DEPARTMENT OF ECONOMICS AND FINANCE

SCHOOL OF BUSINESS AND ECONOMICS

UNIVERSITY OF CANTERBURY

CHRISTCHURCH, NEW ZEALAND

Executive Characteristics as Moderators: Exploring the Impact of Geopolitical Risk on Capital Structure Decisions

Mona Yaghoubi

WORKING PAPER

No. 14/2023

Department of Economics and Finance
UC Business School
University of Canterbury
Private Bag 4800, Christchurch
New Zealand

WORKING PAPER No. 14/2023

Executive Characteristics as Moderators: Exploring the Impact of Geopolitical Risk on Capital Structure Decisions

Mona Yaghoubi[1†]

November 2023

Abstract: This study examines the relationship between geopolitical risk and firms' capital structure decisions, focusing on the moderating effects of executive characteristics. Using US corporation data from 1992 to 2020, we find that firms adopt more conservative capital structure choices in response to higher exposure to geopolitical risk. Furthermore, we investigate how executives' age and gender influence this relationship. Our findings indicate that firms with a higher proportion of female executives demonstrate heightened sensitivity to geopolitical risk, leading to more risk-averse financial decisions. In contrast, firms with older executives attenuate the adverse impact of geopolitical risk on financial leverage, suggesting a mitigating effect. The robustness of our results is confirmed through alternative measures of capital structure and estimation methods. We also identify risk aversion as a potential channel through which geopolitical risk affects capital structure choices and examine the role of executive characteristics in this channel using a moderated mediation model.

Keywords: Geopolitical risk, capital structure, executives age, executives' gender and risk-aversion

JEL Classifications: G32, G41, D80, F50

[1] Department of Economics and Finance, University of Canterbury, NEW ZEALAND

† Corresponding author: Mona Yaghoubi. Email: mona.yaghoubi@canterbury.ac.nz

1 Introduction

In recent years, the interconnectedness of global markets has created new opportunities for firms to expand their operations and achieve significant growth. However, along with this expansion, firms face challenges stemming from increased exposure to geopolitical risks, which can jeopardize their financial stability and hinder their access to capital. As a result, scholars and practitioners have displayed a growing interest in comprehending the intricate relationship between geopolitical risk and corporate investing and financing decisions. Geopolitical risk encompasses the potential impact of political, social, and economic events on a company's operations and profitability. It includes factors such as changes in government policies, trade disputes, and conflicts. The extent to which geopolitical risk affects firms varies considerably, depending on their level of exposure and their ability to effectively manage these risks.

Geopolitical risk poses significant concerns for economies and businesses worldwide, with the literature documenting its detrimental consequences. Studies by Caldara and Iacoviello (2022); Clance, Gupta and Wohar (2019); Liu, Ma, Tang and Zhang (2019); Pan, Huang, Liu and Huang (2023); Zhang, He, He and Li (2023) highlight the panic and disruption of energy supply chains, increased stock market volatility, and higher probability of future recessions associated with geopolitical risk. The corporate finance literature on geopolitical risk has grown substantially in recent years. Several studies have examined the impact of geopolitical risk on various aspects of corporate finance, such as corporate financing behavior (Khoo and Cheung, 2021; Lee, Lee and Xiao, 2021), cash holdings (Lee and Wang, 2021; Wang, Xiong, Mirza, Shao and Yue, 2021), payout policy (Adra, Gao, Huang and Yuan, 2023), investment (Alam, Houston and Farjana, 2023; Rumokoy, Omura and Roca, 2023; Wang, Wu and Xu, 2019), innovation (Jia, Yang and Zhou, 2022; Lee, Zhang, Yu and Fang, 2023), carbon emissions (Anser, Syed and Apergis, 2021; Wang, Kan, Jiang and Su, 2022), bank stability (Phan, Tran and Iyke, 2022), and cost of bank loans (Nguyen and Thuy, 2023). Despite these contributions, there is still much to learn about the ways in which firms respond to geopolitical risk and make financing decisions in the face of geopolitical uncertainty.

While numerous studies have explored the relationship between geopolitical risk and capital structure choices by considering various channels such as the supply and demand sides, as well as the

increases in the cost of debt or the company's asset riskiness,[1] the underlying behavioral mechanisms that drive this relationship remain relatively unexplored. However, one crucial mechanism that deserves attention and can serve as a channel through which geopolitical risk affects capital structure choices is risk aversion.

In the context of geopolitical risk, firms' executives may exhibit heightened risk aversion due to the elevated uncertainty and the potential negative consequences associated with geopolitical events. Geopolitical risks introduce a layer of unpredictability, making executives more cautious about the potential impact of these risks on their firms' financial health and stability. As a result, executives may lean towards more conservative financial decisions as a means to mitigate the potential adverse effects of geopolitical risk.

One way risk aversion can influence capital structure choices is by leading to a decrease in the debt ratio of firms. Executives, being more risk-averse during times of heightened geopolitical risk, may opt for lower levels of leverage and reduce their reliance on debt financing. By doing so, firms aim to enhance their financial resilience and minimize the exposure to potential financial distress associated with geopolitical uncertainties.

Moreover, risk aversion can also influence other aspects of capital structure decisions. Executives may choose to prioritize internal funding sources and retain earnings rather than seeking external financing through debt. This cautious approach helps to maintain greater control over the firm's financial resources and reduces the dependence on external funding that may be subject to the uncertainties and constraints posed by geopolitical risk.

[1]Geopolitical risk can severely impact a company's financial stability and its ability to access capital. Studies like Favara, Gao and Giannetti (2021); Nguyen and Thuy (2023) show that the increase in a firm's cost of debt as a result of increased geopolitical risk makes it more difficult and expensive to secure funding. Consequently, banks and bond investors may require higher rates on loans and corporate bonds to compensate for the increased risk. This can lead to companies becoming more cautious about borrowing, or being forced to seek other sources of financing as they anticipate higher borrowing costs and increased market uncertainty. In response to heightened geopolitical risk, such firms may reduce corporate investments (Alam et al., 2023; Rumokoy et al., 2023; Wang et al., 2019), ultimately resulting in a lower leverage ratio, or simply choose to reduce their debt as financial leverage is associated with increased firm's risk (Lewellen, 2006). Moreover, as discussed by Lee et al. (2023) geopolitical risks can lead to a re-evaluation of a company's asset riskiness, leading to higher overall cost of capital. Operating in politically unstable regions may cause investors to demand higher returns to compensate for the perceived increased risk. Furthermore, geopolitical risks create an unpredictable environment, impacting long-term strategic planning and decision-making and introducing uncertainty into cash flows and risk profiles.

Additionally, increased risk aversion as a result of higher geopolitical risk can impact investment decisions, which in turn impact the capital structure of a firm. Empirical studies such as Alam et al. (2023); Rumokoy et al. (2023); Wang et al. (2019) have demonstrated that firms tend to decrease their capital expenditure in response to heightened geopolitical risk. This cautious approach to capital expenditure reduces the need for external financing, resulting in firms issuing less debt.

Executive characteristics also play a significant role in shaping the risk aversion and the relationship between geopolitical risk and corporate capital structure. Prior research has highlighted the importance of executive characteristics in influencing firm-level outcomes, such as debt structure (Datta, Doan and Toscano, 2021), firm performance and risk (Perryman, Fernando and Tripathy, 2016; Xing, Gonzalez and Sila, 2021), environmental violations (Liu, 2018), analysts' earnings forecasts (Datta, Doan and Iskandar-Datta, 2022), and payout policy (Ye, Deng, Liu, Szewczyk and Chen, 2019).

This study seeks to investigate how executives' age and gender diversity moderate the impact of geopolitical risk on firms' financing choices, employing a large sample of U.S. publicly traded firms from 1992 to 2020.

We begin by examining the well-documented relationship between geopolitical risk and financial leverage, aligning with previous studies by Khoo and Cheung (2021); Lee et al. (2021), which demonstrate a decrease in firms' debt ratios in response to geopolitical risk.

Next, we investigate the moderating role of executives' age in this relationship. The impact of age on executives' risk-taking propensity is subject to debate. One perspective suggests that younger executives, driven by career concerns, exhibit risk aversion and adopt conservative investment policies, as supported by Hirshleifer and Thakor (1992); Holmström (1999). Another perspective, proposed by Prendergast and Stole (1996), suggests that younger managers engage in more frequent, daring, and risky investments as a way to signal their abilities. The current literature mixed findings contribute to an unclear understanding of how age influences the relationship between geopolitical risk and financial leverage. Younger executives may either amplify or decrease the negative effect of geopolitical risk on financial leverage, depending on their risk aversion or appetite for risk. This paper's findings support the notion that older executives are less

risk-averse and are less concerned about their careers, and as a result they demonstrate a reduced responsiveness to changes in geopolitical risk when making decisions about financial leverage. As executives grow older, they exhibit a less cautious approach, indicating a decreased sensitivity to geopolitical risk.

We further investigate the influence of executives' gender on this relationship. Previous research consistently demonstrates that women exhibit higher risk aversion and lower overconfidence compared to men (Barber and Odean, 2001; Graham, Harvey and Puri, 2013; Perryman et al., 2016). This risk-averse behavior suggests a preference for certain outcomes over risky ones in decision making (Hersch, 1996; Levin, Snyder and Chapman, 1988). Additionally, studies highlight that male executives tend to have higher debt ratios (Graham et al., 2013; Huang and Kisgen, 2013). Considering these findings, it is plausible that firms with a higher representation of female executives may display increased sensitivity to geopolitical risk and a greater inclination to reduce debt levels. This paper's findings support this notion, indicating that firms with a greater proportion of female executives demonstrate a stronger tendency toward conservative financial decisions when confronted with heightened geopolitical risk.

Next, we employ a measure of physical cash as a proxy for executives' risk aversion, as proposed by Sah (2021); Sah, Adhikari, Krolikowski, Malm and Nguyen (2022). Using a structural equation model, we establish that risk aversion serves as a significant channel through which geopolitical risk influences capital structure decisions. To further investigate the moderating role of executives' characteristics in this mediation process, particularly the influence of geopolitical risk on risk aversion, we employ a first-stage moderated mediation model. Specifically, we examine how executives' age and gender moderate the risk aversion channel. By generating bootstrap confidence intervals, we assess whether these moderating effects differ significantly from zero. Our channel testing results reveal statistical significance, providing support for our main findings and demonstrating the importance of executives' characteristics in shaping the relationship between geopolitical risk, risk aversion, and capital structure decisions.

To strengthen the reliability of the findings, we conduct a series of robustness analysis. These analysis encompass alternative estimation methods and capital structure measures. In particu-

lar, a panel Generalized Linear Model (GLM) with a logit link function is employed to address concerns regarding the dependent variable, which is a proportion bounded between zero and one. Additionally, we address potential specification errors and endogeneity concerns by utilizing a Two-Stage Least Squares (2SLS) model. Importantly, this paper's results exhibit consistent quantitative patterns across all robustness tests, affirming the robustness and validity of the main findings.

This study contributes to the literature on corporate finance and executive management by examining the role of executive characteristics in the context of geopolitical risk. It sheds light on the complex interplay between firm-level and individual-level factors that shape corporate financing decisions. By investigating risk aversion as a potential channel, the study provides insights into the mechanisms through which geopolitical risk impacts capital structure choices. The findings have important implications for policymakers and practitioners, offering guidance on mitigating risks associated with geopolitical uncertainty and making more effective capital allocation decisions in the global economy.

The paper is structured as follows: Section 2 provides a comprehensive review of the relevant literature, where we also formulate the hypotheses. In Section 3, we provide a detailed account of the data, explain the construction of variables, and present the univariate statistics. The subsequent section, Section 4, is dedicated to hypothesis testing and a thorough discussion of the results. Additionally, we investigate the risk aversion channel in Section 5, while Section 6 conducts robustness tests using alternative econometric methods and capital structure measures. Finally, in Section 7, we offer concluding remarks summarizing the main findings and implications of the study.

