

Article

Pro-Climate Lobbying and Corporate Default Risk: Evidence from U.S. Firms

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Abstract

This study examines whether pro-climate lobbying intensity is associated with corporate default risk. Using a panel of 4176 firm-year observations from U.S.-listed firms, we measure financial stability using distance-to-default and pro-climate lobbying intensity as annual pro-climate lobbying expenditure scaled by total assets. Fixed-effects estimates show that pro-climate lobbying intensity is positively and significantly associated with distance-to-default, indicating lower default risk. Economically, a one-standard-deviation increase in lobbying intensity corresponds to an approximately 0.084-unit increase in distance-to-default, equivalent to 1.39% of its sample mean. The evidence is consistent with signaling theory, as costly climate engagement may signal transition preparedness, and with stakeholder theory, as alignment with climate-conscious stakeholders may lower regulatory, reputational, and financing risks. The relationship remains evident after entropy balancing, controlling for lagged distance-to-default in a dynamic specification, and replacing distance-to-default with the Altman Z-score. It is also qualitatively robust to replace the comprehensive lobbying measure with a narrower text-based proxy that identifies pro-climate lobbying through explicit climate-related keywords. Split-sample analyses show a stronger association among firms with at-or-above-median environmental and social performance and among firms with at-or-above-median cash-flow and earnings volatility, suggesting that climate-policy engagement is most informative under greater operating uncertainty; these patterns remain descriptive pending formal coefficient-comparison tests. Overall, the study contributes to the corporate political activity, climate-finance, and credit-risk bodies of literature by showing that pro-climate lobbying carries information relevant to financial resilience and that its relevance varies with firms' sustainability performance and operating uncertainty.



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1. Introduction

Corporate climate lobbying refers to firms' efforts to influence federal climate legislation through lobbying reports, and it takes two directions often conflated in public debate: opposition to climate regulation ("anti-climate" lobbying) and support for it ("pro-climate" lobbying). [Leippold et al. \(2024\)](#) show that these two directions can be systematically identified using the political-party leanings of a firm's executives and hired lobbyists,

since firms whose associated individuals donate predominantly to Democratic candidates disproportionately lobby in favor of climate action, while those aligned with Republican candidates' lobby against it. This distinction matters because the two forms of lobbying are not mirror images of one another. Anti-climate lobbyists cluster in carbon-intensive sectors and are perceived by investors as riskier, commanding a return premium consistent with reputational, transition, legal, and political risk. Pro-climate lobbyists, by contrast, are systematically more green-innovative, suggesting that supporting climate regulation reflects a firm's underlying business model and its readiness for the low-carbon transition rather than a costless public-relations gesture. If pro-climate lobbying intensity credibly signals this preparedness, it should also be reflected in how credit markets assess a firm's risk of default, which motivates our focus on the relationship between pro-climate lobbying and distance-to-default.

Distance-to-default (DTD) is a market-based, forward-looking credit-risk measure derived from the structural model of [Merton \(1974\)](#), which treats a firm's equity as a call option on its assets, with default occurring when asset value falls below the face value of debt. DTD captures the number of standard deviations a firm's asset value must decline before crossing this threshold; a higher DTD signals greater financial resilience. Because it is estimated from equity prices and volatility, DTD reflects the market's continuously updated assessment of default risk and is therefore more forward-looking than accounting-based measures.

The link between pro-climate lobbying and DTD follows from channels already documented in the literature. [Safiullah et al. \(2024\)](#) show that U.S. firms with higher green innovation exhibit higher distance-to-default, operating through lower cash-flow volatility and reduced managerial risk-taking, while [Meles et al. \(2023\)](#) find a similar pattern in a European sample. Since [Leippold et al. \(2024\)](#) show that pro-climate lobbyists are themselves more green-innovative than anti-climate lobbyists, pro-climate lobbying intensity should proxy for the same risk-reducing characteristics. Firms lobbying in favor of climate policy are more likely to have already begun aligning their business models with the low-carbon transition, implying more stable cash flows and lower exposure to regulatory and reputational shocks, both of which mechanically raise distance-to-default under the Merton framework. This motivates our hypothesis that pro-climate lobbying intensity is positively associated with distance-to-default.

Signaling theory ([Spence, 1973](#)) and stakeholder theory ([Freeman, 2010](#)) motivate the hypothesized positive association: both imply that costly, credible climate-policy engagement is associated with more stable cash flows and lower asset-value volatility, which under the [Merton \(1974\)](#) framework raises distance-to-default. Section 2.2 develops these mechanisms and their implications for the heterogeneity analyses.

Two research streams inform this study: work on corporate climate lobbying, reviewed in Section 2.1, and climate-finance literature linking environmental performance to corporate default risk. These streams remain largely disconnected, since climate-lobbying studies mainly examine firms' lobbying motives, environmental behavior, legislative outcomes, and equity-market consequences, whereas default-risk studies focus on emissions, environmental performance, and green innovation without considering political engagement. This study connects the two streams by examining whether pro-climate lobbying intensity contains information about firms' financial resilience. By linking lobbying to distance-to-default, it extends the financial implications of climate lobbying from equity valuation to credit risk and identifies pro-climate lobbying as a potential indicator of transition preparedness, regulatory adaptability, and lower financial-distress exposure, a contribution that is important because it addresses the comparatively underexplored constructive side of corporate climate lobbying rather than treating all lobbying as regulatory obstruction.

We test these predictions using a panel of U.S.-listed firms spanning 2007 to 2022, with up to 10,525 firm-year observations for which pro-climate lobbying data are available. Our baseline analysis uses 4176 firm-year observations with complete data and estimates firm and year fixed-effects models with standard errors clustered at the firm level. We find that pro-climate lobbying intensity is positively and significantly associated with distance-to-default (coefficient = 7.262, $p < 0.01$), consistent with H1 and indicating that firms engaging more intensively in pro-climate lobbying exhibit lower default risk and greater financial stability. The finding remains robust when entropy balancing is used to improve covariate comparability between lobbying and non-lobbying firms (coefficient = 6.885, $p < 0.05$), when the lagged dependent variable is included in a dynamic fixed-effects specification (coefficient = 5.353, $p < 0.05$), and when Altman Z-Score replaces distance-to-default as the measure of financial distress (coefficient = 4.900, $p < 0.10$). Collectively, these tests reduce concerns that the baseline result is attributable to observable differences between firms, persistence in default risk, or reliance on a particular distress measure.

The results are also economically meaningful rather than merely statistically detectable. Based on the baseline coefficient and the sample standard deviation of pro-climate lobbying intensity (0.0115), a one-standard-deviation increase in lobbying intensity is associated with an increase of approximately 0.084 in distance-to-default (7.262×0.0115), equivalent to about 1.39% of its sample mean. The corresponding effects remain economically relevant in the entropy-balanced and dynamic specifications, at approximately 1.31% and 1.02% of mean distance-to-default, respectively. Moreover, the relationship is particularly pronounced among firms with stronger environmental and social performance. For firms with above-median environmental performance, a one-standard-deviation increase in pro-climate lobbying intensity corresponds to an increase of approximately 0.195 in distance-to-default, or 3.23% of its full-sample mean; for firms with above-median social performance, the comparable increase is approximately 0.167, or 2.78%. These split-sample patterns suggest that pro-climate lobbying is most strongly associated with financial resilience when it is supported by substantive environmental and stakeholder-oriented performance, although formal coefficient-difference tests are required before concluding that the subgroup estimates differ statistically.

Addressing the gaps in the existing literature, this study makes three principal contributions. First, it connects the emerging literature on corporate climate lobbying with research on corporate default risk by documenting that the direction and intensity of firms' political engagement on climate policy are associated with their financial resilience. Whereas prior studies largely examine the determinants, credibility, and environmental consequences of climate lobbying, we show that pro-climate lobbying also has implications for an important capital-market outcome: the firm's distance from default. Second, the study contributes to the credit-risk and sustainability bodies of literature by identifying pro-climate lobbying intensity as a distinct, forward-looking dimension of corporate climate-transition positioning. Consistent with signaling theory, sustained pro-climate lobbying may communicate credible information about transition preparedness; consistent with stakeholder theory, it may strengthen relationships with regulators, investors, communities, and other climate-conscious stakeholders. Both channels can reduce exposure to regulatory, reputational, and financing shocks, thereby supporting more stable cash flows and asset values. Third, the environmental- and social-performance analyses identify meaningful boundary conditions: the positive association is stronger among firms with above-median environmental and social scores, suggesting that external policy advocacy is most informative when accompanied by stronger underlying sustainability performance.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature, develops the theoretical arguments based on signaling theory and stakeholder

theory, and presents the hypothesis. Section 3 describes the U.S. sample, data sources, variable measurement, and empirical model specifications. Section 4 reports the descriptive statistics and multicollinearity diagnostics, presents the baseline fixed-effects results, evaluates robustness and endogeneity using entropy balancing, dynamic fixed-effects estimation, and Altman Z-Score, and examines heterogeneity across firms with different levels of environmental and social performance. Section 5 discusses the theoretical and policy implications of the findings and acknowledges the study's limitations and avenues for future research, and Section 6 concludes.

2. Literature Review and Hypothesis Development

2.1. Pro-Climate Lobbying and Corporate Default Risk

Recent research increasingly treats pro-climate lobbying as a revealed-preference form of corporate political activity rather than symbolic sustainability rhetoric, motivated primarily by Leippold et al. (2024), who explicitly quantify corporate anti- and pro-climate lobbying among U.S.-listed firms and show that pro-climate lobbyists exhibit significantly more green innovation, whereas anti-climate lobbyists are associated with more carbon-intensive business models and higher market-perceived risk. This distinction suggests that pro-climate lobbying may reflect genuine climate-transition preparedness rather than generic ESG engagement. Consistent with this view, Kwon et al. (2026) show that the direction of environmental lobbying provides an informative signal of firms' climate-transition strategy, as lobbying orientation predicts real environmental actions such as emissions, while innovation and lobbying operate as complementary responses to regulatory uncertainty. From a theoretical perspective, Kennard (2020) argues that firms with lower expected adjustment costs may support climate regulation because stricter environmental policy can shift market share toward better-prepared firms and away from competitors facing higher compliance costs. Importantly, recent evidence directly links green innovation to lower default risk. Meles et al. (2023), using a large European sample, find that green innovation is negatively associated with firms' default risk, measured through market-based default probability, Altman's Z-score, and Zmijewski's ZM-score, mainly through improved profitability and firm value channels. Similarly, Safiullah et al. (2024), using U.S. firm-year observations, show that firms with higher green innovation experience lower default risk measured by distance-to-default, probability of default, and CDS spreads, with lower cash flow volatility and reduced managerial risk-taking serving as important channels. Taken together, these studies suggest that pro-climate lobbying may indicate stronger green innovation capacity, better transition readiness, lower regulatory and cash-flow uncertainty, and improved financial resilience, all of which are consistent with higher distance-to-default.

The political-economy literature further suggests that firms' climate lobbying reflects strategic responses to climate-policy uncertainty, regulatory exposure, and emerging transition opportunities. Lerner and Osgood (2023) show that corporate support for climate policy diffuses through board networks, indicating that firms' constructive climate-policy engagement is shaped by governance linkages, learning, socialization, and competitive dynamics rather than being purely symbolic. Similarly, Baehr et al. (2026) find that firms with greater exposure to climate-related opportunities and regulatory concerns are more likely to engage in climate lobbying, spend more on lobbying, and direct their lobbying toward different government targets depending on the nature of their climate exposure. Kwon et al. (2026) further show that the direction of environmental lobbying provides an informative signal of firms' environmental stance and predicts real environmental actions, such as emissions, beyond what is captured by conventional environmental ratings. In a related corporate finance setting, Jiao et al. (2026) document that firms engaging in environmental lobbying experience less negative stock price reactions following the pas-

sage of environment-related legislation, while emissions decline for green lobbying firms. Collectively, these studies suggest that pro-climate lobbying may reflect firms' strategic climate-policy orientation, enhance regulatory preparedness, strengthen stakeholder confidence, and improve firms' ability to navigate climate-transition risks, thereby contributing to greater financial stability.

The finance literature provides additional evidence linking climate-oriented corporate actions to lower financial distress risk. Hoepner et al. (2024) show that ESG shareholder engagement reduces firms' downside risk, with particularly strong effects for environmental engagements, and lowers the likelihood of subsequent adverse environmental incidents. Similarly, Duong et al. (2025) document that firms with stronger carbon-risk management practices exhibit significantly lower credit default swap (CDS) spreads, indicating reduced credit risk and improved debt-market perceptions. Kacperczyk and Peydró (2026) further show that firms with higher carbon emissions receive less bank credit from decarbonization-committed lenders and subsequently reduce debt, leverage, size, and investment, highlighting the importance of climate alignment for financing access and credit-market outcomes. Direct evidence on corporate political activity and credit-market outcomes lends further support to this channel: Delis et al. (2024) show that lobbying by banks improves the performance of their corporate borrowers, particularly opaque and credit-constrained firms, consistent with lobbying conveying valuable information to credit markets rather than merely securing preferential regulatory treatment. More directly related to default risk, Chowdhury et al. (2026) find that firms with greater exposure to climate-related shocks, such as natural disasters, exhibit higher corporate default risk and face stricter credit terms from lenders, underscoring the relevance of climate-related factors for credit-market assessments of firm risk. Although these studies focus on climate engagement, carbon-risk management, and financing rather than lobbying per se, they identify several channels through which pro-climate lobbying may enhance financial resilience, including lower downside risk, improved creditworthiness, enhanced stakeholder legitimacy, and better access to capital markets. When combined with Leippold et al.'s (2024) evidence that pro-climate lobbyists are more green-innovative and strategically positioned for the climate transition, this literature provides strong theoretical and empirical support for the hypothesis that greater pro-climate lobbying intensity is associated with higher distance-to-default and lower default risk.

