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Abstract

This paper introduces a novel measure of Structural Geopolitical Risk (SGR), designed to capture the long-run conditions that shape the likelihood of geopolitical tensions, conflicts, and fragmentation. Complementing existing geopolitical risk measures, the SGR aims to measure the latent structural factors that increase the likelihood of future geopolitical disruptions. Constructed for nearly all countries worldwide over 1960-2025, it combines an internal dimension (ISGR), capturing domestic political, institutional, and military vulnerabilities of each individual country, and crucially, an external dimension (ESGR), reflecting the political environment of different interconnected groups of foreign countries which are weighted by geographical proximity, military relevance, and ideological distance. We show that global SGR has risen steadily since the early 2000s, reaching levels comparable to those of the late Cold War by 2025. Validation exercises indicate that higher SGR is associated with weaker trade and investment, greater financial vulnerability, a higher probability of future conflicts and geopolitical risk events, and a stronger transmission of realized geopolitical shocks to economic activity. Extensive sensitivity analyses confirm the robustness of the indicators dynamics, cross-country rankings, and economic relationships.

Keywords: geopolitical risk, political instability, institutional quality, geopolitical conflicts, geoeconomics

JEL Classification: F51, F52, D74, P16, C33, C43

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1 Introduction

Interest in geopolitical risk and economic fragmentation has progressively risen over the past decade and is at a peak, after years of being left aside following the fall of the USSR and the "End of history" (Fukuyama, 1989).

Such renewed interest in geopolitical risk is based on the emergence of several new conflicts in the last decade, the escalation of the US-China rivalry, and the awareness that it can impact macroeconomic variables through several channels, such as uncertainty, reduced investment, trade disruptions, institutional instability and higher financial and energy costs.

However, until recently, the study of the real impact of geopolitics has been limited by the lack of quantitative indicators of geopolitical risk that were consistent over time while also providing a comprehensive cross-country coverage. The emergence of indices like Caldara and Iacoviello (2022) Geopolitical Risk (GPR) index marked a methodological leap in the study of geopolitics and one of the biggest efforts to resolve that obstacle.

Nevertheless, this type of news-based indicators fluctuate strongly with realized events and, given their news-based nature, tend to vanish once the attention span by the general public diminishes; hence, they do not fully capture longer-term, structural shifts in the geopolitical factors underlying the likelihood of such events.

To cover this gap in the literature, we introduce in this paper a new annual structural indicator for a large number of countries and an extended time coverage (1960-2025), which we denominate Structural Geopolitical Risk (SGR). We believe that this indicator captures a wide and comprehensive range of possible geopolitical risk factors, complementing news-based indices and shading light on the evolution and economic impact of geopolitical tensions.

Several factors help explain the absence of a consistent structural indicator, most notably the lack of a clearly defined and broadly agreed-upon conceptual framework. In addition, data complexity and the multitude of interrelations that deter-

mine geopolitical risks pose additional challenges.

Agreeing on a unique definition of geopolitics could definitely be challenging. One of its earliest definitions formalizes it as the study of "how geographical factors, including territory, population, strategic location, and natural resource endowments affect the relations between states and the struggle for world domination" (Foster, 2006). However, it is clear that the popular usage of the term geopolitics is more complex and contested, as noted by Caldara and Iacoviello (2022). For instance, the media refers to geopolitical risks as a catchall phrase to describe the effects of international crises and violence, actual or perceived (Rogers, Castree and Kitchin, 2013), but other definitions include concepts such as international powers' rivalry, strategic competition or diplomatic tensions.

Caldara and Iacoviello (2022) define geopolitical risk as *"the threat, realization, and escalation of adverse events associated with wars, terrorism, and any tensions among states and political actors that affect the peaceful course of international relations"*.

We based our indicator on this definition, although we understand risk as the likelihood or underlying factors of an event, not as the event itself. Thus, we rely on traditional long time-series idiosyncratic variables such as indices of democracy, political polarization, rule of law and military spending that are available for a large set of countries.

