The value of values: Does focusing on sustainability provide a competitive advantage in forecasting earnings?*

Salman Arif
University of Minnesota
salman@umn.edu

Nargess M. Golshan†
Indiana University

ORCID: 0000-0003-0417-9610
nargolsh@iu.edu

This Draft: July 10, 2024

*We thank Beth Blankespoor, Michael Clement, Patty Dechow, Will Demeré, Murray Frank, Jeffrey Hales, Russell Jame, Dave Larcker, Amy Hutton, Stan Markov, Maureen McNichols, Gans Narayanamoorthy, Joe Piotroski, Mark Piorkowski, Aneesh Raghunandan, Richard Sloan, Jenny Tucker, Sebastian A. Tideman-Frappart (discussant), Joel Waldfogel, conference participants at Stanford Accounting Summer Camp, George Washington University Cherry Blossom Conference, Haskayne and Fox Accounting Conference, and seminar participants at Indiana University, University of Illinois Chicago, University of Minnesota Applied Economics Workshop, Wake Forest University, and University of Kentucky for helpful comments and suggestions. We thank Jared Flake and Mark Piorkowski for sharing their code for merging I/B/E/S with Capital IQ analyst data. We thank Parabole.ai for sharing their fine-tuned BERT model to identify sustainability content in text. We thank the IFRS Foundation for providing the SASB standards and the SICS® dataset. We also thank Ziyi Liu and Minho Joen for excellent research assistance.

†Corresponding author.

The value of values: Does focusing on sustainability provide a competitive advantage in forecasting earnings?

Abstract

We identify sustainability-focused analysts using recent advances in machine learning combined with conference call transcript data. Sustainability-focused analysts issue more accurate earnings forecasts, and the stock market reacts more strongly to their revisions. Analysts focus on sustainability when they are more experienced and the firm has low analyst coverage. Our results provide new evidence on the determinants and consequences of analysts' sustainability focus. Moreover, they suggest that far from being a waste of time and resources, focusing on sustainability provides a competitive advantage in one of the most pivotal steps in valuation - forecasting earnings.

Keywords: Analyst Forecast Accuracy; Sustainability; Machine Learning; Natural Language Processing; BERT

1 Introduction

In her 2023 Presidential Address to the American Finance Association, Laura Starks highlights that there is significant debate on whether incorporating sustainability issues such as ESG into the investment process provides market participants with a competitive edge ('value') or leads them to sacrifice performance arising from non-pecuniary preferences ('values') (Starks, 2023). We address the debate by providing novel evidence on whether focusing on sustainability provides a competitive advantage in one of the most pivotal steps in valuation: forecasting earnings. We use the setting of equity analysts because they are forecasting specialists who acquire and process both "soft" and "hard" information about firms. Specifically, we study whether an analyst's forecast accuracy relative to her peers improves when she focuses on sustainability for a covered firm. We broaden our analysis of whether focusing on sustainability provides an advantage in valuation by studying the short-window stock market reaction to earnings forecast revisions. Finally, we investigate the mechanism through which sustainability focus impacts analyst accuracy and study the determinants of an analyst's decision to focus on sustainability for a covered firm.

We introduce a novel method to identify sustainability-focused analysts using recent advances in machine learning and data on analysts' questions during conference calls. A rapidly growing literature uses conference call data to glean value-relevant information about firms (e.g., Sautner et al., 2023; Hassan et al., 2019, 2023a,b; Chen et al., 2018). Further, the questions asked by analysts on conference calls reveal the topics they are actively focused on for a particular firm. Because analysts face limited opportunities to communicate with management, the discussion topics they raise during Q&A indicate the issues they are keenly interested in and deem important for their personal understanding of the firm. Consistent with analysts engaging meaningfully with managers, Matsumoto et al. (2011) find that the Q&A portion is the primary source of information arising from conference calls.

Ex-ante, there are at least three reasons why analysts who focus on sustainability issues (e.g. ESG) may generate inferior earning forecasts. First, sustainability may be a distraction when forecasting earnings if it does not play a significant role in shaping corporate profitability or if the payoffs related to sustainability activities are sufficiently risky and uncertain (e.g. Goldstein et al., 2022). Second, prior work suggests that sustainability information itself is difficult to analyze and interpret and also susceptible to greenwashing (e.g., Christensen et al., 2022; Berg et al., 2022; Fiechter et al., 2022). If it is sufficiently costly to process such information when forecasting earnings, focusing on sustainability issues will not be a fruitful use of an analyst's attention and effort. Third, even if sustainability issues are useful in forecasting earnings, asking managers about these topics during the conference call could simply signal that the asking analyst does not adequately understand these issues.

On the other hand, a burgeoning empirical and theoretical literature discussed in Section 2.2 (e.g., Edmans, 2011, 2021, 2022; Green et al., 2019; Aghamolla and An, 2021; Larcker et al., 2007; Pástor et al., 2021; Albuquerque et al., 2019; Reboredo and Ugolini, 2022; Friedman et al., 2022; Pedersen et al., 2021) posits that corporate profits are affected by sustainability-related issues including a company's relationships with its employees, environment, communities, customers and other stakeholders. Under this view, an analyst can generate more precise expectations of future earnings for a covered firm if she expends the effort needed to understand and integrate the payoffs from the firm's sustainability activities into her earnings forecasts.

We use a pre-trained machine learning model based on Google's Bidirectional Encoder Representations from Transformers (BERT) to classify whether an analyst question is sustainability-focused by determining whether it relates to one of the sustainability dimensions defined by the Sustainability Accounting Standards Board (SASB). BERT is one of the most powerful natural language processing (NLP) algorithms at the time of this writing and has shown superior performance in language tasks used in the finance and accounting literature such as text classification and sentiment analysis (e.g. Siano and Wysocki, 2021; Frankel et al., 2022; Huang et al., 2022).

We classify an analyst as sustainability-focused for a given firm-year if the analyst asks that firm's management at least one sustainability-focused question during one of the firm's conference calls in the past year. We measure sustainability focus at the analyst-firm-year level for several reasons. First, analysts face limited time, energy and resources (e.g. Harford et al., 2019; Hirshleifer et al., 2019) and likely choose whether or not to focus on sustainability for a firm depending on the unique cost-benefit trade-off faced by the analyst at that time.[1] Second, the importance of sustainability issues in driving performance for a specific firm can change over time depending on the specific risks and opportunities faced by that firm (e.g. Edmans, 2022). Third, our approach avoids lookahead bias since it uses strictly ex-ante information. Finally, it enables us to conduct both within-analyst as well as within-analyst-firm tests and thereby control for a variety of unobservable heterogeneity.

We begin by providing new descriptive evidence on the extent to which analysts focus on sustainability. On average, analysts focus on sustainability for 20% of the firms they cover per year. 47% of all conference calls contain at least one sustainability-focused question, indicating that sustainability is important for many firms. Further, 33% of analysts who cover a given firm focus on sustainability issues for that firm per year. Our finding that analysts routinely focus on sustainability is consistent with survey evidence that many finance professionals use ESG information in investment decision-making (Amel-Zadeh and Serafeim, 2018; Bancel, Glavas, and Karolyi, 2023).

Our main result is that when an analyst focuses on sustainability for a covered firm, her earnings forecast accuracy improves relative to other analysts covering the same firm. Our finding that focusing on sustainability provides a forecasting advantage is robust to analyst-, firm- and analyst-firm fixed effects as well as controlling for the number and length of questions asked by an analyst. Our results also continue to hold after restricting the

[1] As such, we do not calculate an analyst-year level measure of sustainability-focus.

sample to analysts participating in the conference call, who have been suggested to issue more favorable and accurate forecasts (e.g. Mayew, 2008; Mayew et al., 2013).

We conduct a series of tests to shed light on the mechanism through which sustainability focus affects analysts' forecasts. If focusing on sustainability provides a forecasting advantage, we expect this advantage to grow when an analyst focuses on the financial impact of firms' sustainability activities. We test this in two ways. First, we examine if the advantage enjoyed by an sustainability-focused analyst increases when she focuses on material sustainability issues. For these tests, we exploit the materiality maps developed by the Sustainability Accounting Standards Board (SASB), which allow us to identify sustainability issues that are *both* financially material and also have a significant impact on the environment and society (i.e. these sustainability issues have "double materiality"). Second, we examine if an analyst's forecast accuracy improves when she focuses on mapping the financial impact of sustainability into firm fundamentals. Accordingly, we refine our classification based on whether an analyst's sustainability-focused question includes financial terms such as "revenues", "expenses", "earnings", "profits" or "losses".

We find that 38% (23%) of all sustainability-focused analysts focus on material sustainability (financial impact-related sustainability) issues. Moreover, focusing on such issues further improves the forecast accuracy of sustainability analysts. Regarding economic magnitude, the improvement in accuracy when an analyst focuses on sustainability for a covered firm is equivalent to about 6.5% of the standard deviation of forecast accuracy in our sample. For analysts who focus on material (financial impact-related) sustainability issues, this effect increases to 7.6% (8%) of the standard deviation of forecast accuracy in our sample.

Third, given the multifaceted nature of sustainability issues, we use the SASB-defined dimensions of sustainability to examine whether analyst forecast accuracy is affected by the specific category of sustainability on which an analyst focuses. We draw on the five sustainability dimensions defined by SASB: Environment, Social Capital, Human Capital, Business Model & Innovation, and Leadership & Governance. We find that forecast accuracy improves significantly when analysts focus on each of these dimensions, suggesting that our results apply broadly and are not driven by a minority of sustainability categories.

Fourth, we examine the short-window three-day stock return response to earnings forecast revisions by sustainability-focused analysts. We find that the sensitivity of stock returns to analyst forecast revisions significantly increases when an analyst focuses on sustainability for a covered stock. In fact, the sensitivity of returns to analyst revisions almost doubles when an analyst focuses on material sustainability issues. This suggests that stock market investors place greater importance on forecasts by sustainability-focused analysts.

Fifth, we examine whether the competitive edge enjoyed by sustainability-focused analysts is affected by analyst and firm characteristics. Consistent with a learning curve associated with understanding how sustainability issues relate to firm performance, we find that more experienced analysts reap greater improvements in accuracy when they focus on sustainability compared to less experienced analysts. We also find that focusing on sustainability provides a greater forecasting advantage in small firms and high market-to-book firms, indicating a heightened competitive edge from focusing on sustainability in firms with greater information asymmetry.

Sixth, we investigate the horizon over which focusing on sustainability delivers a forecasting advantage. Consistent with prior studies (e.g., O'Brien, 1990; Sinha et al., 1997; Clement, 1999; Clement and Tse, 2005; Mayew et al., 2013), our results focus on one-year-ahead EPS forecasts. If the implications of sustainability for firm performance materialize over long horizons, we expect that the forecasting advantage enjoyed by sustainability-focused analysts also manifests for longer term earnings forecasts. Consistent with this, we find that sustainability-focused analysts issue more accurate two-year-ahead EPS forecasts compared to other analysts covering the same firm.

We also probe the determinants of sustainability focus. We document that analysts are more likely to focus on sustainability when they are more experienced, which dovetails with our earlier finding that experienced analysts benefit more from focusing on sustainability.

Analysts are also more likely to focus on sustainability issues among firms with low analyst coverage and smaller market capitalization, consistent with them focusing on sustainability when there is greater information asymmetry.

Finally, we investigate the role of firms' voluntary sustainability reports in our setting. First, we do not find that the disclosure of a voluntary sustainability report by a firm significantly alters the competitive advantage associated with focusing on sustainability. This is consistent with our findings (which relate to the cross-section of analyst forecast accuracy within each firm) being independent of Dhaliwal et al. (2012) and Muslu et al. (2019), who document that at the firm level, voluntary CSR reports are associated with smaller average analyst forecast errors. Second, we examine whether the presence of a voluntary sustainability report plays a role in the likelihood that analysts focus on sustainability. We find some evidence that the issuance of a voluntary sustainability report stimulates greater analyst focus on sustainability, consistent with recent research by Christensen et al. (2022) who suggest that greater ESG disclosure offers opportunities for market participants to showcase their ability to interpret and analyze ESG issues.

A potential methodological concern in identifying sustainability-focused analysts is that all analysts might benefit equally from questions asked by sustainability-focused analysts because conference calls are public information and observable by all analysts. However, there are at least four reasons that mitigate this concern. First, there is likely to be variation in analysts' ability to interpret and impound publicly observed sustainability information into forecasted earnings. For example, we find that less experienced analysts reap lower benefits in terms of forecast accuracy when they focus on sustainability compared to more experienced analysts. Moreover, even ESG experts disagree on how to process ESG information (e.g., Berg et al., 2022; Christensen et al., 2022). Processing sustainability information and mapping its implications for future cash flows is likely to be challenging and costly for equity analysts, and the asking analyst is likely better able to do this than other analysts. Second, asking a sustainability-related question is simply a signal that an analyst is focused on sustainability, and their question may not completely reveal all their private information. Third, in the spirit of Mayew (2008), we note that although management's answer to a sustainability-focused question is observable to all analysts, it can still yield uniquely valuable private information for the asking analyst once it is conditioned on her existing unique private information. Fourth, if all analysts benefit equally from any information revealed by sustainability-focused analysts, it would not explain our empirical finding that forecasts by sustainability-focused analysts (particularly those focused on material sustainability issues) are significantly more accurate and evoke stronger market reactions than forecasts by non-sustainability-focused analysts covering the same firm.[2]

We highlight that our fixed effects structure enables us to overcome an identification challenge commonly faced in the sustainability literature. This literature is often constrained to using firm-level research designs that make it difficult to be certain that the results are not driven by unobservable firm-level characteristics that are correlated with the firm's sustainability-related disclosure or performance. Our within-firm design mitigates such concerns. Further, our use of analyst fixed effects enables us to isolate within-analyst variation and control for overall analyst characteristics such as reputation and ability. As a further test, we add fixed effects for each analyst-firm pair to isolate within-analyst-firm variation and control for factors like analyst-management relationships and endogenous analyst-firm matching. The robustness of our results to analyst-firm pair effects is especially notable because we are holding the pairing constant to examine the accuracy of the same analyst covering the same firm depending on whether or not she focuses on sustainability at that time for that firm. As such, we are able to provide unique evidence on the competitive edge

[2]Another potential concern is that multiple analysts have the same question as the asking analyst. This concern is mitigated for three reasons. First, if this were the case, then ceteris paribus we would expect questions about sustainability to appear earlier in the Q&A portion of the conference call. However, in untabulated tests, we do not find a significant difference in the order of sustainability questions and other questions. Second, we use all conference calls over the past year to identify sustainability-focused analysts. Thus, our identification is not based on just a single conference call episode; rather, we allow multiple events in which analysts could ask questions from managers. Third, it would bias against finding a significant treatment effect for sustainability-focused analysts, since some sustainability-focused analysts would be incorrectly classified as non-sustainability-focused analysts.

enjoyed by individual market participants when they focus on sustainability, as well as the mechanism associated with this competitive edge.

Our paper makes several contributions. First, we contribute to the ongoing debate on the role of sustainability and ESG issues in investing. While some regard the inclusion of these issues in valuation and investment processes as a harmless distraction (at best) or a waste of valuable resources (at worst), others regard it as an essential, highly value-relevant step. We provide some of the first evidence that focusing on sustainability provides a competitive advantage in one of the most pivotal steps in valuation: forecasting earnings. Two contemporaneous working papers are closest to ours. First, Park et al. (2023) document that analysts' outputs such as stock recommendations and EPS forecasts negatively predict ESG risk events, consistent with analysts integrating ESG risks into their research. However, they do not investigate whether focusing on ESG provides a competitive advantage to an individual analyst relative to her peers when forecasting earnings for the same firm. Second, Derrien et al. (2022) document that analysts in developed European countries who react to ESG incidents exhibit better forecast accuracy. In our robustness tests we explicitly control for ESG incidents and find that our inferences are unchanged. In other words, our results are not driven by ESG incidents. Moreover, we stress that our study explicitly examines many important topics which these contemporaneous studies do not, such as the stock market reaction to revisions by sustainability-focused analysts, the determinants of sustainability focus, and the role of material sustainability issues. That said, we note that these contemporaneous studies complement ours.

Second, we contribute to the literature by examining one of the most important information agents in capital markets - equity analysts. While a large literature studies the properties of analysts' outputs and it is well-accepted that analysts engage in costly information acquisition and processing (Bradshaw, 2011; Brown et al., 2015; Lee et al., 2023), a persistent difficulty faced by researchers is their inability to observe the specific factors and inputs that shape analysts' forecasts. We shed light on this by first constructing a new measure of analysts' sustainability focus and providing descriptive evidence on the extent to which analysts focus on sustainability. Our finding that analysts frequently focus on sustainability comports with both recent survey evidence by Bancel, Glavas, and Karolyi (2023) that 41.6% of finance executives integrate ESG into earnings when implementing a discounted cash flow (DCF)-style valuation.

