Value, Values, and Opportunities in Corporate Environmental Practices

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Abstract

Using a novel dataset that combines survey responses from 505 sell-side analysts with textual analysis of 273,664 analyst reports, we examine how analysts view and value corporate environmental practices. Four key findings emerge. First, analysts devote substantial attention to corporate environmental issues. Second, they primarily approach these matters through a *value*-maximization lens rather than a *values*-based one. Financial considerations outweigh non-financial *values* by a wide margin in both survey responses and report content. Third, analysts view environmental factors not solely as risks but even more so as opportunities, especially regarding the transition to green technologies. These perspectives significantly shape their earnings forecasts and stock recommendations. Fourth, analysts identify regulatory frameworks and public/media scrutiny as the most effective drivers of corporate environmental improvements, while institutional investors and employees are seen as playing more limited roles. Importantly, these findings are consistent across the two data sources, allowing us to cross-validate analysts' self-reported views (survey) with their actual professional actions (reports). Overall, our findings underscore the dominance of *value*-driven analysis, the financial materiality of environmental opportunities alongside risks, and the pivotal role of regulation in shaping corporate environmental practices.

Keywords: Sell-side Analysts; Sustainability; Corporate Environmental Practice; *Values*, Environmental Opportunities

JEL Classification: G24, G32, G34

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1. Introduction

Public firms are among the largest greenhouse gas emitters in modern history (CDP 2017; MSCI 2023a; Shive and Forster 2020), making it crucial to understand their environmental practices. Recent research has begun to unveil how various stakeholders – including regulators, large shareholders, media, consumers, and employees – influence corporate environmental behavior. Much of this work has focused on institutional investors, an important group of market-based monitors. However, critical questions remain about whether institutional investors' actions meaningfully affect firms' sustainability practices (e.g., Heath, Macciocchi, Michaely, and Ringgenberg 2023; Hoepner, Oikonomou, Sautner, Starks, and Zhou 2024), whether changes in the cost of capital are sufficient to induce change (e.g., Berk and van Binsbergen 2025), and whether the threat of divestment or investor selection can be effective (Gantchev, Giannetti, and Li 2022; Atta-Darkua, Glossner, Krueger, and Matos 2023).

At the same time, the role of another pivotal group of market-based monitors – sell-side analysts – remains largely underexplored. This is surprising given that analysts have both the incentives and the means to influence corporate decisions (Hong and Kubik 2003; Chen, Harford, and Lin 2015; Loh and Stulz 2018). Our study addresses this gap by examining analysts' beliefs, perspectives, and actions related to corporate environmental practices[1]. To the extent that analysts' views often serve as a proxy for the market's (e.g., Bouchaud, Krueger, Landier, and Thesmar 2019; Derrien, Krueger, Landier, and Yao 2025), our results also shed light on how the market interprets and values firms' environmental strategies.

We employ a two-pronged approach. First, we conduct a large-scale survey to capture analysts' beliefs and viewpoints. The survey encompasses responses from 505 analysts, ensuring representation across various industries, genders, brokerage houses, and experience levels. Second, we leverage a large language model to analyze environmental discussions in 273,664 analyst reports. These reports cover 3,931 unique firms from 2013 to 2022 and represent the actual environmental information that analysts convey to the investing public. Our data is drawn from China – the world's second-largest economy, a major greenhouse gas emitter, and a key player in advancing climate solutions.

By integrating these two sources of information, along with external datasets such as

[1] The two environmental issues most closely related to corporations are climate change and pollution. Throughout the paper, we the terms "climate and environmental" and "environmental" interchangeably.

analyst forecasts and stock recommendations, we address several important questions. First, how frequently do analysts engage with environmental issues? Do they pay attention only sporadically, or do they routinely integrate environmental analysis into their research? Second, when assessing environmental matters, do analysts champion sustainability for profit or principles? That is, is their attention motivated by financial returns (value maximization) or by ethical and societal considerations (a *values*-oriented approach), as discussed in Starks (2023)? Third, do analysts view environmental factors solely as risks to mitigate, or do they also recognize the opportunities associated with the climate transition? Moreover, do they incorporate these risks and opportunities into their financial forecasts and stock recommendations? Finally, what do analysts perceive as the primary drivers of corporate environmental improvement?

A necessary condition for examining corporate environmental practices through the lens of financial analysts is that analysts meaningfully cover these issues. Analyzing 273,664 analyst reports, we find that 27.6% (75,611) contain discussions of environmental topics. For comparison, only 16.4% (44,881) of reports mention artificial intelligence (AI), and just 3.9% (10,673) reference cybersecurity risks. This indicates that analysts address environmental issues far more frequently than other prominent emerging topics. Importantly, this coverage is not concentrated in a few firms or industries: environmental-related reports span 63.7% of firm-years and 83.3% of unique firms in our sample. Moreover, the environmental discussions are relatively intensive. Among the reports that mention environmental issues, an average of 5.37 sentences per report – or 13.6% of all sentences – are dedicated to environmental topics, suggesting a meaningful level of analysis. Survey evidence further reinforces these findings. Of the 505 analysts surveyed, 83.4% (420) rate their level of attention to climate and environmental information as 3 or above on a 1-5 scale. The average rating is 3.38, significantly above the midpoint of 3. Only 16.6% report low attention levels (1 or 2). Taken together, textual analysis of analyst reports and survey results consistently indicate that analysts' environmental coverage is both broad and in-depth. Analysts routinely integrate environmental analysis into their research, in addition to addressing it in response to salient ESG events (e.g., Derrien et al. 2025).

Given the substantial environmental coverage observed, we next explore how analysts evaluate corporate environmental practices. Do they focus solely on firm value-maximization, or do they also consider broader societal welfare? Hart and Zingales (2017) frame this distinction as shareholder value maximization versus welfare maximization, while Starks (2023) summarizes it

as *value* versus *values*. To probe analysts' orientation, we ask in the survey: "*Do you try to influence your covered firms to invest in reducing their environmental impact?*" (Q4). A majority of analysts (57.2%) select "*Only when it can increase firm value*," reflecting a *value*-oriented approach. In contrast, only 14.5% choose "*Yes, I usually do (even when it does not increase firm value)*," indicating a *values*-oriented perspective. Thus, *value*-oriented analysts outnumber *values*-oriented analysts by nearly four to one (57.2% vs.14.5%).

Textual analysis of analyst reports reveals the same pattern of emphasis on *value* over *values*. We classify *value* sentences as those linking environmental discussions to financial performance, and *values* sentences as those referring to externalities, such as environmental or societal impact (see Internet Appendix 5 for definitions and examples). Among the 75,611 analyst reports that include environmental content, an average report contains 3.40 *value*-related sentences and 0.62 *values*-related sentences. This means that for every mention of a *values*-related consideration, there are approximately 5.5 references (=3.40/0.62) to financial performance, underscoring analysts' predominant focus on value maximization.

In further exploring the determinants of analysts' orientation toward *value* versus *values*, we find that an analyst's alignment with *values* tends to be relatively stable over time. Analysts who include more *values*-related discussions in their reports in year *t* are significantly more likely to do so in subsequent years than those who do not. We also find that the *values* orientation correlates with several observable characteristics: analysts who pay greater attention to environmental issues, female and older analysts, and those affiliated with brokerage houses that promote a *values*-oriented culture are significantly more likely to align with *values.* The persistence of *values* orientation, as well as the influence of gender, age, and employers' stance on externalities, is consistent with findings from other contexts and countries (e.g., Eisenberg et al. 2015; Eagly and Crowley 1986; Mayr and Freund 2020; Michaely, Ordonez-Calafi, and Rubio 2024). Thus, it is likely that the implications and insights from our study extend beyond Chinese sell-side analysts and apply to analysts' beliefs and behavior in general.

We next examine analysts' perceptions of environmental factors. At the macro level, climate change poses a profound threat to the planet and humanity. At the firm level, however, related developments – such as regulatory shifts, technological innovation, and evolving stakeholder preferences – can generate both risks and opportunities, affecting firms in markedly different ways. While academic research has largely emphasized downside risks (e.g., Krueger,

Sautner, and Starks 2020; Bolton and Kacperczyk 2021, 2003), practitioners often stress the upside potential. For instance, BlackRock CEO Larry Fink described the climate transition as a "*historic investment opportunity*" (Fink 2021), and former Bank of England Governor Mark Carney called it "*the greatest commercial opportunity of our time*" (Climate Change News 2020). Motivated by this disconnect between academic emphasis and practitioner outlook, we examine how financial analysts perceive environmental factors – do they view them primarily as risks to mitigate, or also as opportunities to seize?

In the survey(Q3), we ask: "*For the firms you cover, do you see environmental and climate change factors more as a risk or an opportunity?*" Among the 505 analyst respondents, 44.4% select "*Equally as a risk and an opportunity*," 26.3% choose "*More as an opportunity*", and 16.6% indicate "*More as a risk."* The remaining 12.7% consider environmental factors irrelevant to the firms they cover. These results suggest that a majority of analysts (70.7% = 44.4% + 26.3%) recognize the opportunity component in environmental matters – either as the dominant lens or in combination with risks. This broadens the conventional "environmental risk" narrative by incorporating a critical "opportunity" perspective.

Textual analyses of analyst reports corroborate these findings. Across the 75,611 reports that mention environmental issues, an average report contains 3.79 sentences related to environmental opportunities and 0.77 sentences related to environmental risks. At the report level, over 85% include at least one mention of environmental-related business opportunities, compared to 37.7% referencing environmental risks. These consistent patterns across survey and textual data suggest that analysts do not perceive environmental factors solely as sources of risks; rather, they also view and frame them as prominent opportunities. We also find evidence that analysts perceive both environmental risks and opportunities as financially material. By matching analyst reports to their corresponding EPS forecasts and stock recommendations, we observe that analysts who put more emphasis on environmental risks also issue significantly lower earnings forecasts and make less favorable recommendations (holding firm fundamentals constant through firm-by-year fixed effects). Conversely, reports that discuss environmental opportunities more extensively are accompanied by higher earnings forecasts and more favorable recommendations. These patterns suggest that analysts do not discuss environmental factors as mere rhetorical considerations; rather, they incorporate them meaningfully into their valuation models and investment advice.

What are the major sources of environmental risks and opportunities? To account for potential heterogeneity across sectors, we classify industries as either brown or green based on the China Securities Regulatory Commission (CSRC)'s list of high-polluting industries. Across both industry types, analysts consistently identify physical environmental changes as the most critical source of risk, underscoring the direct adverse effects of climate change. In contrast, regulatory risks are perceived as a significant threat only in brown industries, but not in green ones. On the opportunity side, analysts highlight the transition to green technologies as the most prominent source of opportunity across both brown and green industries. This assessment aligns with recent empirical evidence on transition opportunities for carbon-intensive firms (e.g., Cheema-Fox, Serafeim, and Wang 2022; Cohen, Gurun, and Nguyen 2024). For green industries in particular, analysts also emphasize additional opportunity drivers, including environmental regulations and subsidies, increasing demand for climate adaptation products, and heightened sustainability expectations from a broad range of stakeholders.

Another critical question is how to effectively motivate corporations to adopt more sustainable environmental practices. We identify eight commonly discussed factors in academic literature and ask survey analysts to evaluate their impact. Important factors include government policies and regulations (e.g., Henderson 1996; Greenstone 2003; He, Wang, and Zhang 2020), investor and creditor influence (e.g., Pástor, Stambaugh, and Taylor 2021; Houston and Shan 2022; Broccardo, Hart, and Zingales 2022; Hong, Wang, and Yang 2023), public and media pressure (e.g., Heese and Pacelli 2024), and supply chain pressures from suppliers and customers (e.g., Dai, Liang and, Ng 2021).

We summarize a few key findings here, with more detailed discussions in Section 5. First, while much of the literature focuses on the role of investors and creditors in promoting corporate sustainability (e.g., Broccardo, Hart, and Zingales 2022; Barber, Morse, and Yasuda 2021; Starks 2023), surveyed analysts rank their influence as the second lowest, significantly below most other factors. This view aligns with recent empirical evidence showing that institutional investors have limited treatment effects (e.g., Heath et al. 2023, Atta-Darkua et al. 2023) and their selection impact on the cost of capital is small (Berk and van Binsbergen 2025; Gantchev et al. 2022; Zhang 2025). The consistency between analysts' perceptions in our study and findings based on U.S. and global data also suggests that our results likely have broader relevance and are not confined to the

Chinese context. Second, analysts rate employees as the least influential group, with an average efficacy score of 2.56 on a 1 - 5 scale, significantly trailing behind all other factors.

At the other end of the spectrum, analysts view government regulations as the most influential driver of corporate environmental practices, followed closely by public and media pressure. Both are rated significantly higher than other factors and are seen as especially important in brown industries. These perceptions reinforce empirical findings on the roles of regulations and media scrutiny (e.g. Zou 2021; Jacobsen, Sallee, Shapiro, Van Benthem 2023; Buntaine, Greenstone, He, Liu, Wang, and Zhang 2024; Heese and Pacelli 2024) and echo the emphasis on regulatory approaches by finance academics, practitioners, and policymakers (Stroebel and Wurgler 2021). Our results highlight that, to achieve meaningful environmental improvements, particularly in high-polluting industries, a combination of robust regulatory frameworks and public/media scrutiny is likely the most effective strategy.