2.2. Theoretical Framework and Hypothesis Development

Two complementary theoretical perspectives motivate the hypothesized positive association between pro-climate lobbying intensity and distance-to-default, and each operates through more than one distinct mechanism.

Signaling theory (Spence, 1973) predicts that, under information asymmetry, agents undertake costly and observable actions to credibly reveal private information that outside parties cannot otherwise verify. Pro-climate lobbying plausibly operates as such a signal through two mechanisms. First, a regulatory-preparedness mechanism: firms that anticipate tightening climate policy have an incentive to lobby in its favor, so lobbying direction reveals private information about a firm's own assessment of its transition-risk exposure. Second, a financing-access mechanism: because sustained lobbying expenditure is costly and worthwhile mainly for firms that expect to benefit from, rather than be harmed by, climate regulation, it is a more credible signal of transition readiness than low-cost public statements, and this credibility can lower the risk premium demanded by capital providers.

Stakeholder theory (Freeman, 2010) predicts that firms that proactively manage relationships with a broad set of stakeholders build relational capital that reduces exposure to stakeholder-driven risks. Applied to pro-climate lobbying, this operates through two

further mechanisms. Third, a stakeholder-support mechanism: firms that visibly align their political activity with climate-conscious investors, creditors, customers, and communities strengthen relational capital that can be drawn on during regulatory or reputational stress. Fourth, a climate-risk-management mechanism: firms that lobby for climate policy are more likely to have already integrated climate-transition planning into their broader risk-management practices, translating into more stable cash flows and lower asset-value volatility. Both channels therefore imply lower cash-flow and asset-value volatility, which under the Merton (1974) framework mechanically raises distance-to-default.

These mechanisms also generate ex ante predictions about when the association should be strongest, motivating the heterogeneity analyses in Section 4.5. If pro-climate lobbying is most credible when corroborated by substantive underlying conduct, the association should be stronger among firms with higher environmental and social performance, since their lobbying is less likely to be dismissed as symbolic. Similarly, because signaling is most valuable when a firm's prospects are otherwise difficult to assess, the association should be stronger among firms with higher cash-flow and earnings volatility. These predictions are developed prior to estimation and evaluated descriptively in Section 4.5, pending formal coefficient-equality or interaction tests.

H1. *Pro-climate lobbying intensity is positively associated with firms' distance-to-default.*

3. Data and Research Design

This section describes the sample-selection process, data sources, variable measurement, and empirical methodology employed in the study. Using a panel of U.S.-listed firms from 2007 to 2022, we combine firm-level pro-climate lobbying data with financial, market, and sustainability information obtained from established databases. We first explain the construction of distance-to-default, pro-climate lobbying intensity, and the control variables. We then present the fixed-effects regression framework used to test the association between pro-climate lobbying intensity and corporate default risk, followed by the robustness, endogeneity, and split-sample analyses.

3.1. Sample Selection and Data Sources

The study employs a panel of U.S.-listed firms covering the period from 2007 to 2022. Data on firms' pro-climate lobbying activities are obtained from the corporate climate-lobbying dataset developed by Leippold et al. (2024). This dataset identifies the direction of corporate climate lobbying and provides firm-level estimates of expenditures associated with lobbying in support of climate-related policies. We merge these data with financial and market information obtained from LSEG Refinitiv. Specifically, LSEG Refinitiv provides the accounting variables used to construct the firm-level controls, including firm age, firm size, leverage, return on assets, market-to-book ratio, property, plant and equipment intensity, current ratio, capital expenditure intensity, cash-flow volatility, earnings volatility, and interest coverage. Environmental and social pillar scores used in the split-sample analyses are also obtained from LSEG Refinitiv.

Distance-to-default data are obtained from the Credit Research Initiative database maintained by the National University of Singapore. The final sample is constructed by matching the lobbying, default-risk, and financial datasets at the firm-year level and retaining U.S. firm-year observations with the information required for each empirical specification. Consequently, the number of observations varies across analyses according to data availability. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of extreme observations. The resulting dataset allows us to examine whether the intensity of firms' pro-climate lobbying is associated with their distance-to-

default while accounting for observable firm characteristics and unobserved time-invariant firm heterogeneity.

The original corporate climate-lobbying dataset contains 15,945 firm-year observations with information on pro-climate lobbying expenditure. After matching the lobbying data with the CRI distance-to-default data and LSEG Refinitiv financial information at the firm-year level, the merged analysis panel contains 10,525 potentially usable observations. The baseline regression requires complete information on distance-to-default, pro-climate lobbying intensity, and all baseline control variables. Removing observations with missing values for any of these variables results in a final baseline sample of 4176 firm-year observations. Environmental and social pillar scores are not baseline controls and therefore do not determine baseline-sample inclusion; their more limited coverage instead reduces only the environmental- and social-performance subsamples, as summarized below in Table 1.

Table 1. Selection of sample.

Sample-Selection Stages	Observations
Original climate-lobbying observations	15,945
Merged analysis panel (matched to CRI distance-to-default and LSEG Refinitiv)	10,525
Complete baseline estimation sample	4176
Environmental-performance split-sample regressions	3578
Social-performance split-sample regressions	3569

3.2. Variable Measurement

3.2.1. Dependent Variable: Default Risk

The extant literature employs both accounting-based and market-based measures of default risk. Market-based measures are generally preferred, as they are forward-looking, incorporate real-time market information, and exhibit superior explanatory power relative to accounting-based alternatives. Following prior studies (Atif & Ali, 2021; Kabir et al., 2021; Vivel-Búa et al., 2023), we adopt distance-to-default (DD_t) as our primary proxy for default risk.

Distance-to-default is derived from the structural credit-risk model of Merton (1974) and is estimated as follows:

$$DD_t = \frac{\ln\left(\frac{V_{A,t}}{X_t}\right) + \left(\mu - \frac{1}{2}\sigma_A^2\right)(T - t)}{\sigma_A\sqrt{T - t}} \quad (1)$$

where $V_{A,t}$ denotes the market value of firm assets, assumed to follow a geometric Brownian motion with drift μ and volatility σ_A^2 ; X_t is the default point, defined as short-term liabilities plus one-half of long-term liabilities; and the time horizon $\sqrt{(T - t)}$ is set to one year. A lower distance-to-default indicates a higher probability of default, and vice versa. Distance-to-default data are obtained from the Credit Research Initiative (CRI) database at the National University of Singapore, which refines the traditional distance-to-default estimation using the technique proposed by Duan et al. (2012).

3.2.2. Main Independent Variable: Pro-Climate Lobbying

The main independent variable is pro-climate lobbying intensity, obtained from the corporate climate-lobbying dataset developed by Leippold et al. (2024). The authors construct the measure from quarterly federal lobbying reports filed under the U.S. Lobbying Disclosure Act. First, they identify climate-related lobbying issues when a report's description contains climate-specific keywords, such as climate change, carbon emissions, renewable energy, clean energy, or energy efficiency, or refers to a climate-related congress-

sional bill. Because lobbying reports disclose total expenditure but not expenditure for each individual issue, the climate-related amount is estimated by allocating the report's total lobbying expenditure proportionally according to the number of climate-related issues contained in the report.

Because lobbying reports generally do not disclose whether a firm supports or opposes the identified climate policy, Leippold et al. (2024) infer lobbying direction from political contributions made by the firm's executives or, when executive contribution data are unavailable or inconclusive, its hired lobbyists. A climate-related lobbying report is classified as pro-climate when the associated executives allocate at least 75% of their political contributions during the preceding three years to the Democratic Party, which the authors identify as having a comparatively pro-climate policy orientation. Executive teams must also have contributed more than \$1000. When executive-based classification is unavailable, the authors apply a similar 75% threshold to lobbyists' historical political contributions. Pro-climate lobbying expenditures are subsequently aggregated across all reports and four quarters for each firm-year. To account for differences in firm size, the annual expenditure is divided by total assets. Accordingly, pro-climate lobbying intensity is defined as follows:

$$\text{Pro - Climate Lobbying Intensity}_{i,t} = \frac{\sum \text{Pro - Climate Lobbying Expenditure}_{i,q,t}}{\text{Total Assets}_{i,t}}$$

Higher values indicate that a firm devotes a greater proportion of its assets to lobbying associated with a pro-climate political orientation, whereas zero indicates that no pro-climate lobbying expenditure is identified under the classification procedure. Importantly, the variable represents an inferred lobbying stance rather than a directly disclosed position on individual legislation. Nevertheless, the measure provides a systematic firm-year indicator of the intensity of corporate political engagement in support of a comparatively pro-climate policy agenda (Leippold et al., 2024).

Two measurement limitations are worth noting explicitly. First, the underlying lobbying-disclosure data are drawn from federal Lobbying Disclosure Act filings, which report lobbying conducted directly by the filing firm; they do not separately isolate lobbying conducted indirectly through trade associations or industry coalitions, so pro-climate lobbying intensity as measured here should be interpreted as a lower bound on a firm's total pro-climate political engagement. Second, because lobbying direction is inferred from issue descriptions and associated legislation rather than from a firm's own statement of intent, the classification is a proxy for revealed political preference rather than a directly observed one and is more informative about the direction of a firm's political activity than about the magnitude of its influence on legislative outcomes.

3.2.3. Alternative Independent Variable: Pro-Climate Lobbying Intensity-Text-Based

As an alternative proxy, the study employs text-based pro-climate lobbying intensity. Unlike the comprehensive measure, which identifies climate-related lobbying through either explicit climate keywords or references to climate-related congressional bills, the text-based measure identifies lobbying activity solely from climate-specific keywords contained in lobbying-report issue descriptions. It therefore excludes lobbying identified only through bill titles, bill numbers, or other legislative references. The lobbying-direction classification, expenditure-allocation procedure, and annual firm-level aggregation follow the same approach used for the primary measure (Leippold et al., 2024).

To maintain comparability with the comprehensive measure, annual text-identified pro-climate lobbying expenditure is scaled by total assets:

$$\text{Pro-Climate Lobbying Intensity-Text-Based}_{i,t} = \text{Annual Text-Identified Pro-Climate Lobbying Expenditure}_{i,t} / \text{Total Assets}_{i,t}$$

Higher values indicate greater text-identifiable pro-climate lobbying expenditure relative to firm size, whereas zero indicates that no pro-climate lobbying expenditure is identified through explicit climate-related keywords. Because this proxy applies a narrower identification criterion, it provides a robustness test of whether the main findings depend on the comprehensive measure's inclusion of climate-related bill references.

3.2.4. Control Variables

Following prior research on climate-related corporate activities and default risk, we include a comprehensive set of firm-level control variables that may affect both pro-climate lobbying decisions and firms' financial stability (Atif & Ali, 2021; Kabir et al., 2021; Leippold et al., 2024; Safiullah et al., 2024). Firm age, measured as the natural logarithm of firm age, controls for organizational maturity, operating experience, and established relationships with external stakeholders. Firm size, measured as the natural logarithm of total assets, accounts for differences in operational scale, resource availability, political engagement capacity, and access to external financing. Leverage, calculated as total liabilities divided by total assets, captures firms' financial obligations and exposure to debt-servicing pressure. Return on assets (ROA), measured as net income scaled by total assets, controls for profitability and firms' ability to generate sufficient resources to meet their financial commitments. Market-to-book ratio, calculated as the trading price divided by book value per share, captures growth opportunities and market expectations regarding firms' future performance.

We further control for PPE intensity, measured as net property, plant, and equipment scaled by total assets, because asset tangibility may affect both borrowing capacity and exposure to climate-transition risk. Current ratio, calculated as current assets divided by current liabilities, captures short-term liquidity and firms' ability to satisfy current obligations. Capital expenditure intensity, measured as capital expenditure scaled by total assets, controls for investment activity and capital requirements. Because fluctuations in internal resources and operating performance can materially influence default risk, we include cash-flow volatility and earnings volatility, measured as the rolling three-year standard deviations of operating cash flow and earnings, respectively. Finally, interest coverage, calculated as earnings before interest and taxes divided by interest expense, captures firms' debt-servicing capacity. All relevant accounting variables are obtained from LSEG Refinitiv, with the required ratios and transformations calculated by the authors. Social and environmental pillar scores are used separately in the heterogeneity analyses rather than as baseline control variables.

Table 2 below provides a full collection of variable definitions, data sources, and relevant references.

Table 2. Variable definitions, data sources, and references.