Third, we make a methodological contribution by introducing a novel machine learning-based technique to measure sustainability content. This methodology is superior to other text-based techniques (e.g., bag-of-words methods) used in prior studies (e.g., Bochkay et al., 2021; Hail et al., 2021), because unlike bag-of-words methods, the BERT model generates context-specific embeddings for each word. Computational linguistic studies show that large language models such as BERT can substantially outperform other NLP algorithms in many NLP tasks such as language translation, named entity recognition, and text classification (Devlin et al., 2018). While we examine the content of analysts' questions during conference calls, this methodology can be used to detect sustainability content in other settings such as news articles, corporate disclosures, and social media. In this regard, our study is related to recent studies by Giglio et al. (2023), who use a BERT-based model to classify the sentiment of biodiversity-related articles, and Huang et al. (2022), who fine-tune their pre-trained FinBERT model to classify firms' ESG discussions in voluntary ESG reports and the management discussion and analysis (MD&A) section of 10-K filings. While Huang et al. (2022) only use three broad categories (Environmental, Social, and Governance) for their ESG classification task, the ESG-BERT model we use classifies text based on the comprehensive sustainability framework created by the Sustainability Accounting Standards Board (SASB) which covers almost two dozen ESG issues across five ESG dimensions using industry-specific mappings. As such, our methodology not only draws on a richer classification scheme but also has the advantage of enabling us to identify sustainability topics that are material to each firm.

This paper is organized as follows. In Section 2, we provide background for our study. In Section 3, we provide a detailed description of our sample and data procedures. Section 4 discusses our research design and results. Section 5 concludes.

2 Background

Interest in the role of sustainability and ESG in firm valuation has accelerated among practitioners in recent years. According to a recent Bloomberg Intelligence report on ESG investing, global ESG assets may surpass $50 trillion by 2025 (Henze and Boyd, 2022). Similarly, academic research examining the role of sustainability and ESG in investing is rapidly growing (e.g., Dechow, 2023; Khan et al., 2016; Ryou et al., 2022). However, policymakers and capital market participants are divided on whether the consideration of sustainability issues actually provides capital market participants with a competitive edge (e.g. Starks, 2023; Giglio et al., 2023; Ackerman and Wise, 2023). Since analysts are key financial market information intermediaries who specialize in forecasting earnings, we examine whether focusing on sustainability impacts analysts' relative forecast accuracy and the market reaction to their forecasts. In the following subsections, we provide background relevant to our study.

2.1 Prior work on Analysts and Conference Calls

Because equity analysts specialize in forecasting and valuation, a vast body of work focuses on the investment value of analyst research (e.g., Joos et al., 2016; De Franco et al., 2015; Cheng, 2005; Bradshaw et al., 2013). It is also well-accepted that the accuracy of analysts' earnings forecasts is of consequence to analysts' careers since analysts are evaluated based on their forecast accuracy relative to their peers and lower forecast accuracy is associated with higher analyst turnover (Brown et al., 2015; Mikhail et al., 1999; Groysberg et al., 2011). In particular, a large body of literature examines the factors that impact analyst forecast accuracy, as it is a summary statistic capturing the quality of an analyst's research process and output. For example, Hirshleifer et al. (2019) document that decision fatigue adversely affects the accuracy of analysts' earnings forecasts, while Ljungqvist et al. (2007) document that the presence of institutional investors is associated with more accurate earnings forecasts and Clement and Tse (2005) find that analysts' bold forecasts are more accurate than their herding forecasts. Li et al. (2023) suggest that analysts with better social skills produce more accurate earnings forecasts, and Han et al. (2023) find that earnings forecasts by analysts who experienced a major climatic disaster become less accurate than those by unaffected analysts.

The enactment of Regulation Fair Disclosure (Reg FD) in October 2000 addressed concerns that conference calls encouraged selective disclosure by revealing new information to analysts privy to the call (e.g., Levitt, 1998; Chen et al., 2010). In the post–Reg FD environment, conference calls must be publicly available, in the sense that all market participants can listen to the call or read the call transcript in real-time (Bushee et al., 2004).[3] Moreover, extant research has shown that conference calls increase the total information available about a firm (e.g., Frankel et al., 1999; Brown et al., 2004; Davis et al., 2015; Call et al., 2023) and thereby enhance analysts' ability to forecast earnings (Bowen et al., 2002). Conference calls are incrementally informative to market participants because managers can voluntarily provide new information in the conference call in a less formal setting compared to regulatory filings while enjoying safe harbor protection with respect to legal liability (Allee et al., 2021). A rapidly growing literature uses the content of conference calls as a rich source of information about firms. Sautner et al. (2023) use conference call data to measure firms' exposure to climate change, Hassan et al. (2023b) use such data to measure firms' exposure to Brexit uncertainty, and Hassan et al. (2023a) use conference call data to measure spikes in perceived country risk.

Analysts play a key role in conference calls since they can query and engage with managers during the (Q&A) portion of the call (Rennekamp et al. (2022); Mayew et al. (2020)). Matsumoto et al. (2011) shed light on the informativeness of conference calls by examining

[3]Under Section 102 Rule 101 of Reg FD, issuers are required to provide an "adequate" advance notice publicly, that includes the date, time, subject matter, and call-in information for the conference call.

the information content of the executive presentation portion versus the Q&A session separately and find that Q&A sessions are the primary source of information to capital markets arising from conference calls.

The higher information content of the Q&A portion of conference calls is attributed to analysts' questions, which are driven by the topics that analysts are actively focused on and deem important for their personal understanding of the firm. As Mayew (2008) highlight, once analyst questions are conditioned on the asking analyst's existing unique information set, the public answer, while heard by all analysts, can yield a unique information advantage for the analyst asking the question relative to other analysts. Specifically, the public information that is disseminated as a result of a manager's response to an analyst's question complements the existing private information possessed by the analyst, rather than merely substituting for it (Kim and Verrecchia, 1997; Barron et al., 2002).

2.2 Analyst forecast accuracy and focus on sustainability

Ex-ante, there are at least three reasons why analysts who focus on sustainability issues during conference calls may generate earning forecasts that are of inferior quality. First, if sustainability issues do not play a significant role in firm profitability or the payoffs from sustainability activities are sufficiently risky and uncertain (e.g. Goldstein et al., 2022), focusing on sustainability may be a waste of analysts' time and resources. Second, prior work suggests that ESG information is difficult to interpret and analyze, even for experts (Christensen et al., 2022; Berg et al., 2022; Griffin et al., 2020; Moroney and Trotman, 2016). An additional challenge in interpreting and processing sustainability-related data (e.g. ESG data) arises from greenwashing, which broadly refers to activities aimed at increasing firms' ESG reputation beyond their actual ESG achievements (e.g. Fiechter et al., 2022; Pinnuck et al., 2021).

Consistent with significant subjectivity and lack of consensus in the processing and integration of sustainability information, Berg et al. (2022) document significant rating divergence among six prominent ESG rating agencies, and Christensen et al. (2022) find that greater ESG disclosure actually leads to greater ESG disagreement among ESG ratings agencies. Prior work suggests that the quality of analysts' forecasts suffers when analysts encounter information that is difficult to process (Plumlee, 2003; Blankespoor et al., 2020). If it is sufficiently costly to acquire, process, and integrate sustainability-related information when forecasting earnings, focusing on these issues will not be a fruitful use of an analyst's effort and attention. Third, asking about sustainability issues during the conference call could signal that the asking analyst does not adequately understand sustainability issues and/or their mapping to firm performance. For these reasons, analyst forecast accuracy may decline when an analyst focuses on sustainability.

On the other hand, a growing body of empirical and theoretical work posits that corporate profitability is affected by sustainability-related factors such as a company's relationships with its employees, environment, communities, customers and other stakeholders. For example, Khan et al. (2016) find empirical evidence that material sustainability ratings predict changes in profitability. Green et al. (2019) find that changes in Glassdoor employer ratings forecast profitability, sales growth, earnings surprises and returns. Reboredo and Ugolini (2022) find that firms' climate transition risk forecasts future profitability.[4] Larcker et al. (2007) document that corporate governance factors forecast profitability. Edmans (2011) documents that firms with high employee satisfaction identified using the '100 Best Companies to work for in America' list exhibit significantly more positive future earnings surprises, announcement returns and risk-adjusted returns than industry benchmarks. Findings such as these lead Edmans (2021) and Edmans (2022) to conclude that ESG is a critical driver of firm performance which should be taken into account by investors when valuing firms.

Numerous theoretical models also posit that a firm's sustainability activities affect its profits. In the model of Friedman et al. (2022), the firm's earnings are affected by its ESG

[4]Griffin et al. (2017) and Johnson et al. (2020) suggest that firms' emissions of greenhouse gas negatively impact firm value. More broadly, Guiral et al. (2020) suggest that CSR performance affects firms' financial performance, while Elliott et al. (2017) suggest that the presentation of CSR information plays a role in investors' investment decisions.

efforts as well as other factors not related to ESG. The earnings implications of ESG efforts can include penalties, subsidies, physical and transition risk, as well as other investments in ESG. For example, an oil company might incorporate carbon capture and storage into its production process. This costly activity affects the firm's profits. As such, ESG actions can have positive or negative implications for profitability. The model of Aghamolla and An (2021) features a firm manager who makes an investment in an ESG project which affects future earnings and the externalities produced by the firm. Albuquerque et al. (2019) model CSR as an investment which increases product differentiation and allows firms to benefit from higher profit margins. Pástor et al. (2021) show that a firm's ESG characteristic affects expected earnings when managers can choose the firm's operating capital and its ESG characteristic, and in the ESG-CAPM model of Pedersen et al. (2021), a firm's expected earnings are affected by its ESG score.[5]

Prior work provides limited insight into whether considering sustainability issues helps or hurts analyst forecast accuracy. Park et al. (2023) document that analysts' outputs such as stock recommendations and EPS forecasts negatively predict ESG risk events, consistent with analysts integrating ESG risks into their research. However, they do not investigate whether focusing on ESG provides a competitive advantage to an individual analyst relative to her peers when forecasting earnings for the same firm. Derrien et al. (2022) document that analysts in developed European countries who react to ESG incidents exhibit better forecast accuracy. However, they fail to find such a result in the US. Moreover, they do not examine the stock market reaction to revisions by ESG-focused analysts, the determinants of ESG focus, nor the role of material ESG issues.

Other related work includes Dhaliwal et al. (2012) and Muslu et al. (2019) who use a global dataset to show that aggregate analyst forecast accuracy is positively associated with the issuance of stand-alone voluntary CSR reports and the quality of these disclosures. However, the analyses in these studies are conducted at the firm level, and thus do not shed

[5]See Section 6.2 of Pástor et al. (2021) and Equation 20 of Pedersen et al. (2021)

light on whether the forecast accuracy of individual analysts changes when they focus on sustainability. As such, these studies do not provide insight into whether analyzing CSR information provides individual analysts with a competitive advantage in forecasting.[6]

3 Sample, Data Sources, and Variables

This section documents the data sources used in this study, the construction of the main variables, and summary statistics for the variables used in our analyses.

3.1 Sample and Data Sources

Consistent with prior studies (e.g., O'Brien, 1990; Sinha et al., 1997; Clement, 1999; Clement and Tse, 2005; Mayew et al., 2013), our sample focuses on analysts' latest one-year-ahead earnings forecasts that are within 365 days to 30 days before the actual earnings announcement.[7] These data come from the I/B/E/S Detail History file for the period between 2008 and 2020. Our sample begins in 2008 because S&P CapitalIQ's conference call transcript data coverage was expanded in 2008. To construct our sample, we first eliminate observations where analysts cannot be identified, i.e., where analyst codes in the I/B/E/S database are missing or equal to zero. Next, we eliminate observations for which data on firm characteristics from Compustat and CRSP are missing. These screening criteria yield a sample of 272,096 analyst-firm-year observations, corresponding to 4,478 analysts issuing

[6]Other papers examining the firm-level relation between ESG and properties of analyst forecasts are as follows (notably, these papers do not examine the cross-section of analysts covering each firm to investigate if sustainability-focused analysts enjoy a competitive advantage in forecasting earnings for a covered firm): Bernardi and Stark (2018) examine data from South Africa and find that the level of ESG disclosures is a mediating variable in determining the effectiveness of integrated reporting using analyst forecast accuracy to evaluate investors' perceptions of the usefulness of integrated reporting. Becchetti et al. (2013) decompose CSR into four factors: accounting opacity, corporate governance, stakeholder risk and overinvestment. They document that all of these factors affect analysts' absolute EPS forecast errors and its standard deviation. Orens and Lybaert (2010) survey Belgian sell-side analysts and suggest that analysts who use more forward-looking information and more internal-structure information make more accurate forecasts. Umar et al. (2022) examine data from Brazil, Russia, India, China, and South Africa (BRICS) and find that ESG scores positively impact target price accuracy, and firms with higher ESG scores have lower forecast errors. Schiemann and Tietmeyer (2022) find that analyst forecast errors are generally higher for firms with higher exposure to ESG controversies.

[7]In Section 4.7, we also examine two-year-ahead earnings forecasts.

earnings forecasts for 3,999 unique firms. To measure analysts' focus on sustainability issues, we use analyst transcripts from S&P CapitalIQ's conference call transcript data. We follow the approach in Du et al. (2022) to create translation files between CapitalIQ's conference call participants dataset and the I/B/E/S price targets and recommendation detail files.[8]

We then identify all questions asked by each analyst in conference calls occurring in the year before they issue their earnings forecast.[9] Figure 1 depicts our research design for measuring the timing of analyst forecasts relative to the earnings announcement date, as well as the timing window to identify analyst questions focused on sustainability. We eliminate questions or comments that contain less than 10 words, as our manual review of a random sample of 50 of these transcripts revealed there is no meaningful content in these snippets.[10] This process generates 1,581,482 analyst transcripts. Table 1 describes our sample selection procedure.

[Insert Figure 1 and Table 1 around here.]

On average, analysts focus on sustainability for 20% of the firms they cover, in a given year. 47% of all conference calls contain at least one sustainability-focused question, indicating that sustainability issues are important for many firms. On average, 33% of analysts who cover a firm focus on sustainability issues for that firm per year. Our finding that analysts regularly focus on sustainability is consistent with survey evidence that ESG information is used by a significant fraction of finance professionals in investment decision-making (Amel-Zadeh and Serafeim, 2018; Bancel, Glavas, and Karolyi, 2023).

[8]The detailed process and translation files are available from Jared Flake and Mark Piorkowski's GitHub repository (https://github.com/j4ffle/CapIQ_IBES_Match).

[9]In an untabulated robustness test, we find that our inferences are unchanged when we limit this period to one quarter.

[10]Some examples of these are: "All right. Take care. Thanks.", "Okay. Go ahead. I'm sorry.", and "Yes, that's why I was asking."

3.2 Measuring Analysts' Focus on Sustainability Issues

We take a novel approach to measure analysts' focus on sustainability issues by identifying the questions they ask in conference calls which relate to sustainability. As discussed in Section 2, this approach relies on three main findings from prior research. First, Matsumoto et al. (2011) establish that due to the involvement of analysts, the question and answer (Q&A) portion of earnings conference call has more information content than the presentation portion. Second, Mayew et al. (2013) suggest that analyst questions during conference calls are driven by analysts' active interest in specific issues, and the information acquired by asking a question complements analysts' private information set. Third, it is unlikely that analysts raise "softball" questions, since analysts face limited opportunities to engage with managers and raising irrelevant or low quality questions in a conference call that is publicly disseminated can have negative reputation and career consequences for analysts.

3.2.1 Natural Language Processing Algorithm

To capture analyst questions relating to sustainability, we use a pre-trained machine learning model that is trained based on Google's Bidirectional Encoder Representations from Transformers (BERT) methodology. At the time of this writing, BERT is one of the most powerful NLP algorithms relative to the size, time and resources required to train or obtain inferences from a pre-trained model. Historically, many NLP algorithms with a bag-of-words structure have been used in the accounting and finance literature to parse large amounts of unstructured text in order to measure disclosure sentiment, readability, quality, and quantity; to compare disclosures and determine similarities or differences; to identify forward-looking information; and to detect themes from annual reports (Bochkay et al., 2023).[11] However, these algorithms mostly ignore context and instead analyze the text as a collection of individual words treated independently without taking grammar or word order into account, leading to limited accuracy in many contexts (e.g., Bochkay et al.,

[11]See Huang et al. (2022) for a complete list of algorithms with a bag-of-words structure.

