Climate Change Exposure and Precautionary Financial Policy: Cross-Country Evidence

Abstract

We examine how firm-level exposure to climate change affects corporate financial policies using a large international sample of publicly listed firms from 34 countries. Employing a forward-looking, disclosure-based measure of climate change exposure, we find that firms with greater climate exposure hold more cash, use less leverage, and pay lower dividends. These effects are economically significant, robust across various specifications, and have become stronger following the Paris Agreement, consistent with increased regulatory and transition risk. We identify three channels through which climate exposure influences financial policy. Climate-exposed firms exhibit higher cash-flow volatility, face tighter external financing conditions, and reduce irreversible investment. Consistent with these mechanisms, the effects are amplified for firms with higher operating volatility, greater reliance on bank financing, and more irreversible capital structures. Cross-country analyses reveal that the impact of climate exposure is stronger in countries with more developed financial markets, stricter climate policies, and higher institutional quality. Overall, our results demonstrate that climate change is a persistent source of risk that induces precautionary adjustments across multiple corporate financial margins.

Keywords

1. Introduction

Climate change has become an increasingly salient and economically consequential force shaping the global business environment. Rising average temperatures have intensified the frequency and severity of wildfires, hurricanes, floods, and other extreme events, rendering climate change an immediate and persistent source of risk. Firms are not insulated from these developments, and many incur direct costs from physical climate impacts that disrupt production, damage capital assets, and weaken supply chains. Others are affected by transition risks arising from policy responses to climate change such as carbon pricing, technological transformation, and tightening environmental regulations. Furthermore, climate change has generated new growth opportunities in sectors such as renewable energy, electric vehicles, and energy storage. These heterogeneous effects underscore the importance of understanding how climate change influences corporate strategies and financial markets.

Climate-related uncertainty has emerged as a material determinant of corporate financial decision-making. Firms face growing exposure to physical risks such as extreme weather events and rising temperatures, and transition risks associated with regulatory change, technological innovation, and evolving investor preferences. These forces raise operating and compliance costs, disrupt production and supply chains, and increase uncertainty surrounding future cash flow (Barrot & Sauvagnat, 2016; Botzen et al., 2019). As a result, climate-exposed firms experience higher cash-flow volatility, greater financing uncertainty, and increased adjustment costs, all of which have meaningful implications for liquidity management, capital structure, and payout decisions (Huang et al., 2018; Kling et al., 2021; Jiang et al., 2025). Understanding how firms adjust their financial policies in response to climate-related uncertainty is thus central to assessing corporate resilience, financial stability, and the broader economic consequences of climate change. While existing studies primarily document correlations between climate conditions and corporate outcomes, relatively little is known about how climate-related uncertainty shapes firms' precautionary financial policies and through which mechanisms these effects operate.

We conceptualize precautionary financial policy under uncertainty as a coordinated set of balance-sheet and payout decisions through which firms enhance financial flexibility in response to elevated downside risk. When firms face persistent uncertainty that raises the probability of adverse cash flow or tight external financing conditions, they optimally adjust multiple financial margins simultaneously rather than in isolation. Specifically, precautionary financial policies are characterized by (i) higher cash holdings to buffer against liquidity

shortfalls and reduce dependence on costly external finance (Opler et al., 1999; Almeida et al., 2004), (ii) lower leverage to mitigate refinancing risk and expected distress costs (Myers & Majluf, 1984; Bolton et al., 2011), and (iii) more conservative payout policies to retain internal funds and preserve operational flexibility (Lintner, 1956; Brav et al., 2005). In this framework, cash, leverage, and payout decisions represent complementary margins of adjustment that collectively reflect firms' strategic response to uncertainty. We examine whether climate change exposure, as a persistent and largely non-diversifiable source of long-horizon risk, induces firms to adopt such precautionary financial policies.

This study addresses these gaps by investigating the relationship between climate change exposure and corporate financial policies using an international sample of firms from 34 countries over the 2002–2020 period. To do so, we employ a firm level measure of climate change exposure developed by Sautner et al. (2023), which is based on textual analysis of corporate disclosures and captures firms' exposure to physical and transition climate risks. Unlike traditional proxies based on carbon emissions or geographic exposure alone, this forward-looking measure reflects firms' sensitivity, vulnerability, and anticipated financial impacts related to climate change, making it particularly well suited for analyzing corporate financial decision-making.

We begin by documenting a robust relationship between climate change exposure and corporate financial policies. Firms facing greater climate exposure adopt more conservative financial policies by increasing cash holdings and reducing leverage and dividend payouts. In economic terms, a one standard deviation (SD) increase in climate change exposure is associated with a 2.77% increase in cash holdings, a 1.11% decline in leverage, and a 1.12% reduction in dividend payouts. These results remain robust to alternative environmental risk measures, industry–year fixed effects (FEs), and controls for the COVID 19 period. We further show that the Paris Agreement intensified the impact of climate risk on corporate financial decisions. In the post-Paris period, firms responded to heightened regulatory and transition risk awareness by further deleveraging and accumulating liquidity, consistent with a stronger precautionary financial stance. To address concerns about selection on observable firm characteristics, we employ propensity score matching (PSM), and the results remain qualitatively unchanged.

To examine the mechanisms underlying these effects, we examine how climate change exposure is related to key firm fundamentals of cash-flow risk, financing constraints, and investment irreversibility. The findings reveal that firms with higher climate exposure exhibit

significantly greater operating cash-flow and earnings volatility, consistent with heightened income uncertainty and an increased risk of liquidity shortfalls. Climate-exposed firms also face more adverse financing conditions, as reflected in higher loan spreads and lower credit ratings, indicating tighter external financing constraints. In addition, consistent with real options considerations, firms with greater climate exposure reduce capital expenditure, merger and acquisition (M&A) activity, and research and development (R&D) intensity, indicating a tendency to delay irreversible investments under elevated climate change uncertainty. These findings provide direct evidence that climate change exposure induces more conservative financial behavior through increased cash-flow risk, tighter financing conditions, and greater investment irreversibility.

We also conduct interaction tests to assess whether the effects of climate change exposure systematically vary across firm characteristics related to uncertainty, financing constraints, and investment irreversibility. The results reveal that the impact of climate exposure on precautionary financial policies is significantly stronger for firms with higher operating volatility, those that rely on bank financing more heavily, and firms with more irreversible capital structures. These findings indicate that climate-related risks affect financial practices most strongly when firm-level uncertainty is high, access to external finance is constrained, and capital is difficult to redeploy.

Finally, we examine cross-country heterogeneity in firms' responses to climate change exposure. Although climate exposure is associated with more conservative financial policies across all settings, the effects are significantly stronger in countries with more developed financial markets, more stringent climate policies, and higher institutional quality. In these environments, heightened investor scrutiny, clearer regulatory signals, and stronger governance increase market discipline and amplify firms' incentives to accumulate liquidity and reduce leverage and payouts in response to climate risk. In summary, these results demonstrate the critical influence of macro-financial and institutional contexts in shaping corporate financial responses to climate-related uncertainty. Building on this evidence, we next examine how different dimensions of climate change exposure and climate-risk awareness further influence firms' financial strategies.

This study advances precautionary finance theory by demonstrating that climate change is a persistent and largely non-diversifiable source of corporate risk that materially shapes financial policy choices. Whereas classic precautionary motives emphasize macroeconomic shocks, financial constraints, and firm-specific risk (Opler et al., 1999; Almeida et al., 2004),

we show that climate exposure introduces long-term uncertainty that increases cash-flow volatility, disrupts operations, and raises expected distress, insurance, and adaptation costs. In response, firms adopt coordinated precautionary financial policies such as higher cash holdings, lower leverage, and more conservative payout decisions, consistent with self-insurance motives amid uncertainty and incomplete markets (Froot et al., 1993; Bolton et al., 2011). We also identify the mechanisms underlying these responses, revealing that climate risk operates through heightened cash-flow uncertainty (Engle et al., 2020; Bolton & Kacperczyk, 2023), intensified financing friction reflected in higher borrowing costs and tighter access to external finance (Javadi & Al Masum, 2021; Ginglinger & Moreau, 2023), and rising insurance and adjustment costs that constrain firms' ability to transfer climate risk (Hong et al., 2020). These channels explain why climate-exposed firms adjust multiple financial margins simultaneously rather than through isolated policy changes.

This study further exploits international variation to reveal that the financial consequences of climate change exposure depend critically on national institutional and regulatory environments. Using firm-level data from 34 countries, we demonstrate that the impact of climate exposure on corporate financial policies is significantly stronger in countries with more developed financial markets (Rajan & Zingales, 1998; Beck et al., 2003), more stringent climate policies (Bolton & Kacperczyk, 2023; Pankratz et al., 2023), and higher institutional quality (La Porta et al., 1998). These findings emphasize the influence of investor scrutiny, regulatory enforcement, and governance in amplifying firms' precautionary responses to climate risk. By integrating firm-level financial practices with country-level characteristics, our international analysis extends the climate finance literature (Carè & Weber, 2023; Hong et al., 2020; Javadi et al., 2023; Wang et al., 2024) and clarifies when and why climate risk translates into more conservative corporate financial policies.

The remainder of the paper is organized as follows. Section 2 reviews the related literature and develops our testable hypotheses. Section 3 describes the data, variable construction, and firm-level climate change exposure measurement. Section 4 presents the baseline empirical results and a series of robustness tests. Section 5 examines the underlying mechanisms through which climate exposure affects corporate financial policies. Section 6 analyzes cross-country heterogeneity in firms' responses to climate risk. Section 7 provides additional analyses and extensions. Section 8 concludes. The Appendix contains detailed variable definitions and supplementary materials.