Variable	Definition and Measurement	Data Source	Reference(s)
DTD (Mean)	Mean value of distance-to-default (DTD); higher values indicate lower default risk.	RMI–CRI, National University of Singapore	(Atif & Ali, 2021; Kabir et al., 2021; Vivel-Búa et al., 2023; Safiullah et al., 2024)
Altman Z-Score	Alternative accounting-based measure of financial distress; higher values indicate lower financial-distress risk and greater financial stability. Calculated as follows: $Z = 1.2(WC/TA) + 1.4(RE/TA) + 3.3(EBIT/TA) + 0.6(MVE/TL) + 1.0(Sales/TA)$.	LSEG Refinitiv; authors' calculation	(Altman, 1968)
Pro-Climate Lobbying Intensity	Pro-Climate Lobbying Intensity _{i,t} = $[\sum_{q=1, \dots, 4}]$; Pro-Climate Lobbying Expenditure _{i,φ,t} /Total Assets _{i,t} .	Corporate Climate Lobbying dataset	(Leippold et al., 2024)
Firm Age	Natural logarithm of firm age.	LSEG Refinitiv; authors' calculation	(Kabir et al., 2021; Leippold et al., 2024; Safiullah et al., 2024)
Firm Size	Natural logarithm of total assets.	LSEG Refinitiv; authors' calculation	(Kabir et al., 2021; Leippold et al., 2024; Safiullah et al., 2024)
Leverage	Total liabilities divided by total assets.	LSEG Refinitiv; authors' calculation	(Kabir et al., 2021; Leippold et al., 2024; Safiullah et al., 2024)
Return on Assets (ROA)	Net income divided by total assets.	LSEG Refinitiv; authors' calculation	(Kabir et al., 2021; Safiullah et al., 2024)
Market-to-Book	Market price per share divided by book value per share.	LSEG Refinitiv	(Kabir et al., 2021; Safiullah et al., 2024)
PPE Intensity	Net property, plant, and equipment divided by total assets.	LSEG Refinitiv; authors' calculation	--
Current Ratio	Total current assets divided by total current liabilities, conditional on positive current liabilities.	LSEG Refinitiv; authors' calculation	--
Capital Expenditure Intensity	Capital expenditure divided by total assets.	LSEG Refinitiv; authors' calculation	--
Cash-Flow Volatility	Three-year rolling volatility of operating cash flow.	LSEG Refinitiv; authors' calculation	--
Earnings Volatility	Three-year rolling volatility of earnings.	LSEG Refinitiv; authors' calculation	--

Table 2. Cont.

Variable	Definition and Measurement	Data Source	Reference(s)
Interest Coverage	Earnings before interest and taxes (EBIT) divided by interest expense.	LSEG Refinitiv; authors' calculation	--
Social Score	LSEG Refinitiv social pillar score, used to partition the sample for heterogeneity analysis.	LSEG Refinitiv	(Atif & Ali, 2021)
Environmental Score	LSEG Refinitiv environmental pillar score, used to partition the sample for heterogeneity analysis.	LSEG Refinitiv	(Atif & Ali, 2021)

Notes: This table presents the definitions, data sources, and primary references for the variables used in the empirical analysis. Social Score and Environmental Score are used to partition the sample for heterogeneity analysis and are not included as baseline controls. All continuous variables are winsorized at the 1st and 99th percentiles unless otherwise noted. For Altman Z-Score, WC denotes working capital, TA total assets, RE retained earnings, EBIT earnings before interest and taxes, MVE market value of equity, and TL total liabilities.

3.3. Empirical Model Specification

To examine the association between pro-climate lobbying intensity and corporate default risk, we first estimate the following baseline fixed-effects regression:

$$DTD_{i,t} = \alpha + \beta_1 ProClimateIntensity_{i,t} + \gamma' Controls_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (2)$$

where $DTD_{i,t}$ denotes the distance-to-default of firm i in year t . Higher DTD values indicate lower default risk and greater financial stability. $ProClimateIntensity_{i,t}$ represents annual pro-climate lobbying expenditure scaled by total assets. The coefficient of interest is β_1 , which captures the association between pro-climate lobbying intensity and distance-to-default. Consistent with the study hypothesis, β_1 is expected to be positive. The control-variable vector includes firm age, firm size, leverage, return on assets, market-to-book ratio, PPE intensity, current ratio, capital expenditure intensity, cash-flow volatility, earnings volatility, and interest coverage. Firm fixed effects (μ_i) control for time-invariant firm characteristics, while year fixed effects (λ_t) account for economy-wide shocks and other temporal factors common to all firms. Standard errors are clustered at the firm level to address heteroskedasticity and within-firm serial correlation.

To reduce observable differences between firms engaging and not engaging in pro-climate lobbying, we subsequently employ entropy balancing. Firms with positive pro-climate lobbying intensity constitute the treatment group, whereas firms reporting no pro-climate lobbying constitute the control group. Entropy balancing reweights control observations so that the covariate distributions of the two groups are comparable. We then re-estimate the baseline fixed-effects model using the entropy-balancing weights:

The treatment/control split is defined at the extensive margin, that is, by lobbying presence rather than lobbying intensity, because entropy balancing is designed to equate the covariate distributions of two discrete groups; it is not intended to balance covariates continuously across a graded treatment. Having balanced the sample on this basis, we retain the continuous intensity measure, rather than a binary lobbying indicator, in the subsequent regression because our hypothesis concerns the intensive margin: whether firms that lobby more heavily exhibit correspondingly lower default risk, not merely whether lobbying occurs at all. The entropy-balancing weights therefore serve to make the control firms a more credible counterfactual for the treated firms' observable characteristics, while the regression itself continues to test for a graded, intensity-based association.

$$DTD_{i,t} = \alpha + \beta_1 ProClimateIntensity_{i,t} + \gamma' Controls_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (3)$$

As an additional robustness test, we estimate a dynamic fixed-effects model that incorporates the one-year lag of the dependent variable:

$$DTD_{i,t} = \alpha + \rho DTD_{i,t-1} + \beta_1 ProClimateIntensity_{i,t} + \gamma' Controls_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (4)$$

Including $DTD_{i,t-1}$ accounts for the persistence of corporate financial condition and helps determine whether pro-climate lobbying intensity retains explanatory power after controlling for prior default-risk levels.

We also replace DTD with the Altman Z-score as an alternative measure of financial distress:

$$AltmanZ_{i,t} = \alpha + \beta_1 ProClimateIntensity_{i,t} + \gamma' Controls_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (5)$$

Because higher Altman Z-scores indicate lower financial-distress risk, a positive β_1 would provide evidence consistent with the baseline findings.

To assess whether the baseline findings are sensitive to the measurement of the main independent variable, we re-estimate the baseline model using Pro Climate Intensity—Text-Based as an alternative proxy. This measure identifies pro-climate lobbying expenditures solely through explicit climate-related keywords contained in lobbying-report issue descriptions and scales the annual text-identified amount by total assets. Unlike the comprehensive measure, it excludes lobbying identified only through references to climate-related bills. The alternative-proxy model is specified as follows:

$$DTD_{i,t} = \alpha + \beta_1 ProClimateIntensity_{i,t}^{Text} + \gamma' Controls_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (6)$$

The dependent variable, control variables, firm and year fixed effects, and firm-level clustering remain unchanged from the baseline specification. A positive and statistically significant β_1 would indicate that the positive association between pro-climate lobbying and distance-to-default is not dependent on the comprehensive lobbying measure's inclusion of climate-related bill references. The specification therefore provides a direct test of measurement robustness using a narrower, text-based proxy for the principal independent variable.

Finally, we conduct split-sample analyses to examine whether the association between pro-climate lobbying intensity and distance-to-default varies with firms' environmental performance, social performance, and operating volatility. First, the sample is divided into firms with environmental pillar scores below the sample median and firms with scores at or above the median, and the baseline fixed-effects model is estimated separately for the two groups. Second, the same procedure is applied using the social pillar score. Third, the sample is divided at the pooled median of three-year cash-flow volatility. Fourth, the corresponding split is performed using three-year earnings volatility. The following model is estimated independently for each subsample:

$$DTD_{i,t}^g = \alpha^g + \beta_1^g ProClimateIntensity_{i,t} + \gamma^{g'} X_{i,t}^g + \mu_i + \lambda_t + \varepsilon_{i,t} \quad (7)$$

where g indexes the below-median and at-or-above-median subsamples formed using the environmental pillar score, social pillar score, three-year cash-flow volatility, or three-year earnings volatility. Distance-to-default remains the dependent variable, pro-climate lobbying intensity is the principal independent variable, and X denotes the applicable set of firm-level controls. The full set of controls is retained in the environmental- and social-performance analyses. In the cash-flow-volatility split, cash-flow volatility is omitted because it is the partitioning variable, while earnings volatility is retained. Conversely, in the earnings-volatility split, earnings volatility is omitted, and cash-flow volatility is retained. All specifications include firm and year fixed effects, with standard errors clustered at the firm level. Comparisons of the estimated coefficients provide descriptive evidence on whether the financial relevance of pro-climate lobbying varies with firms' sustainability performance and operating uncertainty. The volatility splits represent heterogeneity analyses rather than tests of mediation. Differences in coefficient magnitude or statistical significance should not be interpreted as statistically significant cross-group differences unless supported by a formal coefficient-equality or interaction test.

4. Empirical Results and Discussion

This section presents and discusses the empirical findings of the study. We begin by reporting the descriptive statistics to provide an overview of the distributional properties of distance-to-default, pro-climate lobbying intensity, and the firm-level control variables. We then present multicollinearity diagnostics to ensure that multicollinearity does not materially affect the regression estimates. Next, we discuss the baseline fixed-effects regres-

sion results, which examine the association between pro-climate lobbying intensity and corporate default risk. We subsequently report the entropy-balanced fixed-effects estimates to reduce observable differences between firms with and without pro-climate lobbying activity. We then present additional robustness analyses using a dynamic fixed-effects specification that controls for the lagged value of distance-to-default and an alternative financial-distress measure based on the Altman Z-score. We also assess the distributional robustness of the pro-climate lobbying intensity measure using a log transformation and an extensive- and intensive-margin decomposition. Finally, we report split-sample evidence based on firms' environmental and social pillar scores, as well as firms' cash-flow and earnings volatility, to provide further insight into whether the association between pro-climate lobbying intensity and distance-to-default differs between firms with below-median and above-median environmental performance, social performance, and operating volatility.

4.1. Descriptive Statistics

Table 3 reports the descriptive statistics for the variables employed in the empirical analysis, using the observations included in the baseline estimation sample. The primary dependent variable, distance-to-default, has a mean of 6.0239 and a standard deviation of 3.0099 across 4176 firm-year observations. Its values range from 0.1674 to 14.3188, indicating substantial variation in financial stability across the sample firms. Because a higher distance-to-default represents a lower likelihood of default, the mean suggests that the average sample firm maintains a reasonable distance from its default threshold. Nevertheless, the relatively large standard deviation and low minimum indicate that some firms experience considerably greater financial vulnerability. The distribution is moderately positively skewed, with a skewness of 0.5429, while its kurtosis of 2.8618 is relatively close to that of a normal distribution.

Table 3. Descriptive statistics.

Variables	Obs	Mean	Std. Dev.	Min	Max	p1	p99	Skew.	Kurt.
Distance-to-Default	4176	6.0239	3.0099	0.1674	14.3188	0.5743	14.3188	0.5429	2.8618
Pro Climate Intensity	4176	0.0027	0.0115	0	0.0843	0	0.0843	5.5896	36.0574
Pro Climate Intensity—Text-Based	4176	0.0013	0.0059	0	0.043	0	0.043	5.6856	36.7612
Firm Age	4176	3.125	0.8054	0	4.6151	1.0986	4.585	−0.4368	3.4359
Firm Size	4176	16.1463	1.6357	10.0709	20.1285	12.0003	19.3946	−0.3225	2.8152
Leverage	4176	0.6408	0.2492	0.1763	2.7466	0.1763	1.468	2.1214	16.3482
ROA	4176	0.0424	0.0935	−0.7919	0.2746	−0.3278	0.2746	−2.572	20.1456
Market-to-Book	4176	4.3089	6.1379	0.115	38.036	0.115	38.036	3.7084	18.5183
PPE Intensity	4176	0.3168	0.2579	0.0031	0.8824	0.0157	0.8824	0.6868	2.1186
Current Ratio	4176	1.8132	1.3388	0.4201	11.7352	0.4223	7.2097	3.1048	17.4897
Capex Intensity	4176	0.0454	0.0389	0	0.2068	0.0024	0.1936	1.6858	6.2794
Cash Flow Volatility	4176	0.0313	0.0339	0.0013	0.2188	0.0015	0.1948	2.7796	13.0632
Earnings Volatility	4176	0.0327	0.0444	0.0001	0.2727	0.0008	0.2554	3.1357	14.5376
Interest Coverage	4176	14.7666	33.7856	−11.8162	188.5343	−11.8162	188.5343	3.9258	19.0439
Social Score	3668	59.0388	22.0396	1.24	98.2	13.34	95.94	−0.2588	2.0893
Environmental Score	3669	50.4572	27.8347	0	98.55	0	93.1	−0.3943	1.9913

The primary independent variable, pro-climate lobbying intensity, has a mean of 0.0027 and a standard deviation of 0.0115 across the same 4176 firm-year observations. The variable ranges from zero to 0.0843, with both its minimum and first-percentile values equal

to zero. This distribution indicates that identifiable pro-climate lobbying remains relatively uncommon and that a substantial proportion of observations report no pro-climate lobbying expenditure. At the same time, the maximum value suggests that a smaller group of firms engages comparatively intensively in pro-climate lobbying after expenditures are scaled by total assets. The high skewness of 5.5896 and kurtosis of 36.0574 confirm that the variable is strongly right-skewed, with most observations concentrated near zero. The alternative text-based measure of pro-climate lobbying intensity has a lower mean of 0.0013 and a standard deviation of 0.0059. Its maximum value is 0.0430, while its skewness and kurtosis are 5.6856 and 36.7612, respectively. The smaller mean and maximum are consistent with the narrower construction of this measure, which identifies climate lobbying only through explicit climate-related keywords in lobbying-report descriptions.