2023). With recent advances in machine learning and deep learning, large language models (LLMs) such as BERT have delivered superior performance in many language tasks, such as text classification and sentiment analysis that are often used in the accounting and finance literature (Siano and Wysocki, 2021; Frankel et al., 2022; Huang et al., 2022).[12] Training an LLM usually includes two steps: pre-training and fine-tuning. During pre-training, BERT learns semantic and syntactic information from a large corpus of unlabeled text. During fine-tuning, BERT learns downstream NLP tasks, such as text classification.

We use a BERT model which is first pre-trained on unstructured ESG-related text from 4,000 articles and sustainability reports to create initial token, sentence, and positional embeddings for the ESG context. The reported accuracy measures of this model for next sentence prediction and masked language modelling tasks are 100% and 98%, respectively.[13] Next, the pre-trained model is fine-tuned for the ESG topic classification task using 11,000 ESG-related articles from Dow Jones that are classified using the SASB's sustainability standards into 24 sustainability categories across five sustainability dimensions: Environment, Social Capital, Human Capital, Business Model & Innovation, and Leadership & Governance.[14,15] After the fine-tuning process, the model's reported F1-score on the hold-out test sample is 90%, which is a significant improvement compared to the benchmark model's F1-score of 0.79 using the "BERT-BASE" off-the-shelf model that was trained on articles from Wikipedia and Google Books corpus.[16,17]

[12] Some other recent LLMs that have shown promising results on NLP tasks such as text classification, question answering, and next sentence prediction include Open AI's GPT-4, and Microsoft and NVIDIA's MT-NLG.

[13] The accuracy of machine learning models is calculated as the ratio of the number of correct predictions divided by total number of predictions ($Accuracy = \frac{True\ Positive + True\ Negative}{True\ Positive + False\ Positive + True\ Negative + False\ Negative}$).

[14] We thank Parabole.ai for sharing this pre-trained model and their discussions in deploying the model in the context of our study.

[15] The latest version of SASB standards include 26 disclosure topics. The two topics that are not included in our machine learning model are "Customer Welfare" and "Materials Sourcing".

[16] The F1-score is calculated as $2 \times \frac{Precision \times Recall}{Precision + Recall}$ where $Precision = \frac{True\ Positive}{True\ Positive + False\ Positive}$ and $Recall = \frac{True\ Positive}{True\ Positive + False\ Negative}$

[17] Placing this into context, the F1-scores of the machine learning models used in Huang et al. (2022) for sentiment classification and ESG classification are 87.8% and 89.6%, respectively.

This NLP model returns the sustainability label that best describes the text along with the confidence level of that label, ranging from 0% to 100%. The confidence level indicates how likely the text relates to the predicted sustainability category. We set the confidence level threshold at 80% to identify analysts' sustainability questions.[18] Following this procedure, we identify 102,113 sustainability-related questions asked by analysts during our sample period.

Table 2 shows the distribution of sustainability-related questions classified into each of the 24 topics across the five sustainability dimensions.

[Insert Table 2 around here.]

The highest number of analyst questions relate to the *Competitive Behavior* topic, while the fewest questions relate to the *Human Rights and Community Relations* topic.[19] In general, analysts' questions are more directed to issues within the *Business Model & Innovation* and *Leadership & Governance* dimensions than the *Environmental*, *Social Capital* and *Human Capital* dimensions, although *Energy Management* and *Labor Practices* issues still receive substantial attention from analysts (corresponding to about 2% of all sustainability-related questions asked by analysts).

Finally, we create a proxy to identify analysts' sustainability focus at the analyst-firm-year level. *Sustainability Focused Analyst* is equal to one if, for a given firm-year, the analyst asks at least one sustainability-related question during any conference call in the 365-day

[18]We selected 1,328 analysts' questions across the 24 different sustainability topics from our dataset using stratified random sampling. Based on our manual validation of these questions, we set the minimum threshold for the confidence score to 80% to balance between precision and recall model evaluation measures. Using this threshold the *out-of-sample* F1-score for our manually selected sample is 70%, whereas it reduces to 58% if we set the confidence score at 90%. Nevertheless, an untabulated robustness test shows that our main inferences are unchanged upon raising the minimum threshold for confidence scores to 90%. We acknowledge that while it is virtually impossible to identify sustainability-focused analysts without error, it is difficult to explain why measurement error would drive our findings that sustainability-focused analysts (and in particular analysts who focus on material and financial impact-related sustainability issues) make forecasts that are both significantly more accurate and evoke stronger short-window market reactions than forecasts by non-sustainability-focused analysts covering the same firm.

[19]In a later robustness test we show that our results are not solely driven by questions classified under the *Competitive Behavior* category.

period before issuing their forecast, and zero otherwise.[20] In order to provide further insights into the potential mechanism through which sustainability focus may bolster analysts' forecasting accuracy, we construct two additional indicator variables, namely *Material Sustainability Focused Analyst* and *Financial Impact Sustainability Focused Analyst*, which we discuss in detail in the following subsections.

3.2.2 Material Sustainability-Focused Analysts

The concept of materiality has long been a guiding principle for disclosure in the capital markets. As a general rule, firms must disclose material information to investors under Generally Accepted Accounting Principles (GAAP), Securities and Exchange Commission (SEC) rules, and exchange reporting requirements (Heitzman et al., 2010). In many jurisdictions, materiality is the basis for determining whether a company may be exposed to fines or lawsuits for making a false or misleading statement about a material matter or for omitting information about a material matter (e.g., AASB, 2019; FASB, 2021). However, unlike financial disclosures that are only subject to materiality in the context of value creation for investors, sustainability disclosure frameworks are subject to materiality in the context of enterprise value creation, as well as materiality in the context of significant impacts on the economy, environment, and people. This is often called "double materiality" (Christensen et al., 2021).

SASB standards are designed to address the subset of sustainability topics that are most relevant for enterprise value creation (SASB, 2022). Specifically, SASB standards identify sustainability issues that are reasonably likely to have a significant effect on financial condition, operating performance, or market valuation within an industry. Hence, the inclusion of a sustainability issue in SASB standards for a specific industry requires evidence of

[20]Analysts in I/B/E/S who do not appear in conference call transcripts are included in our main sample and their number of sustainability-related questions are assigned a value of zero. However, we also estimate all of our models by excluding those analysts in I/B/E/S who do not ask any questions in the conference calls in the one-year period prior to their earning forecast. We find that sustainability-focused equity analysts continue to enjoy a competitive advantage when forecasting earnings compared to those analysts who "participate" in conference calls in the spirit of Mayew et al. (2013).

both investor interest in the topic and the topic having a material impact on sustainability-related issues. Serafeim and Yoon (2022) find that the market only reacts to financially material ESG news, and Khan et al. (2016) document that material sustainability ratings predict firm profitability. Hence, when examining analysts' focus on sustainability issues, it is important to also capture their focus on sustainability issues that are material.

We rely on the Sustainable Industry Classification System® (SICS®) developed by the SASB to identify material sustainability issues for each specific firm. While major industry classification systems such as the Standard Industrial Classification (SICS), or the North American Industry Classification System (NAICS) use sources of revenue as their basis for classifying companies into specific sectors and industries, the SASB's SICS® groups similar companies based on their sustainability-related risks and opportunities. This system classifies companies into 77 industries across 11 sectors.[21,22] At the highest level, the five main sustainability dimensions of *Environmental*, *Social Capital*, *Human Capital*, *Business Model & Innovation*, and *Leadership & Governance* serve as an organizing structure for the industry-specific topics covered in the SASB standards and are further defined by a subset of industry-agnostic General Issue Categories (G.I.C.s). As an example, in Figure 2 we present an example of structure of SASB's structure for a material issue (*Greenhouse Gas (GHG) Emissions*) for firms in the *Oil and Gas – Exploration and Production* industry under the *Extractive and Minerals Processing* sector.

[Insert Figure 2 around here.]

For our proxy for material sustainability issues, we use the complete list of G.I.C.s that the SASB has identified for each company based on the industry in which the company

[21]The complete list of SASB standards and SASB's tool to determine SICS® for tens of thousands of companies around the globe can be found on SASB's website: https://www.sasb.org/standards/download/?lang=en-us and https://www.sasb.org/find-your-industry/.

[22]The SASB standards were developed and provisionally released one sector at time between 2012 to 2016, and then were officially approved in November 2018 by the SASB. For a detailed review of the SASB's development process of these standards, see Bochkay et al. (2021).

is classified.[23] Specifically, *Material Sustainability Focused Analyst* is an indicator variable equal to 1 if the analyst asks at least one material sustainability-related question during a conference call in the 365-day period before issuing their forecast for a given firm-year, and zero otherwise.

3.2.3 Financial Impact Sustainability-Focused Analysts

We additionally investigate the extent to which analysts focus on the financial implications of sustainability issues by identifying sustainability-related questions posed by analysts that include terms relating to firm fundamentals. To operationalize this, we create a list of terms that relate to core firm fundamentals.[24] Next, we create an indicator variable *Financial Impact Sustainability Focused Analysts* that takes a value of one when an analyst's sustainability-related question includes at least one of these terms, and zero otherwise.

3.3 Analyst Forecast Accuracy

Prior studies show that an analyst's forecast accuracy relative to her peers affects analyst turnover. By contrast, an analyst's absolute forecast accuracy is not associated with turnover (Mikhail et al., 1999). Moreover, we are interested in whether focusing on sustainability imparts a competitive advantage to an analyst relative to her peers. Hence, following Clement and Tse (2005), we measure an analyst's forecast accuracy relative to her peers as:

$$Relative\ Forecast\ Accuracy_{i,j,t} = \frac{Max\ Forecast\ Error_{i,t} - Forecast\ Error_{i,j,t}}{Max\ Forecast\ Error_{i,t} - Min\ Forecast\ Error_{i,t}}, \tag{1}$$

where i,j, and t represent firm, analyst, and year, respectively. $MaxForecastError_{it}$ and $MinForecastError_{it}$ are the maximum and minimum absolute forecast error among all analysts issuing a forecast for firm i in year t, respectively. The forecast error of analyst j

[23]We thank the IFRS Foundation for providing us with the SASB standards and the Sustainable Industry Classification System® (SICS®) for all companies in their database.

[24]These terms include: "income", "revenue", "sale*", "earning*", "profit", "expense*", "loss*", "bottom*line", "gross margin", "asset*", "liability*", or "equity*"

for firm i in year t is calculated as the absolute difference between the analyst's earning per share (EPS) forecast and the firm's actual EPS:

$$Forecast\ Error_{i,j,t} = |Analyst\ EPS\ Forecast_{i,j,t} - Actual\ EPS_{i,t}| \tag{2}$$

The relative forecast accuracy measure lies between zero and one, where higher values indicate higher relative forecast accuracy. In a robustness test presented in Section 4.7, we show that our inferences are unchanged when we use an alternative relative forecast accuracy measure similar to the one used in Hirshleifer et al. (2019).

4 Research Design and Results

4.1 Analyst Sustainability Focus and Forecast Accuracy

Our main test is based on estimating the following regression model:

$$\begin{aligned} Relative\ Forecast\ Accuracy_{i,j,t} = \alpha &+ \beta_1\ Sustainability\ Focused\ Analyst_{i,j,t} \\ &+ \Sigma\beta_k\ Analyst\ Characteristics_{j,t} + \Sigma\beta_m\ Firm\ Characteristics_{i,t} \\ &+ \Sigma\beta_n\ Firm_i + \Sigma\beta_n\ Analyst_j + \Sigma\beta_q\ Year_t + \varepsilon_{i,j,t}, \end{aligned} \tag{3}$$

where i, j, and t represent firm, analyst, and year, respectively. Consistent with prior research (e.g., Clement and Tse, 2005; Kumar, 2010; Jennings et al., 2017) we control for a set of time-variant analyst and firm characteristics associated with analyst forecast accuracy. Analyst characteristics include the forecast horizon (*Horizon*), the natural logarithm of brokerage size (*Ln(Brokerage Size)*), the natural logarithm of analyst firm specific experience (*Ln(Firm Specific Experience)*), the natural logarithm of analyst's overall experience (*Ln(Overall Experience)*), the natural logarithm of the number of firms that the analyst covers (*Ln(Num Firms Following)*), and the natural logarithm of the number of industries the analyst covers (*Ln(Num Industries Following)*). Firm characteristics include turnover of the firm's shares during a given year (*Turnover*), annual stock return (*Return*), annual stock volatility (*Return Vol*), the natural logarithm of assets (*Size*), return on assets (*ROA*), the market-to-book ratio (*MTB*), the percentage of shares held by institutional investors (*Instown*), the natural logarithm of firm's age (*Ln(Firm Age)*), and the natural logarithm of the number of analysts covering the firm in a given year (*Ln(Num Analyst Following)*). All variables are defined in detail in Appendix A. The analyst-firm-year nature of our research design allows us to exploit *within*-analyst and *within*-firm (*within*-analyst-firm) variation by including *analyst* and *firm* (*analyst-firm* fixed effects), that hold constant any time-invariant unobservable analyst and firm (analyst-firm) characteristics. [25]

4.2 Descriptive Statistics

Table 3 presents summary statistics for the variables used in our analyses. The average forecast accuracy calculated based on the Clement and Tse (2005) measure is 78.9%. On average, analysts focus on sustainability for 19.9% of the firms that they cover in a given year (*Sustainability Focused Analyst*), of which 38.2% ($= \frac{0.076}{0.199}$) are focused on a material sustainability topic as defined by SASB, and 23.1% ($= \frac{0.046}{0.199}$) are focused on an financial impact-related sustainability issue. 67.1% of the analysts in our sample participate in conference calls, in the sense that they ask at least one question in a conference call in the one-year period before they forecast earnings for a given firm.

[Insert Table 3 around here.]

Our descriptive statistics on analyst and firm characteristics used in this study are consistent with prior literature (e.g., Jennings et al., 2017). The average forecast horizon is 110 days, and there are an average of 60 analysts in a given brokerage house. The average time an analyst has followed a covered firm is around 4.5 years ($\approx$ 1,620 days). The average time that the analyst has been covered in the I/B/E/S database, which we use as a proxy for analyst experience, is more that 12.7 years ($\approx$ 4,630 days). Analysts follow 16 (4) firms

[25]Following Brown (2001), in an untabulated robustness test, we also control for past relative forecast accuracy and our inferences are unchanged.

(industries) on average. The average of the total number (length) of questions asked by an analyst during conference calls in the one year prior before they issue their forecast for a given firm is 6 (346). The median firm in our sample has a share turnover ratio of 1.08. Average annual stock return and stock volatility are both 12%. The average total assets of firms in our sample is $2.5 billion. The average return on assets is -0.2% and the average institutional ownership is 71.3%. The average firm age is around 19 years and a firm is followed by 17 analysts in a given year on average.

4.3 Analyst Forecast Accuracy and Analyst Sustainability Focus

Panel A of Table 4 shows our results of estimating Eq. (3) using ordinary least squares (OLS). In columns (1) and (2), we include all analysts in our sample, whereas in columns (3) and (4), we estimate Eq. (3) on a sample that is restricted to *Participating Analysts*. In columns (1) and (3), we include analyst, firm, and year fixed effects individually in the regression model. We further demonstrate that the proxy we use to identify analysts' sustainability focus supports more robust inferences and facilitates more refined analyses which leverage its analyst-firm-level nature. To accomplish this, in columns (2) and (4) we include analyst-firm two-way fixed effects and year fixed effects.[26] The coefficient on *Sustainability Focused Analyst* across all models is positive and significant ($p < 0.01$), consistent with the idea that analysts' sustainability focus improves their forecast accuracy. In economic terms, the relative forecast accuracy of sustainability-focused analysts is 1.5% better than analysts who do not focus on sustainability. This improvement is equivalent to about 6.5% ($= \frac{0.0152}{0.235}$) of the standard deviation of relative forecast accuracy in our sample.[27] This effect is almost

[26]The number of observations in columns (2) and (4) is lower than those in columns (1) and (3), due to more singleton observations that are being dropped to robustly estimate these models (Correia, 2015).

[27]Following Mitton (2021), we employ measures of economic significance that are scaled by the standard deviation of the dependent variable rather than the mean of the dependent variable.

double the improvement in forecast accuracy documented by Mayew et al. (2013) and Ke and Yu (2006).[28]

[Insert Table 4 around here.]

The coefficients on the control variables are consistent with prior research (e.g., Ljungqvist et al., 2007; Kumar, 2010; Jennings et al., 2017; Drake et al., 2020; Fang and Hope, 2021; Huang et al., 2022). In particular, we find that forecast accuracy is lower for firms with higher return on assets, as well as for analysts from larger brokerage houses, and analysts with a longer forecast horizon.[29] Further, forecast accuracy is higher for larger firms and firms with higher institutional ownership.