2. Literature Review and Hypotheses Development

The increased frequency of extreme weather events and escalation of climate-related risks require firms to adapt to sustain long-term performance (Berkhout, 2012). A substantial body of research on organizational resilience emphasizes firms' capacity to absorb shocks, adjust to adverse environments, and recover from disruptions, distinguishing between operational adaptation and the use of organizational slack (Linnenluecke et al., 2013; Li, 2024). While operational responses such as relocating activities or investing in climate resilient infrastructure can mitigate climate impacts, these adjustments are often costly, slow to implement, and difficult to reverse. As a result, financial slack has a central influence by providing firms with immediate flexibility under heightened uncertainty. Therefore, firms facing greater climate change exposure optimally adopt precautionary financial policies, including higher cash holdings, lower leverage, and more conservative payout decisions, as a form of self-insurance against climate-related risks (Favara et al., 2021; Javadi et al., 2023).

Climate change exposure heightens uncertainty in firms' operating cash flow through physical- and transition-related channels. Physical climate risks such as droughts, floods, hurricanes, and heatwaves disrupt production processes, damage property, plant, and equipment (PPENT), and undermine supply chain reliability (Reisch, 2005). These shocks simultaneously depress revenue and increase operating, repair, and insurance costs, resulting in lower and more volatile cash inflow (Dessaint & Matray, 2017; Lenox & Duff, 2021). Consistent with this mechanism, a growing empirical literature shows that firms with greater climate exposure experience significantly higher volatility in earnings and operating cash flow (Engle et al., 2020; Bolton & Kacperczyk, 2023). Elevated cash-flow volatility increases the likelihood of liquidity shortfalls, particularly for firms with rigid cost structures or limited operational flexibility. In response, firms optimally accumulate cash as a precautionary buffer to sustain operations during periods of climate-related disruption. In addition, transition risks that arise from climate policies such as carbon taxes, emissions trading systems, and stricter environmental standards introduce further uncertainty by imposing sudden and compliance costs that are difficult to forecast and require immediate cash outlays (Li et al., 2023; Yuan & Gao, 2022). Furthermore, emerging research emphasizes that climate-related opportunities also shape corporate policies as firms better positioned to exploit low-carbon transitions increase green investment and adjust capital allocation accordingly (Ma et al., 2023). Anticipating downside risks and strategic opportunities, firms with greater climate change exposure

maintain larger cash balances to preserve financial flexibility, consistent with precautionary savings theory.

Beyond its effect on operating risk, climate change exposure also intensifies financing friction by raising the cost and reducing the availability of external capital. Credit rating agencies increasingly recognize climate risk as a material determinant of asset impairment, earnings volatility, and default probability, rendering climate-exposed firms more vulnerable to rating downgrades and higher bond issuance costs (Javadi & Al Masum, 2021; Ginglinger & Moreau, 2023). Bank financing is similarly affected, as lenders incorporate climate risk into loan pricing and contracting, leading to higher interest spreads and more restrictive nonprice terms that reflect concerns about future cash-flow stability and collateral values (Huang et al., 2022). At the same time, expanded climate aware investment strategies and regulatory screening makes external capital more selective, and in some cases, less accessible for climate vulnerable firms (Agoraki et al., 2024). When external finance becomes costly and uncertain, firms optimally reduce leverage, retain earnings, and limit payout commitments to mitigate refinancing risk and financial distress, reinforcing reliance on internal funds and precautionary financial policies.

In summary, the existing literature suggests that climate change exposure increases cash-flow uncertainty and financing frictions, strengthening firms' incentives to adopt conservative financial policies. Accordingly, we propose the following testable hypotheses:

H1: *Firms with greater exposure to climate change hold higher levels of cash.*

H2: *Firms with greater exposure to climate change maintain lower leverage.*

H3: *Firms with greater exposure to climate change reduce dividend payouts.*

3. Data and Summary Statistics

3.1. Firm-level climate change exposure

The effects of warming temperatures are one of the most urgent issues of the 21st century, affecting nations and regions worldwide. Indicators such as increased global warming, elevating sea levels, and climate-induced catastrophes such as floods and droughts have been used to evaluate this vulnerability (Stern, 2008). On a business level, climate change has generated opportunities and challenges. However, measuring individual firms' vulnerability to its effects remains a complicated task. One obstacle is the ambiguity surrounding the future trajectory of global warming and its influence on businesses, as noted by Barnett et al. (2020).

Another challenge is the diverse ways in which climate change impacts different firms and industries. Consequently, there is no universal framework for assessing firm-specific vulnerability to climatic change.

This study employs the methodology introduced by Sautner et al. (2023) to evaluate firm-level exposure to climate change by analyzing the transcripts of earnings conference calls.[1] The authors developed time-sensitive metrics for publicly traded firms by using a machine learning-based keyword frequency technique to identify four categories of climate-related bigrams. These bigrams are then used to calculate firms' vulnerability to global warming, expressed as the proportion of pertinent bigrams to the total number of bigrams in a transcript. This approach centers on understanding how market participants perceive climate-related events or shocks impacting a firm. These exposure metrics capture key dimensions such as the opportunities, legislative effects, and physical hazards related to global warming. The validity of these measures is validated through various tests, demonstrating their superiority in reflecting firm-level variations compared to traditional carbon intensity metrics. Additionally, these metrics align with economic indicators such as public interest in climate change, which previous research has identified as vital for assessing climate change exposure.

Sautner et al. (2023) emphasize that their measure is less prone to "greenwashing" by corporate management because it is derived from earnings call transcripts, wherein company executives are directly questioned and heard by investors, financial specialists, and multiple market actors. Unlike climate-related information extracted from sources such as annual reports or press releases, the language and content of these transcripts are less susceptible to managers' manipulation. This perspective has been approved by Bingler et al. (2021), who demonstrate that firms often "cherry-pick" the information disclosed in annual reports. Additionally, Sautner et al. (2023) and Hollander et al. (2010) argue that earnings call transcripts provide greater insight compared to other corporate documents, as they facilitate real-time information exchange between managers and market participants.

Sautner et al. (2023) establish the firm-specific exposure for more than 10,000 publicly listed firms from 34 countries.[2] This measure is accepted and widely used in academia, e.g.,

[1] We thank Sautner et al. (2023) for making their data publicly available.

[2] The domination of the English-speaking countries in our sample may drive our results due to the measure of English language bigrams of climate change. To alleviate this concern, we conduct our analyses on subsamples that i) include only the English-speaking countries (the United States (US), the United Kingdom, Canada, Australia, New Zealand, and Ireland), ii) exclude the English-speaking countries, and iii) exclude US firms. We then present the results in Table B.2 in Appendix B. The findings demonstrate that US and other English-speaking countries in our sample do not drive our results.

see Ahmad et al. (2023), Gu and Hale (2023), Hossain et al. (2022), Sfrappini and Müller (2023), among others.

3.2. Sample construction and summary statistics

This section explores the process of constructing our sample, with details provided in Panel A of Table 1. We begin by compiling data on global enterprises from CompStat for the 2002–2020 period, resulting in an initial dataset of 569,950 firm–year observations. We then exclude countries that lack climate change exposure data. In accordance with previous studies (e.g., Bates et al., 2009; Ginglinger & Moreau, 2023; Heo, 2023), we remove banking institutions (SIC codes 6000–6999) and utility firms (SIC codes 4900–4999) due to sector-specific constraints on their capital structures and operations. We also exclude companies with absent or negative values for total assets (TA), common equity (CEQ), or sales (SALE). Additionally, firms must have accessible accounting data to construct firm-level variables. The final sample includes 53,796 firm–year observations from 7,526 publicly traded companies across 34 countries.

[INSERT TABLE 1 HERE]

Panel B of Table 1 provides a summary of the key variables used in our empirical analysis across 34 countries. All values, with the exception of the quantity of enterprises and firm–year observations, represent the median for each country or sample. The primary independent variable is *CCExposure*, which quantifies firms' exposure to opportunities, physical impacts, and regulatory changes related to climate change in a given year. The main dependent variables are *Cash holdings, Leverage,* and *Dividends*. These variables are defined in Appendix Table A.1.

As shown in Panel B of Table 1, the United States (US) has the most substantial share in the data set with 4,196 firms, followed by Canada, the United Kingdom, and Australia. Column (4) presents the median climate change exposure value, which ranges from 0.040 in Israel to 0.175 in Spain, where a higher *CCExposure* value indicates more significant climate change impacts. Considerable variation in the Cash holdings ratio is evident across countries, from 0.000 in Turkey and Bermuda to 14.683 in New Zealand. Israel has the lowest capital expenditure at 0.029, while the Republic of Korea has the highest at 0.086.

Table 2 presents the firm-level descriptive statistics for the entire sample. Following previous studies, we winsorize all continuous variables at the 1% and 99% percentiles to mitigate the effect of outliers. Respective average and median annual climate change exposure

are 0.082 and 0.032. The median values for the sample firms are 0.109 for *Cash holdings,* 0.231 for *Leverage*, and 0.001 for *Dividends*. The median firm size is 7.352 with a SD of 2.389, and the mean market-to-book ratio (MTB) is 0.198 with a SD of 0.215. We also present statistics for some country-specific variables, such as a median GDP growth of 10.778 and a log-transformed GDP per capita of 2.250. Comprehensive variable definitions are presented in Appendix Table A.1.