The control variables also display considerable cross-sectional and time-series variation. Logged firm age and firm size have respective means of 3.1250 and 16.1463. Mean leverage is 0.6408, with a standard deviation of 0.2492, while mean ROA is 0.0424, indicating modest average profitability. ROA is negatively skewed and exhibits high kurtosis, reflecting a smaller number of observations with substantial accounting losses. Market-to-book has a mean of 4.3089 and a standard deviation of 6.1379, together with pronounced positive skewness, indicating considerable differences in firms' market valuations and growth opportunities. PPE intensity averages 0.3168, while the current ratio has a mean of 1.8132. Capital expenditure intensity averages 0.0454, suggesting that capital expenditures represent approximately 4.5% of the relevant scaling base for the average observation.

Cash-flow volatility and earnings volatility have respective means of 0.0313 and 0.0327. Both variables exhibit substantial positive skewness and excess kurtosis, indicating that although operating and accounting volatility is relatively low for most firms, a smaller group experiences considerable instability. Interest coverage has a mean of 14.7666 and a comparatively large standard deviation of 33.7856. Its values range from −11.8162 to 188.5343, while its skewness of 3.9258 and kurtosis of 19.0439 demonstrate substantial dispersion and a strongly right-skewed distribution. This variation suggests meaningful differences in firms' capacity to service their interest obligations.

Finally, the social pillar score has a mean of 59.0388 and a standard deviation of 22.0396 across 3668 observations, whereas the environmental pillar score has a mean of 50.4572 and a standard deviation of 27.8347 across 3669 observations. Their broad ranges provide meaningful variation for the subsequent split-sample analyses examining whether the association between pro-climate lobbying intensity and distance-to-default differs according to firms' environmental and social performance. The smaller numbers of observations for these scores reflect their more limited data availability relative to the baseline financial variables.

4.2. Multicollinearity Diagnostic

Table 4 reports the variance inflation factor (VIF) and tolerance statistics for the two measures of pro-climate lobbying intensity and the financial control variables employed in the empirical analyses. The results indicate that multicollinearity is not a material concern. The highest VIF is 2.71 for the text-based measure of pro-climate lobbying intensity, closely followed by 2.70 for the comprehensive measure. These moderately higher values are unsurprising because both variables measure the same underlying construct and are scaled by total assets, although the text-based proxy identifies pro-climate lobbying solely through explicit climate-related keywords. Importantly, both VIF values remain substantially below the conservative threshold of 5 and the conventional threshold of 10.

Table 4. Multicollinearity diagnostic test using variance inflation factors.

Variable	VIF	Tolerance (1/VIF)
Pro-Climate Lobbying Intensity (Text-Based)	2.71	0.3688
Pro-Climate Lobbying Intensity	2.70	0.3704
PPE Intensity	2.05	0.4875
Capex Intensity	1.83	0.5458
Earnings Volatility (3-Year)	1.70	0.5865
Cash-Flow Volatility (3-Year)	1.59	0.6290
Current Ratio	1.47	0.6789
ROA	1.38	0.7230
Interest Coverage	1.37	0.7323
Leverage	1.35	0.7422
Firm Size	1.35	0.7434
Market-to-Book	1.09	0.9211
Firm Age	1.04	0.9575
Mean VIF	1.66	

Notes: This table reports variance inflation factor (VIF) values for the comprehensive and text-based measures of pro-climate lobbying intensity and the control variables. Tolerance is calculated as the reciprocal of VIF. The mean VIF is 1.66, and the maximum individual VIF is 2.71. All values are below the conservative threshold of 5, indicating that multicollinearity is not a serious concern.

Among the control variables, PPE intensity has the highest VIF at 2.05, followed by capital expenditure intensity at 1.83, three-year earnings volatility at 1.70, and three-year cash-flow volatility at 1.59. The VIF values for the remaining variables range from 1.04 for firm age to 1.47 for the current ratio. The mean VIF of 1.66 further indicates a low overall degree of linear dependence among the explanatory variables. Thus, although the two pro-climate lobbying measures contain some common information, their VIF values do not indicate a level of overlap likely to cause unstable coefficient estimates or materially inflate standard errors. Moreover, the comprehensive and text-based measures are used as alternative proxies in separate regression specifications rather than interpreted jointly in the same main model.

The tolerance statistics, calculated as the reciprocal of VIF, reinforce this conclusion. The lowest tolerance value is 0.3688 for text-based pro-climate lobbying intensity, followed by 0.3704 for the comprehensive measure and 0.4875 for PPE intensity. All tolerance values are therefore substantially above the commonly applied cutoff of 0.10. The main financial controls also exhibit comfortable tolerance levels, ranging from 0.5458 for capital expenditure intensity to 0.9575 for firm age. Overall, the VIF and tolerance results demonstrate that the regressors included in the empirical analysis do not exhibit problematic multicollinearity. Accordingly, the estimated relationship between pro-climate lobbying intensity and distance-to-default is unlikely to be driven by excessive linear dependence among the explanatory variables.

4.3. Baseline Regression Results

Table 5 reports the baseline fixed-effects regression results examining the association between pro-climate lobbying intensity and corporate default risk. The dependent variable is distance-to-default, for which higher values indicate lower default risk and greater financial stability. The specification includes firm and year fixed effects, while standard errors are clustered at the firm level. Firm fixed effects absorb time-invariant firm characteristics that may jointly influence climate-related political engagement and default risk, whereas year fixed effects account for macroeconomic conditions, changes in climate policy, financial-market developments, and other common temporal shocks. Clustering the standard errors at the firm level addresses potential heteroskedasticity and serial corre-

lation among observations belonging to the same firm. The regression is estimated using 4176 firm-year observations and reports an R-squared of 0.816, indicating that the model explains a substantial proportion of the variation in distance-to-default.

Table 5. Pro-climate lobbying and corporate default risk: baseline evidence.

	(1) Distance-to-Default
Pro Climate Intensity	7.262 *** (2.803)
Firm Age	0.117 (0.492)
Firm Size	−0.515 *** (−3.556)
Leverage	−1.765 *** (−4.352)
ROA	3.373 *** (5.562)
Market-to-Book	0.020 *** (3.374)
PPE Intensity	−0.575 (−0.806)
Current Ratio	0.035 (0.810)
Capex Intensity	5.485 *** (3.249)
Cash Flow Volatility	−4.220 *** (−3.027)
Earnings Volatility	−5.324 *** (−4.592)
Interest Coverage	0.007 *** (3.886)
Constant	14.921 *** (6.064)
Observations	4176
R-squared	0.816
Firm FE	Yes
Year FE	Yes
Firm Level Cluster SE	Yes

Notes: This table reports baseline fixed-effects regressions examining the association between pro-climate lobbying intensity and corporate default risk. The dependent variable is distance-to-default (DTD), where higher values indicate lower default risk and greater financial stability. Pro Climate Intensity is measured as pro-climate lobbying expenditure scaled by total assets. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. Column (1) reports fixed-effects estimates with standard errors clustered at the firm level. t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The coefficient on pro-climate lobbying intensity is positive and statistically significant at the 1% level ($\beta = 7.262$, $t = 2.803$). Because a higher distance-to-default indicates a lower probability of default, this result suggests that greater pro-climate lobbying intensity is associated with stronger corporate financial stability after controlling for firm age, size, leverage, profitability, growth opportunities, asset tangibility, liquidity, capital expenditure intensity, cash-flow volatility, earnings volatility, and debt-servicing capacity. The result therefore supports H1, which predicts that pro-climate lobbying intensity is positively associated with firms' distance-to-default. Importantly, because the model includes firm fixed effects, the coefficient represents a within-firm association: increases in a firm's pro-

climate lobbying intensity over time are associated with increases in its distance-to-default after accounting for common year-level shocks and time-invariant firm characteristics.

The economic magnitude of the relationship is also informative. The updated descriptive statistics show that pro-climate lobbying intensity has a standard deviation of 0.0115. Accordingly, a one-standard-deviation increase in pro-climate lobbying intensity is associated with an increase in distance-to-default of approximately 0.0835 units (7.262×0.0115). Relative to the updated sample mean distance-to-default of 6.0239, this represents an increase of approximately 1.39%. Although the magnitude is moderate, it is economically meaningful given the highly concentrated distribution of pro-climate lobbying intensity. The variable has a mean of only 0.0027, a first-percentile value of zero, a skewness of 5.5896, and a kurtosis of 36.0574. These statistics indicate that most firm-year observations exhibit relatively low pro-climate lobbying intensity, while a considerably smaller number engage much more intensively. The economic magnitude should therefore be interpreted in light of this strongly right-skewed distribution.

The positive association is consistent with signaling theory. Under information asymmetry, firms may undertake costly and observable actions to communicate private information about their underlying quality and strategic preparedness (Spence, 1973). Pro-climate lobbying requires the allocation of financial and managerial resources and may therefore constitute a more credible signal of climate-transition readiness than inexpensive environmental statements or symbolic commitments. Consistent with this interpretation, Leippold et al. (2024) find that pro-climate lobbyists exhibit greater green innovation, suggesting that the direction of corporate climate lobbying contains information about firms' underlying business models and transition capabilities. Firms that are better prepared for climate-related regulatory and technological changes may experience lower compliance uncertainty, more stable future cash flows, and lower asset-value volatility. Within the Merton (1974) structural credit-risk framework, these characteristics increase the distance between firm value and the default threshold.

The finding is also consistent with stakeholder theory (Freeman, 2010). Firms depend on continued support from investors, creditors, regulators, customers, employees, and communities. By actively supporting climate-related policy, firms may strengthen their relationships with climate-conscious stakeholders and demonstrate that their political activities are aligned with broader environmental expectations. Stronger stakeholder relationships may reduce exposure to reputational damage, regulatory disputes, litigation, customer boycotts, and financing constraints. They may also improve access to financial resources and reduce uncertainty regarding future regulatory requirements. These potential benefits can contribute to more stable cash flows and lower asset-value volatility, thereby increasing distance-to-default. The result is broadly consistent with evidence that green innovation reduces corporate default risk through lower cash-flow volatility and reduced managerial risk-taking (Safiullah et al., 2024). It also complements Leippold et al. (2024) by showing that the financial relevance of pro-climate lobbying extends beyond firms' green innovation characteristics to their exposure to corporate default risk.

The control variables generally behave in accordance with corporate default-risk expectations. Leverage has a negative and statistically significant coefficient ($\beta = -1.765$, $t = -4.352$), indicating that increases in financial obligations are associated with lower distance-to-default and greater default risk. This finding is consistent with the view that higher indebtedness moves firms closer to their default threshold and increases debt-servicing pressure. ROA is positive and statistically significant ($\beta = 3.373$, $t = 5.562$), suggesting that improvements in profitability strengthen firms' financial capacity and increase their distance from default. Market-to-book is also positive and significant ($\beta = 0.020$,

$t = 3.374$), indicating that stronger market valuation and growth prospects are associated with greater financial stability.

Capital expenditure intensity has a positive and statistically significant coefficient ($\beta = 5.485$, $t = 3.249$). This result may indicate that productive investment strengthens firms' operating capacity, future cash-flow prospects, and asset values. Cash-flow volatility and earnings volatility are both negative and statistically significant. The coefficient on cash-flow volatility is -4.220 ($t = -3.027$), while the coefficient on earnings volatility is -5.324 ($t = -4.592$). These findings indicate that greater instability in internal cash generation and accounting performance is associated with lower distance-to-default. This evidence is economically intuitive because volatile operating outcomes increase uncertainty regarding firms' ability to meet future financial obligations. Interest coverage is positive and statistically significant ($\beta = 0.007$, $t = 3.886$), confirming that firms with stronger capacity to cover interest expenses exhibit lower default risk.

Firm size has a negative and statistically significant coefficient ($\beta = -0.515$, $t = -3.556$). Within the firm fixed-effects framework, this estimate captures the association between changes in firm size and distance-to-default within the same firm rather than a simple comparison between large and small firms. The negative coefficient may indicate that asset expansion does not necessarily improve financial stability when it is accompanied by increased financing requirements, organizational complexity, or risk exposure. Firm age, PPE intensity, and the current ratio are statistically insignificant, suggesting that these variables do not independently explain within-firm variation in distance-to-default after the remaining financial controls and fixed effects are included.