In Panel B of Table 4, we re-estimate Eq. (3) by including the indicator variable that identifies *Material Sustainability Focused Analysts* in Eq. (3) to explore whether focusing on material sustainability issues enhances the competitive advantage enjoyed by sustainability-focused analysts. The coefficient on *Material Sustainability Focused Analysts* is positive and significant across all models ($p < 0.10$), indicating that there is an incremental increase in the forecast accuracy of analysts who focus on material sustainability issues compared to other sustainability-focused analysts. In economic terms, the relative forecast accuracy of material sustainability-focused analysts is 1.8% ($= 0.0043 + 0.0136$) better than analysts who do not focus on sustainability. This improvement is equivalent to 7.6% ($= \frac{0.0179}{0.235}$) of the standard deviation of relative forecast accuracy in our sample.

In Panel C of Table 4, we re-estimate Eq. (3) by including an indicator variable that identifies *Financial Impact Sustainability Focused Analysts* to explore whether focusing on the link between sustainability issues and financial impact enhances the forecasting advantage

[28]For example, Mayew et al. (2013, p. 405) regress the change forecast accuracy on an indicator variable that identifies analysts that start participating in conference calls and report a coefficient of 1.205 on participating analysts which is 2.7% ($= \frac{1.205}{43.903}$) of the standard deviation of relative forecast accuracy in their sample.

[29]Clement (1999) and Jacob et al. (1999) document a positive relation between forecast accuracy and brokerage size, whereas more recent studies (e.g., Drake et al., 2020; Fang and Hope, 2021; Huang et al., 2022) document a negative relation.

enjoyed by sustainability-focused analysts.[30] The coefficient on *Financial Impact Sustainability Focused Analysts* is positive and significant across all models ($p < 0.10$), indicating that there is an incremental increase in forecast accuracy when analysts focus on the financial impact of sustainability issues relative to other sustainability-focused analysts. In economic terms, the relative forecast accuracy of sustainability-focused analysts who focus on sustainability issues in the context of their financial impact on the firm is 0.44% better than analysts who do not focus on sustainability. This improvement is equivalent to 2% ($= \frac{0.0044}{0.235}$) of the standard deviation of relative forecast accuracy in our sample.

4.4 Sustainability Dimensions and Forecast Accuracy

As discussed in detail in Section 3.2.2, the SASB standards use five sustainability dimensions (i.e. Environment, Social Capital, Human Capital, Business Model & Innovation, and Leadership & Governance) as a high-level organizing structure for detailed categorization of sustainability issues. We use the issues classified in each sustainability dimension as per Table 2 to identify analysts' focus on each of the dimensions separately. Specifically, we define five separate indicator variables that are equal to one when an analyst asks about an sustainability issue that is classified under each of the five dimensions, and zero otherwise.

We next estimate Eq. (3) for each SASB-defined dimension of sustainability using these variables. The results are presented in Table 5.[31] In Panel A, we examine whether forecast accuracy changes depending on the specific dimension of sustainability that an analyst focuses on. In Panel B, we examine the accuracy of analysts who focus on issues that are material to that specific dimension of sustainability. In Panel C, we examine the accuracy of analysts who focus on the financial impact of that specific dimension of sustainability.

In Panel A, the coefficient on *Sustainability Focused Analyst* is positive and significant ($p < 0.10$) for all dimensions. In Panel B, the coefficient on *Material Sustainability Focused*

[30] Note that by definition this variable is the interaction term between *Financial Impact Analyst* and *Sustainability Focused Analysts*.

[31] The results tabulated from this section onward are estimated on all the analysts in our sample. However, our results are qualitatively similar if we limit our analyses to the *Participating Analysts* subset.

Analyst is positive and significant ($p < 0.05$) for all dimensions, except Human Capital. In Panel C, the coefficient on *Financial Impact Sustainability Focused Analyst* is positive and significant ($p < 0.05$) across all dimensions except for Environment, and Human Capital. Taken together, these results suggest that the positive association between analysts' sustainability focus and their forecast accuracy holds for the majority of SASB-defined sustainability subcategories.

[Insert Table 5 around here.]

4.5 Stock Market Reaction

In this section, we examine the stock market's response to forecast revisions by sustainability-focused analysts. To do so, we estimate the following regression model:

$$\begin{aligned}
\textit{Three-Day CAR}_{i,j,t} = \alpha &+ \beta_1 \ \textit{Forecast Revision}_{i,j,t} \times \textit{Analyst}_{i,j,t} \\
&+\beta_2 \ \textit{Forecast Revision}_{i,j,t} + \beta_3 \ \textit{Analyst}_{i,j,t} \\
&+\Sigma\beta_k \ \textit{Analyst Characteristics}_{j,t} + \Sigma\beta_m \ \textit{Firm Characteristics}_{i,t} \\
&+\Sigma\beta_n \ \textit{Firm}_i + \Sigma\beta_n \ \textit{Analyst}_j + \Sigma\beta_q \ \textit{Year}_t + \varepsilon_{i,j,t},
\end{aligned} \tag{4}$$

where i, j, and t represent firm, analyst, and year, respectively. *Three-Day CAR* is the cumulative three-day market-adjusted return centered on the analyst's earnings forecast revision date. An analyst's forecast revision is calculated as:

$$\textit{Forecast Revision}_{i,j,t} = \frac{\textit{Analyst EPS Forecast}_{i,j,t_2} - \textit{Analyst EPS Forecast}_{i,j,t_1}}{\textit{Price}_{i,j,q}}, \tag{5}$$

where t_2 is the date of the latest one-year-ahead earnings forecasts that is within 365 days to 30 days before the actual earnings announcement, and t_1 is the immediate forecast prior to that. $\textit{Price}_{i,j,q}$ is the firm's share price on the earning announcement date. All other variables in Eq. (4) are similar to those included in Eq. (3).

The results of estimating Eq. (4) using OLS are presented in Table 6.[32] In columns (1) and (2), we replace *Analyst* in Eq. (4) with *Sustainability Focused Analyst*. In columns (3) and (4) we replace *Analyst* in Eq. (4) with *Material Sustainability Focused Analyst*. In columns (5) and (6) we replace *Analyst* in Eq. (4) with *Financial Impact Sustainability Focused Analyst*. In columns (1), (3), and (5), we include analyst, firm, and year fixed effects individually in the regression model. In columns (2), (4), and (6), we include analyst-firm two-way fixed effects and year fixed effects. The coefficient on *Forecast Revision* $\times$ *Analyst* is positive and significant ($p < 0.10$) across all models, providing strong evidence that the market returns are more sensitive to *Sustainability Focused Analyst*, *Material Sustainability Focused Analyst*, and *Financial Impact Sustainability Focused Analyst* forecast revisions relative to other analysts' forecast revisions. Specifically, the sensitivity of stock returns to revisions is almost 60% stronger for sustainability-focused analysts compared to non-sustainability-focused analysts. In fact, the sensitivity of returns to revisions almost doubles for material sustainability-focused analysts compared to non-sustainability-focused analysts, indicating that revisions by analysts who focus on material sustainability issues have particularly important valuation implications for investors.

[Insert Table 6 around here.]

[32]The number of observations for these analyses is lower than in our main analyses due to missing values for *Forecast Revision* and *Three-Day CAR* variables in our sample.

4.6 Cross-Sectional Tests

In this section, we examine whether the relation between forecast accuracy and analysts' sustainability focus varies with analyst and firm characteristics by estimating the following regression model:

$$\begin{aligned}
\textit{Relative Forecast Accuracy}_{i,j,t} = \alpha &+ \beta_1 \textit{ Sustainability Focused Analyst}_{i,j,t} \times \textit{Cross-Sectional Variable}_{i,j,t} \\
&+ \beta_2 \textit{ Sustainability Focused Analyst}_{i,j,t} + \beta_3 \textit{ Cross-Sectional Variable}_{i,j,t} \\
&+ \Sigma\beta_k \textit{ Analyst Characteristics}_{j,t} + \Sigma\beta_m \textit{ Firm Characteristics}_{i,t} \\
&+ \Sigma\beta_n \textit{ Firm}_i + \Sigma\beta_n \textit{ Analyst}_j + \Sigma\beta_q \textit{ Year}_t + \varepsilon_{i,j,t},
\end{aligned} \tag{6}$$

where we define *Cross-Sectional Variable* based on the following analyst and firm characteristics: analyst experience (*Experienced Analyst*) is an indicator equal to one when an analyst's overall experience is in the year-specific top tercile of our sample, and zero otherwise; firm size (*Small Firm*) is an indicator that is equal to one when firm size is in the year-specific bottom tercile of our sample, and zero otherwise; firm growth opportunities (*Growth Firm*) is an indicator that is equal to one when the firm's market-to-book-ratio is in the year-specific top tercile of our sample, and zero otherwise; and firm voluntary sustainability reporting (*Voluntary Sustainability Report*) which is an indicator that is equal to one when the firm issued a voluntary sustainability report in the year before the analyst issues their forecast, and zero otherwise. The results of estimating Eq. (6) using OLS are presented in Table 7.

[Insert Table 7 around here.]

In column (1), the cross-sectional variable is *Experienced Analyst*. The coefficient on the interaction term is positive and significant ($p < 0.10$), indicating that more experienced analysts reap greater benefits from focusing on sustainability issues compared to less experienced analysts. This suggests that there is a learning curve associated with understanding how sustainability issues relate to firm performance. In column (2), the cross-sectional variable is

Small Firm. The coefficient on the interaction term is positive and significant ($p < 0.05$), indicating that the increase in relative forecast accuracy associated with focusing on sustainability is incrementally higher when a sustainability-focused analyst is forecasting earnings for relatively smaller firms. In column (3), the cross-sectional variable is *Growth Firm*. The coefficient on the interaction term is positive and significant ($p < 0.01$), indicating that the increase in relative forecast accuracy is incrementally higher when a sustainability-focused analyst forecasts earnings for growth firms. Finally, in column (4), in the spirit of Dhaliwal et al. (2012), we examine whether the increase in relative forecast accuracy is driven by firms that issue a voluntary sustainability report (*Voluntary Sustainability Report*). The coefficient on the interaction term is negative, but not significant at conventional levels ($p > 0.10$). This result indicates that the increase in relative forecast accuracy of sustainability-focused analysts in our sample is not driven by firms' voluntary sustainability disclosures. In a broader sense, this confirms the contribution of our study above and beyond Dhaliwal et al. (2012) and Muslu et al. (2019) in that we provide new evidence suggesting that focusing on sustainability provides individual analysts a competitive edge in forecasting earnings over other analysts who cover the same company but do not focus on sustainability.

4.7 Robustness Tests and Additional Analyses

In this section we examine whether our main results are sensitive to different research design choices.

4.7.1 Voluntary Sustainability Reports

Using an international setting, Dhaliwal et al. (2012) and Muslu et al. (2019) find that analyst forecast errors are lower when firms issue voluntary ESG reports. However, recent empirical research does not document significant evidence of investors using voluntary sustainability reports for their investment decisions. For example, using Google searches as a proxy for stakeholder attention, Ferguson et al. (2022) show that the level of attention directed toward sustainability reports is very low compared to the level of attention directed toward financial and accounting information. In a similar vein, Moss et al. (2023) do not find evidence that retail investors react to ESG press releases. To examine whether the positive effect of analysts' sustainability focus on forecast accuracy is merely driven by firms' voluntary sustainability disclosure, we follow prior literature (e.g., Lys et al., 2015) and use proprietary data from corporateregister.com to identify whether firms issue voluntary sustainability reports. Corporateregister.com provides a global online directory of corporate sustainability reports going back to 1990.[33] Specifically, we include an indicator variable equal to 1 when a firm issues a voluntary sustainability disclosure (*Voluntary Sustainability Report*) in the year prior to the analyst's forecast, and zero otherwise, in Eq. (3). The results are presented in Panel A of Table 8. The coefficient on *Sustainability Focused Analyst* remains statistically significant ($p < 0.01$) and the magnitude is similar to our main analyses presented earlier in Table 4. The coefficient on *Voluntary Sustainability Report* is negative, but not significant at conventional levels ($p > 0.10$). This confirms that our inferences are not driven by firms' voluntary sustainability disclosures.

[Insert Table 8 around here.]

4.7.2 Analysts' General Information Acquisition During Conference Calls

A potential concern is that our results might be driven by the general information acquisition activity of analysts who participate in conference calls. To address this concern, we re-estimate Eq. (3) after controlling for the number of questions (*Ln (Num Analyst Questions)*) and the length of all questions (*Ln (Length Analyst Questions)*) that an analyst asks during conference calls in the one year prior to their earnings forecast. The results are presented in Panel B of Table 8. The coefficient on *Sustainability Focused Analyst* is positive and significant ($p < 0.01$) and the coefficient magnitude is comparable to those documented in Table 4, while the coefficients on both *Ln (Num Analyst Questions)* and *Ln (Length*

[33] More information about this dataset can be found at https://www.corporateregister.com/about/CR_Data.pdf.

Analyst Questions) are not statistically significant. This indicates that our inferences are not driven by analysts' general information acquisition during conference calls.

4.7.3 Excluding Analysts' Focus on Competitive Behavior

A potential concern is that our results might be driven by a single sustainability issue, rather than sustainability issues in general. Specifically, in our sample, 23.4% of analysts' sustainability-related questions comprise of questions about "Competitive Behavior", which is under the Leadership & Governance sustainability dimension according to the SASB standards. To address this concern, we refine our main test variable *Sustainability Focused Analyst* to exclude sustainability questions that relate to "Competitive Behavior". Next, we re-estimate Eq. (3) using this newly defined variable. The results are presented in Panel C of Table 8. The coefficient on *Sustainability Focused Analyst* is positive and significant ($p < 0.01$) and the coefficient magnitude is comparable to those documented in Table 4, indicating that our inferences are not driven by sustainability issues relating to Competitive Behavior.

4.7.4 Alternative Relative Forecast Accuracy Measure

While our main proxy for relative forecast accuracy following Clement and Tse (2005) adjusts analysts' forecast accuracy based on their peer group (i.e., all analysts that issue forecasts for the same firm in a given year), a potential concern is that this measure is not adjusted for the different horizons of analysts' forecasts. To mitigate this concern, we follow Hirshleifer et al. (2019) and calculate relative forecast accuracy as:

$$Relative\ Forecast\ Accuracy\ HLLT_{i,j,t} = \frac{Median\ Forecast\ Error_{i,t-t-90days} - Forecast\ Error_{i,j,t}}{Std\ Forecast\ Error_{i,t-t-90days}}, \tag{7}$$

where i, j, and t represent firm, analyst, and year. *Forecast Error* is similar to the one calculated in Eq. (2). *Median Forecast Error* is calculated as the median of forecast errors among analysts issuing a forecast in the 90-day period before analyst j's earnings forecast for firm *i*. By using the 90-day window, we ensure that relative forecast accuracy is calculated among analysts with a comparable forecast horizon.

We re-estimate Eq. (3) using *Relative Forecast Accuracy HLLT* as the dependent variable. The results are presented in Panel D of Table 8. The coefficient on *Sustainability Focused Analyst* remains positive and statistically significant ($p < 0.01$), in line with our main results.

4.7.5 Alternative Analyst Sustainability Focus Measure

In a robustness test, we re-estimate Eq. (3) using the number of sustainability-related questions that the analyst asks during conference calls in the year before they issue their forecast (*Num Sustainability Focused Questions*) instead of the *Sustainability Focused Analyst* indicator variable. The results are presented in Panel E of Table 8. The coefficient on *Num Sustainability Focused Questions* is positive and statistically significant ($p < 0.01$), indicating that greater sustainability focus is associated with greater improvements in forecast accuracy.

4.7.6 Alternative Forecast Horizons

Our main focus in the preceding tests is on one-year-ahead earnings forecasts. If the effect of sustainability issues on firm performance mostly manifests over longer horizons as suggested by prior literature (e.g. Edmans, 2021, 2022; Khan et al., 2016; Aghamolla and An, 2021) we expect that the accuracy of two-year-ahead forecasts will be also affected by analysts' sustainability focus. To investigate this we replicate our analyses for two-year-ahead forecasts. The results are presented in Panel F of Table 8. The coefficient on *Sustainability Focused Analyst* is positive and statistically significant ($p < 0.05$). These results are consistent with sustainability being an important driver of firms' long-term performance.

4.7.7 Order of sustainability questions in conference calls

A potential concern with identifying sustainability-focused analysts using the questions they ask on conference calls is that multiple analysts have the same sustainability-related question as the asking analyst. If this is the case, we would expect sustainability-related questions to appear earlier in the Q&A portion of the conference call. However, in untabulated tests, we do not find any significant difference between the order of sustainability questions and other questions.

