

Cash as a Strategic Buffer: Mitigating the Impact of Geopolitical Risk on Firm Performance in Indonesia

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ARTICLE INFO	ABSTRACT
Article History Received 30/03/2026 Accepted 28/05/2026 <i>JEL Classifications</i> G30, G32	Purpose: This study investigates the impact of geopolitical risk (GPR) on firms' financial performance and evaluates the extent to which internal liquidity serves as a buffer against geopolitical uncertainty. In particular, it explores the moderating effects of net changes in cash, operating cash flow, investing cash flow, and financing cash flow in mitigating the adverse consequences of geopolitical risk on firm performance. Design/methodology/approach: This study employs a fixed-effects regression model as the primary empirical approach. Furthermore, quantile regression analysis is performed to provide additional insights into the distributional effects. To address potential endogeneity concerns, a two-stage least squares (2SLS) estimation is implemented, utilizing geopolitical risk indices from selected ASEAN countries—namely Malaysia, the Philippines, Thailand, and Vietnam—as instrumental variables. Findings: The empirical findings indicate that geopolitical risk (GPR) exerts a statistically significant negative effect on firm financial performance. While net changes in cash mitigate this adverse impact on average, cash flows from investing and financing activities do not exhibit significant buffering effects. In contrast, firms with higher levels of operating cash flow demonstrate a stronger capacity to offset the detrimental effects of geopolitical risk on performance. These results remain robust across a range of specifications, including the use of alternative measures of the GPR index, variations in the sample period, and the inclusion of macroeconomic controls. Research limitations/implications: The results underscore the importance of internal liquidity generation in enhancing firms' resilience to geopolitical shocks. Accordingly, the study suggests that firm managers prioritize operational efficiency, cost management, and revenue stability, while avoiding excessive or non-essential investments and maintaining prudent leverage levels. From a policy perspective, governments may consider providing targeted incentives or tax relief during periods of heightened geopolitical uncertainty to support corporate stability. Originality/value: This study contributes to the existing literature in several important ways. First, by utilizing data from 1996 to 2023, it comprehensively captures major geopolitical risk events affecting Indonesia over an extended period. Second, this study incorporates multiple dimensions of cash flow, rather than focusing solely on net cash flow, by examining operating, investing, and financing cash flows. This approach provides a more complete understanding of the role of liquidity in mitigating geopolitical risk. Third, the study employs geopolitical risk indices from ASEAN countries with similar economic and cultural contexts—Malaysia, the Philippines, Thailand, and Vietnam—as instrumental variables, thereby strengthening the identification strategy.

Keywords:

corporate finance,
geopolitical risk, cash flow,
Indonesia

1. Introduction

Firms worldwide have increasingly faced heightened uncertainty arising from various geopolitical and economic events, including trade protectionism, the Brexit referendum, the first trade war in 2018 and the second trade war in 2025 between the United States and China (Bermpei et al., 2022; Ou et al., 2023). In addition, numerous conflicts and terrorist activities have significantly disrupted business operations. For instance, the bombings of U.S. embassies in Kenya and Tanzania increased security costs for multinational corporations operating in Africa; the terrorist attacks on the World Trade Center on September 11, 2001 triggered global economic downturns, particularly affecting the aviation, insurance, and tourism sectors; the emergence of ISIS in Iraq and Syria in 2014 destabilized global energy markets; the Russia–Ukraine war led to sharp increases in commodity prices, especially in energy (natural gas) and agricultural products (wheat); and the COVID-19 pandemic beginning in 2020 severely disrupted global economic activity. These events collectively generated geopolitical risk, defined as the risk associated with wars, terrorist acts, and escalating interstate conflicts that create uncertainty in international relations (Caldara & Iacoviello, 2022; Wang et al., 2024). Consequently, identifying effective strategies to mitigate the adverse effects of such uncertainty and enhance corporate resilience has become an increasingly important research issue (Ou et al., 2023).

Meanwhile, a growing body of literature has documented the significant adverse effects of geopolitical risk (hereafter GPR) on both macroeconomic and microeconomic outcomes. Geopolitical risk has been shown to negatively affect economic growth (Akadiri et al., 2020; Wang et al., 2024), oil prices (Bouoiyour et al., 2019; Qin et al., 2020), stock markets (Balcilar et al., 2018; Smales, 2021), GDP growth (Akadiri et al., 2020; Caldara & Iacoviello, 2022), as well as economic contraction and declining consumption (Cheng & Chiu, 2018). At the firm level, GPR influences corporate investment decisions (Gupta, 2023), debt financing costs (Waisman et al., 2015), and cash holdings (Demir et al., 2019; Sandra & Kim, 2022; Wang et al., 2024). Moreover, geopolitical risk has been identified as a major threat to global financial stability (Phan et al., 2022). Consistent with these findings, central bank officials, financial institutions, investors, entrepreneurs, and corporate managers increasingly view geopolitical risk as a critical factor shaping corporate operations and financial performance (Caldara & Iacoviello, 2022; Sandra & Kim, 2022), and as a key determinant of economic decision-making by policymakers and firm managers (Demir & Ersan, 2017).

Firms have adopted various strategies to mitigate the adverse effects of uncertainty arising from geopolitical risk (GPR), including maintaining higher levels of cash and liquid assets (Demir et al., 2019; Ou et al., 2023). Wang et al. (2024) investigated the impact of GPR on corporate cash holdings using a geopolitical risk index covering the period from 2003 to 2021 and reported a significantly negative effect of geopolitical risk on firms' cash reserves. This negative relationship was found to be more pronounced among firms operating in environments with stronger regulatory capacity and more developed legal systems. Moreover, their findings suggest that corporate cash holding decisions can partially offset the negative impact of geopolitical risk on firm value. Similarly, Kotcharin and Maneenop (2020) examined the influence of geopolitical risk on firms' cash holding behavior and demonstrated that GPR significantly affects corporate liquidity management decisions. In addition, Ozdemir et al. (2023) documented that heightened uncertainty exerts a significant adverse effect on financial performance. Accordingly, this study seeks to address the following research question:

Does cash flow mitigate the impact of geopolitical risk on financial performance?

Recent research examining the impact of geopolitical risk on Indonesian firms remains relatively limited (Sandra & Kim, 2022). Moreover, as an emerging economy, Indonesia is particularly vulnerable to uncertainty, including geopolitical instability (Cheng & Chiu, 2018). The Southeast Asian financial crisis of 1997–1998 provides a clear illustration of this vulnerability. While several countries in the region, such as Singapore, Malaysia, Thailand, and Indonesia, experienced severe economic disruptions during this period, Indonesia required more than two years to fully recover from the crisis. Accordingly, this study aims to investigate the impact of geopolitical risk on firm financial performance in Indonesia.

Specifically, this study examines the effect of geopolitical risk (GPR) on corporate financial performance and explores the role of cash flow components—including cash flow from operations, investing activities, and financing activities—in mitigating the adverse impact of GPR. A fixed-effects panel regression model is employed, along with a series of robustness tests to ensure the reliability of the results. Following Ou et al. (2023), the robustness checks include using alternative measures of the GPR index, excluding macroeconomic influences, and varying the sample period. To address potential endogeneity concerns, this study applies a two-stage least squares (2SLS) approach, using GPR indices from selected ASEAN countries—namely Malaysia, the Philippines, Thailand, and Vietnam—as instrumental variables. The empirical findings indicate that GPR has a significantly negative effect on firm financial performance. Furthermore, net cash holdings and operating cash flow mitigate the detrimental impact of geopolitical risk, whereas cash flows from investing and financing activities do not exhibit buffering effects.

Indonesia represents a particularly relevant setting for investigating the corporate consequences of geopolitical risk due to its unique economic, demographic, and geopolitical characteristics. As the world's fourth

most populous nation, with over 285 million inhabitants distributed across more than 17,000 islands, Indonesia exhibits substantial social and cultural diversity, including over 1,300 ethnic groups, more than 700 local languages, and six officially recognized religions. This diversity contributes to a complex institutional and socio-political environment in which geopolitical uncertainty may exert significant effects on economic activity and corporate behavior. Moreover, Indonesia's strategic location along major international maritime trade routes and its proximity to the geopolitically sensitive South China Sea increase its vulnerability to external geopolitical shocks. The country's abundant reserves of critical natural resources, such as nickel, tin, copper, gold, and coal, further heighten its exposure to global geopolitical competition and resource-related tensions. These characteristics make Indonesia an ideal empirical setting for examining how geopolitical risk influences firm-level financial performance.

This study contributes to the existing literature in several important ways. First, by utilizing data from 1996 to 2023, it comprehensively captures major geopolitical risk events affecting Indonesia over an extended period. Second, this study incorporates multiple dimensions of cash flow, rather than focusing solely on net cash flow, by examining operating, investing, and financing cash flows. This approach provides a more complete understanding of the role of liquidity in mitigating geopolitical risk. Third, the study employs geopolitical risk indices from ASEAN countries with similar economic and cultural contexts—Malaysia, the Philippines, Thailand, and Vietnam—as instrumental variables, thereby strengthening the identification strategy.

The remainder of the paper is organized as follows. Section 2 presents the literature review, Section 3 discusses the data and methodology, Section 4 reports and discusses the empirical results, and Section 5 concludes the study.