Overall, the updated baseline evidence supports the central argument of the study. Pro-climate lobbying intensity remains positively and significantly associated with distance-to-default after controlling for a broad range of default-risk determinants, firm and year fixed effects, and firm-level clustering. Both signaling theory and stakeholder theory provide plausible explanations: pro-climate lobbying may signal credible climate-transition preparedness and strengthen relationships with important stakeholders, thereby reducing regulatory, reputational, financing, and operating risks. The baseline findings therefore support H1 and provide the foundation for the subsequent entropy-balancing, alternative-measure, and cross-sectional analyses.

4.4. Robustness and Endogeneity Analyses

This section presents a series of additional analyses designed to evaluate the robustness of the baseline findings and mitigate selected endogeneity concerns. First, we employ entropy balancing to improve the comparability of firms with positive pro-climate lobbying activity and firms reporting no pro-climate lobbying by reweighting the control group according to observable firm characteristics. We then re-estimate the baseline fixed-effects model using the entropy-balancing weights. Second, we estimate a dynamic fixed-effects specification that includes the lagged value of distance-to-default, thereby accounting for the persistence of firms' financial condition and examining whether pro-climate lobbying intensity retains explanatory power after controlling for prior default-risk levels.

Third, we replace distance-to-default with the Altman Z-score as an alternative accounting-based measure of financial distress. This analysis evaluates whether the baseline conclusion is robust to an alternative measurement of the dependent variable. Fourth, we replace the comprehensive measure of pro-climate lobbying intensity with a narrower text-based proxy. The alternative measure identifies pro-climate lobbying expenditures solely through explicit climate-related keywords in lobbying-report issue descriptions and, like the primary measure, is scaled by total assets. This test examines whether the baseline

result depends on the broader measure of pro-climate lobbying activity or remains evident when lobbying is identified using only explicit climate-related textual information.

Collectively, these analyses assess whether the positive association between pro-climate lobbying intensity and corporate financial stability is robust to observable covariate imbalance, dynamic model specification, alternative measurement of financial distress, and alternative measurement of pro-climate lobbying intensity. Although these tests strengthen confidence in the reliability of the baseline findings, they do not completely eliminate endogeneity concerns arising from unobservable time-varying factors, measurement error, omitted variables, or reverse causality. The results should therefore continue to be interpreted as evidence of a robust association rather than a definitive causal relationship.

4.4.1. Entropy-Balancing Analysis

Table 6 reports the covariate-balance diagnostics before and after applying entropy balancing. The treatment group comprises firms with positive pro-climate lobbying intensity, whereas the control group comprises firms with no identified pro-climate lobbying activity. Before balancing, the two groups exhibit noticeable differences in several observable characteristics. In particular, treatment firms are larger than control firms, with mean firm-size values of 16.97 and 15.97, respectively. Treatment firms also have higher market-to-book ratios (3.994 versus 3.323) and greater PPE intensity (0.354 versus 0.304). Differences are also evident in the current ratio, cash-flow volatility, earnings volatility, and interest coverage. These pre-balancing differences suggest that firms engaging in pro-climate lobbying are not randomly comparable with non-engaging firms and may possess characteristics that independently influence distance-to-default.

Table 6. Balance diagnostics for entropy balancing: treatment and control group comparison.

Variable	Before Balancing		After Balancing	
	Treatment Mean	Control Mean	Treatment Mean	Control Mean
Firm Age	3.161	3.124	3.161	3.161
Firm Size	16.97	15.97	16.97	16.97
Leverage	0.652	0.639	0.652	0.652
ROA	0.040	0.039	0.040	0.039
Market-to-Book	3.994	3.323	3.994	3.990
PPE Intensity	0.354	0.304	0.354	0.354
Current Ratio	1.725	1.847	1.725	1.726
Capex Intensity	0.046	0.045	0.046	0.046
Cash Flow Volatility	0.030	0.032	0.030	0.030
Earnings Volatility	0.031	0.034	0.031	0.031
Interest Coverage	14.79	14.24	14.79	14.80

Notes: This table reports covariate balance before and after entropy balancing. The treatment group includes firms with positive pro-climate lobbying intensity, and the control group includes firms with no pro-climate lobbying activity. The results show that entropy balancing improves the similarity of observable characteristics between the two groups.

The post-balancing results demonstrate that entropy balancing substantially improves covariate comparability. After reweighting, the treatment and control means are identical or nearly identical for all included characteristics. For example, the mean firm-size values are both 16.97, leverage is 0.652 for both groups, PPE intensity is 0.354 for both groups, and capital expenditure intensity is 0.046 for both groups. The post-balancing differences in market-to-book, current ratio, ROA, and interest coverage are also economically negligible. Cash-flow volatility and earnings volatility are exactly balanced at 0.030 and 0.031, respectively.

Overall, the diagnostics indicate that the entropy-balancing procedure successfully removes the observable mean differences between firms with and without pro-climate lobbying activity. The resulting weighted control group therefore provides a more comparable counterfactual for the treatment firms based on the covariates reported in Table 5. This improved balance reduces concerns that the estimated association between pro-climate lobbying intensity and distance-to-default is driven solely by systematic differences in observable firm characteristics. Nevertheless, entropy balancing cannot eliminate bias arising from unobservable characteristics or reverse causality. The entropy-balanced fixed-effects regression presented subsequently provides the formal test of whether the baseline association persists in the reweighted sample.

Table 7 reports the entropy-balanced fixed-effects regression results examining whether the positive association between pro-climate lobbying intensity and distance-to-default persists after improving the comparability of firms with and without positive pro-climate lobbying activity. The coefficient on pro-climate lobbying intensity is positive and statistically significant at the 5% level ($\beta = 6.885$, $t = 2.185$). Because a higher distance-to-default indicates lower default risk, this result suggests that greater pro-climate lobbying intensity remains associated with stronger financial stability after observations are reweighted to balance the observable characteristics of the treatment and control groups. The entropy-balanced coefficient is also close to the updated baseline estimate of 7.262, being approximately 5.2% smaller. Therefore, the positive baseline association is not driven entirely by observable differences between lobbying and non-lobbying firms.

The economic magnitude remains meaningful. Using the updated standard deviation of pro-climate lobbying intensity of 0.0115, a one-standard-deviation increase in lobbying intensity is associated with an approximate 0.079-unit increase in distance-to-default (6.885×0.0115). Relative to the updated sample mean distance-to-default of 6.0239, this represents an increase of approximately 1.31%. This effect is comparable to the baseline economic magnitude of approximately 0.084 units, or 1.39% of the mean distance-to-default. Thus, the estimated financial relevance of pro-climate lobbying remains broadly stable after entropy balancing.

The control-variable estimates are generally consistent with the baseline results. Firm size is negative and statistically significant ($\beta = -0.463$, $t = -2.661$), while leverage is also negative and significant ($\beta = -2.408$, $t = -3.772$), indicating that firm expansion and greater indebtedness are associated with lower distance-to-default. ROA is positive and significant ($\beta = 3.149$, $t = 3.902$), as are market-to-book ($\beta = 0.016$, $t = 2.044$) and capital expenditure intensity ($\beta = 7.251$, $t = 2.940$). Cash-flow volatility ($\beta = -4.120$, $t = -2.131$) and earnings volatility ($\beta = -5.047$, $t = -3.027$) remain negatively and significantly associated with distance-to-default. Firm age, PPE intensity, the current ratio, and interest coverage are statistically insignificant in the entropy-balanced specification.

The model includes firm and year fixed effects, uses 4176 firm-year observations, and reports an R-squared value of 0.819, slightly exceeding the updated baseline value of 0.816. Overall, the entropy-balanced results reinforce the baseline evidence and provide additional support for H1: pro-climate lobbying intensity is positively associated with firms' distance-to-default and, therefore, negatively associated with corporate default risk. Nevertheless, entropy balancing addresses selection arising from observed characteristics only and does not eliminate potential endogeneity associated with unobserved time-varying factors or reverse causality. Accordingly, the results strengthen the robustness of the documented association but should not be interpreted as definitive evidence of causality.

Table 7. Entropy balancing analysis of pro-climate lobbying and corporate default risk.

	(1) Distance-to-Default
Pro Climate Intensity	6.885 ** (2.185)
Firm Age	0.187 (0.724)
Firm Size	−0.463 *** (−2.661)
Leverage	−2.408 *** (−3.772)
ROA	3.149 *** (3.902)
Market-to-Book	0.016 ** (2.044)
PPE Intensity	−0.123 (−0.126)
Current Ratio	0.028 (0.467)
Capex Intensity	7.251 *** (2.940)
Cash Flow Volatility	−4.120 ** (−2.131)
Earnings Volatility	−5.047 *** (−3.027)
Interest Coverage	0.005 (1.423)
Constant	14.490 *** (4.858)
Observations	4176
R-squared	0.819
Firm FE	Yes
Year FE	Yes
Entropy Balanced	Yes

Notes: This table reports entropy-balanced fixed-effects regressions examining the association between pro-climate lobbying intensity and corporate default risk. Entropy balancing (Hainmueller, 2012) is employed to reweight observations and improve covariate balance between firms with positive pro-climate lobbying activity (treatment group) and firms with no pro-climate lobbying activity (control group). The dependent variable is distance-to-default (DTD), where higher values indicate lower default risk and greater financial stability. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. Both specifications include firm and year fixed effects. t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

4.4.2. Dynamic Fixed-Effects Regression

Table 8 reports the dynamic fixed-effects regression results after incorporating the one-period lag of distance-to-default. The lagged dependent variable is positive and statistically significant at the 1% level ($\beta = 0.342$, $t = 19.180$), providing evidence of persistence in firms' financial condition over time. More importantly, the coefficient on pro-climate lobbying intensity remains positive and statistically significant at the 5% level ($\beta = 5.353$, $t = 2.388$). Because higher distance-to-default indicates lower default risk, this result suggests that greater pro-climate lobbying intensity remains associated with stronger financial stability after controlling for the firm's prior default-risk position.

Table 8. Dynamic fixed-effects regression results: pro-climate lobbying intensity and distance-to-default.

	(1) Distance-to-Default
L Distance-to-Default	0.342 *** (19.180)
Pro Climate Intensity	5.353 ** (2.388)
Firm Age	0.079 (0.441)
Firm Size	−0.534 *** (−4.834)
Leverage	−1.375 *** (−4.472)
ROA	2.860 *** (5.808)
Market-to-Book	0.011 ** (2.279)
PPE Intensity	−0.143 (−0.249)
Current Ratio	0.021 (0.509)
Capex Intensity	2.030 (1.447)
Cash Flow Volatility	−3.502 *** (−2.935)
Earnings Volatility	−4.290 *** (−4.528)
Interest Coverage	0.006 *** (3.484)
Constant	13.133 *** (7.014)
Observations	4168
R-squared	0.840
Firm FE	Yes
Year FE	Yes
Lagged DV	Yes
Firm-Level clustered SE	Yes

Notes: This table reports dynamic fixed-effects regressions examining the association between pro-climate lobbying intensity and corporate default risk. The dependent variable is distance-to-default (DTD), where higher values indicate lower default risk and greater financial stability. Column (1) reports the dynamic fixed-effects estimates, which include the lagged dependent variable and use firm-level clustered standard errors. All continuous variables are winsorized at the 1st and 99th percentiles. t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The economic magnitude remains meaningful. Using the updated standard deviation of pro-climate lobbying intensity of 0.0115, a one-standard-deviation increase in lobbying intensity is associated with an approximate 0.062-unit increase in distance-to-default (5.353×0.0115). Relative to the updated sample mean distance-to-default of 6.0239, this represents an increase of approximately 1.02%. The dynamic coefficient is smaller than the updated baseline estimate of 7.262, which is reasonable because the lagged dependent variable absorbs part of the persistent variation in firms' financial stability. Nevertheless, the coefficient retains its positive sign and statistical significance, reinforcing the baseline conclusion and providing additional support for H1.

The control-variable estimates are broadly consistent with the baseline results. Firm size ($\beta = -0.534$, $t = -4.834$), leverage ($\beta = -1.375$, $t = -4.472$), cash-flow volatility ($\beta = -3.502$, $t = -2.935$), and earnings volatility ($\beta = -4.290$, $t = -4.528$) are negatively and statistically significantly associated with distance-to-default. These results indicate that firm expansion, greater indebtedness, and more volatile operating outcomes are associated with increased default risk. In contrast, ROA ($\beta = 2.860$, $t = 5.808$), market-to-book ($\beta = 0.011$, $t = 2.279$), and interest coverage ($\beta = 0.006$, $t = 3.484$) are positive and statistically significant, suggesting that profitability, growth opportunities, and debt-servicing capacity contribute to greater financial stability. Firm age, PPE intensity, the current ratio, and capital expenditure intensity are statistically insignificant in the dynamic specification.