2 Hypothesis development

In the modern global economy, firms face an array of risks stemming from an increasingly complex geopolitical landscape. The effects of these risks on corporate decisions, particularly on firms' capital structure choices, have been a subject of research interest among finance and economics scholars. However, while previous studies have explored the impact of geopolitical risk on capital structure, there remains a notable research gap regarding the examination of this relationship through risk aversion channel and how executives' characteristics impact this relationship. Specif-

ically, we aim to investigate the extent to which a firm's executives' age and gender moderate the effect of geopolitical risk on firms' capital structure decisions through risk aversion channel. Such insights will contribute to the existing literature and offer valuable implications for both researchers and practitioners striving to navigate the complexities of geopolitical risk and its implications on firm-level financial decisions.

2.1 Geopolitical Risk and Capital Structure

The relationship between geopolitical risk and firms' debt ratios is characterized by an adverse association, which can be attributed to multiple factors, including a decrease in debt supply, an increase in the cost of debt, and managerial traits.

Prior research has examined the impact of geopolitical risk on firms' financing decisions, particularly through the channels of decreased debt supply and increased cost of debt. In our study, we focus on a different aspect, namely the influence of risk aversion and managerial traits on the relationship between geopolitical risk and capital structure.

When geopolitical risk escalates, it tends to result in a contraction of lending activities by banks (Alessandri and Bottero, 2020; Buch, Buchholz and Tonzer, 2015; Raunig, Scharler and Sindermann, 2017). Simultaneously, the cost of loans rises (Nguyen and Thuy, 2023). This decrease in credit supply and higher borrowing costs can be attributed to several underlying factors. Firstly, heightened geopolitical risk introduces greater cash flow volatility for firms, making them appear riskier to lenders. Consequently, lenders adopt a more cautious approach, reducing their willingness to extend credit. Secondly, elevated geopolitical risk exacerbates information asymmetry between borrowers and lenders, making it more challenging for lenders to accurately assess the creditworthiness and risk profile of potential borrowers. This heightened uncertainty prompts creditors to tighten their credit standards and reduce the availability of credit.

Furthermore, the heightened cash flow volatility experienced by firms due to geopolitical risk leads to increased costs of debt. The increased uncertainty and potential disruptions associated with geopolitical events elevate the perceived riskiness of firms, causing lenders to demand higher interest rates as compensation for this elevated risk (Keefe and Yaghoubi, 2016). Consequently,

firms face higher borrowing costs, making debt financing less attractive and prompting them to reduce their debt ratios as a risk management strategy.

Additionally, the level of debt employed by a company attracts significant interest in the fields of finance and behavioral economics. It is crucial to acknowledge that heightened debt usage entails greater risk while potentially yielding higher expected returns. This propensity towards increased debt levels may be influenced by executives' personality traits. Theoretical propositions by Heaton (2002) and Hackbarth (2008) posit that managers' behavioral characteristics shape their decisions regarding debt utilization. Consistent with these theories, we contend that executives with a higher degree of risk aversion are less inclined to embrace the heightened risk associated with higher debt ratios. Consequently, they opt for lower levels of debt in their capital structure.

Recent empirical studies conducted by Lee et al. (2021) and Khoo and Cheung (2021) provide further support for the aforementioned negative relationship between geopolitical risk and firms' debt ratios.

2.2 Moderating Role of Executives' Age

The impact of executives' age on their risk-taking propensity remains a subject of ongoing debate in theoretical and empirical research. One perspective suggests that younger executives, driven by heightened career concerns, exhibit a greater inclination towards risk aversion and adopt conservative investment policies (Hirshleifer and Thakor, 1992; Holmström, 1999). This cautious approach stems from their recognition of their relatively lower status and reputation within the industry, as well as the significant career implications associated with unfavorable investment and financing decisions. Furthermore, studies have highlighted the prevalence of herding behavior among young executives, fund managers, and analysts, driven by their career concerns and the fear of negative career outcomes (Chevalier and Ellison, 1999; Hong, Kubik and Solomon, 2000; Scharfstein and Stein, 1990).

In contrast, another strand of literature suggests that younger managers demonstrate a tendency for more frequent, daring, and riskier investments compared to their older counterparts (Agha and Pramathevan, 2023; Trabert, 2023). This viewpoint finds support in the managerial signaling model

proposed by Prendergast and Stole (1996), which suggests that younger managers adopt riskier investment strategies to signal their superior ability and high-quality performance. Additionally, biological factors such as decreasing testosterone levels with age have been linked to a higher propensity for risk-taking among younger executives (Holland, Bandelow and Hogervorst, 2011; Samaras, Papadopoulou, Samaras and Ongaro, 2014).

Financial leverage amplifies a firm's risk (Lewellen, 2006), and the approach to financial leverage can be significantly influenced by executives' propensity for engaging in risk-taking. When executives exhibit higher levels of risk-taking behavior, characterized by a greater inclination towards frequent, daring, and riskier investments, it often coincides with a heightened appetite for leverage. This tendency arises as risk-seeking managers actively pursue innovative and potentially higher-yielding opportunities, making them more willing to utilize leverage to magnify potential returns.

The mixed findings in the literature regarding the impact of executives' age on risk-taking propensity lead to an unclear understanding of how age influences the relationship between geopolitical risk and financial leverage. On one hand, younger executives, driven by career concerns, tend to exhibit lower risk-taking behavior. Consequently, in uncertain circumstances such as a higher geopolitical risk environment, they may amplify the negative effect of geopolitical risk on financial leverage (i.e. decreasing the financial leverage more). This cautious approach aligns with their risk-averse nature, as they prioritize protecting their careers and avoiding detrimental outcomes.

On the other hand, the managerial signaling model suggests that younger executives have a greater appetite for risk. In this perspective, younger executives may actually decrease the negative effect of geopolitical risk on financial leverage. Their willingness to take on risk and pursue ambitious investment strategies, even in the face of geopolitical uncertainty, can lead them to actively seek opportunities to leverage their investments for potentially higher returns.

Hypothesis 1. *The age of a firm's executives moderates the relationship between geopolitical risk and financial leverage.*

2.3 Moderating Role of Executives' Gender

To develop the second hypothesis, we can further explore the relationship between financial leverage and executives' risk-taking propensity (Lewellen, 2006).

Previous research consistently demonstrates that women tend to exhibit higher levels of risk aversion and lower overconfidence compared to men (Agha and Pramathevan, 2023; Barber and Odean, 2001; Graham et al., 2013; Gull, Nekhili, Nagati and Chtioui, 2018; Perryman et al., 2016). This risk-averse behavior indicates a preference for certain outcomes over risky ones, both in general decision-making and financial decision-making contexts (Hersch, 1996; Jianakoplos and Bernasek, 1998; Levin et al., 1988; Martin, Nishikawa and Williams, 2009; Sunden and Surette, 1998). Furthermore, studies have shown that male executives are more likely to have higher debt ratios (Adusei and Obeng, 2019; Faccio, Marchica and Mura, 2016; Graham et al., 2013; Huang and Kisgen, 2013). Based on these findings, it is plausible to consider that firms with a higher representation of female executives may display a greater sensitivity to geopolitical risk and, consequently, exhibit a higher inclination to reduce their debt levels in response.

One possible explanation is that risk-averse individuals, such as women, are more inclined to invest in strategies aimed at mitigating the impact of geopolitical risk. For instance, they may prioritize diversifying operations or hedging against currency fluctuations to minimize potential losses. In firms with a larger proportion of female executives, their higher risk aversion may contribute to an increased emphasis on risk management and a heightened sensitivity to geopolitical risk. Female executives, who tend to have different risk preferences and decision-making approaches compared to their male counterparts (Melero, 2011; Werhane, 2007), may be more cautious and risk-averse when assessing and addressing the impact of geopolitical risk on the firm's financial leverage decisions. By reducing debt, these firms seek to enhance their financial flexibility, lower their exposure to interest rate fluctuations, and create a buffer against potential disruptions caused by geopolitical events. The focus on debt reduction aligns with the risk-averse nature of female executives and their preference for stable and secure financial outcomes.

Therefore, it is hypothesized that:

Hypothesis 2. *Firms with a higher proportion of female executives amplify the negative effect of geopolitical risk on financial leverage.*

This hypothesis suggests that firms with a larger representation of female executives will demonstrate an intensified response to geopolitical risk, leading to a stronger reduction in their financial leverage. The risk-averse nature of female executives and their inclination towards stable financial outcomes are expected to drive this effect.

3 Sample, Variable Construction, and Univariate Statistics

3.1 Sample

The financial annual data used in this study is obtained from the Compustat database and covers US corporations from 1992 to 2020. To ensure the consistency and relevance of the data, we follow the methodology outlined in Keefe and Yaghoubi (2016). Specifically, we exclude certain types of firms to maintain data integrity, such as financial firms, utility firms, and companies involved in major mergers (identified by the Compustat footnote code AB). Additionally, we exclude firms with missing values for book value of assets, revenue, total liabilities, or total assets.

Furthermore, the executive gender and age data are sourced from the Execucomp database, ensuring comprehensive information on key executive characteristics.

Consistent with the methodology proposed by Das and Yaghoubi (2023), we employ data winsorization at the 1% level for both tails of the distribution. In addition, we conduct variable filtration, lag the control variables, and incorporate different measures of capital structure variables. As a result of these procedures, the sample size is further reduced to between 7,910 and 26,289 firm-year observations.

3.2 Variable Construction

3.2.1 Geopolitical risk

We employ the GPR index developed by Caldara and Iacoviello (2022) as the measure of geopolitical risk. This index captures the threat, occurrence, and escalation of adverse events associated

with wars, terrorism, and tensions among states and political actors, all of which have significant implications for international relations. The GPR index is constructed by analyzing the frequency of articles that mention these adverse geopolitical events and their related risks on a monthly basis. The data is gathered through automated text searches conducted on electronic archives of 10 newspapers.

To enhance accuracy and minimize misclassifications and measurement errors resulting from one-word searches, the automated text-search algorithm is designed with eight categories: C1 (War Threats), C2 (Peace Threats), C3 (Military Buildups), C4 (Nuclear Threats), C5 (Terror Threats), C6 (Beginning of War), C7 (Escalation of War), and C8 (Terror Acts). Each category is represented by a search query composed of sets of two words. The first set comprises topic words such as "war", "military", or "nuclear" while the second set includes "threat" words (for categories C1 to C5) or "act" words (for categories C6 to C8), such as "threat", "warn", or "danger" for threats, and "attack", "kill", or "bomb" for acts.

In this study, we construct an annual GPR index (Geopolitical Risk) by calculating the 12-month average of the monthly GPR index developed by Caldara and Iacoviello (2022). To normalize the distribution of the GPR index, we employ the natural logarithm of the annual GPR index (GPR), following the approach of Hao, Prapan, Gavriilidis, Petmezas and Vagenas-Nanos (2022) and Adra et al. (2023).

3.2.2 Executive Age, Executive Gender, and Risk Aversion Variables

To test our hypotheses, we require measures of executives' age, and gender. These variables are obtained from the Execucomp database, which provides comprehensive data on executive characteristics.

Executive Age

The executives' age variable (AGE_{exe}) is constructed using a methodology similar to that proposed by Xu, Fernando and Tam (2018) and Mekhaimer, Abakah, Ibrahim and Hussainey (2022). It is

calculated as the natural logarithm of the average age of all executives in the Execucomp database for a firm in a given year.

Executive Gender

The executives' gender variable ($Gender_{exe}$) is defined as the proportion of female executives relative to the total number of executives within a firm for a specific year. This ratio allows us to examine and analyze the gender composition of executive positions within the firm (Clacher, Osma, Scarlat and Shields, 2021; Datta et al., 2022, 2021).

