Global Banking Systems, Financial Stability and Uncertainty: How have countries coped with Geopolitical Risk?

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ABSTRACT:

The study universally examines the consequences of geopolitical risk (GPR) on the financial stability of global banking systems with a large panel of 158 economies around the world over the past decades. We find the adverse effects of GPR on financial stability with the predicted (increase) decrease in the Bank (non-performing loans – NPL) Z-score, where higher capitalized banking systems experience higher exposure to GPR as a source of uncertainty due to information asymmetries. Besides economic growth and inflation rate, international trade openness and multidimensional financial development are the mechanisms to mitigate the consequences of GPR on the world economy. Countries with better governance effectiveness such as higher political stability and well control of corruption can decrease the effects of GPR on their banking stability (increased Bank Z-score and decreased NPL). Besides the financial, governance, and economic mechanisms, the study finds the role of military expenditure in coping with GPR to maintain more stable financial stability through times of uncertainty. Alike but distinguished from the extant literature, the study is among the first to empirically quantify the consequences of GPR with other kinds of uncertainty tested to the banking financial stability due to raising informational asymmetries and higher costs of financial intermediation worldwide.

Keywords: Geopolitical risk, banking systems, financial stability, global uncertainty, information asymmetry, military expenditure.

JEL Classification Codes: G00, E00, E02, E5, F4

I.   Introduction:

The impacts of geopolitical risk (GPR) on institutions and markets have been examined since the introductions of firm-level GPR as well as the nationwide and aggregate universal GPR indices (Caldara & Iacoviello, 2022; Hassan et al., 2019). The GPR plays as a predictor of stock market realized volatility (Aye et al., 2018) and adversely affects stock liquidity (Fiorillo et al., 2023), firm value (Pringpong et al., 2023), corporate investments (Alam et al., 2023; Le & Tran, 2021; Wang et al., 2018), leading to higher cash holdings (Hasan et al., 2022). With the news-based GPR indices introduced (Caldara & Iacoviello, 2022) that capture the adverse geopolitical events and related risks 10 major newspapers in the United States, United Kingdom, and Canada divided by the total monthly number of published newspapers, there is a growing body of literature on the association between geopolitical uncertainty/risk, corporate behaviors, markets, and the economy (Balcilar et al., 2018; Cheng & Chiu, 2018; Demiralay & Kilincarslan, 2019; Gong & Xu, 2022; Ivanovski & Hailemariam, 2022; Lee & Wang, 2021; Qin et al., 2020).

For the US banking systems, the GPR increases the cost of bank loans (Nguyen & Thuy, 2023) and adversely affects bank stability (Phan et al., 2022). Like the other sources of global uncertainty (Baker et al., 2016a; Davis, 2016a), the impacts of GPR have been found in the growing literature not only in the major markets such as the US and China but also in global markets (Alam et al., 2023; Bouoiyour et al., 2019; Fiorillo et al., 2023; Le & Tran, 2021; Pringpong et al., 2023; Qin et al., 2020; Wang et al., 2018; Zhang et al., 2023). Through times of world uncertainty in particular, the recent literature found the adverse impacts of economic policy uncertainty (EPU) on financial stability in a sample of 23 economies (Phan et al., 2021). Given the international context, the authors argue that the impacts of EPU on financial stability depend on the characteristics of financial systems in the sample countries where their stable functionality facilitates the smooth capital flows from savers to investors and ensure an effective allocation of scarce resources (Mishkin, 1999). The author implies that the escalation of uncertainty may start from a recession, government policies, or a collapse of non-financial or large financial institutions. Central bank independence (CBI) may not only benefit from price stability but also from maintaining financial stability (Klomp & de Haan, 2009). The study finds that a better independence from external pressure helps central banks with lower political constraints in preventing financial distress. In other words, CBI will allow them to make more timely decisions when a crisis emerges. It has been argued that the robust negative relation between CBI and financial instability is mainly caused by political independence. Driven

by the prior literature, our main hypothesis is that the rise of aggregate geopolitical risk (including both political uncertainty in Acts and Threats) is a source of financial instability that increases information asymmetry, leading to the opacity in the characteristics of borrowers. In simple words, it becomes more challenging for lenders to perceive credit risks during uncertain times (i.e., when political uncertainty is high), leading to a decrease in investment, and lending and consequently a downtick in economic activity. Our main hypothesis is in line with the previous studies on the impact of uncertainty on investment due to financial distortions caused by the volatility in credit spreads (Gilchrist et al., 2014) and asset prices (Avery & Zemsky, 1998; Rigotti & Shannon, 2005; Segal et al., 2015).

Once the association between geopolitical risk and financial stability is established in the global banking systems worldwide, how do countries cope with political uncertainty? At first glance, we expect the aggregate development of financial markets and institutions is expected to plan a role in coping with the GPR, motivated by the literature on the long-run finance-growth nexus (De Gregorio & Guidotti, 1995; Valickova et al., 2015) in which globalization plays a key role in stimulating institutional reforms that promote financial development and economic growth for emerging economies (Mishkin, 2009). To test this additional hypothesis, we employ the multidimensional proxy for financial development (FD) with the sub-proxies for financial institutions (FI) and markets (FM), a new aggregate broad-based index of Financial Development (Svirydzenka, 2016). The better financial development is expected to mitigate the impact of GPR on financial stability across the world's banking systems.

Regarding the literature on political uncertainty, we further expect the roles of world governance in preventing the escalation of GPR on financial stability through a well control of corruption (Bahoo et al., 2020; A. Castro et al., 2020; Gründler & Potrafke, 2019) and a maintained political stability (Bellettini, 1998; Brogaard et al., 2020; Darby et al., 2004; JULIO & YOOK, 2012; Waisman et al., 2015; Wellman, 2017). Pooling the related literature, with a cross-country global sample, we take advance of the aggregate and individual governance indicators for six dimensions of governance estimates including i) Voice and Accountability (VAE), ii) Political Stability and Absence of Violence/Terrorism (PVE), iii) Government Effectiveness (GEE), iv) Regulatory Quality (RQE),

v) Rule of Law (RLE) and vi) Control of Corruption (CCE). The database covers comprehensively over 200 countries and territories over the period 1996-2021[2].

Going further to the literature on the interlink between political stability, growth and public expenditure (d'Agostino et al., 2016; Darby et al., 2004; Devarajan et al., 1996; Dzhumashev, 2014; Irmen & Kuehnel, 2009), military expenditure in particular (Alptekin & Levine, 2012), we further hypothesize that governments spend more in military expenditure will be able to mitigate the impacts of GPR on financial stability toward economic growth in times of the world's geopolitical uncertainty. Distinguished from the prior literature on the uncertainty-financial stability nexus, we focus on the multidimensional financial development, country governance, and military expenditure as the three additional mediating channels for the world's economy in coping with the global geopolitical risk and sub-indices. To strengthen further our empirical work and be consistent with the recent literature, we also test for the mediations of bank capital with the inclusion of economic growth and inflation rate for our estimations as the main explanatory variables (Phan et al., 2021, 2022).

