables are defined in detail in Appendix 3A. Year-Quarter FE and Industry FE are year-quarter and industry fixed effect, respectively. Standard errors are clustered by firms to account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)
	DISP	DISP
Material_ESG	0.0580***	
_	(0.0208)	
Nonmaterial_ESG		0.0233*
		(0.0120)
MESG_Score	-0.0260	
	(0.0275)	
NMESG_Score		-0.0420
		(0.0274)
Firm Size	0.0070***	0.0073***
	(0.0013)	(0.0013)
Leverage	0.0220***	0.0223***
	(0.0071)	(0.0071)
Book-to-market	0.0108***	0.0104***
	(0.0039)	(0.0039)
QTR4	0.0008	0.0007
-	(0.0008)	(0.0008)
LOSS	0.0236***	0.0238***
	(0.0026)	(0.0025)
EPS_Volatility	0.0004***	0.0004***
	(0.0001)	(0.0001)
BNEW	0.0149***	0.0149***
	(0.0013)	(0.0013)
Coverage	-0.0028	-0.0023
	(0.0027)	(0.0027)
Institutional	0.0096**	0.0102**
	(0.0040)	(0.0040)
Tenure	0.0003	0.0003
	(0.0002)	(0.0002)
Constant	-0.0277***	-0.0324***
	(0.0092)	(0.0104)
Year-Quarter FE	Yes	Yes
Industry FE	Yes	Yes
N	42999	42999
adi R-sa	0.175	0.174

### Table 3.3 Material and non-material ESG discussion and analyst forecast dispersion

*Note:* This table reports the results of tests on material and non-material ESG discussion and analyst forecast dispersion. The independent variable of interest is *Material\_ESG* and *Nonmaterial\_ESG*, representing the proportion of material and non-material ESG-related discussions in earnings call presentations, respectively. The dependent variable

is analyst forecast dispersion (*DISP*), defined as the standard deviation of analyst forecasts for the next quarter issued after the earnings call. All control variables are defined in detail in Appendix 3A. *Year-Quarter FE* and *Industry FE* are year-quarter and industry fixed effect, respectively. Standard errors are clustered by firms to account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)
	ACCURACY	ACCURACY	DISP	DISP
Material_ESG_fog	-0.0002***		0.0008	
	(0.0001)		(0.0006)	
Material_ESG	-0.0031*		0.0538**	
	(0.0017)		(0.0212)	
MESG_Score	-0.0058**		-0.0257	
	(0.0024)		(0.0275)	
Nonmaterial_ESG_fog		-0.0012***		0.0134***
		(0.0004)		(0.0052)
Nonmaterial_ESG		-0.0008		0.0268**
		(0.0008)		(0.0122)
NMESG_Score		-0.0006		-0.0403
		(0.0021)		(0.0274)
Firm Size	0.0004***	0.0003***	0.0070***	0.0073***
	(0.0001)	(0.0001)	(0.0013)	(0.0013)
Leverage	-0.0080***	-0.0079***	0.0220***	0.0218***
	(0.0009)	(0.0009)	(0.0071)	(0.0070)
Book-to-market	-0.0089***	-0.0088***	0.0108***	0.0103***
	(0.0009)	(0.0009)	(0.0039)	(0.0039)
QTR4	0.0002	0.0002	0.0007	0.0007
	(0.0001)	(0.0001)	(0.0008)	(0.0008)
LOSS	-0.0048***	-0.0048***	0.0236***	0.0237***
	(0.0004)	(0.0004)	(0.0026)	(0.0025)
EPS_Volatility	-0.0000**	-0.0000**	0.0004***	0.0004***
	(0.0000)	(0.0000)	(0.0001)	(0.0001)
BNEW	-0.0012***	-0.0012***	0.0149***	0.0148***
	(0.0002)	(0.0002)	(0.0013)	(0.0013)
Coverage	0.0007**	0.0006*	-0.0028	-0.0023
	(0.0003)	(0.0003)	(0.0027)	(0.0027)
Institutional	0.0003	0.0003	0.0096**	0.0101**
	(0.0003)	(0.0003)	(0.0040)	(0.0039)
Tenure	-0.0000	-0.0000	0.0003	0.0003
	(0.0000)	(0.0000)	(0.0002)	(0.0002)
Constant	-0.0011	0.0018	-0.0293***	-0.0686***
	(0.0008)	(0.0012)	(0.0092)	(0.0182)
Year-Quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	42999	42999	42999	42999
adj. R-sq	0.206	0.205	0.175	0.175