Crucially, the main innovation of our index is that we take into consideration, for each country i , not only the internal dimension of these variables (say, rule of law or military spending), but also their external dimension; i.e., for each country i , we build an external component by averaging the same set of variables across all country i 's possible partners, weighing them through different measures of geo-spatial and ideological distance, in an effort to capture all the political risks stemming from external sources. The SGR for each country is then the addition of its internal and external dimensions.

We believe that this is the first index of geopolitical risk that captures the external sources of risk and that therefore, makes it a unique and comprehensive measure

of structural trends in geopolitical risks. For instance, a recent [European Central Bank and European Systemic Risk Board \(2026\)](#) report provides one of the most comprehensive reviews and classifications of geopolitical risk indicators currently available in the literature and policy practice. The report surveys a broad set of indicators covering military conflicts, infrastructure vulnerabilities, trade disruptions, capital and financial risks, and political and societal factors, including news-based measures, market-based indicators, uncertainty indices, and structural measures of fragmentation. Despite this extensive coverage, the review does not identify any indicator that jointly incorporates domestic political and institutional vulnerabilities together with exposure to external geopolitical risks originating in foreign countries, something that is essential in the concept of geopolitical risk itself. In this sense, the Structural Geopolitical Risk (SGR) index proposed in this paper fills an important gap in the existing measurement toolkit.

We acknowledge that measuring geopolitical risk can be challenging for many reasons. As mentioned, the definition itself can be contested. Additionally, when constructing our indexes we have to take several decisions regarding which variables to utilize, what transformations to apply, how to deal with missing values, how to combine them, how to choose important parameters, etc. We also acknowledge that some of the methodological choices that we have made are inherently discretionary, reflecting the innovative nature of the exercise and the absence of established precedents in the literature.

In order to validate our proposed indicator as an actual measure of geopolitical risks we follow a multi-step process. First, we check whether our new indicator and its two main sub-components are correlated to some of the macroeconomic variables that we usually associate with an increase in geopolitical risk, such as trade, FDI flows and other financial variables. Second, we check whether our indicator and its main sub-components are actually correlated to other type of existing indicators of geopolitical stress, such as the Caldara & Iacovello GPR, or if they can actually predict the onset of international conflicts. In all cases we show that our indicators

do display a clear correlation with those variables.

Finally, we perform a sensitivity analysis in which we modify in a systematic fashion some of the main parameters that define the weights given to different variables or components in the construction of the SGR. In such exercise we consider around 360 versions of our main indicator and its two main components. The sensitivity analysis show that: i) the different versions of the SGR are still very highly correlated among themselves; ii) they keep a very similar correlation with macroeconomic variables and iii) the temporal dynamics and variability in the world-wide country rankings remain fairly stable.

All in all, we believe that, despite the difficulty of measuring something as challenging as the structural dimension of geopolitical risk, the SGR clearly reflects the trends that are behind the historical global geopolitical trends and recent environment, the results are coherent and easily interpretable, and hopefully they also offer a new framework for analyzing the structural trends in geopolitics and geo-economics.

The rest of the paper is organized as follows: Section 2 reviews the different strands of the literature related to measurement of geopolitical risk, political instability, the determinants of conflicts and its economic implications. Section 3 briefly describes the data used in the construction of the different indicators. Section 4 defines our object of interest, describes the construction of the indicators, provides a basic descriptive analysis and describe the sensitivity analysis. Section 5 provides a detailed analysis of the relation of the new indicators to different macroeconomic variables, the onset of military conflicts, its relation to the most popular news-based indicator (GPR) and some possible amplification effects between the SGR and GPR. Finally, Section 6 concludes.

2 Literature Review

Our work relates with primarily four strands of literature: i) how political and institutional instability shapes the likelihood of internal and inter-state conflicts, ii) the determinants of conflicts and tensions among states, iii) the economic implications of tensions and conflicts, and iv) the measurement of geopolitical risk.

