The impact of ESG debt issuance on corporate disclosure*

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Abstract

This study supports ESG lending in helping mitigate information asymmetries in traditional debt and improving corporate disclosure. It examines two crucial channels through which ESG lending can influence corporate disclosure: the external mechanism driven by environmentally conscious institutional investors and the internal mechanism arising from board composition independence and diversification. Furthermore, we conducted a robustness test using conference call data, and the results further suggest that the issuance of ESG lending drives firms to make more voluntary disclosures. Additionally, our study highlights that companies obtaining ESG lending experience several benefits, including improved ESG ratings, reductions in carbon emissions under Scope 1, enhanced stock liquidity, and higher ESG disclosure score. Our findings also suggest that ESG lending not only improves corporate disclosure, but also plays a critical role in promoting sustainable business operations.

Keywords: Green loans, sustainability-linked loans, sustainable finance, corporate disclosure
JEL Codes: G21, G32, M14

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1 Introduction

As climate issues become increasingly severe, people are beginning to emphasize sustainable development. Green finance, particularly in the form of green lending, has emerged as a critical tool for driving the transition towards a sustainable future. ESG lending, which accounted for just 0.5% of the overall loan market in 2017, has consistently increased, peaking at 11.54% in 2021. Several factors highlight its growing importance. First, heightened global awareness of environmental issues has led to an increased demand for ESG debt. Additionally, as reported by Bloomberg, [1], ESG lending provides benefits to lenders, including reduced credit risks and an improved reputation, mainly because borrowers adhere to strong ESG standards. Moreover, ESG lending is designed to support environmental conservation by directing funds to projects that prioritize sustainability. These elements explain the rising prominence of ESG lending (Kim et al., 2022).

Information asymmetry can lead to inefficient markets (Akerlof 1970).In the credit market, including the market for bank loans, information is often imperfect and asymmetrically distributed (Stiglitz and Weiss 1981).In the decision-making process for approving loans, banks have the challenge of information asymmetry. Often, banks do not have full information about a borrower's financial situation. This information asymmetry gives potential borrowers a greater information advantage than banks. Besides, ESG lending has more challenges in terms of information asymmetry issues, especially due to the unpredictability of environmental project outcomes and impacts. Unlike traditional loans that focus on financial metrics, ESG lending needs a thorough evaluation, including sustainability objectives. This broader range of assessment criteria adds to the complexity of the necessary information, posing greater challenges for lenders in making well-informed decisions.

Thus, to mitigate this information asymmetry, firms can take action to credibly display this information. In signaling theory, signals are considered credible when it is costly for

[1]Refer to "ESG Is Taking Over the Loan Market," available at https://www.bloomberg.com/news/articles/2022-11-30/esg-is-grabbing-a-bigger-share-of-Europe's-company-loans-market

unscrupulous firms to replicate them (Spence, 1973). This approach is particularly important in ESG lending because firms are encouraged to improve their disclosure. These not only satisfy the requirements of ESG lending covenants, which often include meeting specific environmental and social objectives, but also reduce investor concerns about "greenwashing", thereby confirming the firm's commitment to sustainability efforts.

In our research, we applied a difference-in-differences (DiD) approach to examine the impact of ESG lending on corporate disclosure across global markets. We compared firms that have secured ESG lending (treatment group) with those that have not (benchmark group). Our findings reveal that ESG lending leads to improved corporate disclosures. Firms that obtained ESG lending demonstrated reduced errors in analyst forecasts and less variation in these forecasts, signifying enhanced disclosure. Furthermore, we delve into the subsequent year's analyst forecast errors and dispersion. This additional analysis corroborates our initial observations, reinforcing the assertion that green lending positively influences corporate disclosure. Additionally, our study differentiated the effects of green loans and SLLs on corporate disclosure. We discovered that companies obtaining SLLs exhibited a more pronounced effect on their disclosure practices compared to those receiving green loans. This indicates that the structure and incentives of SLLs, aimed at specific sustainability objectives, are more effective in fostering detailed and transparent reporting. Furthermore, we run our analyses using a propensityscore-matched (PSM) sample by making our treatment and benchmark firms more comparable on the observable covariates (Rosenbaum and Rubin, 1984).This further validates our previous findings.Furthermore, We use an external shock to ESG lending for firms: the introduction of carbon tax legislation for the first time in a country. The interaction between esg Lending and carbon tax captures whether firm increase their disclosure following a change in carbon-related legislation. As our study covers an international setting, our sample includes firm across the world with variations in when or if countries enact carbon tax legislation. Hence, these countries offer a quasi-experimental setting in which to study the impact of ESG lending on the firm disclosure.The results also

support our findings.

Besides, this study explores the possibility of two channels through which ESG lending might potentially increase corporate disclosure. The first channel, an external mechanism, involves the growth of institutional investors with a preference for environmentally responsible investments. As awareness about climate change and environmental issues intensifies, investors increasingly prioritize companies with strong ESG performance. Companies acquiring ESG lending are likely to capture the attention of environmentally conscious investors, leading to a higher proportion of institutional investors in their shareholder base. These large shareholders play a significant governance role, frequently pushing for enhanced transparency and disclosure from the companies in which they invest. The second channel is the internal mechanism, where the loan contracts of SLLs usually set the goal that the company needs to diversify its board composition. As a result, companies tend to enhance the independence and gender diversity of their boards. Owing to the distinct characteristics and expertise of independent directors, they are fully capable of effective governance, thereby fostering improvements in information disclosure. In addition, female directors tend to exhibit greater risk-aversion. This risk aversion translates into more careful and informed decision-making, which in turn leads to more comprehensive and detailed disclosure. Further analyses show that companies with ESG loans have experienced increased stock liquidity, reflecting the market's positive reaction to the status of their ESG loans. These companies also improved their ESG ratings and reduced their carbon emissions in Scope 1. In addition, these companies tend to work with suppliers with strong ESG capabilities, suggesting that ESG principles have a chain effect in corporate networks. Robustness testing using conference calls reinforces these findings. It suggests that the issuance of ESG lending drives firms to make more voluntary disclosures.

Our study makes a significant contribution to the ESG financing literature. The current academic discourse on ESG lending remains in its infancy. Kim et al. (2022) were the first to research ESG lending. Their study revealed that larger, publicly listed companies

typically choose SLLs and maintain strong ties with their lenders. Conversely, smaller, non-public firms often favor green loans, which have lower interest rates. Further investigations showed that firms issuing green loans appear to be effective in shrinking their environmental emissions; however, they weaken in social performance.This implies that they prioritize their environmental goals yet neglect their commitment to their clients and society. Conversely, they find Sll incentivize firms to improve their ESG performance by increasing both their environmental and governance scores (Dursun-de Neef,2022). Besides,there are differences in the transparency of sustainability practices across companies.A decline in ESG ratings after obtaining an SLL, especially with lower transparency, raises concerns about potential greenwashing. However, the stock market positively views SLL announcements that maintain high transparency (Kim et al., 2022).

Besides, a part of the literature focuses more on SLL. The results show companies acquiring SLLs do not initially benefit from lower interest rates compared to different loans, and there's no tangible improvement in their ESG performance post-borrowing. Lending institutions can attract more deposits and appear to gain more benefits from SLLs than the borrowers themselves (Du, Harford, and Shin,2022). Futhermore, Loumioti and Serafeim (2022) and Carrizosa and Ghosh (2022) both analyzed the contract design of SLLs. Carrizosa and Ghosh (2022) looked at how these contracts can motivate companies to boost their ESG performance. Their study shows that a company's sustainability performance and the quality of their reports can influence the design of SLL incentives. More SLL contracts include requirements related to sustainability performance measurement, reporting, and auditing, possibly due to the quality of ESG reports and the need for third-party verification.On the other hand, Loumioti and Serafeim (2022) focused on whether these loans genuinely lead to substantial improvements in sustainability performance. They found that SLL lenders prefer borrowers with lower ESG risks. Borrowers choose the sustainability indicators often don't reflect the company's true industry and risk characteristics. So SLLs might not have real, significant improvements in sustainability performance. Building on previous studies,

we identify a notable gap in research regarding corporate disclosure in response to ESG lending. Our work uniquely bridges this gap by examining how ESG lending might influence corporate transparency.By identifying the channels through which ESG lending influences corporate disclosure, our study offers new insights into the interaction between sustainable finance, corporate governance, and corporate disclosure.

Besides,our research makes a contribution to the literature that aims to establish a causal relationship between institutional ownership and firm disclosure.Furthermore, our study adds to the content of literature that explores the monitoring function of institutional investors.By examining the impact of ESG lending on corporate disclosure, our findings suggest that institutional investors play a crucial monitoring role in promoting better disclosure. Previous research has shown that investors closely monitor company disclosures, with increased institutional ownership encouraging better disclosure. Institutional ownership's short-term focus prompts more frequent disclosure adjustments, especially among passive investors (Boone and White, 2015; Abramova, Core, and Sutherland, 2020). Additionally, higher institutional ownership increases the demand for analyst services, promoting transparency and reducing analyst disparities (Frankel, Kothari, and Weber, 2006). Also, top-ranking firms in the Russell 2000 index with high institutional ownership influence their peers to increase their disclosures.By examining the relationship between IO, ESG lending, and corporate disclosure, we add evidence to previous findings and demonstrate the importance of institutional investors in driving greater transparency.

Furthermore, our study contributes to the literature that seeks to establish a causal relationship between independence, diversification, and corporate disclosure. Previous literature suggests that board gender diversity enhances board discussions and improves the governance of company disclosures. Diverse boards improve disclosure quality and quantity (Adams and Ferreira, 2009). Female directors often join committees like audit and governance, boosting transparency. Also, having women on boards fosters better communication with investors, improving the quality of vital company information (Srinidhi et al., 2011). We provide an

additional perspective on the role of female directors in shaping corporate transparency and validate previous findings. Our findings suggest that increased board diversity, especially the addition of female directors, strengthens the positive influence of ESG lending on corporate disclosure.

The rest of the paper is organized as follows: Section 2 is for hypothesis development, Section 3 describes the data collection procedure and descriptive statistics, Section 4 provides the baseline results, Section 5 describes potential channels, Section 6 presents the results of our additional analyses,and Section 7 concludes this paper.

2. Hypothesis Development

Disclosure plays a vital role in the functioning of capital markets and serves as a significant driver of market efficiency (Botosan, 1997). It enables investors to make informed decisions about buying or selling securities, ensuring that these securities are priced efficiently. Companies disclose information for various objectives, including reducing information asymmetry, improving market efficiency, enhancing corporate governance, and managing stakeholder relationships. Furthermore, disclosure can significantly impact a company's future performance by signaling its prospects to investors (Lundholm and Myers, 2002).

This asymmetry creates challenges in identifying companies. Hence, companies aim to diminish this gap by offering signals or credible actions that reflect their true value. Increasing disclosure is a strategic move to reduce this asymmetry. Signaling theory primarily focuses on reducing information asymmetry between two parties. When a company discloses positive information about its operations, financial performance, or growth prospects, it signals that the company is well-positioned for future success (Spence, 2002). This can boost investor confidence, leading to higher demand for securities, higher share prices, and increased access to capital. Disclosure can greatly influence investor expectations and decisions by signaling a company's future performance.Effective disclosure can boost investor trust and attract capital, while poor communication may hinder investment.When the company ob-

tains ESG lending, this action demonstrates to stakeholders the company's commitment to social responsibility and long-term sustainability.

ESG lending have covenants that promote borrowers to meet specific ESG-related objectives. While these requirements are generally not mandatory, they operate more as incentives or aspirations. To confirm their adherence, companies might tend to enhance their reporting and disclosure, thus improving transparency. In addition, banks might also increased their monitoring of ESG lending due to potential risk exposures (Vashishtha, 2014; Gustafson et al., 2021). Thus, companies may broaden their disclosure not only due to the objectives within the loan covenants but also driven by incentives from banks.Furthermore, the motivation to enhance information disclosure extends beyond regulatory compliance; it also arises from investors' concerns about "greenwashing." There is a general concern that companies may be using environmental initiatives as a marketing strategy rather than a real commitment. By enhancing disclosure, companies can demonstrate the validity of their ESG performance. Furthermore, transparency can increase positive media coverage, potentially boosting customer loyalty and attracting socially conscious investors.Based on the above analysis the following assumptions are made:

H1: The issuance of ESG lending increases the company's disclosure.