The regression includes firm and year fixed effects with standard errors clustered at the firm level. It is estimated using 4168 firm-year observations and reports an R-squared value of 0.840, compared with 0.816 in the baseline model. The higher explanatory power is consistent with the inclusion of lagged distance-to-default, which captures persistence in firms' financial condition. Overall, the dynamic results demonstrate that the positive association between pro-climate lobbying intensity and financial stability is not attributable solely to firms' prior default-risk levels. However, the dynamic fixed-effects specification does not completely eliminate endogeneity concerns and may be subject to finite-panel bias when the time dimension is short. The results should therefore be interpreted as additional robustness evidence rather than definitive evidence of causality.

4.4.3. Alternative Measure of Financial Distress

Table 9 examines whether the baseline finding is robust to using the Altman Z-score as an alternative accounting-based measure of financial distress. Higher Altman Z-scores indicate lower distress risk and greater financial stability. Pro-climate lobbying intensity has a positive coefficient that is statistically significant at the 10% level ($\beta = 4.900$, $t = 1.661$). This positive direction is consistent with the baseline result based on distance-to-default, where pro-climate lobbying intensity is positive and significant at the 1% level. Using the updated standard deviation of pro-climate lobbying intensity of 0.0115, a one-standard-deviation increase in lobbying intensity is associated with an approximate 0.056-unit increase in the Altman Z-score (4.900×0.0115). Although the significance is weaker than in the baseline model, the result indicates that the documented association is not dependent solely on the market-based distance-to-default measure.

Table 9. Pro-climate lobbying intensity and financial distress risk: evidence using Altman Z-score.

	(1) Altman Z-Score
Pro Climate Intensity	4.900 * (1.661)
Firm Age	−0.097 (−0.640)
Firm Size	−1.000 *** (−10.818)
Leverage	−3.344 *** (−13.896)
ROA	6.951 *** (15.287)
Market-to-Book	0.023 *** (4.193)
PPE Intensity	0.670 (1.168)

Table 9. *Cont.*

	(1) Altman Z-Score
Current Ratio	0.696 *** (16.158)
Capex Intensity	1.290 (0.914)
Cash Flow Volatility	−0.396 (−0.323)
Earnings Volatility	−3.490 *** (−3.604)
Interest Coverage	0.017 *** (14.062)
Constant	19.894 *** (12.315)
Observations	4194
R-squared	0.839
Firm FE	Yes
Year FE	Yes

Notes: This table reports fixed-effects regressions examining the association between pro-climate lobbying intensity and financial distress risk. The dependent variable is the Altman Z-score, where higher values indicate lower distress risk and greater financial stability. Column (1) reports the fixed-effects estimates, which include firm and year fixed effects and use firm-level clustered standard errors. All continuous variables are winsorized at the 1st and 99th percentiles. t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The control-variable estimates generally reinforce this interpretation. Firm size and leverage are negative and statistically significant, whereas ROA, market-to-book, the current ratio, and interest coverage are positive and significant. Earnings volatility is negative and significant, indicating that unstable financial performance is associated with greater distress risk. The model includes firm and year fixed effects, uses 4194 firm-year observations, and reports an R-squared value of 0.839. Overall, the positive pro-climate lobbying coefficient across both distance-to-default and the Altman Z-score provides qualitative robustness for the baseline conclusion that greater pro-climate lobbying intensity is associated with stronger financial stability. Nevertheless, because the Altman Z-score coefficient is significant only at the 10% level, it should be interpreted as supplementary rather than strong standalone support for H1.

4.4.4. Alternative Text-Based Measure of Pro-Climate Lobbying Intensity

Table 10 examines whether the baseline result is robust enough to replace the comprehensive measure of pro-climate lobbying intensity with the alternative text-based measure. The alternative proxy identifies pro-climate lobbying only through explicit climate-related keywords in lobbying-report issue descriptions, whereas the comprehensive measure also incorporates lobbying identified through climate-related bill titles and codes. Both measures are scaled by total assets. The coefficient on text-based pro-climate lobbying intensity is positive and statistically significant at the 5% level ($\beta = 10.496$, $t = 2.115$). Because higher distance-to-default indicates lower default risk and greater financial stability, this result suggests that firms engaging more intensively in explicitly identifiable pro-climate lobbying exhibit greater financial resilience. The positive direction is consistent with the baseline coefficient of 7.262, which is statistically significant at the 1% level. Although the text-based coefficient is numerically larger, it is estimated less precisely. Therefore, the result provides qualitative robustness for the baseline conclusion, but the difference in

coefficient magnitudes should not be interpreted without accounting for differences in the distributions of the two proxies.

Table 10. Text-based pro-climate lobbying intensity and distance-to-default.

	(1) Distance-to-Default
Pro Climate Intensity_Text-Based	10.496 ** (2.115)
Firm Age	0.116 (0.486)
Firm Size	−0.511 *** (−3.541)
Leverage	−1.761 *** (−4.312)
ROA	3.415 *** (5.660)
Market-to-Book	0.021 *** (3.460)
PPE Intensity	−0.599 (−0.838)
Current Ratio	0.035 (0.814)
Capex Intensity	5.470 *** (3.237)
Cash Flow Volatility	−4.328 *** (−3.115)
Earnings Volatility	−5.284 *** (−4.553)
Interest Coverage	0.007 *** (3.901)
Constant	14.865 *** (6.062)
Observations	4176
R-squared	0.816
Firm FE	Yes
Year FE	Yes
Cluster	Firm level

Notes: The dependent variable is distance-to-default. Pro Climate Text amount scaled by Total Assets is the annual pro-climate lobbying amount identified solely from climate keywords in lobbying-report issue descriptions and scaled by total assets. The model includes firm and year fixed effects. t-statistics based on firm-level clustered standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The control-variable estimates are also broadly consistent with the baseline findings. Firm size and leverage are negative and statistically significant ($\beta = -0.511$, $t = -3.541$; and $\beta = -1.761$, $t = -4.312$, respectively), whereas ROA and capital expenditure intensity are positive and significant ($\beta = 3.415$, $t = 5.660$; and $\beta = 5.470$, $t = 3.237$). Market-to-book and interest coverage are likewise positive and significant. Cash-flow volatility and earnings volatility remain negative and statistically significant, with coefficients of -4.328 ($t = -3.115$) and -5.284 ($t = -4.553$), respectively, reinforcing the importance of operating and accounting stability in reducing default risk. Firm age, PPE intensity, and the current ratio remain statistically insignificant. The model uses 4176 firm-year observations and reports an R-squared value of 0.816. It includes firm and year fixed effects with standard errors clustered at the firm level. Overall, the alternative-proxy analysis supports the baseline finding that pro-climate lobbying intensity is positively associated with distance-

to-default, even when climate lobbying is measured exclusively through explicit textual disclosures. Nevertheless, the weaker statistical significance warrants a more cautious interpretation than the baseline estimate.

4.4.5. Distributional Robustness of Pro-Climate Lobbying Intensity

Table 11 reports a distributional robustness between pro-climate lobbying intensity and distance-to-default. The distributional analysis supports the baseline conclusion while clarifying its limits. Column (1) reproduces the positive baseline coefficient on pro-climate lobbying intensity ($\beta = 7.262$, $t = 2.803$). Column (2) applies a transformation designed to retain zero observations and compress the right tail. The transformed coefficient remains positive and statistically significant at the 5% level ($\beta = 0.087$, $t = 2.462$). The transformation reduces the skewness of lobbying intensity from approximately 5.59 to 2.98. Because the variables in Columns (1) and (2) use different scales, their coefficient magnitudes should not be compared directly. The stable signs, significance, control estimates, and model fit indicate that the baseline association is not attributable solely to a small number of observations in the upper tail.

Table 11. Pro-climate lobbying intensity and distance-to-default: distributional robustness. Dependent variable: distance-to-default (DTD).

Variables	(1) Baseline Raw Measure	(2) Log Transformed Measure	(3) Extensive Margin	(4) Intensive Margin
Pro-Climate Lobbying Intensity	7.262 *** (2.803)	--	--	--
Ln(1 + 1000 × Pro-Climate Lobbying Intensity)	--	0.087 ** (2.462)	--	--
Any Positive Pro-Climate Lobbying	--	--	0.075 (0.762)	--
Ln(Pro-Climate Lobbying Intensity), Positive Sample	--	--	--	0.011 (0.154)
Firm Age	0.117 (0.492)	0.119 (0.499)	0.115 (0.483)	0.317 (0.402)
Firm Size	−0.515 *** (−3.556)	−0.518 *** (−3.606)	−0.505 *** (−3.547)	−0.151 (−0.510)
Leverage	−1.765 *** (−4.352)	−1.761 *** (−4.340)	−1.761 *** (−4.277)	−3.940 *** (−3.288)
ROA	3.373 *** (5.562)	3.413 *** (5.628)	3.412 *** (5.635)	2.610 * (1.971)
Market-to-Book	0.020 *** (3.374)	0.020 *** (3.369)	0.021 *** (3.437)	0.010 (0.719)
PPE Intensity	−0.575 (−0.806)	−0.623 (−0.873)	−0.606 (−0.847)	1.072 (0.598)
Current Ratio	0.035 (0.810)	0.035 (0.833)	0.037 (0.875)	−0.070 (−0.590)
Capital Expenditure Intensity	5.485 *** (3.249)	5.479 *** (3.234)	5.446 *** (3.199)	−2.253 (−0.406)
Cash-Flow Volatility	−4.220 *** (−3.027)	−4.283 *** (−3.085)	−4.381 *** (−3.159)	−3.513 (−1.061)
Earnings Volatility	−5.324 *** (−4.592)	−5.304 *** (−4.571)	−5.274 *** (−4.550)	−4.638 (−1.598)
Interest Coverage	0.007 *** (3.886)	0.007 *** (3.888)	0.007 *** (3.898)	0.003 (0.477)
Constant	14.922 *** (6.064)	14.968 *** (6.135)	14.779 *** (6.099)	10.005 * (1.887)
Observations	4176	4176	4176	537
R-squared	0.816	0.816	0.816	0.855

Table 11. Cont.

Variables	(1) Baseline Raw Measure	(2) Log Transformed Measure	(3) Extensive Margin	(4) Intensive Margin
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm-level clustered standard errors	Yes	Yes	Yes	Yes

Notes: This table reports firm- and year-fixed-effects regressions of distance-to-default on alternative measures of pro-climate lobbying. Higher distance-to-default indicates lower default risk. Column (1) uses the winsorized, asset-scaled lobbying intensity employed in the baseline model. Column (2) uses $\ln(1 + 1000 \times \text{Pro-Climate Lobbying Intensity})$; multiplying by 1000 expresses the small asset-scaled ratio in units of 0.001 before applying the logarithm. Column (3) uses an indicator equal to one when lobbying intensity is positive and zero otherwise. Column (4) is restricted to positive lobbying observations and uses the natural logarithm of lobbying intensity; fixed-effects estimation yields 537 observations. The baseline sample contains 3560 zero-lobbying observations out of 4176 observations (85.25%). All models include the complete set of baseline controls. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. “--” denotes that the result value is not relevant for that row-column and thus is left blank.

Columns (3) and (4) separate lobbying participation from variation in lobbying intensity. The extensive-margin coefficient, which compares positive lobbying with zero lobbying, is positive but statistically insignificant ($\beta = 0.075$, $t = 0.762$). The intensive-margin coefficient estimated among positive-lobbying observations is also positive but insignificant ($\beta = 0.011$, $t = 0.154$). These estimates do not identify either margin independently as the source of the baseline association: the participation indicator discards information about lobbying magnitude, while the positive-only regression has a much smaller estimation sample of 537 observations and correspondingly limited precision. The results are therefore best described as consistent with the baseline association in direction, but inconclusive as to which margin, extensive or intensive, accounts for it.

4.5. Cross-Sectional Analyses

This section presents split-sample analyses examining whether the association between pro-climate lobbying intensity and corporate default risk varies with firms’ underlying environmental and social performance and with the volatility of their operating and financial outcomes. We first divide the sample according to the median values of the environmental and social pillar scores. We then partition the sample separately using the pooled medians of three-year cash-flow volatility and three-year earnings volatility. For each partitioning variable, the baseline fixed-effects model is estimated separately for observations below the median and those at or above the median. These analyses provide additional insight into whether the financial relevance of pro-climate lobbying depends on the credibility of firms’ environmental performance, the strength of their stakeholder-oriented conduct, or the uncertainty surrounding their cash flows and earnings. The environmental- and social-performance specifications include the complete set of baseline control variables. In the volatility-based specifications, the variable used to partition the sample is omitted from the corresponding regressions, while the alternative volatility measure is retained as a control. All specifications include firm and year fixed effects with standard errors clustered at the firm level.

4.5.1. Environmental Performance

Table 12 reports the association between pro-climate lobbying intensity and distance-to-default across firms with different levels of environmental performance. Columns (1)

and (2) present separate fixed-effects regressions for firms with environmental pillar scores below and at or above the pooled sample median, respectively. For firms with below-median environmental performance, the coefficient on pro-climate lobbying intensity is positive but statistically insignificant ($\beta = 4.883$, $t = 1.252$). In contrast, the coefficient for firms with environmental performance at or above the median is positive and statistically significant at the 1% level ($\beta = 16.921$, $t = 5.272$). Column (3) reports a pooled interaction specification that formally tests whether these two coefficients differ statistically, rather than relying solely on the descriptive comparison of separately estimated subsample coefficients.