A large body of international relations research shows that political and institutional instability whether in autocracies, fragile democratizing regimes, or highly polarized states substantially increases the likelihood of both interstate and internal conflict. Weakly institutionalised regimes face decision-making failures, elite competition, and incentives for diversionary external aggression, making them systematically more war-prone than stable autocracies or consolidated democracies. [Mansfield and Snyder \(2005\)](#) demonstrate that states undergoing partial democratization, where mass political mobilization expands faster than institutional constraints, are significantly more likely to initiate or escalate interstate disputes. Autocracies and polarized political systems exhibit similar dynamics: leaders with insecure domestic coalitions are more susceptible to using foreign conflict as a diversionary strategy to consolidate internal support ([Schultz, 2001](#)).

Empirical studies also show that domestic instability increases crisis miscalculation and vulnerability to external opportunism, contributing to higher rates of militarized interstate disputes ([Chiozza and Goemans, 2011](#); [Weeks, 2012](#)). At the same time, fragile institutions and deep polarization heighten the probability of internal conflict, as documented in state-fragility frameworks and civil-war research emphasizing weak governance, exclusionary politics, and declining legitimacy as drivers of internal violence ([Hegre et al., 2001](#)). Overall, the literature converges on the view that institutionally weak or politically unstable states exhibit elevated propensities for both domestic conflict and external aggression, making internal political risk a structural amplifier of geopolitical tensions.

A central conclusion in the international conflict literature on the determinants

of inter-state conflicts and tensions is that geography, especially contiguity and short distance, is one of the strongest structural predictors. [Bremer \(1992\)](#) demonstrates that shared borders and short geographic distance are the most powerful dyadic predictors of militarized interstate disputes, far outweighing regime type or alliance structures. [Vasquez \(1995\)](#) similarly argues that most wars originate in territorial disputes among contiguous states, where proximity intensifies security dilemmas, historical grievances, and opportunities for coercion. Further research shows that conflict risk is spatially clustered, diffusing across borders through refugee flows, transnational ethnic ties, and external intervention ([Buhaug and Gleditsch, 2008](#); [Salehyan and Gleditsch, 2006](#)).

Beyond geography, ideological distance has become an important relational determinant of interstate behavior. [Bailey, Strezhnev and Voeten \(2017\)](#) provide dynamic estimates of states' foreign-policy preferences using United Nations General Assembly (UNGA) voting data, allowing to measure ideological distance between countries in a systematic and comparable way. These ideal points have been adopted to study how preference alignment shapes inter-state disputes, rivalry and conflicts. [Bailey and Voeten \(2018\)](#) show that dyads with greater ideological distance in UN voting exhibit a higher likelihood of militarized interstate disputes, reflecting deeper preference divergence and reduced trust.

The economic consequences of geopolitical tensions and conflict have been widely studied, and the evidence consistently shows substantial adverse effects. [Alesina and Perotti \(1996\)](#) show that political instability depresses private investment by raising uncertainty and undermining policy credibility. At the international level, geopolitical shocks such as wars, sanctions, and embargoes can trigger sharp economic contractions, especially in countries with weak institutional buffers, as shown by [Rodrik, 1999](#)). Conflicts also disrupt trade and long-run economic integration, and [Martin, Mayer and Thoenig \(2008\)](#) provide causal evidence that interstate wars and rising geopolitical tensions reduce bilateral trade volumes and weaken global economic connections. Additional empirical work indicates that wars generate per-

sistent macroeconomic and financial dislocations: [Glick and Taylor \(2010\)](#) find that conflicts lead to lasting collapses in trade, output, and asset market performance, and [Federle et al. \(2025\)](#) document large global macroeconomic effects of wars, including elevated inflation and depressed output, capital stock and productivity. Recent evidence from the Russia–Ukraine war highlights firm-level economic implications; [Caldara et al. \(2025a\)](#) show that firms exposed to the conflict sharply reduce investment due to heightened uncertainty and tighter financial conditions. The papers cited here represent only a subset of a much larger body of research, but together they illustrate the main empirical channels through which geopolitical tensions and conflict generate significant economic costs.