4.7.8 ESG Incidents

A potential concern is that firms' ESG incidents solely drive analysts' sustainability questions, and therefore, ESG incidents subsume the effect of analyst sustainability focus when predicting analysts' forecast accuracy. To address this, we follow the approach in Derrien et al. (2022) and control for the occurance of an ESG incident during the fiscal year. The result of this analysis is presented in panel G of Table 8. We continue to find that analysts' sustainability focus is positively related to their forecast accuracy after controlling for *ESG Incidents*.

Taken together, the results presented in Table 8 indicate that our main inferences on the positive association between analysts' sustainability focus and forecast accuracy are not sensitive to different design choices.

4.8 Determinants of Analysts' Sustainability Focus

Our primary analyses study the valuation implications of analysts' focus on sustainability issues. However, because this study is the first to document analysts' focus on sustainability issues, we believe it is important to understand what leads analysts to focus on sustainability. To do this, we estimate regression models taking the form:

$$\begin{aligned} &\mathit{Sustainability\ Focused\ Analyst}_{i,j,t} = \alpha + \Sigma\beta_k\ \mathit{Analyst\ Characteristics}_{j,t} \\ &\quad +\Sigma\beta_m\ \mathit{Firm\ Characteristics}_{i,t} + \Sigma\beta_n\ \mathit{Firm}_i + \Sigma\beta_n\ \mathit{Analyst}_j + \Sigma\beta_q\ \mathit{Year}_t + \varepsilon_{i,j,t}, \end{aligned} \tag{8}$$

where i, j, and t represent firm, analyst, and year.

We include analyst and firm characteristics from our main analyses that are potentially associated with analysts' sustainability focus. The analyst characteristics include *Ln(Brokerage*

Size), *Ln(Firm Specific Experience)*, *Ln(Overall Experience)*, *Ln(Num Firms Following)*, and *Ln(Num Industries Following)*. The firm characteristics include *Turnover*, *Return*, *Return Vol*, *Size*, *ROA*, *MTB*, *Instown*, *Ln(Num Analyst Following)*, and *Voluntary Sustainability Report*. To further shed light on the determinants of sustainability focus, in additional analysis we replace the dependent variable with *Material Sustainability Focused Analyst* and *Financial Impact Sustainability Focused Analyst*. We note that all the models include analyst fixed effects to control for unobservable time-invariant analyst characteristics.

The results of estimating Eq. (8) using OLS are presented in Table 9. In columns (1)–(3) we examine factors that are associated with analysts' sustainability focus in general (*Sustainability Focused Analyst*). In columns (4)–(6) we examine factors that are associated with analysts' material sustainability focus (*Material Sustainability Focused Analyst*). In columns (7)–(9) we examine factors that are associated with analysts' sustainability focus in the context of its impact on firm fundamentals (*Financial Impact Sustainability Focused Analyst*). Analyst sustainability focus is positively associated with analyst experience, which dovetails with our earlier finding that there is a learning curve associated with focusing on sustainability in that more experienced analysts reap greater benefits when they focus on sustainability compared to less experienced analysts. Analysts who cover more stocks are also more likely to focus on sustainability, consistent with the view that exposure to a broad set of firms leads analysts to recognize and focus on shared performance drivers such as sustainability.

Regarding the types of firm characteristics that lead analysts to focus on sustainability, we find that analysts are more likely to focus on sustainability for small firms and those with low analyst following. This is consistent with analysts focusing on sustainability when information asymmetry is greater and comports with our earlier finding that analysts reap greater benefits in terms of forecast accuracy when they focus on sustainability for small firms and growth firms. Further, we document some evidence that the issuance of a voluntary sustainability report is positively associated with sustainability focus and negatively associated with stock returns.

[Insert Table 9 around here.]

5 Conclusion

There is significant debate regarding the incorporation of sustainability into the investment process (e.g. Starks, 2023; Giglio et al., 2023; Ackerman and Wise, 2023). We propose a novel method for measuring equity analysts' focus on sustainability issues by analyzing their questions during conference calls. We exploit recent advances in natural language processing and use a machine learning BERT-based model to classify questions using the SASB's sustainability dimensions. This approach offers future researchers a methodology to detect sustainability-related content in other types of text, such as corporate disclosures and social media. Using the classifications from this model, we examine whether sustainability-focused analysts enjoy a competitive advantage in forecasting earnings.

Our main result is that when an analyst focuses on sustainability for a covered firm, her earnings forecast accuracy improves relative to other analysts who cover the same firm. Moreover, analysts who focus on material sustainability issues make even more accurate forecasts. We also find that the stock market reacts significantly more strongly when an analyst focuses on sustainability. Taken together, our findings are consistent with the view that considering sustainability issues provides a competitive edge when forecasting earnings. These results have practical implications for investment professionals and policymakers, who are increasingly interested in the role of sustainability in investing and enterprise value creation.

Appendix A: Variable Descriptions

Variable Name	Description
Brokerage Size	Number of analysts in a specific brokerage firm
ESG Incidents	Equal to 1 if the firm had any ESG incidents reported in the RepRisk database during the fiscal year, zero otherwise
Experienced Analyst	Equal to 1 if analyst's experience is in the year-specific top tercile of our sample, and zero otherwise.
Financial Impact Sustainability Focused Analyst	Equal to 1 if the analyst asks a Sustainability question that includes any of the words "asset*", "bottom line", "bottom-line", "bottomline", "earning*", "equity", "expense*", "gross margin", "income", "liability", "liabilities", "loss", "losses", "profit*", "revenue*", or "sale*" in a conference call hosted by the covered firm in the one year before they issue their forecast, zero otherwise
Firm Age	The difference between the end of fiscal year and the first day that the firm appeared on Compustat
Firm Specific Experience	Number of days between the first date the analyst started covering the firm until the day of the forecast
Growth Firm	Equal to 1 if firm market-to-book ratio is in the year-specific top tercile of our sample, and zero otherwise.
Horizon	The number of days between analyst forecast and earnings announcement date
Instown	The proportion of shared owned by institutional investors
Length Analyst Questions	Number of words in all questions asked by the analyst during conference calls hosted by the covered firm in the one year they issue their forecast
Material Sustainability Focused Analysts	Equal to 1 if the analysts ask a question regarding a material Sustainability topic in a conference call hosted by the covered firm in the one year before they issue their forecast, zero otherwise
MTB	Market value of equity divided by book value of equity
Num Analyst Following	Number of analysts following the firm
Num Analyst Questions	Number of all questions asked by the analyst during conference calls hosted by the covered firm in the one year they issue their forecast
Num Sustainability Focused Questions	Total number of Sustainability questions asked by an analyst in a conference call hosted by the covered firm in the one year before they issue their forecast
Num Firms Covered	Number of firms that the analyst covers in a given year
Num Industries Covered	Number of unique two-digit SIC codes of firms that the analyst covers in a given year
Overall Experience	The number of days between the first date that the analyst appeared in IBES database and the day of the forecast
Participating Analyst	Equal to 1 if the analyst asks at least one question in a conference call hosted by the covered firm in the one year before they issue their forecast, zero otherwise
Relative Forecast Accuracy	The maximum analysts forecast error among all analysts forecasting for the same firm in a given year minus focal analyst's forecast error scaled by the difference between maximum and minimum among all analysts forecast error forecasting for the same firm in a given year.
Relative Forecast Accuracy HLLT	The difference between median of analyst forecast errors within the same 90 days and the focal analyst forecast error scaled by standard deviation of all forecast errors within the same 90 dates
Return	Cumulative stock return of the firm over the past 12 months
Return Vol	Standard deviation of firm monthly returns over the past 12 months
Revision	The difference between analysts' current forecast and their immediate last forecast scaled by price on earning announcement date
ROA	Income before extraordinary items scaled by total assets
Size	Natural logarithm of 1 plus total assets
Small Firm	Equal to 1 if firm size is in the year-specific bottom tercile of our sample, and zero otherwise.
Sustainability Focused Analyst	Equal to 1 if the analyst asks a Sustainability question in a conference call hosted by the covered firm in the one year before they issue their forecast, zero otherwise
Three-Day CAR	3-day abnormal return around analyst forecast revision date
Turnover	Natural logarithm of 1 plus the ratio of total share volume scaled by the number of shares outstanding
Voluntary Sustainability Report	Equal to 1 if the firm issued a voluntary Sustainability report in the year before analysts forecast, zero otherwise

References

AASB (2019, May). Australian accounting standards board conceptual framework.

Ackerman, A. and L. Wise (2023, Mar). Senate votes 50-46 to reverse esg rule for retirement funds. *Wall Street Journal*.

Aghamolla, C. and B.-J. An (2021). Mandatory vs. voluntary ESG disclosure, efficiency, and real effects. *Working Paper*.

Albuquerque, R., Y. Koskinen, and C. Zhang (2019). Corporate social responsibility and firm risk: Theory and empirical evidence. *Management Science 65*(10), 4451–4469.

Allee, K. D., C. Do, and M. Sterin (2021). Product market competition, disclosure framing, and casting in earnings conference calls. *Journal of Accounting and Economics 72*(1), 101405.

Amel-Zadeh, A. and G. Serafeim (2018). Why and how investors use ESG information: Evidence from a global survey. *Financial Analysts Journal 74*(3), 87–103.

Bancel, F., D. Glavas, and G. A. Karolyi (2023). Do esg factors influence firm valuation? evidence from the field. *Evidence from the Field (February 20, 2023)*.

Barron, O. E., D. Byard, and O. Kim (2002). Changes in analysts' information around earnings announcements. *The Accounting Review 77*(4), 821–846.

Becchetti, L., R. Ciciretti, and A. Giovannelli (2013). Corporate social responsibility and earnings forecasting unbiasedness. *Journal of Banking & Finance 37*(9), 3654–3668.

Berg, F., J. F. Koelbel, and R. Rigobon (2022). Aggregate confusion: The divergence of ESG ratings. *Forthcoming Review of Finance*.

Bernardi, C. and A. W. Stark (2018). Environmental, social and governance disclosure, integrated reporting, and the accuracy of analyst forecasts. *The British Accounting Review 50*(1), 16–31.

Blankespoor, E., E. deHaan, and I. Marinovic (2020). Disclosure processing costs, investors' information choice, and equity market outcomes: A review. *Journal of Accounting and Economics 70*(2-3), 101344.

Bochkay, K., S. V. Brown, A. J. Leone, and J. W. Tucker (2023). Textual analysis in accounting: What's next? *Contemporary accounting research 40*(2), 765–805.

Bochkay, K., J. Hales, and G. Serafeim (2021). Disclosure standards and communication norms: Evidence of voluntary disclosure standards as a coordinating device for capital markets. *Working Paper*.

Bowen, R. M., A. K. Davis, and D. A. Matsumoto (2002). Do conference calls affect analysts' forecasts? *The Accounting Review 77*(2), 285–316.

Bradshaw, M. T. (2011). Analysts' forecasts: what do we know after decades of work? *Working Paper*.

Bradshaw, M. T., L. D. Brown, and K. Huang (2013). Do sell-side analysts exhibit differential target price forecasting ability? *Review of Accounting Studies 18*, 930–955.

Brown, L. D. (2001). How important is past analyst forecast accuracy? *Financial Analysts Journal 57*(6), 44–49.

Brown, L. D., A. C. Call, M. B. Clement, and N. Y. Sharp (2015). Inside the "black box" of sell-side financial analysts. *Journal of Accounting Research 53*(1), 1–47.

Brown, S., S. A. Hillegeist, and K. Lo (2004). Conference calls and information asymmetry. *Journal of Accounting and Economics 37*(3), 343–366.

Bushee, B. J., D. A. Matsumoto, and G. S. Miller (2004). Managerial and investor responses to disclosure regulation: The case of Reg FD and conference calls. *The Accounting Review 79*(3), 617–643.

Call, A. C., R. W. Flam, J. A. Lee, and N. Y. Sharp (2023). Managers' use of humor on public earnings conference calls. *Review of Accounting Studies*, 1–38.

Chen, J. V., V. Nagar, and J. Schoenfeld (2018). Manager-analyst conversations in earnings conference calls. *Review of Accounting Studies 23*(4), 1315–1354.

Chen, Z., D. S. Dhaliwal, and H. Xie (2010). Regulation fair disclosure and the cost of equity capital. *Review of Accounting Studies 15*, 106–144.

Cheng, Q. (2005). The role of analysts' forecasts in accounting-based valuation: A critical evaluation. *Review of Accounting Studies 10*, 5–31.

Christensen, D. M., G. Serafeim, and A. Sikochi (2022). Why is corporate virtue in the eye of the beholder? the case of ESG ratings. *The Accounting Review 97*(1), 147–175.

Christensen, H. B., L. Hail, and C. Leuz (2021). Mandatory CSR and sustainability reporting: economic analysis and literature review. *Review of Accounting Studies 26*(3), 1176–1248.

Clement, M. B. (1999). Analyst forecast accuracy: Do ability, resources, and portfolio complexity matter? *Journal of Accounting and Economics 27*(3), 285–303.

Clement, M. B. and S. Y. Tse (2005). Financial analyst characteristics and herding behavior in forecasting. *The Journal of Finance 60*(1), 307–341.

Correia, S. (2015). Singletons, cluster-robust standard errors and fixed effects: A bad mix. *Technical Note, Duke University 7*.

Davis, A. K., W. Ge, D. Matsumoto, and J. L. Zhang (2015). The effect of manager-specific optimism on the tone of earnings conference calls. *Review of Accounting Studies 20*, 639–673.

De Franco, G., O.-K. Hope, and S. Larocque (2015). Analysts' choice of peer companies. *Review of Accounting Studies 20*, 82–109.

Dechow, P. M. (2023). Understanding the sustainability reporting landscape and research opportunities in accounting. *The Accounting Review 98*(5), 481–493.

Derrien, F., P. Krueger, A. Landier, and T. Yao (2022). Esg news, future cash flows, and firm value. *Swiss Finance Institute Research Paper* (21-84). Available at https://www.aeaweb.org/conference/2023/program/paper/Gn4SZzfb, October 14, 2022.

Devlin, J., M.-W. Chang, K. Lee, and K. Toutanova (2018). BERT: Pre-training of deep bidirectional transformers for language understanding. *arXiv preprint arXiv:1810.04805*.

Dhaliwal, D. S., S. Radhakrishnan, A. Tsang, and Y. G. Yang (2012, 01). Nonfinancial Disclosure and Analyst Forecast Accuracy: International Evidence on Corporate Social Responsibility Disclosure. *The Accounting Review 87*(3), 723–759.

Drake, M., P. Joos, J. Pacelli, and B. Twedt (2020). Analyst forecast bundling. *Management Science 66*(9), 4024–4046.

Du, K., M. Liu, and S. Wang (2022). Human information production in the machine age: Evidence from machine adoption in the asset management industry. *Working Paper*.

Edmans, A. (2011). Does the stock market fully value intangibles? employee satisfaction and equity prices. *Journal of Financial economics 101*(3), 621–640.

Edmans, A. (2021). *Grow the Pie: How Great Companies Deliver Both Purpose and Profit–Updated and Revised*. Cambridge University Press.

Edmans, A. (2022). The end of ESG. *European Corporate Governance Institute–Finance Working Paper* (847).

Elliott, W. B., S. M. Grant, and K. M. Rennekamp (2017). How disclosure features of corporate social responsibility reports interact with investor numeracy to influence investor judgments. *Contemporary Accounting Research 34*(3), 1596–1621.

Fang, B. and O.-K. Hope (2021). Analyst teams. *Review of Accounting Studies 26*(2), 425–467.

FASB (2021, Dec). Financial accounting standards board conceptual framework.

Ferguson, P., J. Hronsky, and M. Pinnuck (2022). Who pays attention to sustainability reports and why? evidence from google search activity. *Working Paper*.

Fiechter, P., J.-M. Hitz, and N. Lehmann (2022). Real effects of a widespread csr reporting mandate: Evidence from the european union's csr directive. *Journal of Accounting Research 60*(4), 1499–1549.

Frankel, R., J. Jennings, and J. Lee (2022). Disclosure sentiment: machine learning vs. dictionary methods. *Management Science 68*(7), 5514–5532.

Frankel, R., M. Johnson, and D. J. Skinner (1999). An empirical examination of conference calls as a voluntary disclosure medium. *Journal of Accounting Research 37*(1), 133–150.

Friedman, H., M. Heinle, and I. Luneva (2022). Implications of investor-focused ESG reporting ... and misreporting. *Working Paper*.

Giglio, S., T. Kuchler, J. Stroebel, and X. Zeng (2023). Biodiversity risk. Technical report, National Bureau of Economic Research.

Giglio, S., M. Maggiori, J. Stroebel, Z. Tan, S. Utkus, and X. Xu (2023). Four facts about esg beliefs and investor portfolios. Technical report, National Bureau of Economic Research.