2. Review of Literature

Caldara and Iacoviello (2022) define geopolitical risk as the occurrence and escalation of threats and adverse events associated with wars, terrorism, and tensions among states and political actors that disrupt peaceful international relations. Geopolitical risk concerns the ability of nations to control and compete over territory, and when such uncertainty cannot be resolved, it adversely affects business operations and economic cycles, thereby harming firms' financial performance (Caldara & Iacoviello, 2022; Gupta, 2023). Moreover, geopolitical risk influences macroeconomic conditions through various channels, including loss of human life, destruction of capital stock, and increased military expenditures (Caldara & Iacoviello, 2022). Consequently, geopolitical risk has become an important determinant of decision-making for policymakers, investors, and firm managers (Demir et al., 2019).

Geopolitical risk is associated with a higher probability of economic disruptions and lower expected GDP growth (Akadiri et al., 2020; Caldara & Iacoviello, 2022). Baker et al. (2016) demonstrate that uncertainty negatively affects macroeconomic performance by reducing managers' ability to forecast regulatory, fiscal, and monetary policies. Similarly, Ozdemir et al. (2023) show that uncertainty influences demand for goods and services, as consumers tend to delay or reduce consumption despite maintaining essential expenditures, leading to declining firm revenues. Prior studies further indicate that firms postpone investment and adopt more conservative strategies during periods of uncertainty (Yuan et al., 2022), which ultimately affects corporate investment, innovation, and financial performance (Iqbal et al., 2020). These effects arise due to higher operational and financing costs (Çolak et al., 2017; Ou et al., 2023), increased information asymmetry (Bermpei et al., 2022), and declining sales performance (Wang et al., 2021). Yung and Root (2019) also find that uncertainty significantly affects earnings management, which in turn influences firm value.

Qin et al. (2020) report that geopolitical risk significantly increases energy market volatility, leading to higher business operating costs. Moreover, geopolitical risk raises firms' cost of capital and risk premiums (James et al., 2024) while making access to external financing more difficult and expensive (Pringpong et al., 2023; Waisman et al., 2015). In response to these adverse conditions, firm managers tend to adopt more cautious financial policies, such as reducing capital investment (Gulen & Ion, 2015) and limiting earnings manipulation (Kim & Yasuda, 2021). As uncertainty is unavoidable and affects firms regardless of size or financial condition (He et al., 2020), its impact is widespread across industries and economies.

Empirical evidence supports these arguments. Trakarnsirinont et al. (2023), using Thai firm data, find that uncertainty significantly affects financial performance. Similarly, Ozdemir et al. (2023) document a significant negative impact of geopolitical risk on firm performance.

Based on prior research, the following hypothesis is proposed:

H1: Geopolitical risk significantly reduces firms' financial performance.

Geopolitical uncertainty exacerbates information asymmetry between corporate managers and external stakeholders. Events such as military conflicts, economic sanctions, oil price shocks, trade restrictions, and disruptions to global supply chains increase uncertainty regarding firms' future prospects and cash flow

generation. As a result, external investors and creditors face greater difficulties in assessing firm value and risk, leading to higher information asymmetry and financing frictions.

According to the Pecking Order Theory, firms follow a hierarchical financing preference in response to information asymmetry. Internal funds are preferred because they do not involve adverse selection costs or require firms to reveal private information to external capital providers. When internal funds are insufficient, firms seek debt financing, while equity issuance is considered the least desirable alternative because it may dilute existing shareholders' ownership and signal potential overvaluation to the market (de Jong et al., 2007). Under heightened geopolitical uncertainty, creditors tend to adopt more conservative lending standards and demand higher risk premiums, thereby increasing the cost of external financing. Consequently, firms become more reliant on internally generated funds to support their operational and investment activities.

The importance of internal liquidity under uncertainty is further supported by Keynesian Liquidity Preference Theory. Keynes (1936) argues that economic agents hold liquid resources for transaction, precautionary, and speculative motives. In the corporate context, operating cash flow represents a firm's ability to continuously generate internal liquidity from its core business activities. Strong operating cash flow enables firms to finance routine operations and meet short-term obligations (transaction motive), maintain financial flexibility against unexpected shocks and future cash flow volatility (precautionary motive), and exploit profitable investment opportunities that may arise during periods of uncertainty (speculative motive). Consequently, firms with higher operating cash flows are less dependent on costly external financing and are better positioned to withstand the adverse effects of geopolitical uncertainty on financial performance. This argument is consistent with Han and Qiu (2007), who suggest that internally generated liquidity enhances firms' ability to cope with uncertainty and sustain investment activities.

Therefore, operating cash flow is expected to mitigate the detrimental impact of geopolitical risk on firm financial performance by reducing financing constraints, enhancing financial flexibility, and supporting the continuity of operational and investment activities during periods of heightened uncertainty.

Cash policy is one of the most important corporate financial strategies. Firms tend to hold substantial cash reserves for prudential and precautionary motives (Demir & Ersan, 2017; Ou et al., 2023). The main motives for cash holdings include transaction, tax, and precautionary purposes (Bates et al., 2009; James et al., 2024; Wang et al., 2024). According to precautionary motive theory, higher cash reserves enable firms to cope with unexpected cash flow fluctuations, meet daily operational needs, and manage risks arising from geopolitical uncertainty. Pinkowitz et al. (2003) further argue that firms hold cash to minimize transaction costs. Additionally, firms accumulate cash to finance growth and investment projects when external financing becomes costly or volatile (Hasan et al., 2022).

During periods of uncertainty, firms actively utilize cash reserves to buffer adverse shocks (Demir & Ersan, 2017). Empirical studies confirm that firms increase cash holdings during uncertain times (Hasan et al., 2022; Sandra & Kim, 2022). Adequate cash holdings enhance liquidity, reduce financial risk (James et al., 2024), and lower managerial risk exposure (Guedhami et al., 2021). Firms experiencing volatile cash flows or limited access to external capital tend to hold more cash as a risk management strategy (Bates et al., 2009; Han & Qiu, 2007; Opler et al., 1999). Geopolitical risk introduces uncertainty in product markets and revenue streams, compelling firms to adjust policies and maintain higher cash balances (Hasan et al., 2022; Lee & Wang, 2021). Therefore, cash holdings play a crucial role in sustaining business operations during periods of geopolitical instability.

Several studies find a significant relationship between geopolitical risk and corporate cash holdings (Demir & Ersan, 2017; Lee & Wang, 2021; Wang et al., 2021). Moreover, substantial cash reserves act as an effective hedge against the negative effects of geopolitical risk on firm performance (Ozdemir et al., 2023). Sandra and Kim (2022) provide evidence from Indonesian firms showing that geopolitical risk significantly affects cash reserves. Nguyen et al. (2024) further demonstrate that cash reserves reduce default risk, which is closely linked to financial performance. Although Wang et al. (2024) find a negative relationship between geopolitical risk and cash holdings, they confirm that cash reserves mitigate the adverse impact of geopolitical risk on corporate value.

Accordingly, the following hypothesis is proposed:

H2: Net change in cash significantly mitigate the negative impact of geopolitical risk on firms' financial performance.

Firms particularly rely on cash generated from operating activities as a buffer against uncertainty (Bates et al., 2009). According to pecking order theory, firms prefer internal financing—such as operating cash flow—over external funding to minimize transaction costs and maintain control (Korolo & Korolo, 2025). Internal financing is also less costly than external sources (Gupta, 2023). Geopolitical risk generates uncertainty in labor costs, production expenses, and transportation costs, making operating cash flow a critical indicator of firms' ability to meet obligations and sustain growth (Ahmed & Elnahass, 2024).

Thus, the following hypothesis is proposed:

H3: Cash flow from operating activities significantly mitigates the negative impact of geopolitical risk on firms' financial performance.

Geopolitical risk disrupts the business environment, increases costly decision-making errors (Le & Tran, 2021), reduces economic growth, and weakens consumer purchasing power (Lee & Lee, 2020; Lee & Wang, 2021). Evidence indicates that manufacturing activity slows during periods of heightened geopolitical risk, as reflected by declining Purchasing Managers' Index (PMI) values (Lee & Wang, 2021). Under such conditions, investment returns become uncertain, making cash flows from investing activities less effective in supporting firm performance.

Accordingly, the following hypothesis is proposed:

H4: Cash flow from investing activities does not significantly mitigate the negative impact of geopolitical risk on firms' financial performance.

During periods of geopolitical instability, firms' cash flows become more volatile, and information asymmetry between firms and creditors intensifies (Khoo & Cheung, 2021; Yaghoubi, 2025). Creditors perceive higher risk and consequently charge higher borrowing costs (Nguyen & Thuy, 2023; Waisman et al., 2015). Increased financing costs negatively affect firms' profitability and financial stability.

Therefore, the following hypothesis is proposed:

H5: Cash flow from financing activities does not significantly mitigate the negative impact of geopolitical risk on firms' financial performance.

3. Methodology

This study employs annual data on Indonesian firms' financial reports, foreign exchange rates, inflation, and geopolitical risk spanning the period from 1996 to 2023. Firm-level financial data are obtained from Compustat. The foreign exchange rate used in this study is the USD/IDR rate, sourced from Investing.com, while inflation data are collected from the World Bank database. Geopolitical risk (GPR) data are obtained from Caldara and Iacoviello's official database.