[INSERT TABLE 2 HERE]

4. Climate Change Exposure and Corporate Financial Policy

4.1. Baseline regressions

To investigate how climate change exposure influences firms' precautionary financial policies, we estimate the following baseline specification:

$$Corporate\_policy_{i,t+1} = \alpha + \beta \times CCExposure_{i,t} + \gamma \times X_{i,t} + d \times Y_{i,t} + \epsilon, \quad (1)$$

where $Corporate\_policy_{i,t+1}$ is the dependent variable of firm i in year $t+1$, which is Leverage, Cash holdings, capital expenditure, and dividend ratio, respectively. Our key independent variable, $CCExposure_{i,t}$ is the firm-level climate change exposure for the same level. $X_{i,t}$ represents the control variables for firm characteristics of SIZE, MTB, cash flow, tangible assets, and SALE.[3] $Y_{i,t}$ denotes the control variables for country characteristics, covering GDP growth, log(GDP per capita), and the rule of law. We estimate Equation (1) controlling for firm and year FEs.[4]

Table 3 presents the baseline regression results. Columns (1)–(3) examine the association between CCExposure and Cash holdings. The CCExposure coefficient is negative and statistically significant at the 1% level −0.139 in column (1)), indicating that firms with greater climate exposure hold more cash, consistent with precautionary motives. This effect remains robust after including country-level controls; the coefficient in column (3) is −0.135 (p = 0.006). Economically, a one-SD increase in CCExposure is associated with a 2.77% increase in Cash holdings (0.139 × 0.199). Columns (4)–(6) present the results for leverage. The coefficient in column (4) is −0.086 and statistically significant at the 1% level, indicating that firms reduce their use of debt financing as climate risk intensifies. A one-SD increase in

[3] We reference Almeida and Campello (2007) by controlling for tangible assets in the corporate investment model. In an unreported test (available from the authors upon request), the result remains unchanged when we remove the tangible assets variable.

[4] Our results hold when we employ different fixed effect (FE) approaches: industry and country–industry FEs. We present the results for different FE tests in Appendix B, Table B.1.

CCExposure corresponds to a 1.11% reduction in Leverage (0.068 × 0.163). Columns (7)–(9) analyze the effects on dividend payouts. The estimates reveal a consistently negative and highly significant relationship, indicating that firms exposed to higher climate risks reduce dividend distributions, once again aligning with precautionary financial practices.

The results demonstrate that firms facing higher climate change exposure adopt more conservative financial policies, hold more cash, reduce leverage, and lower dividend payouts, reflecting a systemic shift toward precautionary financial management under climate-related uncertainty.

[INSERT TABLE 3 HERE]

4.2. Climate change exposure and corporate financial policy: Robustness tests

This section presents the series of robustness tests conducted to assess the reliability of our baseline findings. First, we examine whether the results persist when employing alternative of climate change exposure measures. We use the Climate Change Risk (CCRisk) index developed by Sautner et al. (2023), which captures the share of climate-related bigrams that cooccur with terms such as "risk," "uncertainty," and related synonyms, presenting the results in Panel A of Table 4. Columns (1)–(3) detail estimates for Cash Holdings, Leverage, and Dividends, and the results are consistent with our baseline results. For example, the CCRisk coefficient in column (1) is positive (0.849) and significant at the 1% level, confirming that higher CCExposure is associated with greater Cash holdings.

Next, we evaluate robustness using the country-level Climate Vulnerability index proposed by Li et al. (2023), which captures national exposure, sensitivity, and adaptive capacity to climate disruptions. Panel B of Table 4 reveals a significant negative association between climate vulnerability and Leverage and Dividends, and a positive association with Cash holdings. In column (1), the Climate Vulnerability coefficient is −0.228 and significant at the 1% level, reinforcing the validity of our baseline conclusions. We further augment the specification by including industry–year FEs, which enables us to control for unobserved, time-varying heterogeneity at the industry level, while country–year FEs adjust for macroeconomic and policy shocks that may jointly influence firms' financial policies. As shown in Panel C, the results are quantitatively similar to those in previous panels. Finally, we re-estimate the models using a restricted sample that excludes the COVID-19 pandemic period, presenting the results for the 2002–2019 subsample in Panel D of Table 4, and our benchmark findings are validated.

This evidence demonstrates that our results remain robust across alternative CCExposure measures, additional FE structures, and a pre-pandemic sample.

[INSERT TABLE 4 HERE]

4.3. Climate change exposure and corporate financial policy: Evidence around the Paris Agreement

The empirical results indicate a significant relationship between CCExposure and firms' precautionary financial policies. Firms with higher exposure tend to hold more cash and operate with lower Leverage, even after controlling for firm-level characteristics, country-level variables, and FEs. To strengthen the causal interpretation, we follow Bolton and Kacperczyk (2023), Ginglinger and Moreau (2023), and Painter (2020), using the Paris Agreement, adopted on December 12, 2015, as a quasi-natural experiment. The Paris Agreement intended to limit the increase in global temperatures to 1.5°C above pre-industrial levels by requiring countries to implement national emissions-reduction plans. We surmise that this global policy commitment increased firms' exposure to and awareness of climate-related regulatory risks, triggering a reassessment of their financing and investment strategies, particularly among firms with high CCExposure. Consistent with Ramadorai and Zeni (2024), the Agreement led firms to adjust expectations regarding more stringent environmental policies and higher compliance costs.

To examine how the Agreement altered the relationship between climate exposure and corporate financial policy, we interact CCExposure with a *Paris Agreement* indicator that equals 1 for the 2016–2018 period and 0 for 2013–2015. The regressions include industry and year FEs, and standard errors are clustered at the firm level (Table 5). The interaction term yields a significantly negative coefficient of 0.067 ($p < 0.01$) for leverage in column (1), indicating that the negative association between climate exposure and leverage became stronger after the Agreement. In column (2), the coefficient on the interaction term is 0.191 ($p < 0.01$) for Cash holdings, indicating that firms with greater CCExposure further increase their liquidity positions in the post-Agreement period.

These findings demonstrate that the Paris Agreement intensified the influence of climate risk on corporate financial decisions. Firms appear to respond to heightened regulatory and transition risk awareness by reducing debt and accumulating additional cash reserves, consistent with a more precautionary financial policy stance under elevated climate-related uncertainty.

[INSERT TABLE 5 HERE]

4.4. Propensity score matching analysis

This section applies PSM to evaluate the impact of CCExposure on corporate financial policies. To do so, we divide the sample into a treatment group consisting of firms with CCExposure scores in the fourth quartile and a control group of firms with scores in the first quartile. We employ one-to-one nearest neighbor matching without replacement, based on SIZE, MTB, cash flow, tangible assets, SALES, GDP per capita, GDP growth, and property rights.

Table 6 presents the PSM results. Panel A compares pre-treatment firm characteristics between the matched treatment and control groups. The t-statistics yield p values greater than 0.1 for all covariates, indicating that the two groups are balanced at the 10% significance level, with no statistically significant differences after matching. Panel B presents regression estimates using the PSM-matched sample. The dependent variables are the same as those used in Table 3, and the key independent variable is CCExposure. The regressions include the full set of firm-level control variables and industry–year FEs. The estimated coefficients are consistent in sign, magnitude, and significance with the baseline results in Table 3. The evidence in Table 6 indicates that the PSM procedure reduces concerns related to selection on observable characteristics. These results provide stronger support for the interpretation that CCExposure has a meaningful influence on corporate financial policy decisions.

[INSERT TABLE 6 HERE]

5. Mechanism Tests

5.1. Climate change exposure and firm fundamentals

To validate the mechanisms through which CCExposure affects precautionary corporate financial policies, we examine its direct impact on key firm fundamentals. We focus on three channels that theory and previous evidence suggest are central to firms' conservative financial behavior: cash-flow volatility, financing constraints, and investment irreversibility. By linking CCExposure to these underlying firm characteristics, we provide direct evidence on the drivers of precautionary financial adjustments. Table 7 reports the corresponding results.

5.1.1. Cash-flow volatility

Climate-related shocks can disrupt production activities, supply chains, and overall operational continuity, increasing the instability in firms' cash flow and earnings. Elevated

volatility heightens the risk of liquidity shortfalls and subsequently strengthens firms' incentives to adopt precautionary liquidity management by accumulating cash buffers. To empirically examine this channel, we follow Bernadette et al. (2002) and Feng et al. (2024) and regress cash flow and earnings volatility measures on CCExposure, controlling for firm-level characteristics and incorporating the full set of FEs specified in Equation (1). Cash-flow volatility is measured as the SD of operating cash flow over the preceding five years, scaled by average TA over the same period. Earnings volatility is defined analogously using earnings before interest and taxes. As shown in Columns (1) and (2) of Table 7, firms with greater CCExposure exhibit significantly higher cash-flow and earnings volatility. These results demonstrate that heightened operational uncertainty is a key mechanism through which CCExposure induces more conservative financial policies.

5.1.2. Financing constraints

Climate change exposure may also affect firms through tightening external financing conditions. Lenders may incorporate physical and transition risks into loan pricing, and credit rating agencies may reassess firms' long-term creditworthiness in light of heightened climate risk. Consequently, climate-exposed firms are likely to face higher borrowing costs and more restricted access to external finance. To evaluate this channel, we reference Ginglinger and Moreau (2023) and Li and Zhang (2023), and regress loan spreads and credit ratings on CCExposure, employing the same set of control variables and FEs as specified in Equation (1). Loan spreads are measured as the number of basis points paid over LIBOR for each dollar drawn from a lending facility. Credit ratings are proxied by a numerical transformation of Standard & Poor's foreign-currency long-term issuer ratings, ranging from 1 for the lowest rating to 25 for the highest. As reported in Columns (3) and (4), firms with greater CCExposure incur significantly higher loan spreads and receive significantly lower credit ratings. These findings demonstrate that climate risk translates into higher financing costs and tighter credit conditions, reinforcing firms' incentive to adopt precautionary financial policies.

