Value, Values, and Opportunities in Corporate Environmental Practices

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Abstract:

We study sell-side analysts' perceptions of corporate environmental practices using survey responses from 505 analysts and 273,664 reports. Analysts devote substantial attention to environmental issues, far more than AI or cybersecurity, and overwhelmingly emphasize financial over non-financial considerations. Analysts view environmental factors not just as risks but more as opportunities. Their environmental perceptions shape both earnings forecasts and stock recommendations. Regulation and media are seen as key drivers of corporate environmental improvement, while institutions and employees matter less. Overall, the consistent survey and textual evidence underscore value-driven analysis, financial materiality of environmental factors, and offer guidance for sustainability policy interventions.

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; Shive and Forster 2020; MSCI 2023a), making it crucial to understand their environmental practices. A growing body of research examines how various stakeholders, including regulators, large shareholders, media, consumers, and employees, influence corporate environmental behavior. Much of this work centers on institutional investors, an important group of market-based monitors. However, critical questions remain concerning 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 incentives and 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 views (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 adopt a two-pronged approach. First, we conduct a large-scale survey to capture analysts' beliefs and viewpoints. The survey encompasses responses from 505 analysts, representing 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 are drawn from China, which is 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 use 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? 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 to be the primary drivers of corporate environmental improvement?

A necessary condition for examining corporate environmental practices from the perspective of financial analysts is that analysts meaningfully cover these issues. We analyze 273,664 analyst reports and find that 27.6% (75,611) contain discussions of environmental topics. For comparison, only 16.4% (44,881) of the 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, as environmental reports span 63.7% of the firm-years and 83.3% of the 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 supports these findings. Of the 505 analysts surveyed, 83.2% (420) rated their level of attention to climate and environmental information as 3 or above on a 5-point scale. Their average rating was 3.38, which is significantly higher than the midpoint of 3. Only 16.8% reported low (1 or 2) attention levels. Together, textual analysis of the analyst reports and the 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 asked 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%) selected "*Only when it can increase firm value*," reflecting a *value*-oriented approach. In contrast, only 14.5% chose "*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 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., Eagly and Crowley 1986; Eisenberg et al. 2015; 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 to 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. Although academic research largely emphasizes downside risks (e.g., Krueger,

Sautner, and Starks 2020; Bolton and Kacperczyk 2021, 2023), 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 asked: "*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% selected "*Equally as a risk and an opportunity*," 26.3% chose "*More as an opportunity*," and 16.6% indicated "*More as a risk.*" The remaining 12.7% considered environmental factors irrelevant to the firms they cover. These results suggest that a majority of analysts (70.7% = 44.4% + 26.3%) recognized 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 the analyst reports corroborate these findings. For 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. Over 85% of the reports include at least one mention of environmental business opportunities, compared with 37.7% referencing environmental risks. Taken together, the consistent patterns in the survey and textual data suggest that analysts do not regard environmental factors solely as 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 with their corresponding earnings per share (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. Robustness tests

show that the results hold when restricting the sample to non-state-owned enterprises (non-SOEs), indicating that analysts' treatment of environmental opportunities is not driven by features unique to Chinese SOEs but applies more broadly to market-oriented firms.

Furthermore, we show that changes in analysts' aggregate discussions of environmental risks and opportunities significantly predict future firm performance. Firms receiving more environmental opportunity-focused commentary are more likely to deliver higher earnings in the following two years, while those receiving more risk-focused discussions tend to report lower earnings. Together, our results indicate that analysts assess environmental risks and opportunities with directional accuracy and that the environmental factors they incorporate into their valuation analyses are indeed financially material.

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 list of high-polluting industries compiled by the China Securities Regulatory Commission (CSRC). 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, they perceive regulatory risks as a significant threat only in brown industries. On the opportunity side, analysts highlight the transition to green technologies as the most prominent source of opportunity across both brown and green industries. Indeed, further empirical analysis finds that opportunity discussions are positively correlated with firms' green patenting. This assessment aligns with recent empirical evidence on transition opportunities, including those for carbon-intensive firms (e.g., Cheema-Fox, Serafeim, and Wang 2022; Cohen, Gurun, and Nguyen 2024). For green industries, analysts emphasize additional opportunity drivers, such as 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 identified eight commonly discussed factors in the academic literature and asked the 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; Broccardo, Hart, and Zingales 2022; Houston and Shan 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 discussion provided in Section 5. First, while much of the literature focuses on the role of investors and creditors in promoting corporate sustainability (e.g., Barber, Morse, and Yasuda 2021; Broccardo, Hart, and Zingales 2022; Starks 2023), the surveyed analysts ranked their influence as the second lowest, significantly below most other factors. This view aligns with recent empirical evidence that institutional investors have limited treatment effects (e.g., Atta-Darkua et al. 2023; Heath et al. 2023) and their selection impact on the cost of capital is small (Gantchev et al. 2022; Berk and van Binsbergen 2025; Zhang 2025). The consistency between analysts' perceptions in our study and findings based on U.S. and global data also suggests that our results are likely to have broader relevance and are not confined to the Chinese context. Second, analysts rated employees as the least influential group, with an average efficacy score of 2.56 on a 5-point scale, which is significantly behind all other factors.

At the other end of the spectrum, analysts viewed government regulations as the most influential driver of corporate environmental practices, followed closely by public and media pressure. Both were rated significantly higher than other factors and 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, and 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 probably 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 is the most significant opportunity across industries. Third, we are able to assess the relative importance of the factors that drive corporate sustainability. Although 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 have 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). More fundamentally, these findings also suggest that efforts to enhance corporate environmental performance may be most effective when channeled through regulatory mechanisms and public accountability rather than relying primarily on market-based investor pressure.

The remainder of this paper is organized as follows. Section 2 describes the survey design and delivery, the textual analysis of the analyst reports, the characteristics of the analysts in both samples, and the analysts' coverage of environmental issues. Section 3 examines analysts' orientation toward *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 the paper.

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 the 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, and we obtained 84 additional feedback responses. Outside of conferences, we 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 to ensure accuracy and clarity. To mitigate order effects, we randomized the ordering of response options in matrix-style questions.

The final survey comprised two parts. The first part gathered the 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 featured 12 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 the 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 excluded 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 removed 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 the survey respondents and compares them with 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 the analysts' characteristics, such as their 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 use the Llama-3-8B model (Bai et al. 2023), an open-source, pre-trained large language model developed by Meta, and apply fine-tuning techniques to identify sentences related to environmental 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 environment-related or unrelated by two research assistants. Following standard practice, we split 80% of the labeled data into a training set and 20% into a test set. The model is fine-tuned on the training set by adjusting its parameters to minimize classification error. Evaluation of the test set shows that the fine-tuned model achieves 97% accuracy and 97% precision in distinguishing environment-related content from other topics. Applying this model to the full corpus, we identify approximately 405,000 environment-related sentences across all analyst reports. Detailed examples are provided in Internet Appendix 3.

In the next step, we further classify the environment-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 environment-related sentence along with its adjacent sentences during labeling and model fine-tuning. The classification criteria and results are detailed in Sections 3 and 4, respectively. Performance metrics for all of the fine-fining processes are reported in Internet Appendix 7.

2.3 Samples' Characteristics

Table 1 presents the characteristics of the analysts in the survey and report-based samples. Among the 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 data suggest that the 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, as shown in Internet Appendix 11, we re-

evaluate the main survey results by resampling the 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 the survey respondents and analyst reports across industries. To formally assess the similarity of the two samples, we conduct a Kolmogorov–Smirnov (KS) test to compare their industry distributions. The KS statistic is 0.047, with a *p*-value of 0.197, which fails to reject the null hypothesis that the industry distributions of the two samples are equal.

2.4 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 of 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. They span 63.7% of the firm-years and 83.3% of the 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 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% of all 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. The detailed methodology and results are provided in Internet Appendix 4. Our analysis shows that only 16.4% (44,811) of the 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 (27.6%, or 75,611 reports). Even when we restrict the sample to the most recent five years, only 16.3% and 4.5% of the reports mention AI and cybersecurity, respectively, compared with 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 asked the surveyed 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 5-point scale, 47.9% of the analysts rated their absolute level of attention as 4 or 5 (high), 35.3% as 3 (mid-level), and 16.8% 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 the survey respondents reported paying limited attention to environmental topics. The majority (83.2%) considered themselves to pay a moderate to high level of attention. Taken together, the analyses of the analyst reports and survey responses consistently indicate that analysts devote meaningful attention—in both breadth and depth—to environmental issues in their day-to-day research.

3. *Value* or *Values*?

3.1 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 in terms of *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 that they communicate to investors by combining the evidence from the survey responses with the analyst reports.

In the survey, we asked the analysts: "*Do you try to influence your covered firms to invest in reducing their environmental impact?*" (Q4). The respondents chose 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

[2] In terms of relative attention, because not everyone can be above average, the rational benchmark for relative attention level should be 3. However, we find a mean relative attention score of 3.27, which is statistically significantly higher than 3, suggesting upward bias in analysts' self-assessments. This is consistent with psychologists' and sociologists' observations that individuals tend to overestimate their environmental awareness because of 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 recognized the difference between absolute and relative levels and perceived their peers as having relatively high levels of environmental coverage.

selected (b), "Aligned with *values*" if they chose (c), and "Not trying to influence" if they chose (a).

Figure 2A and Panel A of Table 3 present the results. A majority of the surveyed analysts (57.2%, or 289 analysts) were aligned with *value*, while only 14.5% were aligned with *values*. The remaining 28.3% reported 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% to 14.5%).

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 they 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.

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 the environment-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 environment-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 pay more attention to environmental topics are more likely to consider environmental externalities. Accordingly, we expect a positive correlation between an analyst's overall attention to environmental issues and their 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 how 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 on survey 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:

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

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 5-point 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)[3]. The results are reported in columns (1) and (2) of Table 4.

Our analyst report sample spans 10 years and identifies both brokers and analysts, enabling us to examine the full set of predictors. Equation (2) specifies the report-based regression:

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

[3] In unreported tests, we examine whether *values* analysts disproportionately cluster in green industries as a result of self-selection, but find no supporting evidence.

(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 10 reports. For key explanatory variables, $\%\ of\ Env\ Related\ Sentences_{i,t}$ is the proportion of environment-related sentences in analyst *i*'s reports in year *t*, serving as a proxy for environmental attention. $Female_{i,t}$ and $Age_{i,t}$ denote the analyst's gender and age, respectively. We measure broker firms' emphasis on *values* by 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. We find that 38% of all brokers incorporate *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 ($X_{i,t}$) 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.

The coefficients 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 the 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 positive and significant in columns (3) and (4), and those on *Age* are positive and significant 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 positive and significant. 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 toward *value* versus *values* appears to be persistent. 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 we calculate 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 consistently have sub-20% probabilities 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 in brokerages that promote a *value*-oriented corporate culture. Finally, analysts' orientation toward *value* versus *values* appears to be relatively stable over time.

4. Analysts' Perspectives on Environmental Risks and Opportunities

4.1 Environmental Factors as Risks and Opportunities

Environmental and climate change issues are often framed in terms of risks (Krueger et al. 2020; Bolton and Kacperczyk 2021, 2023; 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 opportunities in anecdotal evidence, in our survey, we asked the analysts: "*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

Table 5, 44.4% (224 analysts) selected "*Equally as a risk and an opportunity*," 26.3% (133 analysts) chose "*More as an opportunity*," and 16.6% (84 analysts) chose "*More as a risk*." The remaining 12.7% (64 analysts) considered 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 using 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 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 the environment-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 depth. 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.

Furthermore, the distribution of environmental risks and opportunities is likely to vary across industries. High-polluting sectors ("brown" industries) may face greater downside risks because of 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 the survey respondents, 22% of the analysts covering brown industries viewed environmental factors primarily as risks, significantly higher than the 14% in green industries. Conversely, only 17% of the analysts covering brown industries saw them mainly as opportunities, significantly lower than the 32% in green industries. Analyst reports reflect 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, whereas brown industries are more exposed to downside environmental risks.

4.2 Financially Materiality of Environmental Risks and Opportunities

We next examine whether these environmental risks and opportunities are financially material, using analysts' assessments in the survey 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. Because 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:

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

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

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: _____.*" The responses ranged from −3 (very negative) to +3 (very positive). *i* denotes the analyst surveyed. 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* selected "*More as a risk*," and zero otherwise. *More as an opportunity*$_i$ equals one if respondent *i* selected "*More as an opportunity*," and zero otherwise. X_i is a set of analyst characteristics, such as general experience and the number of firms covered. Ψ_j denotes industry fixed effects. The results are reported in Table 6.