The sample includes all non-financial firms listed in Compustat, with financial institutions—such as banks, insurance companies, securities firms, and leasing companies—excluded due to their distinct regulatory frameworks and financial structures.

The dependent variable is Return on Assets (ROA), which serves as a proxy for firm financial performance. The key independent variable is the Indonesian Geopolitical Risk (GPR) Index developed by Caldara and Iacoviello (2022). This index measures geopolitical tensions, conflicts, wars, and terrorist activities by calculating the share of newspaper articles that reference adverse geopolitical events across multiple countries, including Indonesia. The objective of the index is to capture distinct dimensions of geopolitical risk affecting economic conditions.

Following Gupta (2023), this study aggregates monthly GPR values into annual measures by computing both the average and median over the twelve months of each fiscal year. GPRMEAN denotes the annual average geopolitical risk index, while GPRMEDIAN represents the annual median value.

Extant literature addressing corporate responses to uncertainty has largely concentrated on cash holdings as a vital precautionary liquidity buffer (Han & Qiu, 2007). In contrast, this study utilizes cash flow from operating activities (OPS) as the primary variable of interest. This methodological choice rests on the premise that OPS captures a firm's ongoing capacity to generate internal funds from core business activities, whereas cash holdings merely reflect a static stock of accumulated liquidity at a given point in time. According to the pecking order theory, information asymmetry and financial constraints compel firms to prioritize internal financing over external capital, which often carries prohibitive costs and adverse selection risks (Myers & Majluf, 1984). Furthermore, Fazzari et al. (1988) posit that when external capital markets are constrained, corporate investment becomes highly sensitive to internal fund availability. Thus, under conditions of heightened uncertainty, OPS offers a more direct metric of a firm's self-financing capacity. While Han and Qiu (2007) demonstrate that firms accumulate cash reserves to counter cash flow volatility, their underlying logic underscores the broader value of liquidity and financial flexibility. Extending this rationale, firms with robust operating cash flows should exhibit superior financial flexibility, reduced external capital dependence, and enhanced resilience to geopolitical shocks. OPS is therefore a superior proxy for analyzing how internally generated liquidity shields firm performance from geopolitical risks.

The interaction variables capture firms' cash flow components, including net change in cash (CASH), cash flow from operating activities (OPS), cash flow from investing activities (INVS), and cash flow from financing activities (FIN).

Control variables include total asset turnover (TATO), fixed asset turnover (FATO), accounts receivable turnover (ARTO), inventory turnover (INTO), gross profit margin (GPM), net income margin (NIM), debt-to-equity ratio (DER), EBIT-to-interest expense ratio (EIXP), and current ratio (CURR).

To mitigate the influence of extreme values, all continuous variables are winsorized at the 2nd and 98th percentiles.

To test Hypothesis 1, the following baseline econometric model is estimated:

$$ROA_{it} = \alpha_{it} + \beta_1 GPRMEAN_{it} + \lambda Control_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (1)$$

Where ROA_{it} denotes firm i 's return on assets in year t , $GPRMEAN_{it}$ represents geopolitical risk, $CONTROL_{it}$ is a vector of control variables, μ_i captures firm-specific effects, δ_t captures time-specific effects, and ε_{it} is the error term.

To examine the moderating role of cash flow components in the relationship between geopolitical risk and financial performance, the following interaction models are estimated:

$$ROA_{it} = \alpha_{it} + \beta_1 (GPRMEAN_{it} \times CASH_{it}) + \beta_2 GPRMEAN_{it} + \beta_3 CASH_{it} + \lambda Control_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (2)$$

$$ROA_{it} = \alpha_{it} + \beta_1 (GPRMEAN_{it} \times OPS_{it}) + \beta_2 GPRMEAN_{it} + \beta_3 OPS_{it} + \lambda Control_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (3)$$

$$ROA_{it} = \alpha_{it} + \beta_1 (GPRMEAN_{it} \times INVS_{it}) + \beta_2 GPRMEAN_{it} + \beta_3 INVS_{it} + \lambda Control_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (4)$$

$$ROA_{it} = \alpha_{it} + \beta_1 (GPRMEAN_{it} \times FIN_{it}) + \beta_2 GPRMEAN_{it} + \beta_3 FIN_{it} + \lambda Control_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (5)$$

Where $GPRMEAN_{it} \times CASH_{it}$, $GPRMEAN_{it} \times OPS_{it}$, $GPRMEAN_{it} \times INVS_{it}$, and $GPRMEAN_{it} \times FIN_{it}$ represent the interaction terms between geopolitical risk and the respective cash flow components.

4. Results and Discussion

4.1 Descriptive Statistics

Table 1 presents the descriptive statistics of the variables employed in the regression analysis, including the mean, standard deviation, minimum, and maximum values. The mean ROA is 4.535006, with a standard deviation of 6.367135, ranging from -9.89 to 25. This indicates substantial variation in firm financial performance across the sample.

The average value of GPRMEAN is 0.0541794, with a standard deviation of 0.0285102, a minimum of 0.0233, and a maximum of 0.1070. Similarly, GPRMEDIAN has a mean of 0.0434, a standard deviation of 0.251024, and ranges from 0.0077 to 0.1134, reflecting considerable fluctuations in geopolitical risk over the sample period.

Regarding cash flow variables, the mean values of net change in cash (CASH), cash flow from operating activities (OPS), cash flow from investing activities (INVS), and cash flow from financing activities (FIN) are 4.053831, 32.5383, -29.3513, and -0.25845, respectively. CASH and OPS exhibit positive average values, indicating that firms, on average, generate positive net cash and operating cash flows. In contrast, INVS and FIN display negative mean values, suggesting that firms tend to spend more on investment activities and experience net cash outflows from financing over the sample period.

4.2 Fixed Effect Regression Result

Table 2 reports the fixed-effects regression results. Column (1) shows that GPRMEAN has a coefficient of -4.826 with a p-value of 0.000, indicating a statistically significant negative effect on ROA at the 1% significance level. This result supports Hypothesis 1 and suggests that heightened geopolitical risk adversely affects firm financial performance.

This finding is consistent with prior studies, including Ozdemir et al. (2023) and Trakarnsirinont et al. (2023), which documented a detrimental relationship between uncertainty and firm performance. One plausible explanation is the significant slowdown in consumer consumption during periods of elevated geopolitical uncertainty (Ozdemir et al., 2023), as consumers tend to postpone spending for precautionary reasons (Caldara & Iacoviello, 2022). This behavior generates uncertainty in firms' sales and profit streams (Wang et al., 2021).

In addition, geopolitical risk increases operational costs and exacerbates information asymmetry between firms and external stakeholders (Bermpei et al., 2022; Çolak et al., 2017; Ou et al., 2023), thereby further weakening financial performance. Collectively, these mechanisms explain why geopolitical risk exerts a significantly negative impact on firm profitability.

Table 1: Descriptive Statistic

Variables	Obs	Mean	Std. Dev.	Min	Max
ROA	10,080	4.535006	6.367135	-9.89	25
GPRMEAN	22,624	.0541794	.0285102	.0233023	.1070437
GPRMEDIAN	22,624	.0434969	.0251024	.0076805	
.1134431					
CASH	10,845	4.053831	29.10868	-71.7	136.7
OPS	10,857	32.52834	85.90408	-34.2	461.8
INVS	10,723	-29.35132	72.1911	-386.9	15.1
FIN	10,584	-.2584475	57.47486	-211	211.6
TATO	10,019	.9115221	.801178	.029	3.67
FATO	9,896	8.022785	18.45193	.107	106
ARTO	9,478	16.008	27.36062	.986	158
INTO	9,149	15.50398	32.82556	.114	185
GPM	10,902	29.73758	20.87902	-7.86	84.8
NIM	10,773	2.160474	24.79511	-102.4	55.9
EIXP	7,919	14.21672	30.7114	.136	163.1
CURR	10,979	2.444274	3.046716	.131	17.2
DER	9,499	112.8143	173.4525	.221	948.4
FOREXCHG	22,624	.1390276	.6040924	-.1783831	
3.228908					
INFLATION	22,624	.0844588	.1041364	.0156013	
.5845104					

Source: Compustat, processed by authors

Column (2) of Table 2 shows that the coefficient of the interaction term between GPR and CASH is 0.0865, with a p-value of 0.01, indicating a statistically significant positive effect on ROA at the 1% significance level. This result provides empirical support for Hypothesis 2, suggesting that net change in cash (CASH) can mitigate the negative impact of geopolitical risk (GPR) on firm financial performance. This finding aligns with the results of Wang et al. (2024), who documented that firms increase cash holdings to buffer against external shocks and maintain smooth operations during periods of uncertainty. Holding sufficient cash enhances a firm's financial stability, its capacity to generate profits, its ability to meet obligations, and its resilience against geopolitical risk (Ahmed & Elnahass, 2024; Wang et al., 2021). Therefore, cash reserves serve as an effective mechanism for reducing the detrimental effects of geopolitical risk on corporate performance.