Previous literature emphasises the theoretical and empirical importance of considering climate risks in institutional investment decisions. A survey by Krueger et al.(2020) highlighted an increasing trend among institutional investors to integrate climate risks into their investment strategies. The majority of respondents indicated that climate risks influence portfolio risk and returns, noting that these risks are already becoming evident. Additionally, the study indicates that institutional investors focused on ESG are more engaged in

managing and addressing climate risks.Similarly, a survey conducted by Ilhan et al. (2023) emphasized that many institutional investors regard corporate climate risk reports as being equally important as financial reports.The issuance of ESG lending is anticipated to garner attention, attracting a broader spectrum of investors. Consequently, we expect an increase in institutional shareholdings. The underlying premise is that as ESG lending becomes more prevalent, it will catalyze heightened awareness and engagement among institutional investors.

Investors pay attention to corporate disclosure and monitoring. A higher institutional ownership often cause firms to improve transparency. Specifically, companies with substantial quasi-indexer ownership tend to communicate more about their future through forecasts and voluntary SEC 8-K filings. This trend is largely driven by institutional investors. Boone and White (2015) suggest that the short-term orientation of institutional ownership can lead management to adjust disclosures more frequently. According to Frankel, Kothari, and Weber (2006), increased institutional ownership can also heighten demand for analyst services, while the associated higher transparency could narrow the disparity among analysts by reducing the costs and risks. Bird and Karolyi (2016) found that higher institutional ownership inevitably results in a significant increase in voluntary disclosures by companies, emphasizing the role of institutional investors in advocating for greater transparency and more comprehensive information from their investments. Moreover, Lin, Mao, and Wang (2018) hypothesize that companies with a higher institutional ownership, particularly those ranking high in the Russell 2000 index, exert considerable pressure on their industry peers to elevate their level of voluntary disclosures.

Institutional investors actively engage with firms on ESG issues, significantly affecting transparency and corporate governance through influence and selection. Climate-conscious institutional ownership shows two distinct behaviors. On one hand, they actively engage with firms, urging them to volunteer climate-related information—an 'influence effect'. On the other hand, they might exhibit a predilection for investing in firms that are already

forthcoming with such disclosures, a phenomenon termed the'selection effect'. This perspective is supported by findings from Huang et al.(2022), which suggest that heightened ESG transparency is primarily investor-driven. For instance, firms in areas with significant local institutional ownership are more inclined to expand disclosure of ESG information following a local disaster.Based on the above analysis, we propose the following hypothesis:

H2: Institutional ownership strengthens the positive influence of the ESG lending issuance on corporate disclosure.

SLLs often incorporate specific KPIs related to governance and diversity. Meeting these KPIs might lead to preferential loan terms, such as reduced interest rates. Therefore, companies have a financial incentive to enhance board diversity.Boards that have a higher proportion of independent directors demonstrate superior monitoring of executive management. Companies with a majority of independent directors exhibit a higher level of voluntary disclosure than companies with no independent directors (Cheng and Courtenay, 2006). To execute their supervisory and advisory roles, independent directors require transparency. Hence, independent directors should undertake measures to ensure access to requisite information (Armstrong Core and Guay, 2014).Wang, Xie, and Zhu (2015) emphasized that having knowledge and expertise relevant to the company's industry enhances the ability of independent directors to fulfill their governance responsibilities. The presence of industry-experienced independent directors on the audit committee significantly reduces corporate earnings manipulation. Moreover, independent directors' industry expertise helps rationalize CEO compensation to reduce overpayments. These independent directors play a crucial role in corporate governance by bearing fiduciary responsibility for shareholders and providing strategic guidance and supervision.Patelli and Prencipe (2007) posit that these directors

aim to preserve or enhance their reputations as regulators. Therefore, they use disclosure as a signal to the financial markets that they take their responsibilities seriously. The desire for reputational integrity drives independent directors to promote transparency for Informed monitoring (Adams and Ferreira, 2007).When faced with higher reputations risk, these directors approach management-provided information with caution. They emphasis on public information from analysts, auditors, and regulatory bodies to promote informed decision-making (Armstrong, Core, and Guay, 2014; Sila, Gonzalez, and Hagendorff, 2017). As reputational incentives are strengthened, independent directors are inclined to enhance the firm's transparency. Furthermore, Sila, Gonzalez, and Hagendorff (2017) suggest that the status of independent directors correlates positively with the extent of voluntary disclosures to investors.

Board gender diversity enhances the quality of discussions and strengthens the board's monitoring of corporate disclosures. Adams and Ferreira (2009) support that gender-diverse boards increase the volume and quality of company disclosures. Female directors tend to join committees with strict monitoring functions, such as audit and governance committees, which play an important role in promoting transparency. Furthermore, having female on boards promotes effective communication with investors and improves disclosure (Srinidhi et al., 2011).Based on the above analysis, we propose the following hypothesis:

H3: In corporate governance,increased independent directors and gender diversity boost the impact of ESG lending on corporate disclosure.

3. Data and summary statistics

3.1 Data

In this study, we access our loan data from Dealscan, a comprehensive database for the commercial loan market, offering detailed terms and conditions for over 155,000 loan and bond transactions globally, covering data from 1988 to the present on both loans and high-yield bonds.To investigate ESG loans, our focus was primarily on data related to green and sustainable development loans. We identified these loans by filtering companies that obtained green loans based on the "market segment" descriptions. Given the emergence of SLLs began in 2017, our sample spans from 2017 to 2022. we also pivotally utilize the Institutional Brokers' Estimate System (IBES) provided by Refinitiv, renowned for its high-quality financial data. This includes consensus earnings forecasts, historical Earnings Per Share (EPS) data, and other key financial metrics for listed companies globally. Furthermore, we extracted market and financial data from the Datastream and Worldscope databases, respectively. WorldScope covers financial data for listed enterprises worldwide and offers standardized account information, facilitating cross-country comparisons. In our first step, we modified a linking table from Beyhaghi et al. (2021) to match Dealscan's loan data with WorldScope's company details. Due to Dealscan's update from company IDs to borrower IDs, we converted these IDs back, enabling effective use of the table to link the loan data to the right companies in WorldScope. In the second step, we manually linked remaining loans to WorldScope companies for years not covered by the link table, using names and addresses for accurate matching. Our sample includes 5015 companies, of which 457 had issued ESG lending: 96 issued only green loans, 332 solely issued SLLs, and the remaining 29 had issued both types of loans.In addition to the above databases, we obtained data related to independent and female directors from the BroadEx database. For institutional investor data and ESG rating data, we collect data from the Thomson/Refinitiv database, which provides

detailed information on institutional holdings, investor profiles and investment strategies.

3.2 Descriptive analysis

3.2.1 The background of ESG lending

ESG lending include two main types: green loans and sustainability-linked loans. In March 2018, the Loan Market Association (LMA), Loan Syndication and Trading Association (LSTA), and Asia Pacific Loan Market Association (APLMA) jointly firstly published the Green Loan Principles. Subsequently, they published the sustainability Linked Loan Principles. Green loans are a form of financing that allows borrowers to exclusively fund projects contributing significantly to an environmental objective. It generally structured in the same way as standard loans except that the loan proceeds are tracked and allocated to eligible green projects. The sustainability-linked loan is unlike green loan, it involves setting "sustainability performance targets" for the borrower and if these targets are met, the borrower is rewarded with a ratcheting down of the loan's interest rate. These sustainability performance targets can be internal targets (such as: reduction in greenhouse gas emissions; improvements in energy efficiency) or external targets (attaining a certain sustainability rating from an external reviewer) Further, sustainability-linked loans proceeds do not need to be allocated exclusively to green projects.

Figure 1 and Table 1 clearly illustrate the evolution of ESG lending trends from 2017 to 2022, focusing on both green loans and SLLs. In 2017, the green loan issuance stood at a mere \$9.96 billion, and by 2022, this figure had increased to \$134.7 billion. Besides, SLLs experienced a significant rise in their issuance from 2017 to 2021. Starting with \$13.16 billion in 2017, SLL issuance peaked at \$461.33 billion in 2021. However,SLL experienced a decrease in 2022, totaling \$216.58 billion, which is a drop of around 61% compared to 2021.The drastic drop in the issuance of ESG-linked loans can be attributed to two main factors. First, many European companies with strong credit ratings, who are the major

drivers of such loans, had already issued a large volume during the pandemic and therefore do not need to refinance before 2024 or 2025. Second, investor skepticism about the efficacy of ESG investments has risen, affecting market confidence. These elements have led to a sharp decline in demand [2].

As shown in Figure 2 and in Panel B of Table 1, we report ESG lending activity by country of borrower registration. In terms of total issuance, the majority of ESG loans were issued to borrowers in the United States and Western European countries. U.S. has engaged in 232 deals, amassing an ESG lending volume of 220.41 billion. It alone contributes to approximately 17.77% of the total global ESG lending volume. In the SLL market, the U.S. has established a commanding presence with $157.8 billion, accounting for 18.53% of the global share. Following the U.S., Western European nations such as France, United Kingdom, and Spain play a crucial role in the ESG lending market, emphasizing Europe's central importance in this sector.

In terms of green loan issuance, the utilities sector accounted for as much as 54.3% of total green loans. In contrast, the allocation of SLLs is more distributed across sectors. The utilities industry accounts for just 12.93% of SLLs, a marked decrease from its share in green loans. The financial services sector holds 11.9% ($101.39 billion) of SLLs, followed by oil and gas and general manufacturing with 7.73% and 7.42%, respectively.Contrary to the concentration of green loans in the utilities industry, SLL issuance exhibits a broader distribution across industries.

Table 2 shows the summary statistics at the firm level. The data of institutional ownership suggests that while institutions own an average of 37.4% of the companies, there appears to be a distinct skewness, given the pronounced gap between the mean and the 75th percentile, which stands at 0.631. This could be indicative of a select few firms with exceptionally high institutional ownership. Furthermore, female representation, with an average

[2]Refer to "How a Downturn in ESG-Linked Loans Prompted a Rethink," Bloomberg, available at https://www.bloomberg.com/news/articles/2023-09-01/how-to-explain-the-drought-in-esg-linked-loans. Additionally, see also, "Sustainable Debt, ESG Markets Turn Frosty in 2022," Bloomberg, available at https://www.bloomberg.com/news/articles/2022-12-15/sustainable-debt-esg-markets-turn-frosty-in-2022.

of 14.03, does exhibit a high variability as denoted by the considerable standard deviation, pointing to a diverse range of female director representation across the sample. Finally, the assessment of financial indicators, particularly price-to-book ratios, return on investment and net profit margins, provides an insight into the overall financial position and valuation of the sample companies. Overall, the return on equity and profitability of these companies are moderate.

4. Empirical results

4.1 Baseline

In this section, we describe our baseline ordinary least squares (OLS) regression model that links corporate disclosure and ESG lending issuance. The purpose of the correlation analysis is to establish some empirical regularities. The baseline regressions are as follows:

$$\text{Firm disclosure}_{i.t} = \beta_0 + \beta_1 \text{ESG Lending}_{it} + \beta_2(\text{Controls}_{it}) + \epsilon_{it} \tag{1}$$

our main variable of interest, ESG Lending, is 1 when a company receives an ESG lending, and 0 before receiving an ESG lending. Besides, the dependent variable of our model is firm disclosure, which is proxied by analysts forecast error or analysts forecast dispersion. The analyst forecast error is the average of the absolute errors of all forecasts made in the year for target earnings, scaled by the stock price at the beginning of the year. And analysts forecast error1 is the average of the absolute errors of all forecasts made for the subsequent year target earnings, scaled by the stock price at the beginning of the given year.Besides, each firm's analyst forecast dispersion is defined as the standard deviation of annual EPS forecasts divided by the firm's stock price at the beginning of the year. Analyst forecast dispersion1 for the subsequent year is defined as the standard deviation of the following year's annual EPS forecasts divided by the firm's stock price at the

beginning of the given year. Analysts play a signifcant role in interpreting and processing a firm's disclosures. Improved corporate disclosure reduces information gaps. Improved disclosure attracts more analyst coverage and results in more precise earnings forecasts, decreasing stock price volatility (Lang and Lundholm, 1996). Analysts value non-financial disclosures for a better understanding of a firm's future prospects (Simpson, 2010). They bridge the information gap between companies' disclosures and investors' comprehension (Merkley, 2014). Dhaliwal et al. (2012) noted that increased CSR disclosures improve analyst forecast accuracy, especially in countries with robust investor protection. Bernardi and Stark (2018) indicate that firms with better ESG disclosure have more accurate analyst earnings forecasts.