The coefficients 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 of the 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 the short and long term. Similarly, the coefficients 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 of the coefficients are statistically significant, which suggests 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 the surveyed 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' EPS forecasts, stock recommendations, and the textual content of their reports. Specifically, we estimate the following regression:

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

The dependent variable, $FEPS_{i,m,t+k}$, refers to analyst i's 1-, 2-, and 3-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. $X_{i,t}$ is 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 the 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 3-year EPS forecasts to approximate a longer-term outlook, though they may still be insufficient to fully reflect the 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-year, analysts who emphasize more environmental opportunities tend to issue higher earnings forecasts than their peers, whereas those who focus more on environmental risks issue lower forecasts. This indicates that analysts meaningfully incorporate their assessments 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 1-year forecast (column (1)) to 0.619 for the 3-year forecast (column (3)). This statistically significant increase implies that analysts expect the financial benefits of environmental opportunities to materialize more fully over longer timeframes. Overall, these findings align with our survey evidence and prior studies showing that analysts incorporate the negative impacts of ESG risks into financial forecasts (Derrien et al. 2025; Park et

al. 2025). Importantly, our results also highlight that analysts account for the positive impacts of environmental opportunities, especially over the long term, echoing recent research on the long-term value of ESG practices (Edmans 2023; Starks, Venkat, and Zhu 2025). 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 of which are 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, across firms, and over time. In Internet Appendix 8, we also show that the results hold when restricting the sample to non-SOEs. This indicates that analysts' discussions and financial assessments of environmental opportunities are not driven by features unique to Chinese SOEs or by analysts catering to these firms, but apply more broadly to market-oriented enterprises, enhancing the credibility and generalizability of our finding. Collectively, these results provide robust evidence that analysts view environmental factors both as risks and opportunities, and treat them as financially material.

Furthermore, since analysts view these environmental factors as financially consequential, we might expect their environmental assessments to predict future firm performance. Specifically, aggregating across analysts, firms characterized by stronger environmental opportunities are expected to generate higher earnings in subsequent years, while those flagged as facing greater environmental risks are likely to exhibit lower future earnings. To empirically assess this, we construct a novel firm-year level measure: the *Opportunity-Risk Ratio*, which captures the net orientation of analysts' environmental commentary. This ratio is calculated as the difference between the average proportions of environmental opportunity-related and risk-related sentences across all analyst reports for a given firm-year, scaled by their sum. Higher values indicate a collective emphasis on opportunities, whereas lower (more negative) values reflect a predominant focus on risks. We examine the predictive power of changes in this ratio using Fama-MacBeth (1973) regressions, estimating year-by-year cross-sectional relationships and averaging coefficients over the full sample period:

$$\Delta EPS_{m,t+k} = \beta_0 + \beta_1 \Delta Opportunity\text{-}Risk\ Ratio_{m,t} + \gamma' X_{m,t} + \varepsilon_{m,t} \quad (6)$$

The dependent variable, $\Delta EPS_{m,t+k}$, is firm m's change in EPS from year t to $t+k$, scaled by the firm's closing price (P) in year t and multiplied by 100 (k=1,2,3). The key independent variable, $\Delta Opportunity\text{-}Risk\ Ratio_{m,t}$, is the change in the *Opportunity-Risk Ratio* from year t-1 to year t. We control for standard firm-level variable ($X_{m,t}$), including changes in EPS, firm size, leverage, and book-to-market ratio from *t-1* to *t*. To reduce measurement error, we restrict the sample to firm-years with at least three analyst reports.

Table 8 presents the results. The coefficients on *ΔOpportunity-Risk Ratio* are positive and statistically significant in columns (1) and (2), and insignificant in column (3). For instance, in column (1), the estimated coefficient of 0.169 indicates that a one-standard-deviation increase in *ΔOpportunity-Risk Ratio* (0.45) corresponds to a significant 2.4% increase in EPS/P in year *t+1*. These findings suggest that firms receiving more environmental opportunity-focused (relative to risk-focused) analyst commentary are more likely to deliver higher earnings over the next two years. Overall, our results indicate that analysts' aggregated environmental discourse offers forward-looking insight into firms' earnings trajectories and that the environmental factors they emphasize are indeed financially material.

4.3 Key Sources of Environmental Risks and Opportunities

The literature identifies key sources of climate and environmental 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 is likely to 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 asked the analysts to rate the expected impact of each factor on the firms they cover on a scale from −3 (very negative) to +3 (very positive). This design allows us to classify whether each factor is perceived as a risk, as neutral, or as an opportunity. As shown in Table 9, 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. 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 (7):

$$Adjusted\ \ mean_n = \frac{Weighted\ mean_n}{\sum_{k=1}^{8} Weighted\ mean_k\ /8}\left(n = 1, 2, ..., 8\right) \tag{7}$$

By construction, an adjusted mean above one indicates an above-average type of risk, while a value below one indicates a below-average risk. Panel A of Table 9 reports the results, with risk factors ranked by their adjusted means. *Physical environmental change* is 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 it underscores the broad economic costs associated with climate and environmental disruptions.

The second highest-rated risk is *environmental regulations and subsidies.* Analysts viewed it 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 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 the prevalence and perceived magnitude of positive impacts. The adjusted mean is calculated using the same procedure as that for risks, but restricted to positive responses. 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* stands out 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; Fink 2022; Cohen et al. 2024). In Internet Appendix 9, we further test the association between analysts' opportunity discussions and firms' green patenting activities. The correlation coefficients are significantly positive (in both brown and green industries), corroborating the survey evidence that analysts view green technology transition as a key source of opportunity.

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) *changes in consumer preferences*, and (5) *changes in customer and supplier preferences.* Interestingly, these factors are typically framed as environmental risks in the literature (e.g., Krueger et al. 2020; Stroebel and Wurgler 2021; Bolton and Kacperczyk 2023; Hsu et al. 2023). *Ex ante*, factors such as green technology advancement and regulatory policies are intended to promote societal welfare and facilitate the net-zero transition. Although they may impose costs on some firms, they can create strategic advantages for others, particularly those that are 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 the 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 10. 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[4]. Panels C and D display opportunity-related themes. In

[4] 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.

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*, whereas green industry reports highlight *subsidies*, both of which correspond to the second-highest rated opportunities identified by the 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 emerges as the most salient risk across industries, the transition to green technologies is widely perceived as the greatest opportunity rather than as 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 identified eight commonly discussed drivers of corporate environmental action and asked the surveyed analysts to assess their influence. Specifically, we asked: "*Please evaluate the extent to which the following factors cause the firms you follow to reduce their environmental impact*" (Q8). The factors were government policies and regulations (e.g., Henderson 1996; Greenstone 2003; He et al. 2020), investor and creditor pressure (e.g., Pástor et al. 2021; Broccardo et al. 2022; Houston and Shan 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. 2023), employee demand (e.g., Krueger et al. 2023), rebranding incentives (e.g., Cornaggia and Cornaggia 2024; Duchin et al. 2025), and firms' intrinsic commitment to sustainability (e.g., Freeman 2010; Hart and Zingales 2017).

Table 10 reports the results, ranking these factors by their average influence ratings. The two most influential drivers that analysts identified are government regulations and public/media pressure. On a scale from 1 ("No influence at all") to 5 ("Highest degree of influence"), 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 behavior. The high ranking of public/media scrutiny also points to an important but 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 have 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, and 15% 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. 2024; 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. 2025) 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 to assess their true impact on environmental outcomes.

Perhaps surprisingly, analysts ranked investor and creditor influence as the second least impactful driver, with a mean score of 3.03. This score is significantly lower than those of most of the other factors and is not statistically different from the midpoint of 3. This contrasts with the extensive attention that these factors receive in academic research (e.g., Barber, Morse, and Yasuda 2021; Green and Roth 2025; Broccardo, Hart, and Zingales 2022; Ilhan, Krueger, Sautner, and Starks 2023; Starks 2023). Nonetheless, analysts' assessments are consistent with recent empirical evidence from U.S. and global data, which indicates that institutional investors exert

minimal treatment effects on firm behavior (e.g., Atta-Darkua et al. 2023; Heath et al. 2023) and only modest selection effects through the cost of capital (Gantchev et al. 2022; Berk and van Binsbergen 2025).

Remarkably, employee influence ranks at the bottom of our assessments. It registers an average score of 2.56, which is significantly below the midpoint of 3. This suggests that Chinese analysts perceive employees as wielding minimal influence over their firms' environmental policy decisions, standing in contrast to empirical findings from Western markets. Flammer and Luo (2017) and Krueger, Metzger, and Wu (2023) show that employees exhibit preferences for sustainability through their willingness to accept lower compensation and work harder at socially responsible firms. These patterns provide firms with economic incentives to pursue sustainability initiatives, as doing so will reduce labor costs and mitigate employee shirking.

The divergence between our findings and prior literature warrants further discussion. Two complementary explanations emerge. First, Chinese analysts may accurately assess that, despite employees' preferences for sustainability—which prior research estimates can yield wage savings of approximately 10%—the actual influence that employees exercise over corporate climate policy remains limited in practice. This interpretation suggests that while some employees may accept lower compensation for working at sustainable firms, their capacity to shape organizational environmental strategies may be constrained by hierarchical corporate structures or limited participatory mechanisms. Second, and perhaps more fundamentally, our results may reflect systematic differences in labor market dynamics between developing and developed economies. Given that our analyst rankings capture perceptions within the Chinese market context, whereas the foundational studies draw primarily from U.S. and European data, the observed disconnect likely stems from cross-national variations in labor market institutions, employee voice mechanisms, and the relative bargaining power of workers vis-à-vis management (Armangué-Jubert, Guner, and Ruggieri, 2025). Lastly, columns (6) and (7) of Table 10 show that the relative rankings of factors influencing corporate sustainability behaviors are similar across both brown industries and green industries.

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 asked the analysts the following (Q12): "*Please evaluate whether and to what extent you can influence your covered firms' environmental policies through the following channels.*" We listed 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. 2023), (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 11 presents the results. On a scale from 1 ("Not at all") to 5 ("Highest degree"), all five channels have mean scores significantly below the midpoint of 3, indicating that analysts generally do not perceive themselves as having a 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 11 show that *values* analysts indeed reported higher perceived influence scores than *value* analysts across all five channels, with three statistically significant differences. An *F*-test confirms that the joint mean scores of the *values* analysts are statistically higher than

those of the *value* analysts, indicating that the *values* analysts perceive themselves as having greater influence over firms' environmental policies.

6. Discussion and Conclusions

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 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 surveyed analysts indicated that they would promote sustainability irrespective of financial consequences, whereas over 55% supported sustainability *only* when it enhanced firm value. Similarly, nearly 90% of the 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). However, it aligns with recent evidence on fund managers' preferences (Edmans et al. 2024), underscoring the shared emphasis on financial returns by both buy-side and sell-side analysts. Future work should bear this in mind when theoretically or empirically modeling their preferences.

Second, analysts highlight environmental opportunities, especially those related to the transition toward green technologies. In our survey, 44% of the analysts perceived environmental issues as both risks and opportunities, and 26% viewed them primarily as opportunities, meaning that a total of 71% recognized the opportunity component in environmental matters. Consistent with this, 87% of the analyst reports referencing environmental topics identify related business opportunities. The figures are even higher in green industries. Moreover, analysts perceive both the environmental opportunities and risks to be financially material, as reflected in their earnings forecasts and stock recommendations. 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; Bolton and Kacperczyk 2021; Ilhan et al. 2021). Financial analysts' pronounced emphasis on environmental opportunities indicates the need for more detailed research into the upside potential of the low-carbon transition and 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. In contrast, investors, employees, and analysts themselves, are perceived as having more limited influence. Notably, despite extensive scholarly interest in investor-driven sustainability (e.g., Barber, Morse, and Yasuda 2021; Bolton and Kacperczyk 2021; Broccardo, Hart, and Zingales 2022), analysts ranked investors and creditor influence seventh out of eight factors, and it trailed 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 the survey respondents reported paying a moderate or high level of attention to environmental and climate change information, and more than one quarter of the 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, because 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.

Although our analysis is based on sell-side analysts in China, we argue that the findings and insights 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 (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 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 dissimilar to that in the U.S. Recent empirical studies using U.S. and global data also find that institutional investors exert very limited impact on firms' sustainability performance (e.g., Atta-Darkua et al. 2023; Heath 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. On the other hand, the perceived limited influence by employees 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.

References

Allen, Franklin, Jun Qian, Chenyu Shan, and Julie Lei Zhu. "Dissecting the long-term performance of the Chinese stock market." *The Journal of Finance* 79, no. 2 (2024): 993-1054.

Armangué-Jubert, Tristany, Nezih Guner, and Alessandro Ruggieri. "Labor market power and development." *American Economic Review: Insights* 7, no. 2 (2025): 177-195.

Atta-Darkua, Vaska, Simon Glossner, Philipp Krueger, and Pedro Matos. "Decarbonizing institutional investor portfolios: Helping to green the planet or just greening your portfolio." *Available at SSRN 4212568* (2023).

Bai, Jinze, Shuai Bai, Yunfei Chu, Zeyu Cui, Kai Dang, Xiaodong Deng, Yang Fan et al. "Qwen technical report." *arXiv preprint arXiv:2309.16609* (2023).

Balakrishnan, Karthik, Mary Brooke Billings, Bryan Kelly, and Alexander Ljungqvist. "Shaping liquidity: On the causal effects of voluntary disclosure." *The Journal of Finance* 69, no. 5 (2014): 2237-2278.

Barber, Brad, Reuven Lehavy, Maureen McNichols, and Brett Trueman. "Can investors profit from the prophets? Security analyst recommendations and stock returns." *The Journal of finance* 56, no. 2 (2001): 531-563.

Barber, Brad M., Adair Morse, and Ayako Yasuda. "Impact investing." *Journal of Financial Economics* 139, no. 1 (2021): 162-185.

Bekkers, René, and Pamala Wiepking. "Who gives? A literature review of predictors of charitable giving part one: Religion, education, age and socialisation." *Voluntary Sector Review* 2, no. 3 (2011): 337-365.