5.1.3. Investment irreversibility

Under heightened climate uncertainty, firms with irreversible capital commitments may delay or scale back discretionary spending to preserve financial flexibility and mitigate the risk of asset stranding. Real options theory predicts that increased uncertainty raises the option value of waiting, thereby inducing firms to adopt more cautious investment policies. To examine this mechanism, we follow Bloom et al. (2007), Bonaime et al. (2018), and Gulen and

Ion (2016), regressing capital expenditure, M&A spending, and R&D intensity on climate change exposure, using the baseline specification in Equation (1). Capital expenditure captures fixed assets investments, M&A spending reflects acquisition-related cash outflow, and R&D intensity is measured as R&D expenditure scaled by TA. As shown in Columns (5)–(7), greater CCExposure is correlated with significant reductions in all three investment measures. These results are consistent with firms postponing discretionary and relatively reversible investments in response to elevated climate-related uncertainty.

Overall, the evidence from these mechanism tests strongly supports the proposed channels. CCExposure increases cash-flow volatility, exacerbates financing constraints, and heightens concerns about investment irreversibility. Through these mechanisms, climate risks induce firms to prioritize liquidity, reduce reliance on external financing, and adopt more precautionary financial policies.

[INSERT TABLE 7 HERE]

5.2. Climate change exposure and corporate financial policy: Interaction tests

The findings presented thus far consistently support our hypotheses regarding the channels through which climate change exposure influences firms' precautionary financial policies. The evidence demonstrates that cash-flow volatility, financing constraints, and investment irreversibility are three mechanisms that shape firms' financial responses to climate-related risks. To further clarify these mechanisms, we conduct a series of interaction tests designed to determine whether the effects of climate change exposure are strengthened or weakened by firm characteristics such as volatility, bank financing dependence, and the degree of investment irreversibility. These analyses help identify the conditions under which climate exposure exerts the strongest influence on firms' precautionary financial practices.

We first examine cash-flow uncertainty as a moderating factor in the relationship between climate change exposure and precautionary financial policies. Previous research documents a close correlation between uncertainty, operational performance, and financial decision-making (Desai et al., 2008; Julio & Yook 2012; Gulen & Ion 2016; Biswas & Zhai 2018). We hypothesize that firms operating under higher uncertainty experience more pronounced effects from CCExposure because they are simultaneously exposed to climate-related and firm-specific risks. Following Chang et al. (2021), we measure firm-level uncertainty using Operating Volatility, defined as the three-year SD of a firm's return on assets. We re-estimate Equation (1) by introducing Operating Volatility and its interaction with *CCExposure*. The

results in Columns (1), (4), and (7) of Table 9 indicate that higher operating uncertainty significantly amplifies the impact of climate change exposure on firms' precautionary financial policies.

We next investigate financing constraints and assess whether such friction intensifies for firms that rely heavily on bank financing. Climate related risks may influence banks' lending decisions, potentially resulting in tighter credit supply and higher loan spreads as lenders incorporate climate considerations into their pricing models. The interaction between CCExposure and Bank Dependent evaluates whether dependence on bank financing magnifies the effects of CCExposure. Consistent with the approaches adopted by Kashyap et al. (1994) and by Chava and Purnanandam (2011), we classify a firm as bank dependent if its leverage ratio exceeds the sample median of 23.1% and if it does not have a public credit rating. Credit rating information is obtained from the S&P Capital IQ database. After integrating this classification into Equation (1), the estimates in Columns (2), (5), and (8) of Table 9 reveal that bank-dependent firms exhibit significantly stronger responses to CCExposure, including greater adjustments in cash holdings, leverage decisions, and payout behavior. These results are consistent with the notion that financing constraints intensify firms' precautionary adjustments under climate-related risks.

Finally, we analyze investment irreversibility as a mechanism through which climate change exposure affects corporate financial decisions. Investment irreversibility refers to the extent to which capital expenditure is difficult or costly to reverse, particularly when assets are highly specialized or vulnerable to climate-induced disruptions. Previous literature on real options, particularly the work of Dixit and Pindyck (1994), emphasizes that in environments characterized by uncertainty, irreversible investments increase the value of waiting and lead firms to adopt more conservative financial strategies. Therefore, we expect firms with high investment irreversibility to have stronger responses to climate-related risks. Referencing Baker et al. (2016) and Bonaime et al. (2017), we identify high irreversibility firms as those with PPENT to TA ratios that exceed the sample median, reflecting a higher degree of commitment to fixed capital. We re-estimate Equation (1) using this measure and include the interaction between CCExposure and High Irreversibility. The results in Columns (3), (6), and (9) of Table 9 reveal that firms with more irreversible capital structures display markedly stronger precautionary adjustments, including larger liquidity buffers, lower leverage, and more conservative payout policies. These findings indicate that investment irreversibility

increases the need for financial flexibility in the context of climate-related risks, particularly as climate shocks raise the likelihood of stranded assets and operational disruptions.

The interaction tests provide robust support for our three hypothesized channels and offer deeper insight into the ways in which CCExposure shapes precautionary financial policies across firms with different characteristics.

[INSERT TABLE 8 HERE]

6. Cross-Country Heterogeneity

CCExposure affects corporate financial policies in heterogeneous ways across countries, reflecting differing macro-financial structures and institutional environments. This section investigates the sources of cross-country variation, focusing on financial market development, climate policy stringency, and institutional quality as key moderating factors.

6.1 Financial market development

First, we assess whether financial market development moderates the relationship between CCExposure and corporate financial policies. In well-developed financial systems, firms benefit from broader external financing options, advanced risk-management instruments, and a more sophisticated investor base. These features reduce financing constraints and information asymmetry, which would theoretically attenuate the influence of climate exposure on precautionary financial practices. In contrast, in less developed markets, limited credit availability and more severe information asymmetry can heighten precautionary motives. Consequently, climate-exposed firms in these settings are more likely to increase cash holdings, reduce dependence on debt financing, and curb dividend payouts to enhance financial resilience.

To examine this heterogeneity, we conduct a subsample analysis based on countries' financial market development. Firm–year observations are classified into developed and developing market groups using the International Monetary Fund Financial Development (FD) Index. Countries with an FD Index above the global median are designated as developed markets, whereas those below the median are categorized as developing markets. Columns (1) and (2) of Table 9 present the respective regression results for developed and developing markets, focusing on the effect of CCExposure on Cash holdings. The estimates reveal that CCExposure is positively correlated with precautionary financial policies—specifically, higher cash holdings—for both groups; however, the effect is substantially stronger in developed markets (0.164, $p < 0.01$) than developing markets (0.092, $p < 0.05$). The cross-group

difference of 0.072 ($z = 2.32$, $p < 0.05$) indicates statistically meaningful heterogeneity. Subsample analyses for leverage and dividend policies, presented in the Online Appendix, yield consistent evidence that the effects are stronger for firms in developed markets.

Overall, these findings indicate that firms operating in more advanced financial systems exhibit a stronger precautionary response to CCExposure, despite having greater financing flexibility. One interpretation is that developed markets entail heightened investor scrutiny, more stringent disclosure requirements, and more forward-looking climate-risk pricing. These institutional features may increase pressure on climate-exposed firms to signal resilience through larger liquidity buffers, amplifying the effect of climate exposure on financial policy choices.

6.2 Climate policy stringency

Second, we examine whether climate policy stringency shapes corporate responses to CCExposure. Stricter regulatory frameworks such as carbon pricing mechanisms, emissions trading schemes, and mandatory disclosure requirements provide firms with clearer transition pathways. These policies reduce uncertainty, enhance cost predictability, and enable financial markets to price climate risks more effectively. In contrast, weaker regulatory environments create policy ambiguity, heighten transition and physical risks, and strengthen firms' incentives to adopt more conservative financial policies.

To assess this heterogeneity, we conduct a subsample analysis using the Environmental Policy Stringency (EPS) Index developed by the Organisation for Economic Co-operation and Development, focusing on climate-related elements such as carbon taxes and renewable energy subsidies. Countries with an EPS Index above the sample median are classified as having strong climate policy, and those below the median are designated as having weak climate policy. Columns (3) and (4) of Table 9 present the regression estimates for these two policy regimes, examining the effect of CCExposure on Cash holdings. The results indicate that CCExposure is positively correlated with Cash holdings for both groups, with a larger effect observed in countries with strong climate policy. The coefficient for the strong-policy group is 0.146 and 0.081 for the weak-policy group, and the difference of 0.065 is statistically significant ($z = 2.20$, $p < 0.05$). These findings indicate that stricter climate policies amplify firms' precautionary financial responses to climate exposure. One explanation is that stronger regulations, while providing clearer long-term transition signals, also increase compliance costs, intensify investor scrutiny, and cultivate more forward-looking climate-risk pricing.

Consequently, firms with greater climate exposure in more stringent policy environments may pre-emptively increase liquidity buffers to signal financial resilience and manage heightened regulatory and transition risks.

6.3 Institutional quality

Finally, we examine whether institutional quality moderates the relationship between CCExposure and firms' financial policies. Countries with strong institutional frameworks, characterized by effective rule of law, credible regulatory enforcement, and stable macroeconomic governance, provide lower financing costs and clearer policy signals. These conditions support more strategic and forward-looking adaptation to climate risks and enable financial markets to price climate-related risks more efficiently. In contrast, weak institutional environments generate governance and policy uncertainty, increase firms' vulnerability to transition and physical climate risks, and encourage precautionary financial practices such as accumulating larger liquidity buffers and reducing leverage.