Our paper contributes to the broader debate on corporate objectives (Jensen 2001; Tirole 2010; Hart and Zingales 2017) by showing that analysts prioritize *value* maximization in environmental matters. To the extent that analysts' views and actions reflect those of the broader market (e.g., Brav, Lehavy, and Michaely 2005; Pástor, Sinha, and Swaminathan 2008; Bordalo, Gennaioli, Porta, and Shleifer 2019), our findings suggest that the market primarily emphasizes financial *value* over ethical or societal *values*. Second, our results underscore the importance of environmental opportunities, adding a critical dimension to the traditional "environmental risk" perspective (e.g., Krueger et al. 2020; Bolton and Kacperczyk 2021). Analysts view these opportunities as financially material and incorporate them meaningfully into their earnings forecasts and stock recommendations. In particular, the transition to green technologies stands out as the most significant opportunity across industries. Third, we are able to assess the relative importance of the factors that drive corporate sustainability. While prior research points to a broad set of stakeholders – including institutional investors, creditors, governments, media, customers, consumers, and employees – their relative influence remains unclear. Analysts, who maintain close contact with and deep knowledge of the firms they cover, perceive regulatory frameworks and public/media scrutiny as the most effective drivers. In contrast, investors and employees are seen as having more limited influence. These insights are particularly important given the growing academic focus on stakeholder pressure and ESG engagement (e.g., Pedersen, Fitzgibbons, and Pomorski 2021; Hoepner et al. 2024).

The remainder of the paper is organized as follows. Section 2 describes the survey design and delivery, the textual analysis of analyst reports, the characteristics of analysts in both samples, and analysts' coverage of environmental issues. Section 3 examines analysts' orientation towards *value*- versus *values*-based perspectives. Section 4 investigates how analysts assess environmental risks and opportunities. Section 5 analyzes the key drivers of firms' environmental improvements. Section 6 concludes.

2. Methodology, Data and Sample Characteristics

We integrate a large-scale survey, textual analysis of analyst reports using a large language model, and external datasets, such as analyst forecasts and recommendations. This section outlines our data collection procedures, presents the characteristics of analysts in both the survey and textual samples, and describes analysts' engagement with environmental topics in their professional outputs.

2.1 Survey Development and Delivery

To ensure question clarity, we developed the survey using an iterative process following Krosnick and Presser (2010). Initially, we presented the survey at the 2023 HKU-TLV Finance Forum and received feedback from 24 academic participants. After revising the questions, we presented the updated version at the 4th Analyst Research Conference in Greece and the 2023 Asian Finance Association Annual Conference in Vietnam, obtaining 84 additional feedback responses. Outside of conferences, we also solicited input from several academics and practicing equity analysts. Following further revisions, we translated the survey into Chinese and asked several Chinese academics and equity analysts to proofread the translation, ensuring accuracy and clarity. To mitigate order effects, we randomized the ordering of response options in matrix-style questions.

The final survey comprises of two parts. The first part gathers respondents' general and professional background information, such as gender, age, years of experience, job role (e.g., equity or strategy research), and the industries and firms they cover. The second part includes twelve questions related to corporate environmental issues. Internet Appendix 1 provides the complete survey instrument in both English and Chinese.

We distributed the survey through two channels: direct outreach to individual brokerage houses and collaboration with the Securities Association of China (SAC). In total, we obtained 555

initial responses. Details on survey distribution and response rates are discussed in Internet Appendix 2. To address potential concerns about careless or unqualified responses, we applied a series of screening criteria. Specifically, we exclude responses that (i) took less than two minutes to complete, (ii) showed no variation in the final five questions, (iii) lacked information about covered industries or firms, or (iv) were submitted by non-equity research analysts (e.g. strategy research analysts). We also remove possible duplicate responses by cross-checking IP addresses and general background information. After screening, we retained 505 valid responses with clear information on their industry or firm coverage. Section 2.3 provides the distribution of survey respondents and compares them to the broader sample of analysts identified from our analyst report data.

2.2 Analyst Reports and Forecasts

We collect all analyst reports issued for Chinese listed firms from 2013 to 2022 using data from DZH, a leading financial information service provider in China. We focus on firm-specific research reports in which the focal firm, the issuing analyst's name, and their broker affiliation can be clearly identified. These reports are matched to analyst forecasts and stock recommendations from the China Stock Market and Accounting Research (CSMAR) database based on the focal firm, the issuing analyst, and the report issuance date. We also obtain analysts' characteristics, such as gender and educational background, from CSMAR and the SAC website. After removing observations with incomplete information, our final sample consists of 273,664 analyst reports and corresponding EPS forecasts. These are issued by 5,261 analysts, covering 17,524 firm-years and 3,931 unique firms.

After extracting the text from these reports, we employ the Llama-3-8B model (Bai et al. 2023), an open-source, pretrained large language model developed by Meta, and apply fine-tuning techniques to identify sentences related to environment issues. For fine-tuning, we randomly select 10,000 sentences from the corpus to create a labeled dataset for training and testing. Each sentence is independently classified as either environmental-related or unrelated by two research assistants. Following standard practice, we split the labeled data into a 80% training set and a 20% testing set. The model is fine-tuned on the training set by adjusting its parameters to minimize classification error. Evaluation on the testing set shows that the fine-tuned model achieves 97% accuracy and 97% precision in distinguishing environmental-related content from other topics. Applying this

model to the full corpus, we identify approximately 405,000 environmental-related sentences across all analyst reports. Detailed examples are provided in Internet Appendix 3.

In the next step, we further classify the environmental-related content based on whether it reflects financial *value* or non-financial *values* considerations, and whether it focuses on environmental risks or opportunities. Because these tasks typically require contextual understanding beyond individual sentences, we include each environmental-related sentence along with its adjacent sentences during labelling and model fine-tuning. The specific classification criteria and results are detailed in Sections 3 and 4, respectively. Performance metrics for all fine-fining processes are reported in Internet Appendix 7.

2.3 Characteristics of the Two Samples

Table 1 presents the characteristics of analysts in the survey and report-based samples. Among survey respondents, 42.4% are female, 55.6% are under 30 years old, 53.9% have more than 2 years of experience, and 81.8% hold a master's degree. In comparison, among all analysts who have ever issued a research report in our sample, the corresponding figures are 25.4%, 50.7%, 58.8%, and 84.7%, respectively. These comparisons suggest that survey respondents are broadly similar to the overall analyst population, with the main difference being gender. Brokerage size and geographic location also show comparable distributions across the two samples. To address potential concerns about gender-related response bias, we adopt two approaches. First, we control for analyst gender in all regression analyses. Second, in Internet Appendix 9, we re-evaluate the main survey results by re-sampling male and female respondents to match the gender distribution observed in the analyst report sample.

Our industry classification follows the CITIC Securities framework, which is widely used by equity analysts in China. Figure 1 displays the distribution of survey respondents and analyst reports across industries. To formally assess the similarity between the two samples, we conduct a Kolmogorov-Smirnov (KS) test comparing their industry distributions. The KS statistic is 0.047, with a *p*-value of 0.197, failing to reject the null hypothesis that the industry distributions of the two samples are equal.

2.4. Measuring Analysts' Coverage of Environmental Issues

Using the textual analysis procedure outlined in Section 2.2, we begin by quantifying the extent of analysts' environmental coverage. Panel A of Table 2 shows that, among the 273,664

analyst reports in our sample, 75,611 (27.6%) contain at least one mention of environmental topics. Importantly, these environment-related reports are not concentrated in a small number of firms or industries. Instead, they span 63.7% of firm-years and 83.3% of unique firms in our sample, indicating broad coverage across the equity market. The discussions of environmental matters are also relatively substantial. Reports that mention environmental topics are longer on average, containing 53.83 sentences, of which 5.37 (13.6%) are specifically dedicated to environmental matters. Across all analyst reports, since 72.4% of them do not reference environmental matters, the average environmental content is diluted to 1.48 sentences per report, or 3.8% sentences. Together, these results suggest that analysts address environmental issues both extensively – across a wide range of firms – and intensively – within individual reports.

For comparison, we apply a standard bag-of-words approach to identify discussions on AI and cybersecurity topics in analyst reports. Our keyword dictionaries include 122 AI-related terms and 185 cybersecurity-related terms, with the detailed methodology and results provided in Internet Appendix 4. Our analysis shows that only 16.4% (44,811) of analyst reports discuss AI-related topics, and just 3.9% (10,673) mention cybersecurity. Both figures are substantially lower than the proportion of reports addressing environmental topics (27.46%, or 75,611 reports). Even when restricting the sample to the most recent five years, only 16.3% and 4.5% of reports mention AI and cybersecurity, respectively, compared to 28.6% that discuss environmental issues over the same period. These findings suggest that environmental topics receive greater attention and broader coverage from analysts than other prominent emerging issues.

We also ask survey analysts to assess their level of attention to climate and environmental issues, both in absolute terms and relative to their industry peers (Q2). Panel B presents the results. On a 1–5 scale, 47.9% of analysts rate their absolute level of attention as 4 or 5 (high), 35.3% as 3 (mid-level), and16.8% as 1 or 2 (low)[2]. Consistent with evidence from analyst reports indicating that fewer than 20% of firms are not associated with any environmental discussion, only 16.8% of survey respondents report paying limited attention to environmental topics. The majority (83.2%)

[2] In terms of relative attention, since not everyone can be above average, the rational benchmark for relative attention level should be three. However, we find a mean relative attention score of 3.27, statistically higher than 3, suggesting an upward bias in analysts' self-assessments. This is consistent with psychologists' and sociologists' observations that individuals tend to overestimate their environmental awareness due to its social desirability (e.g., Phillips and Clancy 1972; Nederhof 1985). At the same time, the mean relative attention level is significantly lower than the absolute level, indicating that the respondents recognize the difference between absolute and relative levels and perceive their peers as having relatively high levels of environmental coverage.

consider themselves as paying a mid- to high-level of attention. Taken together, the analysis of analyst reports and survey responses consistently indicates that analysts devote meaningful attention – both in breadth and in depth – to environmental issues in their day-to-day research.

3. *Value* or *Values*?

3.1 Measuring Analysts' Orientation Toward *Value* versus *Values*

An ongoing debate centers on the appropriate objective function for firms: should firms aim solely to maximize value, or should they pursue a "double bottom line," balancing financial profits with environmental and social impact? Hart and Zingales (2017) frame this distinction as shareholder value maximization versus welfare maximization, while Starks (2023) describes it as *value* versus *values.* Security analysts are key information intermediaries in capital markets, and their views often shape and reflect those of the broader market (e.g., Brav et al. 2005; Pástor et al. 2008; Bordalo et al. 2019). In this section, we investigate both their stated beliefs and the opinions they communicate to investors by combining evidence from survey responses with analyst reports.

In the survey, we ask analysts: "*Do you try to influence your covered firms to invest in reducing their environmental impact?"* (Q4). Respondents choose from three options: (a) "*I don't try to influence*," (b) "***Only*** *when it can increase firm value*," and (c) "*Yes, I usually do (even when it does not increase firm value)*." We classify analysts as "Aligned with *value*" if they select (b), "Aligned with *values*" if they choose (c), and "Not trying to influence" if they opt for (a).

Figure 2a and Panel A of Table 3 present the results. A majority of survey analysts (57.2%, or 289 analysts) are aligned with *value*, while only 14.5% are aligned with *values*. The remaining 28.3% report not attempting to influence firms' environmental policies. Thus, analysts who prioritize financial *value* overwhelmingly outnumber those who emphasize non-financial *values* by nearly four to one (≈57.2% to14.5%).

Using the environmental discussions identified in analyst reports (as described in Section 2), we fine tune the Llama model to determine whether each discussion pertains to *value* or *values*. An environmental discussion is labeled as *value*-related if it, along with its surrounding context, relates to a firm's financial performance, such as growth, sales, costs, or financing. For example, the following excerpts are labeled as *value*-related: (i) "*Various regions are preparing to reinforce the 'oil-to-gas' policies, which may lead to explosive growth [for the firm] in the coming years*." (ii) *"Recycled aluminum enhances profit margins. Currently, recycled aluminum accounts for 70%*

of the company's total aluminum usage. Compared to primary aluminum, it has a cost advantage, while the green premium on the sales side is also gradually emerging." (iii) "*The company's planned new energy projects align closely with the criteria for green refinancing. Combined with its strong credit profile, it is highly likely to secure financing, creating new opportunities to reduce the company's overall debt financing costs*." These discussions link environmental topics directly to firm-level financial outcomes, without reference to broader social or environmental externalities, and are thus classified as *value*-related.

Conversely, an environmental discussion is classified as non-financial *values*-related if it pertains to externalities, such as impacts on the natural environment, human health, societal welfare, or macroeconomic development. For instance, one analyst report states, "*Once completed, the project will play an important role in improving the ecological environment of Yining City and also provide new development opportunities for surrounding residents, businesses, and the tourism industry.*" Another report mentions, "*Water gas from ceramic kilns can cause significant harm to crops, air quality, and human health.*" These discussions connect environmental issues to societal or ecological outcomes rather than firm performance and are therefore labeled as *values*-related.

Notably, an environmental discussion can be *value*-related, *values*-related, both, or neither. Discussions that simply describe facts without implications for either firm performance or societal impact are classified as neither. For example, an analyst report states, "*Government investment is primarily directed toward affordable housing projects, agriculture, water conservancy, urban infrastructure, public welfare projects, as well as energy conservation, emission reduction, and ecological protection initiatives*." This passage does not clearly relate to *value* or *values,* so we label it as neither. Overall, 32% of environmental-related sentences in analyst reports fall into this "neither" category. Internet appendix 5 provides additional examples of *value*, *values*, both, and neither-related environmental discussions.