We employ a universal sample for the commercial banking systems of 158 economies worldwide with 3,938 country-year observations for the period of 1996-2020[3] to test our hypotheses. Consistent with the literature (Fernández et al., 2016; Phan et al., 2022), we employ Bank Z-score as the main proxy for financial stability and bank non-performing loans as an alternative proxy for robustness check. The main findings show that the bank Z-score is predicted to decrease by -0.116% for each 1% increase in the geopolitical risk (GPR) overall, while a 1% increase in the geopolitical risk Threats (GPRT) and Acts (GPRA) respectively decreases the world's Z-score of the banking systems worldwide by -0.466% and -0.053%. The main findings contribute to the recent evidence on the US banking systems (Phan et al., 2022) where the study finds a 0.71% to 5.10% approximately decrease in the mean value of bank stability. Contributing to the literature on the impacts of uncertainty on financial stability (bank risk-taking) (Bilgin et al., 2021), with global evidence, we find a robust negative association between uncertainty and bank risk-taking for the banking systems across 158 economies worldwide. In other words, the higher the geopolitical risk the earlier year t_{-1} is associated with higher bank risk-taking level with a predicted

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[2] WGI 2022 Interactive > Documentation (worldbank.org)
[3] The mutual period for our full sample after matching different data sub-samples for the study.

decrease in the Bank Z-score in the current year t_0. Employing the six indices for capturing the GPR with a sample of 158 economies worldwide, this study is distinguished from the extant literature on the consequences of GPR not only in the US context (Phan et al, 2022), but also in other parts of the world for the determinants of financial stability of the global banking systems (Ahamed & Mallick, 2019; Bai & Elyasiani, 2013; Fang et al., 2014; A. I. Fernández et al., 2016; Goetz, 2018; Jokipii & Monnin, 2013; Koetter & Poghosyan, 2010; Köhler, 2015a, 2015b; Nier, 2005; Schaeck & Cihák, 2014; Wagner, 2007). The study is related to but different from previous studies on the impacts of economic policy uncertainty on financial stability (Phan et al., 2021), loan pricing (Ashraf & Shen, 2019), and among other studies (El Ghoul et al., 2022; Gulen & Ion, 2015; Kang et al., 2014), affirming the geopolitical risk (GPR) as another source of uncertainty to the global banking stability.

As the GPR indices are constructed based on the electronic archives of 10 newspapers (6 from the US, 3 from the United Kingdom, and 1 from Canada)[4] which are the homes of the major banking systems, we find that countries with higher bank capital are more sensitive to the GPR with a higher predicted decrease of -0.122% in their financial stability compared to the lower capitalized banking systems with a predicted decrease of just -0.117% for a 1% increase in the GPR. Even though there is no difference in the estimated -0.007% decrease in the Bank z-score for the joint effect between GPR and bank high versus low capitalization, this study's global evidence is different from recent evidence on a single country like the US (Phan et al, 2022) where the authors find that the effect is less pronounced for large banks, well-capitalized banks, and the groups of banks with lower deposit-to-asset ratios. Besides the main macroeconomic variables namely economic growth and inflation, we find that international trade openness plays a crucial role in enhancing financial stability with the predicted (decrease) increase in the bank (non-performing loans) Z-score throughout the tested models. Contributing to the related literature on international trade, countries with more trade openness implying a higher dynamic of the sum of exports and imports of goods and services (% of GDP) can improve financial stability under uncertainty. Furthermore, the development of institutions and markets (Financial Development Pyramid) is critical to mitigating the impact of GPR on the banking system's financial stability. Employing the

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[4] The 10 newspapers include the Chicago Tribune, the Daily Telegraph, the Financial Times, the Globe and Mail, the Guardian, the Los Angeles Times, the New York Times, USA Today, the Wall Street Journal, and the Washington Post. See the study of Caldara & Iacoviello (2022)

multidimensional index for financial development (FD) capturing both institutions (FI) and markets (FM), countries with higher FD can mitigate the effect of GPR on financial stability from -0.116% to only -0.076% decrease in the Bank Z-score. Not just the literature on international trade and economic development (Kim et al., 2016; Kim & Lin, 2009; Schneider, 2005; Singh, 2010), we contribute to the literature on the long-run finance-growth nexus with mitigating the consequences of GPR (another source of uncertainty) to financial stability of the global banking systems worldwide (Aghion et al., 2005; Arestis & Demetriades, 1997; Blackburn & Hung, 1998; A. Fernández & Tamayo, 2017; Greenwood & Jovanovic, 1990; Kendall, 2012). Regarding the theory of economic growth, trade and financial development, countries with better financial development can mitigate the costs of external finance which arise from informational asymmetries between lenders and borrowers where the geopolitical risk may execrate the situation which is even more costly to resolve the problem in a turbulent world, leading to the escalating financial instability across the global banking systems due to the higher costs of financial intermediation (Khan, 2001). Since the introduction of the new broad-based financial development index covering the pyramid more comprehensively (Svirydzenka, 2016), with the long-run theoretical literature and our established empirical evidence, we argue that the triangle between finance, trade, and growth is inseparable to modelling the consequences of global uncertainty including GPR to the financial stability[5].

Since the GPR has been found as a source of uncertainty to financial stability, *"how have countries coped with the geopolitical risk?"*. In the context of geopolitical events and threats, we find that world governance quality is crucial to coping with the uncertainty across the six tested world governance indicators. Controlling for GPR, we find that countries with higher political stability can maintain their financial banking stability with a predicted (-0.064) 0.006 (decrease) increase in the bank (non-performing loans) Z-score. The findings are robust when we test for the other proxies for the world governance with global evidence, supporting the literature on political (in)stability and country governance (Bahoo et al., 2020; Bellettini, 1998; Brogaard et al., 2020; A. Castro et al., 2020; V. Castro & Martins, 2018; d'Agostino et al., 2016; Darby et al., 2004; Dzhumashev, 2014; Gründler & Potrafke, 2019; Hossain et al., 2021; JULIO & YOOK, 2012; Krifa-Schneider et al., 2022; Waisman et al., 2015; Wellman, 2017). Regarding the meta-analysis of military expenditure and

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[5] It is critical to consider the multidimensionality of the complex financial development pyramid. See the emerging literature on the heterogeneity of the multidimensional financial development (Ngo et al., 2022; Sahay et al., 2015; Svirydzenka, 2016; Trinh et al., 2022; Trinh & Tran, 2023) and the evolution of financial centers worldwide (Phung et al., 2023)

economic growth (Alptekin & Levine, 2012), besides the demonstrated economic mechanisms and governance in coping with the geopolitical risk, we find the strong evidence on the role of military expenditure in coping with GPR. The study finds that countries with a 1% higher military expenditure can mitigate the impact of GPR on financial stability with a (-0.585) 0.138 change in the Bank (non-performing loans) Z-score. To our best knowledge, with universal evidence for 158 economies worldwide over the past decades, we are the first study that finds the role of military expenditure in coping with the uncertainty where the geopolitical risk with its adverse consequences to the financial stability of the global banking systems worldwide. In short, not just factors like institutional quality, world governance and political stability, investments in miniature expenditure are critical to coping with geopolitical risk events and threats. The findings on the military expenditure are validated when we test for different types of uncertainty including Global Economic Policy Uncertainty (GEPU), World Uncertainty Index (WUI), World Uncertainty Spillover (WUSI including US namely WUSI_US) (Ahir et al., 2022; Baker et al., 2016; Davis, 2016).

The remaining parts of the study are structured as follows. Section 2 presents data, sources, selected variables, and models. Section 3 presents the results with additional tests and discussions. Section 4 concludes the main findings, policy implications and future directions.

II.   Data and models:

2.1. Data sources:

Data for the study are extracted from multiple sources. We first extract data on geopolitical risk (GPR) indices from Caldara & Iacoviello (2022). Data on financial stability and bank-related variables are extracted from Global Financial Development Database (GFDD)[6]. We extract data on economic growth (GDPG), military expenditure to GDP, trade to GDP, and inflation from World Development Indicators World Bank (WDI-WB), while data on country-level governance indicators are extracted from Worldwide Governance Indicators World Bank (WGI-WB)[7]. Data on the overall financial development (FD), institutions (FI), markets (FM) and sub-proxies are extracted from International Monetary Fund (IMF)[8].