To assess this heterogeneity, we conduct a subsample analysis in which institutional quality is measured using the World Bank's Worldwide Governance Indicators. The index is calculated as the simple average of six governance dimensions that include voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and corruption control. Each dimension ranges from -2.5 to $+2.5$, where higher scores indicate stronger institutional performance. We classify countries into high- and low-institutional quality groups based on whether their institutional quality index is above or below the sample median.

Columns (5) and (6) of Table 9 present the subsample regressions that examine how CCExposure affects Cash holdings across institutional environments. The results reveal that CCExposure is positively correlated with Cash holdings in both groups, and the association is noticeably stronger for high institutional quality countries. The estimated CCExposure coefficient is 0.175 in high-quality environments and 0.117 in low-quality environments. The difference of 0.058 is marginally significant, with a z-statistic of 1.72 and a p value below 0.10. This indicates that stronger institutional environments amplify firms' precautionary adjustments to climate-related risks. Enhanced investor and regulatory scrutiny, stricter disclosure expectations, and more forward-looking climate-risk pricing in high-quality institutional settings place greater pressure on climate-exposed firms to demonstrate financial

resilience. As a result, these firms tend to maintain larger liquidity buffers even when financing frictions are relatively limited.

[INSERT TABLE 9 HERE]

7. Climate Change Exposure and Corporate Financial Policy: Additional Analysis

To provide deeper insights, we next analyze how various facets of CCExposure affect corporate financial strategies, and how this relationship is conditioned by climate-risk awareness, further exploring variability in these impacts across different firms.

7.1. Three dimensions of climate change exposure

As previously discussed, climate change exposure comprises three central dimensions: opportunity, regulatory, and physical climate shocks. Using this multidimensional framework, we analyze how each component shapes corporate financial policies. To do so, we separate the overall CCExposure index into three subindices representing distinct channels of climate-related risks and opportunities. The CC_Opportunity index captures the frequency of bigrams related to climate-driven opportunities such as electric vehicles and renewable energy that appear in analyst conference call transcripts. The CC_Physical index is measured by the frequency of bigrams linked to physical disruptions associated with climate change, covering rising sea levels and natural disasters. The CC_Regulatory index reflects bigrams associated with climate-related regulatory changes such as carbon taxes and emissions trading systems.

To identify which aspect of climate exposure drives the main results, we examine the effects of the CC_Opportunity, CC_Physical, and CC_Regulatory indices on firms' financial policies in Table 10. The findings indicate that all three components are negatively associated with Leverage and Dividend and positively correlated with Cash holdings. The estimated coefficient for CC_Regulatory is substantially larger than those for CC_Opportunity and CC_Physical; approximately three times greater in several specifications. This pattern highlights the dominant influence of regulatory risk on corporate financial practices. Recent studies on government climate policies, e.g., Bartram et al. (2022), Ren et al. (2022), and Seltzer et al. (2022), document significant effects of climate regulation on firm productivity, emissions, and bond credit ratings. Our study contributes to this literature by demonstrating that regulatory climate risks strongly shape firms' cash holding, borrowing, and payout decisions.

[INSERT TABLE 10 HERE]

7.2. Moderating effect of climate-risk awareness

This section examines whether public climate-risk awareness strengthens the influence of CCExposure on corporate financial policies. Individuals and firms are unlikely to adjust financial practices in response to climate threats unless they recognize or actively consider the risks involved. Therefore, higher public awareness should heighten firms' sensitivity to climate-related shocks. Previous evidence from Choi et al. (2020) shows that individuals experiencing unusually warm temperatures exhibit greater concern about climate change, which is reflected in increased Google Search Volume Index (SVI) activity for terms related to global warming. Although the SVI measure is not perfectly exogenous, it is a widely used and informative proxy for the salience of climate issues within a given region.

To quantify climate-risk awareness, we use the national-level SVI for the topic "Climate variability and climate change." Google normalizes search intensity relative to all searches within each country and scales the values from 0 to 100. We classify firm–year observations for each country into high- and low-attention groups based on the country's median SVI. High Google SVI equals one when a country's SVI exceeds the median value. The key moderating variable is the CCExposure × High Google SVI interaction term, which captures whether firms' responses to climate exposure intensify in environments with heightened public attention to climate-related issues.

The results are consistent with the moderating hypothesis, demonstrating that firms located in high-attention countries exhibit significantly stronger relationships between CCExposure and subsequent financial policies. As shown in Table 11, the positive association between Cash holdings and CCExposure becomes substantially stronger in high-attention regions. The results further indicate that public climate-risk awareness meaningfully amplifies the impact of CCExposure on precautionary financial practices. The baseline effects of CCExposure are modest, with a positive association with Cash holdings and negative associations with Leverage and Dividends, and the interaction term markedly intensifies these relationships. The coefficient on CCExposure × High Google SVI is 0.143 ($p < 0.001$) for Cash holdings, −0.072 ($p < 0.001$) for Leverage, and −0.020 ($p < 0.001$) for Dividends. These magnitudes imply that heightened public attention to climate risks more than triples firms' precautionary responses, reflected in larger liquidity buffers and reduced reliance on debt and payout policies.

We further validate this moderating mechanism by exploiting two major global events that heightened awareness of climate change, the Paris Agreement and the release of the Stern

Review.[5] The results from this quasi-natural experimental approach reinforce the conclusion that public awareness has a significant influence on shaping the extent to which CCExposure translates into precautionary corporate financial decision-making.

[INSERT TABLE 11 HERE]

8. Conclusion

This study investigates how firm-level exposure to climate change shapes corporate financial policies using a large international sample of publicly listed firms from 34 countries. Employing a forward-looking, disclosure-based measure of climate change exposure, we demonstrate that firms facing greater climate risk adopt systematically more precautionary financial policies. Specifically, higher climate exposure is associated with increased cash holdings, lower leverage, and reduced dividend payouts. These effects are economically meaningful, robust across alternative specifications, and become significantly stronger following the Paris Agreement, consistent with heightened regulatory pressure and increased awareness of transition risks.

We also identify the mechanisms through which climate change exposure affects corporate financial decisions. Firms with greater exposure experience higher operating cash-flow and earnings volatility, face tighter external financing conditions, and reduce irreversible investment. These patterns are consistent with precautionary motives under heightened uncertainty and with real options considerations. The effects are particularly pronounced for firms with higher operating uncertainty, greater dependence on bank financing, and more irreversible capital structures, indicating that climate risk interacts with firm-level constraints to amplify conservative financial practices. Our cross-country analysis demonstrates the influence of institutional and financial environments in mediating these responses. The impact of climate exposure on financial policies is significantly stronger in countries with more developed financial markets, more stringent climate policies, and higher institutional quality, indicating that market discipline, regulatory frameworks, and governance mechanisms intensify precautionary responses to climate risk.

Our findings contribute to the literature on precautionary finance and climate risk by identifying climate change as a persistent and largely nondiverse source of uncertainty that induces coordinated adjustments across multiple financial margins. More broadly, the results underscore corporate financial policy as a central channel through which firms adapt to climate-

[5] Our supplementary results examining the impact of the Stern Review are presented in the Online Appendix.

related uncertainty, with significant implications for corporate resilience and financial stability in a warming world. For investors, our evidence indicates that liquidity, leverage, and payout policies convey valuable information about firms' exposure to and preparedness for climate-related risks, particularly in environments with strong market discipline. For regulators and financial supervisors, the findings demonstrate corporate balance-sheet adjustments as a significant transmission channel through which climate risk affects firm resilience and systemic stability, with implications for prudential regulation and climate stress testing.

This study also has several limitations that open promising avenues for future research. First, while our disclosure-based measure captures firms' perceived and anticipated climate risks, it may also reflect managerial attention or disclosure incentives, potentially introducing measurement noise. Future research could combine textual measures with more granular data on physical exposure, regulatory shocks, or asset-level climate vulnerability to strengthen identification. Second, although our empirical design uses rich firm-level and cross-country variation, causal inference remains challenging in the presence of unobserved, time-varying firm characteristics. Natural experiments related to climate regulation, extreme weather events, or policy discontinuities may provide sharper causal insights. Third, our analysis focuses on financial policy responses rather than their long-term real consequences. A significant direction for future work is to assess whether precautionary financial adjustments enhance firm resilience and value or instead result in underinvestment and slower growth.

Finally, an essential avenue for future research is to examine how firms' precautionary financial responses to climate risk interact with environmental outcomes, particularly carbon emissions and decarbonization strategies. While our study focuses on financial and investment policies, future work could investigate whether liquidity accumulation and investment restraint facilitate or hinder firms' transition toward lower emissions, cleaner technologies, and improved long-term environmental performance. Understanding the joint dynamics of financial precaution and emissions practices would provide valuable insights into the real economic effects of climate risk and subsequent corporate responses in supporting the transition to a low-carbon economy.

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Tables

Table 1. Sample selection and summary statistics

This table presents the sample selection procedure (Panel A) and summary statistics of certain key variables by country (Panel B). The sample period spans 2002–2020. *CCExposure*, *Cash holdings, Leverage*, and *Dividend* variables in Panel B are defined in Appendix Table A.1.