Berk, Jonathan B., and Jules H. Van Binsbergen. "The impact of impact investing." *Journal of Financial Economics* 164 (2025): 103972.

Bisetti, Emilio, Guoman She, and Alminas Zaldokas. "ESG shocks in global supply chains." *Available at SSRN 4562841* (2024).

Bolton, Patrick, and Marcin Kacperczyk. "Do investors care about carbon risk?" *Journal of Financial Economics* 142, no. 2 (2021): 517-549.

Bolton, Patrick, and Marcin Kacperczyk. "Global pricing of carbon-transition risk." *The Journal of Finance* 78, no. 6 (2023): 3677-3754.

Bordalo, Pedro, Nicola Gennaioli, Rafael La Porta, and Andrei Shleifer. "Diagnostic expectations and stock returns." *The Journal of Finance* 74, no. 6 (2019): 2839-2874.

Bouchaud, Jean-Philippe, Philipp Krueger, Augustin Landier, and David Thesmar. "Sticky expectations and the profitability anomaly." *The Journal of Finance* 74, no. 2 (2019): 639-674.

Bradley, Daniel, Sinan Gokkaya, Xi Liu, and Fei Xie. "Are all analysts created equal? Industry expertise and monitoring effectiveness of financial analysts." *Journal of Accounting and Economics* 63, no. 2-3 (2017): 179-206.

Brav, Alon, Reuven Lehavy, and Roni Michaely. "Using expectations to test asset pricing models." *Financial Management* 34, no. 3 (2005): 31-64.

Broccardo, Eleonora, Oliver Hart, and Luigi Zingales. "Exit versus voice." *Journal of Political Economy* 130, no. 12 (2022): 3101-3145.

Brown, Lawrence D., and Michael S. Rozeff. "The superiority of analyst forecasts as measures of expectations: Evidence from earnings." *The Journal of Finance* 33, no. 1 (1978): 1-16.

Buntaine, Mark T., Michael Greenstone, Guojun He, Mengdi Liu, Shaoda Wang, and Bing Zhang. "Does the squeaky wheel get more grease? The direct and indirect effects of citizen participation on environmental governance in China." *American Economic Review* 114, no. 3 (2024): 815-850.

Bushman, Robert M., Joseph D. Piotroski, and Abbie J. Smith. "Insider trading restrictions and analysts' incentives to follow firms." *The Journal of Finance* 60, no. 1 (2005): 35-66.

Cao, Sean Shun, Guojin Gong, Yongtae Kim, Hanzhong Shi, and Angie Wang. "Site visits and corporate investment efficiency." *Management Science* 71, no. 1 (2025): 635-658.

CDP (Carbon Disclosure Project) 2017. The Carbon Majors Database. Available at https://cdn.cdp.net/cdp-production/cms/reports/documents/000/002/327/original/Carbon-Majors-Report-2017.pdf?1501833772

CDP (Carbon Disclosure Project) 2024. Scope 3 Upstream: Big Challenges, Simple Remedies. Available at https://cdn.cdp.net/cdp-production/cms/reports/documents/000/007/834/original/Scope-3-Upstream-Report.pdf

Cheema-Fox, Alexander, George Serafeim, and Hui Stacie Wang. "Climate solutions investments." *Harvard Business School Accounting & Management Unit Working Paper* 22-054 (2022).

Chen, Deqiu, Yujing Ma, Xiumin Martin, and Roni Michaely. "On the fast track: Information acquisition costs and information production." *Journal of Financial Economics* 143, no. 2 (2022): 794-823.

Chen, Tao, Jarrad Harford, and Chen Lin. "Do analysts matter for governance? Evidence from natural experiments." *Journal of Financial Economics* 115, no. 2 (2015): 383-410.

Chen, Huimin, and Thomas D. Shohfi. "Do sell‐side analysts play a role in hedge fund activism? Evidence from textual analysis." *Contemporary Accounting Research* 39, no. 3 (2022): 1583-1614.

Cheng, Qiang, Fei Du, Brian Yutao Wang, and Xin Wang. "Do corporate site visits impact stock prices?." *Contemporary Accounting Research* 36, no. 1 (2019): 359-388.

Climate Change News 2020. https://www.climatechangenews.com/2020/02/27/net-zero-goal-greatest-commercial-opportunity-time-says-mark-carney/

Cohen, Lauren, Andrea Frazzini, and Christopher Malloy. "Sell-side school ties." *The Journal of Finance* 65, no. 4 (2010): 1409-1437.

Cohen, Lauren, Umit G. Gurun, and Quoc H. Nguyen. "The ESG-innovation disconnect: Evidence from green patenting." No. w27990. *National Bureau of Economic Research* (2024).

Cornaggia, Jess, and Kimberly Cornaggia. "ESG ratings management." *Available at SSRN 4520688* (2024).

Dai, Rui, Hao Liang, and Lilian Ng. "Socially responsible corporate customers." *Journal of Financial Economics* 142, no. 2 (2021): 598-626.

Dell, Melissa, Benjamin F. Jones, and Benjamin A. Olken. "Temperature and income: Reconciling new cross-sectional and panel estimates." *American Economic Review* 99, no. 2 (2009): 198-204.

Dell, Melissa, Benjamin F. Jones, and Benjamin A. Olken. "Temperature shocks and economic growth: Evidence from the last half century." *American Economic Journal: Macroeconomics* 4, no. 3 (2012): 66-95.

Derrien, François, and Ambrus Kecskés. "The real effects of financial shocks: Evidence from exogenous changes in analyst coverage." *The Journal of Finance* 68, no. 4 (2013): 1407-1440.

Derrien, François, Philipp Krueger, Augustin Landier, and Tianhao Yao. "ESG news, future cash flows, and firm value." *The Journal of Finance*, Forthcoming (2025).

Duan, Tinghua, Frank Weikai Li, and Roni Michaely. "Consumers' reaction to corporate ESG performance: Evidence from store visits." *Available at SSRN 4584361* (2023).

Duchin, Ran, Janet Gao, and Qiping Xu. "Sustainability or greenwashing: Evidence from the asset market for industrial pollution." *The Journal of Finance* 80, no. 2 (2025): 699-754

Eagly, Alice H., and Maureen Crowley. "Gender and helping behavior: A meta-analytic review of the social psychological literature." *Psychological Bulletin* 100, no. 3 (1986): 283.

Edmans, Alex. "The end of ESG." *Financial Management* 52, no. 1 (2023): 3-17.

Edmans, Alex, Tom Gosling, and Dirk Jenter. "Sustainable investing: Evidence from the field." *FEB-RN Research Paper* 18 (2024).

Eisenberg, Nancy, Tracy L. Spinrad, and Ariel Knafo-Noam. "Prosocial Development." *Handbook of Child Psychology and Developmental Science* (2015): 1-47.

Elton, Edwin J., and Martin J. Gruber. "Marginal Stockholder Tax Rates and the Clientele Effect." *The Review of Economics and Statistics* 52, no. 1 (1970): 68.

Fama, Eugene F., and James D. MacBeth. "Risk, return, and equilibrium: Empirical tests." *Journal of Political Economy* 81, no. 3 (1973): 607-636.

Fink, Larry. 2021. Larry Fink's 2021 letter to CEOs. Available at https://www.blackrock.com/corporate/investor-relations/2021-larry-fink-ceo-letter

Fink, Larry. 2022. Larry Fink's 2022 letter to CEOs. Available at https://www.blackrock.com/corporate/investor-relations/2022-larry-fink-ceo-letter

Flammer, Caroline, and Jiao Luo. "Corporate social responsibility as an employee governance tool: Evidence from a quasi-experiment." *Strategic Management Journal* 38, no. 2 (2017): 163-183.

Forbes 2022. The Climate Fight Presents Massive Opportunity for Businesses, Investors. Available at https://www.forbes.com/councils/forbesfinancecouncil/2022/02/11/the-climate-fight-presents-massive-opportunity-for-businesses-investors/

Freeman, R Edward. 2010. *Strategic management: A stakeholder approach*. Cambridge University Press.

Gantchev, Nickolay, Mariassunta Giannetti, and Rachel Li. "Does money talk? Divestitures and corporate environmental and social policies." *Review of Finance* 26, no. 6 (2022): 1469-1508.

Green, Daniel, and Benjamin N. Roth. "The allocation of socially responsible capital." *The Journal of Finance* 80, no. 2 (2025): 755-781.

Greenstone, Michael. "Estimating regulation-induced substitution: The effect of the Clean Air Act on water and ground pollution." *American Economic Review* 93, no. 2 (2003): 442-448.

Guo, Yingwen, Jingjing Li, and Bingxuan Lin. "Corporate site visit and tax avoidance: The effects of monitoring and tax knowledge dissemination." *Journal of Corporate Finance* 79 (2023): 102385.

Hart, Oliver, and Luigi Zingales. "Companies should maximize shareholder welfare not market value." *ECGI-Finance Working Paper* 521 (2017).

He, Guojun, Shaoda Wang, and Bing Zhang. "Watering down environmental regulation in China." *The Quarterly Journal of Economics* 135, no. 4 (2020): 2135-2185.

Heath, Davidson, Daniele Macciocchi, Roni Michaely, and Matthew C. Ringgenberg. "Does socially responsible investing change firm behavior?" *Review of Finance* 27, no. 6 (2023): 2057-2083.

Heese, Jonas, and Joseph Pacelli. "The monitoring role of social media." *Review of Accounting Studies* 29, no. 2 (2024): 1666-1706.

Henderson, Stuart. "The Information Systems Security Policy Statement." *EDPACS: The EDP Audit, Control, and Security Newsletter* 23, no. 12 (1996): 9-18.

Hoepner, Andreas G. F., Ioannis Oikonomou, Zacharias Sautner, Laura T. Starks, and Xiao Y. Zhou. "ESG shareholder engagement and downside risk." *Review of Finance* 28, no. 2 (2024): 483-510.

Hong, Harrison, and Jeffrey D. Kubik. "Analyzing the analysts: Career concerns and biased earnings forecasts." *The Journal of Finance* 58, no. 1 (2003): 313-351.

Hong, Harrison, Neng Wang, and Jinqiang Yang. "Mitigating disaster risks in the age of climate change." *Econometrica* 91, no. 5 (2023): 1763-1802.

Houston, Joel F., Chen Lin, Hongyu Shan, and Mo Shen. "How does ESG shape consumption?" *Available at SSRN 4243071* (2024).

Houston, Joel F., and Hongyu Shan. "Corporate ESG profiles and banking relationships." *The Review of Financial Studies* 35, no. 7 (2022): 3373-3417.

Hsiang, Solomon, Robert Kopp, Amir Jina, James Rising, Michael Delgado, Shashank Mohan, Daniel J. Rasmussen et al. "Estimating economic damage from climate change in the United States." *Science* 356, no. 6345 (2017): 1362-1369.

Hsu, Po-Hsuan, Kai Li, and Chi-Yang Tsou. "The pollution premium." *The Journal of Finance* 78, no. 3 (2023): 1343-1392.

Ilhan, Emirhan, Philipp Krueger, Zacharias Sautner, and Laura T. Starks. "Climate risk disclosure and institutional investors." *The Review of Financial Studies* 36, no. 7 (2023): 2617-2650.

Ilhan, Emirhan, Zacharias Sautner, and Grigory Vilkov. "Carbon tail risk." *The Review of Financial Studies* 34, no. 3 (2021): 1540-1571.

Jacobsen, Mark R., James M. Sallee, Joseph S. Shapiro, and Arthur A. Van Benthem. "Regulating untaxable externalities: Are vehicle air pollution standards effective and efficient?" *The Quarterly Journal of Economics* 138, no. 3 (2023): 1907-1976.

Jensen, Michael. "Value maximisation, stakeholder theory, and the corporate objective function." *European Financial Management* 7, no. 3 (2001): 297-317.

Jia, Chunxin, Yaping Wang, and Wei Xiong. "Market segmentation and differential reactions of local and foreign investors to analyst recommendations." *The Review of Financial Studies* 30, no. 9 (2017): 2972-3008.

Jiang, Xuanyu, and Qingbo Yuan. "Institutional investors' corporate site visits and corporate innovation." *Journal of Corporate Finance* 48 (2018): 148-168.

Jing, Chenxing, Kevin Keasey, Ivan Lim, and Bin Xu. "Analyst coverage and corporate environmental policies." *Journal of Financial and Quantitative Analysis* 59, no. 4 (2024): 1586-1619.

Krosnick, Jon A., and Stanley Presse. (2010). Question and questionnaire design. In P. V. Marsden, & J. D. Wright (Eds.), *Handbook of survey research* (2nd ed., pp. 264-313). Emerald.

Krueger, Philipp, Daniel Metzger, and Jiaxin Wu. "The sustainability wage gap." *Swedish House of Finance Research Paper* 20-14 (2023): 21-17.

Krueger, Philipp, Zacharias Sautner, and Laura T. Starks. "The importance of climate risks for institutional investors." *The Review of Financial Studies* 33, no. 3 (2020): 1067-1111.

Leippold, Markus, Qian Wang, and Wenyu Zhou. "Machine learning in the Chinese stock market." *Journal of Financial Economics* 145, no. 2 (2022): 64-82.

Li, Kai, Feng Mai, Gabriel Wong, Chelsea Yang, and Tengfei Zhang. "Female equity analysts and corporate environmental and social performance." *Available at SSRN 4154013* (2024).

