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# THE IMPACT OF CLIMATE RISK ON FIRM'S DEBT FINANCING DECISIONS: EMPIRICAL EVIDENCE FROM VIETNAM

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This study analyzes the effect of physical climate risk on companies' debt financing decisions in the context of an emerging market.

Using data from Vietnamese listed companies from 2011 to 2022 and applying methods such as summary statistics, correlation matrix, industry-fixed effects, and year-fixed effects methods, we investigate whether and how firms adjust their capital structure in response to local climate hazards. Climate risk data are obtained from the Climate Physical Risk Index (CPRI) developed by Guo, Ji, and Zhang (2024). The CPRI dataset provides annual climate physical risk measures for 170 countries. Since no more recent and comparable climate physical risk dataset specifically available for Vietnam could be identified at the time of this study, the sample period is restricted to 2011–2022, corresponding to the availability of both firm-level financial data and the climate risk index. This restriction ensures the completeness, consistency, and comparability of the empirical analysis.

By combining detailed firm-level financial data from Vietnamese listed companies with a Climate Physical Risk Index (CPRI), we provide empirical evidence that higher exposure to climate risk is associated with lower leverage ratios, indicating that firms can develop more sustainable strategies to manage climate risks. This highlights the necessity of emphasizing the importance of incorporating climate awareness into corporate debt decision-making.

This study contributes to the growing literature on climate finance by providing firm-level evidence from one of the world's most climate-vulnerable emerging markets. Drawing on annual indicators of physical climate risk-capturing extreme low and high temperature days, extreme rainfall, and extreme drought-we link localized environmental exposure to corporate debt financing behavior for Vietnamese listed firms between 2011 and 2024. By combining climate data from Guo et al.'s (2024) Global

Climate Physical Risk Index (GCPRI) with firm-level financial records, our analysis offers a nuanced view of how environmental shocks shape capital structure choices in a setting characterized by both high exposure to natural disasters and significant financial market frictions.

Our empirical analysis shows a robust negative association between physical climate risk and corporate leverage, consistent with the prediction of the Trade-off Theory that higher expected distress costs lead firms toward more conservative capital structures. Furthermore, we find that under higher uncertainty and information asymmetry resulting from climate shocks, firms may prioritize internal over external sources, thereby reducing debt demand, according to the pecking order theory (Myers & Majluf, 1984).

A key limitation of this study lies in the measurement of climate risk at the firm level. Since the Global Climate Policy Risk Index (GCPRI) is only available at the national level, the same value is assigned to all firms within a given year. As a result, the climate risk variable captures only temporal variation across years but does not reflect cross-sectional differences among firms or regions. This limitation implies that the empirical results primarily capture the aggregate impact of climate risk on corporate debt decisions, while firm-specific or regional heterogeneity in climate exposure cannot be fully addressed. Future research may overcome this issue by employing more granular measures of climate risk, such as province-level or firm-specific exposure indicators.

Our findings contribute to a growing body of international research that adds climate risk to corporate financing decisions. Empirically, the negative relationship between climate risk and leverage that we observe is consistent with cross-country evidence. For example, Jiang et al. (2025) argue that Chinese firms decrease their leverage in response to escalating physical climate risks, primarily due to concerns over asset devaluation and stricter financing conditions. In a similar vein, Huang et al. (2022) demonstrate that firms in emerging markets, which frequently experience natural disasters, tend to reduce their reliance on debt and instead build up precautionary liquidity as part of their risk-management strategy. Evidence from developed markets points in the same direction: Addoum, Ng, and Ortiz-Bobea (2020) find that climate shocks in the United States lead firms to cut short-term borrowing and rely on internal funds.

In contrast with our hypothesis and our findings, while most evidence favors a deleveraging response, there is also a growing strand of research that suggests this relationship can also be positive under certain conditions. Zhang et al. (2023) provide global evidence that firms sometimes maintain or raise leverage to fund climate adaptation and transition projects, particularly in capital-intensive industries. Zhou and Botzen (2021) examine Vietnamese manufacturing firms hit by natural disasters and find that in the short run, flooding has a significant positive effect on firms' investment in physical capital. In regions struck by severe floods or storms, firms' capital stock growth rates were higher than normal as companies repaired and replaced assets, even though sales growth simultaneously declined. This suggests that after extreme events, firms turn to external financing, likely debt and aid, to fund reconstruction. The

immediate infusion of debt capital can temporarily raise leverage ratios in the aftermath of disasters, as companies borrow to restore operations. These findings point to a strategic use of leverage as a tool for both financing climate resilience and sharing risk with creditors, challenging the other status that climate risk always reduces the leverage index. In short, these studies highlight the role of climate-related exposures as an important factor that can shape corporate financial policy, especially in settings characterized by financial frictions and climate vulnerability.

The findings have many important implications for both theory and practice. Theoretically, they can extend canonical capital structure frameworks to combine with environmental uncertainty as a systematic, exogenous shock that shapes financing decisions. Practically, they highlight the need for policymakers in Vietnam to add climate risk metrics into credit assessment systems, financial disclosure requirements, and disaster-risk management frameworks. For firms and investors, the results emphasize the importance of climate-aware financial planning and the incorporation of physical risk assessments into capital allocation decisions.

As climate-related disruptions increase, understanding their financial consequences will remain a critical research priority. Future research can build upon our findings by exploring the interaction between physical climate risk and environmental, social, and governance (ESG) practices, as well as evaluating the effectiveness of green financial instruments in alleviating financing constraints.

**Keywords:**
Climate risk, Debt financing decisions, Emerging market, Vietnam, Climate Physical Risk Index