Column (3) of Table 2 shows that the coefficient of the interaction term between GPR and OPS is 0.0484, with a p-value of 0.000, indicating a statistically significant positive effect on ROA at the 1% level. This result supports Hypothesis 3 and suggests that cash flow from business operations (OPS) can mitigate the negative impact of geopolitical risk (GPR) on firm financial performance. Cash flow from operations reflects the underlying performance and efficiency of a firm's core business activities (Ahmed & Elnahass, 2024). Firms with stable and robust operating cash flow are better equipped to manage day-to-day operations and respond effectively to uncertainty, including geopolitical risk. This financial flexibility allows such firms to sustain profitability and operational resilience during periods of elevated external risk.

Table 2: GPRMEAN

	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA
GPRMEAN	-4.826*** (0.000)	-5.193*** (0.000)	-7.123*** (0.000)	-6.240*** (0.000)	-6.008*** (0.000)
TATO	5.297*** (0.000)	5.337*** (0.000)	5.339*** (0.000)	5.388*** (0.000)	5.357*** (0.000)
FATO	-0.00934** (0.031)	-0.00890** (0.039)	-0.00790* (0.064)	-0.00934** (0.030)	-0.00901** (0.036)
ARTO	0.00770*** (0.003)	0.00784*** (0.002)	0.00732*** (0.004)	0.00790*** (0.002)	0.00752*** (0.003)
INTO	0.00897*** (0.000)	0.00820*** (0.000)	0.00824*** (0.000)	0.00900*** (0.000)	0.00799*** (0.000)
GPM	0.233*** (0.000)	0.233*** (0.000)	0.225*** (0.000)	0.234*** (0.000)	0.235*** (0.000)

NIM	0.0452*** (0.000)	0.0457*** (0.000)	0.0460*** (0.000)	0.0459*** (0.000)	0.0462*** (0.000)
EIXP	0.0250*** (0.000)	0.0247*** (0.000)	0.0227*** (0.000)	0.0246*** (0.000)	0.0240*** (0.000)
CURR	0.00913 (0.678)	0.00336 (0.878)	0.0202 (0.352)	0.0139 (0.526)	0.0148 (0.500)
DER	-0.000517* (0.072)	-0.000449 (0.119)	-0.000252 (0.376)	-0.000382 (0.186)	-0.000430 (0.135)
FOREXCHG	0.209** (0.020)	0.215** (0.022)	0.312*** (0.001)	0.215** (0.021)	0.264*** (0.005)
INFLATION	5.302*** (0.000)	5.418*** (0.000)	6.429*** (0.000)	5.390*** (0.000)	5.542*** (0.000)
GPRMEANxCASH		0.0865*** (0.010)			
CASH		-0.000481 (0.799)			
GPRMEANxOPS			0.0484*** (0.000)		
OPS			0.00453*** (0.000)		
GPRMEANxINVS				-0.0364** (0.011)	
INVS				0.000665 (0.458)	
GPRMEANxFIN					-0.0507*** (0.005)
FIN					-0.000456 (0.656)
_cons	-7.052*** (0.000)	-7.060*** (0.000)	-7.136*** (0.000)	-7.165*** (0.000)	-7.113*** (0.000)
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes
N	6317	6275	6277	6262	6259
R ²	0.545	0.552	0.562	0.553	0.554

Source: Compustat, processed by authors p -values in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results for the interaction term between GPR and cash from investing (INVS) are presented in column (4) of Table 2. The coefficient is -0.0364 with a p -value of 0.011 , indicating a statistically significant negative effect on ROA at the 5% level. This finding supports Hypothesis 4, suggesting that cash from investing (INVS) cannot mitigate the adverse impact of geopolitical risk (GPR) on firm financial performance. This result is consistent with Demir et al. (2020). Geopolitical risk increases the difficulty of forecasting and magnifies the downside risk to GDP growth (Caldara & Iacoviello, 2022), while also raising investment costs and risk premiums (James et al., 2024). Consequently, cash allocated to investing activities may not provide sufficient flexibility to buffer firms against geopolitical uncertainty.

Similarly, column (5) of Table 2 reports the results for the interaction between GPR and cash from financing (FIN). The coefficient is -0.0507 with a p -value of 0.005 , indicating a statistically significant negative effect on ROA at the 1% level. This finding supports Hypothesis 5, suggesting that cash from financing (FIN) also fails to mitigate the impact of GPR on firm financial performance. During periods of geopolitical uncertainty, firms face higher debt costs and an increased likelihood of credit default (Waisman et al., 2015; Wisniewski & Lambe, 2015), which reduces the effectiveness of financing-related cash flows in protecting profitability.

Unlike operating cash flow, investing cash flow does not mitigate the adverse effects of geopolitical risk on firm performance, as investment-driven liquidations become inefficient sources of liquidity amid uncertainty. Positive investing cash flows generally reflect the sale of long-term assets like machinery or facilities; however, heightened geopolitical risks often cause investors to postpone acquisitions in favor of a wait-and-see strategy. This behavior reduces asset market liquidity, making rapid and favorable asset divestment difficult for firms. Conversely, increasing capital allocations during geopolitical crises is equally unappealing due to rising risk premiums and uncertain future returns. Consistent with real options theory, firms facing substantial uncertainty

tend to delay irreversible investments. For these reasons, investing cash flows provide a restricted capacity to shield corporate financial performance from geopolitical shocks.

Furthermore, financing cash flows fail to cushion the adverse effects of geopolitical risk (GPR) on firm performance, primarily because heightened uncertainty increases external capital costs and constrains credit accessibility. This phenomenon is rooted in amplified information asymmetry and elevated risk perceptions among investors and creditors during periods of geopolitical distress, which prompts lenders to extract higher risk premiums and equity investors to demand steeper discounts. Consequently, firms are subjected to elevated borrowing costs, stringent covenants, and diminished market receptivity for seasoned equity offerings. Framed within Myers and Majluf's (1984) Pecking Order Theory, firms systematically prioritize internal liquidity over external financing to minimize adverse selection costs. In the wake of intense geopolitical shocks, these frictional financing costs escalate, thereby nullifying the utility of external financing cash flows as an effective buffer. Under these deteriorating operating conditions, a forced reliance on incremental debt financing can ultimately exacerbate firm underperformance by intensifying fixed financial obligations and interest burdens.

4.3 Robustness Test

Following Ou et al. (2023), this study conducts robustness tests by: (1) using an alternative measure of geopolitical risk, (2) varying the sample period, and (3) controlling for the potential effects of macroeconomic factors.

4.3.1 Replacing the Measurement of Geopolitical Risk (GPR)

To further examine the impact of geopolitical risk (GPR) on firm financial performance and the moderating role of cash, this study conducts regression analysis using the median of the geopolitical risk index (GPRMEDIAN). The results are presented in Table 3. The coefficient of GPRMEDIAN is -3.782 with a p-value of 0.018, indicating a statistically significant negative effect on ROA at the 5% level.

The interaction term between GPRMEDIAN and net change in cash (CASH) has a coefficient of 0.107 with a p-value of 0.019, suggesting a positive and significant moderating effect on ROA at the 5% level. Similarly, the interaction between GPRMEDIAN and cash from operations (OPS) has a coefficient of 0.0552 with a p-value of 0.000, indicating a positive and highly significant effect on ROA at the 1% level.

In contrast, the interaction terms of GPRMEDIAN with cash from investing (INVS) and cash from financing (FIN) have negative coefficients of -0.0573 ($p = 0.002$) and -0.0541 ($p = 0.025$), respectively, indicating statistically significant negative effects on ROA at the 5% level. These results confirm that while net cash holdings and operating cash flows help mitigate the adverse impact of geopolitical risk, cash from investing and financing do not provide such a buffer.

4.3.2 Changing The Sample Period

Several significant geopolitical risk events occurred in Indonesia prior to and around 2007, largely due to increased terrorist activities. Notable incidents include the Christmas Eve church bombings across 11 churches in major cities on December 24, 2000; the Bali Bombing I in Kuta on October 12, 2002; the JW Marriott Hotel bombing in Jakarta on August 5, 2003; the Australian Embassy bombing in Jakarta on September 9, 2004; the Bali Bombing II in Kuta on October 1, 2005; and multiple bomb explosions in Poso, Central Sulawesi, on July 29, 2007. In light of these events, this study uses data from 2007 onwards as part of the robustness test

Table 3: GPRMEDIAN

	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA
GPRMEDIAN	-6.992*** (0.000)	-7.548*** (0.000)	-9.982*** (0.000)	-9.043*** (0.000)	-8.042*** (0.000)
TATO	5.309*** (0.000)	5.349*** (0.000)	5.351*** (0.000)	5.399*** (0.000)	5.375*** (0.000)
FATO	-0.00952** (0.028)	-0.00910** (0.034)	-0.00809* (0.057)	-0.00960** (0.026)	-0.00911** (0.034)
ARTO	0.00762*** (0.003)	0.00774*** (0.003)	0.00727*** (0.004)	0.00780*** (0.002)	0.00742*** (0.004)
INTO	0.00904*** (0.000)	0.00826*** (0.000)	0.00851*** (0.000)	0.00916*** (0.000)	0.00800*** (0.000)
GPM	0.233*** (0.000)	0.233*** (0.000)	0.225*** (0.000)	0.234*** (0.000)	0.235*** (0.000)
NIM	0.0451***	0.0455***	0.0458***	0.0458***	0.0461***