Loh, Roger K., and René M. Stulz. "When are analyst recommendation changes influential?" *The Review of Financial Studies* 24, no. 2 (2011): 593-627.

Loh, Roger K., and René M. Stulz. "Is sell-side research more valuable in bad times?" *The Journal of Finance* 73, no. 3 (2018): 959-1013.

Lu, Shirley, Edward J. Riedl, Simon Xu, and George Serafeim. "Climate solutions, transition risk, and stock returns." *Available at SSRN 5018767* (2024).

Marianne, Bertrand. "New perspectives on gender." In *Handbook of labor economics*, vol. 4, pp. 1543-1590. Elsevier, 2011.

Mayr, Ulrich, and Alexandra M. Freund. "Do we become more prosocial as we age, and if so, why?" *Current Directions in Psychological Science* 29, no. 3 (2020): 248-254.

Michaely, Roni, Guillem Ordonez-Calafi, and Silvina Rubio. "Mutual funds' strategic voting on environmental and social issues." *Review of Finance* 28, no. 5 (2024): 1575-1610.

MSCI (Morgan Stanley Capital International) 2023a. More Public Companies Are Making Climate Commitments But Deadline To Limit Warming To 1.5°C Shrinks Again. Available at https://www.msci.com/documents/10199/ea23ea92-ad52-e5a0-9f09-8cc3a48b613b

MSCI (Morgan Stanley Capital International) 2023b. The Climate Transition Is Increasingly About Opportunity. Available at https://www.msci.com/documents/10199/ba227167-ec26-39fd-d0da-3943ed54c903#:~:text=The%20climate%20transition%20is%20increasingly%20beckoning%20for%20investment.,the%20cost%20of%20transition%20technologies.

Nederhof, Anton J. "Methods of coping with social desirability bias: A review." *European Journal of Social Psychology* 15, no. 3 (1985): 263-280.

Park, Min, Aaron Yoon, and Tzachi Zach. "Sell-side analysts' assessment of ESG risk." *Journal of Accounting and Economics* 79, no. 2-3 (2025): 101759.

Pástor, Ľuboš, Meenakshi Sinha, and Bhaskaran Swaminathan. "Estimating the intertemporal risk–return tradeoff using the implied cost of capital." *The Journal of Finance* 63, no. 6 (2008): 2859-2897.

Pástor, Ľuboš, Robert F. Stambaugh, and Lucian A. Taylor. "Sustainable investing in equilibrium." *Journal of Financial Economics* 142, no. 2 (2021): 550-571.

Pedersen, Lasse Heje, Shaun Fitzgibbons, and Lukasz Pomorski. "Responsible investing: The ESG-efficient frontier." *Journal of Financial Economics* 142, no. 2 (2021): 572-597.

Phillips, Derek L., and Kevin J. Clancy. "Some effects of 'social desirability' in survey studies." *American Journal of Sociology* 77, no. 5 (1972): 921-940.

Rajan, Raghuram, Pietro Ramella, and Luigi Zingales. *What purpose do corporations purport? Evidence from letters to shareholders*. No. w31054. National Bureau of Economic Research, 2023.

Sautner, Zacharias, Laurence Van Lent, Grigory Vilkov, and Ruishen Zhang. "Firm-level climate change exposure." *The Journal of Finance* 78, no. 3 (2023): 1449-1498.

Sautner, Zacharias, Laurence Van Lent, Grigory Vilkov, and Ruishen Zhang 2024. *Climate Value and Values Discovery*. Working paper.

Shive, Sophie A., and Margaret M. Forster. "Corporate governance and pollution externalities of public and private firms." *The Review of Financial Studies* 33, no. 3 (2020): 1296-1330.

Starks, Laura T. "Presidential address: Sustainable finance and ESG issues—value versus values." *The Journal of Finance* 78, no. 4 (2023): 1837-1872.

Starks, Laura T., Parth Venkat, and Qifei Zhu. "Corporate ESG profiles and investor horizons." *The Journal of Finance*, Forthcoming (2025).

Stroebel, Johannes, and Jeffrey Wurgler. "What do you think about climate finance?" *Journal of Financial Economics* 142, no. 2 (2021): 487-498.

Tirole, Jean. *The theory of corporate finance*. Princeton University Press, 2010.

Zhang, Shaojun. "Carbon returns across the globe." *The Journal of Finance* 80, no. 1 (2025): 615-645.

Zou, Eric Yongchen. “Unwatched pollution: The effect of intermittent monitoring on air quality.” *American Economic Review* 111, no. 7 (2021): 2101-2126.

Appendix. Variable Definitions and Data Sources

Variable	Definition 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 environment-related sentences among all sentences in an analyst report. Environment-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 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)?"
Educational 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 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 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 prices are 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 this item 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 Env Related Sentences	The number of environment-related sentences in an analyst report.
No. of Firms Covered	Based on survey 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 5-point scale: 2 = Strong Buy, 1 = Buy, 0 = Hold, −1 = Sell, and −2 = Strong Sell. Recommendation data are 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 provided a rating 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.

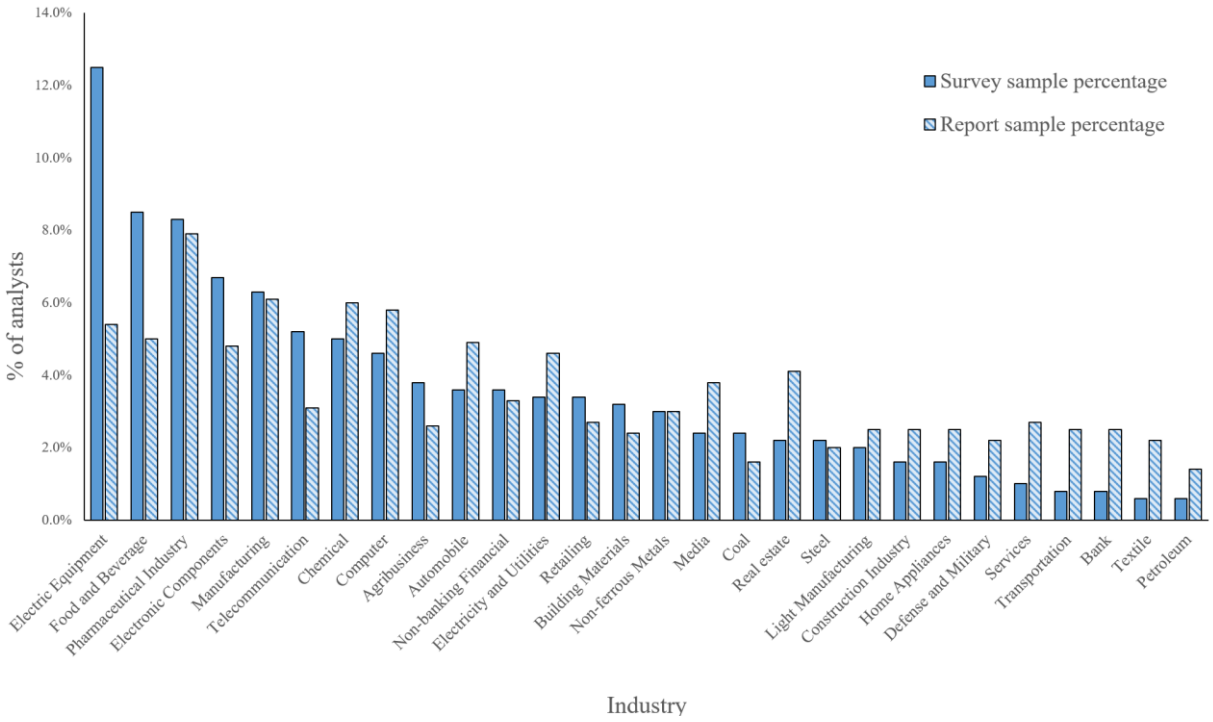
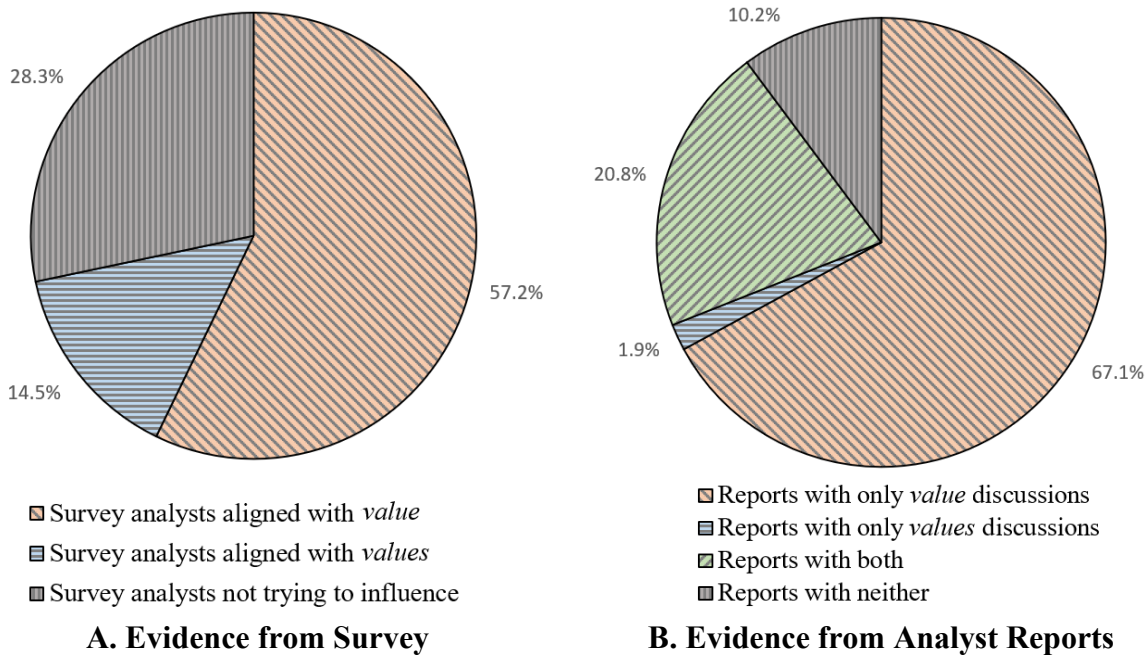


Figure 1. Industry Distribution of Survey Respondents and Analyst Reports
This figure presents the industry breakdown of the survey respondents and analyst reports in our sample.



A. Evidence from Survey **B. Evidence from Analyst Reports**

Figure 2. Analysts' *Values* versus *Values* Orientation

Figure 2A shows the distribution of responses to Survey Q4: "Do you try to influence your covered firms to invest in reducing their environmental impact?" Respondents selected from: (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 responses as "Not trying to influence" (a), "Aligned with *value*" (b), and "Aligned with *values*" (c). Figure 2B reports the percentage of environment-related analyst reports that contain only *value*-related discussions, only *values*-related discussions, both, or neither.