## Table 3.4 The Complexity of ESG discussion and analyst forecast

*Note:* This table reports the results of tests on the linguistic complexity of material and nonmaterial ESG discussion and analyst forecast. The independent variable of interest is *Material\_ESG\_fog* and *Nonmaterial\_ESG\_fog*, representing the log of the fog index of the material and non-material ESG-related content in the presentation section of a firm's quarterly earnings calls, respectively. The dependent variables in Columns (1) and (2) are analyst forecast accuracy (*ACCURACY*), defined as negative one times the average absolute difference between a firm's actual performance for the next quarter and analyst forecasts issued after the earnings call, scaled by the firm's stock price prior to the earnings call. The dependent variables in Columns (3) and (4) are analyst forecast dispersion (*DISP*), defined as the standard deviation of analyst forecasts for the next quarter issued after the earnings call. All control variables are defined in detail in Appendix 3A. *Year-Quarter FE* and *Industry FE* are year-quarter and industry fixed effect, respectively. Standard errors are clustered by firms to account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)
	ACCURACY	ACCURACY	DISP	DISP
Material_ESG	-0.004**		0.051***	
	(0.002)		(0.019)	
MESG_Score	-0.005		-0.041	
	(0.003)		(0.033)	
Material_ESG×MESG_Score	-0.013		0.246	
	(0.028)		(0.329)	
Nonmaterial_ESG		-0.000		0.022*
		(0.001)		(0.012)
NMESG_Score		0.002		-0.063
		(0.004)		(0.057)
Nonmaterial_ESG×NMESG_Score		-0.011		0.104
		(0.016)		(0.239)
Firm Size	0.000***	0.000***	0.007***	0.007***
	(0.000)	(0.000)	(0.001)	(0.001)
Leverage	-0.008***	-0.008***	0.022***	0.022***
	(0.001)	(0.001)	(0.007)	(0.007)
Book-to-market	-0.009***	-0.009***	0.011***	0.010***
	(0.001)	(0.001)	(0.004)	(0.004)
QTR4	0.000	0.000	0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.001)
LOSS	-0.005***	-0.005***	0.024***	0.024***
	(0.000)	(0.000)	(0.003)	(0.003)
EPS_Volatility	-0.000**	-0.000**	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
BNEW	-0.001***	-0.001***	0.015***	0.015***
	(0.000)	(0.000)	(0.001)	(0.001)
Coverage	0.001**	0.001*	-0.003	-0.002
	(0.000)	(0.000)	(0.003)	(0.003)
Institutional	0.000	0.000	0.010**	0.010**
	(0.000)	(0.000)	(0.004)	(0.004)
Tenure	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.002**	-0.002**	-0.027***	-0.032***
	(0.001)	(0.001)	(0.009)	(0.010)
Year-Quarter FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
N	42999	42999	42999	42999
adj. R-sq	0.206	0.205	0.175	0.174

# Table 3.5 The role of ESG performance on ESG discussion and analyst response

Note: This table reports the test of the role of ESG performance in the relationship between ESG discussion and analyst forecast. The independent variables of interest are the interaction terms Material ESG×MESG Score and Nonmaterial ESG×NMESG Score. Material ESG and Nonmaterial ESG represent the proportion of material and non-material ESG-related discussions in earnings call presentations, respectively. MESG Score and NMESG Score represent the material ESG and non-material ESG scores classified based on SASB standards, respectively. The dependent variables in Columns (1) and (2) are the analyst forecast accuracy (ACCURACY), defined as negative one times the average absolute difference between a firm's actual performance for the next quarter and analyst forecasts issued after the earnings call, scaled by the firm's stock price prior to the earnings call. The dependent variables in Columns (3) and (4) are the analyst forecast dispersion (DISP), defined as the standard deviation of analyst forecasts for the next quarter issued after the earnings call. All control variables are defined in detail in Appendix 3A. Year-Ouarter FE and Industry FE are yearquarter and industry fixed effect, respectively. Standard errors are clustered by firms to account for heteroscedasticity and reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.