Risk Aversion

The risk aversion variable ($RiskAverse$) is used for the channel testing and is defined as a ratio of physical cash to total assets, as proposed by Sah (2021), and Sah et al. (2022). They consider the measure of physical cash to total assets as a proxy for executives' risk aversion as risk averse executives maintain a higher levels of physical cash as a precautionary measure to mitigate potential financial risks and uncertainties.

3.2.3 Debt Ratios

The selection of an appropriate measure to assess leverage has been a subject of debate, as highlighted by Welch (2011). Researchers often overlook the importance of measure selection and rely on measures used in previous studies without careful consideration. One commonly used measure is the ratio of financial debt to total assets. However, Welch (2011) points out that this measure is flawed because it treats non-financial liabilities as equity, which is incorrect.

Furthermore, studies such as Kieschnick and Moussawi (2018); Trimbath (2001) criticize the use of book debt ratio in capital structure studies. They argue that relying on book value measures overlooks the fact that book equity is merely a balancing figure in accounting, used to reconcile assets and claims on assets. Therefore, it fails to accurately reflect a firm's choice of equity financing. This limitation applies not only to firms reporting negative book equity but also to those reporting negative earnings or facing similar circumstances.

Therefore, considering the above, we construct two alternative measures of capital structure. The first measure, following Ho, Bai, Lu and Qin (2021); Kieschnick and Moussawi (2018), is the long plus short-term market debt ratio (MDR_{S+L}), defined as the sum of short and long-term market debt divided by the sum of short and long-term debt plus the market value of common equity:

$$MDR_{S+L} = \frac{Long + \ Short\ Term\ Debt}{Long + \ Short\ Term\ debt \ + \ Market\ Value\ of\ Common\ Equity}. \tag{1}$$

Additionally, we construct the second debt ratio, following Keefe and Yaghoubi (2016), using only long-term debt. The long-term market debt ratio (MDR_{LT}) is defined as the total long-term debt divided by the sum of the total long-term debt plus the market value of common equity:

$$MDR_{L} = \frac{Long\ Term\ Debt}{Long\ Term\ Debt \ + \ Market\ Value\ of\ Common\ Equity}. \tag{2}$$

Furthermore, we create a dummy variables to capture the zero leverage behavior of firms, based on the studies by Huang, Li and Gao (2017); Strebulaev and Yang (2013). ZL_{S+L} is a binary variable that takes the value of one when a firm's combined short-term and long-term debt is zero, and zero otherwise.

3.2.4 Control Variables

i) CFV represents the measure of operating cash flow volatility, constructed using the methodology introduced by De Veirman and Levin (2018).[2]

ii) $Tangibility$ denotes the asset tangibility, calculated as the ratio of fixed assets to total assets.

iii) $Size$ serves as a proxy for a firm's size and is represented by the natural logarithm of its total assets.

[2]For a detailed explanation of this variable, readers can refer to the study of Keefe and Yaghoubi (2016).

iv) $FirmAge$ is computed as the number of years a firm has been listed in the Compustat database. It reflects the length of time a firm has been operating and provides insights into its level of experience and maturity.

v) $Profitability$ indicates the profitability of a firm and is calculated as the ratio of the firm's operating income before depreciation to its total assets. It measures the ability of a firm to generate profits relative to its asset base.

vi) MtB represents the ratio of the market value of assets to total assets. It captures the market valuation of a firm's assets relative to their book value and provides insights into the perceived value of the firm by the market.

vii) RnD is the natural logarithm of (1+ the ratio of research and development (R&D) expenses to sales). It captures the intensity of a firm's R&D investment relative to its sales revenue. Following the literature, we change missing R&D to zero.

viii) $EquIssue$ denotes the net equity issuance of a firm.

ix) $IndustLev$ represents the median industry leverage and is calculated as the median of the total debt to market value of assets ratio for each year and four-digit Standard Industrial Classification (SIC) code. It provides insights into the typical leverage levels within specific industries.

Since the geopolitical uncertainty variable is an annual variable and is constant for all firm- year observations, we do not include a year fixed effect in our regressions since including it would reduce the explanatory power of the geopolitical risk variable. Therefore in all our specifications, we include the followings macro econometrics variables to control for to control for the uncertainty arising from business cycles, and the general economic policy uncertainty in the market.

x) EPU represents the natural logarithm of the Economic Policy Uncertainty (EPU) index developed by Baker, Bloom and Davis (2016). The EPU index serves as a measure of the level of uncertainty surrounding economic policy decisions and their potential impacts on the econ-

omy. The natural logarithm transformation of the index is often used to normalize the data and facilitate analysis.

xi) $Inflation$ represents the anticipated change in the consumer price index (CPI) over the upcoming year. It serves as a measure of the expected rate of price increase for goods and services, providing insights into the projected level of inflationary pressure in the economy.

xii) GDP refers to the U.S. Gross Domestic Product (GDP) per capita, which measures the economic output of the country per person on an annual basis. It provides insights into the average economic prosperity and standard of living experienced by individuals in the United States.

xiii) GDP_{growth} represents the annual growth rate of the U.S. Gross Domestic Product (GDP) compared to the previous year. It serves as a key indicator of the economic performance and expansion of the country's overall output and productivity.

xiv) CCI refers to the U.S. Consumer Confidence Index, an important measure that gauges the sentiment and confidence of consumers in the United States. It provides insights into consumer attitudes, expectations, and their overall perception of the economic environment.

xv) CLI represents the composite leading indicator, which is specifically designed to offer early indications of potential turning points in business cycles. It tracks the fluctuations in economic activity around its long-term potential level, serving as a valuable tool for assessing the overall economic outlook.

3.2.5 Univariate Statistics

insert Table 1

Table 1 presents the summary statistics for the variables. The debt ratio means indicate that a broader definition of debt corresponds to a higher debt ratio. Specifically, MDR_{S+L} has a mean debt ratio of 0.186, while MDR_L has a mean debt ratio of 0.168. This suggests that including additional components in the debt calculation leads to a higher overall debt ratio.

Furthermore, the table reveals that 16.7% of firms in the sample have zero long+short term debt, which highlights the presence of firms with no debt in both categories, indicating variation in debt usage among the sampled firms. Additionally, the average age of executives in the sample is 53, with a standard deviation of 5.334. The gender ratio indicates that only 7% of the executives in the sample are female on average. This suggests a gender imbalance within the executive positions.

insert Table 2

Table 2 presents the correlation coefficients among the key variables investigated in this study. As anticipated, a strong positive correlation is observed between MDR_{S+L} and MDR_L. Moreover, the table reveals a negative correlation between GPR and the debt ratios, aligning with expectations. Furthermore, in line with existing literature, a statistically significant and positive relationship is found between executives' age and MDR_{S+L} and MDR_L. Additionally, the correlation coefficient between gender and debt ratios is also statistically significant and negative, supporting prior research findings.

4 Testing

The relationship between geopolitical risk and leverage can be investigated using the following model:

$$Leverage_{i,t} = \alpha_i + \beta_1 GPR_t + \sum_n \beta_n Controls^n_{i,t-1} + \sum_m \beta_m Macros^m_{t-1} + \epsilon \tag{3}$$

In Equation (3), $Leverage_{i,t}$ represents one of the three capital structure measures constructed in Section 3.2.3: either MDR_{S+L}, MDR_L, or ZL_{S+L}. The variable GPR corresponds to the natural logarithm of the measure of geopolitical risk explained in Section 3.2.1. The term $Controls$ encompasses a set of firm-specific control variables, while the term $Macros$ controls for economy-wide macroeconomic factors as detailed in Section 3.2.4. Notably, we exclude the year fixed effect from the model since the geopolitical risk variable remains constant for all firm-year observations. Including a year fixed effect could diminish the explanatory power of the geopolitical risk variable.

Instead, we choose to control for economy-wide macroeconomic factors. The index i denotes firms, and the index t represents the calendar year. The term α_i accounts for firm fixed effects, capturing firm-specific characteristics. To address firm heterogeneity, serial correlations, and heteroskedasticity in the error term ϵ, cluster robust standard errors at the firm level are utilized. The primary focus is on examining the effect of GPR on debt ratios, specifically investigating the coefficient β_1.

Additionally, inspired by Keefe and Yaghoubi (2016) and Kieschnick and Moussawi (2018), we consider the presence of zero-leverage (all equity) firms and acknowledge that the governance features of these firms differ from those of non-zero levered firms. It is important to recognize that the impact and magnitude of geopolitical risk on leveraged and unleveraged firms may differ. Therefore, additional tests on Equation (3) are conducted, excluding firms with zero long and short-term debt, as well as firms with zero long-term debt.

Furthermore, we examine the probability of zero-leverage as a result of geopolitical risk. Since ZL_{S+L} is a binary indicator variable, we follow Strebulaev and Yang (2013) and employ a logit model using maximum-likelihood estimation for Equation (3) when utilizing the zero leverage variable.

Next, to test the moderating effect of executives' age, and gender on the relationship between geopolitical risk and leverage, we estimate the following model:

$$\begin{aligned} Leverage_{i,t} = \alpha_i + \beta_1 GPR_t + \beta_2 GPR_t \times Executive_{t-1} + \beta_3 Executive_{t-1} \\ + \sum_n \beta_n Controls^n_{i,t-1} + \sum_m \beta_m Macros^m_{t-1} + \epsilon \end{aligned} \tag{4}$$

In Equation (4), *Executive* represents one of the two executives characteristics discussed in Section 3.2.2: AGE_{exe}, $Gender_{exe}$. The term $GPR \times Executive$ represents the interaction between GPR and these variables. The primary focus, as stated in Hypotheses 1 and 2, is to examine the effect of GPR on leverage in the presence of *Executive* variables, specifically through the coefficients β_1 and β_2.

4.1 Testing the Relationship Between Geopolitical Risk and Leverage

insert Table 3

Table 3 presents the estimation results of Equation (3) with GPR as the variable of interest, utilizing firm-clustered standard errors. Columns (1) and (3) employ the full sample of firms, using MDR_{S+L} and MDR_L as the debt ratio measures, respectively. The table reveals that the coefficients associated with GPR are negative and statistically significant at the 1% level, indicating its substantial impact on both debt ratio measures. These findings align with the results reported by Lee et al. (2021), and Khoo and Cheung (2021).

To further investigate the influence of zero-leverage firms, we retest Equation (3) in Columns (2) and (4), excluding firms with zero long and short-term debt, and zero long-term debt, respectively. The coefficients in Columns (2) and (4) suggest a slightly greater adverse effect of GPR when excluding zero-leverage firms; however, the difference is trivial.

In addition, we employ a logit model with maximum-likelihood estimation for Equation (3) in Column (5), introducing a binary variable ZL_{S+L}. The results in Column (5) reveal that higher geopolitical risk increases the probability of zero-leverage. It is important to note that although the coefficient in this columns is positive, the overall results remain consistent with those observed in Columns (1) to (4).

To assess the economic significance of geopolitical risk in Equation (3), we examine the impact of a one standard deviation increase in geopolitical risk on the debt ratios and the zero-leverage variable. We calculate the values of the dependent variable at the mean of all other variables, as well as at the mean plus one standard deviation of GPR, and the mean of all other variables.

The calculations indicate that a one standard deviation increase from the mean of GPR leads to an approximate 3.2% decrease in the debt ratios. Additionally, we observe an approximately 15% increase in the probability of zero long plus short-term debt as a result of a one standard deviation increase from the mean of GPR.