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[6] Global Financial Development | DataBank (worldbank.org). Last Updated:09/23/2022
[7] WGI 2022 Interactive > Home (worldbank.org)
[8] IMF Data Home Page - At a Glance - IMF Data

2.2. Variables and models:

To examine the relationship between geopolitical risk (hereafter, GPR) and financial stability (FS), we propose the following baseline regression model. After matching multiple databases, the final strongly balanced sample data we use for the study includes 158 countries for the period 1996-2020[9].

$$FS_{i,j,t} = \alpha + \beta_1 GPR_{i,j,t} + \beta_2 BANK\_CREDIT_{i,j,t} + \beta_k \sum_{i=0}^{n} X_{i,j,t} + \gamma + \varepsilon \quad (1)$$

Consistent with the literature, we employ Bank Z-score for the main proxy of financial stability capturing the probability of default of the commercial banking system for each of sample countries. The Z-score compares the buffer of the country's commercial banking system both capitalization and returns with the volatility of those bank returns. According to GFDD, the Z-score is estimated as follows:

$$Z\_score = \frac{\left(ROA + \left(\frac{EQUITY}{ASSETS}\right)\right)}{\sigma(ROA)} \quad (2)$$

Where $\sigma(ROA)$ is the standard deviation of return on assets (ROA) which is calculated for countries with available country-year observations no less than 5 bank-level observations. ROA, equity, and assets are the country-level aggregate measures. The measures are estimated from the unconsolidated underlying bank-by-bank data from Bank Scope and Orbis. $GPR_{i,j,t}$ is the main independent variable of interest proxying the world aggregate geopolitical risk defined as the adverse events related to terrorism, wars and any tensions among states and political factors that may affect the peaceful course of international relations[10]. $X_{i,j,t}$ is a vector of macroeconomic variables used in the study where we control for GDP growth, inflation rate and total trade to GDP as the main control variables for the baseline estimation as follows:

$$Z\_score_{i,j,t} = \alpha + \beta_1 GPR_{i,j,t} + \beta_2 BANK\_CREDIT_{i,j,t} + \beta_3 GDP\_GROWTH_{i,j,t} +$$
$$\beta_4 INFLATION_{i,j,t} + \beta_5 TRADE\_GDP_{i,j,t} + \gamma + \varepsilon \quad (3)$$

We further examine the roles of financial development (FD), an aggregate index for the development of financial institutions (FI) and markets (FM) accounting for all the perspectives of

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[9] The period is mutually available for all the databases needed after matching.
[10] Please refer to Caldara & Iacoviello (2022) for further details on definitions and constructions.

access, depth, and efficiency for each of the sub-FD index (FIA, FID, FIE and FMA, FMD, FME). To examine how FD dynamically affects FS in the context of GPR, we interact FD with GPR using the following estimation model:

$$Z\_score_{i,j,t} = \alpha + \beta_1 GPR * FD_{i,j,t} + \beta_2 BANK\_CREDIT_{i,j,t} + \beta_3 GDP\_GROWTH_{i,j,t} + \beta_4 INFLATION_{i,j,t} + \beta_5 TRADE\_GDP_{i,j,t} + \gamma + \varepsilon \quad (4)$$

Motivated by the literature for the worldwide study, we also examine the roles of high versus low bank capital that are dynamically interacted with GRP using the following model:

$$Z\_score_{i,j,t} = \alpha + \beta_1 GPR * CAPITAL\_HIGH_{i,j,t} + \beta_2 GPR * CAPITAL\_LOW_{i,j,t} + \beta_k \sum_{i=0}^{n} X_{i,j,t} + \gamma + \varepsilon \quad (5)$$

We include the interaction terms with GPR separately for CAPITAL_HIGH and CAPITAL_LOW to mitigate the potential consequences of collinearity in the estimation procedure with unbiased signs of the estimated coefficients. For further robustness checks, we also consider the interactions with banking crisis, a dummy variable (BANKING_CRISIS) that is set equal to 1 for the presence of banking crisis and zero otherwise (1=banking crisis, 0=none). Extended from the previous equation, the estimation model with the banking crisis dummy is as follows:

$$Z\_score_{i,j,t} = \alpha + \beta_1 GPR * BANKING\_CRISIS_{i,j,t} + \beta_1 GPR * BANKING\_CRISIS * CAPITAL\_HIGH_{i,j,t} + \beta_2 GRP * BANKING\_CRISIS * CAPITAL\_LOW_{i,j,t} + \beta_k \sum_{i=0}^{n} X_{i,j,t} + \gamma + \varepsilon \quad (6)$$

After a thorough investigation of bank-related factors for the effects of GPR on Z-score, the study now examines the roles of world governance quality in coping with geopolitical risk which mitigating the effects of GPR on Z-score as the main proxy for financial stability. The study proposes the following estimation model:

$$Z\_score_{i,j,t} = \alpha + \beta_1 GPR_{i,j,t} + \beta_2 GRP * WGI_{i,j,t} + \beta_k \sum_{i=0}^{n} X_{i,j,t} + \gamma + \varepsilon \quad (7)$$

Offered by WGI-WB, we employ the total of six dimensions of governance for the world governance indicators (WGI) for each of the sample countries including the estimates for Voice and Accountability (VAE), Political Stability and Absence of Violence/Terrorism (PVE), Government Effectiveness (GEE), Regulatory Quality (RQE), Rules of Law (RLE), and Control

for Corruptions (CCE)[11]. Besides the Bank Z-score, we further employ Bank non-performing loans to gross loans % as the additional proxy for financial stability (FS), a ratio of defaulting loans for the payments of principal and interest past the due date by 90 days or more to total gross loans which is a total value of loan portfolio. In the context of adverse geopolitical events, the study also examines the roles of military expenditure to GDP to cope with GPR in maintain a more stable performance of a banking system when GPR is escalating.

$$Z\_score_{i,j,t} = \alpha + \beta_1 GPR_{i,j,t} + \beta_2 GRP * MILITARY\_EXPENDITURE_{i,j,t} + \beta_k \sum_{i=0}^{n} X_{i,j,t} + \gamma + \varepsilon \quad (8)$$

The characters of i, j, and t present country i in region j in year t. γ presents the estimations with fixed effects for both cross-section and time-series for each of the countries in the full panel data. Consistent with the literature, we lag all the control variables for one year period (year t_{-1}). For endogeneity, we employ the two-step generalized method of moments (GMM) for panel data with the alternative measure for the impacts of GPR on FS. Because the bank Z-score to proxy the financial stability is a noisy measure with the detected skewness (Houston et al., 2010; Laeven & Levine, 2009), hence we take the logarithm value for both the Bank Z-score and bank non-performing loans from the beginning as well as control for the effect of the Global Financial Crisis (GFC) for mitigating the endogeneity issues for our estimated models. We report the descriptive statistics, sources, and a distribution table of 158 economies for the period 1996-2020. We report the sample for countries with non-missing data available for the Bank Z-score as the main proxy for the financial stability. This results to a final sample with 2,835 country-year observations, reported in Tables A1-3, respectively.

III. Results
3.1. Main findings.

We regress Bank Z-score on GPR using Eq. 1 with the findings reported in Table 1 with the fixed-effects (FE) models for the panel data. Without the controls, Models 1-6 present a negative and significant association between GPR and Bank Z-score with the coefficients varying between -0.057 and -4.997 for the overall GPR and additional GRP indices (GRPT, GPRA, GPRH, GPRHA,

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[11] Please visit the documentation at WGI 2022 Interactive | Documentation (worldbank.org)

GPRHT)[12]. The findings are strongly robust and statistically significant at the 5% level when we control for the bank credit and macroeconomic controls (Columns 1-6) with a minor variation in the estimated models, using the fixed-effect models for both cross-section and timeseries. On the statistical interpretation is that a unit standard deviation increase in GPR leads to a decrease in Z-score by between 0.014 and 0.934. the mean value of Z-score for the full sample is 2.710 that is interpreted that every unit increase in the overall GPR, there is a -0.116 decrease in the predicted Bank Z-score (decrease in financial stability).