EIXP	(0.000) 0.0249***	(0.000) 0.0247***	(0.000) 0.0226***	(0.000) 0.0245***	(0.000) 0.0240***
CURR	(0.000) 0.0119	(0.000) 0.00633	(0.000) 0.0231	(0.000) 0.0167	(0.000) 0.0174
DER	(0.589) -0.000498*	(0.773) -0.000427	(0.286) -0.000224	(0.447) -0.000364	(0.428) -0.000402
FOREXCHG	(0.084) 0.204**	(0.138) 0.209**	(0.431) 0.312***	(0.209) 0.209**	(0.163) 0.265***
INFLATION	(0.023) 5.414***	(0.026) 5.542***	(0.001) 6.558***	(0.026) 5.516***	(0.005) 5.643***
GPRMEDIANxCASH	(0.000)	(0.000) 0.0875***	(0.000)	(0.000)	(0.000)
CASH		(0.009) -0.000467			
GPRMEDIANxOPS		(0.804)	0.0693*** (0.000)		
OPS			0.00427*** (0.000)		
GPRMEDIANxINVS				-0.0474*** (0.005)	
INVS				0.000767 (0.372)	
GPRMEDIANxFIN					-0.0577*** (0.007)
FIN					-0.000648 (0.513)
_cons	-7.038*** (0.000)	-7.043*** (0.000)	-7.112*** (0.000)	-7.134*** (0.000)	-7.124*** (0.000)
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes
<i>N</i>	6317	6275	6277	6262	6259
<i>R</i> ²	0.545	0.553	0.563	0.553	0.555

Source: Compustat, processed by authors p -values in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Change Sample Period and Excluding Macroeconomics

	Change Sample Period					Excluding Macroeconomics				
	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA	(8) ROA	(9) ROA	(10) ROA
GPRMEAN	-3.422*** (0.004)	-3.764*** (0.002)	-6.797*** (0.000)	-4.784*** (0.000)	-4.527*** (0.000)	-2.811** (0.014)	-3.139*** (0.006)	-4.794*** (0.000)	-4.170*** (0.001)	-3.862*** (0.001)
TATO	5.459*** (0.000)	5.509*** (0.000)	5.453*** (0.000)	5.587*** (0.000)	5.525*** (0.000)	5.333*** (0.000)	5.373*** (0.000)	5.376*** (0.000)	5.420*** (0.000)	5.391*** (0.000)
FATO	-0.00659 (0.118)	-0.00630 (0.134)	-0.00532 (0.200)	-0.00673 (0.109)	-0.00636 (0.130)	-0.00946** (0.031)	-0.00895** (0.040)	-0.00823* (0.057)	-0.00946** (0.030)	-0.00905** (0.037)
ARTO	0.00792*** (0.002)	0.00783*** (0.002)	0.00768*** (0.003)	0.00790*** (0.002)	0.00751*** (0.004)	0.00741*** (0.004)	0.00761*** (0.003)	0.00719*** (0.005)	0.00771*** (0.003)	0.00727*** (0.005)
INTO	0.00986*** (0.000)	0.00941*** (0.000)	0.00916*** (0.000)	0.0104*** (0.000)	0.00896*** (0.000)	0.00958*** (0.000)	0.00888*** (0.000)	0.00911*** (0.000)	0.00968*** (0.000)	0.00876*** (0.000)
GPM	0.237*** (0.000)	0.234*** (0.000)	0.226*** (0.000)	0.236*** (0.000)	0.237*** (0.000)	0.248*** (0.000)	0.248*** (0.000)	0.244*** (0.000)	0.249*** (0.000)	0.250*** (0.000)
NIM	0.0440*** (0.000)	0.0445*** (0.000)	0.0435*** (0.000)	0.0446*** (0.000)	0.0446*** (0.000)	0.0401*** (0.000)	0.0409*** (0.000)	0.0403*** (0.000)	0.0411*** (0.000)	0.0412*** (0.000)
EIXP	0.0237*** (0.000)	0.0235*** (0.000)	0.0222*** (0.000)	0.0233*** (0.000)	0.0231*** (0.000)	0.0236*** (0.000)	0.0233*** (0.000)	0.0214*** (0.000)	0.0232*** (0.000)	0.0227*** (0.000)
CURR	0.00760 (0.726)	0.00236 (0.913)	0.0154 (0.471)	0.0145 (0.502)	0.0126 (0.560)	0.00978 (0.660)	0.00415 (0.851)	0.0186 (0.398)	0.0139 (0.529)	0.0147 (0.509)
DER	0.000866*** (0.007)	-0.000774** (0.015)	-0.000625** (0.048)	-0.000705** (0.028)	-0.000762** (0.017)	0.0000613 (0.829)	0.000127 (0.657)	0.000384 (0.177)	0.000184 (0.521)	0.000161 (0.573)
FOREXCHG	0.901** (0.022)	0.910** (0.020)	0.508 (0.190)	0.862** (0.028)	0.839** (0.033)					
INFLATION	1.783 (0.226)	1.937 (0.187)	6.456*** (0.000)	1.769 (0.230)	2.455* (0.098)					
GPRMEANx CASH		0.0875** (0.0328)					0.0846** (0.0339)			
CASH		-0.000658 (0.721)					-0.000713 (0.708)			
GPRMEANx OPS			0.0488*** (0.000)					0.0462*** (0.000)		
OPS			0.00455*** (0.000)					0.00329*** (0.000)		
GPRMEANx INVS				-0.0383*** (0.006)					-0.0334** (0.021)	

INVS		0.000240 (0.789)				0.000958 (0.290)					
GPUMEAN _x											
FIN						-0.0491*** (0.005)				-0.0476*** (0.008)	
FIN						0.000440 (0.662)				-0.000101 (0.922)	
_cons		-7.258*** (0.000)	-7.233*** (0.000)	-7.330*** (0.000)	-7.380*** (0.000)	-7.317*** (0.000)	-7.303*** (0.000)	-7.317*** (0.000)	-7.398*** (0.000)	-7.404*** (0.000)	-7.372*** (0.000)
Firm Effect	Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>		5918	5898	5900	5885	5884	6317	6275	6277	6262	6259
<i>R</i> ²		0.550	0.555	0.566	0.557	0.556	0.536	0.543	0.550	0.544	0.545

Source: Compustat, processed by authors *p-values in parentheses* **p* < 0.10, ***p* < 0.05, ****p* < 0.01

Columns (1) to (5) of Table 4 present the regression results using data from 2007 to 2023. The coefficient of GPRMEAN is -3.422 with a p-value of 0.004, indicating a statistically significant negative effect on ROA at the 5% level. The interaction term between GPRMEAN and net change in cash (CASH) has a coefficient of 0.0875 and a p-value of 0.0328, demonstrating a positive and significant effect on ROA at the 5% level. Similarly, the interaction between GPRMEAN and cash from operations (OPS) has a coefficient of 0.0488 with a p-value of 0.000, indicating a positive and highly significant impact on ROA. In contrast, the interaction terms of GPRMEAN with cash from investing (INVS) and cash from financing (FIN) have coefficients of -0.0383 ($p = 0.006$) and -0.0491 ($p = 0.005$), respectively, indicating significant negative effects on ROA. These results suggest that while net cash holdings and operating cash flows help mitigate the adverse impact of geopolitical risk, cash from investing and financing activities do not provide such a buffer.

4.3.3 Excluding Macroeconomics

Following Ou et al. (2023), this study also examines the robustness of the results by excluding the impact of macroeconomic factors on ROA, specifically removing the FOREXCHG and INFLATION variables. The results are presented in columns (6) to (10) of Table 4. The coefficient of GPRMEAN is -2.811 with a p-value of 0.014, indicating a negative effect on ROA that is significant at the 5% level. The interaction term between GPRMEAN and net change in cash (CASH) has a coefficient of 0.0846 and a p-value of 0.0339, showing a positive and significant effect on ROA at the 5% level. Similarly, the interaction between GPRMEAN and cash from operations (OPS) has a coefficient of 0.0462 with a p-value of 0.000, indicating a positive and highly significant effect on ROA at the 1% level. In contrast, the interaction terms of GPRMEAN with cash from investing (INVS) and cash from financing (FIN) have coefficients of -0.0334 ($p = 0.021$) and -0.0476 ($p = 0.008$), respectively, indicating statistically significant negative effects on ROA. These results confirm that net cash holdings and operating cash flows can mitigate the negative impact of geopolitical risk, whereas cash from investing and financing do not provide an effective buffer even after controlling for macroeconomic influences.

4.4 Endogeneity Issue

This study employs instrumental variables to address potential endogeneity issues arising from omitted variables. Following Ou et al. (2023), a two-stage least squares (2SLS) estimation is conducted, using the geopolitical risk (GPR) indices of Malaysia, the Philippines, Thailand, and Vietnam as instrumental variables. Each index is measured as the average of the twelve months of the fiscal year. These countries were selected because, along with Indonesia, they are members of the Association of Southeast Asian Nations (ASEAN) and share similar cultural and economic characteristics, as well as exposure to comparable geopolitical risks.