Table 3 further displays the statistical significance of the coefficients for the control variables, which are significant at the 1% level, exhibiting the expected signs. It is important to highlight that the inclusion of the EPU variable in our analysis ensures that the estimated effect of GPR can

be specifically attributed to geopolitical risk and not to economic policy uncertainty. By carefully accounting for the EPU variable in the testing, we ensure the robustness of this study's findings, thereby isolating and identifying the distinct impact of geopolitical risk on the observed outcomes.

4.2 Testing Hypothesis 1: The Moderating Role of Executives' Age

In order to investigate Hypothesis 1, which focuses on the role of executive age in the relationship between geopolitical risk and leverage, we include the variable AGE_{exe} as one of the executive variables in Equation (4). By analyzing the coefficient β_2 associated with the interaction term $GPR \times Age_{exe}$, one can assess the influence of executive age on this relationship.

insert Table 4

Findings are presented in Table 4, which parallels the structure of Table 3. In Columns (1) and (2), we employ MDR_{S+L} as the explanatory variable, while Columns (3) and (4) utilize MDR_L. Column (5) focuses on ZL_{S+L}. As noted before, Columns (2) and (4) exclude firms with zero long and short-term debt, and zero long-term debt, respectively. As can be seen from the table, the coefficients associated with GPR demonstrate similar signs and levels of significance as those in Table 3. Notably, the interaction term between age and geopolitical risk, denoted as $GPR \times Age_{exe}$, attains statistical significance at the 1% level. These significant findings indicate that executives' age exerts a moderating influence on the relationship between geopolitical risk and financial leverage.

Columns (1) to (4) of Table 4 exhibit positive and statistically significant coefficients for the interaction term, implying that as executives' age increases, the connection between geopolitical risk and financial leverage weakens. Moreover, in Column (5), we find a negative coefficient for the interaction term, indicating that as executives grow older, the probability of zero-leverage under higher geopolitical risk decreases. In simpler terms, older executives display reduced responsiveness to changes in geopolitical risk when making decisions regarding financial leverage. This finding aligns with the existing literature, which suggests that younger executives, driven by career concerns and risk aversion (Hirshleifer and Thakor, 1992; Holmström, 1999), are more inclined to decrease firm leverage in response to geopolitical risk. This inclination arises from the understanding that financial leverage amplifies a firm's overall risk (Lewellen, 2006).

Through demonstrating the moderating effect of executives' age on the relationship between geopolitical risk and financial leverage, the results provide substantial support for the hypothesis put forward. These findings shed light on the intricate dynamics at play and contribute to a deeper understanding of how age-related factors influence decision-making processes within the context of financial leverage and geopolitical risk.

4.3 Testing Hypothesis 2: The Moderating Role of Executives' Gender

This section aims to test Hypothesis 2, which explores the moderating effect of executives' gender on the relationship between geopolitical risk and financial leverage. Prior research indicates that women tend to exhibit higher levels of risk aversion and lower overconfidence compared to men (Agha and Pramathevan, 2023; Barber and Odean, 2001; Graham et al., 2013; Perryman et al., 2016). These gender-based differences in risk preferences suggest that firms with a higher representation of female executives may respond differently to geopolitical risk and make more conservative decisions regarding financial leverage. In Equation (4), we include the variable $Gender_{exe}$ as one of the executive-related variables and examine the coefficient β_2 associated with the interaction term $GPR \times Gender_{exe}$ to assess the impact of executives' gender on this specific relationship.

insert Table 5

The empirical findings are presented in Table 5. Upon reviewing the table, it becomes evident that the coefficients related to GPR exhibit similar signs and levels of significance as those shown in Table 3. Of particular interest is the interaction term between gender and geopolitical risk, denoted as $GPR \times Gender_{exe}$. These statistically significant results indicate that executives' gender plays a critical moderating role in the relationship between geopolitical risk and financial leverage. Consequently, it can be inferred that gender influences the association between these variables, emphasizing the importance of gender in shaping this relationship.

The negative and statistically significant coefficients of the interaction term in Columns (1) to (4), along with the positive and statistically significant coefficient when incorporating the ZL_{S+L} variable in Column (5), provide support for Hypothesis 2. Specifically, we find that firms with

a higher proportion of female executives exhibit heightened sensitivity to geopolitical risk and tend to reduce their financial leverage in response to increased risk. As geopolitical risk levels rise, firms with a greater representation of female executives demonstrate a stronger inclination towards conservative financial decisions. This behavior aligns with the risk-averse nature of female executives and their preference for stable and secure financial outcomes.

This finding suggests that the gender composition of executive teams plays a role in shaping a firm's response to geopolitical risk, with a higher proportion of female executives contributing to a more conservative approach.

4.4 Additional testing: Categorizing Age_{exe} and $Gender_{exe}$

To further explore the influence of age and gender on the relationship between debt and geopolitical risk and determine its economic significance, we categorized firms into sub-samples based on the median values of age and gender variables.

insert Table 6

In Column (1) of Table 6, we present the results of Equation (3) for firms with executive ages exceeding the median (Age_{exe}), while Column (2) displays the outcomes for firms with executive ages below the median. Column (3) focuses on firms where the executive gender ($Gender_{exe}$) surpasses the median, and Column (4) centers on firms where the executive gender is below the median.

In Panel B, we report the marginal effects, which quantify the change in the debt ratio (MDR_{S+L}) resulting from a one standard deviation increase in the geopolitical risk variable for each category. The table highlights that for firms with executives younger than the median age, a one standard deviation increase in the geopolitical risk variable leads to a 5% decrease in the debt ratio, while the effect of GPR on debt is not statistically significant for firms with executives older than median age. In addition, Panel B shows that firms with a higher proportion of female executives experience a 5.2% reduction in the debt ratio, while firms with fewer female executives show a 2.3% decrease. These results consistently align with the findings from our interaction variables in Tables 4 and 5 and reinforce our primary conclusions.

5 Potential Channel

This section aims to investigate the role of risk aversion as a potential channel through which geopolitical risk influences capital structure. To accomplish this, a path analysis will be conducted to comprehensively explore the relationship between these variables. Path analysis allows for the identification and analysis of both direct and indirect pathways through which geopolitical risk affects capital structure.

The risk aversion variable, denoted as $RiskAverse$, is employed for channel testing. It is defined as the ratio of physical cash to total assets, as proposed by Sah (2021) and Sah et al. (2022). These studies consider the measure of physical cash to total assets as a proxy for executives' risk aversion. They argue that risk-averse executives maintain higher levels of physical cash as a precautionary measure to mitigate potential financial risks and uncertainties. The graphical representation of the path analysis, illustrating the relationships between geopolitical risk, risk aversion, and capital structure, is presented in Figure 1.

insert Figure 1

Using a Structural Equation Model (SEM) as depicted in Figure 1, we examine whether risk aversion acts as a significant channel through which geopolitical risk impacts capital structure decisions.

In Figure 1, the structural equations are as follows:

1a) $MDR_{S+Li,t} = \alpha_i + \beta_1 GPR_t + \beta_2 RiskAverse_t + \sum_n \beta_n Controls^n_{i,t-1} + \epsilon$,

1b) $RiskAverse_{i,t} = \alpha_i + \alpha_1 GPR_t + \sum_n \beta_n Controls^n_{i,t-1} + \epsilon$.

The coefficients (β_1) and ($\alpha_1 \times \beta_2$) correspond to the direct path (c) and indirect path ($a \times b$) respectively, as illustrated in Figure 1. The mediation effect of risk aversion is analyzed in Table 7. The results in Table 7 demonstrate that both the coefficients for the indirect and direct paths are statistically significant at the 1% level, and they exhibit the expected signs. Additionally, the table presents the percentage of each direct and indirect path contributing to the total effect of geopolitical risk on capital structure. The findings reveal that 84.5% of the effect of geopolitical

risk on MDR_{S+L} is attributed to the direct path, while 15.5% is attributed to the indirect path. Overall, these results support the notion that risk aversion is a potential channel through which geopolitical risk impacts capital structure.

insert Table 7

Additionally, this section examines the moderating effect of executive characteristics on the relationship between geopolitical risk and capital structure. Specifically, a first-stage moderated mediation model will be employed to investigate how executive characteristics moderate the risk aversion channel and the influence of geopolitical risk on capital structure decisions. As discussed in Section 2, this analysis builds upon the notion that female executives and younger executives tend to exhibit higher levels of risk aversion. Figure 2 illustrates the direct path (c) and the indirect path $(a_1 + a_3 \times Executives) \times b$.

In Figure 2, the structural equations are as follows:

2a) $MDR_{S+Li,t} = \alpha_i + \beta_1 GPR_t + \beta_2 RiskAverse_{i,t} + \sum_n \beta_n Controls^n_{i,t-1} + \epsilon$,

2b) $RiskAverse_{i,t} = \alpha_i + \alpha_1 GPR_t + \alpha_2 Executive_{i,t-1} + \alpha_3 GPR_t \times Executive_{i,t-1} + \sum_n \beta_n Controls^n_{i,t-1} + \epsilon$.

insert Figure 2

Tables 8 and 9 present the results of examining the moderating effects of executives' age and gender, respectively, on the mediating effect of risk aversion in the relationship between geopolitical risk and capital structure. In Panel A of both tables, the results of Equation (2b) are reported, where the dependent variable is risk aversion ($RiskAverse$).

In Table 8, the coefficient for $GPR \times Age_{exe}$ is negative and statistically significant at the 5% level. This indicates that the positive effect of GPR on risk aversion decreases as the age of a firm's executives increases, aligning with expectations. Similarly, in Table 9, the coefficient for $GPR \times Gender_{exe}$ is positive and statistically significant at the 1% level. This suggests that the effect of GPR on risk aversion increases with a higher ratio of female executives in a firm, as anticipated.

Furthermore, Panel B of Table 8 and Panel B of Table 9 present the effects of GPR on $RiskAverse$ at different levels of Age_{exe} and $Gender_{exe}$, respectively. As expected, the effect of GPR on $RiskAverse$ decreases as the value of Age_{exe} increases, and it increases as the value of $Gender_{exe}$ increases. These findings are consistent with the signs of the interaction terms in Panel A of both tables.

Panel C of both tables then report the results of Equation (2a) above, where MDR_{S+L} is the dependent variable. As expected, both risk aversion and geopolitical risk decrease MDR_{S+L}.

Additionally, bootstrap confidence intervals were generated to assess the significance of these moderating effects, as reported in Panel D of Tables 8 and 9. Both tables show that the Index of Moderated Mediation (IMM) is statistically significant at the 1% and 5% levels, providing evidence of moderated mediation.

Moreover, Panel D of the tables presents the conditional indirect effect using one standard deviation below the mean, at the mean, and above the mean of the executives' characteristics variables Age_{exe} and $Gender_{exe}$. The results demonstrate statistically significant effects, and as observed in Panel D, the negative conditional indirect effect decreases with an increase in the age of the executives, while it increases with a higher ratio of female executives. These findings are consistent with our main results and indicate that risk aversion is a proper channel and that executives' characteristics moderate the relationship between geopolitical risk and financing decisions.

insert Tables 8 and 9

6 Robustness

In this section, we assess the robustness of the findings of this study by examining alternative estimation methods and employing different measures of capital structure.

6.1 Alternative Estimation Methods

6.1.1 Generalized Linear Model

Given that the dependent variable in this study is a proportion variable that is bounded between zero and one, we need to account for the potential specification errors that arise when using a linear prediction equation. Cook, Kieschnick and McCullough (2008) have highlighted the limitations of linear models in capturing the nonlinear relationship between independent variables and the conditional expectation of a proportional or fractional variable.

To address these concerns and mitigate estimation problems associated with a bounded dependent variable, we follow Kieschnick and McCullough (2003) and Keefe and Yaghoubi (2016) and employ a panel Generalized Linear Model (GLM) with a logit link function. This modeling approach allows us to properly capture the nonlinear nature of the relationship and ensure more accurate estimation of the effects of the independent variables on the dependent variable.

insert Table 10

Table 10 reports the estimation results using the Panel GLM. The coefficients associated with GPR and the interaction between GPR and executives variables are statistically significant and consistent with the main findings reported in Section 4.