Figure 2b and Panel B of Table 3 present the summary statistics. Among the 75,611 environmental-related analyst reports, 67.1% (50,753) contain only *value*-related discussions, 20.8% (15,742) include both *value* and *values* elements, and just 1.9% (1,441) have *values*- but not *value*-related content. This means that when analysts reference environmental issues, they most often focus solely on financial implications (67.1%) or, less frequently, consider both financial and non-financial aspects (20.8%). It is rare (1.9%) for analysts to address environmental matters from

purely non-financial perspectives. At the sentence level, an average report includes 3.40 *value*-related sentences and 0.62 *values*-related sentences, showing that financial *value* discussions occur approximately 5.5 times (=3.40/0.62) as frequently as non-financial *values* discussions. These patterns, together with the survey results, suggest that *value* considerations dominate analysts' assessments of environmental issues. This finding aligns with Sautner et al. (2024), who analyze earnings calls, and with Edmans et al. (2024), whose survey shows that fund managers are generally unwilling to sacrifice financial returns for environmental or social goals, reinforcing the primary focus on financial performance.

3.2 Determinants of *Value* versus *Values* Orientation

What determines analysts' alignment with *values,* and does this alignment persist? We explore several potential factors. First, at the individual level, analysts who generally pay more attention to environmental topics are more likely to consider environmental externalities, and vice versa. Accordingly, we expect a positive correlation between an analyst's overall attention to environmental issues and her inclination toward *values.* Second, psychological and sociological research suggests that women and older individuals tend to exhibit stronger altruistic concerns and engage more frequently in prosocial behavior than men and younger individuals (e.g., Eagly and Crowley 1986; Bekkers and Wiepking 2011; Marianne 2011; Mayr and Freund 2020). We therefore anticipate that female and older analysts are more likely to be *values*-oriented. Third, analysts may be influenced by their employers' culture, much like portfolio managers are shaped by the ideology of their fund families (Michaely et al. 2024). Clearly, self-selection can also contribute to this association. Regardless, we expect analysts affiliated with brokers that emphasize broader social or environmental *values* to place greater weight on such considerations in their professional work. Finally, if a preference for *values* reflects a relatively stable personal trait, we expect this tendency to persist over time.

We test these predictions using two sets of regressions – one based responses and one based on analyst reports. Because the survey does not identify brokers and lacks time-series observations, we are only able to test a subset of predictors in the survey-based regression. Equation (1) specifies the survey-based regression model:

$$\begin{aligned} Aligned\ with\ Values_i = {} & \beta_0 + \beta_1 Attenntion\ to\ Env\ Topics_i \\ & + \beta_2 Female_i + \beta_3 Age_i + \gamma' X_i + \psi_j + \varepsilon_i \end{aligned} \quad (1)$$

The dependent variable, *Aligned with Values*$_i$, is derived from responses to Q4: "*Do you try to influence your covered firms to invest in reducing their environmental impact?"* It equals one if analyst *i* selects "*Yes, I usually do (even when it does not increase firm value),"* and zero otherwise. We examine three key explanatory variables. *Attention to Env Topics*$_i$ is measured on a 1-5 scale based on analyst *i*'s self-reported attention to environmental and climate change information (Survey Q2). *Female*$_i$ is an indicator equal to one if the respondent is female, and zero otherwise. *Age*$_i$ captures the analyst's age. We also include a set of analyst-level control variables (X_i), such as general experience and number of firms covered, and account for analysts' industry coverage using industry fixed effects (Ψ_j). Results are reported in columns (1) and (2) of Table 4.

Our analyst report sample spans ten years and identifies both brokers and analysts, enabling us to examine the full set of predictors. Equation (2) specifies the report-based regression:

$$\begin{aligned} Values\ Ratio_{i,t} = {} & \beta_0 + \beta_1\ \%\ of\ Env\ Related\ Sentences_{i,t} + \beta_2 Female_{i,t} + \beta_3 Age_{i,t} \\ & + \beta_4 Broker\ values\ culture_{i,t} + \beta_5 Values\ Ratio_{i,t-1} + \gamma' X_{i,t} + \psi_{j,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

The dependent variable, *Values Ratio*$_{i,t}$, is the ratio of *values*-related sentences to the sum of *value*- and *values*-related sentences in analyst *i*'s reports in year *t*. This measure captures the analyst's orientation toward *values* as opposed to *value*. To reduce measurement error, we limit the sample to analyst-years with at least ten reports. For key explanatory variables, *% of Env Related Sentences*$_{i,t}$ is the proportion of environmental-related sentences in analyst *i*'s reports in year *t*, serving as a proxy for environmental attention. *Female*$_i$ and *Age*$_i$ denote the analyst's gender and age. We measure broker firms' emphasis on *values* through analyzing their stated corporate culture on their official websites. *Broker values culture*$_{i,t}$ is an indicator equal to one if the broker explicitly includes social, environmental, or sustainability considerations in its stated corporate culture, and zero otherwise. In total, we identify 38% of the brokers incorporating *values* into their culture. Lastly, to assess persistence in analysts' *values* orientation, we adopt an autoregressive specification by including the lagged dependent variable, *Values Ratio*$_{i,t-1}$. As in the survey-based model, we control for additional analyst characteristics (X_i) and include industry-by-year fixed effects ($\Psi_{j,t}$) to account for analysts' industry coverage. The results are reported in columns (3) and (4) of Table 4.

We find that coefficient estimates on *Attention to Env Topics* (columns 1 and 2) and *% of Env Related Sentences* (columns 3 and 4) are all positive and statistically significant. These results

suggest that, in both survey responses and analyst reports, analysts who devote greater attention to environmental issues are also more likely to internalize environmental externalities and think about *values*. The coefficients on *Female* are significantly positive in columns (3) and (4), and those on *Age* are significantly positive in columns (1) and (2). These findings are consistent with expectations: female and older analysts are more likely than their male and younger counterparts to incorporate environmental externalities and adopt a *values*-oriented perspective. Regarding employer influence, the coefficients on *Broker values culture* in columns (3) and (4) are also significantly positive. This indicates that analysts at brokerages that explicitly promote a *values*-oriented culture are more likely to integrate such *values* into their research.

Lastly, analysts' orientation towards *value* versus *values* appears to be persistent over time. In column (4), the coefficient on $Values\ Ratio_{t-1}$ is positive and statistically significant at the 1% level. To further examine this persistence, we sort all analysts covering the same industry into tertiles based on their *Values Ratio* in year *t,* and calculated the probability that an analyst remains in or moves into the top tertile over the subsequent five years (*t+1* to *t+5).* Because sorting is done within industries, tertile differences are not driven by industry coverage. As shown in Figure 3, analysts in the top *Values Ratio* tertile in year *t* are substantially more likely to remain there in subsequent years, with probabilities ranging from 65% to 75%. In contrast, analysts in the middle and bottom tertiles have consistently low probabilities - below 20% - of transitioning into the top tertile. In unreported results, we confirm that the differences between the top and bottom tertiles are statistically significant at the 5% level or above across all five years. Overall, these patterns underscore the relative stability of analysts' *value* versus *values* orientation over time.

In summary, evidence from both the survey and analyst reports suggests that, on average, financial *value* considerations - rather than broader societal *values* - dominate analysts' beliefs and the research they deliver to investors. Alignment with *values* is positively associated with greater environmental attention, being female, older age, and employment at brokerages that promote a *value*-oriented corporate culture. Finally, analysts' orientation toward *value* versus *values* appears relatively stable over time.

4. Analysts' Perspectives on Environmental Risks and Opportunities

4.1 Do Analysts See Environmental Factors as Risks, Opportunities, or Both?

Environmental and climate change issues are often framed in terms of risks (Krueger et al. 2020; Bolton and Kacperczyk 2021, 2003; Ilhan Sautner, and Vilkov 2021; Hsu, Li, and Tsou,

2023; Zhang 2025), but they are not solely about downside costs. Government subsidies, advances in green technologies, and increasing stakeholder demand for sustainability can also create upside potential, especially for firms engaged in climate adaptation and mitigation. These opportunities could span a wide range of sectors, with renewable energy, electric vehicles, insurance and reinsurance, and agricultural technologies among the most prominent examples. Reflecting this perspective, a recent MSCI report (2023b) is titled "*The Climate Transition Is Increasingly About Opportunity.*" Similarly, a Forbes article (2022) notes: *"Solving for climate change presents perhaps the biggest opportunity for businesses and investors over this decade. It is not just about renewables; opportunities abound in sectors ranging from agriculture and mining to information technology and professional services."*

Echoing this growing recognition of environmental related opportunities in anecdotal evidence, we ask analysts in our survey: "*For the firms you cover, do you see environmental and climate change factors more as a risk or an opportunity?*" (Q3). As shown in Figure 4a and Panel A of Tables 5, 44.4% (224 analysts) select "*Equally as a risk and an opportunity*," 26.3% (133 analysts) choose "*More as an opportunity*", and 16.6% (84 analysts) respond "*More as a risk."* The remaining 12.7% (64 analysts) consider environmental factors irrelevant to the firms they cover. These responses suggest that a majority of analysts (70.7% = 44.4% + 26.3%) do not evaluate environmental matters through a risk-exclusive perspective. Rather, they acknowledge the opportunity dimension – either in conjunction with environmental risks or as their primary lens. This view expands the traditional "environmental risk" narrative prevalent in the academic literature and aligns with recent empirical evidence showing that firms with higher exposure to climate solutions are valued at a premium (Lu, Riedl, Xu, and Serafeim 2024).

We also examine whether analysts discuss environmental risks and opportunities in their research output. Using a fine-tuned Llama model, we classify the identified environmental discussions in analyst reports as either risks or opportunities for the focal firms. Sentences are labeled as opportunities if they imply a positive impact on the firm, and as risks if they indicate a negative impact. For example, the statement "*There is a risk of periodic fluctuations in the feed industry caused by abnormal weather and livestock diseases*" is labeled as a risk. In contrast, the description "*Paper packaging is an eco-friendly alternative to materials like plastic, metal, and glass. Growing consumer awareness of environmental issues will accelerate the adoption of paper*

packaging, and the company will benefit from this trend in the long term" is labeled as an opportunity. Additional classification details and examples are provided in Internet Appendix 6.

Figure 4b and Panel B of Table 5 show that 86.6% of environmental-related analyst reports mention associated business opportunities (55.1% opportunity-only + 31.5% both risk and opportunity), and 37.7% discuss environmental risks (6.2% risk-only + 31.5% both). These patterns suggest that analysts more frequently highlight opportunities than risks in their environmental discussions. At the sentence level, each report contains an average of 3.79 sentences referencing environmental opportunities and 0.77 referencing risks. Even among reports that address both dimensions (column 4 of Panel B), opportunity-related content tends to be more extensive: 7.61 sentences on average for opportunities versus 2.20 for risks. These findings indicate that analysts not only mention environmental opportunities more often but also engage with them in greater depths. Overall, the textual analysis of analyst reports is consistent with the survey findings, reinforcing that environmental opportunities are a prominent consideration in analysts' assessments of sustainability issues.

Further, the distribution of environmental risks and opportunities likely varies across industries. High-polluting sectors ("brown" industries) may face greater downside risks due to stricter environmental regulations and growing stakeholder demand for sustainability, whereas the renewable energy sector ("green" industries) may benefit from these same trends. In Panel C of Table 5, we divide both the survey and analyst report samples into brown and green industries based on the CSRC's high-polluting industry list. Among survey respondents, 22% of analysts covering brown industries view environmental factors primarily as risks, significantly higher than the 14% in green industries. Conversely, only 17% of analysts covering brown industries see them mainly as opportunities, significantly lower than the 32% in green industries. Analyst reports reflects a similar pattern: reports covering brown industries contain an average of 0.94 environmental risk-related sentences per report, significantly more than the 0.68 in green industries. Conversely, reports on brown industries contain 2.92 environmental opportunity-related sentences on average, significantly fewer than the 4.22 in green industries. These results align with expectations: green industries are better positioned to capture environmental opportunities, while brown industries are more exposed to downside environmental risks.

4.2 Are Environmental Risks and Opportunities Financially Material?

We next examine whether these environmental risks and opportunities are financially material, using analysts' assessments as a starting point. *Ex ante,* if an analyst views environmental factors as risks and considers these risks financially material, they should expect negative financial consequences. Conversely, if an analyst sees environmental factors as opportunities and regards these opportunities as financially material, they should anticipate positive financial effects. Since environmental factors, such as regulatory changes, technological advancements, and shifts in stakeholder preferences, often take time to fully materialize, we expect long-term financial impacts to be larger than short-term ones. To test these predictions, we first estimate the following regressions using survey data:

$$\begin{aligned} Short\text{-}Term\ Financial\ Impacts_i = {} & \beta_0 + \beta_1 More\ as\ an\ opportunity_i \\ & + \beta_2 More\ as\ a\ risk_i + \gamma' X_i + \psi_j + \varepsilon_i \end{aligned} \quad (3)$$

$$\begin{aligned} Long\text{-}Term\ Financial\ Impacts_i = {} & \beta_0 + \beta_1 More\ as\ an\ opportunity_i \\ & + \beta_2 More\ as\ a\ risk_i + \gamma' X_i + \psi_j + \varepsilon_i \end{aligned} \quad (4)$$

The dependent variables, *Short-Term Financial Impacts*$_i$ and *Long-Term Financial Impacts*$_{i,}$, are based on responses to Q6: "*For the firms you cover, please evaluate how environmental and climate change factors affect their financial performance. In the short term: _____; In the long term: _____."* Responses range from -3 (very negative) to +3 (very positive). *i* denotes individual surveyed analysts. The key independent variables are derived from Q3: "*For the firms you cover, do you see environmental and climate change factors more as a risk or an opportunity?*" *More as a risk*$_i$ equals one if respondent *i* selects *"More as a risk,"* and zero otherwise. *More as an opportunity*$_i$ equals one if respondent *i* selects *"More as an opportunity,"* and zero otherwise. X_i are a set of analyst characteristics, such as general experience and the number of firms covered. Ψ_j denotes industry fixed effects. Results are reported in Table 6.