Table 5: First Stage Regression

Variables	First Stage (Dependent Variable: GPRMEAN)
GPRMYS	-0.165^{***} (0.000)
GPRPHIL	0.424^{***} (0.000)
GPRTHA	0.635^{***} (0.000)
GPRVNM	0.054^{***} (0.000)
Controls	Yes
Firm FE	Yes
Observations	6317
Within R ²	0.239
First-stage F-statistic	302.79^{***} (0.000)

Note: The dependent variable is GPRMEAN. Control variables include TATO, FATO, ARTO, INTO, GPM, NIM, EIXP, CURR, DER, FOREXCHG, and INFLATION. The first-stage F-statistic refers to the joint significance test of the excluded instruments (GPRMYS, GPRPHIL, GPRTHA, and GPRVNM). p-values are reported in parentheses. *

$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results of the first-stage regression are presented in Table 5. The geopolitical risk indices of the neighboring ASEAN nations—namely Malaysia, the Philippines, Thailand, and Vietnam—serve as statistically significant predictors of Indonesia's geopolitical risk. Crucially, the excluded instruments exhibit joint significance, yielding a first-stage-statistic of 302.79 ($p < 0.001$). Because this value substantially surpasses the conventional rule-of-thumb threshold of 10, these diagnostics confirm that the selected instruments are highly relevant and robust against weak-instrument biases.

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Table 6 presents the 2SLS regression results. The coefficient of GPRMEAN is -12.95 with a p-value of 0.000, indicating a statistically significant negative effect on ROA at the 1% level. The interaction term between GPRMEAN and net change in cash (CASH) has a coefficient of 0.166 with a p-value of 0.009, showing a positive and significant moderating effect on ROA at the 1% level. Likewise, the interaction between GPRMEAN and cash from operations (OPS) has a coefficient of 0.104 with a p-value of 0.000, indicating a positive and highly significant impact on ROA at the 1% level.

In contrast, the interaction terms of GPRMEAN with cash from investing (INVS) and cash from financing (FIN) have coefficients of -0.0957 ($p = 0.001$) and -0.119 ($p = 0.000$), respectively, indicating statistically significant negative effects on ROA. These findings confirm that net cash holdings and operating cash flows effectively mitigate the negative impact of geopolitical risk, whereas cash from investing and financing do not serve as effective buffers even after addressing endogeneity.

Table 6: Instrumental Variable

	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA
GPRMEAN	-12.95*** (0.000)	-12.71*** (0.000)	-16.66*** (0.000)	-15.71*** (0.000)	-15.05*** (0.000)
TATO	3.498*** (0.000)	3.504*** (0.000)	3.485*** (0.000)	3.552*** (0.000)	3.459*** (0.000)
FATO	-0.0478*** (0.000)	-0.0475*** (0.000)	-0.0432*** (0.000)	-0.0471*** (0.000)	-0.0463*** (0.000)
ARTO	-0.00788*** (0.001)	-0.00773*** (0.002)	-0.00775*** (0.001)	-0.00776*** (0.002)	-0.00778*** (0.001)
INTO	-0.0000763 (0.964)	-0.000264 (0.874)	-0.00185 (0.266)	-0.000806 (0.635)	-0.000523 (0.753)
GPM	0.0928*** (0.000)	0.0917*** (0.000)	0.0855*** (0.000)	0.0902*** (0.000)	0.0901*** (0.000)
NIM	0.108*** (0.000)	0.108*** (0.000)	0.103*** (0.000)	0.108*** (0.000)	0.108*** (0.000)
EIXP	0.0432*** (0.000)	0.0429*** (0.000)	0.0401*** (0.000)	0.0430*** (0.000)	0.0407*** (0.000)
CURR	-0.152*** (0.000)	-0.157*** (0.000)	-0.103*** (0.000)	-0.128*** (0.000)	-0.134*** (0.000)
DER	0.000237 (0.529)	0.000257 (0.493)	0.000281 (0.446)	0.000280 (0.455)	0.000406 (0.288)
FOREXCHG	0.337*** (0.006)	0.326** (0.013)	0.369*** (0.004)	0.320** (0.013)	0.386*** (0.003)
INFLATION	9.441*** (0.000)	9.391*** (0.000)	9.846*** (0.000)	9.524*** (0.000)	9.622*** (0.000)
GPRMEANxCASH		0.166*** (0.009)			
CASH		0.00114 (0.709)			
GPRMEANxOPS			0.104*** (0.000)		
OPS			0.00305** (0.014)		
GPRMEANxINVS				-0.0957*** (0.001)	
INVS				0.000273 (0.848)	
GPRMEANxFIN					-0.119*** (0.000)
FIN					-0.00245 (0.127)
_cons	-0.634*** (0.007)	-0.650*** (0.007)	-0.656** (0.011)	-0.683** (0.010)	-0.474** (0.044)
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes
N	6317	6275	6277	6262	6259
R ²	0.431	0.436	0.459	0.436	0.443

Source: Compustat, processed by authors p -values in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.5 Further Analysis

This study employs quantile regression as a supplementary analysis to examine whether the effects of net change in cash and operating cash flow vary across different levels of firm performance. Ordinary Least Squares (OLS) estimates the average conditional effect of explanatory variables and implicitly assumes that the relationship between liquidity and firm performance is homogeneous across firms. However, this assumption may be restrictive in the context of geopolitical risk, as firms differ substantially in their financial capacity, liquidity positions, and ability to utilize internal funds.

The capacity of operating cash flow and net changes in cash to buffer geopolitical uncertainty may exhibit considerable heterogeneity across the performance distribution. For instance, low-cash-flow firms likely prioritize available liquidity to sustain basic daily operations and satisfy immediate short-term obligations. Conversely, their high-cash-flow counterparts possess the requisite financial flexibility to strategically deploy liquidity toward innovation, structural operational adjustments, and emergent growth opportunities. Consequently, the mitigating efficacy of internal liquidity is expected to diverge substantially between low- and high-performing cash flow regimes.

Quantile regression allows the impact of operating cash flow and net change in cash to be estimated at different points of the firm performance distribution, thereby providing a more comprehensive understanding of whether liquidity buffers geopolitical risk uniformly or whether the effect is concentrated among specific groups of firms.

This study divides net change in cash (CASH) and cash from operations (OPS) into four quantiles: below 0.25, 0.25–0.5, 0.5–0.75, and above 0.75. These two variables were selected because, based on the statistical results, they are the only interaction variables that have demonstrated the ability to mitigate the detrimental impact of geopolitical risk (GPR) on ROA, unlike the other interaction variables.

Table 7: Quantile of Net Cash Holdings

	(1) <0.25	(2) 0.25 – 0.5	(3) 0.5 – 0.75	(4) >0.75
GPRMEANxCASH	-0.0565 (0.553)	-6.298 (0.500)	0.254 (0.940)	0.0844 (0.112)
GPRMEAN	-4.089 (0.182)	-12.65*** (0.003)	-10.03** (0.043)	-2.955 (0.346)
CASH	0.00637 (0.303)	-0.404 (0.495)	0.161 (0.418)	-0.00139 (0.667)
TATO	5.094*** (0.000)	5.137*** (0.000)	4.749*** (0.000)	6.251*** (0.000)
FATO	-0.0120 (0.338)	-0.0230** (0.030)	-0.0115 (0.263)	-0.0147 (0.150)
ARTO	0.0133** (0.010)	-0.00980 (0.195)	-0.00262 (0.723)	0.0153*** (0.003)
INTO	0.00419 (0.348)	0.00976 (0.157)	0.0203** (0.010)	0.00952** (0.021)
GPM	0.231*** (0.000)	0.211*** (0.000)	0.257*** (0.000)	0.244*** (0.000)
NIM	0.0360*** (0.000)	0.0580*** (0.000)	0.0310*** (0.005)	0.0517*** (0.000)
EIXP	0.0300*** (0.000)	0.0103** (0.044)	0.0280*** (0.000)	0.0227*** (0.000)
CURR	0.0535 (0.237)	0.107* (0.051)	-0.121* (0.081)	0.0634 (0.123)
DER	0.000431 (0.494)	0.000364 (0.598)	-0.00116* (0.082)	-0.000241 (0.714)
FOREXCHG	0.236 (0.201)	0.182 (0.469)	0.0617 (0.786)	-0.125 (0.503)
INFLATION	2.335** (0.026)	4.842*** (0.003)	8.766*** (0.000)	4.632*** (0.000)
_cons	-6.709*** (0.000)	-6.503*** (0.000)	-7.113*** (0.000)	-8.136*** (0.000)
Firm Fixed Effect	Yes	Yes	Yes	Yes
N	1699	1180	1476	1920
R ²	0.559	0.466	0.503	0.630

Source: Compustat, processed by authors p -values in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Columns (1) to (4) of Table 7 present the results of the quantile regression for the interaction between net change in cash (CASH) and GPR. The results show that this interaction variable is statistically insignificant across all quantiles, indicating that net cash holdings can mitigate the detrimental impact of GPR on ROA on average but not consistently at specific points of the distribution. This pattern suggests a threshold or nonlinear relationship, where only firms with exceptionally high levels of net cash holdings—likely in the extreme upper tail—can effectively buffer against geopolitical shocks. However, net cash holdings may not be an ideal variable for mitigating the impact of GPR because it aggregates cash from various sources, including cash from financing (debt) and cash from investing (asset sales), which may not be as directly linked to operational resilience during periods of geopolitical uncertainty.