6.1.2 Two-Stage Least Squares

insert Table 11

To account for potential endogeneity concerns arising from factors such as measurement error and reverse causality, we adopt an instrumental variable strategy to address these issues. Drawing inspiration from Chatjuthamard, Wongboonsin, Kongsompong and Jiraporn (2020), we identify distinct spikes in the geopolitical risk variable corresponding to two significant events: the September 11 terrorist attack in 2001 and the 2003 invasion of Iraq. These spikes serve as instrumental variables in our analysis, allowing us to mitigate endogeneity concerns.

In Panel A of Table 11, we present the results of the first-stage regressions, which demonstrate the relationship between the instrumental variables and the endogenous explanatory variable. Panel

B reports the results of the second-stage regressions, capturing the impact of geopolitical risk on the dependent variable after controlling for endogeneity. Importantly, even after accounting for simultaneity, our results remain qualitatively consistent, indicating the robustness of the main findings.

Furthermore, in Panel B of Table 11, we examine the results of diagnostic tests, which provide further validity to our regression results. The under-identification test rejects the null hypothesis that our instrument is irrelevant, affirming its relevance in addressing endogeneity concerns. Additionally, the Cragg–Donald Wald F-statistic significantly exceeds the critical value of 16.38 as suggested by Stock and Yogo (2005) at the 10% maximal instrumental variable (IV) size. This rejection of the null hypothesis implies that our instrumental variables are not weak, further bolstering the credibility of the instruments.

6.2 Alternative Measures of Capital Structure

While we acknowledge that relying solely on book value measures may lead to overlooking the balancing aspect of book equity in accounting, we have also conducted an examination of two book debt ratios in the robustness section.

The first metric we employ is the ratio of combined short-term and long-term debt to the sum of short-term and long-term debt plus common shareholders' equity, as presented on the balance sheet.

$$BDR_{S+L} = \frac{Long+\ Short\ Term\ Debt}{Long+\ Short\ Term\ debt\ +\ Common\ shareholders'\ Equity}. \tag{5}$$

Additionally, we consider the long-term book debt ratio, which focuses solely on long-term debt relative to the sum of long-term debt and common shareholders' equity:

$$BDR_{L} = \frac{Long\ Term\ Debt}{Long\ Term\ debt\ +\ Common\ shareholders'\ Equity}. \tag{6}$$

We re-examined Hypotheses 1 and 2 using these two book debt ratios, and the results are reported in Table 12. Columns (1) to (4) utilize BDR_{S+L} as the explanatory variable, while Columns (5) to

(8) employ BDR_L. Upon examining the table, it is evident that the majority of the results remain qualitatively consistent with the main findings.

insert Table 12

7 Concluding Remarks

In this study, we investigate the influence of geopolitical risk on capital structure decisions while examining the moderating effects of executives' characteristics, including age and gender. Additionally, we explore the role of risk aversion as a potential channel through which geopolitical risk impacts capital structure. Our research adds to the existing literature by being the first to examine these moderating effects and shed light on the significance of executives' characteristics in shaping the relationship between geopolitical risk and financial leverage.

Consistent with previous studies by Lee Lee et al. (2021) and Khoo and Cheung (2021), our findings confirm the adverse impact of higher levels of geopolitical risk on firms' debt ratios, indicating a decrease in financial leverage. Building on this finding, we have tested three hypotheses.

Our first hypothesis focuses on the effect of executives' age on the relationship between geopolitical risk and financial leverage. The results reveal that executives' age significantly influences this relationship, with older executives displaying reduced sensitivity to changes in geopolitical risk when making decisions about financial leverage. This effect holds across various capital structure measures and methodologies employed. These findings align with existing literature suggesting that younger executives, driven by career concerns and risk aversion (Hirshleifer and Thakor, 1992; Holmström, 1999), are more likely to decrease firm leverage in response to geopolitical risk.

Moving to the second hypothesis, we examine the effect of executives' gender on the relationship between geopolitical risk and financial leverage. Our findings indicate that executives' gender plays a significant moderating role in this relationship. Specifically, firms with a higher proportion of female executives exhibit a stronger inclination toward conservative financial decisions in the face of increased geopolitical risk. These results are consistent with previous research highlighting the risk-averse nature of female executives and their preference for stable and secure financial outcomes

(Agha and Pramathevan, 2023; Barber and Odean, 2001; Graham et al., 2013; Perryman et al., 2016).

Furthermore, our study demonstrates that risk aversion serves as a significant channel through which geopolitical risk influences capital structure decisions. By utilizing a measure of physical cash as a proxy for executives' risk aversion, we confirm the role of risk aversion in shaping firms' capital structure choices. Additionally, we employ a first-stage moderated mediation model to investigate how executives' age and gender moderate this risk aversion channel. The analysis reveals statistically significant moderating effects, underscoring the importance of executives' characteristics in shaping the relationship between geopolitical risk, risk aversion, and capital structure choices.

Finally, we have conducted robustness analysis to enhance the reliability of the results. These include employing alternative estimation methods and capital structure measures. The results remain consistent across all robustness tests, providing further support for the robustness and validity of our main findings.

In conclusion, this study contributes valuable insights to the existing literature by examining the moderating effects of executives' characteristics on the relationship between geopolitical risk and capital structure choices. We demonstrate that executives' age and gender significantly shape firms' responses to geopolitical risk. These findings have important implications for practitioners, investors, and policymakers seeking to understand the complexities of capital structure decisions in the presence of geopolitical risk.

References

Adra, S., Gao, Y., Huang, J. and Yuan, J. (2023), 'Geopolitical risk and corporate payout policy', *International Review of Financial Analysis* **87**, 102613.

Adusei, M. and Obeng, E. (2019), 'Board gender diversity and the capital structure of microfinance institutions: A global analysis', *The Quarterly Review of Economics and Finance* **71**, 258–269.

Agha, M. and Pramathevan, S. (2023), 'Executive gender, age, and corporate financial decisions and performance: The role of overconfidence', *Journal of Behavioral and Experimental Finance* **38**, 100794.

Alam, A., Houston, R. and Farjana, A. (2023), 'Geopolitical risk and corporate investment: How do politically connected firms respond?', *Finance Research Letters* **53**, 103681.

Alessandri, P. and Bottero, M. (2020), 'Bank lending in uncertain times', *European Economic Review* **128**, 103503.

Anser, M., Syed, Q. and Apergis, N. (2021), 'Does geopolitical risk escalate co2 emissions? evidence from the brics countries', *Environmental Science and Pollution Research* **28**(35), 48011–48021.

Baker, S., Bloom, N. and Davis, S. (2016), 'Measuring economic policy uncertainty', *The Quarterly Journal of Economics* **131**(4), 1593–1636.

Barber, B. and Odean, T. (2001), 'Boys will be boys: Gender, overconfidence, and common stock investment', *The quarterly journal of economics* **116**(1), 261–292.

Buch, C., Buchholz, M. and Tonzer, L. (2015), 'Uncertainty, bank lending, and bank-level heterogeneity', *IMF Economic Review* **63**(4), 919–954.

Caldara, D. and Iacoviello, M. (2022), 'Measuring geopolitical risk', *American Economic Review* **112**(4), 1194–1225.

Chatjuthamard, P., Wongboonsin, P., Kongsompong, K. and Jiraporn, P. (2020), 'Does economic policy uncertainty influence executive risk-taking incentives?', *Finance Research Letters* **37**, 101385.

Chevalier, J. and Ellison, G. (1999), 'Career concerns of mutual fund managers', *The Quarterly Journal of Economics* **114**(2), 389–432.

Clacher, I., Osma, B., Scarlat, E. and Shields, K. (2021), 'Do commonalities facilitate private information channels? evidence from common gender and insider trading', *Journal of Corporate Finance* **70**, 102062.

Clance, M., Gupta, R. and Wohar, M. (2019), 'Geopolitical risks and recessions in a panel of advanced economies: evidence from over a century of data', *Applied Economics Letters* **26**(16), 1317–1321.

Cook, D., Kieschnick, R. and McCullough, B. (2008), 'Regression analysis of proportions in finance with self selection', *Journal of Empirical Finance* **15**(5), 860–867.

Das, K. and Yaghoubi, M. (2023), 'Stock liquidity and firm-level political risk', *Finance Research Letters* **51**, 103419.

Datta, S., Doan, T. and Iskandar-Datta, M. (2022), 'Top executives' gender and analysts' earnings forecasts', *Finance Research Letters* **47**, 102965.

Datta, S., Doan, T. and Toscano, F. (2021), 'Top executive gender, board gender diversity, and financing decisions: Evidence from debt structure choice', *Journal of Banking & Finance* **125**, 106070.

De Veirman, E. and Levin, A. (2018), 'Cyclical changes in firm volatility', *Journal of Money, Credit and Banking* **50**(2-3), 317–349.

Faccio, M., Marchica, M. and Mura, R. (2016), 'Ceo gender, corporate risk-taking, and the efficiency of capital allocation', *Journal of Corporate Finance* **39**, 193–209.

Favara, G., Gao, J. and Giannetti, M. (2021), 'Uncertainty, access to debt, and firm precautionary behavior', *Journal of Financial Economics* **141**(2), 436–453.

Graham, J., Harvey, C. and Puri, M. (2013), 'Managerial attitudes and corporate actions', *Journal of financial economics* **109**(1), 103–121.

Gull, A., Nekhili, M., Nagati, H. and Chtioui, T. (2018), 'Beyond gender diversity: How specific attributes of female directors affect earnings management', *The British Accounting Review* **50**(3), 255–274.

Hackbarth, D. (2008), 'Managerial traits and capital structure decisions', *Journal of Financial and Quantitative Analysis* **43**(4), 843–881.

Hao, Z., Prapan, A., Gavriilidis, K., Petmezas, D. and Vagenas-Nanos, E. (2022), 'Does geopolitical risk affect acquisitions?', *Available at SSRN 3475537* .

Heaton, J. (2002), 'Managerial optimism and corporate finance', *Financial Management* pp. 33–45.

Hersch, J. (1996), 'Smoking, seat belts, and other risky consumer decisions: Differences by gender and race', *Managerial and decision economics* **17**(5), 471–481.

Hirshleifer, D. and Thakor, A. (1992), 'Managerial conservatism, project choice, and debt', *The Review of Financial Studies* **5**(3), 437–470.

Ho, L., Bai, M., Lu, Y. and Qin, Y. (2021), 'The effect of corporate sustainability performance on leverage adjustments', *The British Accounting Review* **53**(5), 100989.

Holland, J., Bandelow, S. and Hogervorst, E. (2011), 'Testosterone levels and cognition in elderly men: a review', *Maturitas* **69**(4), 322–337.

Holmström, B. (1999), 'Managerial incentive problems: A dynamic perspective', *The review of Economic studies* **66**(1), 169–182.

Hong, H., Kubik, J. and Solomon, A. (2000), 'Security analysts' career concerns and herding of earnings forecasts', *The Rand Journal of Economics* pp. 121–144.

Huang, J. and Kisgen, D. (2013), 'Gender and corporate finance: Are male executives overconfident relative to female executives?', *Journal of financial Economics* **108**(3), 822–839.

Huang, Z., Li, W. and Gao, W. (2017), 'Why do firms choose zero-leverage policy? evidence from china', *Applied Economics* **49**(28), 2736–2748.

Jia, S., Yang, L. and Zhou, F. (2022), 'Geopolitical risk and corporate innovation: Evidence from china', *Journal of Multinational Financial Management* **66**, 100772.