For the baseline estimations, the study reports the negative association between bank credit and Bank Z-score. The findings show that a one unit increase in the bank credit as the financial resources provided to the private sector by the domestic money banking system as a share of total deposits leads to a -0.081 unit decrease in banking financial stability (Z-score). Macroeconomic factors include GDP growth (annual %), Inflation, GDP deflator (annual %), and trade (% GDP) are positively associated with the banking financial stability implying an increase of 0.004, 0.001, 0.002% in the predicted Z-score (Column 1), respectively. The findings are strongly robust and significant at the 5% level for all the tested models with the five additional other GPR indices (Columns 2-6). Overall, the baseline estimations affirm the negative impacts of geopolitical risk on the financial stability for the banking systems across 150 countries over the last decades from 1996 to 2020.

Table 1: Baseline regressions of geopolitical risk on financial stability.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
GPR_{t-1}	-0.116**					
	(0.049)					
$GPRT_{t-1}$		-0.466**				
		(0.196)				
$GPRA_{t-1}$			-0.053**			
			(0.022)			
$GPRH_{t-1}$				-0.136**		
				(0.057)		
$GPRHA_{t-1}$					-0.060**	
					(0.025)	
$GPRHT_{t-1}$						-4.604**
						(1.941)
$BANK\_CREDIT_{t-1}$	-0.081***	-0.081***	-0.081***	-0.081***	-0.081***	-0.081***

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[12] The change in Bank Z-score equals the GPR coefficients β_1 for the estimated models multiplied by the standard deviation of GPR indices. For the regression with the interpretation of the annotated outputs in STATA, please visit Regression Analysis | Stata Annotated Output (ucla.edu)

	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
GDP_GROWTH$_{t-1}$	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INFLATION$_{t-1}$	0.001**	0.001**	0.001**	0.001**	0.001**	0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TRADE$_{t-1}$	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	3.456***	5.136***	3.148***	3.509***	3.159***	24.171***
	(0.269)	(0.959)	(0.161)	(0.290)	(0.164)	(8.977)
Observations	2,338	2,338	2,338	2,338	2,338	2,338
R-squared	0.079	0.079	0.079	0.079	0.079	0.079
Number of countries	150	150	150	150	150	150
FE	Yes	Yes	Yes	Yes	Yes	Yes

After controlling for the mediating effects of financial development (FD), the findings of Table 2 Columns 1-6 show a favorable contribution to the association between GPR and financial stability. Statistically speaking, FD helps to mitigate the impact of GPR on financial stability from -0.116 to -0.076% given a 1% increase in GPR in the previous year. The findings are robust and statistically significant for most the tested models at the 1% level with the estimated decrease of -0.068, -0.075, -0.088, -0.085 and -0.078% in the bank Z-score respectively for a 1% increase in geopolitical risk threats (GPRT), Acts (GPRA), historical (GPRH), historical acts and threats (GPRHA and GPRHT) respectively.

Table 2: The joint effects of financial development and geopolitical risk on financial stability.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
GPR*FD$_{t-1}$	-0.076***					
	(0.027)					
GPRT*FD$_{t-1}$		-0.068**				
		(0.027)				
GPRA*FD$_{t-1}$			-0.075***			
			(0.025)			
GPRH*FD$_{t-1}$				-0.088***		
				(0.028)		
GPRHA*FD$_{t-1}$					-0.085***	
					(0.026)	
GPRHT*FD$_{t-1}$						-0.078***
						(0.028)
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
GDP_GROWTH$_{t-1}$	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
INFLATION$_{t-1}$	0.001**	0.001**	0.001**	0.001**	0.001*	0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TRADE$_{t-1}$	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Constant	2.907***	2.902***	2.908***	2.908***	2.907***	2.903***
	(0.114)	(0.114)	(0.113)	(0.113)	(0.113)	(0.113)
Observations	2,338	2,338	2,338	2,338	2,338	2,338
R-squared	0.083	0.082	0.083	0.084	0.084	0.083
Number of countries	150	150	150	150	150	150
FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 3 reports the findings when we control for bank capital. Given the impact of GPR, the findings show the similar joint effects of GPR on financial stability with a -0.07% decrease in the Bank Z-score. With the other controls, the banking systems with higher capital experience higher exposure to the impact of GPR with a -0.122 decrease in the Bank Z-score, while the banking systems with lower bank capital experience less exposure to the impact of GRP with just a -0.117% decrease in the Bank Z-score given 1% increase in GPR in the previous year.

Table 3: Bank capital channel

VARIABLES	(1)	(2)	(3)	(4)
GPR*CAPITAL_HIGH$_{t-1}$	0.007**	0.005		
	(0.003)	(0.003)		
GPR*CAPITAL_LOW$_{t-1}$			-0.007**	-0.005
			(0.003)	(0.003)
GPR$_{t-1}$	-0.137***	-0.122**	-0.130***	-0.117**
	(0.049)	(0.049)	(0.049)	(0.049)
BANK_CREDIT$_{t-1}$		-0.076***		-0.076***
		(0.024)		(0.024)
GDP_GROWTH$_{t-1}$		0.004***		0.004***
		(0.001)		(0.001)
INFLATION$_{t-1}$		0.001**		0.001**
		(0.001)		(0.001)
TRADE$_{t-1}$		0.002***		0.002***
		(0.000)		(0.000)
Constant	3.348***	3.450***	3.348***	3.450***
	(0.234)	(0.269)	(0.234)	(0.269)
Observations	2,585	2,338	2,585	2,338
R-squared	0.050	0.080	0.050	0.080
Number of countries	158	150	158	150
FE	Yes	Yes	Yes	Yes

We robustly check for the non-performing loans (NPL) as an alternative proxy of the banking financial stability. The findings of Table 4 present a positive impact of GPR and sub-GPR indices on the bank NPL with a predicted 0.891 increase for a 1% change in GPR in the earlier year. The most significant impacts are predicted for the historical GPR (GPRH), Threats (GPRT) and

historical Acts (GPRHA) with a predicted increase respectively by 1.041, 3.571, and 35.288% for the bank NPL given a 1% increase in the previous year t_{-1}.

Table 4: Effect of geopolitical risk on bank non-performing loans

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
GPR	0.891***					
	(0.116)					
GPRT$_{t-1}$		3.571***				
		(0.464)				
GPRA$_{t-1}$			0.405***			
			(0.053)			
GPRH$_{t-1}$				1.041***		
				(0.135)		
GPRHA$_{t-1}$					35.288***	
					(4.582)	
GPRHT$_{t-1}$						0.457***
						(0.059)
BANK_CREDIT	0.355***	0.355***	0.355***	0.355***	0.355***	0.355***
	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)
GDP_GROWTH	-0.029***	-0.029***	-0.029***	-0.029***	-0.029***	-0.029***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
INFLATION	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
TRADE	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-4.235***	-17.115***	-1.878***	-4.645***	-162.992***	-1.966***
	(0.634)	(2.261)	(0.381)	(0.682)	(21.189)	(0.389)
Observations	1,918	1,918	1,918	1,918	1,918	1,918
R-squared	0.156	0.156	0.156	0.156	0.156	0.156
Number of countries	134	134	134	134	134	134
FE	Yes	Yes	Yes	Yes	Yes	Yes

Controlling for the effects of banking crisis which is set equal to 1 for banking crisis period and 0 otherwise, the findings are robust with a higher exposure of the banking systems with higher capital to GPR with a -0.081% decrease in the bank Z-score compared to a -0.034% decrease for the banking systems with lower capital under the banking crisis period. The findings are consistent when we test for the ban non-performing loans as a percentage to gross loans (NPL) with a 0.175% increase in NPL for the banking systems with higher bank capital and a 0.072% increase in NPL for the banking systems with lower capital. Controlling for the banking crisis, an exposure to the geopolitical risk decreases the Bank Z-score by -0.045% and increase the Bank non-performing

loans by 0.089% (Columns 2 & 4 Table 5) in overall. Accounting for the banking crisis, the banking systems with a higher bank capital experience larger effect of GPR on financial stability with a predicted (-0.081) 0.175 change in (Z-score) non-performing loans compared the banking systems with a lower bank capital for a predicted (-0.034) 0.072 change (Columns 5-8 Table 5).