Panel A: Sample selection procedure

Description	No. of firm–years	No. of firms	No. of countries
Firms in the CompStat database.	569,950	59,221	119
Excluding countries with no climate change exposure data.	86,350	11,001	34
Excluding firms in financial (SIC: 6000–6999) or utility (SIC: 4900–4999) industries.	72,069	9,258	34
Excluding firms with missing or negative values for total assets (AT), equity (CEQ), or sales (SALE).	67,707	8,958	34
Excluding firms with missing dependent variables.	65,621	8,681	34
Excluding firms with missing country-level control variables.	63,856	8,447	34
Excluding firms with missing firm-level control variables.	53,796	7,526	34

Panel B: Summary statistics by country

Country	No. of firms	No. of firm–years	CCExposure	Cash holdings	Leverage	Dividend
Australia	232	972	0.074	0.029	0.243	0.061
Austria	22	137	0.114	0.328	0.249	0.028
Belgium	30	227	0.093	0.344	0.271	0.046
Bermuda	33	269	0.058	0.000	0.416	0.087
Brazil	99	597	0.079	0.602	0.352	0.049
Canada	541	3,506	0.093	0.000	0.247	0.028
Chile	19	103	0.092	0.063	0.321	0.037
China	208	902	0.149	0.000	0.161	0.020
Denmark	46	348	0.078	4.453	0.207	0.047
Finland	49	400	0.123	0.000	0.230	0.044
France	115	1,038	0.105	0.131	0.253	0.038
Germany	157	1,1	0.109	0.005	0.216	0.024
Greece	30	188	0.054	0.000	0.455	0.066
Hong Kong	67	389	0.080	0.949	0.218	0.042
India	214	852	0.098	0.000	0.209	0.031
Ireland	52	473	0.045	5.821	0.293	0.024
Israel	77	466	0.040	2.072	0.167	0.027
Italy	56	400	0.091	5.021	0.297	0.045
Japan	192	1,332	0.089	0.002	0.215	0.020
Republic of Korea	27	209	0.118	0.000	0.228	0.021
Luxembourg	32	205	0.081	0.208	0.335	0.025
Mexico	59	408	0.074	0.204	0.310	0.036
Netherlands	75	594	0.074	0.001	0.269	0.027

New Zealand	31	118	0.050	14.683	0.279	0.137
Norway	72	385	0.123	0.390	0.259	0.043
Russian Federation	34	233	0.093	0.255	0.336	0.047
Singapore	30	184	0.159	0.000	0.275	0.053
South Africa	65	376	0.105	2.195	0.212	0.037
Spain	45	316	0.175	5.400	0.316	0.045
Sweden	146	812	0.084	0.000	0.237	0.043
Switzerland	90	730	0.075	0.013	0.225	0.044
Turkey	18	101	0.048	0.000	0.314	0.053
United Kingdom	367	2,567	0.083	0.789	0.272	0.038
United States	4,196	32,859	0.076	10.693	0.262	0.014

Variables	Mean	SD	P25	Median	P75	N
Climate change exposure variable						
CCExposure	0.082	0.163	0.011	0.032	0.079	53,796
Dependent variables						
Cash holdings	0.182	0.199	0.043	0.109	0.242	53,796
Leverage	0.258	0.214	0.086	0.231	0.374	53,796
Dividend	0.020	0.047	0.000	0.001	0.021	53,796
Firm characteristics						
Size	7.509	2.389	5.926	7.352	8.838	53,796
MTB	0.231	0.215	0.055	0.198	0.341	53,796
Cash flow	0.054	0.165	0.042	0.083	0.123	53,796
Tangible assets	0.529	0.422	0.193	0.411	0.788	53,796
Sales growth	0.124	0.363	−0.019	0.066	0.181	53,796
Country characteristics						
Log (GDP per capita)	2.160	2.106	1.695	2.250	2.996	53,796
GDP growth	10.653	0.611	10.639	10.778	10.916	53,796
Rule of law	1.477	0.500	1.540	1.605	1.640	53,796

Table 3. Climate change exposure and corporate financial policy

Notes: This table presents evidence on the relationship between climate change exposure (CCExposure) and corporate financial policies. The sample consists of 53,796 firm–year observations for 7,526 unique firms from 34 countries spanning 2002–2020. The key variable of interest is CCExposure, which captures exposures related to opportunity, physical, and regulatory shocks associated with climate change. The dependent variable in Columns (1)–(3) is Cash holdings, which is defined as the ratio of cash and cash equivalents (CHE) to total assets (AT). The dependent variable in Columns (4)–(6) is Leverage, which is defined as the ratio of the total of short-term debt (DLC) and long-term debt (DLTT) to AT. The dependent variable in Columns (7)–(9) is Dividends, which is defined as the ratio of cash dividends declared on common/ordinary shares (DVC) to total sales (SALE) multiplied by 100. All firm-level continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix Table A.1. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Cash holdings			Leverage			Dividend		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CCExposure	0.139***	0.135***	0.135***	−0.086***	−0.065***	−0.068***	−0.023***	−0.024***	−0.024***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.008)	(0.006)	(0.002)	(0.002)	(0.002)
Firm characteristics									
Size		−0.037***	−0.036***		0.021***	0.004***		−0.001	−0.001
		(0.002)	(0.002)		(0.002)	(0.000)		(0.001)	(0.001)
MTB		−0.050***	−0.050***		0.557***	0.805***		−0.009***	−0.009***
		(0.007)	(0.007)		(0.009)	(0.006)		(0.002)	(0.002)
Cash flow		−0.027**	−0.028***		−0.023**	0.006		0.015***	0.015***
		(0.011)	(0.011)		(0.011)	(0.007)		(0.003)	(0.003)
Tangible assets		−0.036***	−0.036***		0.007	0.001		−0.011***	−0.011***
		(0.005)	(0.005)		(0.006)	(0.003)		(0.002)	(0.002)
Sales growth									
		−0.004	−0.004*		0.000	0.007***		−0.002***	−0.002***
Country characteristics		(0.002)	(0.002)		(0.002)	(0.002)		(0.001)	(0.001)
GDP growth			0.000		0.002***	0.001			0.000
			(0.000)		(0.000)	(0.000)			(0.000)
Log (GDP per capita)			−0.032***			0.015***			0.004
			(0.009)			(0.002)			(0.004)
Rule of law			−0.017**			−0.007***			0.009
			(0.009)			(0.002)			(0.007)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	53,796	53,796	53,796	53,796	53,796	53,796	47,794	47,794	47,794
Adjusted R^2	0.830	0.836	0.836	0.744	0.832	0.748	0.687	0.689	0.689

Table 4. Climate change exposure and corporate financial policy: Robustness tests

Notes: This table presents different robustness tests on the relationship between climate change exposure (CCExposure) and corporate financial policies. In Panel A, we replace the CCExposure variable with the climate change risk (CCRisk) measure. CCRisk is quantified using the relative frequency of climate change bigrams mentioned in the same sentence with the words "risk" or "uncertainty" (or their synonyms). In Panel B, we replace the CCExposure variable with the measure of a country's vulnerability to climate disruptions (Climate vulnerability). The climate vulnerability index is a sub-index of the Notre Dame Global Adaptation Index (ND-GAIN). In Panel C, we use alternative fixed effects. In Panel D, we use a sample period prior to the COVID-19 pandemic. The dependent variable in column (1) is Cash holdings, which is defined as the ratio of cash and cash equivalents (CHE) to total assets (AT). The dependent variable in column (2) is Leverage, which is defined as the ratio of the total of short-term debt (DLC) and long-term debt (DLTT) to AT. The dependent variable in Columns (3) is Dividends, which is defined as the ratio of cash dividends declared on common/ordinary shares (DVC) to total sales (SALE) multiplied by 100. All firm-level continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix Table A.1. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Cash holdings	Leverage	Dividend
Variables	(1)	(2)	(3)
Panel A: Climate change risk			
CCRisk	0.849***	−0.288***	−0.076***
	(0.133)	(0.053)	(0.016)
Control variables	Yes	Yes	Yes
Firm and year FEs	Yes	Yes	Yes
Obs.	53,796	53,796	53,796
Adjusted R^2	0.450	0.747	0.196
Panel B: Climate vulnerability			
Climate vulnerability	0.228***	−0.052***	−0.256***
	(0.059)	(0.016)	(0.024)
Control variables	Yes	Yes	Yes
Firm and year FEs	Yes	Yes	Yes
Obs.	53,138	53,138	53,138
Adjusted R^2	0.451	0.745	0.211
Panel C: Including country–year FEs			
CCExposure	0.156***	−0.067***	−0.017***
	(0.016)	(0.006)	(0.002)
Control variables	Yes	Yes	Yes
Country–year FEs	Yes	Yes	Yes
Firm and year FEs	Yes	Yes	Yes
Obs.	53,796	53,796	53,796
Adjusted R^2	0.474	0.754	0.252
Panel D: Before the COVID-19 pandemic			
CCExposure	0.157***	−0.065***	−0.015***
	(0.016)	(0.006)	(0.002)
Control characteristics	Yes	Yes	Yes
Industry and year FEs	Yes	Yes	Yes
Obs.	49,823	49,823	49,823
Adjusted R^2	0.460	0.749	0.198

Table 5. Climate change exposure and corporate financial policy: Paris Agreement

Notes: This table presents the results of a quasi-natural experiment using the Paris Agreement adopted in 2015. We define *Paris Agreement* as a dummy variable that is valued as one for post-agreement years (i.e., 2016–2018) and 0 for the pre-agreement years (i.e., 2013–2015). The key variable of interest is *CCExposure*, which captures exposures related to opportunity, physical, and regulatory shocks associated with climate change. The dependent variable in column (1) is *Cash holdings*, which is defined as the ratio of cash and cash equivalents (CHE) to total assets (AT). The dependent variable in column (2) is *Leverage*, which is defined as ratio of the total of short-term debt (DLC) and long-term debt (DLTT) to AT. The dependent variable in Columns (3) is *Dividends*, which is defined as the ratio of cash dividends declared on common/ordinary shares (DVC) to total sales (SALE) multiplied by 100. All firm-level continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix Table A.1. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Cash holdings	Leverage	Dividend
Variables	(1)	(2)	(3)
CCExposure × Paris Agreement	0.151***	−0.075***	−0.020***
	(0.019)	(0.011)	(0.003)
CCExposure	0.029*	−0.018*	−0.004**
	(0.017)	(0.010)	(0.002)
Firm characteristics			
Size	−0.011***	0.003***	0.001***
	(0.001)	(0.001)	(0.000)
MTB	−0.171***	0.819***	−0.002
	(0.010)	(0.008)	(0.003)
Cash flow	−0.342***	0.013	0.050***
	(0.017)	(0.011)	(0.004)
Tangible assets	−0.049***	−0.002	−0.012***
	(0.006)	(0.004)	(0.003)
Sales growth	0.016***	0.012***	−0.007***
	(0.004)	(0.003)	(0.001)
Country characteristics			
GDP growth	0.002	0.005	−0.001*
	(0.001)	(0.007)	(0.000)
Log (GDP per capita)	0.010**	0.018***	−0.002
	(0.005)	(0.002)	(0.002)
Rule of law	−0.044***	−0.012***	−0.004
	(0.006)	(0.003)	(0.003)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	23,119	23,119	20,025
Adjusted R^2	0.476	0.747	0.249