Jianakoplos, N. A. and Bernasek, A. (1998), 'Are women more risk averse?', *Economic inquiry* **36**(4), 620–630.

Keefe, M. and Yaghoubi, M. (2016), 'The influence of cash flow volatility on capital structure and the use of debt of different maturities', *Journal of Corporate Finance* **38**, 18–36.

Khoo, J. and Cheung, A. (2021), 'Does geopolitical uncertainty affect corporate financing? evidence from midas regression', *Global Finance Journal* **47**, 100519.

Kieschnick, R. and McCullough, B. (2003), 'Regression analysis of variates observed on (0, 1): percentages, proportions and fractions', *Statistical Modelling* **3**(3), 193–213.

Kieschnick, R. and Moussawi, R. (2018), 'Firm age, corporate governance, and capital structure choices', *Journal of Corporate Finance* **48**, 597–614.

Lee, C., Lee, C. and Xiao, S. (2021), 'Policy-related risk and corporate financing behavior: evidence from China's listed companies', *Economic Modelling* **94**, 539–547.

Lee, C. and Wang, C. (2021), 'Firms' cash reserve, financial constraint, and geopolitical risk', *Pacific-Basin Finance Journal* **65**, 101480.

Lee, C., Zhang, J., Yu, C. and Fang, L. (2023), 'How does geopolitical risk affect corporate innovation? evidence from China's listed companies', *Emerging Markets Finance and Trade* pp. 1–17.

Levin, I., Snyder, M. and Chapman, D. (1988), 'The interaction of experiential and situational factors and gender in a simulated risky decision-making task', *The Journal of Psychology* **122**(2), 173–181.

Lewellen, K. (2006), 'Financing decisions when managers are risk averse', *Journal of Financial Economics* **82**(3), 551–589.

Liu, C. (2018), 'Are women greener? corporate gender diversity and environmental violations', *Journal of Corporate Finance* **52**, 118–142.

Liu, J., Ma, F., Tang, Y. and Zhang, Y. (2019), 'Geopolitical risk and oil volatility: A new insight', *Energy Economics* **84**, 104548.

Martin, A., Nishikawa, T. and Williams, M. (2009), 'Ceo gender: effects on valuation and risk', *Quarterly Journal of Finance and Accounting* pp. 23–40.

Mekhaimer, M., Abakah, A. A., Ibrahim, A. and Hussainey, K. (2022), 'Subordinate executives' horizon and firm policies', *Journal of Corporate Finance* **74**, 102220.

Melero, E. (2011), 'Are workplaces with many women in management run differently?', *Journal of Business Research* **64**(4), 385–393.

Nguyen, T. and Thuy, T. (2023), 'Geopolitical risk and the cost of bank loans', *Finance Research Letters* **54**, 103812.

Pan, Z., Huang, X., Liu, L. and Huang, J. (2023), 'Geopolitical uncertainty and crude oil volatility: Evidence from oil-importing and oil-exporting countries', *Finance Research Letters* **52**, 103565.

Perryman, A., Fernando, G. and Tripathy, A. (2016), 'Do gender differences persist? an examination of gender diversity on firm performance, risk, and executive compensation', *Journal of Business Research* **69**(2), 579–586.

Phan, D., Tran, V. and Iyke, B. (2022), 'Geopolitical risk and bank stability', *Finance Research Letters* **46**, 102453.

Prendergast, C. and Stole, L. (1996), 'Impetuous youngsters and jaded old-timers: Acquiring a reputation for learning', *Journal of Political Economy* **104**(6), 1105–1134.

Raunig, B., Scharler, J. and Sindermann, F. (2017), 'Do banks lend less in uncertain times?', *Economica* **84**(336), 682–711.

Rumokoy, L., Omura, A. and Roca, E. (2023), 'Geopolitical risk and corporate investment in the metals and mining industry: evidence from australia', *Pacific-Basin Finance Journal* **79**, 101991.

Sah, N. (2021), 'Cash is queen: Female ceos' propensity to hoard cash', *Journal of Behavioral and Experimental Finance* **29**, 100412.

Sah, N., Adhikari, H., Krolikowski, M., Malm, J. and Nguyen, T. (2022), 'Ceo gender and risk aversion: further evidence using the composition of firm's cash', *Journal of Behavioral and Experimental Finance* **33**, 100595.

Samaras, N., Papadopoulou, M., Samaras, D. and Ongaro, F. (2014), 'Off-label use of hormones as an antiaging strategy: a review', *Clinical interventions in aging* pp. 1175–1186.

Scharfstein, D. and Stein, J. (1990), 'Herd behavior and investment', *The American Economic Review* pp. 465–479.

Stock, J. and Yogo, M. (2005), 'Testing for weak instruments in linear iv regression, in dwk andrews and jh stock, eds., identification and inference for econometric models: Essays in honor of thomas j. rothenberg. cambridge: Cambridge university press'.

Strebulaev, I. and Yang, B. (2013), 'The mystery of zero-leverage firms', *Journal of Financial Economics* **109**(1), 1–23.

Sunden, A. and Surette, B. (1998), 'Gender differences in the allocation of assets in retirement savings plans', *The American economic review* **88**(2), 207–211.

Trabert, S. (2023), 'Do younger CEOs really increase firm risk? evidence from sudden CEO deaths', *Journal of Corporate Finance* **79**, 102367.

Trimbath, S. (2001), 'Lemmings to the sea: The inappropriate use of financial ratios in empirical analysis', *Milken Institute Working Paper* .

Wang, K., Kan, J., Jiang, C. and Su, C. (2022), 'Is geopolitical risk powerful enough to affect carbon dioxide emissions? evidence from china', *Sustainability* **14**(13), 7867.

Wang, K., Xiong, D., Mirza, N., Shao, X. and Yue, X. (2021), 'Does geopolitical risk uncertainty strengthen or depress cash holdings of oil enterprises? evidence from china', *Pacific-Basin Finance Journal* **66**, 101516.

Wang, X., Wu, Y. and Xu, W. (2019), 'Geopolitical risk and investment', *Journal of Money, Credit and Banking, Forthcoming* .

Welch, I. (2011), 'Two common problems in capital structure research: The financial-debt-to-asset ratio and issuing activity versus leverage changes', *International review of finance* **11**(1), 1–17.

Werhane, P. (2007), 'Women leaders in a globalized world', *Journal of Business Ethics* **74**, 425–435.

Xing, L., Gonzalez, A. and Sila, V. (2021), 'Does cooperation among women enhance or impede firm performance?', *The British Accounting Review* **53**(4), 100936.

Xu, Q., Fernando, G. and Tam, K. (2018), 'Executive age and the readability of financial reports', *Advances in Accounting* **43**, 70–81.

Ye, D., Deng, J., Liu, Y., Szewczyk, S. H. and Chen, X. (2019), 'Does board gender diversity increase dividend payouts? analysis of global evidence', *Journal of Corporate Finance* **58**, 1–26.

Zhang, Y., He, J., He, M. and Li, S. (2023), 'Geopolitical risk and stock market volatility: A global perspective', *Finance Research Letters* **53**, 103620.

8 Tables & Figures

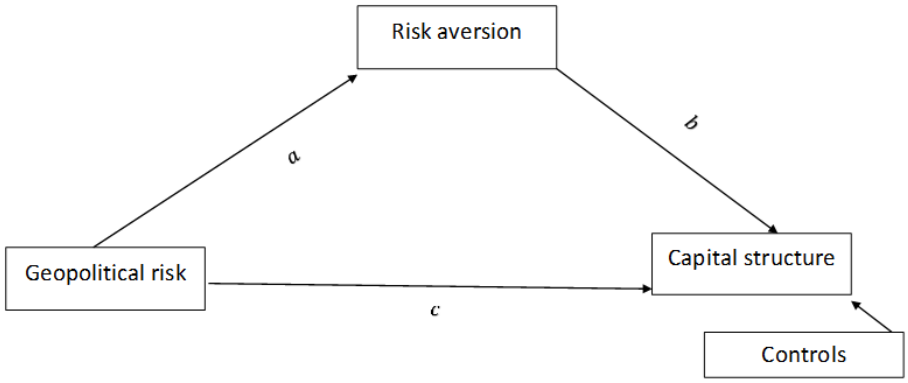

Figure 1: Path analysis exploring the role of risk aversion as a channel linking geopolitical risk and capital structure decisions.

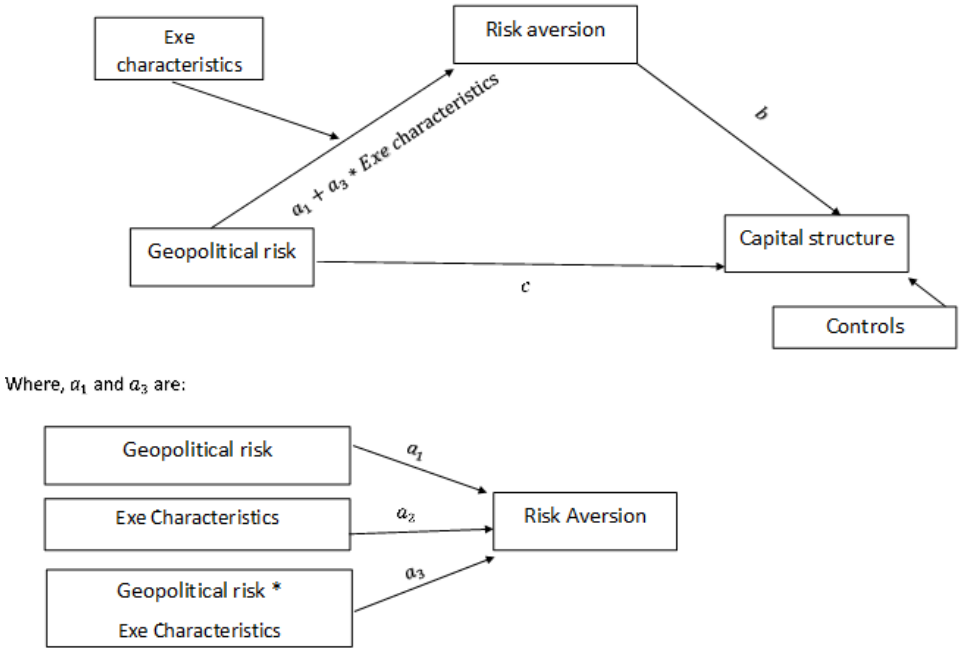

Figure 2: Moderated mediation analysis examining the influence of executive characteristics on the risk aversion channel between geopolitical risk and capital structure decisions.

Table 1: **Descriptive Statistics**
This table reports summary statistics of variables of the study. All the variables are winsorized at 1% level in both tails of the distribution.