The critical foundation of our identification methodology is the parallel-trends assumption. It suggests that without ESG lending issuance, our treated firms would have followed a hypothetical disclosure path similar to our control firms. While it's impossible to directly verify the parallel-trends assumption, its validity can be inferred by observing parallel movements in the pre-issuance phase of ESG lending.In Figure 3, we are presented with a fundamental validation of the parallel-trends assumption. The period immediately preceding the treatment functions as the baseline for comparison. Before the ESG lending event (pre3 and pre2), the forecast errors reveal a steady trend, suggesting no significant pre-existing differential trends between the treated and control firms. This consistency strengthens the foundational premises of our multi-timepoint difference-in-differences (DID) approach. In the subsequent periods (post1, post2, and post3), we observe a declining trend in forecast errors. This suggests a possible connection between the ESG lending event and improved corporate disclosure quality. Such improvements may contribute to more accurate analyst forecasts. Referring to Figure 4, we can draw similar conclusions for analyst forecasts of dispersion. Overall, the trends illustrated in Figures 3 and 4 confirm the plausibility of the parallel-trends assumption and emphasize the integrity of our empirical methodology.

Moreover, considering other firm characteristics that may influence firm disclosure, we

include several control variables to help isolate the relationship between forecast error and firm disclosure. Some control variables about financial performance were incorporated into our analysis. Tangibility The difference between common equity and total intangible assets divided by the difference between total assets and total intangible assets. This factor can influence a company's risk profile and affect disclosure as well as analysts' forecasting behaviors.Leverage, defined as total liabilities divided by total assets, can influence a company's risk profile and, consequently, its disclosure and analysts' forecasts.Firm size is the logarithm of the total asset. Larger firms tend to have more analyst coverage and more sophisticated disclosure. Besides, return on Equity measures a company's profitability in generating profits from its equity. A high ROE indicates that the company is effectively using its equity to generate earnings.We include fixed effects for industry, year, and country to control for unobservable factors that might influence firm disclosure. These effects account for industry-specific characteristics, time-related factors, and country-specific attributes.

The main aim of the regression results is to examine how ESG lending issuance affects corporate disclosures, particularly focusing on analyst forecast error and analyst forecast dispersion. In column (1) of Table 3, focusing on the same year of the ESG lending issuance, the coefficient for ESG lending reveals that a unit rise in ESG lending results in a 5.9% decline in analysts forecast error. This reduction corresponds to approximately 21.77% of the standard deviation (0.271) for the analysts forecast error in the issuance year. In column (2), there's a pronounced negative relationship between ESG lending and the analysts forecast error for the year following the ESG lending issuance. Given the standard deviation of 0.262, an increase of one standard deviation in ESG lending translates to nearly a 32.82% reduction in the forecast error. This reflects a significant improvement in the accuracy of analysts' predictions. The decline in analysts' forecast errors indicates that the acquisition of ESG lending drives firms to improve their disclosure.Furthermore, in column (3) of Table 3, focusing on the year of the ESG lending issuance, ESG lending demonstrates a negative correlation with analyst forecast dispersion. Given the 0.193 standard deviation

for analyst forecast dispersion in the issuance year, this signifies an approximate 29.53% decrease when ESG lending rises by one standard deviation. For column (4), assessing the year post-issuance, there's nearly a 28.49% decrease in analyst forecast dispersion for each unit growth in ESG Lending.Decreases in analyst forecast dispersion are often interpreted as signaling increased corporate disclosure. The results demonstrate that after a company obtains ESG lending, analyst forecast dispersion decreases, indicating increased disclosure by the company.

To further analyze the different impacts of green loans and SSLs on corporate disclosure, our analysis focuses solely on firms that have exclusively obtained either a green loan or an SSL, excluding those companies that have both types of loans.Panels A and B in Table 4 provide results of the impact of green loans and SLL on the accuracy and dispersion of analysts' forecasts. In Panel A, green loans do not significantly influence analyst forecast errors or dispersion. Conversely, Panel B's focus on SLL shows a negative and more substantial effect on both forecast error and dispersion. The coefficients for SLL on analyst forecast errors and forecast dispersion are negative.These results indicate a significant improvement in forecast accuracy and greater convergence of analysts' expectations after firms obtain SLLs.The significance of the coefficients indicates a decrease in analysts' forecast errors and dispersion. This suggests that SLLs are more effective than green loans in encouraging firms to enhance their disclosure, consequently improving the information environment for analysts.

4.2 Endogenous

Based on the analysis above, we document that ESG lending issuance have a positive impact on firm disclosure. Nevertheless, interpreting the results as establishing a causal relationship may be complicated by potential endogeneity issues.There is a self-selection bias. Firms that choose to obtain ESG lending may already have a higher level of corporate disclosure, driven by their commitment to sustainability. As a result, these firms may inherently differ from those that do not seek ESG debt, making it challenging to establish a causal relationship

between green loans and disclosure.Besides, it is possible that firms with higher levels of corporate disclosure are more likely to receive ESG lending, as they may be perceived as more transparent and responsible by lenders. In this case, the relationship between green loans and corporate disclosure could be bidirectional, complicating the analysis of the true impact of green loans on disclosure. Furthermore, there may be unobserved factors that influence both a firm's decision to obtain green loans and its level of corporate disclosure. For example, a firm's management philosophy, corporate culture, or industry-specific regulations could simultaneously affect its disclosure. Failing to account for these omitted variables can lead to biased estimates of the relationship between ESG lending and corporate disclosure.

In our study, we used Propensity Score Matching (PSM) with a 1-to-1 nearest-neighbor approach and a caliper of 0.01, ensuring close matches between control and treated firms. This method is designed to refine the robustness of our analysis by broadening the comparative base with an appropriately similar group of untreated companies.To ensure balance and congruity between the groups, we calculated propensity scores employing financial metrics such as the book-to-market ratio, return on equity (ROE), leverage ratio, asset tangibility, net profit margin, and firm size. Our comprehensive sample included 383 firms that had received ESG lending.The matched results virtually eliminated the differences between the treatment and control groups. The average treatment effect (ATE) was at -0.0586, and the average treatment effect on the treated (ATT) was at -0.0074. We repeat the baseline regression again based on the matched results.These results in Appendix table 1 implys that ESG lending could potentially incentivizes companies to provide more accurate financial disclosures.The post-PSM analysis corroborates the initial inferences drawn from the baseline model, thereby reinforcing the robustness of the findings.

Besides, We use an external shock to ESG lending of firms: the introduction of carbon tax legislation for the first time in a country. We define Carbon Tax as an indicator variable that is coded one after the issuance of the carbon tax legislation and zero otherwise. The interaction between esg Lending and Carbon Tax (our variable of interest) captures whether

firm increase their disclosure following a change in carbon-related legislation. esg lending is represented as 1 if a company has engaged in such activities within the year, and 0 otherwise It is different from ESG lending). As our study covers an international setting, our sample includes firm across the world with variations in when or if countries enact carbon tax legislation. Hence, these countries offer a quasi-experimental setting in which to study the impact of ESG lending on the firm disclosure. reports the regression results. We document that the coefficients of interaction variable are negative and statistically significant in column 2 and 4. These findings corroborate the findings that ESG lending could potentially incentivizes companies to provide more accurate financial disclosures.

5. Possible channels

In this section, we will study the potential reasons underlying corporate disclosures post-acquisition of ESG lending.The potential relationship between ESG lending and corporate disclosure can be explained by the "ESG institutional investor pressure" hypothesis for the external channel and the "Board independence and diversity drivers" hypothesis for the internal channel. In this section, we try to provide more specific evidence on each channel.

5.1 Institutional ownership

We suppose that institutional investors, inclined towards sustainable and responsible investment, are likely to increase their ownership in companies after obtaining ESG loans. This is because ESG lending are consistent with their investment strategies and adhere to responsible investment principles. Access to ESG-based financing is a powerful signal to these investors of a company's commitment to sustainable operations and ethical business practices. In addition, ESG financing typically imposes strict covenants that require borrowers to meet predefined sustainability benchmarks. Meeting these benchmarks provides external validation of a company's ESG efforts.Existing research has shown that institu-

tional investors, particularly those with significant ownership, often play a monitoring role. Their significant stakes force them to seek increased transparency in company disclosures, ultimately enhancing the quality of these disclosures.

In this study, we measure Institutional Ownership as the proportion of a company's market capitalization held by institutional investors. Besides, we used two measures to proxy for influential institutional investors (Chen et al.,2007; Buchanan et al.,2018). The first is Top Five Institutional Ownership (Top 5 IO) which refers to the percentage of a firm's shares held by the 5 largest institutional investors, and the second is Block Institutional Ownership (Block IO) which is measured as the percentage of a firm's shares held by investors whose ownership is at least 5% of the firm's shares. Table 6 shows the impact of institutional ownership on ESG lending on corporate disclosure. Columns (1),(3), and (5) in table 6 control for country, industry, and year fixed effects, which account for unobservable heterogeneity across these dimensions. In contrast, columns (2), (4), and (6) include interactions of country-year and industry-year fixed effects, capturing more granular time-varying effects that could influence the dependent variable.In columns (1) and (2), the interaction term coefficients between IO and ESG lending are significantly negative, at -0.261 and -0.397, respectively. This finding supports the finding that an increase in institutional investors increases the effect of ESG lending on expanding the information disclosure of the companies that obtain it. negative yet statistically significant interaction between Block Institutional Ownership (IO) and ESG lending. This suggests that institutional investors holding substantial shares are more efficacious in enhancing the precision of corporate disclosures via ESG lending. The results in columns (5) and (6) also support this conclusion. This analysis confirms previous arguments in the literature that institutional investment affects corporate disclosure (Lin et al.,2018). The presence of institutional investors, especially those with significant shareholdings, is associated with an enhanced impact of ESG lending on corporate disclosure. This suggests that institutional investors play a crucial role in influencing the transparency of firms that receive ESG lending.

5.2 Composition of the Board

Previous literature states that there is a positive relationship between the proportion of independent directors and voluntary disclosure. The function of independent directors on the board is to govern management decisions. A higher proportion of independent directors on the board could lead to improved monitoring of activities and a reduction in managerial opportunism. Independent directors, being less aligned with management, may be more likely to advocate for increased disclosure to external investors. Therefore, it is expected that a greater presence of outside directors on the board will result in enhanced voluntary disclosure.

Columns (1) and (2) in Table 7 indicate that for firms receiving ESG lending, the addition of an independent director does not affect the corporate disclosures within the same year but results in a 0.6% decrease in the forecast error by analysts for the following year. However, with the addition of female directors, the impact is opposite; the increase in female directors immediately affects the effectiveness of corporate disclosures, but this effect does not persist into the following year. Moreover, the results in columns (5) and (6) suggest that for companies with ESG loans, when female directors also serve as independent directors, their influence on corporate information disclosure becomes more pronounced. Specifically, the impact on the current and subsequent year's forecast errors is a decrease of 1% and 1.9%, respectively. In summary, the data indicate that for companies with green loans, increasing the number of female independent directors may enhance corporate disclosure. This could be attributed to the diverse perspectives and higher decision-making capabilities of female independent directors. Essentially, ESG lending is conducive to corporate information disclosure, and the composition of the board, especially the presence of female independent directors, plays a crucial role in amplifying this effect.Furthermore, we also find that companies that receive ESG lending increase their sustainability compensation incentives (Appendix Table 2).