Table 5: Banking crisis channel

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Z-score	Z-score	Z-score	NPL	Z-score	NPL	Z-score	NPL
GPR*BANKING_CRISIS	-0.048***	-0.045***	0.117***	0.089***				
	(0.005)	(0.005)	(0.011)	(0.011)				
GPR*BANKING_CRISIS*CAITAL_HIGH					-0.081***	0.175***		
					(0.013)	(0.033)		
GPR*BANKING_CRISIS*CAITAL_LOW							-0.034***	0.072***
							(0.006)	(0.012)
BANK_CREDIT		-0.072***		0.307***	-0.074***	0.309***	-0.082***	0.324***
		(0.027)		(0.062)	(0.027)	(0.063)	(0.027)	(0.063)
GDP_GROWTH		0.003**		-0.024***	0.003***	-0.026***	0.003***	-0.025***
		(0.001)		(0.003)	(0.001)	(0.003)	(0.001)	(0.003)
INFLATION		0.001*		-0.005***	0.001*	-0.004***	0.001**	-0.005***
		(0.001)		(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
TRADE		0.002***		0.004***	0.002***	0.004***	0.002***	0.004***
		(0.000)		(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Constant	2.675***	2.848***	1.973***	0.372	2.848***	0.380	2.887***	0.309
	(0.019)	(0.124)	(0.044)	(0.298)	(0.125)	(0.301)	(0.125)	(0.300)
Observations	2,291	2,083	1,827	1,718	2,083	1,718	2,083	1,718
R-squared	0.072	0.102	0.133	0.191	0.088	0.174	0.086	0.179
Number of countries	158	150	141	134	150	134	150	134
FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The table shows the roles of world governance in coping with GPR. The banking systems belonging to economies with a better country governance can maintain their financial stability with a predicted increase in the Bank Z-score by 0.014, 0.006, 0.004, 0.012, 0.007, and 0.014% respectively for better Voice and Accountability (VAE), Political Stability and Absence of Violence/Terrorism (PVE), Government Effectiveness (GEE), Regulatory Quality (RQE), Rule of Law (RLE), and Control for Corruption (CCE), reported in Table 6 Panel A. The roles of VAE, RQE and CEE in coping with GPR are prominent with a statistically significance at the 1% level. The world governance even plays a better role when we test for the bank non-performing loans with a predicted decrease ranging from -0.055 to -0.086% for a 1% increase in GPR. The findings are statistically significant at the 1% level for all the tested models, reported in Table 6 Panel B.

Table 6: The roles of world government in financial stability
Panel A: Effect of GPR on Bank Z-scores

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
			Bank Z-score			
GPR_{t-1}	-0.131***	-0.133***	-0.125**	-0.122**	-0.123**	-0.125**
	(0.049)	(0.049)	(0.049)	(0.049)	(0.049)	(0.049)
$GPR*VAE_{t-1}$	0.014***					
	(0.005)					
$GPR*PVE_{t-1}$		0.006**				
		(0.003)				
$GPR*GEE_{t-1}$			0.004			
			(0.005)			
$GPR*RQE_{t-1}$				0.012***		
				(0.005)		
$GPR*RLE_{t-1}$					0.007	
					(0.005)	
$GPR*CEE_{t-1}$						0.014***
						(0.005)
Constant	3.329***	3.343***	3.300***	3.283***	3.293***	3.302***
	(0.234)	(0.234)	(0.234)	(0.234)	(0.234)	(0.234)
Observations	2,583	2,583	2,583	2,583	2,583	2,583
R-squared	0.050	0.049	0.048	0.050	0.048	0.050
Number of countries	158	158	158	158	158	158
FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: The roles of world government in financial stability
Panel B: Effect of GPR on bank non-performing loans.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
			Bank NPL			
GPR_{t-1}	0.713***	0.763***	0.648***	0.651***	0.645***	0.672***
	(0.114)	(0.114)	(0.114)	(0.114)	(0.115)	(0.114)
$GPR*VAE_{t-1}$	-0.075***					
	(0.014)					
$GPR*PVE_{t-1}$		-0.064***				
		(0.008)				
$GPR*GEE_{t-1}$			-0.083***			
			(0.011)			
$GPR*RQE_{t-1}$				-0.081***		
				(0.012)		
$GPR*RLE_{t-1}$					-0.055***	
					(0.014)	
$GPR*CEE_{t-1}$						-0.086***
						(0.011)
Constant	-1.565***	-1.818***	-1.197**	-1.211**	-1.239**	-1.352**
	(0.546)	(0.542)	(0.544)	(0.545)	(0.551)	(0.543)

Observations	2,047	2,047	2,047	2,047	2,047	2,048
R-squared	0.084	0.102	0.095	0.092	0.078	0.097
Number of countries	141	141	141	141	141	141
FE	Yes	Yes	Yes	Yes	Yes	Yes

We report the role of military expenditure in coping with the GPR in Table 7. Testing for both the Bank Z-score and NPL, we find a strong support of the government military expenditure to mitigate the impacts of GPR on the countries' banking systems. A 1% increase in national military expenditure, countries can increase their financial stability with a 0.138 predicted increase in the Bank Z-score (higher financial stability), while the Bank NPL is predicted to decrease by -0.585%, controlling for the change in bank credit and economic growth. The impacts for GPR on the financial stability of the world's banking systems are mitigated to just a -0.031% decrease in the bank Z-score and a 0.127% increase in the Bank non-performing loans.

Table 7: The roles of military expenditure to cope with GPR

VARIABLES	(1)	(2)	(3)	(4)
	Z-score	Z-score	NPL	NPL
GPR*MILITARY_EXPENDITURE	-0.031**	-0.032**	0.129***	0.127***
	(0.013)	(0.013)	(0.032)	(0.030)
MILITARY_EXPENDITURE	0.124**	0.138**	-0.586***	-0.585***
	(0.061)	(0.060)	(0.149)	(0.143)
BANK_CREDIT		-0.098***		0.356***
		(0.025)		(0.060)
GDP_GROWTH		0.005***		-0.031***
		(0.001)		(0.003)
Constant	2.734***	3.118***	1.860***	0.413
	(0.027)	(0.114)	(0.071)	(0.278)
Observations	2,311	2,207	1,835	1,764
R-squared	0.069	0.088	0.090	0.169
Number of countries	145	143	127	124
FE	Yes	Yes	Yes	Yes

3.2. Additional tests:

For testing the endogeneity issues in the relation between geopolitical risk and financial stability, besides the Bank Z-score as the main proxy for the financial stability of the banking systems, we employ the two-step generalized method of moments (GMM) for panel data using the Bank non-

performing loans to gross loans as the alternative measure for financial stability. Controlling for the six world governance indicators (WGIs), the findings of the system GMM models present a strong positive impact of GPR on the Bank NPL with a predicted 0.364 (0.395) increase (with)out the control variables (Columns 1 & 2 Table 8). The world governance indicators show a strong support with coping with the GPR with a predicted decrease in the Bank NPL by -1.019, -0.107, -0.104, -0.090, -0.083, and -0.092 for a 1% improvement respectively in each of the six world governance indicators including Voice and Accountability (VAE), Political Stability and Absence of Violence/Terrorism (PVE), Government Effectiveness (GEE), Regulatory Quality (RQE), Rule of Law (RLE) and Control for Corruption (CEE), reported in Columns 4-9 Table 8.