Variable	N	Mean	p25	p50	p75	Max	Min	SD
MDR_{S+L}	35710	0.186	0.0230	0.136	0.284	0.874	0	0.190
MDR_L	35710	0.168	0.00986	0.115	0.259	0.837	0	0.182
ZL_{S+L}	35710	0.138	0	0	0	1	0	0.345
GPR	35710	4.531	4.397	4.510	4.622	5.172	3.930	0.278
EPU	35710	4.665	4.397	4.678	4.790	5.493	4.267	0.287
AGE_{exe}	32836	3.976	3.916	3.980	4.040	4.477	3.466	0.100
$Gender_{exe}$	35710	0.0717	0	0	0.167	1	0	0.122
CFV	29213	1.563	0.927	1.512	2.150	5.160	-0.285	0.930
$Tangibility$	35654	0.262	0.0988	0.199	0.364	0.897	0.00184	0.213
$Size$	35710	7.110	5.992	7.015	8.167	10.26	1.233	1.558
$FirmAge$	35710	17.80	8	17	25	42	0	11.39
$Profitability$	35647	0.131	0.0886	0.134	0.186	0.401	-1.018	0.116
MtB	33274	1.840	0.924	1.359	2.153	10.93	0.281	1.541
RnD	35681	0.0562	0	0.00527	0.0564	2.397	0	0.166
$EquIssue$	35709	0.571	-0.0216	0.0110	0.100	20.06	-8.737	2.578
$IndustLev$	35710	0.304	0.174	0.280	0.411	0.905	0.0204	0.158
$Inflation$	35710	0.0258	0.0222	0.0238	0.0290	0.0401	0.0166	0.00607
GDP	35710	44.07	34.52	46.30	53.29	65.12	25.42	11.42
GDP_{growth}	35710	2.429	1.842	2.706	3.773	4.794	-2.768	1.720
CLI	35710	99.82	99.24	99.88	100.7	102.1	96.18	1.248
CCI	35710	100.2	99.27	100.4	101.1	102.8	96.86	1.586

Table 2: **Pairwise Correlations**
This table shows the pairwise correlations between the key variable of this study. Reference numbers in columns and rows refer to the variables associated with the pairwise correlation. * and $\diamond$ indicate 1%, and 5% significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
(1) MDR_{S+L}	1					
(2) MDR_L	0.9736*	1				
(3) GPR	-0.0127$^\diamond$	-0.00710	1			
(4) EPU	0.0529*	0.0616*	0.0845*	1		
(5) AGE_{exe}	0.0808*	0.0772*	0.0234*	-0.0249*	1	
(6) $Gender_{exe}$	-0.0564*	-0.0507*	0.0306*	0.1294*	-0.0862*	1

Table 3: **Examining the Influence of Geopolitical Risk on Capital Structure**
This table presents the findings from estimating Equation (3) to examine the impact of geopolitical risk (GPR) on capital structure, represented by MDR_{S+L}, MDR_L, and ZL_{S+L}. Clustered standard errors by firm are reported in parentheses, with ***, **, and * indicating statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	MDR_{S+L}		MDR_L		ZL_{S+L}
GPR	-0.023***	-0.026***	-0.018***	-0.021***	0.598***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.115)
CFV	-0.010***	-0.011***	-0.009***	-0.009***	0.137**
	(0.002)	(0.003)	(0.002)	(0.003)	(0.055)
$Tangibility$	0.097***	0.092***	0.095***	0.093***	-4.356***
	(0.026)	(0.029)	(0.026)	(0.030)	(0.501)
$Size$	0.038***	0.039***	0.036***	0.037***	-0.663***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.064)
$FirmAge$	0.001	0.001	0.001	0.001	0.079**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.037)
$Profitability$	-0.219***	-0.314***	-0.194***	-0.298***	1.537***
	(0.018)	(0.027)	(0.017)	(0.026)	(0.365)
MtB	-0.013***	-0.019***	-0.011***	-0.017***	0.164***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.028)
RnD	-0.056***	-0.074***	-0.050***	-0.069***	0.426*
	(0.011)	(0.019)	(0.010)	(0.018)	(0.236)
$EquIssue$	0.001***	0.000	0.001***	0.001	-0.040***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.013)
$IndustLev$	0.263***	0.269***	0.244***	0.254***	-1.912***
	(0.016)	(0.017)	(0.015)	(0.017)	(0.428)
$Inflation$	0.925***	0.667**	0.813***	0.563*	-59.338***
	(0.268)	(0.311)	(0.261)	(0.305)	(8.573)
GDP	-0.002***	-0.002***	-0.001**	-0.002***	-0.083***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.027)
GDP_{growth}	-0.018***	-0.024***	-0.016***	-0.022***	-0.052
	(0.001)	(0.001)	(0.001)	(0.001)	(0.047)
CLI	0.023***	0.029***	0.020***	0.026***	0.095*
	(0.001)	(0.002)	(0.001)	(0.002)	(0.051)
CCI	0.018***	0.021***	0.017***	0.019***	-0.203***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.040)
EPU	0.049***	0.061***	0.047***	0.056***	-0.404*
	(0.005)	(0.006)	(0.005)	(0.006)	(0.212)
Constant	-4.207***	-5.107***	-3.836***	-4.706***	
	(0.195)	(0.238)	(0.192)	(0.235)	
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	26,289	18,574	26,289	18,574	7,910
R-squared	0.709	0.703	0.694	0.688	
Chi-squared					662.32
VIF	3.400	3.300	3.200	3.200	
F-stat	88.72	92.010	80.310	82.930	
P-value	0.000	0.000	0.000	0.000	

Table 4: **Examining Hypothesis 1: The Moderating Effect of Executives' Age**
This table presents the estimation results of Equation (4), where $GPR \times Age_{exe}$ represents the interaction between geopolitical risk and executives' age. All explanatory variables are lagged by one year. Columns (1) and (2) use MDR_{S+L} as the dependent variable, Columns (3) and (4) utilize MDR_L, and Column (5) employs the zero short and long-term variable ZL_{S+L} as the dependent variable. The variables of interest are GPR and the interaction term $GPR \times Age_{exe}$. Clustered standard errors by firm are indicated in parentheses, with significance levels denoted by ***, **, and * representing 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	MDR_{S+L}		MDR_L		ZL_{S+L}
GPR	-0.447***	-0.455***	-0.414***	-0.425***	7.684**
	(0.114)	(0.146)	(0.108)	(0.142)	(3.826)
$GPR \times Age_{exe}$	0.106***	0.106***	0.099***	0.101***	-1.772*
	(0.028)	(0.037)	(0.027)	(0.036)	(0.966)
Age_{exe}	-0.526***	-0.548***	-0.501***	-0.526***	7.106
	(0.134)	(0.171)	(0.128)	(0.166)	(4.475)
CFV	-0.008***	-0.009***	-0.008***	-0.008***	0.113*
	(0.002)	(0.003)	(0.002)	(0.003)	(0.059)
$Tangibility$	0.105***	0.098***	0.102***	0.098***	-4.272***
	(0.027)	(0.031)	(0.027)	(0.032)	(0.550)
$Size$	0.040***	0.040***	0.038***	0.039***	-0.729***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.072)
$FirmAge$	0.001	0.001	0.001	0.001	0.052
	(0.001)	(0.001)	(0.001)	(0.001)	(0.041)
$Profitability$	-0.226***	-0.314***	-0.200***	-0.298***	1.827***
	(0.019)	(0.028)	(0.018)	(0.028)	(0.389)
MtB	-0.014***	-0.020***	-0.012***	-0.018***	0.173***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.030)
RnD	-0.060***	-0.084***	-0.054***	-0.079***	0.493**
	(0.011)	(0.020)	(0.010)	(0.018)	(0.247)
$EquIssue$	0.001***	0.000	0.001***	0.000	-0.050***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.014)
$IndustLev$	0.257***	0.263***	0.237***	0.247***	-1.617***
	(0.017)	(0.018)	(0.016)	(0.018)	(0.457)
$Inflation$	0.373	0.019	0.298	-0.055	-57.567***
	(0.275)	(0.323)	(0.270)	(0.320)	(9.950)
GDP	-0.002***	-0.002***	-0.001**	-0.002***	-0.067**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.029)
GDP_{growth}	-0.020***	-0.027***	-0.018***	-0.024***	-0.036
	(0.001)	(0.002)	(0.001)	(0.002)	(0.051)
CLI	0.024***	0.030***	0.020***	0.027***	0.098*
	(0.001)	(0.002)	(0.001)	(0.002)	(0.054)
CCI	0.021***	0.024***	0.019***	0.023***	-0.214***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.045)
EPU	0.051***	0.064***	0.049***	0.059***	-0.312
	(0.005)	(0.006)	(0.005)	(0.006)	(0.224)
Constant	-2.479***	-3.385***	-2.167***	-3.037***	
	(0.561)	(0.724)	(0.540)	(0.706)	
Observations	24,205	17,095	24,205	17,095	7,025
R-squared	0.714	0.708	0.699	0.694	

Table 4 continued					
	(1)	(2)	(3)	(4)	(5)
Chi-squared					634.52
VIF	3.400	3.400	3.300	3.200	
F-stat	77.180	77.610	70.270	70.560	
P-value	0.000	0.000	0.000	0.000	

Table 5: **Examining Hypothesis 2: The Moderating Effect of Executives' Gender**
This table presents the estimation results of Equation (4), where $GPR \times Gender_{exe}$ represents the interaction between geopolitical risk and executives' age. All explanatory variables are lagged by one year. Columns (1) and (2) use MDR_{S+L} as the dependent variable, Columns (3) and (4) utilize MDR_L, and Column (5) employs the zero short and long-term variable ZL_{S+L} as the dependent variable. The variables of interest are GPR and the interaction term $GPR \times Gender_{exe}$. Clustered standard errors by firm are indicated in parentheses, with significance levels denoted by ***, **, and * representing 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	MDR_{S+L}		MDR_L		ZL_{S+L}
GPR	-0.018***	-0.023***	-0.013***	-0.017***	0.472***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.132)
$GPR \times Gender_{exe}$	-0.084***	-0.069*	-0.092***	-0.085**	1.754**
	(0.028)	(0.036)	(0.026)	(0.035)	(0.862)
$Gender_{exe}$	0.350***	0.306*	0.391***	0.382**	-6.879*
	(0.125)	(0.166)	(0.120)	(0.162)	(3.940)
CFV	-0.010***	-0.011***	-0.009***	-0.009***	0.147***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.055)
$Tangibility$	0.098***	0.093***	0.096***	0.094***	-4.430***
	(0.026)	(0.029)	(0.026)	(0.030)	(0.502)
$Size$	0.038***	0.039***	0.035***	0.037***	-0.660***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.064)
$FirmAge$	0.001	0.001	0.001	0.001	0.083**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.037)
$Profitability$	-0.218***	-0.314***	-0.193***	-0.298***	1.526***
	(0.018)	(0.027)	(0.017)	(0.026)	(0.365)
MtB	-0.013***	-0.019***	-0.011***	-0.017***	0.165***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.028)
RnD	-0.056***	-0.074***	-0.050***	-0.069***	0.427*
	(0.011)	(0.019)	(0.010)	(0.018)	(0.237)
$EquIssue$	0.001***	0.000	0.001***	0.001	-0.042***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.013)
$IndustLev$	0.263***	0.269***	0.244***	0.253***	-1.934***
	(0.016)	(0.017)	(0.015)	(0.017)	(0.429)
$Inflation$	0.913***	0.666**	0.805***	0.566*	-58.460***
	(0.268)	(0.311)	(0.261)	(0.305)	(8.591)
GDP	-0.002***	-0.002***	-0.001**	-0.002***	-0.088***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.027)
GDP_{growth}	-0.018***	-0.024***	-0.016***	-0.022***	-0.050
	(0.001)	(0.001)	(0.001)	(0.001)	(0.047)
CLI	0.022***	0.029***	0.019***	0.026***	0.097*
	(0.001)	(0.002)	(0.001)	(0.002)	(0.051)
CCI	0.018***	0.021***	0.017***	0.019***	-0.209***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.040)
EPU	0.048***	0.060***	0.046***	0.055***	-0.422**
	(0.005)	(0.006)	(0.005)	(0.006)	(0.213)
Constant	-4.209***	-5.104***	-3.837***	-4.700***	
	(0.195)	(0.238)	(0.192)	(0.235)	
Observations	26,289	18,574	26,289	18,574	7,910

Table 5 continued					
	(1)	(2)	(3)	(4)	(5)
R-squared	0.709	0.703	0.694	0.688	
Chi-squared					676.810
VIF	3.400	3.400	3.300	3.200	
F-stat	79.770	82.070	72.410	74.320	
P-value	0.000	0.000	0.000	0.000	

Table 6: **Additional testing: Categorizing Age_{exe} and $Gender_{exe}$**
Panel A of this table presents the results of estimating Equation (3) through sub-sample analysis. Columns (1) and (2) analyze firms with executive ages exceeding the median age, while columns (3) and (4) adopt a similar approach, but this time categorize firms based on the gender variable. Each column offers distinct estimates for individual sub-samples, highlighting variations based on the chosen criteria. Panel B provides marginal effect results, calculating the increase in the debt ratio, as measured by MDR_{S+L} , resulting from a one standard deviation increase from the mean of the geopolitical risk variable. Clustered standard errors by firm are indicated in parentheses, with significance levels denoted by ***, **, and * representing 1%, 5%, and 10% levels, respectively.