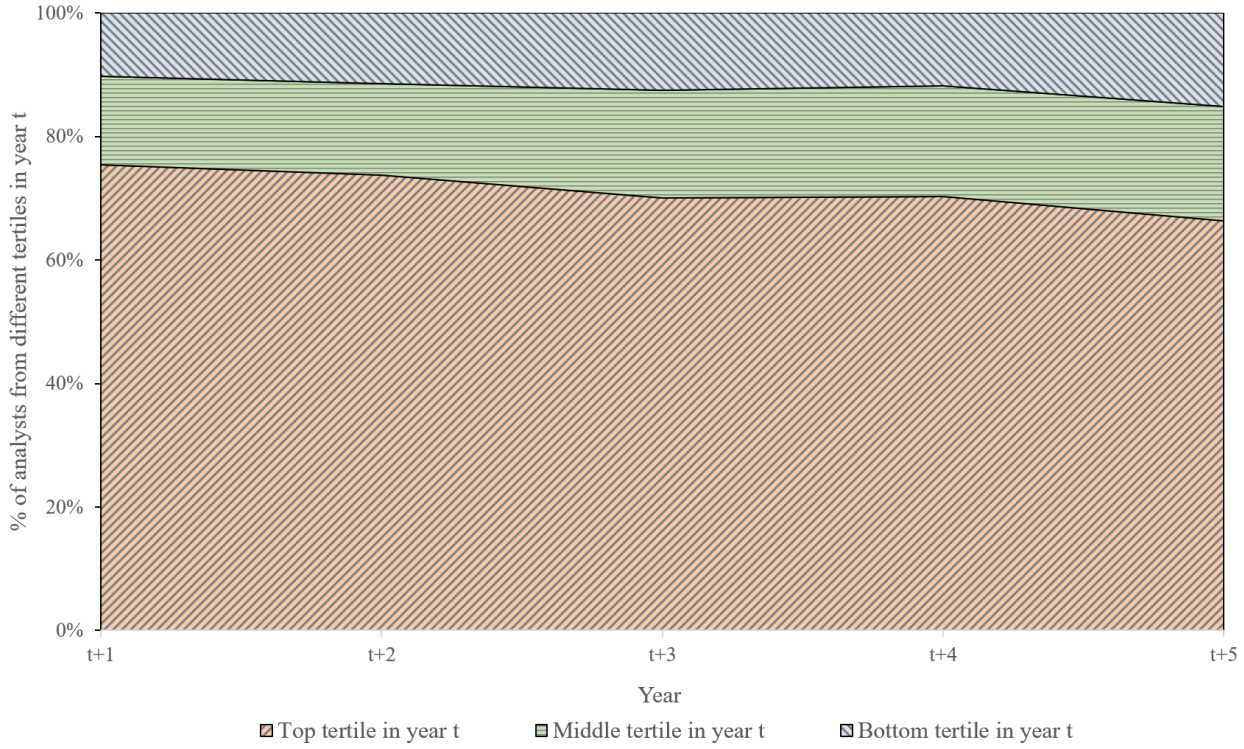
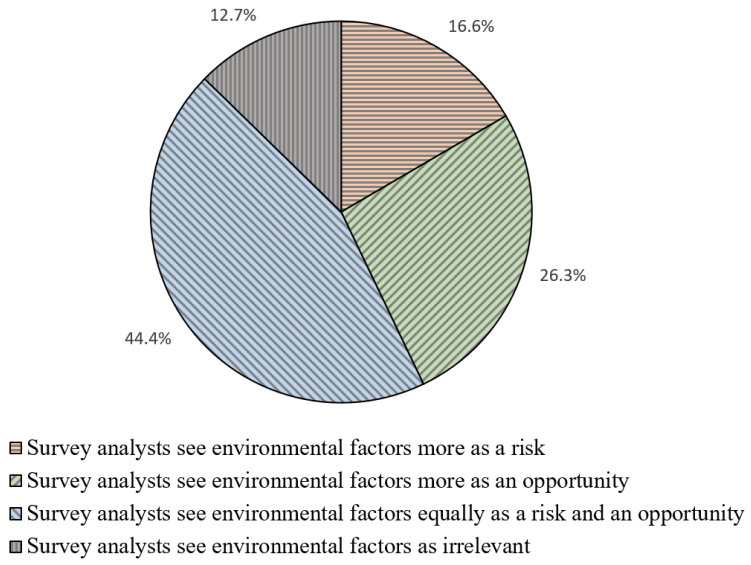
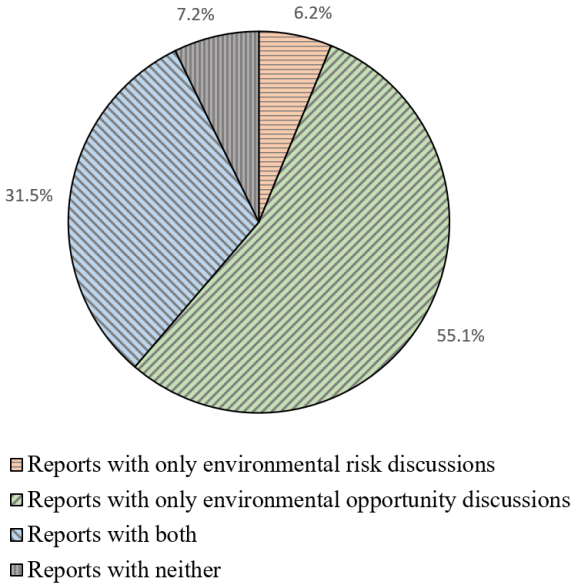


Figure 3. Likelihood of Analysts Remaining in or Moving into the Top *Values* Tertile Over Time

In year *t*, we sort all analysts covering the same industry into tertiles based on their *Values Ratio* (as defined in the Appendix). We then calculate the percentage of analysts who remain in or move into the top *values* tertile over year *t+1* to *t+5*. For instance, in year *t+1*, 75.5% of the analysts in the top tertile were also in the top tertile in year *t*, while 14.2%, and 10.3% came from the middle and bottom tertiles, respectively.



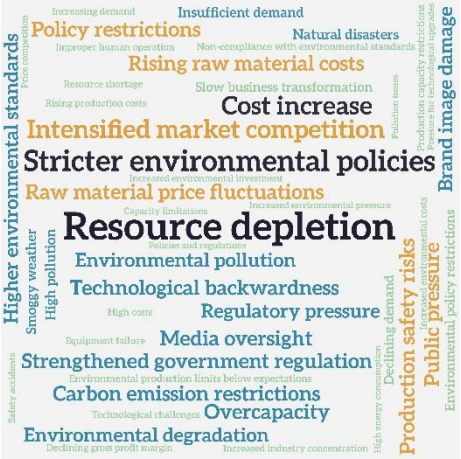
A. Evidence from Survey



B. Evidence from Analyst Reports

Figure 4. Analysts' Perceptions of Environmental Risks and Opportunities

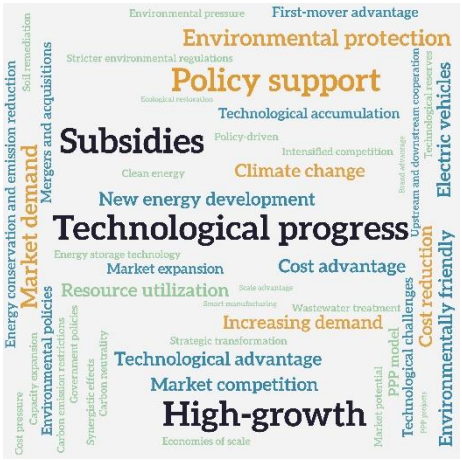
Figure 4A shows the distribution of responses to Survey Question 3: "For the firms you cover, do you view environmental and climate change factors more as a risk or an opportunity?" Respondents chose from: (a) "More as a risk," (b) "More as an opportunity," (c) "Equally as a risk and an opportunity," and (d) "Environmental and climate change is irrelevant to my covered firms (i.e., neither a risk nor an opportunity)." Figure 4B reports the percentage of environment-related analyst reports that contain only environmental risk discussions, only environmental opportunity discussions, both, or neither.



A. Risk Discussions in Brown Industries

B. Risk Discussions in Green Industries

C. Opportunity Discussions in Brown Industries



D. Opportunity Discussions in Green Industries

Figure 5. Themes in Analysts' Environmental Discussions

Figures 5A–5D present the top 50 themes in analysts' discussions of environmental risks and opportunities for brown and green industries. We first use prompt in the Llama model to extract keywords (i.e., themes) from analysts' environmental discussions in the reports. We then separately count the frequencies of these themes for: (i) risk discussions in brown industries, (ii) risk discussions in green industries, (iii) opportunity discussions in brown industries, and (iv) opportunity discussions in green industries, respectively. Lastly, we generate word clouds using the top 50 themes and their frequencies in each category. Font size reflects frequency, and the three most frequent themes are highlighted in black. Details on the methodology and prompt used to extract and classify these themes are provided in Internet Appendix 10.

Table 1. Analyst Characteristics: Survey and Report Samples

This table presents the demographics of the survey respondents and the analysts identified from the analyst reports, which include all firm-specific research reports issued between 2013 and 2022. Demographic and professional background information for the 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. Broker revenue and location information is obtained from CSMAR. The number of firms covered is estimated using 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 (RMB)		
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	City		
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's	13.1	6.6	11–20	28.1	26.0
Master's	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

Note: Our report data are only available between 2003 and 2022, so the maximum possible experience is capped at 19 years. As a result, estimated analyst ages are capped at 41, 43, and 46 years based on their level of education. Consequently, the percentages of analysts in the 41–50 and > 50 age groups are underestimated.

Table 2. Analysts' Environmental Coverage

Panel A presents the summary statistics for the sentences in the 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 means, standard deviations, and medians of the variables in the full sample of analyst reports. Columns (4)–(6) report the same statistics for the subsample of reports that contain at least one environmental discussion. Panel B summarizes the 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 means and standard deviations 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 = 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' *Value* versus *Values* Orientation

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 selected (b), "Aligned with *values*" if they chose (c), and "Not trying to influence" if they opted for (a). Panel B reports the average numbers of *value*-related and *values*-related sentences in the 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 of Analysts' *Value* versus *Values* Orientation

This table presents the regression results regarding the determinants of analysts' orientation toward *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 if a respondent chose "*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 our textual analysis of the 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 the analyst reports, aggregated at the analyst-year level. To reduce measurement error, we restrict the sample to analyst-years with at least 10 reports. *% of Env Related Sentences* is the proportion of environment-related sentences in the 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. The *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*	
VARIABLE	(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 of 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 sentences related to environmental risks and opportunities in the analyst reports. These sentences are identified through a fine-tuned Llama model. Column (1) presents the results for all reports with environmental discussions. Column (2) presents the results for all reports with environmental risk discussions but not opportunity discussions. Column (3) presents the results for all reports with environmental opportunity discussions but not risk discussions. Column (4) presents the results for all reports with both risk and opportunity discussions. Column (5) presents the results for all 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, means, and standard deviations 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%

Panel 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. Financial Impacts of Environmental Factors: Survey Evidence

This table presents the regression estimates of the relationship between the surveyed analysts' perceptions of environmental risks and opportunities and their evaluations of the financial impacts of environmental factors. The dependent variables, *Short-Term Financial Impacts* and *Long-Term Financial Impacts*, are based on the responses to Q6: "*For the firms you cover, please evaluate how environmental and climate change factors affect their financial performance*." Respondents rated this item separately for the short term and long term on a scale ranging from −3 (very negative) to +3 (very positive). 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* takes a value of one if a respondent selected *"More as a risk*," and zero otherwise. *More as an opportunity* takes a value of one if a respondent selected "*More as an opportunity*," and zero otherwise. The *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. Environmental Factors in Analysts' Forecasts and Recommendations

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 are obtained from the CSMAR database and matched to analyst reports using the broker name, analyst name, focal firm, and issuance date. $FEPS_{(t+k)}$ refers to the 1-, 2-, and 3-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. The *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.

VARIABLE	*FEPS(t+1)* (1)	*FEPS(t+2)* (2)	*FEPS(t+3)* (3)	*Rec* (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. Actual Earnings and Analysts' Aggregate Environmental Discussions

This table presents the Fama-MacBeth (1973) regressions of the relationship between changes in firms' actual EPS and analysts' aggregate discussions of environmental risks and opportunities. Δ*EPS (t+k)* is calculated as the firm's actual EPS in year *t+k* minus its EPS in year *t*, scaled by the firm's closing price in year *t* and multiplied by 100 (*k*=1,2,3). *Opportunity-Risk Ratio* is the difference between the average percentages of environmental opportunity-related sentences and risk-related sentences in all analyst reports issued for the firm in the year, scaled by the sum of the two. Δ *Opportunity-Risk Ratio* (t) is the change in *Opportunity-Risk Ratio* from year *t*-1 to year *t*. The *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.

	Δ*EPS (t+1)*	Δ*EPS (t+2)*	Δ*EPS(t+3)*
VARIABLES	(1)	(2)	(3)
Δ Opportunity-Risk Ratio (t)	0.169**	0.261**	−0.070
	(2.580)	(3.388)	(−0.393)
ΔEPS (t)	−0.097*	−0.125*	−0.167***
	(−1.970)	(−2.141)	(−3.869)
EPS (t)	−0.259***	−0.335***	−0.346***
	(−7.823)	(−6.095)	(−7.230)
Δ Size (t)	0.003	−1.109**	−2.340***
	(0.010)	(−3.090)	(−5.502)
Δ Leverage (t)	2.025	2.091***	2.067*
	(1.742)	(4.160)	(2.194)
Δ BM (t)	−3.416**	−1.908	−0.789
	(−2.980)	(−1.661)	(−0.720)
Constant	0.570*	1.227***	1.553***
	(3.442)	(10.299)	(11.834)
R-squared	0.17	0.17	0.15

Table 9. Importance of Environmental Risk and Opportunity Factors

This table presents the responses to survey Q7: "*Please evaluate how the following factors affect the firms you cover*." The respondents rated each factor on a scale from −3 (very negatively) to +3 (very positively). Panel A reports the results for the 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) we 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: $Adjusted\ mean_n = \frac{Weighted\ mean_n}{\sum_{k=1}^{8} Weighted\ mean_k\ /8}$ (*n=1,2, … ,8).* Panel B reports the results for the 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 same 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)	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)	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 10. Drivers of Corporate Sustainability Policies

This table reports the responses to survey Q8: "*Please evaluate the extent to which the following factors cause the firms you follow to reduce their environmental impact.*" The 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 means and standard deviations 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 11. Analysts' Influence on Firms' Environmental Policies

This table reports the 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 means and standard deviations 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 $p = 0.10$

Internet Appendix 1. Survey Instrument in English and Chinese

- We are a team of researchers from the University of Hong Kong, the Hong Kong Polytechnic University, and the University of International Business and Economics. This survey is part of our research project to understand whether and how sell-side analysts incorporate environmental and climate change information into day-to-day activities.
- This survey is anonymous. We will **not** share your personal information or individual responses with any third party or your brokerage firm.
- Please answer ***all questions***. The survey will take about 10 minutes.
- Please take this survey seriously. As a token of appreciation, we would like to invite you to *a lucky draw after the survey*. 50% of respondents will be randomly selected by the system to win RMB 200 each (Qualified analysts only).