Table 8: Dealing with endogeneity using the two-step generalized method of moments (GMM) for panel data.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					Bank NPL				
GPR	0.364***	0.305***		0.447***					
	(0.001)	(0.006)		(0.008)					
VAE_{t-1}				4.458***					
				(0.108)					
$GPR*VAE_{t-1}$			-0.048***	-1.019***					
			(0.001)	(0.023)					
$GPR*PVE_{t-1}$					-0.107***				
					(0.001)				
$GPR*GEE_{t-1}$						-0.104***			
						(0.002)			
$GPR*RQE_{t-1}$							-0.090***		
							(0.002)		
$GPR*RLE_{t-1}$								-0.083***	
								(0.002)	
$GPR*CEE_{t-1}$									-0.092***
									(0.002)
BANK_CREDIT		0.101***	0.404***	-0.029***	0.374***	0.387***	0.394***	0.391***	0.381***
		(0.004)	(0.003)	(0.010)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
GDP_GROWTH		-0.024***	-0.020***	-0.025***	-0.026***	-0.023***	-0.022***	-0.024***	-0.023***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
INFLATION		0.002***	0.000	-0.001***	-0.004***	-0.004***	-0.003***	-0.003***	-0.003***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TRADE		-0.001***	-0.001***	-0.001***	0.001***	0.002***	0.001***	0.001***	0.001***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,049	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918
Number of countries	141	134	134	134	134	134	134	134	134
ar1p	6.13e-07	0.403	0.0209	0.822	0.644	0.197	0.102	0.191	0.219
ar1	4.987	0.837	2.309	0.225	0.463	1.289	1.634	1.308	1.230
hansenp	1	1	1	1	1	1	1	1	1
hansen_df	284	280	280	278	280	280	280	280	280
hansen	140.7	132.8	132.3	130.2	132.2	129.7	132.8	129.8	131.5
sarganp	0	0	0	0	0	0	0	0	0
sar_df	284	280	280	278	280	280	280	280	280
sargan	9060	7739	8050	5537	5832	6229	6644	6936	6737
j0	432	432	432	432	432	432	432	432	432
j	285	285	285	285	285	285	285	285	285
ar2p	0.991	0.607	0.305	0.210	0.961	0.373	0.271	0.212	0.309
ar2	-0.0113	0.514	1.026	-1.254	0.0488	0.890	1.101	1.249	1.018

Motivated by the literature, we further test for the impact of other types of uncertainty namely Global Economic Policy Uncertainty (GEPU), World Uncertainty (WUI), and World Uncertainty

Spillover Index (WUSI) on the bank non-performing loans. Given the established role of world governance indicators (WGIs) presented earlier, we focus on the role of political stability (PVE) in coping with different types of the uncertainty. The findings of Table 9 show a strong adverse impact of GEPU (CURRENT and PPP), WUI, WUSI, and WUSI to the US (WSUI_US) on the non-performing loans (NPL) of the global banking systems with a predicted increase of 0.120, 0.099, 0.126, 0.111, and 0.016%, respectively for a 1% increase in the tested uncertainty indices. Robustly with the earlier findings, the banking systems of countries with higher political stability can decrease their bank non-performing loans by -0.024, -0.096, -0.182, and -0.050% given the emergence of GPEU, WUI, WUSI and WUSI to the US. In short, the findings once again confirm the roles of country governance indicators that, among the other indicators the world political stability plays a crucial role in coping with the world uncertainty. The findings are robust and all statistically significant at the 1% level.

Table 9: The role of political stability in mitigating bank non-performing loans under different types of uncertainty

VARIABLES	(1)	(2)	(3)	(4)	(5)
GEPU_CURRENT$_{t-1}$	0.120***				
	(0.004)				
PVE$_{t-1}$	-0.211***	-0.471***	0.543***	1.382***	-0.087***
	(0.030)	(0.048)	(0.059)	(0.075)	(0.007)
GEPU_CURRENT*PVE$_{t-1}$	-0.024***				
	(0.007)				
GEPU_PPP$_{t-1}$		0.099***			
		(0.005)			
GEPU_PPP*PVE$_{t-1}$		0.012			
		(0.009)			
WUI$_{t-1}$			0.126***		
			(0.002)		
WUI*PVE$_{t-1}$			-0.096***		
			(0.006)		
WUSI$_{t-1}$				0.111***	
				(0.004)	
WUSI*PVE$_{t-1}$				-0.182***	
				(0.007)	
WUSI_US$_{t-1}$					0.016***
					(0.001)
WUSI_US*PVE$_{t-1}$					-0.050***
					(0.001)
BANK_CREDIT$_{t-1}$	-0.054***	0.107***	0.093***	0.098***	0.094***
	(0.013)	(0.013)	(0.014)	(0.009)	(0.011)

GDP_GROWTH$_{t-1}$	-0.021***	-0.025***	-0.025***	-0.025***	-0.026***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
INFLATION$_{t-1}$	-0.002***	-0.003***	-0.002***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TRADE$_{t-1}$	-0.000***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.497***	0.798***	0.077	0.190***	1.224***
	(0.066)	(0.071)	(0.071)	(0.055)	(0.046)
Observations	1,918	1,918	1,918	1,918	1,918
Number of countries	134	134	134	134	134
System GMM two-step	Yes	Yes	Yes	Yes	Yes

Testing for both the GPR and the other types of uncertainty, we find the strong role of military expenditure in decreasing the bank non-performing loans (increasing financial stability). Controlling for all the types of uncertainty, countries invest a 1% more in military expenditure as a percentage to GDP can mitigate the increment in the bank non-performing loans by -1.510, -0.248, -0.231, -1.170, -1.121, and -0.045% under the world geopolitical risk, GPEU (both current and PPP terms), WUI, WUSI, and WUSI to the US, respectively. The world political risk, controlling for the joint role of military expenditure (GPR*MILITARY_EXPENDITURE), the impact of GPR on the bank non-performing loans is -0.662% for a 1% increase in GPR in the previous year t$_{-1}$. In other word, under the world geopolitical risk, countries with higher military expenditure can mitigate the impact of GPR on financial stability with a -0.662% predicted decrease in the bank non-performing loans. Along with the world governance, we find an important role of military expenditure in coping with the geopolitical risk maintaining a well financial stability of the global banking systems.

Table 10: The role of military expenditure in mitigating the bank non-performing loans under different types of uncertainty.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
GPR$_{t-1}$	-0.662***					
	(0.023)					
MILITARY_EXPENDITURE$_{t-1}$	-1.510***	-0.248***	-0.231***	-1.170***	-1.121***	-0.045***
	(0.046)	(0.030)	(0.032)	(0.062)	(0.112)	(0.012)
GPR*MILITARY_EXPENDITURE$_{t-1}$	0.327***					
	(0.010)					
GEPU_CURRENT$_{t-1}$		0.043***				
		(0.013)				
GEPU_CURRENT*MILITARY_EXPENDITURE$_{t-1}$		0.056***				
		(0.006)				
GEPU_PPP$_{t-1}$			0.041***			
			(0.012)			

	(1)	(2)	(3)	(4)	(5)	(6)
GEPU_PPP*MILITARY_EXPENDITURE$_{t-1}$			0.051***			
			(0.007)			
WUI$_{t-1}$				-0.061***		
				(0.010)		
WUI*MILITARY_EXPENDITURE$_{t-1}$				0.120***		
				(0.006)		
WUSI$_{t-1}$					-0.069***	
					(0.019)	
WUSI*MILITARY_EXPENDITURE$_{t-1}$					0.115***	
					(0.011)	
WUSI_US$_{t-1}$						-0.008***
						(0.003)
WUSI_US*MILITARY_EXPENDITURE$_{t-1}$						0.008***
						(0.001)
BANK_CREDIT$_{t-1}$	-0.255***	-0.186***	-0.197***	-0.188***	-0.175***	-0.219***
	(0.011)	(0.016)	(0.014)	(0.015)	(0.017)	(0.015)
GDP_GROWTH$_{t-1}$	-0.024***	-0.017***	-0.018***	-0.018***	-0.019***	-0.022***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
INFLATION$_{t-1}$	0.001***	0.002***	0.002***	0.003***	0.003***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TRADE$_{t-1}$	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	6.173***	2.539***	2.616***	3.337***	3.386***	2.971***
	(0.134)	(0.092)	(0.069)	(0.100)	(0.228)	(0.083)
Observations	1,739	1,739	1,739	1,739	1,739	1,739
Number of countries	122	122	122	122	122	122
System GMM two-step	Yes	Yes	Yes	Yes	Yes	Yes