Panel A				
	(1)	(2)	(3)	(4)
	Older than median	Younger than median	More female than median	Less female than median
VARIABLES			MDR_{S+L}	
GPR	-0.006	-0.027***	-0.031***	-0.014***
	(0.004)	(0.004)	(0.005)	(0.004)
Constant	-4.002***	-3.783***	-3.958***	-3.632***
	(0.271)	(0.272)	(0.394)	(0.221)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	11,377	14,456	8,202	17,827
R-squared	0.734	0.721	0.726	0.719
VIF	3.700	3.500	3.500	3.600
F-stat	88.720	82.070	72.410	74.320
P-value	0.000	0.000	0.000	0.000
Panel B - marginal effect				
% Δ	NA	-5.0%	-5.2%	-2.3%

Table 7: **Channel Testing: the Mediating Role of Risk Aversion**
This table summarizes the findings of the path analysis for the relationship between geopolitical risk, risk aversion, and capital structure, using *RiskAverse* variable as a proxy for executives' risk aversion. Standard errors are indicated in parentheses, with significance levels denoted by ***, **, and * representing 1%, 5%, and 10% levels, respectively.

Channel tests - Structural Equation Modeling	
Path analysis	
	MDR_{S+L}
Direct path	
P(GPR, MDR_{S+L}) = c	-0.023***
	(0.004)
Percentage	84.5%
Indirect path	
P(GPR, $RiakAverse$) = a	0.016***
	(0.003)
P($RiakAverse$, MDR_{S+L}) = b	-0.235***
	(0.021)
Total indirect path = a $\times b$	-0.00368
Percentage	15.5%
Direct path	
Firm FE	Yes
Controls	Yes
Observations	18,574

Table 8: **Channel Testing: The Moderated Mediation Model using Executives' Age as the Moderator**
This table presents the results of examining the moderating effects of executives' age on the mediating effect of risk aversion in the relationship between geopolitical risk and capital structure. Standard errors are indicated in parentheses, with significance levels denoted by ***, **, and * representing 1%, 5%, and 10% levels, respectively.

Panel A

Testing, $RiskAverse_{i,t} = \alpha_i + \alpha_1 GPR_t + \alpha_2 Age_{exei,t-1} + \alpha_3 GPR_t \times Age_{exei,t-1} + \sum_n \beta_n Controls^n_{i,t-1} + \epsilon$.

	Coefficient	Std. err.	t	P>t
GPR	0.014	0.002	7.090	0.000
Age_{exe}	0.001	0.008	0.090	0.926
$GPR \times Age_{exe}$	-0.040	0.018	-2.250	0.025
Firm FE	Yes	Yes		
Controls	Yes	Yes		

Panel B

The impact of GPR on $RiskAverse$ is assessed at three different levels of the proposed moderator Age_{exe}: one standard deviation below the mean, at the mean, and above the mean of Age_{exe}.

	Delta-method			
	dy/dx	std. err.	z	P>z
Below the mean	0.018	0.003	6.590	0.000
At the mean	0.014	0.002	7.090	0.000
Above the mean	0.010	0.003	4.120	0.000

Panel C

Testing, $MDR_{S+Li,t} = \alpha_i + \beta_1 GPR_t + \beta_2 RiskAverse_{i,t} + \sum_n \beta_n Controls^n_{i,t-1} + \epsilon$

	Coefficient	Std. err.	t	P>t
$RiskAverse$	-0.246	0.014	-17.420	0.000
GPR	-0.010	0.003	-2.900	0.004
Firm FE	Yes	Yes		
Controls	Yes	Yes		

Panel D

Bootstrap analysis is conducted to generate confidence intervals and test the presence of moderated mediation effects.

	Observed	Bootstrap		
coefficient	std. err.	z	P>z	
Index of Moderated Mediation (IMM)	0.0098	0.005	2.010	0.044
Conditional indirect effect at 1 sd below the mean	-0.0044	0.001	-5.380	0.000
Conditional indirect effect at the mean	-0.0035	0.001	-6.070	0.000
Conditional indirect effect at 1 sd above the mean	-0.0026	0.001	-3.930	0.000

Table 9: **Channel testing: The Moderated Mediation Model using Executives' Gender as the Moderator** This table presents the results of examining the moderating effects of executives' gender on the mediating effect of risk aversion in the relationship between geopolitical risk and capital structure. Standard errors are indicated in parentheses, with significance levels denoted by ***, **, and * representing 1%, 5%, and 10% levels, respectively.

Panel A

Testing $RiskAverse_{i,t} = \alpha_i + \alpha_1 GPR_t + \alpha_2 Gender_{exei,t-1} + \alpha_3 GPR_t \times Gender_{exei,t-1} + \sum_n \beta_n Controls^n_{i,t-1} + \epsilon$.

	Coefficient	Std. err.	t	P>t
GPR	0.014	0.002	7.210	0.000
$Gender_{exe}$	0.026	0.007	3.660	0.000
$GPR \times Gender_{exe}$	0.052	0.020	2.670	0.008
Firm FE	Yes	Yes		
Controls	Yes	Yes		

Panel B

The impact of GPR on $RiskAverse$ is assessed at three different levels of the proposed moderator $Gender_{exe}$: one standard deviation below the mean, at the mean, and above the mean of $Gender_{exe}$.

		Delta-method		
	dy/dx	std. err.	z	P>z
Below the mean	0.008	0.003	3.050	0.002
At the mean	0.014	0.002	7.210	0.000
Above the mean	0.020	0.003	6.460	0.000

Panel C

Testing, $MDR_{S+Li,t} = \alpha_i + \beta_1 GPR_t + \beta_2 RiskAverse_{i,t} + \sum_n \beta_n Controls^n_{i,t-1} + \epsilon$

	Coefficient	Std. err.	t	P>t
$RiskAverse$	-0.233	0.013	-17.420	0.000
GPR	-0.010	0.003	-3.260	0.001
Firm FE	Yes	Yes		
Controls	Yes	Yes		

Panel D

Bootstrap analysis is conducted to generate confidence intervals and test the presence of moderated mediation effects.

	Observed coefficient	Bootstrap std. err.	z	P>z
Index of Moderated Mediation (IMM)	-0.0121	0.005	-2.470	0.014
Conditional indirect effect at 1 sd below the mean	-0.0019	0.001	-2.810	0.005
Conditional indirect effect at the mean	-0.0032	0.001	-6.010	0.000
Conditional indirect effect at 1 sd above the mean	-0.0046	0.001	-5.500	0.000

Table 10: **Robustness to Econometric Method: Estimation Results Using Panel Generalized Linear Model (GLM)**

This table employs a panel GLM with a logit link function to address potential specification errors when using a linear prediction equation for dependent variables bounded between 0 and 1. Columns (1) & (2) retest Equation (3), while Columns (3) to (6) retest Equation (4) with specific executive characteristics according to Hypotheses 1 and 2. Robust standard errors are reported in parentheses, with significance levels denoted by ***, **, and * representing 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	MDR_{S+L}	MDR_{L}	MDR_{S+L}	MDR_{L}	MDR_{S+L}	MDR_{L}
GPR	-0.150***	-0.124***	-2.769***	-2.652***	-0.123***	-0.094***
	(0.021)	(0.023)	(0.805)	(0.831)	(0.024)	(0.026)
$GPR \times Age_{exe}$			0.650***	0.629***		
			(0.201)	(0.208)		
AGE_{exe}			-3.216***	-3.175***		
			(0.929)	(0.965)		
$GPR \times Gender_{exe}$					-0.551***	-0.606***
					(0.207)	(0.211)
$Gender_{exe}$					2.213**	2.466**
					(0.939)	(0.960)
Constant	-32.359***	-32.029***	-21.702***	-21.359***	-32.329***	-31.988***
	(1.248)	(1.339)	(3.917)	(4.084)	(1.250)	(1.341)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,436	26,436	24,362	24,362	26,436	26,436
Number of gvkey	2,385	2,385	2,282	2,282	2,385	2,385

Table 11: **Robustness to Econometric Method: Two-Stage Least Squares (2SLS) Regressions**

This table presents the results of a two-stage least squares (2SLS) regression analysis. The instrumental variables used are dummy variables representing the years 2001 ($Sept11$ - the September 11 terrorist attack) and 2003 ($IraqWar$ - the Iraq invasion). Panel A displays the results of the first-stage regressions, while Panel B reports the results of the second-stage regression. Clustered standard errors by firm are reported in parentheses, with statistical significance denoted by *, **, and *** indicating levels of 10%, 5%, and 1%, respectively.

Panel A: 2SLS - first stage			
		GPR	
$Sept11$		0.771***	
		0.000	
$IraqWar$		0.733***	
		0.000	
Firm FE		Yes	
Controls		Yes	
Panel B : 2SLS - second stage			
	(1)	(2)	(3)
VARIABLES		MDR_{S+L}	
GPR	-0.039***	-1.163***	-0.014***
	(0.005)	(0.337)	(0.004)
$GPR \times Age_{exe}$		0.021***	
		(0.006)	
Age_{exe}		-0.096***	
		(0.028)	
$GPR \times Gender_{exe}$			-0.097***
			(0.030)
$Gender_{exe}$			0.411***
			(0.135)
Controls	Yes	Yes	Yes
Cragg-Donald Wald F statistic	4540.057	103.495	8654.657
Kleibergen-Paap rk LM statistic	995.027	58.884	1018.262
p-value	0.000	0.000	0.000
Weak Instrument Test: F-statistic	25000	63.382	11000
Firm FE	Yes	Yes	Yes
Observations	26,289	24,205	26,289
R-squared	0.171	0.099	0.173

Table 12: **Robustness to Alternative Capital Structure Measures**
This table presents the results of Equations (3) and (4) using alternative measures of the debt ratio. The table re-examines Hypotheses 1 and 2 by employing the long and short-term book debt ratio in Columns (1) to (4), and the long-term book debt ratio in Columns (5) to (8). Clustered standard errors by firm are reported in parentheses, with statistical significance denoted by *, **, and *** indicating levels of 10%, 5%, and 1%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES		BDR_{S+L}			BDR_L	
GPR	-0.012***	-0.372**	-0.006	-0.017***	-0.382**	-0.013**
	(0.004)	(0.156)	(0.005)	(0.004)	(0.159)	(0.005)
$GPR \times Age_{exe}$		0.090**			0.091**	
		(0.039)			(0.040)	
AGE_{exe}		-0.432**			-0.422**	
		(0.183)			(0.186)	
$GPR \times Gender_{exe}$			-0.092**			-0.083**
			(0.037)			(0.037)
$Gender_{exe}$			0.402**			0.354**
			(0.168)			(0.168)
Constant	-1.702***	-0.315	-1.701***	-1.802***	-0.495	-1.802***
	(0.218)	(0.770)	(0.218)	(0.216)	(0.779)	(0.215)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,289	24,205	26,289	26,289	24,205	26,289
R-squared	0.691	0.697	0.691	0.706	0.713	0.706
VIF	3.200	3.300	3.200	3.400	3.400	3.400
F-stat	50.920	51.420	61.950	53.650	55.550	55.640
P-value	0.000	0.000	0.000	0.000	0.000	0.000