The coefficient estimates on *More as an opportunity* are 0.440 and 0.316 for short-term financial impacts (columns 1 and 2) and 0.740 and 0.527 for long-term financial impacts (columns 3 and 4). All coefficients are positive and statistically significant, except in column (2), indicating that analysts who view environmental factors primarily as opportunities expect them to positively affect firm performance in both the short and long term. Similarly, the coefficient estimates on *More as a risk* are -0.472 and -0.481 for short-term financial impacts (columns 1 and 2) and -0.713

and -0.705 for long-term financial impacts (columns 3 and 4). All coefficients are statistically significant, suggesting that analysts who perceive environmental factors as risks anticipate negative financial consequences across both time horizons.

Moreover, the absolute magnitudes of the coefficients in columns (3) and (4) (long-term) are consistently larger than those in columns (1) and (2) (short-term). *F*-tests confirm that the differences between columns (1) and (3) are statistically significant, whereas those between columns (2) and (4) are not - likely because industry fixed effects absorb cross-industry variations and reduce statistical power. Overall, these results suggest that survey analysts perceive both environmental risks and opportunities as having material financial impacts, with long-term effects outweighing short-term ones.

If analysts indeed consider environmental risks and opportunities to be financially impactful, such assessments should also be reflected in their earnings forecasts and stock recommendations. We thus examine analysts' earnings forecasts, stock recommendations, and the textual content of their reports. Specifically, we estimate the following regression:

$$\begin{aligned} FEPS_{i,m,t+k} = {} & \beta_0 + \beta_1 \, \%\ of\ Env\ Opportunity\ Sentences_{i,m,t} \\ & + \beta_2 \, \%\ of\ Env\ Risk\ Sentences_{i,m,t} + \gamma' X_{i,t} + \psi_{m,t} + \varepsilon_{i,m,t} \end{aligned} \quad (5)$$

The dependent variable, $FEPS_{i,m,t+k}$, refers to analyst *i*'s one-, two-, and three-year-ahead EPS forecasts for firm *m*, scaled by the firm's stock price at the end of year *t* (k=1, 2, 3). The key independent variables, $\%\ of\ Env\ Opportunity\ Sentences_{i,m,t}$ and $\%\ of\ Env\ Risk\ Sentences_{i,m,t}$, represent the proportions of sentences in the analyst report discussing environmental opportunities and risks, respectively. $X_{i,t}$ are a set of analyst-level controls, such as general experience and the number of firms covered. $\Psi_{m,t}$ denotes firm-by-year fixed effects. We then repeat the analysis using stock recommendations as the dependent variable. *Rec* is coded as 2 (strong buy), 1 (buy), 0 (hold), –1 (sell), and –2 (strong sell). Data on analyst forecasts and recommendations are obtained from the CSMAR database and matched to analyst reports using broker name, analyst name, focal firm, and issuance date.

Ideally, we want to examine the short- and long-term financial forecasts separately, as we expect the long-term impacts to be larger. However, because analysts in China typically do not provide long-term growth rate forecasts, we rely on three-year EPS forecasts to approximate a longer-term outlook, though they may still be insufficient to fully reflect long-term impacts.

In Table 7, columns (1) to (3), the coefficients on *% Env Opportunity Sentences* are consistently positive and significant across all forecast horizons. The coefficients on *% Env Risk Sentences* are negative throughout, with statistical significance in columns (1) and (3). As we control for firm-by-year fixed effects, these results suggest that, for a given firm, analysts who identify more environmental opportunities tend to issue higher earnings forecasts than their peers, whereas those who recognize more environmental risks issue lower forecasts for the same firm. Thus, analysts meaningfully incorporate their perceptions of environmental risks and opportunities into valuation models and earnings projections. Notably, the magnitude of the coefficients on *% Env Opportunity Sentences* increases with the forecast horizon, rising from 0.362 for the one-year forecast (column 1) to 0.619 for the three-year forecast (column 3). This increase is statistically significant, implying that analysts expect the financial benefits of environmental opportunities to be greater over longer timeframes. These findings align with our survey evidence and with prior literature emphasizing the long-term value of ESG practices (e.g., Starks, Venkat, and Zhu 2023; Edmans 2023).

In column (4), the dependent variable is stock recommendations (*Rec*). The coefficients on *% Env Opportunity Sentences* and *% Env Risk Sentences* are 0.053 and -0.078, respectively, both statistically significant. This indicates that analysts incorporate environmental considerations – both risks and opportunities - as material inputs into their investment recommendations, rather than treating them as symbolic or peripheral.

In unreported robustness tests, we replace firm-by-year fixed effects with firm, industry, or year fixed effects, and obtain consistent results. This confirms that analysts' assessments of environmental risks and opportunities are reflected in variations in EPS forecasts and stock recommendations across analysts, over time, and across firms. Collectively, these findings provide robust evidence that analysts treat both environmental risks and opportunities as financially material.

4.3 Key Sources of Environmental Risk and Opportunities

Existing literature identifies key sources of climate- and environmental-related risks, including physical climate change, regulatory developments, technological innovation, and shifts in stakeholder preferences (e.g., Krueger et al. 2020; Stroebel and Wurgler 2021; Bolton and Kacperczyk 2023). Yet, these same factors can also create upside opportunities. For instance,

extreme weather events may boost demand for electric heaters and air conditioners; stricter environmental regulations can benefit firms investing in emissions abatement technologies; and heightened consumer awareness of climate issues will likely accelerate the adoption of electric vehicles.

Building on this literature, we investigate which environmental factors analysts perceive as the most significant sources of risks and which they view as key opportunities. In our survey (Q7), we ask analysts to rate the expected impact of each factor on the firms they cover, using a scale from –3 (very negative) to +3 (very positive). This design allows us to classify each factor as a perceived risk, neutral, or opportunity. As shown in Table 8, the factors include physical environmental change, environmental regulations and subsidies, the transition to green technologies and products, demand for climate-adaptive goods, and changes in various stakeholders' preferences.

To identify the most salient types of environmental risks, we focus on negative responses and construct two measures: (i) the percentage of analysts rating the factor as having a negative impact, which captures prevalence, and (ii) an adjusted weighted mean, which incorporates both prevalence and severity. Specifically, for each factor *n*, we compute the mean of negative ratings, multiply it by the percentage of negative responses to obtain the weighted mean, and then normalize this value relative to the average across all eight factors, as shown in Equation (6):

$$Adjusted\ \ mean_n = \frac{Weighted\ mean_n}{\sum_{k=1}^{8} Weighted\ mean_k \ / 8} \ (n = 1,2, \ldots, 8) \tag{6}$$

By construction, an adjusted mean above one indicates an above-average type of risk, while a value below one indicates a below-average risk. Panels A of Table 8 report the results, ranking risk factors by their adjusted means. *Physical environmental change* emerges as the most salient risk, with adjusted means significantly above one across both brown and green industries. This finding is consistent with prior research linking climate change to adverse macroeconomic outcomes (Dell, Jones, and Olken 2009, 2012; Hsiang et al. 2017) and underscores the broad economic costs associated with climate and environmental-related disruptions.

The second highest-rated risk is *environmental regulations and subsidies.* It is viewed as a significant threat in brown industries (adjusted mean significantly above one), but not in green industries (adjusted mean well below one). This pattern underscores the specific relevance of

regulatory risks for high-polluting sectors. Other factors, such as changes in various stakeholders' preferences and technological shifts, have adjusted means near one in brown industries (ranging from 0.80 to 1.10), suggesting that they are perceived as moderate risks to these firms.

For environmental opportunities, we construct and report two analogous measures: (i) the percentage of analysts rating the factor as having a positive impact (prevalence), and (ii) an adjusted weighted mean, reflecting both prevalence and perceived magnitude of positive impacts. The adjusted mean is calculated using the same procedure as for risks, but restricted to positive response. As before, an adjusted mean above one indicates an above-average opportunity, while a value below one indicates below-average importance.

Panel B presents the results. In brown industries, *transitions to green technologies and products* emerges as the most important - and the only statistically significant - opportunity, with an adjusted mean above one. This finding is consistent with recent empirical evidence and practitioner commentary emphasizing the strategic value of technology transitions for carbon-intensive firms (Cheema-Fox et al. 2022; Cohen et al. 2024; Fink 2022).

In green industries, five factors emerge as prominent environmental opportunities, each with adjusted means significantly above one: (1) *transitions to green technologies and products,* (2) *environmental regulations and subsidies,* (3) *demand for products to cope with pollution and climate change*, (4) *shifts in consumer preference*, and (5) *changes in customer and supplier preferences.* Interestingly, these factors are typically framed as environmental risks in prior literature (e.g., Krueger et al. 2020; Stroebel and Wurgler 2021; Bolton and Kacperczyk 2023; Hsu et al. 2023). *Ex ante,* factors like green technology advancement and regulatory policies are intended to promote societal welfare and facilitate the net-zero transition. While they may impose costs on some firms, they can create strategic advantages for others, particularly those well-positioned for the transition. Analysts' assessments thus underscore the dual nature of these environmental drivers and highlight both the existence and importance of firm-level environmental opportunities.

To further illustrate the key environmental risks and opportunities discussed in analyst reports, we apply the Llama model to extract dominant themes and visualize them using word clouds. In Figure 5, font size reflects theme frequency, with the three most frequent themes highlighted in black. Full methodological details, including the prompt used for theme extraction, are provided in Internet Appendix 8. Panel A shows that in brown industries, environmental risk

discussions predominantly center on *resource depletion* and *stricter environmental policies*, aligning with the top two risk factors identified in the survey. In green industries (Panel B), the primary risk theme is *environmental degradation* – a physical environmental change, again aligning closely with the survey results[3]. Panels C and D display opportunity-related themes. In both brown and green industries, *technological innovation* and *technological progress* stand out as the most frequent topics, mirroring the top-rated opportunities in the survey. Additionally, brown industry reports emphasize *policy support,* while green industry reports highlight *subsidies,* both corresponding to the second-highest rated opportunities identified by survey respondents.

Overall, the survey responses and analyst reports paint a consistent picture. Analysts view environmental factors as both risks and opportunities, consider them financially material, and meaningfully incorporate their impacts into earnings forecasts and stock recommendations. While physical environmental change remains the most salient risk across industries, the transition to green technologies is widely perceived as the greatest opportunity, rather than a source of risk.

5. Analysts' View: What Drives Corporate Sustainability Policies?

5.1 Analysts' Rankings of Major Factors

Public firms are among the largest greenhouse gas emitters in modern history (CDP 2017). From a societal perspective, a central question is how to effectively motivate them to adopt more sustainable environmental practices. Building on prior academic research, we identify eight commonly discussed drivers of corporate environmental action and ask survey analysts to assess their influence. Specifically, we ask: "*Please evaluate the extent to which the following factors cause the firms you follow to reduce their environmental impact"* (Q8). The factors include: government policies and regulations (e.g., Henderson 1996; Greenstone 2003; He et al. 2020); investor and creditor pressure (e.g., Pástor et al. 2021; Houston and Shan 2022; Broccardo et al. 2022; Hong et al. 2023); public and media pressure (e.g., Heese and Pacelli 2024); supply chain pressure (e.g., Dai et al. 2021); consumer preferences (e.g., Duan et al. 2024), employee demand (e.g., Krueger et al. 2023); rebranding incentives (e.g., Duchin et al. 2024; Cornaggia and

3 Analyst discussions also highlight "overcapacity" and "intensified market competition" as important risks, suggesting that competitive pressures – although not classified as environmental risks - pose significant challenges for green industries.

Cornaggia 2024); and firms' intrinsic commitment to sustainability (e.g., Freeman 2010; Hart and Zingales 2017).

Table 9 report the results, ranking these factors by their average influence ratings. The two most influential drivers identified by analysts are government regulations and public/media pressure. On a scale of 1 ("No influence at all") to 5 ("Highest Degree"), these factors receive mean scores of 3.69 and 3.55, respectively. Both scores are significantly above the midpoint of 3 and statistically higher than those of other factors. Moreover, these forces receive significantly higher ratings in brown industries than in green industries, highlighting their stronger impact in high-polluting sectors. Analysts' assessments underscore the central role of regulatory frameworks in shaping corporate environmental behaviour. The high ranking of public/media scrutiny also points to a important, though still relatively underexplored, mechanism of external accountability. For example, Heese and Pacelli (2024) find that social media activities reduce corporate misconduct, including environmental violations, and Buntaine et al. (2024) show that public appeals to regulators via social media significantly lower firm-level pollution and emissions.