Goldstein, I., A. Kopytov, L. Shen, and H. Xiang (2022). On ESG investing: Heterogeneous preferences, information, and asset prices. *NBER working Paper*.

Green, T. C., R. Huang, Q. Wen, and D. Zhou (2019). Crowdsourced employer reviews and stock returns. *Journal of Financial Economics 134*(1), 236–251.

Griffin, P. A., D. H. Lont, and E. Y. Sun (2017). The relevance to investors of greenhouse gas emission disclosures. *Contemporary Accounting Research 34*(2), 1265–1297.

Griffin, P. A., T. Neururer, and E. Y. Sun (2020). Environmental performance and analyst information processing costs. *Journal of Corporate Finance 61*, 101397.

Groysberg, B., P. M. Healy, and D. A. Maber (2011). What drives sell-side analyst compensation at high-status investment banks? *Journal of Accounting Research 49*(4), 969–1000.

Guiral, A., D. Moon, H.-T. Tan, and Y. Yu (2020). What drives investor response to csr performance reports? *Contemporary Accounting Research 37*(1), 101–130.

Hail, L., S. Kim, and R. X. Zhang (2021). How do managers greenwash? evidence from earnings conference calls. *Working Paper*.

Han, Y., C. X. Mao, H. Tan, and C. Zhang (2023). Climatic disasters and distracted analysts. *Contemporary Accounting Research*.

Harford, J., F. Jiang, R. Wang, and F. Xie (2019). Analyst career concerns, effort allocation, and firms' information environment. *The Review of Financial Studies 32*(6), 2179–2224.

Hassan, T. A., S. Hollander, L. Van Lent, and A. Tahoun (2019). Firm-level political risk: Measurement and effects. *The Quarterly Journal of Economics 134*(4), 2135–2202.

Hassan, T. A., S. Hollander, L. Van Lent, and A. Tahoun (2023a). The global impact of brexit uncertainty. *Forthcoming Journal of Finance*.

Hassan, T. A., S. Hollander, L. Van Lent, and A. Tahoun (2023b). Sources and transmission of country risk. *Forthcoming Review of Economic Studies*.

Heitzman, S., C. Wasley, and J. Zimmerman (2010). The joint effects of materiality thresholds and voluntary disclosure incentives on firms' disclosure decisions. *Journal of Accounting and Economics 49*(1), 109–132.

Henze, V. and S. Boyd (2022, Jan). ESG may surpass $41 trillion assets in 2022, but not without challenges. *Bloomberg Intelligence*.

Hirshleifer, D., Y. Levi, B. Lourie, and S. H. Teoh (2019). Decision fatigue and heuristic analyst forecasts. *Journal of Financial Economics 133*(1), 83–98.

Huang, A. H., A. P. Lin, and A. Y. Zang (2022, aug). Cross-industry information sharing among colleagues and analyst research. *Journal of Accounting and Economics 74*(1), 101496.

Huang, A. H., H. Wang, and Y. Yang (2022). FinBERT: A large language model for extracting information from financial text. *Contemporary Accounting Research*.

Jacob, J., T. Z. Lys, and M. A. Neale (1999). Expertise in forecasting performance of security analysts. *Journal of Accounting and Economics 28*(1), 51–82.

Jennings, J., J. Lee, and D. A. Matsumoto (2017). The effect of industry co-location on analysts' information acquisition costs. *The Accounting Review 92*(6), 103–127.

Johnson, J. A., J. Theis, A. Vitalis, and D. Young (2020). The influence of firms' emissions management strategy disclosures on investors' valuation judgments. *Contemporary Accounting Research 37*(2), 642–664.

Joos, P., J. D. Piotroski, and S. Srinivasan (2016). Can analysts assess fundamental risk and valuation uncertainty? an empirical analysis of scenario-based value estimates. *Journal of Financial Economics 121*(3), 645–663.

Ke, B. and Y. Yu (2006). The effect of issuing biased earnings forecasts on analysts' access to management and survival. *Journal of Accounting Research 44*(5), 965–999.

Khan, M., G. Serafeim, and A. Yoon (2016). Corporate sustainability: First evidence on materiality. *The accounting review 91*(6), 1697–1724.

Kim, O. and R. E. Verrecchia (1997). Pre-announcement and event-period private information. *Journal of Accounting and Economics 24*(3), 395–419.

Kumar, A. (2010). Self-selection and the forecasting abilities of female equity analysts. *Journal of Accounting Research 48*(2), 393–435.

Larcker, D. F., S. A. Richardson, and I. r. Tuna (2007). Corporate governance, accounting outcomes, and organizational performance. *The accounting review 82*(4), 963–1008.

Lee, K., M. Aleksanyan, E. Harris, and M. Manochin (2023). Throwing in the towel: what happens when analysts' recommendations go wrong? *Contemporary Accounting Research 40*(3), 1576–1604.

Levitt, A. (1998, Feb). A question of integrity: Promoting investor confidence by fighting insider trading. *Sec.gov*.

Li, C., A.-P. Lin, and H. Lu (2023). The effect of social skills on analyst performance. *Contemporary Accounting Research 40*(2), 1418–1447.

Ljungqvist, A., F. Marston, L. T. Starks, K. D. Wei, and H. Yan (2007). Conflicts of interest in sell-side research and the moderating role of institutional investors. *Journal of Financial Economics 85*(2), 420–456.

Lys, T., J. P. Naughton, and C. Wang (2015). Signaling through corporate accountability reporting. *Journal of Accounting and Economics 60*(1), 56–72.

Matsumoto, D., M. Pronk, and E. Roelofsen (2011). What makes conference calls useful? the information content of managers' presentations and analysts' discussion sessions. *The Accounting Review 86*(4), 1383–1414.

Mayew, W. J. (2008). Evidence of management discrimination among analysts during earnings conference calls. *Journal of Accounting Research 46*(3), 627–659.

Mayew, W. J., M. Sethuraman, and M. Venkatachalam (2020). Individual analysts' stock recommendations, earnings forecasts, and the informativeness of conference call question and answer sessions. *The Accounting Review 95*(6), 311–337.

Mayew, W. J., N. Y. Sharp, and M. Venkatachalam (2013, jun). Using earnings conference calls to identify analysts with superior private information. *Review of Accounting Studies 18*(2), 386–413.

Mikhail, M. B., B. R. Walther, and R. H. Willis (1999). Does forecast accuracy matter to security analysts? *The Accounting Review 74*(2), 185–200.

Mitton, T. (2021). Economic significance in corporate finance. *Working Paper*.

Moroney, R. and K. T. Trotman (2016). Differences in auditors' materiality assessments when auditing financial statements and sustainability reports. *Contemporary Accounting Research 33*(2), 551–575.

Moss, A., J. P. Naughton, and C. Wang (2023). The irrelevance of environmental, social, and governance disclosure to retail investors. *Management Science*.

Muslu, V., S. Mutlu, S. Radhakrishnan, and A. Tsang (2019). Corporate social responsibility report narratives and analyst forecast accuracy. *Journal of Business Ethics 154*, 1119–1142.

O'Brien, P. C. (1990). Forecast accuracy of individual analysts in nine industries. *Journal of Accounting Research 28*(2), 286–304.

Orens, R. and N. Lybaert (2010). Determinants of sell-side financial analysts' use of non-financial information. *Accounting and Business Research 40*(1), 39–53.

Park, M., A. Yoon, and T. Zach (2023). Sell-side analysts' assessment of operational risk: Evidence from negative esg incidents. *Available at SSRN*.

Pástor, L., R. F. Stambaugh, and L. A. Taylor (2021). Sustainable investing in equilibrium. *Journal of Financial Economics 142*(2), 550–571.

Pedersen, L. H., S. Fitzgibbons, and L. Pomorski (2021). Responsible investing: The esg-efficient frontier. *Journal of Financial Economics 142*(2), 572–597.

Pinnuck, M., A. Ranasinghe, N. Soderstrom, and J. Zhou (2021). Restatement of csr reports: Frequency, magnitude, and determinants. *Contemporary Accounting Research 38*(3), 2376–2416.

Plumlee, M. A. (2003). The effect of information complexity on analysts' use of that information. *The Accounting Review 78*(1), 275–296.

Reboredo, J. C. and A. Ugolini (2022). Climate transition risk, profitability and stock prices. *International Review of Financial Analysis 83*, 102271.

Rennekamp, K. M., M. Sethuraman, and B. A. Steenhoven (2022). Engagement in earnings conference calls. *Journal of Accounting and Economics 74*(1), 101498.

Ryou, J. W., A. Tsang, and K. T. Wang (2022). Product market competition and voluntary corporate social responsibility disclosures. *Contemporary Accounting Research 39*(2), 1215–1259.

SASB (2022, Jun). Sustainability accounting standards board conceptual framework.

Sautner, Z., L. V. Lent, G. Vilkov, and R. Zhang (2023). Firm-level climate change exposure. *The Journal of Finance LXXVIII*(3).

Schiemann, F. and R. Tietmeyer (2022). Esg controversies, esg disclosure and analyst forecast accuracy. *International Review of Financial Analysis 84*, 102373.

Serafeim, G. and A. Yoon (2022). Which corporate ESG news does the market react to? *Financial Analysts Journal 78*(1), 59–78.

Siano, F. and P. Wysocki (2021). Transfer learning and textual analysis of accounting disclosures: Applying big data methods to small (er) datasets. *Accounting Horizons 35*(3), 217–244.

Sinha, P., L. D. Brown, and S. Das (1997). A re-examination of financial analysts' differential earnings forecast accuracy. *Contemporary Accounting Research 14*(1), 1–42.

Starks, L. T. (2023). Presidential address: Sustainable finance and esg issues—value versus values. *The Journal of Finance*.

Umar, M., N. Mirza, S. K. A. Rizvi, and B. Naqvi (2022). Esg scores and target price accuracy: Evidence from sell-side recommendations in brics. *International Review of Financial Analysis 84*, 102389.

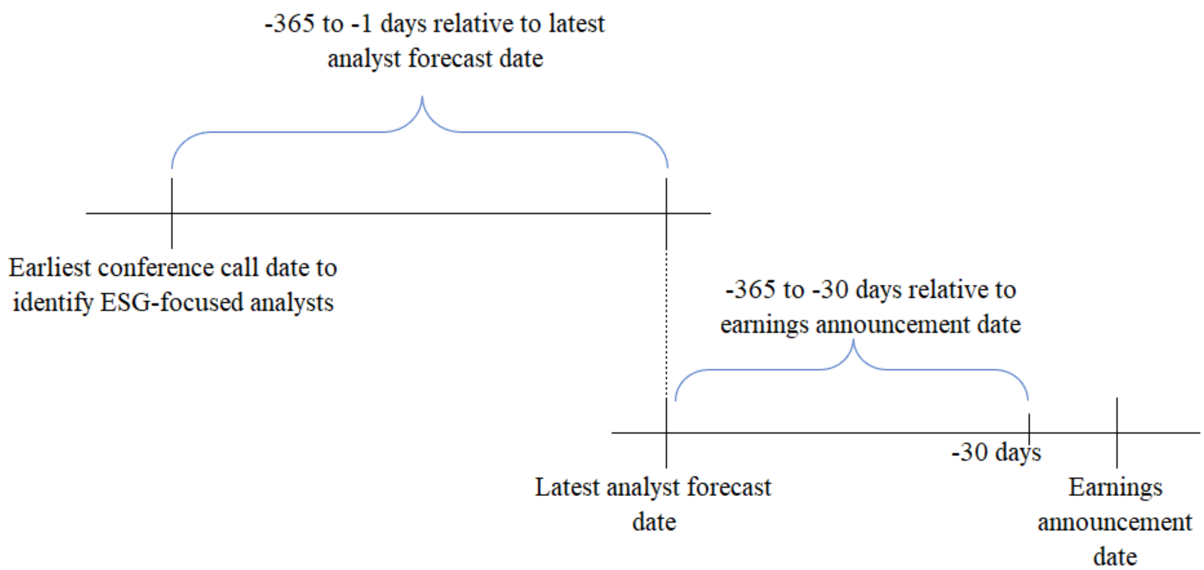

Figure 1. Timeline for Identifying Sustainability-Focused Analysts
This figure shows the timeline for identifying Sustainability-focused analysts in our research design.

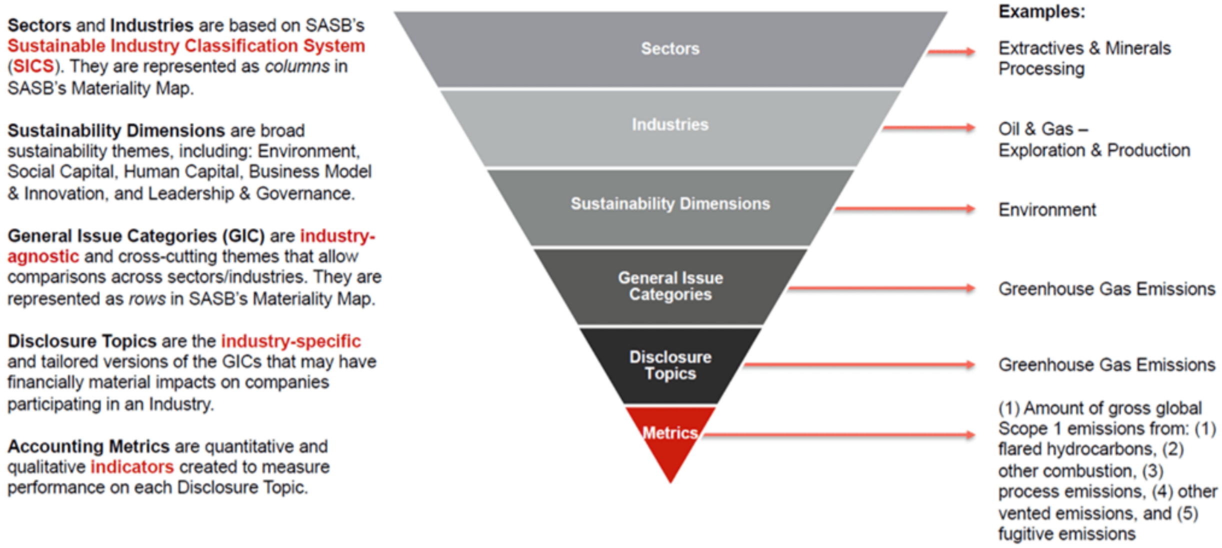

Figure 2. An Example of the Structure of the SASB Standards

This figure shows an example of a material Sustainability issue (GHG Emissions) for the Extractive and Minerals Processing industry. Source: https://www.sasb.org/wp-content/uploads/2021/07/PCP-package_vF.pdf.

Table 1. Sample Selection

Procedure	Number of Observations
I/B/E/S Detail analysts last forecast for the next fiscal year (FPE=1) with non-missing values for analyst forecast accuracy and analyst characteristic variables during fiscal years 2008-2020 after excluding forecasts that are more than one year or less than one month away from the earnings announcement day	551,054
Matching with CRSP and Compustat with non-missing values on firm characteristics	301,732
Eliminating observations with missing CapitalIQ Company ID and unmatched analysts with CapitalIQ	272,096
Number of corresponding conference calls	111,789
Number of corresponding transcript questions from CapitalIQ	1,849,827
Eliminating corresponding transcript questions from CapitalIQ with less than 10 words	1,581,482
Number of Sustainability question transcripts	102,113
Number of Sustainability analysts-firm-years	54,168 (20% of all the observations in our sample)
Number of conference calls with at least one Sustainability question	52,820 (47% of all conference calls in our sample)
Average ratio of Sustainability-focused analysts to all analysts who cover a firm in a given year	33%

This table presents the sample selection process for the analyses in this paper. The final sample constitutes 272,096 analyst-firm-year observations during 2008–2020.

Table 2. Frequency of Sustainability Issues among Questions of Sustainability-focused Analysts

Sustainability Dimension	Sustainability Issue	Frequency	Frequency Percentage
Environment	GHG Emissions	162	0.16
	Air Quality	88	0.09
	Energy Management	1,959	1.92
	Waste and Hazardous Materials Management	267	0.26
	Water and Wastewater Management	412	0.4
	Ecological Impacts	146	0.14
Social Capital	Human Rights and Community Relations	7	0.01
	Customer Privacy	110	0.11
	Data Security	781	0.76
	Access and Affordability	121	0.12
	Product Quality and Safety	395	0.39
	Selling Practices and Product Labeling	74	0.07
Human Capital	Labor Practices	2,070	2.03
	Employee Health and Safety	309	0.3
	Employee Engagement Inclusion and Diversity	585	0.57
Business Model & Innovation	Product Design and Lifecycle Management	17,200	16.84
	Business Model Resilience	1,497	1.47
	Supply Chain Management	4,316	4.23
	Physical Impacts of Climate Change	509	0.5
Leadership & Governance	Critical Incident Risk Management	191	0.19
	Management of Legal and Regulatory Framework	23,931	23.44
	Competitive Behavior	32,489	31.82
	Business Ethics	291	0.28
	Systemic Risk Management	14,203	13.91

This table presents the frequencies of analysts' questions in our sample categorized across 24 Sustainability issues within five Sustainability dimensions.