Table 8: Quantile of Cash from Operation

	(1) <0.25	(2) 0.25 – 0.5	(3) 0.5 – 0.75	(4) >0.75
GPRMEANxOPS	-0.146 (0.553)	-3.061 (0.345)	-0.109 (0.791)	0.0268** (0.031)
GPRMEAN	-11.15*** (0.001)	-5.229 (0.268)	-4.934 (0.321)	-3.648 (0.159)
OPS	-0.00522 (0.723)	0.503** (0.012)	0.0605** (0.019)	0.00414*** (0.000)
TATO	3.058*** (0.000)	4.779*** (0.000)	5.819*** (0.000)	8.198*** (0.000)
FATO	0.0115 (0.101)	-0.00703 (0.431)	-0.0153 (0.180)	-0.0197* (0.089)
ARTO	0.0107 (0.102)	0.00203 (0.720)	-0.00539 (0.365)	0.0110*** (0.006)
INTO	-0.00218 (0.716)	0.0128** (0.028)	0.00406 (0.348)	0.00861** (0.010)
GPM	0.175*** (0.000)	0.162*** (0.000)	0.256*** (0.000)	0.240*** (0.000)
NIM	0.0261*** (0.000)	0.0386*** (0.000)	0.0431*** (0.000)	0.0524*** (0.000)
EIXP	0.0163*** (0.000)	0.0105** (0.014)	0.0283*** (0.000)	0.0156*** (0.000)
CURR	-0.0661 (0.123)	0.0463 (0.337)	0.0290 (0.577)	0.0917** (0.018)
DER	0.000491 (0.417)	-0.00164** (0.015)	0.000986* (0.083)	0.0000383 (0.943)
FOREXCHG	0.226 (0.216)	0.304 (0.195)	0.549*** (0.010)	0.278 (0.108)
INFLATION	4.717*** (0.001)	10.62*** (0.000)	7.940*** (0.000)	5.736*** (0.000)
_cons	-3.729*** (0.000)	-6.015*** (0.000)	-8.658*** (0.000)	-9.711*** (0.000)
Firm Fixed Effect	Yes	Yes	Yes	Yes
N	1270	1198	1746	2063
R ²	0.410	0.430	0.599	0.700

Source: Compustat, processed by authors *p*-values in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8 presents the results of the quantile regression for the interaction between cash from operations (OPS) and GPR. The results show that this interaction variable has a positive and statistically significant impact on ROA only at the highest quantile (above 0.75, column 4). This indicates that only firms with high levels of cash from operations can effectively mitigate the detrimental impact of geopolitical risk on financial performance. Cash from operations is derived from revenues minus all operating costs, reflecting the firm's ability to generate sufficient internal cash flow. A high level of operational cash indicates that the business is running efficiently and possesses adequate liquidity to cover operating costs and withstand uncertainty, even during periods of geopolitical instability.

The quantile regression estimates reveal that cash from operation (OPS) alleviates the adverse impacts of geopolitical risk exclusively within the highest performance distribution. This finding underscores the heterogeneous value of internally generated liquidity across different corporate strata. For firms situated in the lower quantiles, OPS is primarily absorbed by routine operations and immediate liquidity maintenance, leaving a marginal residual capacity to absorb geopolitical shocks. Conversely, upper-quantile firms possess superior financial flexibility, enabling them to strategically deploy surplus OPS toward operational adaptation, innovation, and proactive risk-management initiatives. Accordingly, it operates not merely as a passive liquidity buffer, but as a strategic asset that cultivates

resilience against macroeconomic disruptions. These insights directly align with the precautionary motive and pecking order theories, reinforcing the critical role of self-financing mechanisms during heightened uncertainty.

5. Conclusion and Recommendations

This study examined the impact of geopolitical risk (GPR) on firm financial performance and the role of cash flow and cash holdings in mitigating this impact. Using annual financial data of Indonesian firms from 1996 to 2023, the results demonstrate that GPR has a significant negative effect on firm financial performance. While net cash holdings can mitigate the impact of GPR at the highest quantile (above 0.75), they are not an ideal tool for managing geopolitical risk due to their composition, which includes cash from financing and investing. In contrast, cash from operating activities effectively mitigates the negative impact of GPR on firm performance, particularly at high levels, whereas cash from investing and cash from financing do not provide a significant buffer.

These findings have important implications for both corporate managers and policymakers. Chief Financial Officers (CFOs) should prioritize operational efficiency, cost control, and revenue stability, avoid aggressive or non-essential investments, and manage leverage prudently. Policymakers should anticipate potential sources of geopolitical risk, such as terrorism or regional conflicts, and consider providing incentives or tax breaks during periods of heightened uncertainty. Such measures can alleviate financial pressure on firms, particularly those directly affected by geopolitical disruptions.

The limitations of this study include its reliance on data from 1996 to 2023 and the use of a limited set of statistical methods. Future research could explore additional variables and alternative methodologies to better understand mechanisms that help firms mitigate the adverse effects of geopolitical risk on financial performance.

References

- Ahmed, M. S., & Elnahass, M. (2024). Being famous matters: Evidence from cash flow volatility. *International Review of Financial Analysis*, 93, 103165. <https://doi.org/10.1016/j.irfa.2024.103165>
- Akadiri, S. S., Eluwol, K. K., Akadiri, A. C., & Avci, T. (2020). Does causality between geopolitical risk, tourism and economic growth matter? Evidence from Turkey. *Journal of Hospitality and Tourism Management*, 43, 273–277. <https://doi.org/10.1016/j.jhtm.2019.09.002>
- Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring Economic Policy Uncertainty*. *The Quarterly Journal of Economics*, 131(4), 1593–1636. <https://doi.org/10.1093/qje/qjw024>
- Balcilar, M., Bonato, M., Demirel, R., & Gupta, R. (2018). Geopolitical risks and stock market dynamics of the BRICS. *Economic Systems*, 42(2), 295–306. <https://doi.org/10.1016/j.ecosys.2017.05.008>
- Bermpei, T., Kalyvas, A. N., Neri, L., & Russo, A. (2022). Does economic policy uncertainty matter for financial reporting quality? Evidence from the United States. *Review of Quantitative Finance and Accounting*, 58(2), 795–845. <https://doi.org/10.1007/s11156-021-01010-2>
- Caldara, D., & Iacoviello, M. (2022). Measuring Geopolitical Risk. *American Economic Review*, 112(4), 1194–1225. <https://doi.org/10.1257/aer.20191823>
- Chen, J.-L., Jia, Z. T., & Sun, P.-W. (2016). Real option component of cash holdings, business cycle, and stock returns. *International Review of Financial Analysis*, 45, 97–106. <https://doi.org/10.1016/j.irfa.2016.03.008>
- Cheng, C. H. J., & Chiu, C.-W. (Jeremy). (2018). How important are global geopolitical risks to emerging countries? *International Economics*, 156, 305–325. <https://doi.org/10.1016/j.inteco.2018.05.002>
- Çolak, G., Durnev, A., & Qian, Y. (2017). Political Uncertainty and IPO Activity: Evidence from U.S. Gubernatorial Elections. *Journal of Financial and Quantitative Analysis*, 52(6), 2523–2564. <https://doi.org/10.1017/S0022109017000862>
- de Jong, A., Verbeek, M., & Verwijmeren, P. (2007). *Testing the Pecking Order Theory: The Impact of Financing Surpluses and Large Financing Deficits*. <http://hdl.handle.net/1765/12673>
- Demir, E., Díez-Esteban, J. M., & García-Gómez, C. D. (2019). The impact of geopolitical risks on cash holdings of hospitality companies: Evidence from emerging countries. *Journal of Hospitality and Tourism Management*, 39, 166–174. <https://doi.org/10.1016/j.jhtm.2019.04.004>
- Demir, E., & Ersan, O. (2017). Economic policy uncertainty and cash holdings: Evidence from BRIC countries. *Emerging Markets Review*, 33, 189–200. <https://doi.org/10.1016/j.ememar.2017.08.001>
- Fazzari, S., Hubbard, R. G., & Petersen, B. (n.d.). Investment, Financing Decisions, and Tax Policy. *The American Economic Review*, May, 1988, Vol. 78, No. 2, *Papers and Proceedings of the One-Hundredth Annual Meeting of the American Economic Association* (May, 1988), Pp. 200–205. Retrieved <https://www.jstor.org/stable/1818123>
- Guedhami, O., Mansi, S., Reeb, D., & Yasuda, Y. (2021). Economic policy uncertainty and allocative distortions. *Journal of Financial Stability*, 56, 100923. <https://doi.org/10.1016/j.jfs.2021.100923>
- Gulen, H., & Ion, M. (2015). Policy Uncertainty and Corporate Investment. *Review of Financial Studies*, hhv050. <https://doi.org/10.1093/rfs/hhv050>
- Gupta, G. (2023). Geopolitical risk and investment-cash flow sensitivity: An empirical analysis for Indian business group-affiliated firms and non-business group-affiliated firms. *Finance Research Letters*, 58, 104574. <https://doi.org/10.1016/j.frl.2023.104574>