6.Other analysis

6.1 Environmental performance

In the following discussion, we will explore whether ESG lending truly leads to improvements in a company's environmental impact or merely results in greenwashing. The concern that green lending could be used as a tool for greenwashing is valid, as some companies may seek to benefit from the positive perception associated with environmentally friendly initiatives without making substantial changes in their operations.The table 7 column (1) shows that firms that obtain ESG lending typically observe a 2.4% enhancement in their ESG rating compared to firms without such financing.Besides, according to column (2), companies with ESG lending experience an average reduction of 9.1% in their direct CO2 emissions under Scope 1 compared to firms without ESG lending.While Scope 1 emissions are direct and come mainly from sources over which the company has direct control, Scope 2 and Scope 3 emissions are more circuitous and depend on lots of external variables outside the company's direct jurisdiction. It suggests that ESG lending is most impactful on emissions directly controlled by the company. Since Scope 2 and Scope 3 are not significant in the model, it implies that ESG lending does not seem to have a strong relationship with indirect emissions from either consumed energy or other activities. This could be because companies have greater control over their direct operations (Scope 1) and can immediately make changes to reduce emissions. However, for Scope 2 and 3, the emissions are more indirect and may be influenced by factors beyond the company's direct control, making it harder for ESG lending to have a pronounced impact.

6.2 The effect of ESG lending on liquidity

Many studies have examined the relationship between information asymmetry and stock liquidity. It has been found that lower information asymmetries contribute to a reduction

in transaction costs and an increase in stock liquidity (Krueger et., 2021).Diamond and Verrecchia (1991) show that disclosure of public information is an effective means of mitigating information asymmetry. The reduction in information asymmetry in turn reduces the cost of capital for the firm. The reason behind this is that the attractiveness of corporate securities to large investors increases as a result of increased liquidity due to increased information transparency. Similarly, Kim and Verrecchia (1994) argue that voluntary disclosure reduces information asymmetries among informed and uninformed investors. As a result, for firms with high levels of disclosure, investors can be relatively confident that any stock transactions occur at a fair price, increasing liquidity in the firm's stock.

We utilize two distinct measures to evaluate stock liquidity. The primary measure used is the bid-ask spread, which is calculated as the difference between the bid and ask prices, and then this spread is normalized by dividing it by the midpoint of the bid and ask prices. This serves as a widely accepted proxy for stock liquidity within the literature. In addition to this primary measure, we employ Amihud's (2002) methodology as our secondary approach for calculating stock liquidity.The result in Table 9 indicates a negative relationship between ESG lending and liquidity. This suggests that companies receiving ESG lending experience an improvement in their liquidity by approximately 12.1%, compared to those not receiving ESG lending.Additionally, there is a significant negative relationship between ESG lending and amihud illiquidity, indicating that ESG lending leads to an increase in stock liquidity of about 18.3% compared to firms without ESG lending and an improvement in stock liquidity. This improvement can be attributed to enhanced investor confidence in the firm's environmental and social performance, increasing the attractiveness of investment in these companies. The results from the amihud illiquidity in columns (2) support the findings, further confirming the positive influence of ESG lending on stock liquidity. According to columns (3) and (4), for green loans, the impact on the bid-ask spread and the Amihud liquidity are not statistically significant, respectively. In contrast, columns (5) and (6) show the significant negative impact of SSL on bid-ask spreads and Amihud liquidity.The results

indicate that the market differentiates between the types of ESG-related lending when it comes to their perceived impact on liquidity. Compared to green loans, SLLs include ESG performance targets, which investors might perceive as more integral to the overall financial health and operational efficiency of a company. This broader scope of SLLs could be seen as more likely to enhance corporate liquidity, unlike the more targeted application of funds in green loans.

6.3 The effect on ESG disclosure

We downloaded data on ESG disclosure scores from Bloomberg to analyze the impact of ESG lending on corporate transparency. Our analysis in table 10 revealed that companies which secured ESG lending were more likely to enhance their ESG disclosures compared to those that did not receive such financing. This suggests that access to ESG lending could be a significant factor in encouraging firms to increase their transparency in environmental, social, and governance aspects.

6.4 Robustness test

In our baseline analysis, we have already demonstrated that the issuance of ESG lending leads to an increase in corporate disclosures. However, indicators such as analyst forecast errors and analyst forecast dispersion can only suggest an increase in corporate disclosures rather than voluntary disclosure. To address this gap, we further use conference calls to analyze whether the issuance of ESG debt indeed leads to a rise in corporations' voluntary disclosures. Conference calls are an important form of corporate voluntary disclosure (Brown et al., 2004; Hung et al., 2018). In this test, we focus on the issuance and frequency of firms' conference calls. Conference call issuance is an indicator variable that equals one if a firm conducts at least one conference call in a given year and zero otherwise. Conference call frequency is the total number of conference calls conducted by a firm in a given year. If a firm does not conduct any conference calls in a given year, we set conference call issuance to

be zero. We estimate a Logit model when the dependent variable is the indicator variable of conference call issuance and a Poisson model when the dependent variable is the count variable of conference call frequency. Because the data conference calls frequency is all positive integers and mostly zeros.

In the year of ESG lending issuance (column 1), there's a positive association between ESG Lending and the likelihood of a firm conducting a conference call. Specifically, a unit increase in ESG lending corresponds to a 25.1% increase in the probability of a firm conducting at least one conference call. In the subsequent year following the ESG lending issuance (column 2), the effect diminishes. While the coefficient suggests a positive correlation, this relationship is not statistically significant, which indicates that the impact of ESG lending on conference call conduct may be more immediate rather than prolonged. Besides, there's a statistically significant positive association between ESG lending and the frequency of conference call disclosures. According to column (3), it shows a unit increase in ESG lending is associated with an approximately 16.7% increase in the frequency of conference calls conducted by firms. In the year following the ESG lending issuance, the relationship persists, as indicated in column (4). An increase in ESG lending correlates with a roughly 13.5% rise in the number of conference calls. Our findings suggest that the issuance of ESG lending prompts an immediate increase in firms' voluntary disclosures. The immediate impact on both the conduct and frequency of these calls is evident. This highlights the significant role of ESG lending in increasing corporate transparency.

Besides, large sample bias can be a concern if many firms are from a single country, so we perform a robustness check by excluding U.S. firms from the sample and rerunning the main regression. The results are presented in Table 12. Consistent with the main results, the coefficients on analysts forecast error and analyst forecast dispersion remain negative and significant. Thus, our robustness tests demonstrate that the positive relation between ESG lending and firm disclosure is not driven by countries with a larger presence in the sample.

7. Conclusion

In conclusion, this paper supports that ESG lending can increase disclosure in corporate governance. As companies acquire ESG lending, they not only gain access to capital for environmentally friendly projects but also demonstrate their commitment to responsible business practices, attracting environmentally conscious investors and enhancing their reputation among stakeholders.Besides, the study emphasises the critical role of institutional investors in monitoring firm practices, thereby promoting robust corporate disclosure. Furthermore, our work sheds light on the impact of board composition, particularly the presence of independent and female directors, on disclosure. Moreover, the positive market responses, as evidenced by increased stock liquidity, improved ESG ratings, and reductions in Scope 1 carbon emissions, emphasise the impact of ESG lending. In addition, these companies tend to work with suppliers with strong ESG capabilities, suggesting that ESG principles have a chain effect in corporate networks. This study significantly enriches the emerging field of ESG financing research. As the world faces the challenges posed by climate change and environmental degradation, the role of green finance, particularly ESG lending, is important.

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Figure 1: Sustainability linked and green loan issuance over time

This figure illustrates the annual issuance of sustainability-linked and green loans during the sample period from 2017 to 2022.In each bar, the dark and light areas indicate sustainability-linked and green loan issuance amounts as a fraction of all loans, respectively (left y-axis). The dashed line indicates the total issuance amount of sustainability-linked and green loans combined (right y-axis).

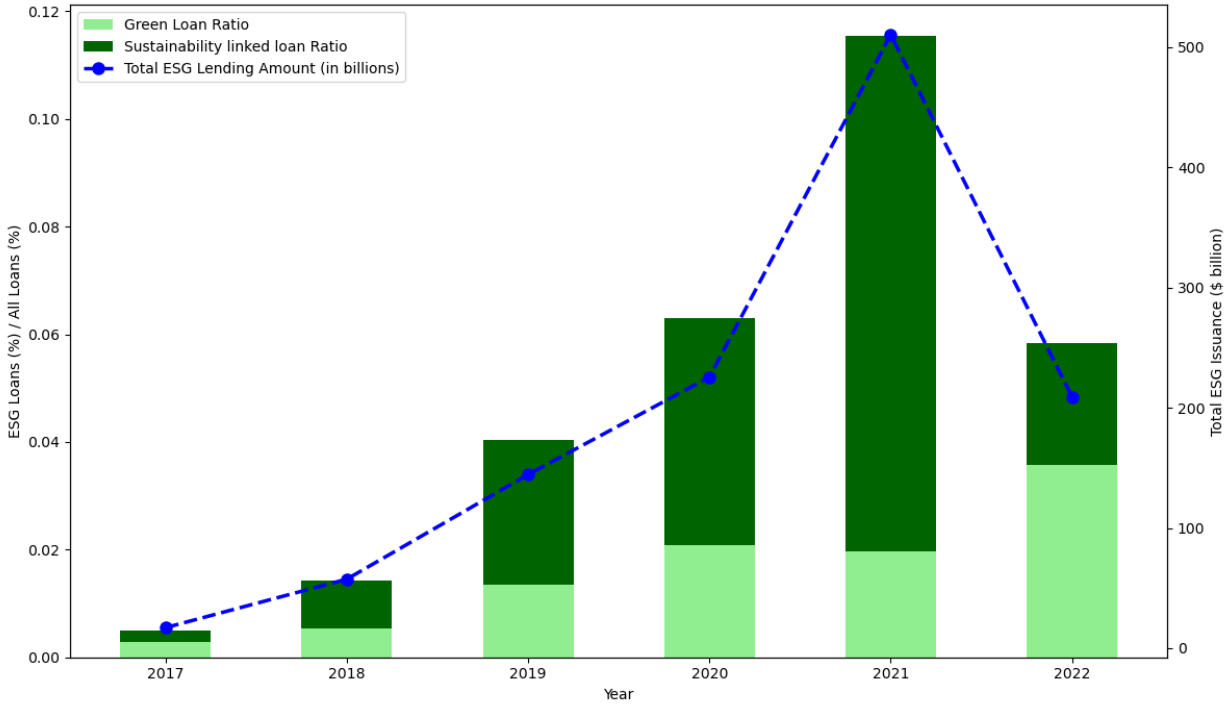

Figure 2: Geographical distribution of ESG lending

The world map shows the geographic distribution of ESG lending in different countries.The darker the green, the more issuances of ESG lending in a country.