Table 12. Environmental performance and the association between pro-climate lobbying intensity and distance-to-default. Dependent variable: distance-to-default.

Variables	(1) Below Median	(2) At or Above Median	(3) Pooled Interaction Model
Pro-Climate Lobbying Intensity	4.883 (1.252)	16.921 *** (5.272)	5.261 (1.319)
At-or-Above-Median Environmental Performance	--	--	0.263 * (1.914)
Pro-Climate Lobbying Intensity $\times$ At-or-Above-Median Environmental Performance	--	--	8.085 * (1.663)
Estimated Pro-Climate Lobbying Effect for At-or-Above-Median Firms	--	--	13.346 *** (4.230)
<i>p</i> -value for coefficient-equality test	--	--	0.097
Observations	1471	2107	3649
R-squared	0.834	0.829	0.820
Control variables	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Firm-level clustered standard errors	Yes	Yes	Yes

Notes: Columns (1) and (2) report separate fixed-effects regressions for firms with environmental pillar scores below and at or above the pooled sample median, respectively. Column (3) reports the pooled interaction model. In Column (3), the coefficient on Pro-Climate Lobbying Intensity is the estimated association for below-median firms. The interaction coefficient is the difference between the at-or-above-median and below-median coefficients. The estimated conditional effect for at-or-above-median firms equals the sum of the Pro-Climate Lobbying Intensity coefficient and its interaction coefficient; it is calculated with Stata's `lincom` command, which uses the model's variance-covariance matrix to obtain the standard error and *t*-statistic. The coefficient-equality *p*-value tests the null hypothesis that the two group-specific lobbying coefficients are equal. All specifications include the complete set of baseline controls and firm and year fixed effects. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. Separate and pooled fixed-effects estimations may retain different observations. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. "--" denotes that the result value is not relevant for that row-column and thus is left blank.

In the pooled interaction model, the coefficient on pro-climate lobbying intensity represents the estimated association for firms with below-median environmental performance, which serves as the reference category, and is positive but statistically insignificant ($\beta = 5.261$, $t = 1.319$); this should not be read as a loss of significance for the full sample, since the interaction specification simply reassigns the reference group. The coefficient on the interaction term between pro-climate lobbying intensity and an indicator for at-or-above-median environmental performance is positive and marginally significant at the 10% level ($\beta = 8.085$, $t = 1.663$, $p = 0.097$), providing suggestive evidence that the association between pro-climate lobbying intensity and distance-to-default is stronger among firms with better environmental performance. Using Stata's `lincom` command, which uses the

model's variance-covariance matrix to obtain the standard error and t-statistic of the linear combination, the estimated conditional coefficient for firms with environmental performance at or above the median (the sum of the Pro-Climate Lobbying Intensity coefficient and the interaction coefficient) is 13.346, which is statistically significant at the 1% level ($t = 4.230$, $p < 0.001$; 95% confidence interval of 7.152 to 19.540). This estimate is consistent with the separately estimated subsample coefficients reported in Columns (1) and (2). The coefficient-equality p -value of 0.097 indicates that the null hypothesis of equal lobbying coefficients across the two environmental-performance groups can be rejected only at the 10% level. The evidence should therefore be interpreted as suggestive support for environmental performance as a boundary condition on the lobbying-default risk association, rather than as definitive confirmation of a statistically distinct effect.

The economic magnitudes further illustrate this pattern. Using the full-sample standard deviation of pro-climate lobbying intensity of 0.0115, a one-standard-deviation increase is associated with an approximate 0.056-unit increase in distance-to-default among firms with below-median environmental performance (4.883×0.0115), equivalent to approximately 0.93% of the mean distance-to-default; however, this coefficient is not statistically distinguishable from zero. For firms with environmental performance at or above the median, the corresponding increase is approximately 0.195 units (16.921×0.0115), equivalent to approximately 3.23% of the mean distance-to-default. The at-or-above-median coefficient is approximately 3.47 times the below-median estimate and 2.33 times the baseline coefficient of 7.262. The pooled interaction model formalizes this pattern: the interaction term is marginally significant at the 10% level, and the estimated conditional effect for at-or-above-median firms is significant at the 1% level, although the cross-group difference itself should be interpreted with appropriate caution given its 10% significance level.

The results are broadly consistent with signaling theory, because pro-climate lobbying may represent a more credible signal of climate-transition preparedness when accompanied by strong underlying environmental performance; for firms with weaker environmental performance, similar lobbying activity may be viewed by investors and creditors as less informative or potentially symbolic. The findings are also consistent with stakeholder theory: firms that combine pro-climate political engagement with stronger environmental performance may establish greater trust with investors, creditors, regulators, customers, and other climate-conscious stakeholders, reducing exposure to regulatory, reputational, litigation, and financing risks. The marginally significant interaction coefficient lends some formal support to this interpretation, although, consistent with our discussion in Section 2.2, this pattern is evaluated descriptively and does not constitute a direct test of the specific credibility or stakeholder-support channels.

4.5.2. Social Performance

Table 13 presents the split-sample fixed-effects regression results examining whether the association between pro-climate lobbying intensity and distance-to-default varies according to firms' social performance. The sample is divided using the median social pillar score. Column (1) reports the results for firms below the median, whereas Column (2) presents the results for firms at or above the median. Pro-climate lobbying intensity is positively associated with distance-to-default in both subsamples. Among firms with below-median social performance, the coefficient is positive and statistically significant at the 10% level ($\beta = 6.067$, $t = 1.760$). For firms with social performance at or above the median, the coefficient is substantially larger and statistically significant at the 1% level ($\beta = 14.559$, $t = 3.165$). Thus, although the positive association is evident in both groups, it is descriptively stronger and more precisely estimated among firms with better social performance.

Table 13. Social performance and the association between pro-climate lobbying intensity and distance-to-default.

	(1)	(2)
	Distance-to-Default	Distance-to-Default
	Below Median	Above Median
Pro Climate Intensity	6.067 * (1.760)	14.559 *** (3.165)
Firm Age	−0.160 (−0.337)	0.248 (0.727)
Firm Size	−0.550 * (−1.746)	−0.787 *** (−3.423)
Leverage	−0.538 (−0.834)	−1.835 *** (−3.706)
ROA	3.525 *** (3.511)	5.999 *** (5.476)
Market-to-Book	0.004 (0.561)	0.027 *** (3.582)
PPE Intensity	−0.524 (−0.540)	−0.903 (−0.918)
Current Ratio	0.057 (0.894)	0.127 (1.476)
Capex Intensity	4.779 *** (2.654)	7.460 ** (2.546)
Cash Flow Volatility	−1.045 (−0.588)	−8.176 *** (−2.887)
Earnings Volatility	−5.309 *** (−3.020)	−7.325 *** (−3.505)
Interest Coverage	0.008 ** (2.319)	0.006 (1.649)
Constant	14.778 *** (2.921)	20.134 *** (4.899)
Observations	1513	2056
R-squared	0.834	0.828
Firm FE	Yes	Yes
Year FE	Yes	Yes
Cluster	Firm level	Firm level

Notes: This table reports split-sample fixed-effects regressions examining whether the association between pro-climate lobbying intensity and corporate default risk varies across firms with different levels of social performance. The dependent variable is distance-to-default (DTD), where higher values indicate lower default risk and greater financial stability. The sample is divided based on the median value of the firm level social pillar score. Column (1) reports results for firms with social scores below the median, while Column (2) reports results for firms with social scores equal to or above the median. All specifications include firm and year fixed effects, with standard errors clustered at the firm level. All continuous variables are winsorized at the 1st and 99th percentiles. t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

The economic magnitude further illustrates this pattern. Using the updated full-sample standard deviation of pro-climate lobbying intensity of 0.0115, a one-standard-deviation increase is associated with an approximate 0.070-unit increase in distance-to-default among firms with below-median social performance (6.067×0.0115). Relative to the updated full-sample mean distance-to-default of 6.0239, this represents an increase of approximately 1.16%. For firms with social performance at or above the median, the corresponding increase is approximately 0.167 units (14.559×0.0115), equivalent to approximately 2.78% of the mean distance-to-default. Descriptively, the at-or-above-median coefficient is approximately 2.40 times the below-median estimate and approximately twice

the baseline coefficient of 7.262. These differences suggest that the financial-stability benefits associated with pro-climate lobbying may be more pronounced when firms' climate-policy engagement is supported by stronger social performance. Nevertheless, a formal coefficient-equality or interaction test is required before concluding that the lobbying coefficients differ statistically across the two social-performance groups.

The findings are consistent with signaling theory because pro-climate lobbying may provide a more credible signal of climate-transition preparedness when undertaken by firms with stronger relationships with employees, customers, communities, and other social stakeholders. They are also consistent with stakeholder theory, as stronger social performance may enhance stakeholder trust and reinforce the benefits of climate-policy engagement by reducing reputational, regulatory, and financing risks. The control-variable estimates are broadly consistent with the baseline results. Firm size is negative and statistically significant in both groups, while leverage is negative and significant only among firms with at-or-above-median social performance. ROA and capital expenditure intensity are positive and significant in both specifications. Earnings volatility is negative and significant in both groups, whereas cash-flow volatility is negative and significant only in the above-median group. Market-to-book is positive and significant only among above-median firms, while interest coverage is positive and significant only among below-median firms. Both specifications include firm and year fixed effects with firm-level clustered standard errors. Nevertheless, a formal coefficient-equality or interaction test is required before concluding that the two subsample coefficients are statistically different.

4.5.3. Volatility-Based Heterogeneity Analysis

Table 14 presents the split-sample fixed-effects regression results examining whether the association between pro-climate lobbying intensity and distance-to-default varies with firms' cash-flow and earnings volatility. Columns (1) and (2) divide the sample using the pooled median of three-year cash-flow volatility, whereas Columns (3) and (4) apply the corresponding split using three-year earnings volatility. Among firms with below-median cash-flow volatility, the coefficient on pro-climate lobbying intensity is positive but statistically insignificant ($\beta = 1.967$, $t = 0.389$). For firms with cash-flow volatility at or above the median, the coefficient is substantially larger and statistically significant at the 1% level ($\beta = 10.291$, $t = 3.610$). A similar pattern appears in the earnings-volatility analysis. The coefficient is positive but insignificant among firms with below-median earnings volatility ($\beta = 2.741$, $t = 0.599$), whereas it is positive and significant at the 1% level among firms with earnings volatility at or above the median ($\beta = 8.030$, $t = 3.039$). Thus, the positive association between pro-climate lobbying intensity and financial stability is concentrated among firms experiencing greater volatility in their operating outcomes.

The economic magnitudes further illustrate this pattern. Using the full-sample standard deviation of pro-climate lobbying intensity of 0.0115, a one-standard-deviation increase is associated with an approximate 0.023-unit increase in distance-to-default among firms with below-median cash-flow volatility (1.967×0.0115), equivalent to approximately 0.38% of the full-sample mean distance-to-default of 6.0239. However, the underlying coefficient is statistically insignificant. For firms with cash-flow volatility at or above the median, the corresponding increase is approximately 0.118 units (10.291×0.0115), or approximately 1.96% of mean distance-to-default. This coefficient is significant at the 1% level and is approximately 5.23 times the below-median estimate and 1.42 times the full-sample baseline coefficient of 7.262.

Table 14. Volatility-based split-sample analyses: pro-climate lobbying intensity and distance-to-default. Dependent variable: distance-to-default (DTD).