Supply chain and consumer demands are also recognized as important drivers of corporate environmental practices. *Demand for sustainability from up and down the supply chain* ranks third, and *consumers' demand for sustainability* ranks fifth. Both receive mean scores significantly above 3, highlighting their perceived importance. These findings coincide with the growing global emphasis on Scope 3 emissions - i.e., indirect emissions across the value chain. For instance, in 2023, the International Sustainability Standards Board (ISSB) issued IFRS S2, requiring firms to disclose Scope 3 emissions. According to CDP (2024), over 23,000 firms disclosed such data in 2023, and15% have set Scope 3 targets. Recent academic studies similarly emphasize the rising relevance of supply chain decarbonization and consumer ESG awareness (e.g., Dai et al. 2021; Bisetti et al. 2023; Duan et al. 2023; Houston, Lin, Shan, and Shen 2024).

Another highly rated factor is firms' efforts to rebrand as greener. This factor ranks fourth with an average score of 3.28, significantly above the midpoint of 3. In contrast, firms' intrinsic commitment to sustainability ranks sixth at 3.08, which is statistically lower than that for rebranding. This disparity suggests that analysts view reputational incentives as stronger motivators of corporate environmental behavior than intrinsic values. These perceptions reflect growing concerns about greenwashing (e.g., Duchin, et al. 2024) and raise doubts about the authenticity of firms' stated environmental goals (Rajan, Ramella, and Zingales 2023). Further

research is needed to distinguish genuine sustainability efforts from symbolic ones and assess their true impact on environmental outcomes.

Perhaps surprisingly, analysts rank investor and creditor influence as the second least impactful driver, with a mean score of 3.03. This score is significantly lower than most other factors and not statistically different from the midpoint of 3. This stands in contrast to the extensive attention these factors receive in academic research (e.g., Broccardo, Hart, and Zingales 2022; Barber, Morse, and Yasuda 2021; Starks 2023; Ilhan, Krueger, Sautner, and Starks 2023; Green and Roth 2021). Nonetheless, analysts' assessment are consistent with recent empirical evidence from the U.S. and global data, which finds that institutional investors exert minimal treatment effects on firm behavior (e.g., Heath et al. 2023, Atta-Darkua et al. 2023) and only modest selection effects through the cost of capital (Berk and van Binsbergen 2025; Gantchev et al. 2022).

At the bottom of the rankings is employee influence, with an average score of 2.56 - significantly below the midpoint of 3 and lower than all other factors. This is notable given prior evidence that employees are willing to accept lower wages and work harder for more sustainable firms (e.g., Flammer and Luo 2017; Krueger, Metzger, and Wu 2023). The low rating suggests a disconnect between employee preferences and their collective influence – or at least analysts' perceived influence - on corporate decision-making. Notably, the relative rankings of these force influencing firms' sustainability behaviors are similar across brown industries and non-brown industries (Table 9, columns (6) and (7)).

5.2 Can Analysts Move the Dial on Corporations' Sustainability Policies?

Prior research shows that analysts can meaningfully influence corporate decisions related to investment, financing, and disclosure (e.g., Derrien and Kecskés 2013; Balakrishnan, Billings, Kelly, and Ljungqvist 2014). However, evidence on their role in shaping firms' environmental practices remains limited (Jing, Keasey, Lim, and Xu 2024; Li et al. 2024). In this context, we survey analysts using the following question (Q12): "*Please evaluate whether and to what extent you can influence your covered firms' environmental policies through the following channels.*" We list five governance channels commonly discussed in the literature: (a) public communication, such as earnings calls and site visits (e.g., Chen et al. 2015; Chen et al. 2022; Sautner et al. 2023b); (b) private communication with corporate managers (e.g., Cohen, Frazzini, and Malloy 2010); (c) adjusting financial forecasts and recommendations (e.g., Brown and Rozeff 1978; Barber, Lehavy, McNichols, and Trueman 2001; Loh and Stulz 2011), (d) discussing environmental issues in

research reports (e.g., Bradley, Gokkaya, Liu, and Xie 2017); and (e) raising concerns with influential investors (e.g., Chen and Shohfi 2022).

Table 10 presents the results. On a scale from 1 ("Not at all") to 5 ("Highest degree"), all five channels receive mean scores significantly below the midpoint of 3, indicating that analysts generally do not perceive themselves as having strong influence over firms' environmental policies. Among the channels, public communication methods, such as conference calls and site visits, receive the highest ratings, while private communication with corporate managers is rated lowest. The difference is statistically significant. This pattern underscores the relatively greater perceived effectiveness of public channels in influencing corporate environmental behavior. It is consistent with our earlier findings (Section 5.1) that analysts view public scrutiny as a key mechanism for disciplining firms' environmental practices.

Given these overall perceptions, we further investigate whether analysts' *value* and *value*s orientations shape their perceived influence. As in section 3, we classify analysts as either *values* analysts or *value* analysts based on their response to Q4 ("*Do you try to influence your covered firms to invest in reducing their environmental impact?")*. Analysts who answered "*Yes, I usually do (even when it does not increase firm value)"* are designated as *values* analysts, while those selecting "*Only when it can increase firm value"* are classified as *value* analysts. *Ex ante*, we expect *values* analysts to report greater perceived influence, given their expressed willingness to promote environmental sustainability regardless of financial consequences. Consistent with this expectation, columns (6) to (8) of Table 10 show that *values* analysts indeed report higher perceived influence scores than *value* analysts across all five channels, with three differences reaching statistical significance. An *F*-test confirms that the joint mean scores of *values* analysts are statistically higher than those of *value* analysts, indicating that *values* analysts perceive themselves as having greater influence over firms' environmental policies.

6. Conclusion and Discussion

This paper integrates survey responses from 505 sell-side analysts, textual analysis of 273,664 analyst reports, and external datasets such as earnings forecasts and stock recommendations. By triangulating across these rich data sources, we cross-validate our findings and offer novel insights into how analysts cover, assess, and interpret environmental issues.

First, analysts predominantly adopt a *value*-oriented, rather than a *values*-oriented, approach to environmental matters. Fewer than 15% of the survey analysts indicate that they would promote sustainability irrespective of financial consequences, whereas over 55% support sustainability *only* when it enhances firm value. Similarly, nearly 90% of analyst reports discussing environmental topics focus on financial implications, while only 20% address externality or ethical considerations. This predominant focus on *value* rather than *values* contrasts with standard sustainable investing models that integrate environmental performance into investors' objectives (e.g., Pedersen, Fitzgibbons, and Pomorski 2021) and with the shareholder welfare-maximization framework proposed by Hart and Zingales (2017). Yet, it aligns with recent evidence on fund managers' preference (Edmans et al. 2024), underscoring the shared emphasis on financial returns among both buy-side and sell-side analysts. Future work should bear this in mind when theoretically or empirically modelling their preferences.

Second, analysts highlight environmental opportunities, especially those related to the transition toward green technologies. In our survey, 44% of analysts perceive environmental issues as both risks and opportunities, and 26% view them primarily as opportunities – meaning that a total of 71% recognize the opportunity component in environmental matters. Consistent with this, 87% of analyst reports referencing environmental topics identify related business opportunities. The figures are even higher in green industries. Moreover, we find that both the environmental opportunities and risks identified by analysts are financially material, as reflected in their earnings forecasts, stock recommendations, and realized earnings outcomes. These findings align with practitioner narratives (e.g., Fink 2021, 2022) and extend the literature's traditionally risk-focused view of environmental matters (e.g. Krueger et al. 2020; Ilhan et al. 2021; Bolton and Kacperczyk 2021). The pronounced emphasis on environmental opportunities by financial analysts call for more detailed research into the upside potential of the low-carbon transition and the financial markets' role in facilitating it.

Third, analysts view government regulations and public/media scrutiny as the most influential drivers of corporate environmental behavior, especially in heavily polluting sectors. By contrast, investors, employees, and analysts themselves, are perceived as having more limited influence. Notably, despite significant scholarly interest in investor-driven sustainability (e.g., Bolton and Kacperczyk 2021; Broccardo, Hart, and Zingales 2022; Barber, Morse, and Yasuda 2021), analysts rank investors and creditor influence seventh out of eight factors - trailing

significantly behind other forces such as customer and supplier demand. These assessments suggest that meaningful changes in corporate environmental practices are more likely to stem from a combination of regulatory frameworks and public/media scrutiny, rather than from market-driven mechanisms alone.

Fourth, we show that analysts devote substantial attention to environmental topics. Over 80% of survey respondents report paying a moderate or high level of attention to environmental and climate change information, and more than one-quarter of analyst reports include such discussions. These findings indicate that environmental considerations are not peripheral but constitute a significant component of analysts' research agendas. Analysts' expertise can thus be leveraged to deepen our understanding of corporate environmental practices. Moreover, since analysts' views often reflect and shape broader market behavior (e.g., Bouchaud et al. 2019; Derrien et al. 2025), our findings imply that the market primarily emphasizes financial *value* and the *opportunities* associated with environmental change.

While our analysis is based on sell-side analysts in China, we argue that the findings and insight regarding analysts' attitudes toward climate change and environmental issues are not confined to a particular country or region. From a macro perspective, China - just like the U.S. or Europe - is one of the world's largest economies and greenhouse gas emitters, where climate risks play a prominent role in government policy and public opinions. From the perspective of analysts, there is evidence -unrelated to climate change - that analysts in China perform similar information intermediary functions as their counterparts in the U.S. and other markets (e.g., Jia, Wang, and Xiong 2017; Chen, Ma, Martin, Michaely 2022), and they have similar incentives as well (e.g., Bushman, Piotroski, and Smith 2005). Given these parallels, we do not expect major differences in analysts' general approach to environmental coverage, particularly regarding their emphasis on *value* over *values* and their assessments of environmental risks and opportunities

One might argue that our findings regarding the limited perceived influence of institutional investors in China reflect the country's distinctive corporate governance structure. Indeed, corporate governance in China is generally considered weaker than in the U.S. or Europe (e.g., Allen, Qian, Shan, and Zhu 2024), and institutional ownership levels are also lower (Leippold, Wang, and Zhou 2022). However, prior research shows that institutional investors in China do exert significant influence over corporate decisions across a wide range of areas, such as investment efficiency (Cao et al. 2025), innovation (Jiang and Yuan 2018), tax strategies (Guo, Li,

and Lin 2023), and stock price dynamics (Cheng, Du, Wang, and Wang 2019). Moreover, the limited influence of institutional investors on corporate sustainability policies in China may not be dis-similar to that in the U.S. Recent empirical studies using the U.S. and global data also find that institutional investors exert very limited impact on firms' sustainability performance (e.g., Heath et al. 2023, Atta-Darkua et al. 2023) and on the cost of capital (Berk and van Binsbergen 2025). These patterns suggest that analysts' skepticism toward investor influence in the sustainability domain may have broader applicability. The perceived limited influence by employees, on the other hand, may be more context-specific, as labor dynamics may differ markedly between developed and emerging markets (Armangué-Jubert, Guner, and Ruggier 2025). Exploring these cross-country commonalities and divergences offers a promising avenue for future research.

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Appendix. Variable Definitions and Source of Data

Variable	Definitions and Source of Data
% of Env Opportunity Sentences	Percentage of environmental opportunity-related sentences among all sentences in an analyst report. Environmental opportunity-related sentences are identified using a fine-tuned Llama model. Analyst reports are obtained from DZH.
% of Env Related Sentences	Percentage of environmentally related sentences among all sentences in an analyst report. Environmental-related sentences are identified using a fine-tuned Llama model. Analyst reports are obtained from DZH.
% of Env Risk Sentences	Percentage of environmental risk-related sentences among all sentences in an analyst report. Environmental risk-related sentences are identified using a fine-tuned Llama model. Analyst reports are obtained from DZH.
Aligned with *Value*	Based on survey responses to Q4: "Do you try to influence your covered firms to invest in reducing their environmental impact?" This variable equals one if a respondent selects "Only when it can increase firm value," and zero otherwise.
Aligned with *Values*	Based on survey responses to Q4: "Do you try to influence your covered firms to invest in reducing their environmental impact?" This variable equals one if a respondent selects "Yes, I usually do (even when it does not increase firm value)," and zero otherwise.
Age	In the survey sample, analyst age is based on responses to question G3: "Your age is __?" In the analyst report sample, age is estimated by adding 22, 24, or 27 years to the analyst's years of experience, depending on whether the analyst holds a bachelor's, master's, or doctoral degree, respectively. Information on analysts' highest educational attainment is obtained from the CSMAR database and the Securities Association of China (SAC) website.
Analyst experience	In the survey sample, analyst experience is based on responses to G1: "How long have you been working as a sell-side analyst?" We assign values to this variable as follows: 1 for "Less than 2 years," 3 for "2–4 years," 6 for "5–8 years," and 9 for "More than 8 years." In the analyst report sample, analyst experience is estimated as the number of years since the analyst's first earnings forecast in the DZH dataset.
Attention to Env Topics	Survey responses to Q2: "On a scale of 1 to 5, how do you rate your level of attention to environmental and climate change information (in absolute terms)?"
Education background	In the survey sample, educational background is based on responses to question G4: "What diploma(s) do you have? (Please check all that apply)." In the analyst report sample, it is based on each analyst's highest degree, obtained from the CSMAR database and the Securities Association of China (SAC) website. We assign values to this variable as follows: 16 for a bachelor's degree, 19 for a master's degree, and 23 for a PhD.
Female	An indicator variable equal to one if the analyst is female, and zero otherwise. In the survey sample, gender is self-reported in response to question G2: "Your Gender is _?" In the analyst report sample, gender information is obtained from the CSMAR database and the Securities Association of China (SAC) website.