GENERAL INFORMATION

G1: How long have you been working as a sell-side analyst?
☐ < 2 year ☐ 2 – 4 years ☐ 5- 8 years ☐ > 8 years

G2: Your Gender is _____? ☐ Male ☐ Female

G3: Your Age is _____? ☐ < 30 ☐ 30 - 40 ☐ 41 - 50 ☐ > 50

G4: What diploma(s) do you have? (Please check all that apply)
☐ Bachelor ☐ Master ☐ Ph.D. ☐ Professional certificate (e.g., CFA and CPA)
☐ Other, please specify:_____

G5: What is your brokerage firm's level of annual revenue (in RMB)?
☐ < 1 billion ☐ 1 - 10 billion ☐ 10 - 20 billion ☐ > 20 billion

G6: Which city is your job based in?
☐ Beijing ☐ Shanghai ☐ Shenzhen ☐ Guangzhou ☐ Other, please specify:_____

G7: Which of the following best describes the nature of your research as a sell-side analyst?
☐ Firm/Industry research ☐ Macro research ☐ Strategy research ☐ Other, please specify:_____

G8: How many firms do you cover currently?
☐ < 5 firms ☐ 5 -10 firms ☐ 11 - 20 firms ☐ > 20 firms ☐ N.A.

G9: Which industry does your research mainly focus on? _____

G10. Could you list a few firms that you cover? (If applicable) _____

SURVEY QUESTIONNAIRE

Q1: Personally, are you concerned about pollution and climate change?
□Not at all concerned □Slightly concerned □Somewhat concerned □Moderately concerned □Extremely concerned

Q2. On a scale of 1 to 5, how do you rate your level of attention to *environmental and climate change*

***information*? (1 = lowest; 5 = highest)**
In absolute terms: _____
Relative to my industry peers: _____

Q3. For <u>the firms you cover</u>, do you see *environmental and climate change factors* more as a risk or an opportunity?
☐ More as a risk.
☐ More as an opportunity.
☐ Equally as a risk and an opportunity.
☐ Climate change is irrelevant to my covered firms (i.e., neither a risk nor an opportunity).

Q4: Do you try to influence your covered firms to invest in reducing their environmental impact?
☐ I don't try to influence.
☐ ***<u>Only</u>*** when it can increase firm value.
☐ Yes, I usually do (even when it does not increase firm value).

Q5: How do you trust the following data sources about firms' environmental performance? (1=Not at all; 5= Trust completely)

	-3	-2	-1	0	1	2	3
ESG ratings by domestic institutions (e.g., Wind ESG ratings)	□	□	□	□	□	□	□
ESG ratings by foreign institutions (e.g., MSCI ESG ratings)	□	□	□	□	□	□	□
Environmental data released by government agencies (e.g., Environmental Survey and Reporting database of China)	□	□	□	□	□	□	□
Corporate disclosure on environmental information (e.g., firms' ESG and annual reports)	□	□	□	□	□	□	□

Q6: For <u>the firms you cover</u>, please evaluate how *environmental and climate change factors* affect their financial performance.

	-3 Very negatively	-2	-1	0 Neutral/ No impact	1	2	3 Very positively
In the short term:	□	□	□	□	□	□	□
In the long term:	□	□	□	□	□	□	□

Q7: Please evaluate how the following factors affect *<u>the firms you cover.</u>*

-3 Very negatively	-2	-1	0 Neutral/ No impact	1	2	3 Very positively
Physical climate and environmental change (e.g., extreme weather, floods, air pollution)						
□	□	□	□	□	□	□
Environmental regulations or subsidies (e.g., production limits, "carbon peaking and neutrality" target, subsidies for PV power and new energy products)						
□	□	□	□	□	□	□
Transitions to green technologies and green products (e.g., transition from fossil fuels to clean energy)						
□	□	□	□	□	□	□
Demand for products to cope with pollution and climate change (e.g., demand for air conditioners, weather insurance products, etc.)						
□	□	□	□	□	□	□
Changes in investors' and creditors' preferences (e.g., emergence of green bonds and ESG funds)						
□	□	□	□	□	□	□
Changes in consumers' preferences (e.g., consumers' preference for green products or loyalty to green brands)						
□	□	□	□	□	□	□
Changes in customers' and suppliers' preferences (e.g., supply chain decarbonization initiatives, scope 3 disclosure requirements)						
□	□	□	□	□	□	□

Changes in employees' preferences (e.g., some talents prefer to work for green firms, or in less polluted areas)						
□	□	□	□	□	□	□

Q8. Please evaluate the extent to which the following factors cause <u>the firms you follow</u> to *reduce their environmental impact*?
(1= Not at all; 5=Highest degree)

	1	2	3	4	5
□ Environment- and climate-related regulations and policies	□	□	□	□	□
□ Firms' intrinsic preference for sustainability (regardless of financial consequences)	□	□	□	□	□
□ Employees' preference for sustainability	□	□	□	□	□
□ Investors' and creditors' demand for sustainability	□	□	□	□	□
□ Consumers' demand for sustainability	□	□	□	□	□
□ Demand for sustainability from up and down the supply chain	□	□	□	□	□
□ Public and media pressure	□	□	□	□	□
□ Efforts to rebrand the firm as a green(er) firm	□	□	□	□	□

Q9: Please evaluate whether and to what extent the following investments can *increase the value of the firms you follow*.
(1= Not at all; 5=Highest degree)

	1	2	3	4	5
□ Investments in environmental protection projects (e.g., carbon reduction projects, development of new energy products, etc.)	□	□	□	□	□
□ Investments to provide better disclosure of environmental information (e.g., detailed disclosure of carbon and toxic emissions)	□	□	□	□	□
□ Investments in rebranding the firm as greener (e.g., hire external consultants to write a sustainability report)	□	□	□	□	□
□ Investments to achieve better ESG ratings	□	□	□	□	□

Q10: Please evaluate whether and to what extent the following factors motivate you to collect and provide environmental and climate information.
(1= Not at all; 5=Highest degree)

	1	2	3	4	5
□ Your personal concern about pollution and climate change.	□	□	□	□	□
□ Environmental information is useful in valuation analysis.	□	□	□	□	□
□ Environmental information is demanded by investors.	□	□	□	□	□
□ Recent occurrence of environmental incidents.	□	□	□	□	□
□ Encouragement or pressure from your brokerage house.	□	□	□	□	□

Q11: Please evaluate whether and to what extent your *coverage of environmental information* can help you…
(1= Not at all; 5=Highest degree)

	1	2	3	4	5
□ make more accurate financial forecasts.	□	□	□	□	□
□ make better recommendations.	□	□	□	□	□
□ provide investors with more information they expect to receive.	□	□	□	□	□
□ obtain a reputation and advance the career.	□	□	□	□	□

Q12. Please evaluate whether and to what extent you can influence your covered firms' environmental policies through the following ways.
(1= Not at all; 5=Highest degree)

	1	2	3	4	5
□ ***<u>Private</u>*** communication with corporate managers	□	□	□	□	□
□ ***<u>Public</u>*** communication channels, such as conference calls, site visits,	□	□	□	□	□
□ Discussing environmental issues in research reports	□	□	□	□	□
□ Raising concerns about environmental issues with influential investors	□	□	□	□	□

□ Adjusting recommendations and financial forecasts to reflect the impact of the firm's environmental performance	□	□	□	□	□

End of the questionnaire. Thank you for your support!

- 我们是来自香港大学、香港理工大学和对外经济贸易大学的研究团队。本问卷是我们研究项目的一部分，旨在了解卖方分析师是否以及如何将环境和气候变化信息纳入日常研究中。
- 本问卷采用匿名方式，我们***不会***向任何第三方或您的证券公司披露您的个人信息或个人回答。
- 请回答***所有问题***。本问卷预计需要 10 分钟。
- 请您认真填写此问卷。为表示感谢，我们诚邀您在*完成问卷后参加抽奖*。系统将随机选取 50% 的参与者，每人赢取人民币 200 元（仅限符合资格的分析师）。

基本信息

G1: 您从事卖方分析师的工作多长时间了？
□ 小于 2 年　□ 2 - 4 年　□ 5 - 8 年　□ 大于 8 年

G2: 您的性别是_____？ □ 男性 □ 女性

G3: 您的年龄是_____？ □ 小于 30 岁 □ 30 - 40 岁 □ 41 - 50 岁 □ 大于 50 岁

G4: 您拥有哪些学位或证书？ (请选择所有适用项目)
□ 本科 □ 硕士 □ 博士 □ 专业证书（例如，CFA、CPA）
□ 其他，请具体说明：_____

G5: 您所在的证券公司的年营业收入位于以下哪个区间？
□ 小于 10 亿元 □ 10 - 100 亿元 □ 100 - 200 亿元 □ 大于 200 亿元

G6: 您在哪个城市工作？
□ 北京 □ 上海 □ 深圳 □ 广州 □ 其他，请具体说明：_____

G7: 以下选项中哪个最能描述您作为卖方分析师的研究性质？
□ 公司/行业研究 □ 宏观研究 □ 策略研究 □ 其他，请具体说明：_____

G8: 您目前覆盖多少家公司？
□ 少于 5 家公司 □ 5 - 10 家公司 □ 11 - 20 家公司 □ 多于 20 家公司 □ 不适用

G9: 您的研究主要集中在哪个行业？ _____

G10: 您能列举一些覆盖的公司吗？（如适用） _____

问卷正文

Q1: 从个人角度而言，您是否担忧环境污染和气候变化？
□完全不担忧 □轻微担忧 □有些担忧 □中度担忧 □极度担忧

Q2. 请您用 1 到 5 的等级评估一下您对*环境和气候变化信息*的关注程度。（1 表示最低，5 表示最高）
从绝对程度来说：_____
相对于同行来说：_____

Q3: 针对<u>您覆盖的公司</u>而言，您将*环境和气候变化因素*更多的视为风险还是机遇？

☐ 更多视为风险。
☐ 更多视为机遇。
☐ 风险与机遇相当。
☐ 环境和气候变化与我覆盖的公司无关（既不是风险也不是机遇）。

Q4: 您是否会尝试影响您覆盖的公司，使其增加在保护环境方面的投资？

☐ 我不会尝试影响。
☐ *<u>只有</u>*在这些投资能增加公司价值时会。
☐ 是的，我通常会这样做（即使不增加公司价值）。

Q5: 您是否信任以下关于企业环境表现的数据来源？
(-3=完全不信任；0=中立； 3= 完全信任)

	-3	-2	-1	0	1	2	3
国内机构的 ESG 评级 (例如，万得 ESG 评级)	□	□	□	□	□	□	□
国外机构的 ESG 评级 (例如，MSCI 的 ESG 评级)	□	□	□	□	□	□	□
政府机构公布的环境数据 (例如，中国环境调查和报告数据库)	□	□	□	□	□	□	□
企业关于环境信息的披露（例如，企业 ESG 报告和年报）	□	□	□	□	□	□	□

Q6: 针对<u>您覆盖的公司</u>，请评估*环境和气候变化因素*如何影响这些公司的财务绩效？

	-3 非常负面	-2	-1	0 中性/无影响	1	2	3 非常正面
短期财务绩效	□	□	□	□	□	□	□
长期财务绩效	□	□	□	□	□	□	□

Q7:请评估以下因素如何影响*<u>您覆盖的公司</u>*。

-3 非常负面	-2	-1	0 中性/无影响	1	2	3 非常正面
污染和气候变化（例如，极端天气、洪水、空气污染等）						
□	□	□	□	□	□	□
环境政策或补贴（例如，环保限产、双碳目标、对光伏和新能源产品的补贴等）						
□	□	□	□	□	□	□
向绿色技术和绿色产品转型的趋势（例如，从化石能源向清洁能源的转变）						
□	□	□	□	□	□	□
应对污染和气候变化的产品需求（例如，对空调、天气保险产品的需求等）						
□	□	□	□	□	□	□
投资者和债权人偏好的变化（例如，绿色债券、ESG 基金的出现）						
□	□	□	□	□	□	□
消费者偏好的变化（例如，消费者对绿色产品的偏好或对绿色品牌的忠诚度）						
□	□	□	□	□	□	□
客户和供应商偏好的变化（例如，供应链脱碳倡议、温室气体范围三排放要求)						
□	□	□	□	□	□	□
员工偏好的变化（例如，一些人才更愿意为绿色企业工作、或在污染较少的地区工作）						
□	□	□	□	□	□	□

Q8: 请评估以下因素是否、以及在何种程度上导致您跟踪的公司*减少其对环境的负面影响*。
（1=无影响；5=最高程度）

	1	2	3	4	5
□ 环境和气候相关的政策和法规	□	□	□	□	□

□ 公司对可持续性的偏好（无论财务后果如何）	□	□	□	□	□
□ 员工对可持续性的偏好	□	□	□	□	□
□ 投资者和债权人对可持续性的要求	□	□	□	□	□
□ 消费者对可持续性的要求	□	□	□	□	□
□ 供应链上下游对可持续性的要求	□	□	□	□	□
□ 公众和媒体的压力	□	□	□	□	□
□ 重构公司（更）绿色环保形象的意愿	□	□	□	□	□

Q9: 请评估以下投资是否、以及在何种程度上能*提升您覆盖的公司的价值*。
（1=无提升；5=最高程度）

	1	2	3	4	5
□ 投资于环境保护工程（例如，碳减排项目、开发新能源产品等）	□	□	□	□	□
□ 投资于提供更好的环境信息披露 （例如，对碳排放和有毒气体排放的详细披露）	□	□	□	□	□
□ 投资于建设更环保的公司形象 （例如，聘请外部顾问编写可持续发展报告）	□	□	□	□	□
□ 投资于获得更高的 ESG 评级	□	□	□	□	□