Table 3. Descriptive Statistics

	N	Mean	SD	Q1	Median	Q3
Dependent Variables:						
Relative Forecast Accuracy	272096	0.789	0.235	0.705	0.875	0.957
Three-Day CAR	218355	0.0002	0.066	-0.026	0	0.027
Test Variables:						
Sustainability Focused Analyst	272096	0.199	0.399	0	0	0
Financial Impact Sustainability Focused Analyst	272096	0.046	0.210	0	0	0
Material Sustainability Focused Analyst	272096	0.076	0.265	0	0	0
Participating Analyst	272096	0.671	0.47	0	1	1
Revision	218355	-0.004	0.052	-0.003	0	0.002
Analyst Characteristics:						
Horizon	272096	110.514	70.502	62	97	120
Brokerage Size	272096	60.999	54.087	18	42	93
Firm Specific Experience	272096	1620.522	1678.639	403	1049	2292
Overall Experience	272096	4630.86	3253.849	1946	3892	6992
Num Firms Covered	272096	16.407	7.15	12	16	20
Num Industries Covered	272096	4.276	2.405	2	4	6
Num Analyst Questions	272096	6.118	7.554	0	4	9
Length Analyst Questions	272096	346.211	435.129	0	212	522
Firm Characteristics:						
Turnover	272096	1.145	0.485	0.799	1.076	1.42
Return	272096	0.117	0.468	-0.17	0.073	0.324
Return Vol	272096	0.118	0.067	0.071	0.101	0.145
Size	272096	7.816	1.847	6.544	7.817	9.04
ROA	272096	-0.002	0.059	-0.006	0.011	0.024
MTB	272096	4.062	7.57	1.515	2.667	4.81
Instown	272096	0.713	0.302	0.628	0.823	0.929
Firm Age	272096	6978.848	3805.846	3562	6940	10227
Num Analyst Following	272096	17.271	10.347	9	15	24
ESG Incidents	272096	0.357	0.479	0	0	1

This table presents reports descriptive statistics of variables used in our analyses throughout the paper. All variables are defined in Appendix A. All variables are winsorized at the 1^{st} and 99^{th} percentiles.

Table 4. Sustainability-Focused Analysts and Relative Forecast Accuracy

Panel A: Sustainability Focused Analysts				
Dependent Variable=	*Relative Forecast Accuracy*			
Analysts Sample=	All		Participating	
	(1)	(2)	(3)	(4)
Sustainability Focused Analyst	0.0152***	0.0157***	0.0147***	0.0159***
	(12.4203)	(11.2239)	(11.4458)	(10.9032)
Horizon	-0.0011***	-0.0011***	-0.0011***	-0.0011***
	(-113.9459)	(-104.3764)	(-97.1496)	(-88.6222)
Ln(Brokerage Size)	-0.0060***	-0.0037**	-0.0068***	-0.0039**
	(-4.6437)	(-2.4956)	(-4.4539)	(-2.2512)
Ln(Firm Specific Experience)	0.0011***	0.0013**	-0.0010	-0.0018
	(2.7858)	(2.0261)	(-1.5637)	(-1.3863)
Ln(Overall Experience)	-0.0021	-0.0031	-0.0017	-0.0023
	(-1.3553)	(-1.6025)	(-0.7918)	(-0.8043)
Ln(Num Firms Covered)	0.0022	0.0038	0.0028	0.0024
	(1.0182)	(1.6081)	(1.0584)	(0.7805)
Ln(Num Industries Covered)	0.0014	0.0025	0.0015	0.0044*
	(0.7524)	(1.1683)	(0.6498)	(1.6867)
Turnover	0.0041**	0.0035*	0.0036*	0.0033
	(2.5182)	(1.9481)	(1.7865)	(1.5002)
Return	-0.0027**	-0.0013	-0.0024*	-0.0006
	(-2.4129)	(-1.0547)	(-1.8721)	(-0.4079)
Return Vol	0.1073***	0.1070***	0.1104***	0.1101***
	(9.1673)	(8.3951)	(7.7548)	(7.0702)
Size	0.0005	-0.0018	0.0023	-0.0003
	(0.3527)	(-0.9497)	(1.2366)	(-0.1339)
ROA	-0.0425***	-0.0580***	-0.0498***	-0.0716***
	(-3.1505)	(-3.9130)	(-2.9869)	(-3.8896)
MTB	0.0000	0.0000	0.0001	0.0001
	(0.4834)	(0.1300)	(1.2293)	(1.2904)
Instown	0.0087***	0.0087**	0.0069*	0.0115***
	(2.8619)	(2.5064)	(1.8356)	(2.7134)
Ln(Firm Age)	0.0181***	0.0124**	0.0091**	0.0020
	(4.8353)	(2.5716)	(1.9720)	(0.3440)
Ln(Num Analyst Following)	0.0423***	0.0446***	0.0362***	0.0371***
	(17.8339)	(15.6858)	(13.0125)	(11.1001)
Observations	272,096	254,360	182,144	168,318
Adjusted R-squared	0.2087	0.2230	0.2061	0.2177
Analyst FEs	Yes	No	Yes	No
Year FEs	Yes	Yes	Yes	Yes
Firm FEs	Yes	No	Yes	No
Analyst-Firm FEs	No	Yes	No	Yes
Cluster	Analyst	Analyst	Analyst	Analyst

Table 4. (Continued)

Panel B: SASB Material Sustainability Focused Analysts				
Dependent Variable=	*Relative Forecast Accuracy*			
Analysts Sample=	All		Participating	
	(1)	(2)	(3)	(4)
Material Sustainability Focused Analyst	0.0043**	0.0067***	0.0040*	0.0062***
	(2.0505)	(2.9377)	(1.8971)	(2.5834)
Sustainability Focused Analyst	0.0136***	0.0132***	0.0134***	0.0138***
	(9.2109)	(7.9381)	(8.5189)	(7.7203)
Horizon	-0.0011***	-0.0011***	-0.0011***	-0.0011***
	(-113.9518)	(-104.3710)	(-96.8887)	(-87.9630)
Ln(Brokerage Size)	-0.0060***	-0.0037**	-0.0067***	-0.0037**
	(-4.6478)	(-2.4976)	(-4.3140)	(-2.0861)
Ln(Firm Specific Experience)	0.0010***	0.0013**	-0.0012*	-0.0022*
	(2.7748)	(2.0202)	(-1.8725)	(-1.7264)
Ln(Overall Experience)	-0.0021	-0.0031	-0.0017	-0.0023
	(-1.3520)	(-1.5995)	(-0.7705)	(-0.8038)
Ln(Num Firms Covered)	0.0022	0.0038	0.0022	0.0015
	(1.0231)	(1.6209)	(0.8175)	(0.4902)
Ln(Num Industries Covered)	0.0014	0.0025	0.0025	0.0060**
	(0.7532)	(1.1696)	(1.0805)	(2.2665)
Turnover	0.0041**	0.0035**	0.0036*	0.0034
	(2.5280)	(1.9684)	(1.7975)	(1.5100)
Return	-0.0027**	-0.0013	-0.0032**	-0.0013
	(-2.4213)	(-1.0654)	(-2.4563)	(-0.9335)
Return Vol	0.1074***	0.1071***	0.1030***	0.1043***
	(9.1741)	(8.4043)	(6.9269)	(6.4474)
Size	0.0005	-0.0018	0.0019	-0.0003
	(0.3503)	(-0.9491)	(1.0219)	(-0.1476)
ROA	-0.0425***	-0.0580***	-0.0504***	-0.0687***
	(-3.1500)	(-3.9150)	(-2.9130)	(-3.6077)
MTB	0.0000	0.0000	0.0002*	0.0002**
	(0.4876)	(0.1345)	(1.8653)	(2.0710)
Instown	0.0087***	0.0086**	0.0142***	0.0182***
	(2.8501)	(2.4869)	(3.4169)	(3.8701)
Ln(Firm Age)	0.0181***	0.0124**	0.0073	0.0011
	(4.8417)	(2.5742)	(1.5468)	(0.1743)
Ln(Num Analyst Following)	0.0423***	0.0446***	0.0359***	0.0364***
	(17.8399)	(15.6902)	(12.6716)	(10.7317)
Observations	272,096	254,360	175,588	162,416
Adjusted R-squared	0.2088	0.2231	0.2067	0.2192
Analyst FEs	Yes	No	Yes	No
Year FEs	Yes	Yes	Yes	Yes
Firm FEs	Yes	No	Yes	No
Analyst-Firm FEs	No	Yes	No	Yes
Cluster	Analyst	Analyst	Analyst	Analyst

Table 4. (Continued)

Panel C: Financial Impact Sustainability Focused Analysts				
Dependent Variable=	*Relative Forecast Accuracy*			
Analysts Sample=	All		Participating	
	(1)	(2)	(3)	(4)
Financial Impact Sustainability Focused Analyst	0.0039*	0.0044*	0.0043*	0.0044*
	(1.7512)	(1.7256)	(1.9189)	(1.7256)
Sustainability Focused Analyst	0.0137***	0.0143***	0.0135***	0.0143***
	(10.3189)	(9.4497)	(9.8524)	(9.4497)
Financial Impact Analyst	0.0028***	0.0026**	0.0025**	0.0026**
	(2.6524)	(2.0905)	(2.1390)	(2.0905)
Horizon	-0.0011***	-0.0011***	-0.0011***	-0.0011***
	(-113.9203)	(-104.3671)	(-97.1228)	(-104.3671)
Ln(Brokerage Size)	-0.0061***	-0.0038**	-0.0069***	-0.0038**
	(-4.6971)	(-2.5408)	(-4.4815)	(-2.5408)
Ln(Firm Specific Experience)	0.0009**	0.0011*	-0.0011*	0.0011*
	(2.2890)	(1.7175)	(-1.7983)	(1.7175)
Ln(Overall Experience)	-0.0021	-0.0031	-0.0018	-0.0031
	(-1.3600)	(-1.6015)	(-0.8158)	(-1.6015)
Ln(Num Firms Covered)	0.0022	0.0037	0.0029	0.0037
	(1.0300)	(1.5973)	(1.0771)	(1.5973)
Ln(Num Industries Covered)	0.0014	0.0024	0.0015	0.0024
	(0.7571)	(1.1637)	(0.6495)	(1.1637)
Turnover	0.0040**	0.0035*	0.0035*	0.0035*
	(2.4905)	(1.9300)	(1.7851)	(1.9300)
Return	-0.0027**	-0.0013	-0.0024*	-0.0013
	(-2.4112)	(-1.0503)	(-1.8611)	(-1.0503)
Return Vol	0.1072***	0.1069***	0.1101***	0.1069***
	(9.1593)	(8.3860)	(7.7348)	(8.3860)
Size	0.0005	-0.0018	0.0023	-0.0018
	(0.3505)	(-0.9639)	(1.2278)	(-0.9639)
ROA	-0.0427***	-0.0579***	-0.0500***	-0.0579***
	(-3.1633)	(-3.9086)	(-2.9941)	(-3.9086)
MTB	0.0000	0.0000	0.0001	0.0000
	(0.4791)	(0.1227)	(1.2323)	(0.1227)
Instown	0.0086***	0.0086**	0.0068*	0.0086**
	(2.8388)	(2.4842)	(1.8288)	(2.4842)
Ln(Firm Age)	0.0181***	0.0124***	0.0091**	0.0124***
	(4.8270)	(2.5839)	(1.9810)	(2.5839)
Ln(Num Analyst Following)	0.0424***	0.0447***	0.0363***	0.0447***
	(17.8889)	(15.7144)	(13.0730)	(15.7144)
Observations	272,096	254,360	182,144	254,360
Adjusted R-squared	0.2088	0.2231	0.2061	0.2231
Analyst FEs	Yes	No	Yes	No
Year FEs	Yes	Yes	Yes	Yes
Firm FEs	Yes	No	Yes	No
Analyst-Firm FEs	No	Yes	No	Yes
Cluster	Analyst	Analyst	Analyst	Analyst

This table presents results from estimating Eq. (3) using OLS. In Panel A, we identify Sustainability Focused Analysts based on all Sustainability related questions that they ask. In Panel B, we identify Material Sustainability Focused analysts by limiting the Sustainability questions to only material topics according to SASB's SICS®. In Panel C, we focus on Financial Impact Sustainability Focused Analysts, who ask about a sustainability issue in the context of its financial impact on the firm. In Columns (1) and (3) of all panels Analyst, Firm, and Year fixed effects are included individually. In columns (2) and (4) of all three panels, combined Analyst-Firm and Year fixed effects are included. In columns (1) and (2) of all panels, we include both participating and non-participating analysts in the analyses. In columns (3) and (4) of all panels we only include participating analysts in the analyses. t-statistics appear in parentheses and are clustered by analyst. *, **, and *** indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. All variables are defined in Appendix A.

Table 5. Sustainability-Focused Analysts and Relative Forecast Accuracy by Sustainability Dimension

Panel A: Sustainability Focused Analysts

Dependent Variable=	*Relative Forecast Accuracy*				
Sustainability Dimension=	Environment	Social Capital	Human Capital	Business Model and Innovation	Leadership and Governance
	(1)	(2)	(3)	(4)	(5)
Sustainability Focused Analyst	0.0085*	0.0113*	0.0137***	0.0180***	0.0130***
	(1.6830)	(1.6596)	(2.6818)	(8.8418)	(8.7551)
Observations	254,360	254,360	254,360	254,360	254,360
Adjusted R-squared	0.2225	0.2225	0.2225	0.2228	0.2228
Controls	Yes	Yes	Yes	Yes	Yes
Analyst-Firm FEs	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Cluster	Analyst	Analyst	Analyst	Analyst	Analyst

Panel B: SASB Material Sustainability Focused Analysts

Dependent Variable=	*Relative Forecast Accuracy*				
Sustainability Dimension=	Environment	Social Capital	Human Capital	Business Model and Innovation	Leadership and Governance
	(1)	(2)	(3)	(4)	(5)
Material Sustainability Focused Analyst	0.0174***	0.0169**	0.0122	0.0184***	0.0173***
	(9.0704)	(2.1005)	(1.5259)	(7.0751)	(5.8909)
Observations	254,360	254,360	254,360	254,360	254,360
Adjusted R-squared	0.2228	0.2225	0.2225	0.2226	0.2226
Controls	Yes	Yes	Yes	Yes	Yes
Analyst-Firm FEs	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Cluster	Analyst	Analyst	Analyst	Analyst	Analyst

Table 5. (Continued)

Panel C: Financial Impact Sustainability Focused Analysts

Dependent Variable=	*Relative Forecast Accuracy*				
Sustainability Dimension=	Environment	Social Capital	Human Capital	Business Model and Innovation	Leadership and Governance
	(1)	(2)	(3)	(4)	(5)
Financial Impact Sustainability Focused Analyst	0.0133	0.0543**	-0.0064	0.0141***	0.0145***
	(0.8938)	(2.3316)	(-0.4477)	(2.9279)	(5.5792)
Observations	254,360	254,360	254,360	254,360	254,360
Adjusted R-squared	0.2225	0.2225	0.2225	0.2225	0.2226
Controls	Yes	Yes	Yes	Yes	Yes
Analyst-Firm FEs	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Cluster	Analyst	Analyst	Analyst	Analyst	Analyst

This table presents results from estimating Eq. (3) using OLS, identifying analyst's specific Sustainability focus based on SASB's five sustainability dimensions. In Panel A we identify Sustainability Focused Analysts based on all Sustainability related questions corresponding to a specific dimension. In Panel B, we focus on those Sustainability Focused Analysts who ask about a sustainability issue in the context of its financial impact on the firm. In Panel C we identify Material Sustainability Focused Analysts by limiting the each dimension's Sustainability questions to only material topics according to SASB's SICS®. We include both participating and non-participating analysts in all analyses. All models include the two-way Analyst-Firm and Year fixed effects. t-statistics appear in parentheses and are clustered by analyst. *, **, and *** indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. All variables are defined in Appendix A.