FEPS (t+k)	The k-year ahead EPS forecast, scaled by the firm's closing stock price in year t and multiplied by 100 (k=1, 2, 3). Analyst forecast data and stock price are obtained from the CSMAR database.
Large Broker	An indicator variable equal to one if the analyst is affiliated with a brokerage firm whose annual revenue exceeds 20 billion RMB, and zero otherwise. In the survey sample, brokerage revenue is self-reported in response to Question G5: "What is your brokerage firm's level of annual revenue (in RMB)?" In the analyst reports sample, brokerage revenue is obtained from the CSMAR database.
Long-Term Financial Impacts	Based on survey responses to Q6: "For the firms you cover, please evaluate how environmental and climate change factors affect their financial performance. In the long-term: ___." Analysts rated on a scale from -3 (negative) to +3 (positive).
More as a risk	Based on survey responses to Q3: "For the firms you cover, do you see environmental and climate change factors more as a risk or an opportunity?" This variable equals one if the analyst selects "More as a risk", and zero otherwise.
More as an opportunity	Based on survey responses to Q3: "For the firms you cover, do you see environmental and climate change factors more as a risk or an opportunity?" This variable equals one if the analyst selects "More as an opportunity", and zero otherwise.
No. of Env Opportunity sentences	The number of environmental opportunity-related sentences in an analyst report.
No. of Env Risk sentences	The number of environmental risk-related sentences in an analyst report.
No. of firms covered	In the survey sample, this variable is based on responses to G8: "How many firms do you currently cover?" We assign values to this variable as follows: 4 for "Less than 5 firms", 8 for "5-10 firms", 15 for "11-20 firms", and 25 for "More than 20 firms". In the analyst report sample, it is measured as the total number of firms the analyst issued reports for in the prior year.
No. of *value*-related sentences	The number of sentences in an analyst report that both (i) relate to environmental topics and (ii) pertain to the firm's financial performance, such as growth, revenues, costs, or financing. These sentences are identified using a fine-tuned Llama model and are selected from the subset of environment-related sentences only.
No. of *values*-related sentences	The number of sentences in an analyst report that both (i) relate to environmental topics and (ii) pertain to externalities, such as impacts on the natural environment, human well-being, societal welfare, or broader macroeconomic development. These sentences are identified using a fine-tuned Llama model and are selected from the subset of environment-related sentences only.
Rec	Stock recommendations coded on a five-point scale: 2 = Strong Buy, 1 = Buy, 0 = Hold, -1 = Sell, and -2 = Strong Sell. Recommendation data is obtained from the CSMAR database.
Short-Term Financial Impacts	Based on survey responses to Q6: "For the firms you cover, please evaluate how environmental and climate change factors affect their financial performance. In the short-term: ___." Analysts rated on a scale from -3 (negative) to +3 (positive).

Values Ratio	The ratio of "*values*"-related sentences to the total number of "*value*"- and "*values*"-related sentences in analyst reports, aggregated at the analyst-year level.

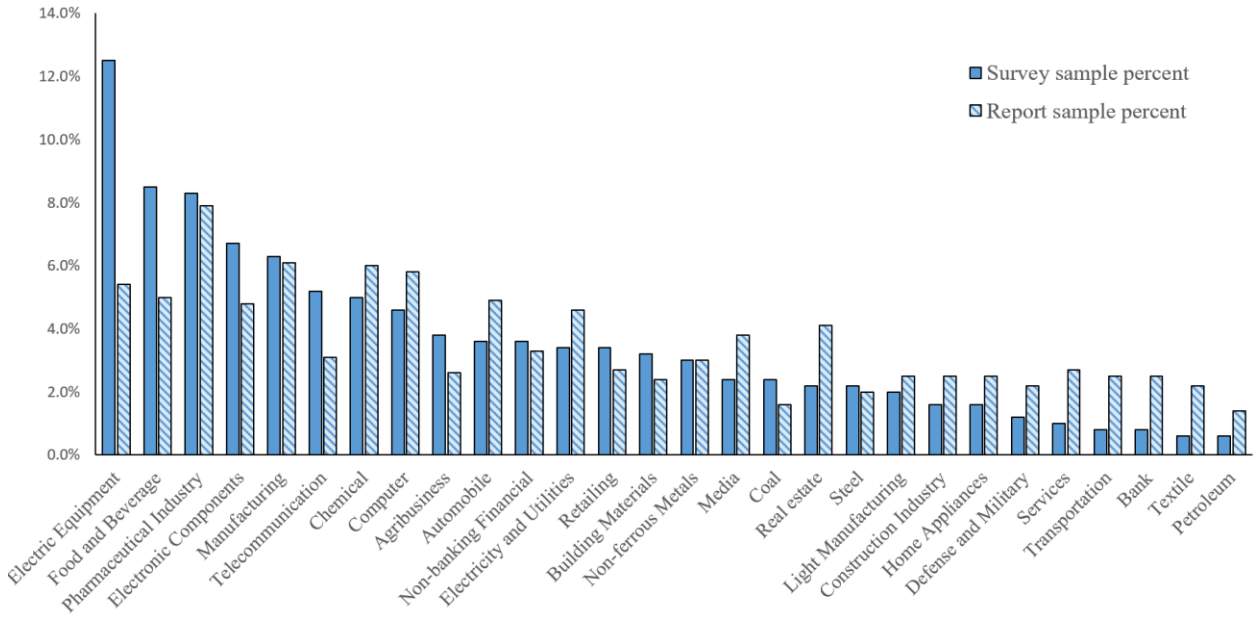


Figure 1. Distribution of Survey Respondents and Analyst Reports by Industry

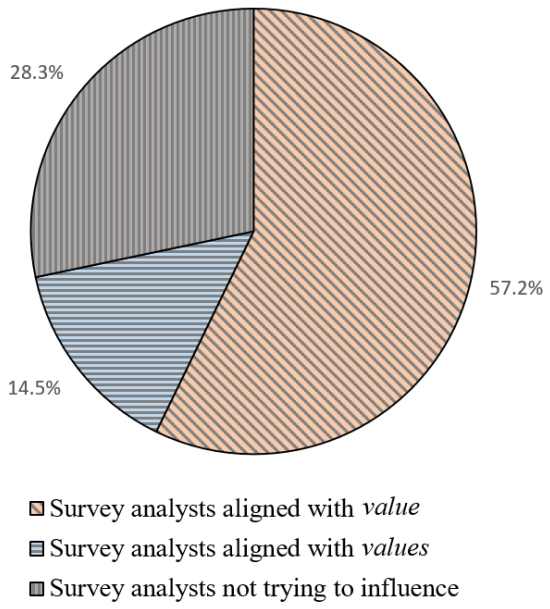


Figure 2a. Survey Analysts' Orientation towards *Value* versus *Values*

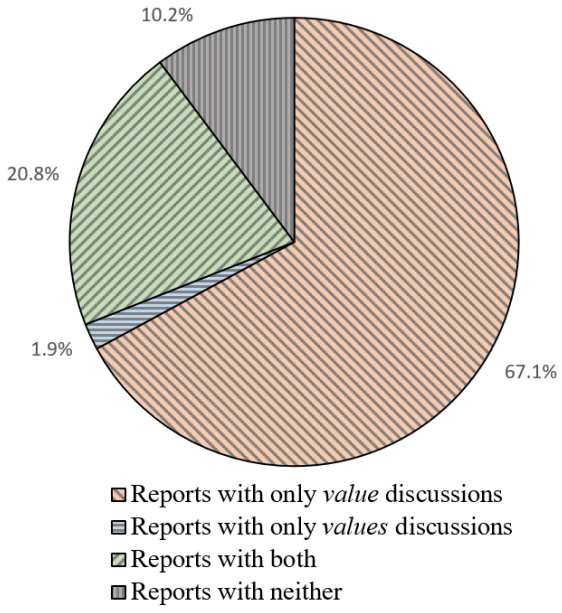


Figure 2b. Analyst Reports with *Value* versus *Values* Discussions

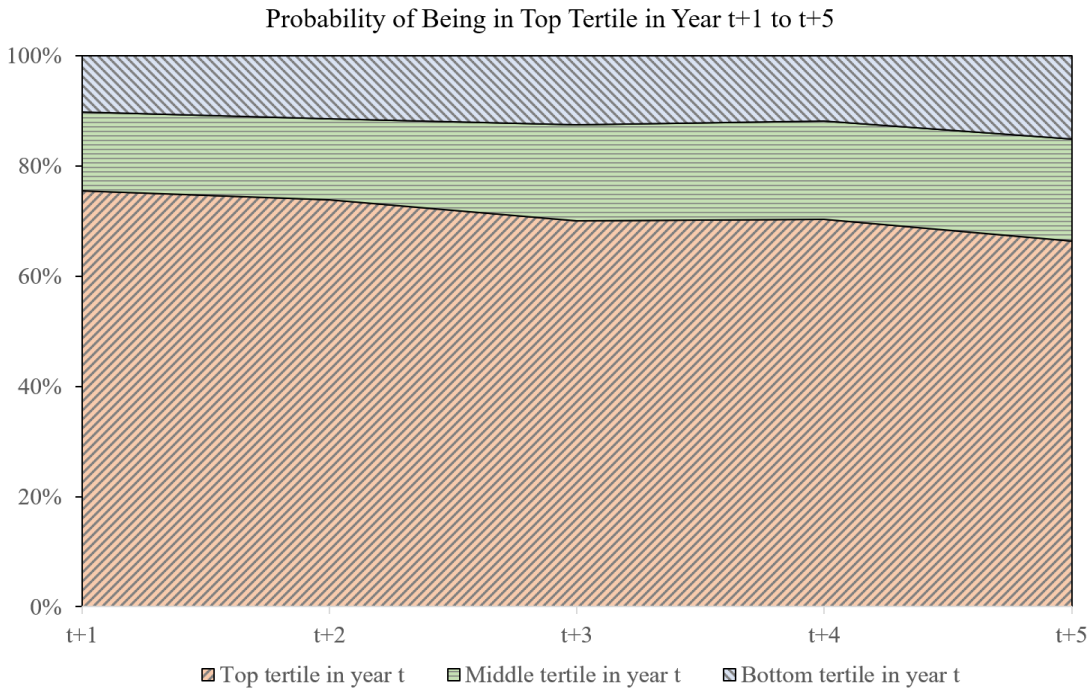


Figure 3. Probability of an Analyst Being in Top *Values* Tertile in Year *t+1* to *t+5*