4. Conclusion:

The geopolitical risk (GPR), another source of uncertainty to the global banking systems, we test our hypothesis by using universal cross-country evidence from 158 economies for the period 1996-2020. We find a strong negative association between geopolitical risk and financial stability proxied by the Bank Z-score as well as the bank non-performing loans as an alternative proxy for our robustness checks. A 1% increase in GPR during the previous year leads to a 0.116 decrease in the Bank Z-score that adversely affects the global financial stability. The adverse effects of GPR are higher for the smaller banking systems with higher bank capital required. Controlling for economic growth and inflation rate, we find that the world governance plays a crucial role in maintaining the global financial stability under the geopolitical risk. in other word, countries with a better governance can mitigate the effects of GPR on the banking system's financial stability. At a global context, the findings are robust and consistent when we test for other kinds of literature-based uncertainty including global economic uncertainty (GEPU), world uncertainty (WUI), world uncertainty spillover (WUSI) including the US (WUSI_US).

In coping with GPR, we show that countries with the higher multidimensional financial development (FD) including the development of both financial institutions (FI) and markets (FM) can mitigate the effects of GPR at a lower-level ranging from a -0.064% to -0.088% decrease in the Bank Z-score. Besides the well functionality of the financial institutions and markets, the financial stability of the global banking systems benefits from a higher political stability to deal with the uncertainty caused by the geopolitical risk from the major economies, highlighting the important roles of country governance and institutional quality. Finally, we find that countries invest more in military expenditure can mitigate the effects of the geopolitical risk on the banking system with a lower predicted decrease in the bank Z-score and non-performing loans over the sample period. In short, the study finds that the geopolitical risk as another source of uncertainty that adversely affects the financial stability of the global banking systems through a universal sample of 158 economies from 1996 to 2020. Along with the economic growth and inflation rate as the two common-used explanatory variables in the extant literature, the study highlights the roles of international trade openness, financial development and world governance as the established mechanisms for the global economy dealing with the geopolitical risk events and threats where investments in military expenditure are crucial to coping with GPR and other sources of uncertainty.

Appendix A1: Variable label and summary statistics

Variable label	Variable	Mean	Min	p50	Max	SD
Bank Z-score [GFDD.SI.01]	Z_SCORE	2.710	-0.394	2.774	4.214	0.576
Bank non-performing loans to gross loans (%) [GFDD.SI.02]	NPL	1.724	0.000	1.629	4.060	0.793
Bank credit to bank deposits (%) [GFDD.SI.04]	BANK_CREDIT	4.428	2.154	4.449	7.959	0.512
Banking crisis dummy (1=banking crisis, 0=none) [GFDD.OI.19]	BANKING_CRISIS	0.050	0.000	0.000	1.000	0.218
GEOPOLITICAL RISK	GPR	4.558	4.068	4.536	5.178	0.244
GPR THREATS	GRPT	4.558	4.119	4.519	5.127	0.221
GPR ACTS	GPRA	4.527	3.918	4.487	5.325	0.374
GPR HISTORICAL	GPRH	4.361	3.842	4.328	4.915	0.235
GPR HISTORICAL ACTS	HPRHA	4.264	3.618	4.236	5.049	0.386
GPR HISTORICAL THREATS	GPRHT	4.488	4.058	4.512	4.916	0.187
FD: Financial development index	FD	0.303	0.000	0.226	1.000	0.228
Voice and Accountability, Estimate	VAE	-0.026	-2.259	-0.015	1.801	0.971
Political Stability and Absence of Violence/Terrorism, Estimate	PVE	-0.028	-3.006	0.033	1.759	0.940
Government Effectiveness, Estimate	GEE	-0.003	-2.450	-0.162	2.426	0.970
Regulatory Quality, Estimate	RQE	0.006	-2.366	-0.146	2.255	0.954
Rule of Law, Estimate	RLE	-0.023	-2.332	-0.195	2.125	0.965
Control of Corruption, Estimate	CCE	-0.017	-1.916	-0.266	2.459	0.993
Military expenditure (% of GDP) [MS.MIL.XPND.GD.ZS]	MILITARY_EXPENDITURE	2.048	0.062	1.535	32.656	1.884
GDP growth (annual %) [NY.GDP.MKTP.KD. ZG]	GDP_GROWTH	3.442	-54.236	3.714	88.958	5.564
Inflation, GDP deflator (annual %) [NY.GDP.DEFL.KD. ZG]	INFLATION	8.430	-31.566	3.922	4800.53	80.099
Trade (% of GDP) [NE.TRD.GNFS. ZS]	TRADE	88.110	9.955	77.510	442.620	54.284
World Uncertainty Index (WUI)	WUI	9.825	9.135	9.839	10.613	0.383
Overall uncertainty	WUSI	9.821	9.256	9.811	10.507	0.335
Uncertainty related to the United States	WUSI_US	6.179	2.197	6.701	8.458	1.694
Global Economic Policy Uncertainty (GEPU) based on current-price GDP measure	GEPU_CURRENT	4.799	4.154	4.802	5.766	0.420
Global Economic Policy Uncertainty (GEPU) based on PPP-adjusted GDP	GEPU_PPP	4.803	4.179	4.803	5.791	0.431

Appendix A2: Data sources	
Variable label	**Source**
Bank Z-score [GFDD.SI.01]	Global Financial Development Database (worldbank.org)
Bank non-performing loans to gross loans (%) [GFDD.SI.02]	Global Financial Development Database (worldbank.org)
Bank credit to bank deposits (%) [GFDD.SI.04]	Global Financial Development Database (worldbank.org)
Banking crisis dummy (1=banking crisis, 0=none) [GFDD.OI.19]	Global Financial Development Database (worldbank.org)
GEOPOLITICAL RISK	Geopolitical Risk (GPR) Index (matteoiacoviello.com)
GPR THREATS	Geopolitical Risk (GPR) Index (matteoiacoviello.com)
GPR ACTS	Geopolitical Risk (GPR) Index (matteoiacoviello.com)
GPR HISTORICAL	Geopolitical Risk (GPR) Index (matteoiacoviello.com)
GPR HISTORICAL ACTS	Geopolitical Risk (GPR) Index (matteoiacoviello.com)
GPR HISTORICAL THREATS	Geopolitical Risk (GPR) Index (matteoiacoviello.com)
FD: Financial development index	IMF Data Home Page - At a Glance - IMF Data
Voice and Accountability, Estimate	WGI-Home (worldbank.org)
Political Stability and Absence of Violence/Terrorism, Estimate	WGI-Home (worldbank.org)
Government Effectiveness, Estimate	WGI-Home (worldbank.org)
Regulatory Quality, Estimate	WGI-Home (worldbank.org)
Rule of Law, Estimate	WGI-Home (worldbank.org)
Control of Corruption, Estimate	WGI-Home (worldbank.org)
Military expenditure (% of GDP) [MS.MIL.XPND.GD.ZS]	World Bank Open Data	Data
GDP growth (annual %) [NY.GDP.MKTP.KD. ZG]	World Bank Open Data	Data
Inflation, GDP deflator (annual %) [NY.GDP.DEFL.KD. ZG]	World Bank Open Data	Data
Trade (% of GDP) [NE.TRD.GNFS. ZS]	World Bank Open Data	Data
World Uncertainty Index (WUI)	Economic Policy Uncertainty Index
Overall uncertainty	Economic Policy Uncertainty Index
Uncertainty related to the United States	Economic Policy Uncertainty Index
Global Economic Policy Uncertainty (GEPU) based on current-price GDP measure	Economic Policy Uncertainty Index
Global Economic Policy Uncertainty (GEPU) based on PPP-adjusted GDP	Economic Policy Uncertainty Index