Table 6. Climate change exposure and corporate financial policy: PSM analysis

Notes: This table presents regression results examining the relationship between climate change exposure (CCExposure) and corporate financial policies using propensity score matching (PSM). The treatment group comprises firms in the highest quartile of CCExposure, and the control group includes firms in the lowest quartile. Firms are matched one-to-one using nearest-neighbor propensity scores without replacement. All control variables are lagged by one year. Variable definitions are provided in Appendix Table A.1. Standard errors are heteroskedasticity-robust and clustered at the firm level. ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively.

	Cash holdings	Leverage	Dividend
Variables	(1)	(2)	(3)
CCExposure	0.148***	−0.076***	−0.020***
	(0.019)	(0.011)	(0.003)
Firm characteristics			
Size	−0.011***	0.002***	0.001***
	(0.001)	(0.001)	(0.000)
MTB	−0.174***	0.819***	−0.002
	(0.010)	(0.008)	(0.003)
Cash flow	−0.345***	0.014	0.051***
	(0.016)	(0.011)	(0.004)
Tangible assets	−0.050***	−0.002	−0.013***
	(0.006)	(0.004)	(0.003)
Sales growth	0.017***	0.011***	−0.007***
	(0.005)	(0.003)	(0.001)
Country characteristics			
GDP growth	0.002	0.000	−0.001*
	(0.001)	(0.001)	(0.000)
Log (GDP per capita)	0.010**	0.018***	−0.002
	(0.005)	(0.002)	(0.002)
Rule of law	−0.044***	−0.011***	−0.000
	(0.006)	(0.003)	(0.003)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	13,531	13,531	11,854
Adjusted R^2	0.474	0.747	0.249

Panel B: Differences in firm characteristics

Variables	Treatment	Control	Difference	p-value
Size	7.899	7.910	−0.011	0.865
MTB	0.227	0.222	0.005	0.516
Cash flow	0.059	0.032	0.027	0.419
Tangible assets	0.612	0.470	0.142	1.521
Sales growth	0.110	0.140	−0.030	1.023
Log (GDP per capita)	2.076	2.191	−0.115	0.975
GDP growth	10.626	10.636	−0.010	0.417
Property rights	1.460	1.470	−0.010	0.231

Table 7. Climate Exposure and Firm Risk, Financing Conditions, and Investment Decisions

Notes: This table presents the results on the relationship between climate change exposure (CCExposure) and corporate financial policies. The sample comprises 53,796 firm–year observations for 7,526 firms from 34 countries over the 2002–2020 period. The key explanatory variable is CCExposure, which captures firm-level exposure to climate-related opportunity, physical, and regulatory shocks. Columns (1) and (2) examine risk outcomes, with cash flow and earnings volatility as the dependent variables. Columns (3) and (4) focus on financing conditions, using loan spreads and credit ratings as dependent variables. Columns (5)–(7) examine investment irreversibility, with CAPEX, M&A spending, and R&D intensity as dependent variables. All continuous variables are winsorized at the 1st and 99th percentiles. Variable definitions are provided in Appendix Table A.1. ***, **, and * denote statistical significance at 1%, 5%, and 10% levels, respectively.

	Cash flow volatility		Financing frictions		Investment irreversibility		
	Cash flow volatility	Earnings volatility	Loan spreads	Credit rating	CAPEX	M&A spending	R&D intensity
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CCExposure	0.139***	0.114***	0.070***	−0.086***	−0.056***	−0.018***	−0.014***
	(0.009)	(0.009)	(0.018)	(0.019)	(0.017)	(0.005)	(0.004)
Firm characteristics							
Size	−0.037***	−0.036***	−0.125***	0.012***	−0.005***	0.011***	0.006***
	(0.002)	(0.002)	(0.009)	(0.002)	(0.001)	(0.003)	(0.002)
MTB	−0.050***	−0.042***	0.022**	−0.006**	−0.019***	0.018***	0.021***
	(0.007)	(0.007)	(0.009)	(0.003)	(0.002)	(0.005)	(0.004)
Cash flow	−0.027**	−0.043***	−0.049**	0.009*	0.027***	0.022***	0.017***
	(0.011)	(0.011)	(0.021)	(0.005)	(0.002)	(0.006)	(0.005)
Tangible assets	−0.036***	−0.012**	0.056***	−0.010***	−0.011***	−0.031***	−0.019***
	(0.005)	(0.005)	(0.011)	(0.003)	(0.002)	(0.007)	(0.005)
Sales growth	−0.004	−0.002	−0.003	0.001	0.005***	0.015**	0.012**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.007)	(0.005)
Country characteristics							
GDP growth	0.001	0.001	−0.004	0.001	0.000***	0.001	0.001
	(0.002)	(0.003)	(0.003)	(0.001)	(0.000)	(0.002)	(0.002)
Log (GDP per capita)	−0.032***	−0.031***	−0.038***	0.019***	−0.001	0.006***	0.007***
	(0.009)	(0.009)	(0.011)	(0.003)	(0.003)	(0.002)	(0.002)
Rule of law	−0.017**	−0.016*	−0.022**	0.011**	−0.002	0.005*	0.004**
	(0.009)	(0.009)	(0.010)	(0.005)	(0.004)	(0.003)	(0.002)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	53,796	53,796	15,179	15,179	53,796	53,796	47,794
Adjusted R^2	0.737	0.754	0.730	0.765	0.733	0.492	0.492

Table 8. Climate change exposure and corporate financial policy: Interaction tests

Notes: This table reports regression results examining the relationship between climate change exposure (CCExposure) and corporate financial policies, including interaction terms. The sample consists of 53,796 firm–year observations for 7,526 unique firms from 34 countries during 2002–2020. The dependent variable in Columns (1)–(3) is Cash holdings, which is defined as the ratio of cash and cash equivalents (CHE) to total assets (AT). The dependent variable in Columns (4)–(6) is Leverage, which is defined as the ratio of the total of short-term debt (DLC) and long-term debt (DLTT) to AT. The dependent variable in Columns (7)–(9) is Dividends, which is defined as the ratio of cash dividends declared on common/ordinary shares (DVC) to total sales (SALE) multiplied by 100. All firm-level continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix Table A.1. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Cash holdings			Leverage			Dividend		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CCExposure	0.032**	0.018**	0.039**	−0.016**	−0.013*	−0.023**	−0.004*	−0.002*	−0.006*
	(0.014)	(0.009)	(0.016)	(0.008)	(0.008)	(0.011)	(0.002)	(0.001)	(0.004)
CCExposure × HighVolatility	0.161***			−0.073***			−0.019***		
	(0.042)			(0.011)			(0.003)		
HighVolatility	0.034			0.008			0.013		
	(0.021)			(0.006)			(0.015)		
CCExposure × BankDependent		0.183***			−0.098***			−0.034***	
		(0.045)			(0.025)			(0.009)	
BankDependent		−0.023			0.011			−0.022	
		(0.018)			(0.014)			(0.033)	
CCExposure × HighIrreversibility			0.130***			−0.067***			−0.018***
			(0.0135)			(0.007)			(0.002)
HighIrreversibility			−0.011			0.003			−0.002*
			(0.013)			(0.004)			(0.001)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	53,796	53,796	53,796	53,796	53,796	53,796	47,794	47,794	47,794
Adjusted R^2	0.835	0.834	0.833	0.747	0.739	0.743	0.681	0.683	0.682

Table 9. Climate change exposure and corporate financial policy: Cross-country heterogeneity

Notes: This table presents subsample analyses examining the relationship between climate change exposure (CCExposure) and corporate financial policies. Columns (1) and (2) divide the sample into firms operating in developed versus developing markets. Columns (3) and (4) split the sample based on strong versus weak climate policy environments, and Columns (5) and (6) divide firms according to high versus low institutional quality. The key variable of interest is *CCExposure*, which captures exposures related to the opportunity, physical, and regulatory shocks associated with climate change. The dependent variable is *Cash holdings*, which is defined as the ratio of cash and cash equivalents (CHE) to total assets (AT). All firm-level continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix Table A.1. Numbers in parentheses are z-statistics for the tests of the difference in coefficients of *CCExposure* between two subsamples. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Cash holdings					
	Developed markets	Developing markets	Strong climate policy	Weak climate policy	High Institutional Quality	Low Institutional Quality
Variables	(1)	(2)	(3)	(4)	(5)	(6)
CCExposure	0.164***	0.092**	0.146***	0.081***	0.175***	0.117***
	(0.038)	(0.040)	(0.015)	(0.023)	(0.018)	(0.053)
Firm characteristics						
Size	−0.017***	−0.012***	−0.008***	−0.009***	−0.015***	−0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MTB	−0.175***	−0.173***	−0.186***	−0.179***	−0.178***	−0.184***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Cash flow	−0.292***	−0.320***	−0.292***	−0.322***	−0.295***	−0.324***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Tangible assets	−0.057***	−0.056***	−0.057***	−0.057***	−0.056***	−0.057***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Sales growth	0.021***	0.016***	0.021***	0.015***	0.022***	0.014***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Country characteristics						
GDP growth	0.006	0.003***	0.004**	0.003***	0.001	0.003***
	(0.010)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Log (GDP per capita)	0.004	0.007	0.003	0.007*	0.001	0.007*
	(0.007)	(0.004)	(0.007)	(0.004)	(0.007)	(0.004)
Rule of law	−0.053***	−0.051***	−0.043***	−0.042***	−0.064***	−0.052***
	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	27,707	26,089	27,707	26,089	22,682	22,015
Adjusted R^2	0.462	0.452	0.462	0.452	0.460	0.450
Difference	0.072**		0.065**		0.058*	
z-statistic	[2.32]		[2.20]		[1.72]	