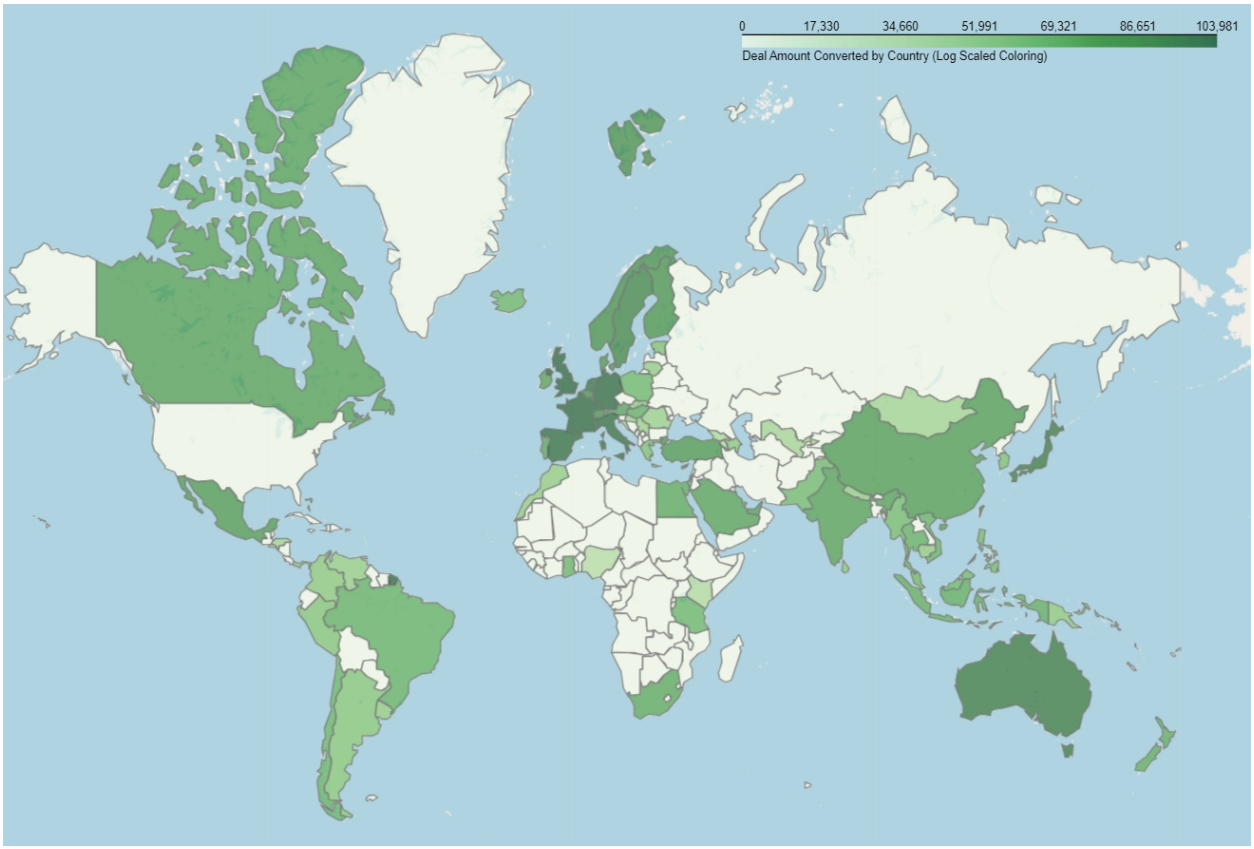

Figure 3: Parallel Trend Analysis - Trend 1

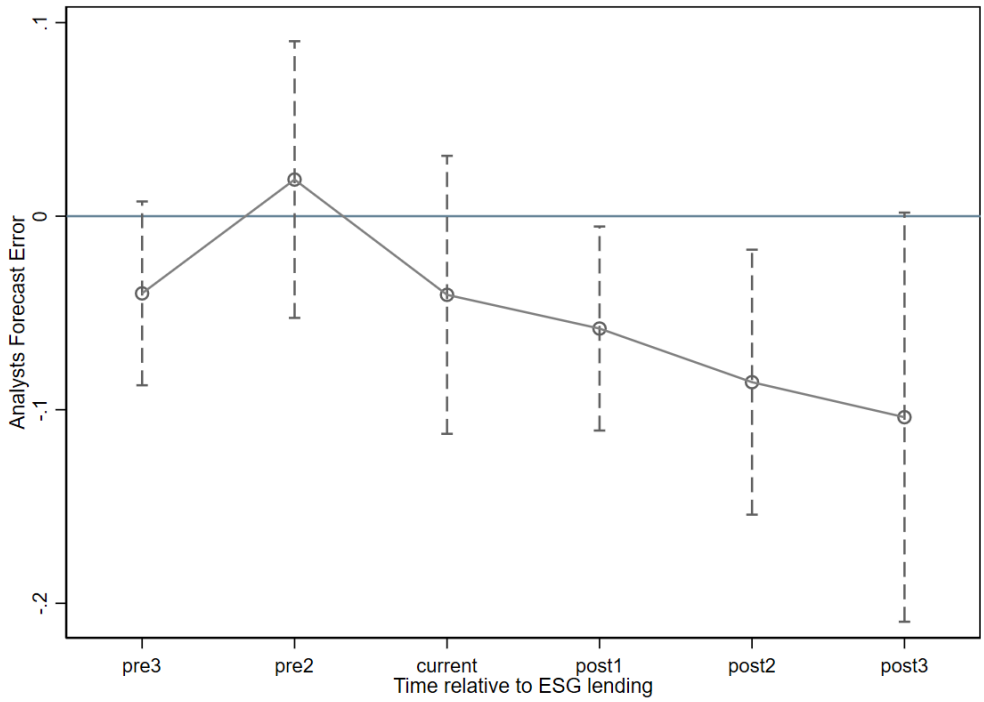

Figure 4: Parallel Trend Analysis - Trend 2

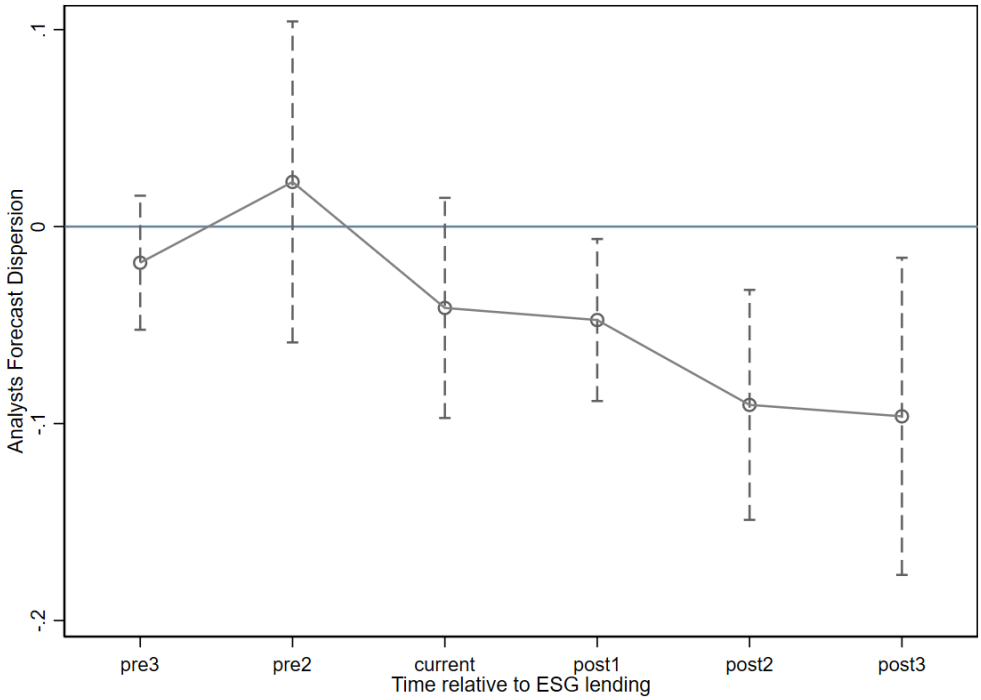

Table 1: : Descriptive Statistics for ESG lending

Table 1 presents the summary statistics for the sample of green loans, sustainability loans, and total ESG lending used in the analysis over the period from 2017 to 2022. Panel A delineates the yearly allocation of the loan types throughout the analysis period. Panel B displays the geographical distribution of these loans by country on an annual basis. Panel C categorizes the yearly dissemination of the loan types across various industry sectors.

panel A: ESG Lending over time

	Green Loan		Sustainability Loans		Total ESG Lending	
Year	Deals	$ billion	Deals	$ billion	Deals	$ billion
2017	56	9.96	11	13.16	67	23.12
2018	53	22.35	47	43.25	100	65.6
2019	144	50.49	141	100.06	285	150.55
2020	235	76.63	226	152.45	461	229.08
2021	287	99.28	578	461.33	861	555.36
2022	375	134.7	181	81.88	556	216.58
Total	1150	393.31	1184	852.13	2334	1245.44

panel B: ESG Lending by country

This table reports the total issuance amount and the number of sustainability-linked and green loan facilities by borrowers' country of incorporation.

Green loan			Sustainability linked loan			Total ESG Lending		
Country	Deals	billion	Country	Deals	billion	Country	Deals	billion
United States	150	62.62	United States	82	157.8	United States	232	220.41
United Kingdom	48	44.73	France	102	85.13	France	142	103.98
Spain	116	27.53	Germany	80	69.28	United Kingdom	139	103.38
Australia	76	26.85	Italy	61	63.91	Germany	106	92.3
Singapore	79	24.59	United Kingdom	91	58.65	Spain	246	79.26
Germany	26	23.02	Netherlands	44	54.06	Italy	109	76.61
Hong Kong	61	23.01	Spain	130	51.73	Singapore	138	55.82
Japan	166	22.48	Singapore	59	31.23	Netherlands	56	55.7
France	40	18.85	Sweden	19	24.47	Australia	103	48.57
Taiwan	29	15.34	Australia	27	21.71	Hong Kong	116	44.44
Italy	48	12.7	Hong Kong	55	21.43	Japan	252	43.41
China	24	7.55	Japan	86	20.93	Sweden	39	30.47
Saudi Arabia	7	6.5	Norway	20	18.31	Taiwan	74	27.59
India	29	6.44	Switzerland	18	17.36	Norway	27	19.24
Sweden	20	6	Belgium	14	16.18	Belgium	19	18.64
Qatar	3	5.82	Denmark	8	14.35	Switzerland	20	18.06
Luxembourg	10	4.23	Taiwan	45	12.25	Luxembourg	23	16.21
United Arab Emirates	9	4.06	Finland	32	12.08	Finland	43	16.05
Finland	11	3.97	Luxembourg	13	11.98	Denmark	11	14.54
Portugal	8	3.86	Mexico	8	11.55	Mexico	11	12.35
Egypt	3	3.78	Turkey	21	11	Turkey	26	11.71
Canada	13	3.15	Russian Federation	20	7.68	China	34	9.6
Hungary	2	2.5	Ireland	5	6.87	United Arab Emirates	16	8.93
Belgium	5	2.47	Austria	13	4.95	Russian Federation	22	7.86
South Africa	6	2.17	United Arab Emirates	7	4.87	India	32	7.71
Vietnam	15	2.14	Cayman Islands	3	4.37	Ireland	7	7.31
Indonesia	5	2.09	Canada	3	3.98	Canada	16	7.13
Tanzania	1	1.64	New Zealand	13	2.77	Saudi Arabia	7	6.5
Netherlands	12	1.63	Cyprus	3	2.6	Qatar	3	5.82
Chile	10	1.38	Bahrain	2	2.22	Austria	18	5.54
Virgin Islands (British)	2	1.01	Mauritius	3	2.2	Portugal	13	5.14
New Zealand	4	0.93	China	10	2.05	Cayman Islands	3	4.37
Norway	7	0.93	South Africa	7	1.97	South Africa	13	4.15
Mexico	3	0.8	Thailand	10	1.96	Egypt	5	3.99
Philippines	3	0.75	Brazil	4	1.9	New Zealand	17	3.69
Poland	7	0.74	Iceland	3	1.54	Indonesia	8	3.37
Turkey	5	0.71	Indonesia	3	1.28	Cyprus	4	3.14
Switzerland	2	0.7	Portugal	5	1.28	Thailand	17	2.61
Brazil	14	0.67	India	3	1.27	Brazil	18	2.56
Other countries	66	8.08	Other countries	50	10.73	Other countries	142	32.14
Total	1145	388.42	Total	1182	851.88	Total	2327	1240.3

panel C: ESG Lending by Industry

This table presents the aggregate issuance amount and the number of sustainability-linked and green loan facilities issued in each borrower industry.