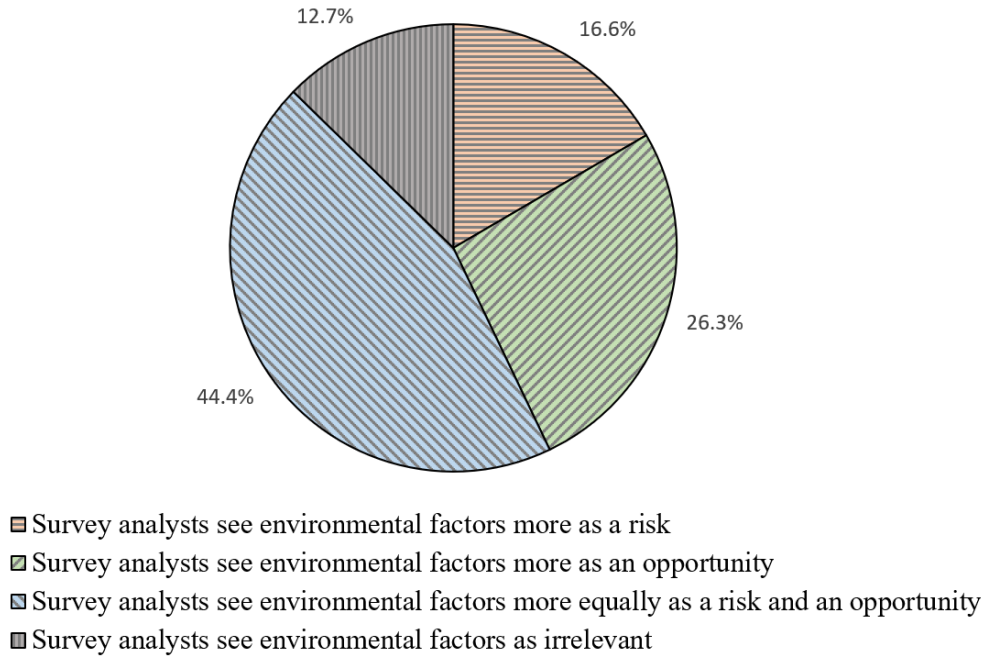


Figure 4a. Survey Analysts' Perception of Environmental Risks and Opportunities

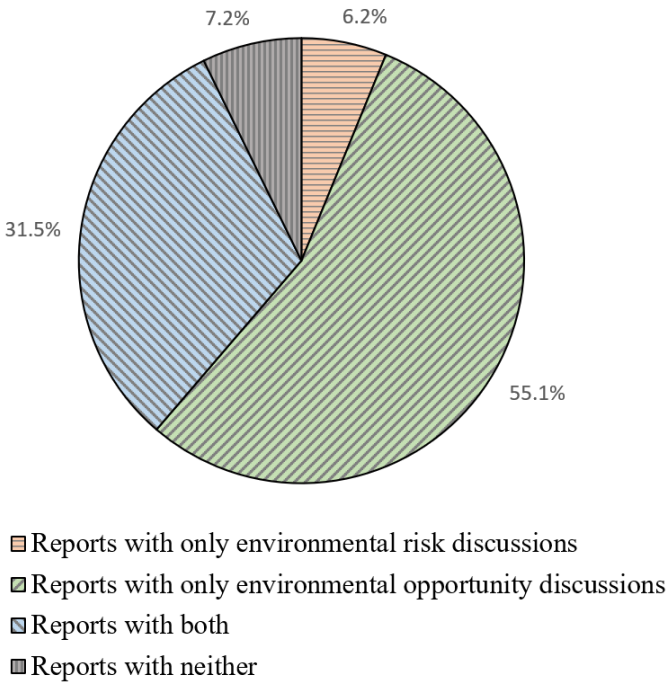


Figure 4b. Analyst Reports with Environmental Risk and Opportunity Discussions

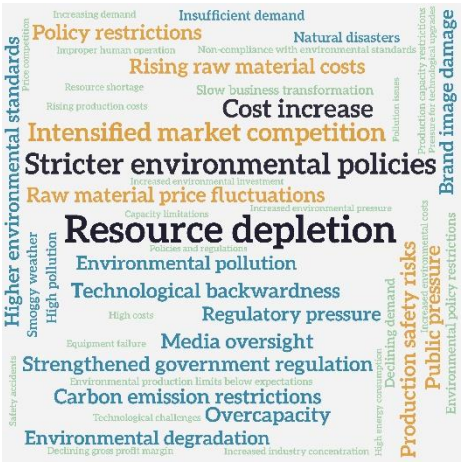


Figure 5a. Risk Discussions in Brown industries



Figure 5b. Risk Discussions in Green industries



Figure 5c. Opportunity Discussions in Brown industries

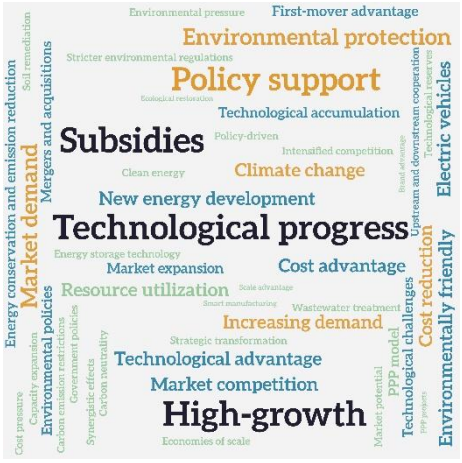


Figure 5d. Opportunity Discussions in Green industries

Thes figures represent the top fifty themes in analysts' discussions of environmental risks and opportunities in their reports. The details to obtain the themes are provided in Internet Appendix 8.

Table 1: Demographics of Analysts in the Survey and the Analyst Report Samples

This table presents the demographics of the survey respondents and the analysts identified from our data of analyst reports, which cover all firm-specific research reports issued between 2013 and 2022. Demographic and professional background information for survey respondents is collected from the first part of the survey. For analysts identified from the reports, experience is estimated based on the number of years since the analyst issued their first report. Gender and educational background are obtained from CSMAR and the SAC website. Age is estimated by adding 22, 24, or 27 years to their years of experience, depending on whether the analyst holds a bachelor's, master's, or doctoral degree, respectively[4]. Broker revenue and location information are obtained from CSMAR. No. of firms covered is estimated by the number of firms for which an analyst issues reports. All information is as of 2022 or the most recent year the analyst was active in the database.

Demographic information	Survey (%)	Reports (%)	Demographic information	Survey (%)	Reports (%)
Gender			Revenue of the broker		
Male	57.6	74.6	< 1 billion	12.7	8.1
Female	42.4	25.4	1-10 billion	48.5	48.5
Age			10-20 billion	18.4	18.2
< 30	55.6	50.7	> 20 billion	20.4	25.2
30-40	37.6	48.5	Cities		
41-50	4.4	0.9	Beijing	21.6	26.3
> 50	2.4	0.0	Shanghai	38.6	39.3
Experience			Shenzhen	24.6	19.8
< 2 years	46.1	41.2	Guangzhou	4.6	3.8
2-4 years	30.5	27.8	Others	10.7	11.0
5-8 years	16.2	20.6	Number of firms covered		
> 8 years	7.1	10.5	< 5	15.5	26.6
Highest degree			5-10	33.9	21.6
Bachelor	13.1	6.6	11-20	28.1	26.0
Master	81.8	84.7	> 20	22.6	25.8
PhD	5.2	8.7			
No. of Obs.	505	5,261	No. of Obs.	505	5,261

[4] Our report data starts to be available in 2003, so the maximum possible experience is capped at 19 years. As a result, estimated analyst ages are capped at 41, 43, and 46 years, respectively. Consequently, the percentages of analysts in the 41-50 and > 50 age groups are underestimated.

Table 2. Analysts' Environmental Coverage in the Two Samples

Panel A presents summary statistics for sentences in analyst reports. *Total no. of sentences* is the total number of sentences in a report. *No. of Env related sentences* is the number of sentences that discuss environmental issues in a report. *% of Env related sentences* is calculated as *No. of Env related sentences* divided by *Total no. of sentences.* Columns 1-3 report the mean, standard deviation, and median of the variables in the full sample of analyst reports. Columns 4-6 report the same statistics for the sub-sample of reports that contain at least one environmental discussion. Panel B summarizes responses to survey Q2: "*On a scale of 1 to 5, how do you rate your level of attention to environmental and climate change information? In absolute terms___; Relative to my industry peers__*." Columns 1 and 2 report the mean and standard deviation of the scores. Column 3 presents the results of a t-test for the null hypothesis that the mean score is equal to 3 (the midpoint). Columns 4-6 show the percentage of respondents choosing scores of 1-2, 3, and 4-5, respectively. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A. Analyst Report Sample

	All reports			Reports with env discussions		
	Mean	Std.	Median	Mean	Std.	Median
Total no. of sentences	35.72	51.79	19.00	53.83	72.71	21.00
No. of Env related sentences	1.48	5.72	0.00	5.37	9.87	2.00
% of Env related sentences	3.8%	8.2%	0.0%	13.6%	11.4%	9.8%
No. and % of reports	273,664 (100%)			75,611 (27.6%)		
No. and % of unique firm-years	17,524 (100%)			11,171 (63.7%)		
No. and % of unique firms	3,931(100%)			3,275 (83.3%)		

Panel B. Survey Sample (N=505)

Level of attention to environmental and climate change information (on a scale of 1 to 5)	Mean	Std	H0: Mean level=3	% of respondents choosing		
				1 or 2	3	4 or 5
(a) In absolute terms	3.38	0.95	***	16.8%	35.3%	47.9%
(b) Relative to industry peers	3.27	1.01	***	20.6%	36.4%	43.0%
(a) - (b)	0.12***					

Table 3. Analysts' Choice between *Value* versus *Values* in Two Samples

Panel A presents responses to survey Q4: "*Do you try to influence your covered firms to invest in reducing their environmental impact?*" Respondents could choose from three options: (a) "*I don't try to influence*," (b) "***Only** when it can increase firm value*," and (c) "*Yes, I usually do (even when it does not increase firm value)*." We classify analysts as "Aligned with *value*" if they select (b), "Aligned with *values*" if they choose (c), and "Not trying to influence" if they opt for (a). Panel B reports the average numbers of *value*-related and *values*-related sentences in analyst reports. These sentences are identified using a fine-tuned Llama model. Column 1 uses all reports with environmental discussions. Column 2 uses reports with *value*-related environmental discussions but not *values*-related discussions. Column 3 uses reports with *values*-related environmental discussions but not *value*-related discussions. Column 4 uses reports with both *value*- and *values*-related environmental discussions. Column 5 uses reports with neither *value*- nor *values*-related discussions.

Panel A. Survey Sample

Motivation to influence covered firms' environmental policies	Total no. of respondents	No. of respondents choosing	% of respondents choosing
Aligned with *value*	505	289	57.2%
Aligned with *values*	505	73	14.5%
Not trying to influence	505	143	28.3%

Panel B. Analyst Report Sample

	All reports with env discussion.	Reports with only *value* env discussion.	Reports with only *values* env discussion	Reports with both ...	Reports with neither ...
No. of *value*-related sentences	3.40	2.82	0	7.24	0
No. of *values*-related sentences	0.62	0	1.22	2.87	0
No. and % of reports	75,611 (100%)	50,753 (67.1%)	1,441 (1.9%)	15,742 (20.8%)	7,675 (10.2%)

Table 4. Determinants for Analysts' *Value* versus *Values* Orientation

This table presents regression results on the determinants of analysts' orientation towards *value* versus *values.* Columns 1 and 2 use survey data. The dependent variable, *Aligned with Values*, is based on responses to survey Q4: "*Do you try to influence your covered firms to invest in reducing their environmental impact*?" *Aligned with Values* equals one a respondent chooses "*Yes, I usually do (even when it does not increase firm value),"* and zero otherwise. The main explanatory variable, *Attention to Env Topics,* is derived from Q2: "*On a scale of 1 to 5, how do you rate your level of attention to environmental and climate change information? In absolute terms."* Columns 3 and 4 use data from textual analysis of analyst reports, with observations at the analyst-year level. The dependent variable, *Values Ratio,* is defined as the ratio of *values*-related sentences to the sum of *value*- and *values*-related sentences in analyst reports, aggregated at the analyst-year level. To reduce measurement error, we restrict the sample to analyst-years with at least ten reports. *% of Env Related Sentences* is the proportion of environmental-related sentences in analyst reports, also aggregated at the analyst-year level. *Broker values culture* is an indicator variable equal to one if the brokerage explicitly incorporates social, environmental, or sustainability considerations into its stated corporate culture, as documented on the brokerage's official website. *Values Ratio* $_{t-1}$ is the one-year lagged dependent variable. *t*-statistics based on robust standard errors clustered at the industry level are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

	Survey Sample		Analyst Report Sample	
	DV=*Aligned with Values*		DV=*Values Ratio*	
VARIABLES	(1)	(2)	(3)	(4)
Attention to Env Topics	0.087**	0.070*		
	(2.161)	(1.777)		
% of Env Related Sentences			0.248*	0.238**
			(1.980)	(2.084)
Broker values culture			0.010**	0.009**
			(2.203)	(2.222)
Values Ratio t-1				0.117***
				(7.008)
Female	-0.020	-0.010	0.025***	0.023**
	(-0.829)	(-0.428)	(2.964)	(2.674)
Age	0.009**	0.008**	0.008	0.011
	(2.613)	(2.490)	(0.176)	(0.235)
General experience	0.006	0.005	0.002	0.001
	(0.658)	(0.452)	(0.193)	(0.096)
Number covered firms	0.025	0.026	-0.007	-0.007
	(1.243)	(1.353)	(-1.342)	(-1.288)
Constant	-0.248**	-0.228**	0.125	0.098
	(-2.516)	(-2.409)	(0.831)	(0.662)
Observations	505	505	4,743	4,743
R-squared	0.042	0.121	0.288	0.300
FE	No	Industry	Industry-year	Industry-year

Table 5. Analysts' Perceptions of Environmental Risks and Opportunities

Panel A reports responses to survey Q3: "*For the firms you cover, do you view environmental and climate change factors more as a risk or an opportunity?*" The number and percentage of respondents choosing each option are presented. Panel B reports the average numbers of environmental risk and opportunity related sentences in analyst reports. These sentences are identified through a fine-tuned Llama model. Column 1 uses all reports with environmental discussions. Column 2 uses reports with environmental risk discussions but not opportunity discussions. Column 3 uses reports with environmental opportunity discussions but not risk discussions. Column 4 uses reports with both risk and opportunity discussions. Column 5 uses reports with neither risk nor opportunity discussions. Panel C presents summary statistics by industry type. Brown industries are those included in the CSRC's high-polluting industry list; green industries are all others. Columns 1-3 report the number of observations, mean, and standard deviation for brown industries. Columns 4-6 report the same for green industries. Column 7 shows the difference in means between brown (column 2) and green (column 5) industries. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A. Survey Sample

... view environmental factors more as a risk or an opportunity to covered firms?	Total no. of respondents	No. of respondents choosing	% of respondents choosing
More as a risk	505	84	16.6%
More as an opportunity	505	133	26.3%
Equally as a risk and an opportunity	505	224	44.4%
Irrelevant	505	64	12.7%

B. Analyst Report Sample

	All reports with env discussion.	Reports with only risk discussions	Reports with only opportunity discussions	Reports with both …	Reports with neither …
No. of Env Risk sentences	0.77	1.18	0	2.20	0
No. of Env Opportunity sentences	3.79	0	2.54	7.61	0
No. and % of reports	75,611 (100%)	4,668 (6.2%)	41,678 (55.1%)	23,798 (31.5%)	5,467 (7.23%)

Panel C. Across Brown and Green Industries

	Brown Industries			Green Industries			Brown - Green
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	
	(1)	(2)	(3)	(4)	(5)	(6)	(2) - (5)
More as a risk (Survey)	180	0.22	0.42	325	0.14	0.34	0.09**
More as an opportunity (Survey)	180	0.17	0.37	325	0.32	0.47	-0.15***
No. of Env Risk sentences (Reports)	24,677	0.94	1.99	50,934	0.68	1.61	0.26***
No. of Env Opportunity sentences (Report)	24,677	2.92	5.31	50,934	4.22	7.39	-1.30***

Table 6. Perceived Environmental Risks and Opportunities and Financial Impacts

This table presents regression estimates of the relationship between analysts' perceptions of environmental risks and opportunities and their evaluations of environmental factors' financial impacts in the survey. The dependent variables, *Short-Term Financial Impacts* and *Long-Term Financial Impacts*, are based on responses to Q6: "*For the firms you cover, please evaluate how environmental and climate change factors affect their financial performance*." Respondents rated on a scale from -3 (very negative) to +3 (very positive), separately for short term and long term. The key independent variables are derived from Q3: "*For the firms you cover, do you see environmental and climate change factors more as a risk or an opportunity?*" *More as a risk* equals one if a respondent selects *"More as a risk,"* and zero otherwise. *More as an opportunity* equals one if a respondent selects *"More as an opportunity,"* and zero otherwise. *t*-statistics based on robust standard errors clustered at the industry level are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