Table 10. Three dimensions of climate change exposure

Notes: This table presents evidence on the relationship between climate change exposure (CCExposure) and corporate financial policies in three different dimensions, encompassing opportunity, physical, and regulatory shocks. The sample includes 53,796 firm–year observations for 7,526 unique firms from 34 countries spanning 2002–2020. The key variable of interest in specifications (1), (4), and (7) is *CC_Opportunity*, which is the opportunity exposure measure. The key variable of interest in specifications (2), (5), and (8) is *CC_Physical*, which is the physical climate shocks. The key variable of interest in specifications (3), (6), and (9) is CC_*Regulatory*, which is the regulatory climate shocks. The dependent variable in Columns (1)–(3) is Cash holdings, which is defined as the ratio of cash and cash equivalents (CHE) to total assets (AT). The dependent variable in Columns (4)–(6) is Leverage, which is defined as the ratio of the total of short-term debt (DLC) and long-term debt (DLTT) to AT. The dependent variable in Columns (7)–(9) is Dividends, which is defined as the ratio of cash dividends declared on common/ordinary shares (DVC) to total sales (SALE) multiplied by 100. All firm-level continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix Table A.1. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Cash holdings			Leverage			Dividend		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CC_Opportunity	0.161***			−0.070***			−0.010***		
	(0.028)			(0.011)			(0.002)		
CC_Physical		0.396***			−0.177***			−0.035***	
		(0.073)			(0.035)			(0.009)	
CC_Regulatory			0.346*			−0.135**			−0.059***
			(0.191)			(0.068)			(0.020)
Firm characteristics									
Size	−0.012***	−0.012***	−0.012***	0.004***	0.004***	0.004***	0.001***	0.001***	0.001***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MTB	−0.181***	−0.180***	−0.180***	0.806***	0.805***	0.806***	−0.002	−0.002	−0.002
	(0.008)	(0.008)	(0.008)	(0.006)	(0.006)	(0.006)	(0.003)	(0.003)	(0.003)
Cash flow	−0.322***	−0.327***	−0.328***	0.009	0.012	0.012	0.048***	0.048***	0.048***
	(0.013)	(0.013)	(0.013)	(0.008)	(0.008)	(0.008)	(0.003)	(0.003)	(0.003)
Tangible assets	−0.057***	−0.058***	−0.058***	0.000	0.001	0.001	−0.010***	−0.010***	−0.010***
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Sales growth	0.016***	0.016***	0.017***	0.007***	0.007***	0.006***	−0.007***	−0.007***	−0.007***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Country characteristics									
GDP growth	0.003***	0.003***	0.003***	0.004	0.003	0.003	−0.004	−0.005	−0.007
	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.008)
Log (GDP per capita)	0.007*	0.007	0.007	0.014***	0.014***	0.014***	−0.002	−0.003	−0.005
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.007)
Rule of law	−0.043***	−0.044***	−0.044***	−0.007***	−0.006***	−0.007***	0.004	0.003	0.005
	(0.005)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.006)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	53,796	53,796	53,796	53,796	53,796	53,796	47,794	47,794	53,796
Adjusted R^2	0.449	0.444	0.443	0.744	0.743	0.743	0.189	0.189	0.189

Table 11. Moderating effect of climate-risk awareness

Notes: This table presents the moderating effect of climate-risk awareness on the relationship between climate change exposure (CCExposure) and corporate financial policies. We define *High Google Search Volume Index (SVI)* as a dummy variable valued as one if Google search volume (Google SVI) within each country for terms associated with the topic of "Climate variability and change" is above the median. The key variable of interest is *CCExposure*, which measures exposures related to opportunity, physical, and regulatory shocks associated with climate change. The dependent variable in column (1) is *Cash holdings*, which is defined as the ratio of cash and cash equivalents (CHE) to total assets (AT). The dependent variable in column (2) is *Leverage*, which is defined as the ratio of the total of short-term debt (DLC) and long-term debt (DLTT) to AT. The dependent variable in Columns (3) is *Dividends*, which is defined as the ratio of cash dividends declared on common/ordinary shares (DVC) to total sales (SALE) multiplied by 100. All firm-level continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendix Table A.1. Numbers in parentheses are z-statistics for the tests of the difference in coefficients of *CCExposure* between two subsamples. ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

	Cash holdings	Leverage	Dividend
Variables	(1)	(2)	(3)
CCExposure	0.029*	−0.020*	−0.007*
	(0.017)	(0.011)	(0.004)
CCExposure × High Google SVI	0.143***	−0.072***	−0.020***
	(0.014)	(0.007)	(0.002)
High Google SVI	0.007	0.011	0.003
	(0.015)	(0.008)	(0.002)
Firm characteristics			
Size	−0.012***	0.003***	0.001***
	(0.001)	(0.000)	(0.000)
MTB	−0.177***	0.806***	−0.002
	(0.008)	(0.006)	(0.003)
Cash flow	−0.319***	0.010	0.051***
	(0.013)	(0.009)	(0.004)
Tangible assets	−0.054***	−0.001	−0.011***
	(0.005)	(0.003)	(0.002)
Sales growth	0.019***	0.007***	−0.007***
	(0.003)	(0.002)	(0.001)
Country characteristics			
GDP growth	0.003***	0.004	−0.002
	(0.001)	(0.006)	(0.003)
Log (GDP per capita)	0.008*	0.013***	−0.002
	(0.004)	(0.002)	(0.002)
Rule of law	−0.044***	−0.007***	0.002
	(0.005)	(0.002)	(0.003)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Obs.	53,796	53,796	47,794
Adjusted R^2	0.450	0.742	0.194

Appendix A

Table A.1 Variable definitions

Variable	Definition	Source
Climate change exposure		
CCExposure	Relative frequency of climate change-related bigrams appearing in analyst conference call transcripts. Following Sautner et al. (2023), the number of such bigrams is divided by the total number of bigrams in the transcript.	Sautner et al. (2023)
Dependent variables		
Leverage	Ratio of total debt, measured as the sum of short-term debt (DLC) and long-term debt (DLTT), to total assets (AT).	CompStat
Cash holdings	Ratio of cash and cash equivalents (CHE) to AT.	CompStat
Capital expenditure	Capital expenditure (CAPX) scaled by total net property, plant, and equipment (PPENT).	CompStat
Dividends	Cash dividends declared on common or ordinary shares (DVC) scaled by total sales (SALE) and multiplied by 100.	CompStat
Firm-level characteristics		
Firm size	Natural logarithm of AT.	CompStat
Market-to-book	Market value of assets, calculated as AT minus book equity (CEQ) plus the market value of equity (CSHO × PRCC), divided by AT.	CompStat
Cash flow	Earnings before interest, taxes, depreciation, and amortization (EBITDA) minus interest expense (XINT) and taxes (TXT), scaled by AT.	CompStat
Tangible assets	Total PPEGT divided by AT.	CompStat
Sales growth	Ratio of SALE in year t to total sales in year $t-1$.	CompStat
Cash-flow volatility	Standard deviation (SD) of operating cash flow over the preceding five-year period, scaled by average total assets (TA) over the same period.	CompStat
Earnings volatility	SD of earnings before interest and taxes (EBIT) over the preceding five-year period, scaled by average TA over the same period.	CompStat
Loan spreads	Number of basis points paid over LIBOR for each dollar drawn from a lending facility.	Dealscan

Variable	Definition	Source
Credit rating	Numerical transformation of Standard & Poor's foreign-currency long-term issuer credit ratings, ranging from 1 (lowest) to 25 (highest).	S&P Capital IQ
CAPEX	Ratio of CAPX to PPENT.	CompStat
M&A spending	Total value of mergers and acquisitions undertaken by the firm in a given year.	Thomson Financial SDC
R&D intensity	Research and development expenditure (XRD) scaled by AT.	CompStat
Alternative climate exposure		
CCRisk	Relative frequency of climate change-related bigrams that appear in the same sentence as the words "risk" or "uncertainty" in analyst conference call transcripts, normalized by the total number of bigrams.	Sautner et al. (2023)
Climate vulnerability	Country-level vulnerability to climate disruptions in year *t*, measured by the climate vulnerability sub-index of the Notre Dame Global Adaptation Index (ND-GAIN).	Notre Dame Global Adaptation Initiative
Country-level characteristics		
GDP growth	Annual percentage growth rate of gross domestic product (GDP).	World Bank
GDP per capita	Natural logarithm of GDP per capita measured in constant 2010 US dollars.	World Bank
Rule of law	Index quantifying perceptions of confidence in and adherence to societal rules, including contract enforcement, property rights, the police, and the courts.	World Bank