	Green loan			Sustainability linked loan			Total ESG lending		
Industry	Amount (billion)	Deal	% to total	Amount (billion)	Deal	% to total	Amount (billion)	Deal	% to total
Utilities	210.91	582	54.3	110.13	135	12.93	321.04	717	25.88
Financial Services	46.83	120	12.06	101.39	127	11.9	148.23	247	11.95
Oil and Gas	3.78	14	0.97	65.85	31	7.73	69.63	45	5.61
Real Estate	36.37	125	9.36	31.77	80	3.73	68.14	205	5.49
REITS	11.32	59	2.91	43.73	70	5.13	55.04	129	4.44
General Manufacturing	7.66	32	1.97	63.17	99	7.42	70.83	131	5.71
Construction	10.45	25	2.69	29.83	58	3.5	40.27	83	3.25
Government	9.04	19	2.33	7.35	14	0.86	16.39	33	1.32
Healthcare	0.3	2	0.08	27.59	39	3.24	27.88	41	2.25
Transportation	8.68	27	2.23	20.22	29	2.37	28.91	56	2.33
Agriculture	0.77	3	0.2	7.51	20	0.88	8.27	23	0.67
Automotive	8	19	2.06	33.64	33	3.95	41.63	52	3.36
Restaurants	0.98	2	0.25	2.17	4	0.25	3.15	6	0.25
Hotel & Gaming	2.67	11	0.69	2.31	9	0.27	4.98	20	0.4
Beverage, Food, and Tobacco Processing	1	7	0.26	33.92	58	3.98	34.92	65	2.82
Paper & Packaging	1.13	6	0.29	13.22	19	1.55	14.36	25	1.16
Wholesale	4.37	8	1.13	23.3	32	2.74	27.67	40	2.23
Technology	0.92	4	0.24	38.91	42	4.57	39.82	46	3.21
Mining	1.84	7	0.47	4.58	13	0.54	6.42	20	0.52
Shipping	1.98	14	0.51	21.49	45	2.52	23.47	59	1.89
Chemicals, Plastics & Rubber	1.48	6	0.38	34.7	64	4.07	36.17	70	2.92
Telecommunications	1.05	3	0.27	31.47	30	3.69	32.52	33	2.62
Media	0.15	3	0.04	13.55	4	1.59	13.7	7	1.1
Services	1.61	7	0.41	19.66	29	2.31	21.27	36	1.71
Business Services	4.71	21	1.21	20.85	36	2.45	25.57	57	2.06
Retail & Supermarkets	2.75	6	0.71	28.84	40	3.39	31.59	46	2.55
Aerospace and Defense	0	0	0	11.09	5	1.3	11.09	5	0.89
Textiles and Apparel	0.03	1	0.01	2.84	11	0.33	2.87	12	0.23
Broadcasting	0	0	0	1.38	2	0.16	1.38	2	0.11
Leisure and Entertainment	0.1	1	0.03	1.23	1	0.14	1.33	2	0.11

Table 2: Descriptive Statistics

This table presents the summary statistics of the main variables in our sample. All variables are defined in the Appendix.All control variables are winsorized at the 1st and 99th percentile.

Variable	N	Mean	SD	p25	p50	p75
Analysts forecast error	21997	0.074	0.271	0.003	0.009	0.029
Analysts forecast error1	17307	0.072	0.262	0.003	0.01	0.029
Analyst forecast dispersion	19363	0.053	0.193	0.002	0.007	0.019
Analyst forecast dispersion1	15532	0.052	0.193	0.002	0.007	0.019
IO	17635	0.396	0.922	0.106	0.234	0.659
Top5 IO	17591	0.558	0.240	0.360	0.534	0.757
Block IO	17635	0.560	0.215	0.387	0.506	0.701
Independent directors	18019	9.397	5.347	5	9	12
Female directors	18019	13.14	15.08	4	9	17
Female independent directors	18019	2.664	2.415	1	2	4
Bid Ask Spread	21838	-6.126	1.313	-7.052	-6.091	-5.253
Amihud illiquidity	21847	-17	2.393	-18.6	-17.19	-15.61
Conference calls	16346	0.347	0.476	0	0	1
Conference calls1	13317	0.422	0.494	0	0	1
Conference calls frequency	16346	0.903	1.979	0	0	1
Conference calls frequency1	13317	1.101	2.132	0	0	2
ESG score	15239	0.524	0.197	0.374	0.536	0.681
Co2 Scope1	9130	0.31	1.672	0.002	0.011	0.112
Co2 Scope2	9024	0.092	3.168	0.004	0.015	0.05
Co2 Scope3	5770	1.043	7.763	0.005	0.094	0.538
New contracts	20743	1.54	0.981	1	1	2
Book to market	23065	0.766	0.668	0.303	0.594	1.031
ROE	23099	0.07	0.314	0.027	0.087	0.155
Leverage	23146	0.307	0.189	0.168	0.294	0.427
Tangibility	23136	0.192	0.471	0.059	0.28	0.475
Net profit margin	23121	0.058	0.29	0.013	0.05	0.113
FirmSize	23157	21.66	1.782	20.4	21.57	22.87

Table 3: Baseline

This table presents the impact of ESG lending issuance on corporate disclosure. Analysts forecast error is the average of the absolute errors of all forecasts made in the year for target earnings, scaled by the stock price at the beginning of the year. And analysts forecast error1 is the average of the absolute errors of all forecasts made for the subsequent year target earnings, scaled by the stock price at the beginning of the given year.Besides,analysts forecast dispersion is the standard deviation of analysts' earnings per share forecasts, divided by the stock's price at the beginning of the year. And analysts forecast dispersion1 is the standard deviation of analysts' earnings per share forecasts, divided by the stock price at the beginning of the given year. Industry, country, and year fixed effects are controlled for in the model. Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Analysts Forecast Error	(2) Analysts Forecast Error1	(3) Analyst Forecast Dispersion	(4) Analyst Forecast Dispersion1
ESG lending	-0.059**	-0.086***	-0.057**	-0.055**
	(-2.01)	(-2.58)	(-2.36)	(-2.26)
Book to market	0.066**	0.052**	0.044	0.062***
	(2.19)	(2.52)	(1.56)	(2.87)
ROE	0.013	0.041	0.057	0.091
	(0.14)	(0.26)	(0.56)	(0.56)
Leverage	0.416**	0.466**	0.429**	0.384*
	(2.42)	(2.03)	(2.27)	(1.76)
Tangibility	0.072*	0.111**	0.083**	0.079
	(1.86)	(2.31)	(2.22)	(1.55)
Net Profit Margin	-0.183*	-0.213	-0.253**	-0.232
	(-1.81)	(-1.25)	(-2.36)	(-1.37)
Firm Size	-0.033***	-0.018**	-0.016**	-0.007
	(-3.99)	(-2.29)	(-2.50)	(-0.91)
Constant	0.669***	0.337*	0.291**	0.096
	(3.90)	(1.81)	(2.22)	(0.56)
Observations	21,437	17,214	18,740	15,450
R-squared	0.072	0.071	0.064	0.059
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 4: The impact of green loan and SLL on corporate disclosure

This table presents the impact of green loan and SLL on corporate disclosure, respectively. Analysts forecast error is the average of the absolute errors of all forecasts made in the year for target earnings, scaled by the stock price at the beginning of the year. And analysts forecast error1 is the average of the absolute errors of all forecasts made for the subsequent year target earnings, scaled by stock price at the beginning of the given year.Likewise, Besides,analysts forecast dispersion is the standard deviation of analysts' earnings per share forecasts, divided by the stock's price at the beginning of the year. And analysts forecast dispersion1 is the standard deviation of analysts' earnings per share forecasts, divided by the stock price at the beginning of the given year. Industry, country, and year fixed effects are controlled for in the model. Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Panel A: Green loan				
VARIABLES	Analysts Forecast Error	Analysts Forecast Error1	Analyst Forecast Dispersion	Analyst Forecast Dispersion1
Green loan	-0.053	-0.056	-0.054*	-0.040
	(-1.37)	(-0.99)	(-1.88)	(-1.07)
Book to Market	0.066**	0.052**	0.044	0.062***
	(2.20)	(2.54)	(1.57)	(2.88)
ROE	0.013	0.041	0.057	0.091
	(0.13)	(0.25)	(0.56)	(0.56)
Leverage	0.416**	0.466**	0.429**	0.384*
	(2.42)	(2.03)	(2.27)	(1.76)
Tangibility	0.071*	0.110**	0.082**	0.079
	(1.85)	(2.30)	(2.22)	(1.54)
Net Profit Margin	-0.183*	-0.213	-0.253**	-0.232
	(-1.81)	(-1.25)	(-2.36)	(-1.37)
Firm Size	-0.034***	-0.019**	-0.017***	-0.008
	(-4.06)	(-2.40)	(-2.58)	(-0.98)

Constant	0.683***	0.354*	0.305**	0.108
	(3.98)	(1.91)	(2.32)	(0.63)
Observations	21,437	17,214	18,740	15,450
R-squared	0.072	0.071	0.064	0.059
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Panel B: Sustainability linked loan

VARIABLES	Analysts Forecast Error	Analysts Forecast Error1	Analyst Forecast Dispersion	Analyst Forecast Dispersion1
SLL	-0.067*	-0.104**	-0.061**	-0.066**
	(-1.85)	(-2.53)	(-2.02)	(-2.10)
Book to Market	0.066**	0.052**	0.044	0.062***
	(2.19)	(2.53)	(1.56)	(2.87)
ROE	0.013	0.042	0.057	0.092
	(0.14)	(0.26)	(0.56)	(0.56)
Leverage	0.416**	0.467**	0.429**	0.385*
	(2.42)	(2.03)	(2.27)	(1.77)
Tangibility	0.072*	0.110**	0.082**	0.079
	(1.85)	(2.30)	(2.22)	(1.54)
Net Profit Margin	-0.184*	-0.213	-0.254**	-0.232
	(-1.81)	(-1.25)	(-2.37)	(-1.37)
Firm Size	-0.033***	-0.018**	-0.016**	-0.007
	(-4.01)	(-2.30)	(-2.52)	(-0.91)
Constant	0.670***	0.337*	0.291**	0.096
	(3.91)	(1.81)	(2.23)	(0.55)
Observations	21,437	17,214	18,740	15,450
R-squared	0.072	0.071	0.064	0.059
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 5: Endogeneity Carbon Tax as an exogenous shock

This table presents the regression results of the ESG lending and firm disclosure using carbon tax enactment as an exogenous shock. We create an indicator variable that is equal to one if the regulation in the firm's country was passed and zero if it was not. We interact carbon tax with our ESG lending proxies to determine if firm disclousre become more important after the regulation is passed. esg lending is represented as 1 if a company has engaged in such activities within the year, and 0 otherwise It is different from ESG lending). Each model controls for industry, country, and year fixed effects. Standard errors are clustered by firm. All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Analysts Forecast Error	(2) Analysts Forecast Error1	(3) Analyst Forecast Dispersion	(4) Analyst Forecast Dispersion1
esg Lending*Carbon Tax	-0.048	-0.115**	-0.039	-0.090**
	(-0.837)	(-2.399)	(-0.899)	(-2.437)
esg Lending	-0.009	-0.010	-0.021	0.009
	(-0.543)	(-0.418)	(-1.590)	(0.577)
Carbon Tax	0.106	0.139	-0.005	0.121
	(0.877)	(0.737)	(-0.065)	(0.964)
book to market	0.065**	0.051**	0.049	0.065***
	(2.049)	(2.325)	(1.598)	(2.711)
ROE	0.018	0.046	0.061	0.096
	(0.176)	(0.275)	(0.576)	(0.566)
Leverage	0.434**	0.489**	0.454**	0.407*
	(2.387)	(2.011)	(2.266)	(1.765)
Tangibility	0.077*	0.118**	0.092**	0.085
	(1.885)	(2.311)	(2.346)	(1.566)
Net Profit Margin	-0.183*	-0.218	-0.268**	-0.243
	(-1.692)	(-1.186)	(-2.346)	(-1.342)
Firm Size	-0.034***	-0.019**	-0.016**	-0.007
	(-3.948)	(-2.250)	(-2.370)	(-0.887)
Constant	0.633***	0.275	0.274**	0.040
	(3.524)	(1.370)	(2.042)	(0.218)
Observations	20,487	16,435	17,890	14,738
R-squared	0.072	0.072	0.065	0.060
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 6: ESG lending, institutional ownership and company disclosure