- Han, S., & Qiu, J. (2007). Corporate precautionary cash holdings. *Journal of Corporate Finance*, 13(1), 43–57. <https://doi.org/10.1016/j.jcorpfin.2006.05.002>
- Harford, J. (1999). Corporate Cash Reserves and Acquisitions. *The Journal of Finance*, 54(6), 1969–1997. <https://doi.org/10.1111/0022-1082.00179>
- Hasan, S. B., Alam, M. S., Paramati, S. R., & Islam, M. S. (2022). Does firm-level political risk affect cash holdings? *Review of Quantitative Finance and Accounting*, 59(1), 311–337. <https://doi.org/10.1007/s11156-022-01049-9>
- He, F., Ma, Y., & Zhang, X. (2020). How does economic policy uncertainty affect corporate Innovation?—Evidence from China listed companies. *International Review of Economics & Finance*, 67, 225–239. <https://doi.org/10.1016/j.iref.2020.01.006>
- Iqbal, U., Gan, C., & Nadeem, M. (2020). Economic policy uncertainty and firm performance. *Applied Economics Letters*, 27(10), 765–770. <https://doi.org/10.1080/13504851.2019.1645272>
- James, H. L., Wang, H., & Borah, N. (2024). Firm-Level Political Risk and the Cash Flow Sensitivity of Cash. *The Quarterly Journal of Finance*, 14(01), 2450004. <https://doi.org/10.1142/S2010139224500046>
- Keynes, J. M. (1936). *The General Theory of Employment, Interest and Money*. McMillan.
- Khoo, J., & Cheung, A. (Wai K. (2021). Does geopolitical uncertainty affect corporate financing? Evidence from MIDAS regression. *Global Finance Journal*, 47, 100519. <https://doi.org/10.1016/j.gfj.2020.100519>
- Kim, H., & Yasuda, Y. (2021). Economic policy uncertainty and earnings management: Evidence from Japan. *Journal of Financial Stability*, 56, 100925. <https://doi.org/10.1016/j.jfs.2021.100925>
- Korolo, S. A., & Korolo, E. O. (2025). Cashflow Management and Financial Performance of Industrial Goods Sector in Nigeria. *FUDMA Journal of Accounting and Finance Research [FUJAFR]*, 3(2), 154–167. <https://doi.org/10.33003/fujaf-2025.v3i2.179.154-167>
- Kotcharin, S., & Maneenop, S. (2020). Geopolitical risk and corporate cash holdings in the shipping industry. *Transportation Research Part E: Logistics and Transportation Review*, 136, 101862. <https://doi.org/10.1016/j.tre.2020.101862>
- Le, A.-T., & Tran, T. P. (2021). Does geopolitical risk matter for corporate investment? Evidence from emerging countries in Asia. *Journal of Multinational Financial Management*, 62, 100703. <https://doi.org/10.1016/j.mulfin.2021.100703>
- Lee, C.-C., & Lee, C.-C. (2020). Insurance activity, real output, and geopolitical risk: Fresh evidence from BRICS. *Economic Modelling*, 92, 207–215. <https://doi.org/10.1016/j.econmod.2020.01.001>
- Lee, C.-C., & Wang, C.-W. (2021). Firms' cash reserve, financial constraint, and geopolitical risk. *Pacific-Basin Finance Journal*, 65, 101480. <https://doi.org/10.1016/j.pacfin.2020.101480>
- Marangoz, C., Gerekan, B., Yilmaz, E., & Bulut, E. (2025). Disentangling geopolitical risks: A quantile approach to geopolitical risk indices' impacts on stock markets. *Finance Research Letters*, 77, 107113. <https://doi.org/10.1016/j.frl.2025.107113>
- Mun, S., Han, S. H., & Seo, D. (2020). The impact of CEO educational background on corporate cash holdings and value of excess cash. *Pacific-Basin Finance Journal*, 61, 101339. <https://doi.org/10.1016/j.pacfin.2020.101339>
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187–221. [https://doi.org/10.1016/0304-405X\(84\)90023-0](https://doi.org/10.1016/0304-405X(84)90023-0)
- Nguyen, T. C., & Thuy, T. H. (2023). Geopolitical risk and the cost of bank loans. *Finance Research Letters*, 54, 103812. <https://doi.org/10.1016/j.frl.2023.103812>
- Opler, T. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, 52(1), 3–46. [https://doi.org/10.1016/S0304-405X\(99\)00003-3](https://doi.org/10.1016/S0304-405X(99)00003-3)
- Ou, L., Zhang, Z., Li, R., & Chen, Z. (2023). Economic policy uncertainty and business performance: The moderating role of service transformation. *International Review of Economics & Finance*, 88, 531–546. <https://doi.org/10.1016/j.iref.2023.06.038>
- Ozdemir, O., Erkmén, E., & Han, W. (2023). EPU and financial performance in the hospitality and tourism industry: Moderating effect of CSR, institutional ownership and cash holding. *Tourism Management*, 98, 104769. <https://doi.org/10.1016/j.tourman.2023.104769>
- Phan, D. H. B., Tran, V. T., & Iyke, B. N. (2022). Geopolitical risk and bank stability. *Finance Research Letters*, 46, 102453. <https://doi.org/10.1016/j.frl.2021.102453>
- Pinkowitz, L., Stulz, R., & Williamson, R. (2003). *Do Firms in Countries with Poor Protection of Investor Rights Hold More Cash?* (No. W10188; p. w10188). National Bureau of Economic Research. <https://doi.org/10.3386/w10188>
- Postdoctoral Research Station of Theoretical Economics, Shenzhen Real Estate and Urban Construction Development Research Center, Shenzhen University, Shenzhen, Guangdong, China, Wang, J., Xiao, Z., Postdoctoral Research Station of Theoretical Economics, Shenzhen Real Estate and Urban Construction Development Research Center, Shenzhen University, Shenzhen, Guangdong, China, Dai, M., & University of Hong Kong, Hong Kong. (2021). Influences of Economic Policy Uncertainty on Corporate Social Responsibility Information Disclosure. *Www.Amfiteatruconomic.Ro*, 23(58), 843. <https://doi.org/10.24818/EA/2021/58/843>
- Pringpong, S., Maneenop, S., & Jaroenjitkam, A. (2023). Geopolitical risk and firm value: Evidence from emerging markets. *The North American Journal of Economics and Finance*, 68, 101951. <https://doi.org/10.1016/j.najef.2023.101951>

- Qin, Y., Hong, K., Chen, J., & Zhang, Z. (2020). Asymmetric effects of geopolitical risks on energy returns and volatility under different market conditions. *Energy Economics*, 90, 104851. <https://doi.org/10.1016/j.eneco.2020.104851>
- Sandra, S., & Kim, S. S. (2022). The Impact of Geopolitical Risk, State Ownership, and Group Affiliations on Indonesian Firms' Cash Reserves. *Jurnal Keuangan Dan Perbankan*, 26(1), 1–25. <https://doi.org/10.26905/jkdp.v26i1.6930>
- Smales, L. A. (2021). Policy uncertainty in Australian financial markets. *Australian Journal of Management*, 46(3), 523–547. <https://doi.org/10.1177/0312896220959120>
- Trakarnsirinont, W., Jitaree, W., & Buachoom, W. W. (2023). Political Uncertainty and Financial Firm Performance: Evidence from the Thai Economy as an Emerging Market in Asia. *Economies*, 11(1), 18. <https://doi.org/10.3390/economies11010018>
- Waisman, M., Ye, P., & Zhu, Y. (2015). The effect of political uncertainty on the cost of corporate debt. *Journal of Financial Stability*, 16, 106–117. <https://doi.org/10.1016/j.jfs.2015.01.002>
- Wang, K.-H., Xiong, D.-P., Mirza, N., Shao, X.-F., & Yue, X.-G. (2021). Does geopolitical risk uncertainty strengthen or depress cash holdings of oil enterprises? Evidence from China. *Pacific-Basin Finance Journal*, 66, 101516. <https://doi.org/10.1016/j.pacfin.2021.101516>
- Wang, X., Wang, M., & Wu, H. (2024). Geopolitical risk and corporate cash Holdings in China: Precautionary motive and agency problem perspectives. *International Review of Financial Analysis*, 93, 103235. <https://doi.org/10.1016/j.irfa.2024.103235>
- Wisniewski, T. P., & Lambe, B. J. (2015). Does economic policy uncertainty drive CDS spreads? *International Review of Financial Analysis*, 42, 447–458. <https://doi.org/10.1016/j.irfa.2015.09.009>
- Yaghoubi, M. (2025). Does the impact of geopolitical risk on leverage vary based on executives' cash compensation? *Applied Economics Letters*, 32(12), 1732–1740. <https://doi.org/10.1080/13504851.2024.2316134>
- Yuan, T., Wu, J. (George), Qin, N., & Xu, J. (2022). Being nice to stakeholders: The effect of economic policy uncertainty on corporate social responsibility. *Economic Modelling*, 108, 105737. <https://doi.org/10.1016/j.econmod.2021.105737>
- Yung, K., & Root, A. (2019). Policy uncertainty and earnings management: International evidence. *Journal of Business Research*, 100, 255–267. <https://doi.org/10.1016/j.jbusres.2019.03.058>

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