Table 6. Market Reaction to Sustainability-focused Analysts' Forecast Revisions

Dependent Variable=	*Three-Day CAR*					
Analyst=	*Sustainability Focused Analyst*		*Material Sustainability Focused Analyst*		*Financial Impact Sustainability Focused Analyst*	
	(1)	(2)	(3)	(4)	(5)	(6)
Revision × Analyst	0.0324***	0.0412***	0.1010***	0.1302***	0.0331*	0.0389*
	(3.1267)	(3.2075)	(4.8137)	(5.1177)	(1.8183)	(1.7814)
Revision	0.0572***	0.0565***	0.0622***	0.0629***	0.0597***	0.0595***
	(11.2108)	(8.9809)	(12.5371)	(10.4048)	(12.2538)	(9.9477)
Analyst	0.0000	0.0004	0.0006	0.0006	-0.0005	-0.0003
	(0.0241)	(0.8681)	(1.0421)	(0.8731)	(-0.7044)	(-0.3226)
Horizon	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***
	(-3.8083)	(-2.9945)	(-3.7476)	(-2.9927)	(-3.8282)	(-3.0792)
Ln(Brokerage Size)	0.0003	-0.0000	0.0003	-0.0000	0.0003	-0.0000
	(0.7307)	(-0.0881)	(0.7194)	(-0.0831)	(0.7467)	(-0.0674)
Ln(Firm Specific Experience)	0.0001	0.0005	0.0000	0.0005	0.0001	0.0005
	(0.3648)	(1.2932)	(0.2901)	(1.2934)	(0.3732)	(1.3351)
Ln(Experience)	0.0003	-0.0005	0.0003	-0.0005	0.0003	-0.0005
	(0.4849)	(-0.6840)	(0.5064)	(-0.6654)	(0.4788)	(-0.6941)
Ln(No of Firms Covered)	0.0014*	0.0016*	0.0014*	0.0016*	0.0014*	0.0016*
	(1.9501)	(1.8771)	(1.9120)	(1.8798)	(1.9351)	(1.8929)
Ln(No of Industries Covered)	-0.0001	0.0001	-0.0001	0.0001	-0.0001	0.0001
	(-0.2157)	(0.1064)	(-0.2171)	(0.0989)	(-0.2127)	(0.1015)
Turnover	-0.0003	-0.0007	-0.0003	-0.0007	-0.0003	-0.0007
	(-0.4995)	(-0.9498)	(-0.5025)	(-0.9668)	(-0.5185)	(-0.9692)
Return	-0.0056***	-0.0054***	-0.0056***	-0.0055***	-0.0056***	-0.0054***
	(-12.1357)	(-10.2768)	(-12.1498)	(-10.2873)	(-12.1107)	(-10.2540)
Return Vol	0.0412***	0.0499***	0.0412***	0.0500***	0.0412***	0.0499***
	(8.3611)	(8.7929)	(8.3533)	(8.7943)	(8.3416)	(8.7663)
Size	-0.0029***	-0.0038***	-0.0029***	-0.0038***	-0.0029***	-0.0038***
	(-5.4594)	(-5.5377)	(-5.4271)	(-5.4572)	(-5.4302)	(-5.4978)
ROA	0.0830***	0.0797***	0.0826***	0.0793***	0.0830***	0.0797***
	(15.4737)	(12.3499)	(15.4211)	(12.3035)	(15.4848)	(12.3579)
MTB	0.0003***	0.0002***	0.0003***	0.0002***	0.0003***	0.0002***
	(9.6250)	(7.6503)	(9.6125)	(7.6478)	(9.6175)	(7.6529)
Instown	0.0027**	0.0026*	0.0028**	0.0026*	0.0028**	0.0027**
	(2.4030)	(1.9245)	(2.4279)	(1.9330)	(2.4442)	(1.9668)
Ln(Firm Age)	0.0028**	0.0039**	0.0028**	0.0039**	0.0027**	0.0038**
	(2.0308)	(2.1336)	(2.0370)	(2.1284)	(2.0135)	(2.1101)
Ln(Num Analyst Following)	-0.0054***	-0.0052***	-0.0054***	-0.0052***	-0.0054***	-0.0052***
	(-6.9666)	(-5.3816)	(-6.9932)	(-5.4520)	(-6.9687)	(-5.3960)
Observations	218,355	199,270	218,355	199,270	218,355	199,270
Adjusted R-squared	0.0484	0.0435	0.0486	0.0437	0.0484	0.0434
Analyst FEs	Yes	No	Yes	No	Yes	No
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	No	Yes	No	Yes	No
Analyst-Firm FEs	No	Yes	No	Yes	No	Yes
Cluster	Analyst	Analyst	Analyst	Analyst	Analyst	Analyst

This table presents results from estimating Eq. (4) using OLS. Columns (1), (3), and (5) Analyst, Firm, and Year fixed effects are included individually. In columns (2), (4), and (6) the two-way Analyst-Firm and Year fixed effects are included. In columns (1) and (2), we identify Sustainability Focused Analysts based on all Sustainability related questions corresponding to a specific dimension. In columns (3) and (4) we identify Material Sustainability Focused Analysts by limiting each dimension's Sustainability questions to only material topics according to SASB's SICS®. In columns (5) and (6), we focus on those Sustainability Focused Analysts who ask about a sustainability issue in the context of its financial impact on the firm. We include both participating and non-participating analysts in all analyses. t-statistics appear in parentheses and are clustered by analyst. *, **, and *** indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. All variables are defined in Appendix A.

Table 7. Cross-Sectional Tests

Dependent Variable=	Relative Forecast Accuracy			
Cross-sectional variable=	*Experienced Analyst*	*Small Firm*	*Growth Firm*	*Voluntary Sustainability Report*
	(1)	(2)	(3)	(4)
Sustainability Focused Analyst × Cross-Sectional Variable	0.0051*	0.0078**	0.0086***	0.0007
	(1.7458)	(2.1659)	(3.4010)	(0.1858)
Sustainability Focused Analyst	0.0143***	0.0142***	0.0125***	0.0157***
	(8.4173)	(9.4858)	(7.2122)	(10.5244)
Cross-Sectional Variable	-0.0004	0.0046	-0.0030*	-0.0020
	(-0.1282)	(1.2273)	(-1.8380)	(-1.0084)
Observations	254,360	254,360	254,360	254,360
Adjusted R-squared	0.2230	0.2231	0.2231	0.2230
Controls	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Analyst-Firm FE	Yes	Yes	Yes	Yes
Cluster	Analyst	Analyst	Analyst	Analyst

This table presents results from estimating Eq. (6) using OLS using multiple cross-sectional variables. In column (1), the cross-sectional variable is an indicator that is equal to 1 when analysts' overall experience is in the year-specific top tercile of our sample, and zero otherwise. In column (2) the cross-sectional variable is an indicator that is equal to 1 when firm size is in the year-specific bottom tercile of our sample, and zero otherwise. In column (3) the cross-sectional variable is an indicator that is equal to 1 when firm's market-to-book-ratio is in the year-specific top tercile of our sample, and zero otherwise. In column (4), the cross-sectional variable is an indicator that is equal to 1 when the firm issued a voluntary Sustainability report in the year before the analyst issue their forecast, and zero otherwise. All models include the two-way Analyst-Firm and Year fixed effects. We include both participating and non-participating analysts in all analyses. t-statistics appear in parentheses and are clustered by firm and date. t-statistics appear in parentheses and are clustered by analyst. *, **, and *** indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. All variables are defined in Appendix A.

Table 8. Robustness Tests

Panel A: Controlling for firms' voluntary Sustainability report

Dependent Variable=	*Relative Forecast Accuracy*
Sustainability Focused Analyst	0.0158***
	(11.2461)
Voluntary Sustainability Report	-0.0018
	(-0.9869)
Observations	254,360
Adjusted R-squared	0.2230
Controls	Yes
Year FEs	Yes
Analyst-Firm FEs	Yes
Cluster	Analyst

Panel B: Controlling for analysts' number and length of questions

Dependent Variable=	*Relative Forecast Accuracy*
Sustainability Focused Analyst	0.0146***
	(10.1037)
Ln(Num Analyst Questions)	0.0005
	(0.3272)
Ln(Length Analyst Questions)	0.0007
	(1.0903)
Observations	254,360
Adjusted R-squared	0.2231
Controls	Yes
Year FEs	Yes
Analyst-Firm FEs	Yes
Cluster	Analyst

Panel C: Excluding "Competitive Behavior" from Sustainability topics

Dependent Variable=	*Relative Forecast Accuracy*
Sustainability Focused Analyst	0.0153***
	(10.1584)
Observations	254,360
Adjusted R-squared	0.2229
Controls	Yes
Year FEs	Yes
Analyst-Firm FEs	Yes
Cluster	Analyst

Table 8. (Continued)

Panel D: Relative forecast accuracy measured based on Hirshleifer et al. (2019)	
Dependent Variable=	*Relative Forecast Accuracy HLLT*
Sustainability Focused Analyst	0.0916***
	(15.5181)
Observations	245,515
Adjusted R-squared	0.0799
Controls	Yes
Year FEs	Yes
Analyst-Firm FEs	Yes
Cluster	Analyst

Panel E: Number of Sustainability focused questions as test variable	
	Relative Forecast Accuracy
Num Sustainability Focused Questions	0.0057***
	(9.7537)
Observations	254,360
Adjusted R-squared	0.2229
Controls	Yes
Year FEs	Yes
Analyst-Firm FEs	Yes
Cluster	Analyst

Panel F: Two-year forecast horizon	
Dependent Variable=	*Relative Forecast Accuracy*
Sustainability Focused Analyst	0.0034**
	(2.3748)
Observations	248,252
Adjusted R-squared	0.0913
Controls	Yes
Year FEs	Yes
Analyst-Firm FEs	Yes
Cluster	Analyst

Panel G: Controlling for ESG incidents	
Dependent Variable=	*Relative Forecast Accuracy*
Sustainability Focused Analyst	0.0079***
	(5.4068)
ESG Incidents	0.0014
	(0.8566)
Observations	254,360
Adjusted R-squared	0.2011
Controls	Yes
Year FEs	Yes
Analyst-Firm FEs	Yes
Cluster	Analyst

This table presents robustness tests from estimating Eq. (3) using OLS. In Panel A, we control for firms' issuance of voluntary sustainability reports. In Panel B, we control for the number of questions and the length of questions that the analyst asks during conference calls. In Panel C, we exclude analysts' sustainability questions regarding "Competitive Behavior". In Panel D, we use an alternative measure for analysts' forecast accuracy based on Hirshleifer et al. (2019). In Panel E, we use the number of sustainability-focused questions asked by an analyst one year before issuing their forecast as the test variable. In Panel F, we replicate the analyses for alternative horizons of two-year ahead forecasts. In panel G, we control for the number of ESG incidents of the firm during the fiscal year. In all panels, both participating and non-participating analysts are included in the analysis. All models include combined Analyst-Firm and Year fixed effects are included. t-statistics appear in parentheses and are clustered by analyst. *, **, and *** indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. All variables are defined in Appendix A.

Table 9. Determinants of Analysts' Sustainability Focus

Dependent Variable=	*Sustainability Focused Analyst*			*Material Sustainability Focused Analyst*			*Financial Impact Sustainability Focused Analyst*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln(Brokerage Size)	-0.0041	-0.0058	-0.0023	-0.0032	-0.0034	-0.0013	-0.0012	-0.0017	-0.0003
	(-0.8429)	(-1.1777)	(-0.4649)	(-1.0328)	(-1.1063)	(-0.4379)	(-0.5805)	(-0.8323)	(-0.1582)
Ln(Firm Specific Experience)	0.0259***	0.0257***	0.0169***	0.0105***	0.0103***	0.0074***	0.0082***	0.0082***	0.0060***
	(11.3002)	(11.2234)	(7.3436)	(6.0993)	(5.9675)	(4.4554)	(6.6817)	(6.6578)	(4.6206)
Ln(Overall Experience)	0.0332***	0.0181*	0.0282***	0.0307***	0.0145**	0.0166***	0.0026	0.0125***	0.0142***
	(4.7839)	(1.7849)	(2.8761)	(6.7497)	(2.2654)	(2.7640)	(0.8148)	(2.7048)	(3.1216)
Ln(Num Firms Covered)	0.0370***	0.0375***	0.0371***	0.0108*	0.0102*	0.0087*	0.0033	0.0027	0.0030
	(4.4094)	(4.4927)	(4.5725)	(1.9407)	(1.8345)	(1.6587)	(0.8385)	(0.6787)	(0.7487)
Ln(Num Industries Covered)	0.0070	0.0041	0.0016	-0.0019	-0.0024	-0.0017	0.0014	0.0018	0.0008
	(1.0388)	(0.6060)	(0.2417)	(-0.4099)	(-0.5289)	(-0.3995)	(0.4332)	(0.5545)	(0.2410)
Turnover	0.0034	0.0040	0.0073	-0.0021	-0.0011	-0.0066*	-0.0017	-0.0013	-0.0001
	(0.8948)	(1.0299)	(1.4652)	(-0.7763)	(-0.3792)	(-1.8974)	(-0.8361)	(-0.6643)	(-0.0204)
Return	-0.0054*	-0.0075**	-0.0047	0.0019	0.0011	0.0005	-0.0056***	-0.0067***	-0.0047**
	(-1.7494)	(-2.3790)	(-1.4250)	(0.8406)	(0.4867)	(0.1975)	(-3.2941)	(-3.8455)	(-2.4905)
Return Vol	-0.1633***	-0.0947***	0.0465	-0.0696***	-0.0599***	0.0042	-0.0079	0.0062	0.0428**
	(-5.3671)	(-2.9313)	(1.2691)	(-3.3852)	(-2.7082)	(0.1675)	(-0.4899)	(0.3560)	(2.1324)
Size	-0.0239***	-0.0227***	-0.0219***	-0.0131***	-0.0130***	-0.0075**	-0.0044***	-0.0039***	-0.0015
	(-15.6739)	(-14.8011)	(-4.8350)	(-11.5823)	(-11.4077)	(-2.2468)	(-5.3153)	(-4.6310)	(-0.5700)
ROA	0.0129	0.0422	-0.0660*	0.0183	0.0289	-0.0222	0.0472***	0.0523***	-0.0183
	(0.4068)	(1.3364)	(-1.7364)	(0.7680)	(1.2126)	(-0.8142)	(2.6745)	(2.9641)	(-0.8536)
MTB	-0.0004**	-0.0004**	-0.0002	-0.0000	-0.0000	-0.0001	-0.0001	-0.0001	-0.0000
	(-2.2917)	(-2.4097)	(-0.9331)	(-0.0291)	(-0.4120)	(-1.0980)	(-1.4425)	(-1.1440)	(-0.4057)
Instown	-0.0044	-0.0018	-0.0139	-0.0092*	-0.0092*	-0.0105	-0.0083**	-0.0070*	-0.0072
	(-0.6452)	(-0.2572)	(-1.2297)	(-1.8486)	(-1.8256)	(-1.3597)	(-2.0719)	(-1.7213)	(-1.0578)
Ln(Num Analyst Following)	-0.0753***	-0.0774***	-0.0262***	-0.0250***	-0.0255***	-0.0099**	-0.0324***	-0.0336***	-0.0198***
	(-19.3568)	(-19.7914)	(-3.6869)	(-8.2710)	(-8.4168)	(-2.0149)	(-14.2622)	(-14.6264)	(-4.7832)
Voluntary Sustainability Report	0.0055	0.0044	0.0067	0.0057*	0.0048	-0.0006	-0.0033*	-0.0029	-0.0031
	(1.3735)	(1.0879)	(1.4163)	(1.9426)	(1.6199)	(-0.1704)	(-1.6494)	(-1.4524)	(-1.2175)
Observations	137,454	137,454	137,288	137,453	137,453	137,287	137,454	137,454	137,288
Adjusted R-squared	0.1156	0.1171	0.1526	0.0966	0.0975	0.1512	0.0522	0.0526	0.0715
Analyst FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Firm FEs	No	No	Yes	No	No	Yes	No	No	Yes
Cluster	Analyst	Analyst	Analyst	Analyst	Analyst	Analyst	Analyst	Analyst	Analyst

This table presents results from estimating Eq. (8) using OLS. In columns (1)–(3) the dependent variable is Sustainability Focused Analyst, in columns (4)–(6) the dependent variable is Financial Impact Sustainability Focused Analyst who ask sustainability questions in the context of its financial impact on the firm, and in columns (7)–(9) the dependent variable is Material Sustainability Focused Analyst. In columns (1), (4), and (7) analyst characteristics, firm characteristics, and analyst fixed effects are included. In columns (2), (5) and (8) analyst characteristics, firm characteristics, analyst, and year fixed effects are included. In columns (3), (6), and (9) analyst characteristics, firm characteristics, analyst, firm, and year fixed effects are included. We include both participating and non-participating analysts in all analyses. t-statistics appear in parentheses and are clustered by analyst. *, **, and *** indicate statistical significance (two-sided) at the 0.1, 0.05, and 0.01 levels, respectively. All variables are defined in Appendix A.