This table illustrates that the increase in institutional investors has strengthened the impact of companies receiving ESG lending on their disclosures. Institutional ownership is defined as the percentage of market capitalization held by institutional investors.Top Five Institutional Ownership (Top 5 IO) which refers to the percentage of a firm's shares held by the 5 largest institutional investors. Block IO is the percentage of a company's shares owned by investors with a stake of at least 5%. Country-by-industry-by-year fixed effects are included in every regression. Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Analysts Forecast Error	(2) Analysts Forecast Error	(3) Analysts Forecast Error	(4) Analysts Forecast Error	(5) Analysts Forecast Error	(6) Analysts Forecast Error
IO*ESG lending	-0.261**	-0.397**				
	(-2.55)	(-2.33)				
IO	0.384***	0.382***				
	(15.01)	(16.23)				
Block IO*ESG lending			-0.314**	-0.278*		
			(-2.43)	(-1.95)		
Block IO			0.531***	0.545***		
			(3.24)	(3.04)		
Top5 IO*ESG lending					-0.338**	-0.303*
					(-2.10)	(-1.68)
Top5 IO					0.577***	0.600***
					(2.91)	(2.80)
ESG lending	0.016	0.059*	0.115*	0.099	0.129*	0.112
	(0.59)	(1.82)	(1.82)	(1.20)	(1.66)	(1.12)
Book to Market	0.090***	0.097***	0.049	0.053	0.049	0.052
	(3.49)	(4.00)	(1.13)	(1.26)	(1.10)	(1.22)
ROE	0.096	0.104	0.099	0.106	0.095	0.103
	(0.72)	(0.74)	(0.71)	(0.73)	(0.70)	(0.72)
Leverage	0.449**	0.427*	0.379*	0.354*	0.383*	0.354*
	(2.08)	(1.95)	(1.88)	(1.76)	(1.93)	(1.78)
Tangibility	0.071	0.055	0.083	0.067	0.085	0.069
	(1.44)	(1.09)	(1.61)	(1.27)	(1.62)	(1.29)
Net Profit Margin	-0.208	-0.203	-0.180	-0.173	-0.180	-0.173
	(-1.63)	(-1.53)	(-1.43)	(-1.33)	(-1.45)	(-1.34)
Firm Size	-0.044***	-0.044***	0.005	0.005	0.004	0.005
	(-4.39)	(-4.33)	(0.42)	(0.43)	(0.30)	(0.36)
Constant	0.717***	0.732***	-0.434	-0.443	-0.438	-0.464
	(3.49)	(3.48)	(-1.28)	(-1.20)	(-1.16)	(-1.14)
Observations	16,556	16,483	16,516	16,442	16,556	16,483
R-squared	0.128	0.162	0.074	0.108	0.074	0.110
Country FE	YES	NO	YES	NO	YES	NO
Industry FE	YES	NO	YES	NO	YES	NO
Year FE	YES	NO	YES	NO	YES	NO
Country*Year FE	NO	YES	NO	YES	NO	YES
Industry*Year FE	NO	YES	NO	YES	NO	YES

Table 7: ESG lending, board independence and diversity and corporate disclosure

This table presents the results of the impact of board diversity and independence on corporate disclosure. Independent director is the number of independent director on the board. Female Director counts the women serving on the board. Independent female directors is the total number of independent female directors on the board. Year, country, industry fixed effects are controlled for in the model. Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Analysts Forecast Error	(2) Analysts Forecast Error1	(3) Analysts Forecast Error	(4) Analysts Forecast Error1	(5) Analysts Forecast Error	(6) Analysts Forecast Error1
Independent*ESG lending	-0.003	-0.006***				
	(-1.08)	(-3.48)				
Independent	-0.004	-0.005				
	(-1.09)	(-1.05)				
Female directors*ESG lending			-0.002*	-0.004		
			(-1.74)	(-1.62)		
Female director			0.002	0.002		
			(1.51)	(1.49)		
Female independent*ESG lending					-0.010**	-0.019***
					(-2.01)	(-3.14)
Female independent					-0.005	0.004
					(-0.65)	(0.43)
ESG lending	-0.034	-0.026	-0.034	-0.023	-0.027	-0.019
	(-1.04)	(-0.84)	(-0.97)	(-0.54)	(-0.99)	(-0.67)
Book to Market	0.086*	0.063*	0.092**	0.070**	0.086*	0.067**
	(1.83)	(1.90)	(1.98)	(2.19)	(1.89)	(2.14)
ROE	0.037	0.061	0.036	0.060	0.037	0.062
	(0.38)	(0.35)	(0.37)	(0.34)	(0.38)	(0.35)
Leverage	0.517**	0.581**	0.534**	0.600**	0.520**	0.591**
	(2.30)	(1.98)	(2.33)	(2.01)	(2.29)	(1.97)
Tangibility	0.080*	0.120**	0.083*	0.124**	0.082*	0.122**
	(1.91)	(2.31)	(1.94)	(2.33)	(1.92)	(2.30)
Net Profit Margin	-0.094	-0.179	-0.088	-0.172	-0.091	-0.174
	(-1.01)	(-1.11)	(-0.95)	(-1.08)	(-0.99)	(-1.10)
Firm Size	-0.036***	-0.017	-0.052***	-0.036**	-0.040***	-0.028**
	(-2.96)	(-1.31)	(-3.47)	(-2.23)	(-3.43)	(-2.20)
Constant	0.747***	0.339	1.033***	0.663**	0.801***	0.519**
	(3.13)	(1.19)	(3.52)	(1.96)	(3.55)	(1.96)
Observations	16,970	13,857	16,970	13,857	16,970	13,857
R-squared	0.074	0.073	0.074	0.074	0.073	0.073
Country FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Table 8: The impact of ESG lending on environmental performance

This table explain the impact of ESG lending on environmental performance. ESG ratings of companies in year t obtained from the Refinitive database. Co2 Scope 1 is the direct greenhouse gas emissions from owned or controlled sources. CO2 Scope 2 emissions would refer to indirect greenhouse gases from the consumption of purchased electricity, heat, and steam, commonly reported in proportion to the company's revenue to facilitate comparison across firms and industries.CO2 Scope 3 emissions encompass all other indirect emissions from a company's activities, from sources not owned or directly controlled by the company. This includes emissions associated with the company's supply chain, product use, and other operational extents, again normalized per thousand units of revenue for standardization. Industry, country, and year fixed effects are controlled for in the model.Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	ESG Score	CO2 Scope 1	CO2 Scope 2	CO2 Scope 3
ESG lending	0.024***	-0.091**	0.005	-0.004
	(3.16)	(-1.99)	(0.58)	(-0.02)
Book to Market	-0.034***	0.033	-0.010	-0.100
	(-7.88)	(0.84)	(-0.74)	(-0.48)
ROE	0.005	0.030	-0.003	-0.528
	(1.20)	(0.63)	(-0.19)	(-1.11)
Leverage	-0.056***	0.399	-0.088	3.431
	(-3.54)	(1.47)	(-0.80)	(1.56)
Tangibility	0.016***	0.135***	0.009	0.462***
	(2.95)	(3.87)	(1.09)	(2.66)
Net Profit Margin	-0.018**	-0.067	-0.070	2.075
	(-2.14)	(-0.34)	(-1.31)	(0.81)
Firm Size	0.079***	-0.039*	-0.011	-0.213
	(45.73)	(-1.79)	(-1.27)	(-0.96)
Constant	-1.206***	0.981*	0.286	4.879
Observations	15,233	9,127	9,021	5,764
R-squared	0.496	0.209	0.125	0.122
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 9: The impact of ESG lending on stock liquidity

This table explain the impact of ESG lending on environmental performance.The bid ask spread is calculated using bid price minus ask price divided by the average of bid price and ask price. The larger the quoted spread, the less liquid the stock. Amihud illiquidity measure is calculated using absolute stock return divided by dollar trading volume on that day. We take the annual average of all available trading days for that calendar year. The higher the Amihud measure, the less liquid the stock. Because our liquidity measure is highly skewed, we take the logarithm. Industry, country, and year fixed effects are controlled for in the model. Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile.The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Bid ask spread	(2) Amihud illiquidity	(3) Bid ask spread	(4) Amihud illiquidity	(5) Bid ask spread	(6) Amihud illiquidity
ESG lending	-0.121***	-0.183**				
	(-3.74)	(-2.17)				
Green loan			0.011	-0.007		
			(0.16)	(-0.03)		
SLL					-0.145***	-0.241***
					(-3.86)	(-2.61)
Book to Market	0.332***	0.528***	0.333***	0.529***	0.332***	0.528***
	(21.53)	(14.17)	(21.57)	(14.19)	(21.55)	(14.18)
ROE	-0.147***	0.060	-0.147***	0.059	-0.146***	0.061
	(-5.53)	(1.28)	(-5.52)	(1.27)	(-5.51)	(1.30)
Leverage	0.425***	0.234*	0.425***	0.233*	0.426***	0.234*
	(7.00)	(1.81)	(6.99)	(1.81)	(7.01)	(1.82)
Tangibility	-0.134***	-0.217***	-0.136***	-0.220***	-0.134***	-0.217***
	(-4.86)	(-4.47)	(-4.92)	(-4.52)	(-4.88)	(-4.48)
Net Profit Margin	-0.088**	0.391***	-0.088**	0.391***	-0.088**	0.390***
	(-2.49)	(5.48)	(-2.51)	(5.46)	(-2.52)	(5.46)
Firm Size	-0.404***	-0.917***	-0.406***	-0.920***	-0.404***	-0.917***
	(-58.35)	(-64.26)	(-58.70)	(-64.41)	(-58.42)	(-64.22)
Constant	2.297***	2.419***	2.327***	2.464***	2.296***	2.413***
	(14.97)	(7.64)	(15.19)	(7.78)	(14.98)	(7.62)
Observations	21,830	21,839	21,830	21,839	21,830	21,839
R-squared	0.747	0.670	0.747	0.670	0.747	0.670
Country FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Table 10: ESG Lending and ESG disclosure.