Q10: 请评估以下因素是否、以及在何种程度上驱动您*收集和提供环境及气候信息*。
（1=无影响；5=最高程度）

	1	2	3	4	5
□ 您个人对污染和气候变化议题的关切。	□	□	□	□	□
□ 环境信息对价值分析很有用。	□	□	□	□	□
□ 投资者对环境信息的需求。	□	□	□	□	□
□ 最近发生的环境事件。	□	□	□	□	□
□ 您所在的证券公司的鼓励或要求。	□	□	□	□	□

Q11: 请评估*关注环境信息*是否、以及在何种程度上能够帮助您：
（1=无影响；5=最高程度）

	1	2	3	4	5
□ 提高财务预测的准确性。	□	□	□	□	□
□ 做出更好的推荐。	□	□	□	□	□
□ 向投资者提供更多他们期望获得的信息。	□	□	□	□	□
□ 获得更好的声誉并有助于职业发展。	□	□	□	□	□

Q12. 请评估您是否、以及在何种程度上能通过以下方式影响您覆盖的公司的环境政策。
（1=无影响；5=最高程度）

	1	2	3	4	5
□ 与企业管理团队***私下***沟通	□	□	□	□	□
□ 通过***公开***渠道进行沟通，如电话会议、实地访问等	□	□	□	□	□
□ 在研究报告中讨论环境问题	□	□	□	□	□
□ 向有影响力的投资者表达对该公司环境问题的担忧	□	□	□	□	□
□ 调整推荐信息和财务预测，以反映公司环境表现的影响	□	□	□	□	□

问卷结束。感谢您的支持！

Internet Appendix 2. Survey Delivery and Response Rate

We delivered the survey through two channels. First, we contacted 20 brokerage houses and asked them to distribute the survey internally among their analysts. Second, we reached out to the Securities Association of China (SAC), a self-regulatory organization in the securities industry, and asked the SAC to help distribute the survey among its members. Each analyst received a barcode and accessed the survey through *Wenjuanxing*, a widely used online platform in China (e.g., Chen, Ma, Martin, and Michaely 2022). This process ensures anonymity and voluntary participation. To incentivize participation, we offered lucky draws. In the first round, we collected a total of 457 initial responses. These responses indicate a non-response bias, with most analysts coming from environmentally friendly industries and fewer than ten from those covering petroleum, coal, and steel industries[5]. To address this, we asked the brokerage houses to send reminders specifically to analysts following high pollution industries. We obtained another 98 responses follow this practice, resulting in 555 responses in total.

As we distributed the survey through brokerage houses and the SAC, we could not track the exact number of recipients. Assuming the survey request reached all active equity analysts in China (approximately 4,500 at the time), our response rate exceeded 12.3% (555/4,500). This rate compares favorably to other surveys, such as 7.5% in the researcher and practitioner survey by Stroebel and Wurgler (2021), and 9.89% in the board secretary survey by Lu, Shin and Zhang (2023). We believe three factors contributed to our high response rate. First, we provided lucky draws with a 50% chance of winning 200 CNY (around 30 USD) upon finishing the survey. For comparison, Krueger et al. (2020) provided small gifts in a survey of investment professionals and received a 40% response rate. Second, our survey was distributed through brokerage houses and the SAO, rather than cold emails. Sponsorship by an organization or person within the survey audience's social network can help increase the response rate (Cycyota and Harrison 2006). Lastly, the reminders helped bring us additional responses. Survey experts also suggest that follow-ups help increase response rate (e.g., Fox, Crask and Kim 1998; Sheehan 2001).

[5] This non-response bias by groups with potentially low ESG awareness is also documented by other ESG-related survey studies (e.g., Krueger et al. 2020).

Internet Appendix 3. Examples of Environmental-Related and Non-Environment-Related Discussions in Analyst Reports

Category	Definition	Examples from analyst reports
Environment-related discussions	*Sentences that explicitly mention topics, activities, policies, or impacts related to the environment, climate change, sustainable development, carbon emissions, energy transition, natural resources, biodiversity, or other environment-related issues.*	1. "Continued low temperatures and economic recovery will sustain strong coal demand through year-end." 2. "Stricter environmental regulations and increased downstream concentration are driving consolidation in the concrete admixture industry." 3. "The acquisition of Zhiyun Shares is strategically significant, enhancing the company's position in the new energy vehicle, creating a new profit driver and overall competitiveness. "
Non-environment-related discussions	*Sentences where the content is completely unrelated to the environment and climate-related topics previously defined. These sentences typically discuss general business or economic matters (e.g., economics, finance, markets, industries, company operations, personnel, strategy) and does not contain any explicit or implied connection to environmental or climate issues.*	1. "In 2007, the company's investment income reached RMB 80.95 million, a year-on-year increase of 68%." 2. "The company is streamlining its store network by closing unprofitable locations to improve the overall store quality." 3. "We believe the company's strategic shift away from real estate and towards high-tech industries aligns with China's economic transition and offers significant profit potential. "

Internet Appendix 4. Methodology and Summary Statistics of AI-related and Cybersecurity-Related Discussions in Analyst Reports.

To build keyword dictionaries for Artificial Intelligence (AI) and cybersecurity risks, we use a similar approach to Li, Mai, Shen, and Yan (2021). Specifically, we begin with a set of seed words for each topic and expand them using the Word2Vec model. For AI, the seed words include Artificial Intelligence, AI, GPU, computing power, neutral network, TensorFlow, auto-drive, among others. The seed words for cybersecurity are drawn from Florackis, Louca, Michaely, and Weber (2023), and include terms such as cybersecurity, hacking, social engineering, denial of service, phishing, cyberattacks, etc. Using this process, we generate a dictionary of 122 AI-related terms and 185 cybersecurity-related terms, as listed in Panel A (after translation into English). We then apply a standard bag-of-words approach to identify discussions that contain AI- and cybersecurity-related keywords in analyst reports. The summary statistics are reported in Panel B.

Panel A. Keyword Dictionaries

AI related keywords (122)	Cybersecurity related keywords (185)
image recognition, supercomputer, VR, computing power, super brain, parallel computing, natural language, IBM, TensorFlow, modality, knowledge, vision, SenseTime, software application, human brain, Google Assistant, intelligent algorithm, intelligence, IT, SLAM, high computing power, interaction technology, expert system, pattern recognition, Google, AI, cutting-edge technology, CRISPR, field of computer science, industry, SDN, autonomous driving, AR, Spark, smart home, humanoid, human-computer dialogue, simulation technology, internet, TurboX, enterprise application, Siri, internet of everything, human-machine, Turing, intelligence analysis, Nvidia, voiceprint recognition, vocabulary, industry, DuerOS, face recognition, computing technology, voiceprint, new generation, Cortana, perception, future-oriented, portrait, attendee, NLP, DT, communications cloud, AIoT, Yitu, AIoT, modeling, neural network, mode of interaction, iot information, informatics, DeepMind, heterogeneous computing, AlphaGo, coprocessor, cloud, Xiaoice, Megvii, go, machine, algorithm, IBM Watson, cerebellum, human-computer interaction, cloud-side, CSDN, cloud, DAMO Academy, Caffe, AI Cloud, inference, cloud-	privacy, system security, IP address, WAF, trojan horse, anti-submarine warfare, security risk, security vulnerability, eavesdropping, terrorist, conflict, security flaw, detection, assault, public opinion pressure, destroy, situation, cyber warfare, vulnerability, provocation, firewall, attacker, proactive defense, data protection, intrusion, security hole, crime, interception, serious threat, assailant, cyberspace, weakness, threat, CNCERT, downtime, attack and defense, major loss, cybersecurity, aggressor, backdoor, classified, attack, flaw, endanger, rear door, system failure, DDoS, paralysis, severe consequences, hijacking, impact, rule of law, spy, communication security, outage, ICT, combat, penetration, cyber attack, network firewall, containment, wiretapping, incident, harm, stolen, system vulnerability, trojan, malware, data security, domestic software, steal, web, strike, password, fragility, adversary, internet surveillance, information technology application innovation, fatal, casualties, virtual space, jeopardy, intercept, FireEye, session hijacking, internet security, malicious, network attack, personal privacy, individual privacy, deterrence, malicious program, capture, terrorism, enemy, interference, NSFOCUS, military operation, hacker, active defense, access control, authorization, fraud, extortion, encryption technology, cyberwar, espionage, harassment, personnel casualties, environmental pollution issue, counter, security policy, cracker, kaspersky, theft, harmful information, malicious software, business secret, network warfare, information security, hidden

edge, brain-like, artificial neural network, learning, brain science, AIUI, Horizon Robotics, real world, brain, Watson, computing power, Fintech, computer, semantic, speech, intelligence, voice input, Cambricon, AI, Apollo, Duer, next generation, frontier of science and technology, machine translation, information retrieval, human, virtual reality, GPU, motion sensing, BYOD, network application	danger, criminal act, espionage agent, cripple, endpoint, annoyance, confidentiality, black hat, back door, battlefield, strike down, cyber protection, web attack, monitoring, adware, DNS, hacking attempt, malicious code, huge loss, incursion, severe damage, wake-up call, topsec, ransom, leak, hacker attack, harmfulness, surveillance, hack, system flaw, negative impact, antivirus, national security agency, crisis of confidence, log, worm, online attack, terminal, crackdown, highly susceptible, exploit, wurm, confrontation, challenge, cyberspace administration, intercepting, pilferage, web application, breach, overhearing, URL, disclosure, positive defense, violence, spam, offensive, air defense, snooping, purloin, scam, e-government, insurgent, reconnaissance, protection system, airstrike

Panel B. Summary Statistics:

	All reports	Reports with AI discussions	Reports with Cybersecurity Discussions
No. and % of reports	273,664 (100%)	44,835 (16.4%)	10,633 (3.9%)
No. and % of unique firm-years	17,524 (100%)	8747 (49.9%)	5020 (28.6%)
No. and % of unique firms	3,931(100%)	2946 (74.9%)	2261 (57.5%)

Internet Appendix 5. Examples of *Value, Values,* Both, and Neither-Related Environmental Discussions in Analyst Reports

Category	Examples from analyst reports
Value-related environmental discussions	1. "The company operates in the animal health sector, engaging in biological products and chemical pharmaceuticals, which are subject to stringent environmental regulations. Failure to meet these environmental standards could negatively impact on the company's performance and product sales." 2. "The successful issuance of a RMB 1 billion-green bond (first tranche), which expanded the company's funding sources, largely offset any significant changes in non-current liabilities during the reporting period." 3. "Leveraging its low-carbon and environmentally friendly operations, the company has established stable sales and partnership channels, including long-term relationships with high-profile clients like Boeing and Airbus."
Values-related environmental discussions	1. "The papermaking process generates significant amounts of black liquor, a byproduct that, if discharged untreated, severely pollutes water resources." 2. "Coal gas from ceramic kilns poses significant risks to crops, air quality, and human health." 3. "Without effective water pollution control, China's future water resources may be insufficient to support sustainable economic development."
Environmental discussions related to **both** *value* and *values*	1. "Rising environmental access barriers are creating a dual impact: while robustly driving energy conservation and ecological protection, they are also causing market share to concentrate around industry leaders with superior capital, technology, and scale." 2. "Advancements in ecological restoration technology provide both ecological and economic benefits, improving the environment while enhancing the financial performance of related sectors." 3. "Carbon dioxide emissions from motor vehicles, a primary contributor to greenhouse gases, will in turn drive growth in the vehicle inspection product market."
Environmental discussions related to **neither** *value* nor *values*	1. "A total of 15.97 million KVAH of lead-acid battery capacity was phased out, comprising 7.80 million KVAH in plate production capacity and 8.17 million KVAH in assembly capacity." 2. "Goldwind Science & Technology, founded in 1998 as Xin Feng Ke Gong Mao and converted into a joint-stock company under its current name in 2001, is the leading company in the wind turbine industry."

Internet Appendix 6. Examples of Opportunity- and Risk-Related Environmental Discussions in Analyst Reports

Category	Examples from analyst reports
Opportunity-related environmental discussion	1. "Driven by environmental protection and energy consumption regulations, the average price of high-grade cement reaches a record high; We expect the company's actual 2018 performance to be near the upper end of its guidance range." 2. "The recovery in overall downstream production and customer demand, coupled with strong growth in the electric vehicle (EV) sector, drove the company's exceptional performance in the fourth quarter." 3. "The company expects to further lower its overall debt financing costs by utilizing carbon emission reduction support policies."
Risk-related environmental discussion	1. "Adverse weather conditions, such as high humidity, heavy rainfall, and thunderstorms, could damage photovoltaic power generation equipment, causing operational disruptions at the company's photovoltaic power stations and negatively impacting production and operations." 2. "The anticipated reduction in government subsidies is expected to negatively impact the company's performance in 2023." 3. "Increased market preference for green and environmentally friendly products could lead to slower revenue growth or even a decline in sales, potentially hindering the company's operating performance."