Appendix A3: Distribution of the sample countries

ID	Country Name	Freq.	Freq.	Percent	Cum.
1	Albania		20	0.71	0.71
2	Algeria		20	0.71	1.41
3	Angola		19	0.67	2.08
4	Antigua and Barbuda		7	0.25	2.33
5	Argentina		20	0.71	3.03
6	Armenia		20	0.71	3.74
7	Australia		19	0.67	4.41
8	Austria		20	0.71	5.11
9	Azerbaijan		20	0.71	5.82
10	Bahamas, The		20	0.71	6.53
11	Bahrain		20	0.71	7.23
12	Bangladesh		20	0.71	7.94
13	Barbados		13	0.46	8.4
14	Belarus		20	0.71	9.1
15	Belgium		20	0.71	9.81
16	Belize		14	0.49	10.3
17	Benin		18	0.63	10.93
18	Bhutan		8	0.28	11.22
19	Bolivia		20	0.71	11.92
20	Bosnia and Herzegovina		20	0.71	12.63
21	Botswana		20	0.71	13.33
22	Brazil		20	0.71	14.04
23	Bulgaria		20	0.71	14.74
24	Burkina Faso		20	0.71	15.45
25	Burundi		19	0.67	16.12
26	Cabo Verde		13	0.46	16.58
27	Cambodia		19	0.67	17.25
28	Cameroon		20	0.71	17.95
29	Canada		20	0.71	18.66
30	Chad		10	0.35	19.01
31	Chile		18	0.63	19.65
32	China		20	0.71	20.35
33	Colombia		15	0.53	20.88
34	Costa Rica		20	0.71	21.59
35	Cote d'Ivoire		20	0.71	22.29
36	Croatia		20	0.71	23
37	Cyprus		20	0.71	23.7

38	Czechia	20	0.71	24.41
39	Denmark	18	0.63	25.04
40	Djibouti	10	0.35	25.4
41	Dominican Republic	20	0.71	26.1
42	Ecuador	20	0.71	26.81
43	Egypt, Arab Rep.	20	0.71	27.51
44	El Salvador	20	0.71	28.22
45	Estonia	20	0.71	28.92
46	Eswatini	18	0.63	29.56
47	Ethiopia	20	0.71	30.26
48	Fiji	6	0.21	30.48
49	Finland	20	0.71	31.18
50	France	20	0.71	31.89
51	Gabon	17	0.6	32.49
52	Gambia, The	12	0.42	32.91
53	Georgia	20	0.71	33.62
54	Germany	20	0.71	34.32
55	Ghana	16	0.56	34.89
56	Greece	17	0.6	35.49
57	Guatemala	20	0.71	36.19
58	Guinea	10	0.35	36.54
59	Guyana	20	0.71	37.25
60	Haiti	18	0.63	37.88
61	Honduras	20	0.71	38.59
62	Hong Kong SAR, China	20	0.71	39.29
63	Hungary	20	0.71	40
64	Iceland	13	0.46	40.46
65	India	20	0.71	41.16
66	Indonesia	20	0.71	41.87
67	Ireland	19	0.67	42.54
68	Israel	20	0.71	43.25
69	Italy	20	0.71	43.95
70	Jamaica	19	0.67	44.62
71	Japan	20	0.71	45.33
72	Jordan	20	0.71	46.03
73	Kazakhstan	20	0.71	46.74
74	Kenya	20	0.71	47.44
75	Korea, Rep.	13	0.46	47.9
76	Kuwait	20	0.71	48.61
77	Kyrgyz Republic	20	0.71	49.31
78	Lao PDR	11	0.39	49.7

79	Latvia	20	0.71	50.41
80	Lebanon	20	0.71	51.11
81	Lesotho	17	0.6	51.71
82	Liberia	6	0.21	51.92
83	Libya	20	0.71	52.63
84	Lithuania	20	0.71	53.33
85	Luxembourg	20	0.71	54.04
86	Macao SAR, China	20	0.71	54.74
87	Madagascar	20	0.71	55.45
88	Malawi	20	0.71	56.16
89	Malaysia	20	0.71	56.86
90	Maldives	5	0.18	57.04
91	Mali	20	0.71	57.74
92	Malta	20	0.71	58.45
93	Mauritania	20	0.71	59.15
94	Mauritius	20	0.71	59.86
95	Mexico	20	0.71	60.56
96	Moldova	20	0.71	61.27
97	Mongolia	20	0.71	61.98
98	Morocco	20	0.71	62.68
99	Mozambique	17	0.6	63.28
100	Myanmar	16	0.56	63.84
101	Namibia	16	0.56	64.41
102	Nepal	20	0.71	65.11
103	Netherlands	20	0.71	65.82
104	New Zealand	15	0.53	66.35
105	Nicaragua	20	0.71	67.05
106	Niger	19	0.67	67.72
107	Nigeria	18	0.63	68.36
108	North Macedonia	20	0.71	69.07
109	Norway	20	0.71	69.77
110	Oman	20	0.71	70.48
111	Pakistan	20	0.71	71.18
112	Panama	20	0.71	71.89
113	Papua New Guinea	4	0.14	72.03
114	Paraguay	20	0.71	72.73
115	Peru	20	0.71	73.44
116	Philippines	20	0.71	74.14
117	Poland	20	0.71	74.85
118	Portugal	20	0.71	75.56
119	Qatar	20	0.71	76.26

120	Russian Federation	20	0.71	76.97
121	Rwanda	19	0.67	77.64
122	Saudi Arabia	20	0.71	78.34
123	Senegal	20	0.71	79.05
124	Serbia	20	0.71	79.75
125	Seychelles	10	0.35	80.11
126	Sierra Leone	19	0.67	80.78
127	Singapore	20	0.71	81.48
128	Slovak Republic	20	0.71	82.19
129	Slovenia	20	0.71	82.89
130	South Africa	18	0.63	83.53
131	South Sudan	7	0.25	83.77
132	Spain	20	0.71	84.48
133	Sri Lanka	10	0.35	84.83
134	St. Lucia	8	0.28	85.11
135	Sudan	11	0.39	85.5
136	Suriname	12	0.42	85.93
137	Sweden	20	0.71	86.63
138	Switzerland	20	0.71	87.34
139	Syrian Arab Republic	17	0.6	87.94
140	Tajikistan	15	0.53	88.47
141	Tanzania	17	0.6	89.07
142	Thailand	20	0.71	89.77
143	Togo	14	0.49	90.26
144	Trinidad and Tobago	18	0.63	90.9
145	Tunisia	20	0.71	91.6
146	Turkiye	19	0.67	92.28
147	Turkmenistan	5	0.18	92.45
148	Uganda	20	0.71	93.16
149	Ukraine	20	0.71	93.86
150	United Arab Emirates	20	0.71	94.57
151	United Kingdom	20	0.71	95.27
152	United States	20	0.71	95.98
153	Uruguay	20	0.71	96.68
154	Uzbekistan	20	0.71	97.39
155	Venezuela, RB	17	0.6	97.99
156	Vietnam	20	0.71	98.69
157	Yemen, Rep.	17	0.6	99.29
158	Zambia	20	0.71	100
	Total	2,835	100	

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