	Short-Term Financial Impacts		*Long-Term Financial Impacts*	
	(1)	(2)	(3)	(4)
More as an opportunity	0.440***	0.316	0.740***	0.527***
	(3.827)	(1.694)	(9.174)	(5.141)
More as a risk	-0.472**	-0.481**	-0.713***	-0.705***
	(-2.408)	(-2.521)	(-3.155)	(-2.947)
Female	-0.114	-0.062	0.019	0.051
	(-1.043)	(-0.521)	(0.192)	(0.458)
Analyst age	-0.001	0.000	-0.009	-0.008
	(-0.159)	(0.026)	(-1.047)	(-0.950)
Analyst experience	-0.031	-0.025	0.002	0.015
	(-1.265)	(-0.852)	(0.095)	(0.501)
No. of firms covered	-0.101**	-0.111**	-0.044	-0.061
	(-2.477)	(-2.474)	(-0.760)	(-1.101)
Educational background	1.205	1.169	1.336	1.468
	(1.248)	(1.236)	(1.126)	(1.246)
Large broker	0.097	0.133	0.033	0.103
	(0.648)	(0.987)	(0.253)	(0.810)
Constant	0.997	1.049	1.049	0.646
	(0.344)	(0.370)	(0.304)	(0.186)
Observations	505	505	505	505
R-squared	0.099	0.188	0.159	0.265
FE	No	Industry	No	Industry
F-tests of equal coefficients on *More as an opportunity* in col. (1) and (3)				p =0.017
F-tests of equal coefficients on *More as a risk* in col. (1) and (3)				p =0.058
F-tests of equal coefficients on *More as an opportunity* in col. (2) and (4)				p=0.181
F-tests of equal coefficients on *More as a risk* in col. (2) and (4)				p=0.143

Table 7. Analysts' Earnings Forecasts, Recommendations, and Discussions of Environmental Risks and Opportunities

This table presents the regression estimates of the relationship between analysts' EPS forecasts, stock recommendations, and discussions of environmental risks and opportunities in their reports. Forecast and recommendation data is obtained from the CSMAR database and matched to analyst reports using broker name, analyst name, focal firm, and issuance date. $FEPS_{(t+k)}$ refers to the one-, two-, and three-year ahead EPS forecasts, scaled by the firm's stock price at the end of year *t* (k=1, 2, 3) and multiplied by 100. *Rec* represents stock recommendation, coded as 2, 1, 0, -1, and -2, for strong buy, buy, hold, sell, and strong sell recommendations, respectively. *% of Env Opportunity sentences* is the number of environmental opportunity-related sentences divided by the total number of sentences in a report. *% of Env Risk sentences* is the number of environmental risk-related sentences divided by the total number of sentences in a report. *t*-statistics based on robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

	FEPS(t+1)	*FEPS(t+2)*	*FEPS(t+3)*	*Rec*
VARIABLES	(1)	(2)	(3)	(4)
% of Env Opportunity Sentences	0.362***	0.501***	0.619***	0.053***
	(4.434)	(5.316)	(4.749)	(4.924)
% of Env Risk Sentences	-0.606***	-0.357	-0.708*	-0.078**
	(-2.987)	(-1.292)	(-1.835)	(-2.574)
Analyst experience	-0.005	0.001	0.007	-0.003***
	(-1.355)	(0.273)	(1.056)	(-5.435)
No. of firms covered	0.005	0.001	-0.013	0.002**
	(0.790)	(0.193)	(-1.202)	(2.284)
Total no. of sentences	0.010***	0.024***	0.059***	0.025***
	(3.136)	(5.958)	(10.509)	(24.723)
Female	0.001	-0.010	-0.038***	0.002*
	(0.160)	(-1.293)	(-3.253)	(1.704)
Large broker	-0.025***	-0.055***	0.010	-0.001
	(-3.479)	(-4.821)	(0.535)	(-0.717)
Forecast horizon	0.426***	2.201***	2.201***	
	(32.652)	(33.730)	(33.730)	
Constant	2.843***	-7.559***	-7.478***	-0.059***
	(40.924)	(-18.471)	(-14.747)	(-16.184)
Observations	257,304	256,721	229,507	219,647
R-squared	0.938	0.925	0.906	0.102
FE	Firm-year	Firm-year	Firm-year	Firm-year
F-test of equal coefficients on *% of Env Opportunity sentences* col. (1) and (3)				p=0.02
F-test of equal coefficients on *% of Env Risk sentences* col. (1) and (3)				p = 0.41

Table 8. Analysts' Perceptions of the Importance of Environmental Risk and Opportunity Factors

This table presents responses to survey Q7: "*Please evaluate how the following factors affect the firms you cover."* Respondents rated each factor on a scale from -3 (very negatively) to +3 (very positively). Panel A reports the results for risk factors. *% negative responses* is the percentage of analysts identifying the factor as having a negative impact (i.e., scores below zero). *Adj. mean* is calculated as follows: (i) compute the mean of negative responses for each factor, (ii) multiply this mean by the percentage of negative responses to obtain the weighted mean, and (iii) adjust the weighted mean by scaling it with the average weighted mean across all eight factors: $Adjusted\ mean_i = \frac{Weighted\ mean_i}{\sum_{k=1}^{8} Weighted\ mean_k\ /8}$ (*i=1,2, … ,8).* Panel B reports the results for opportunity factors. *% positive responses* is the percentage of analysts identifying the factor as having a positive impact (i.e., scores above zero). *Adj. mean* is calculated using the procedures as in Panel A, but focusing on positive responses. Brown industries are those included in the CSRC's high-polluting industry list; green industries are all others. *, **, and *** indicate adjusted means statistically greater than one at the 10%, 5% and 1% levels, respectively.

Panel A. Importance of Environmental Risk Factors

		All		Brown Ind.		Green Ind.	
		% negative responses	Adj. mean	% negative responses	Adj. mean	% negative responses	Adj. mean
(a)	Physical climate and environmental change (e.g., extreme weather, floods, air pollution)	36.2%	3.45***	50.0%	4.63***	28.6%	2.74***
(b)	Environmental regulations or subsidies (e.g., production limits, ("carbon peaking and neutrality" target, subsidies for PV power and new energy products)	12.6%	1.07	23.3%	1.89**	6.7%	0.61
(c)	Changes in employees' preferences (e.g., some talents prefer to work for green firms, or in less polluted areas)	9.5%	0.72	13.9%	1.04	7.1%	0.54
(d)	Changes in consumers' preferences (e.g., consumers' preference for green products or loyalty to green brands)	8.1%	0.61	14.4%	1.10	4.6%	0.33
(e)	Changes in customers' and suppliers' preferences (e.g., supply chain decarbonization initiatives, scope 3 disclosure requirements)	7.1%	0.61	11.1%	1.10	4.9%	0.33
(f)	Transitions to green technologies and green products (e.g., transition from fossil fuels to clean energy)	6.5%	0.60	10.0%	1.00	4.6%	0.35
(g)	Demand for products to cope with pollution and climate change (e.g., demand for air conditioners, weather insurance products, etc.)	7.5%	0.54	12.7%	0.90	4.6%	0.33
(h)	Changes in investors' and creditors' preferences (e.g., emergence of green bonds and ESG funds)	7.3%	0.53	10.5%	0.80	5.53%	0.38

Panel B. Importance of Environmental Opportunity Factors

		All		Brown Ind.		Green Ind.	
		%. positive responses	Adj. mean	%. positive responses	Adj. mean	%. positive responses	Adj. mean
(a)	Transitions to green technologies and green products (e.g., transition from fossil fuels to clean energy)	71.9%	1.35***	70.0	1.19**	72.9	1.44***
(b)	Environmental regulations or subsidies (e.g., production limits, "carbon peaking and neutrality" target, subsidies for PV power and new energy products)	64.8%	1.19***	48.9	0.82	73.5	1.40***
(c)	Demand for products to cope with pollution and climate change (e.g., demand for air conditioners, weather insurance products, etc.)	61.2%	1.10**	55.0	0.88	64.6	1.22***
(d)	Changes in consumers' preferences (e.g., consumers' preference for green products or loyalty to green brands)	63.6%	1.09***	54.4	0.88	68.6	1.21***
(e)	Changes in customers' and suppliers' preferences (e.g., supply chain decarbonization initiatives, scope 3 disclosure requirements)	64%	1.04	59.4	0.91	66.5	1.11**
(f)	Changes in investors' and creditors' preferences (e.g., emergence of green bonds and ESG funds)	54.1%	0.89	47.2	0.69	57.8	1.00
(g)	Changes in employees' preferences (e.g., some talents prefer to work for green firms, or in less polluted areas)	51.5%	0.80	45.0	0.62	55.1	0.90
(h)	Physical climate change and pollution (e.g., extreme weather, floods, air pollution	34.5%	0.53	25.0	0.39	39.7	0.61

Table 9. Analysts' Perceptions of Drivers of Corporate Sustainability Policies

This table reports responses to survey Q8: "*Please evaluate the extent to which the following factors cause the firms you follow to reduce their environmental impact.*" Respondents rated the influence of each factor on a scale from 1 ("Not at all") to 5 ("Highest degree"). Columns 1 and 2 report the mean and standard deviation of the scores, respectively. Column 3 shows the results of a t-test for the null hypothesis that the mean score is equal to 1 (no influence at all). Column 4 shows the results of a t-test for the null hypothesis that the mean score is equal to 3 (the midpoint). Column 5 shows the results of pairwise t-tests comparing the mean score for each factor to the mean score of each other factor, with significance tested at the 5% level. Columns 6 and 7 report the mean scores for analysts following brown industries and green industries, respectively. Brown industries are those included in the CSRC's high-polluting industry list; green industries are all others. Column 8 reports the difference in mean scores between brown and green industries. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

	Mean	Std. Dev.	H0: Mean score=1 No influence at all)	H0: Mean score=3 (midpoint)	Sig. diff in mean score vs rows	Brown Ind.	Green Ind.	Brown - Green
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(6) - (7)
(a) Regulations and policies	3.69	1.12	***	***	2-8	3.82	3.62	0.20*
(b) Public and media pressure	3.55	1.01	***	***	1, 3-8	3.65	3.49	0.16*
(c) Demand for sustainability from up and down the supply chain	3.32	1.13	***	***	1-2, 6-8	3.42	3.26	0.16
(d) Efforts to rebrand the firm as a green(er) firm	3.28	1.12	***	***	1-2, 6-8	3.42	3.20	0.22**
(e) Consumers' demand for sustainability	3.24	1.11	***	***	1-3, 6-8	3.25	3.24	0.01
(f) Firms' intrinsic preference for sustainability	3.08	1.06	***	*	1-5, 8	3.14	3.04	0.10
(g) Investors' and creditors' demand for sustainability	3.03	1.05	***	n.s.	1-5, 8	2.98	3.06	-0.08
(h) Employees' preference for sustainability	2.56	1.08	***	(-) ***	1-7	2.56	2.56	0.00
No. of analysts	505					180	325	F test p=0.06

Table 10. Analysts' Perceptions of Their Influence on Firms' Environmental Policies

This table reports responses to survey Q12: "*Please evaluate whether and to what extent you can influence your covered firms' environmental policies through the following ways.*" Respondents rated their influence on a scale from 1 ("Not at all") to 5 ("Highest degree"). Columns 1 and 2 report the mean and standard deviation of the scores, respectively. Column 3 shows the results of a t-test for the null hypothesis that the mean score is equal to 1 (no influence at all). Column 4 shows the results of a t-test for the null hypothesis that the mean score is equal to 3 (the midpoint). Column 5 shows the results of pairwise t-tests comparing the mean score for each factor with the mean score for every other factor, with significance tested at the 5% level. Columns 6 and 7 report the mean scores for *values* analysts and *value* analysts, respectively. *Values* analysts and *value* analysts are classified based on responses to Q4: "*Do you try to influence your covered firms to invest in reducing their environmental impact?*" *Values* analysts are those selecting "*Yes, I usually do (even when it does not increase firm value),"* and *Value* analysts are those selecting "***Only*** *when it can increase firm value."* Column 8 shows the difference in mean scores between *value* analysts and *values* analysts. *, **, and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

	Mean	Std. Dev.	H0: Mean score=1 (No influence at all)	H0: Mean score=3 (midpoint)	Sig. diff in mean score vs rows	*Values* analysts	*Value* analysts	*Values* - *Value*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(6) – (7)
(a) Public communication channels such as conference calls, site visits, etc.	2.86	1.13	***	(-) ***	3-5	3.25	2.91	0.34**
(b) Raising concerns about environmental issues with influential investors	2.82	1.11	***	(-) ***	4-5	3.12	2.99	0.11
(c) Adjusting recommendations and financial forecasts to reflect the impact of the firm's environmental performance	2.74	1.18	***	(-) ***	1, 5	3.11	2.90	0.22
(d) Discussing environmental issues in research reports	2.69	1.09	***	(-) ***	1, 2	3.04	2.81	0.23*
(e) Private communication with corporate managers	2.63	1.13	***	(-) ***	1-3	3.08	2.71	0.37***
No. of analysts	505					73	289	F-test p=0.10