Internet Appendix 7. Performance Metrics for Classification Tasks Using Fine-Tuning Techniques

Tasks	Accuracy	Precision	Recall	F1-score	Support
Panel A: Classification of Environment- vs. Non-Environment-related Discussions					
Environment-related discussions	0.97	0.97	0.97	0.97	10000
Panel B: Classification of *Value* and *Values*-Related Environmental Discussions					
Value-related discussions	0.93	0.93	0.93	0.93	10000
Values-related discussions	0.91	0.91	0.91	0.91	10000
Panel C: Classification of Environmental Risk and Opportunity Discussions					
Risk-related discussions	0.96	0.96	0.96	0.96	10000
Opportunity-related discussions	0.95	0.94	0.96	0.95	10000

Internet Appendix 8. Re-evaluation of Results by Restricting the Sample to Non-SOEs

We re-run the analyses in Tables 5 and 7 using only non-SOE. For the survey data, however, each observation corresponds to an analyst who typically covers both SOEs and non-SOEs, so we do not separate the sample or re-run the tests.

Re-evaluation of Table 5 Panel B Using Only Non-SOEs

	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	0.76	1.17	0	8.00	0
No. of Env Opportunity Sentences	4.03	0	2.65	2.20	0
No. and % of reports	54,287 (100%)	2,983 (5.5%)	30,572 (56.3%)	17,254 (31.8%)	3,478 (6.4%)

Re-evaluation of Table 5 Panel C Using Only Non-SOEs

	Brown			Green			Green-Brown
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	
	(1)	(2)	(3)	(4)	(5)	(6)	(5) − (2)
No. of Env Risk Sentences	16,007	0.94	2.07	38,280	0.69	1.64	-0.25***
No. of Env Opportunity Sentences	16,007	3.15	5.64	38,280	4.40	7.59	1.25***

Re-evaluation of Table 7 Using Only Non-SOEs

VARIABLE	*FEPS(t+1)* (1)	*FEPS(t+2)* (2)	*FEPS(t+3)* (3)	*Rec* (4)
% of Env Opportunity Sentences	0.052***	0.045	0.067	0.045***
	(2.724)	(1.567)	(1.620)	(3.578)
% of Env Risk Sentences	-0.145**	-0.270***	-0.388***	-0.073**
	(-2.471)	(-2.833)	(-2.869)	(-2.162)
Analyst experience	0.001	0.002	0.006***	-0.003***
	(0.572)	(0.926)	(2.614)	(-4.952)
No. of firms covered	-0.002	-0.001	-0.004	0.002
	(-1.287)	(-0.368)	(-0.987)	(1.468)
Total no. of sentences	-0.000	0.002	0.009***	0.025***
	(-0.239)	(1.150)	(4.278)	(21.398)
Female	0.001	0.002	-0.003	0.002*
	(0.342)	(0.676)	(-0.681)	(1.908)
Large broker	-0.002	-0.008**	-0.004	-0.001
	(-1.047)	(-2.463)	(-0.675)	(-0.534)
Forecast horizon	0.093***	0.492***	0.586***	
	(22.436)	(18.385)	(16.927)	
Constant	0.666***	-1.584***	-1.794***	-0.056***
	(31.174)	(-9.502)	(-8.311)	(-13.010)
Observations	179,308	178,992	162,742	147,469
R-squared	0.951	0.948	0.944	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)				$p = 0.52$
F-test of equal coefficients on *% of Env. Risk sentences* col. (1) and (3)				$p < 0.01$

Internet Appendix 9. Analysts' Environmental Opportunity Discussions and Firms' Green Innovation

This table reports the correlation coefficients between analysts' discussions of environmental opportunities for firm *i* in year *t* and firm *i*'s green patent applications in year *t*. Green patent data is obtained from the Green Patent Research Database (GPRD) on the Chinese Research Data Services (CNRDS) platform. The GPRD classifies green patents according to the IPC Green Inventory published by the World Intellectual Property Organization (WIPO). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	All industries		Brown industries		Green Industries	
	No. of Env Opportunity Sentences (1)	% of Env Opportunity Sentences (2)	No. of Env Opportunity Sentences	% of Env Opportunity Sentences	No. of Env Opportunity Sentences	% of Env Opportunity Sentences
No. of green patent applications	0.161***	0.186***	0.073***	0.086***	0.159***	0.187***

Internet Appendix 10. Methodology and Full Prompt Used to Generate Themes in Environmental Risk and Opportunity Discussions

To illustrate the major environmental risks and opportunities discussed in analyst reports, we use prompts in the Llama model to identify key themes in these discussions. Specifically, we use the following prompt in Llama 3 to generate themes in analysts' environmental risk and opportunity discussions:

"*As a sell-side equity analyst specializing in climate change impacts, risk and opportunity identification, your task is to analyze sentences extracted from sell-side equity analyst research reports. These sentences pertain to climate and environmental change-related risks and opportunities. Your objective is to extract and interpret the underlying drivers of these risks and opportunities, even when these drivers are not explicitly stated in the sentence itself. Your ultimate goal is to summarize these drivers into a comma-separated list of keywords for each sentence. Let's think step by step:*

1. Identify the core drivers: Extract the fundamental causes or primary sources that give rise to the risk or opportunity described in the sentence. These drivers often manifest as underlying trends, events, policies, technological advancements, or market shifts.

2. Summarize as keywords: Condense the identified core drivers into one to three concise and relevant keywords. These keywords should clearly and accurately encapsulate the essence of the driving factors. Avoid using full sentences or lengthy phrases."

We apply this prompt to all environment-related discussions in analyst reports and obtain the key words (i.e., themes). We then count the frequency of each theme in the risk environmental discussions in brown industries, the risk discussions in green industries, the opportunity discussions in brown industries, and the opportunity discussions in green industries, respectively. Finally, we use the themes and their frequencies to generate the word clouds in Figure 5A-5D.

Internet Appendix 11. Re-evaluation of Key Survey Results by Re-Sampling Male and Female Analyst Respondents

We re-sample male and female survey respondents to match the gender distribution observed in the analyst report sample, where male: female = 74.6%:25.4%. To maximize the number of observations, we randomly select 97 female and 291 male (i.e., all males) from the survey respondents and re-evaluate the key survey results.

Re-evaluation of Table 2 Panel B: Analysts' Environmental Coverage in Survey Sample

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	3.34	0.96	***	17.8%	36.3%	45.9%
(b) Relative to industry peers	3.21	1.03	***	22.7%	36.3%	41.0%
(a) - (b)	0.13***					

Re-evaluation of Table 3 Panel A: Analysts' Choice between *Value* versus *Values* in the Survey Sample

Motivation to influence covered firms' environmental policies	Total no. of respondents	No. of respondents choosing	% of respondents choosing
Aligned with *value*	388	218	56.2%
Aligned with *values*	388	58	15.0%
Not trying to influence	388	218	28.9%

Re-evaluation of Table 4 Columns (1) and (2): Determinants for Analysts' *Value* versus *Values* Orientation

	Survey Sample DV=*Aligned with Values*	
VARIABLES	(1)	(3)
Attention to Env topics	0.084*	0.063
	(2.017)	(1.512)
Female	-0.002	0.006
	(-0.049)	(0.175)
Age	0.013***	0.012**
	(3.047)	(2.517)
General experience	-0.004	-0.004
	(-0.406)	(-0.438)
Number covered firms	0.046**	0.048**
	(2.244)	(2.654)
Constant	-1.052	-0.833

	(-0.640)	(-0.505)
Observations	388	388
R-squared	0.056	0.177
FE	No	Ind

Re-evaluation of Table 5 Panel A: Analysts' Perceptions of Environmental Risks and Opportunities in the 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	388	61	15.7%
More as an opportunity	388	101	26.0%
Equally as a risk and an opportunity	388	173	44.6%
Irrelevant	388	53	13.7 %

Re-evaluation of Table 6: Perceived Environmental Risks and Opportunities and Financial Impacts

	Short-Term Financial Impacts		*Long-Term Financial Impacts*	
	(1)	(2)	(3)	(4)
More as an opportunity	0.345***	0.126	0.778***	0.451***
	(2.999)	(0.667)	(8.422)	(3.193)
More as a risk	-0.446**	-0.500**	-0.620**	-0.692**
	(-2.212)	(-2.455)	(-2.562)	(-2.522)
Female	-0.086	-0.037	-0.043	-0.013
	(-0.889)	(-0.338)	(-0.475)	(-0.116)
Analyst age	0.003	0.003	-0.013	-0.015
	(0.241)	(0.270)	(-1.134)	(-1.352)
Analyst experience	-0.014	-0.012	0.001	0.004
	(-0.538)	(-0.343)	(0.047)	(0.115)
No. of firms covered	-0.068	-0.064	-0.041	-0.022
	(-1.163)	(-0.872)	(-0.855)	(-0.395)
Educational background	1.685	1.455	1.554	1.430
	(1.488)	(1.388)	(1.474)	(1.359)
Large broker	0.086	0.127	-0.108	-0.066
	(0.863)	(1.518)	(-1.204)	(-0.935)
Constant	-0.643	0.023	0.561	1.026
	(-0.190)	(0.008)	(0.177)	(0.326)
Observations	388	388	388	388
R-squared	0.077	0.198	0.162	0.293

FE	No	Ind	No	Ind
F-tests of equal coefficients on *More as an opportunity* in col. (1) and (3)				$p < 0.001$
F-tests of equal coefficients on *More as a risk* in col. (1) and (3)				$p = 0.253$
F-tests of equal coefficients on *More as an opportunity* in col. (2) and (4)				$p = 0.046$
F-tests of equal coefficients on *More as a risk* in col. (2) and (4)				$p = 0.275$

Re-evaluation of Table8: Analysts' Perceptions of the Importance of Environmental Risk and Opportunity Factors

Panel A. Importance of Environmental Risk Factors

		All Industries	
		% negative responses	Adj. mean
(a)	Physical climate and environmental change (e.g., extreme weather, floods, air pollution)	35.6	3.47***
(b)	Environmental regulations or subsidies (e.g., production limits ("carbon peaking and neutrality" target, subsidies for PV power and new energy products)	12.9	1.07
(c)	Changes in employees' preferences (e.g., some talents prefer to work for green firms or in less polluted areas)	8.7	0.70
(d)	Changes in consumers' preferences (e.g., consumers' preference for green products or loyalty to green brands)	7.7	0.56
(e)	Changes in customers' and suppliers' preferences (e.g., supply chain decarbonization initiatives, Scope 3 disclosure requirements)	6.2	0.68
(f)	Transitions to green technologies and green products (e.g., transition from fossil fuels to clean energy)	6.9	0.56
(g)	Demand for products to cope with pollution and climate change (e.g., demand for air conditioners, weather insurance products)	7.7	0.56
(h)	Changes in investors' and creditors' preferences (e.g., emergence of green bonds and ESG funds)	7.0	0.50

Panel B. Importance of Environmental Opportunity Factors

		All Industries	
		%. positive responses	Adj. mean
(a)	Transitions to green technologies and green products (e.g., transition from fossil fuels to clean energy)	72.9	1.35***
(b)	Environmental regulations or subsidies (e.g., production limits, "carbon peaking and neutrality" target, subsidies for PV power and new energy products)	63.9	1.15***
(c)	Demand for products to cope with pollution and climate change (e.g., demand for air conditioners, weather insurance products)	61.6	1.10**
(d)	Changes in consumers' preferences (e.g., consumers' preference for green products or loyalty to green brands)	64.4	1.10***
(e)	Changes in customers' and suppliers' preferences (e.g., supply chain decarbonization initiatives, Scope 3 disclosure requirements)	65.7	1.06
(f)	Changes in investors' and creditors' preferences (e.g., emergence of green bonds and ESG funds)	55.4	0.89
(g)	Changes in employees' preferences (e.g., some talents prefer to work for green firms or in less polluted areas)	53.3	0.82

(h) Physical climate change and pollution (e.g., extreme weather, floods, air pollution)	35.1	0.53

Re-evaluation of Table 9. Analysts' Perceptions of Drivers of Corporate Sustainability Policies

	Mean	Std. Dev.	H0: Mean score=1 (No influence at all)	H0: Mean score=3 (midpoint)	Sig. diff in mean score vs rows
	(1)	(2)	(3)	(4)	(5)
(a) Regulations and policies	3.64	1.13	***	***	3-8
(b) Public and media pressure	3.58	1.01	***	***	3-8
(c) Demand for sustainability from up and down the supply chain	3.33	1.15	***	***	1-2, 6-8
(d) Efforts to rebrand the firm as a green(er) firm	3.31	1.11	***	***	1-2, 6-8
(e) Consumers' demand for sustainability	3.23	1.14	***	***	1-3, 6-8
(f) Firms' intrinsic preference for sustainability	3.07	1.06	***	*	1-5, 8
(g) Investors' and creditors' demand for sustainability	3.05	1.05	***	n.s.	1-5, 8
(h) Employees' preference for sustainability	2.57	1.07	***	(-) ***	1-7
No. of analysts	388				

Re-evaluation of Table 10: Analysts' Perceptions of Their Influence on Firms' Environmental Policies

	Mean	Std	H0: Mean score=1 (No influence at all)	H0: Mean score=3 (midpoint)	Sig. diff in mean score vs rows
	(1)	(2)	(3)	(4)	(5)
(a) Public communication channels such as conference calls, site visits, etc.	2.91	1.13	***	n.s.	3-5
(b) Raising concerns about environmental issues with influential investors	2.87	1.08	***	(-) **	4-5
(c) Adjusting recommendations and financial forecasts to reflect the impact of the firm's environmental performance	2.81	1.18	***	(-) ***	1, 5
(d) Discussing environmental issues in research reports	2.76	1.08	***	(-) ***	1, 2
(e) Private communication with corporate managers	2.64	1.11	***	(-) ***	1-3
No. of analysts	388				