This table presents the impact of ESG lending issuance on corporate disclosure. ESG disclosure score1 represents the score of a company's sustainability and governance disclosures in year t+1. The ESG disclosure score data are collected from Bloomberg. Industry, country, and year fixed effects are controlled for in the model. Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) ESG disclosure score	(2) ESG disclosure score1
ESG lending	2.657***	2.339***
	(5.75)	(4.50)
Book to market	-1.374***	-1.704***
	(-6.54)	(-7.20)
ROE	0.579**	0.253
	(2.18)	(0.84)
Leverage	-0.400	-0.430
	(-0.50)	(-0.51)
Tangibility	2.291***	2.392***
	(7.04)	(6.95)
Net Profit Margin	-0.677	-0.561
	(-1.46)	(-1.14)
Firm Size	4.734***	4.858***
	(51.86)	(51.60)
Constant	-60.101***	-61.444***
	(-29.99)	(-29.69)
Observations	19,800	16,185
R-squared	0.623	0.620
Country FE	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes

Table 11: Robustness test: The impact of ESG lending on conference calls

This table shows the impact of ESG lending on conference calls. Conference call issuance is a dummary variable set to one when a firm provides at least one conference call during year t, otherwise the value is 0. Conference call1 is a dummary variable set to one when a firm provides at least one conference call during subsequent year,otherwise the value is 0. Conference call frequency is the total count of conference call issued by a firm in year t. Conference call frequency1 is the total count of conference call issued by a firm in year t+1. Industry, country, and year fixed effects are controlled for in the model. Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	Conference calls	Conference calls1	Conference calls frequency	Conference calls frequency1
ESG lending	0.073	0.260*	0.121***	0.165***
	(0.62)	(1.77)	(3.32)	(4.03)
Book to market	-0.002	-0.168***	-0.036*	-0.104***
	(-0.04)	(-3.09)	(-1.72)	(-4.48)
ROE	0.051	-0.161**	-0.047*	-0.079***
	(0.69)	(-2.05)	(-1.88)	(-3.49)
Leverage	-0.494***	-0.841***	-0.197***	-0.278***
	(-2.86)	(-4.70)	(-3.10)	(-4.55)
Tangibility	-0.057	-0.084	-0.082***	-0.073***
	(-0.85)	(-1.27)	(-2.68)	(-2.84)
Net Profit Margin	-0.202***	-0.094	-0.069***	-0.082***
	(-2.59)	(-1.08)	(-2.61)	(-3.28)
Firm Size	0.263***	0.285***	0.084***	0.088***
	(13.01)	(13.90)	(9.31)	(9.85)
Constant	-13.791***	-8.829***	-9.247***	-4.361***
	(-12.18)	(-9.30)	(-13.83)	(-13.30)
Observations	16,312	13,288	16,340	13,312
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 12: Robustness test: Excluding U.S. firms

This table presents the impact of ESG lending issuance on corporate disclosure excluding U.S. firms. Each model controls for industry, country, and year fixed effects. Standard errors are clustered by firm. All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Analysts Forecast Error	(2) Analysts Forecast Error1	(3) Analyst Forecast Dispersion	(4) Analyst Forecast Dispersion1
ESG lending	-0.062*	-0.081**	-0.068**	-0.057*
	(-1.71)	(-2.06)	(-2.14)	(-1.80)
book to market	0.072**	0.058**	0.060*	0.076***
	(2.02)	(2.26)	(1.72)	(2.78)
ROE	-0.030	0.069	0.180	0.211
	(-0.15)	(0.19)	(0.73)	(0.53)
Leverage	0.584**	0.705**	0.686**	0.646*
	(2.19)	(1.97)	(2.13)	(1.76)
Tangibility	0.137**	0.196**	0.128**	0.144*
	(2.28)	(2.52)	(2.25)	(1.74)
Net Profit Margin	-0.173	-0.299	-0.348**	-0.356
	(-1.25)	(-1.12)	(-2.01)	(-1.22)
Firm Size	-0.039***	-0.028**	-0.028**	-0.016
	(-3.60)	(-2.34)	(-2.57)	(-1.20)
Constant	0.758***	0.487*	0.465**	0.204
	(3.47)	(1.79)	(2.31)	(0.77)
Observations	14,874	11,910	12,324	10,190
R-squared	0.081	0.077	0.071	0.065
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Appendix

Table 1: Results after propensity score matching

This table reports the diagnostic tests of the propensity score matching.Analysts forecast error is the average of the absolute errors of all forecasts made in the year for target earnings, scaled by the stock price at the beginning of the year. And analysts forecast error1 is the average of the absolute errors of all forecasts made for the subsequent year target earnings, scaled by the stock price at the beginning of the given year.Besides,analysts forecast dispersion is the standard deviation of analysts' earnings per share forecasts, divided by the stock's price at the beginning of the year. And analysts forecast dispersion1 is the standard deviation of analysts' earnings per share forecasts, divided by the stock price at the beginning of the given year.Industry, country, and year fixed effects are controlled for in the model. Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Analysts Forecast Error	(2) Analysts Forecast Error1	(3) Analyst Forecast Dispersion	(4) Analyst Forecast Disper-sion1
ESG lending	-0.064**	-0.087**	-0.057**	-0.055**
	(-2.19)	(-2.56)	(-2.38)	(-2.23)
Book to Market	0.067**	0.047**	0.044	0.055**
	(2.19)	(2.10)	(1.54)	(2.43)
ROE	-0.023	0.057	0.079	0.108
	(-0.23)	(0.31)	(0.70)	(0.58)
Leverage	0.402**	0.461**	0.420**	0.371*
	(2.36)	(2.02)	(2.22)	(1.72)
Tangibility	0.092**	0.119**	0.084**	0.079
	(2.48)	(2.37)	(2.22)	(1.43)
Net Profit Margin	-0.130	-0.282	-0.273**	-0.317
	(-1.03)	(-1.24)	(-2.00)	(-1.39)
Firm Size	-0.026***	-0.018**	-0.015**	-0.008
	(-3.59)	(-2.25)	(-2.24)	(-1.03)
Constant	0.510***	0.342*	0.258**	0.133
	(3.47)	(1.87)	(1.98)	(0.79)
Observations	21,105	16,955	18,472	15,209
R-squared	0.071	0.071	0.063	0.060
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Figure 5: Assessment of Covariate Balance Using Standardized Bias: Pre- and Post-Matching Evaluation

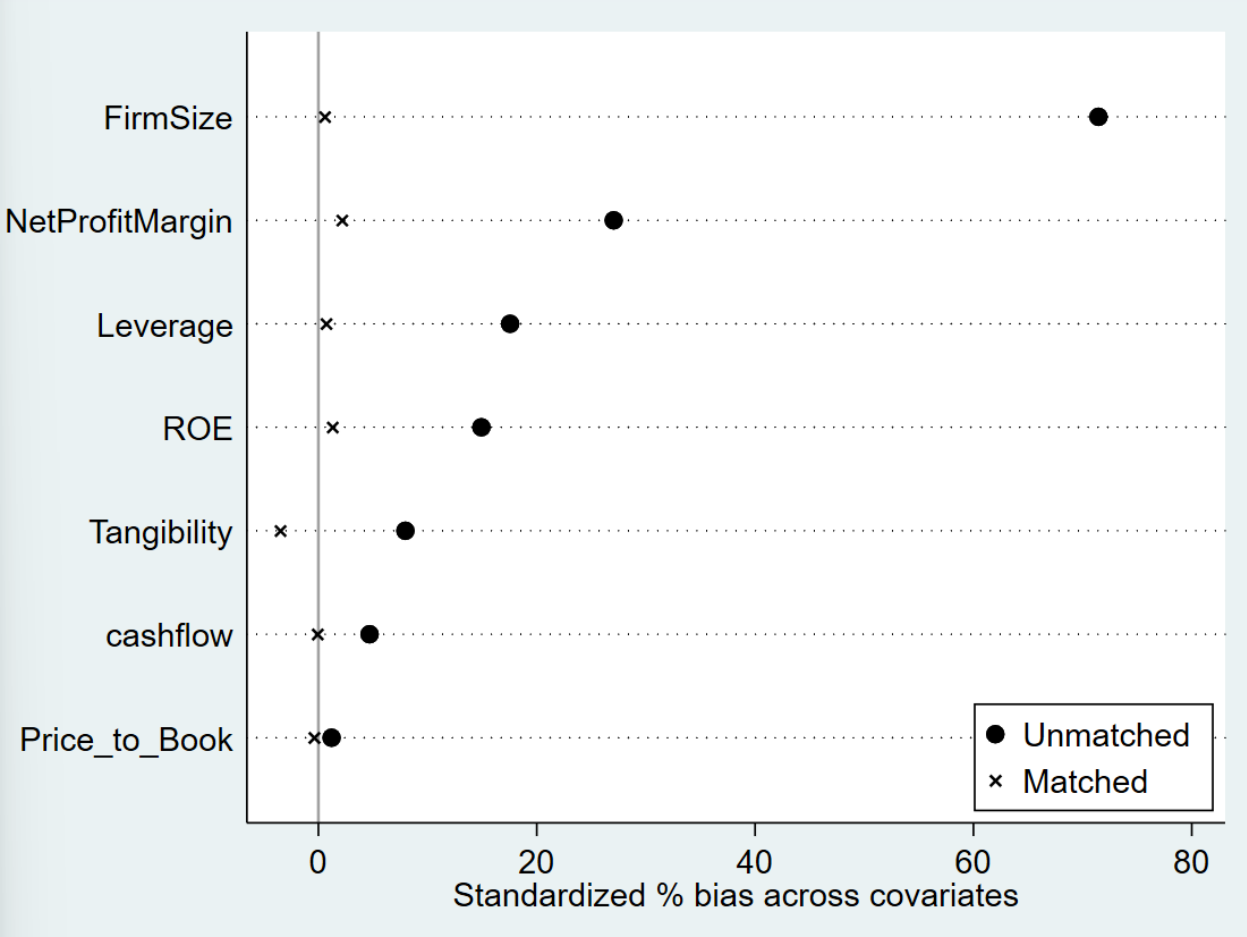

Table 2: The impact of ESG lending on sustainability compensation incentives

This table explain impact of ESG lending on sustainability compensation incentives. Sustainability compensation incentives is dummy variable. It means the senior executive's compensation linked to CSR, H&S and Sustainability targets Industry, country, and year fixed effects are controlled for in the model. Standard errors are clustered by firm.All control variables are winsorized at the 1st and 99th percentile. The symbols *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1) Sustainability Compensation Incentives	(2) Sustainability Compensation Incentives	(3) Sustainability Compensation Incentives
ESG lending	0.294***		
	(3.09)		
Green loan		0.153	
		(0.59)	
SLL			0.351***
			(3.35)
Book to market	0.004	0.001	0.002
	(0.08)	(0.03)	(0.05)
ROE	0.055	0.056	0.053
	(0.82)	(0.85)	(0.80)
Leverage	0.125	0.126	0.123
	(0.85)	(0.86)	(0.84)
Tangibility	0.094*	0.101*	0.094*
	(1.76)	(1.88)	(1.77)
Net Profit Margin	0.007	0.006	0.009
	(0.08)	(0.07)	(0.11)
Firm Size	0.355***	0.360***	0.355***
	(20.99)	(21.39)	(21.00)
Constant	-7.423***	-7.547***	-7.417***
	(-13.32)	(-13.54)	(-13.31)
Observations	15,080	15,080	15,080
Country FE	YES	YES	YES
Industry FE	YES	YES	YES
Year FE	YES	YES	YES

Table 3: Variable definitions

Variable	Definitions
Analysts Forecast Error	The average of the absolute errors of all forecasts made in the year for target earnings, scaled by the stock price at the beginning of the year
Analysts Forecast Error1	The average of the absolute errors of all forecasts made for the subsequent year (t+1) target earnings, scaled by the stock price at the beginning of the given year.
Analysts Forecast Dispersion	The standard deviation of analysts' earnings per share forecasts, divided by the stock's price at the beginning of the year
Analysts Forecast Dispersion1	The standard deviation of analysts' earnings per share forecasts, divided by the stock price at the beginning of the given year.
Top Five Institutional Ownership	The percentage of a firm's shares held by the 5 largest institutional investors.
Block IO	The percentage of a company's shares owned by investors with a stake of at least 5%
Independent director	The number of independent director on the board in year t
Female directors	The number of female directors on the board in year t
Independent female directors	The number of independent female directors on the board in year t
ESG Score	ESG ratings of companies in year t obtained from the Refinitive database.
Co2 Scope 1	Direct greenhouse gas emissions from owned or controlled sources.Carbon emissions per thousand units of net sales or revenue in year t.
Co2 Scope 2	Indirect greenhouse gas emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting company. Carbon emissions per thousand units of net sales or revenue in year t.
Co2 Scope 3	All other indirect emissions not covered in Scope 2 that occur in the value chain of the reporting company, including both upstream and downstream emissions.Carbon emissions per thousand units of net sales or revenue in year t.
Conference call issuance	A dummary variable set to one when a firm provides at least one conference call during year t, otherwise the value is 0.
Conference call issuance1	A dummary variable set to one when a firm provides at least one conference call during year t+1, otherwise the value is 0.
Conference call frequency	The total count of conference call issued by a firm in year t.
Conference call frequency1	The total count of conference call issued by a firm in year t+1.
Book to market	Common equity divided market capitalization in year t
Return on equity	Net income divided by shareholders' equity in year t.
Leverage	Total liabilities divided by total assets in year t.
Tangibility	The difference between common equity and total intangible assets (net) divided by the difference between total assets and total intangible assets (net) in year t.
Net profit margin	Net income divided by net revenues in year t.
Firm size	Logarithm of the total asset in the year t