	Cash-Flow Volatility Split		Earnings Volatility Split	
	(1) Below Median	(2) At/Above Median	(3) Below Median	(4) At/Above Median
Pro-Climate Lobbying Intensity	1.967 (0.389)	10.291 *** (3.610)	2.741 (0.599)	8.030 *** (3.039)
Firm Age	0.225 (0.673)	−0.112 (−0.371)	0.340 (1.044)	−0.201 (−0.748)
Firm Size	−0.638 ** (−2.464)	−0.321 ** (−2.198)	−0.127 (−0.321)	−0.401 *** (−2.914)
Leverage	−2.553 *** (−4.594)	−1.460 *** (−3.137)	−1.214 (−1.626)	−1.599 *** (−3.567)
ROA	7.726 *** (3.178)	2.108 *** (3.553)	25.167 *** (7.203)	2.482 *** (4.368)
Market-to-Book	0.015 (1.393)	0.016 ** (2.002)	0.038 *** (3.842)	0.008 (1.105)
PPE Intensity	0.703 (0.583)	−0.678 (−0.823)	−0.148 (−0.103)	−0.702 (−0.957)
Current Ratio	−0.005 (−0.071)	0.033 (0.686)	0.094 (1.109)	0.034 (0.707)
Capital Expenditure Intensity	4.764 (1.603)	4.571 ** (2.476)	3.361 (0.969)	7.101 *** (3.998)
Earnings Volatility	−1.692 (−0.663)	−6.032 *** (−5.139)	n/a n/a	n/a n/a
Interest Coverage	0.004 (0.977)	0.008 *** (3.724)	0.001 (0.541)	0.007 *** (2.946)
Cash-Flow Volatility	n/a n/a	n/a n/a	−2.374 (−0.699)	−5.003 *** (−3.798)
Constant	17.363 *** (3.916)	11.650 *** (4.731)	7.057 (1.084)	13.125 *** (5.481)
Observations	1937	2073	1682	2338
R-squared	0.846	0.830	0.845	0.832
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cluster	Firm level	Firm level	Firm level	Firm level

Notes: Columns (1) and (2) report firm- and year-fixed-effects regressions for observations below and at/above the pooled median of three-year cash-flow volatility, respectively; cash-flow volatility is omitted from these specifications, while earnings volatility is retained. Columns (3) and (4) apply the corresponding split using three-year earnings volatility; earnings volatility is omitted, while cash-flow volatility is retained. “n/a” denotes a variable that is intentionally excluded from the corresponding specification because it is the partitioning variable used to form that column’s subsample. Higher DTD indicates lower default risk and greater financial stability. All continuous variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered at the firm level. t-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

In the earnings-volatility analysis, a one-standard-deviation increase in pro-climate lobbying intensity corresponds to an approximately 0.032-unit increase in distance-to-default among below-median firms (2.741×0.0115), equivalent to approximately 0.52% of mean distance-to-default; however, this estimate is statistically insignificant. For firms with earnings volatility at or above the median, the corresponding increase is approximately 0.092 units (8.030×0.0115), or approximately 1.53% of mean distance-to-default. This coefficient is significant at the 1% level, approximately 2.93 times the below-median

estimate, and approximately 1.11 times the baseline coefficient. These descriptive patterns suggest that the positive association between pro-climate lobbying and financial stability is concentrated among firms experiencing greater operating volatility. Nevertheless, formal coefficient-equality or interaction tests are necessary to establish whether the differences between the volatility groups are statistically significant.

These findings are consistent with signaling theory because pro-climate lobbying may provide a more valuable signal of climate-transition preparedness when firms face greater uncertainty in their operating cash flows and earnings. When underlying financial outcomes are volatile, investors and creditors may have greater difficulty assessing firms' future financial resilience. Costly and observable engagement in support of climate policy may therefore communicate information about firms' regulatory preparedness, strategic adaptability, and capacity to manage transition-related risks. The findings are also consistent with stakeholder theory, as alignment with climate-conscious investors, creditors, regulators, customers, and other stakeholders may reduce exposure to regulatory, reputational, and financing shocks. These potential benefits may be particularly valuable for firms whose cash flows or earnings are relatively unstable, helping explain why the positive association between pro-climate lobbying intensity and distance-to-default is concentrated in the higher-volatility subsamples.

The control-variable estimates are broadly consistent with the baseline findings. Earnings volatility is negative and statistically significant in the high-cash-flow-volatility subsample, while cash-flow volatility is negative and significant in the high-earnings-volatility subsample. Firm size and leverage generally exhibit negative associations with distance-to-default, although their significance varies across the subsamples. ROA remains positive and statistically significant in all four specifications. Capital expenditure intensity and interest coverage are also positive and significant primarily in the higher-volatility groups. Market-to-book is positive and significant in the high-cash-flow-volatility and low-earnings-volatility subsamples, whereas PPE intensity and the current ratio remain statistically insignificant. In Columns (1) and (2), cash-flow volatility serves as the sample-partitioning variable and is therefore omitted, while earnings volatility is retained as a control. In Columns (3) and (4), earnings volatility is omitted and cash-flow volatility is retained. All specifications include firm and year fixed effects with firm-level clustered standard errors. Nevertheless, a formal coefficient-equality or interaction test is required before concluding that the lobbying coefficients differ statistically across the volatility groups. Accordingly, the results should be interpreted as evidence of volatility-based heterogeneity rather than as a formal test of mediation through cash-flow or earnings volatility.

5. Discussion and Conclusions

5.1. Summary of Findings

This study examines whether pro-climate lobbying intensity is associated with corporate default risk, measured primarily through distance-to-default. The findings support H1: pro-climate lobbying intensity is positively and significantly associated with firms' distance-to-default, so firms engaging more intensively in pro-climate lobbying tend to maintain a stronger financial position. The baseline estimate remains positive after controlling for firm age, size, leverage, profitability, growth opportunities, asset tangibility, liquidity, investment intensity, cash-flow volatility, earnings volatility, and interest coverage, with firm and year fixed effects and firm-level clustered standard errors. Economically, a one-standard-deviation increase in pro-climate lobbying intensity is associated with an approximately 0.084-unit increase in distance-to-default, or about 1.39% of the sample mean. Corporate political engagement in support of climate policy thus has implications extending beyond environmental behavior and green innovation to financial resilience.

5.2. Theoretical Implications

The findings are consistent with signaling theory (Spence, 1973). Under information asymmetry, firms can communicate otherwise unobservable information about their quality and strategic preparedness through costly, observable actions. Pro-climate lobbying requires financial resources, managerial attention, and political capital, making it potentially more informative than inexpensive environmental statements. Consistent with this argument, Leippold et al. (2024) show that pro-climate lobbyists exhibit greater green innovation, suggesting that lobbying direction contains information about firms' preparedness for the low-carbon transition. Firms better positioned for regulatory and technological change may experience lower compliance uncertainty, more stable cash flows, and lower asset-value volatility, which under the Merton (1974) framework increases the distance between firm value and the default threshold.

The results are also consistent with stakeholder theory (Freeman, 2010). Firms depend on the continuing support of creditors, investors, regulators, customers, employees, and communities. Corporate support for climate policy may strengthen relationships with climate-conscious stakeholders and demonstrate alignment between firms' political activities and broader environmental expectations, reducing exposure to reputational controversies, regulatory disputes, litigation, customer opposition, and financing constraints. These benefits may improve access to capital, reduce uncertainty, and stabilize operating cash flows, thereby lowering default risk. The findings complement evidence that green innovation lowers corporate default risk through reduced cash-flow volatility and managerial risk-taking (Safiullah et al., 2024) and extend the climate-lobbying literature by showing that pro-climate engagement matters not only for environmental strategy and equity valuation but also for financial-distress exposure.

5.3. Robustness and Heterogeneity

The additional analyses support the principal conclusion. Entropy balancing substantially improves the comparability of lobbying and non-lobbying firms; after reweighting, pro-climate lobbying intensity remains positively and significantly associated with distance-to-default at a magnitude similar to the baseline estimate, indicating that the association is not explained solely by observable differences between firms. The dynamic fixed-effects model, which incorporates lagged distance-to-default, produces a smaller but still positive and significant coefficient, suggesting the result is not attributable merely to persistence in firms' prior financial condition. The positive association also persists when the Altman Z-score replaces distance-to-default. Together, these results show that the principal conclusion is robust to covariate imbalance, dynamic specification, and alternative measurement of financial stability.

The split-sample findings offer additional insight into when pro-climate lobbying appears most financially relevant. The positive association is particularly strong among firms with environmental pillar scores at or above the sample median, but positive and statistically insignificant below the median. The social-performance analysis shows a related pattern, with a larger and more precisely estimated association above the median. The volatility-based analyses similarly show a significant association among firms with above-median cash-flow or earnings volatility but not below it. These patterns suggest that pro-climate lobbying is most informative when supported by substantive environmental and social performance or when firms face greater operating uncertainty. From a signaling perspective, lobbying communicates a more credible signal of transition preparedness when consistent with a firm's underlying sustainability conduct, and this signal is more valuable when volatile cash flows or earnings make a firm's prospects harder to assess. From a stakeholder perspective, firms with stronger sustainability performance may hold

greater stakeholder trust and relational capital, allowing pro-climate engagement to generate larger reputational, regulatory, and financing benefits, while for firms with greater operating volatility, credible engagement may similarly reduce stakeholder uncertainty about regulatory preparedness. For the environmental-performance split, a formal pooled interaction test reported in Section 4.5.1 provides suggestive support for this cross-group difference, with the interaction coefficient marginally significant at the 10% level; the corresponding formal tests for the social-performance and volatility-based splits have not yet been conducted, and these cross-group differences should be interpreted cautiously unless supported by formal coefficient-equality or interaction tests. Moreover, the volatility splits demonstrate heterogeneity in the association rather than establishing that cash-flow or earnings volatility mediates the relationship between pro-climate lobbying and default risk.

5.4. Contributions to the Literature

The study contributes to several areas of research. First, it extends the corporate climate-lobbying literature, which has mainly examined the determinants, direction, environmental consequences, and equity-market pricing of lobbying, by documenting its association with default risk. Second, it contributes to the climate-finance and credit-risk literature, which has focused predominantly on carbon emissions, environmental performance, climate disclosure, carbon-risk management, and green innovation, by identifying pro-climate lobbying as a further informative dimension of corporate climate-transition strategy. Third, it shows that the relationship between pro-climate lobbying and default risk depends on the firm's broader sustainability profile. The stronger results among firms with higher environmental and social performance suggest that lobbying should not be evaluated in isolation from the firm's underlying operations and stakeholder conduct.

5.5. Policy and Practical Implications

The findings carry several policy implications. For regulators, the results highlight the value of transparent, decision-useful lobbying disclosures. Existing lobbying reports identify issues and total expenditures but rarely disclose whether a firm supports or opposes specific climate legislation, forcing researchers and market participants to infer lobbying positions indirectly. Policymakers could improve transparency by requiring firms to disclose the specific positions supported, the amount spent on each issue, and the consistency of lobbying activity with publicly stated climate commitments, helping investors, creditors, and other stakeholders distinguish substantive pro-climate engagement from symbolic communication.

The findings also have implications for creditors, rating agencies, and investors. Pro-climate lobbying may provide supplementary information about firms' transition preparedness and exposure to future climate-policy risks, particularly relevant when firms show above-median cash-flow or earnings volatility. Credit analysts should therefore consider lobbying direction and intensity alongside operating volatility, leverage, profitability, liquidity, emissions, and broader environmental and social performance, rather than treating lobbying as a standalone indicator of credit quality, since the split-sample differences remain descriptive unless confirmed by formal tests. Evaluating whether political engagement is consistent with firms' operational conduct can reduce the risk of mistaking symbolic lobbying for genuine transition preparedness.

For corporate boards and executives, the results emphasize aligning climate-policy engagement with environmental strategy, stakeholder commitments, and financial-risk management, especially for firms with volatile cash flows or earnings, since credible and consistent lobbying can communicate regulatory preparedness to capital providers. Boards should establish oversight covering direct lobbying, external consultants, and

trade-association activity, with regular reviews of whether lobbying positions remain consistent with transition plans and sustainability disclosures. Firms should explain how their political engagement supports climate-risk management and stable long-term outcomes rather than short-term regulatory advantage, which can strengthen the credibility of climate commitments and reduce exposure to reputational and regulatory controversy.

5.6. Discussion: Limitations

The study has several limitations. First, lobbying direction is inferred from political contributions rather than from directly disclosed positions on individual legislation, so political affiliation may not perfectly represent a firm's stance on every issue. Second, issue-level lobbying expenditures are estimated by proportionally allocating total report expenditure, since firms do not disclose spending by issue. Third, the data cover U.S. federal lobbying and may not capture state-level, international, or indirect trade-association lobbying. Fourth, entropy balancing addresses observable differences but cannot eliminate bias from unobservable factors or reverse causality, and while the dynamic and alternative-measure analyses strengthen the results, they do not establish definitive causality. Finally, the split-sample findings reveal suggestive differences across the environmental-performance, social-performance, cash-flow-volatility, and earnings-volatility groups, but formal coefficient-equality or interaction tests are required before concluding that these associations differ statistically.

5.7. Discussion: Future Research Directions

Future research may address these limitations by using legislative events, regulatory shocks, or other quasi-experimental settings to strengthen causal identification and by examining the specific channels linking pro-climate lobbying to default risk, including green innovation, financing costs, cash-flow volatility, stakeholder support, and access to credit. Additional studies could investigate whether direct and trade-association lobbying have different financial consequences, whether inconsistencies between climate commitments and lobbying positions increase credit risk, and whether the findings extend to privately held firms or firms outside the United States.

6. Conclusions

This study provides evidence that pro-climate lobbying intensity is positively and significantly associated with corporate financial stability, as measured by distance-to-default, across a panel of U.S.-listed firms spanning 2007 to 2022. The baseline association survives entropy balancing, a dynamic specification accounting for the persistence of default risk, and replacement of distance-to-default with the Altman Z-score, and remains qualitatively evident under a narrower, text-based lobbying measure. The association is not uniform across firms: it is concentrated among firms with at-or-above-median environmental and social performance and among firms facing greater cash-flow and earnings volatility, suggesting that pro-climate lobbying is most informative when corroborated by substantive sustainability performance or when a firm's prospects are otherwise difficult for outside stakeholders to assess. Despite the limitations discussed above, most notably the inference of lobbying direction from political contributions and the descriptive nature of the split-sample comparisons, the study provides consistent evidence that pro-climate lobbying intensity is positively associated with financial stability and that this relationship is most pronounced among firms with stronger environmental and social performance.

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