Finally, a rapidly growing literature focuses on measuring geopolitical risk and quantifying its economic effects. The benchmark contribution is [Caldara and Iacoviello \(2022\)](#), who construct a news-based index of geopolitical risk (GPR) using systematic text analysis of international media sources. This index has become the standard tool for empirical research on the macroeconomic consequences of geopolitical shocks. Recent studies employ GPR to evaluate a range of economic transmission channels. For instance, [Caldara et al. \(2025b\)](#) examine how geopolitical risk affects inflation dynamics, showing that GPR shocks produce substantial and persistent inflationary effects, specially after GPR acts. [Bondarenko et al. \(2024\)](#) develop local-news-based measures of geopolitical risk and show that local GPR perceptions significantly affect real economic outcomes. [Niepmann and Shen \(2025\)](#) analyze how geopolitical risk influences global banking, documenting that higher GPR reduces cross-border lending and alters banks international exposure patterns. Complementing this work, [Balli et al. \(2022\)](#) show that geopolitical risk spills over across countries, with transmission intensity shaped by economic ties and geographic proximity. Together, this literature demonstrates that the GPR framework provides a robust measure of geopolitical tensions and a powerful tool for quantifying their economic implications.

Our SGR indicator complements this broad literature by jointly integrating the

domestic sources of political and institutional instability with the external drivers of inter-state tensions documented in work on geography, rivalry, and ideological distance to develop what we understand as the latent factor behind the occurrence of inter-state disputes and conflicts, which we further validate by estimating its economic impact.

3 Data

The construction of the Structural Geopolitical Risk (SGR) index relies on a broad set of political, institutional, military, and geopolitical variables covering nearly all countries worldwide over the period 1960-2025. Table 1 summarizes the variables and data sources employed in both the construction of the index and its empirical validation exercises.

In order to proceed with the construction of the SGR, political polarization, electoral democracy, and rule of law indicators are obtained from the Varieties of Democracy (V-Dem) database (Coppedge et al., 2025), military expenditure variables are taken from SIPRI (Stockholm International Peace Research Institute, 2025) and the World Bank, and the Gini coefficient from the World Bank. Variables used as weighting variables necessary to construct a measure of the internal environment are obtained from the UN (total population), World Bank (surface area), the CEPII Gravity Database (Conte, Cotterlaz and Mayer, 2022) (distance between countries and a dummy indicator of frontiers' sharing, and GDP of no longer existing countries), and Bailey and Voeten (2018) (bilateral ideological distance proxied using foreign policy preferences derived from UN General Assembly voting data).

To validate the economic relevance of the SGR, we employ real and financial macroeconomic variables sourced from the Global Macro Database (Jordà et al., 2024) (trade over GDP and long-term interest rates), the IMF (total FDI and total portfolio, both over GDP) and market data (credit default swaps (CDS)). Moreover, we employ the Geopolitical Risk Index (GPR) in our analysis (Caldara and

Iacoviello, 2022), and armed inter-state and intra-state conflicts are obtained from the UCDP/PRIO Armed Conflict Dataset. Following the UCDP definition, a conflict is recorded whenever the use of armed force between opposing parties results in at least 25 battle-related fatalities within a calendar year, with at least one party being the government of a sovereign state (Davies et al., 2025). Finally, we include in the modelling section the fiscal balance and public debt (% GDP) from the IMF, the VIX from Oxford Economics, the BAA spread from FRED data and historical sovereign default episodes from the database compiled by Reinhart and Rogoff (2009).

The selected databases constitute the standard references within their respective research areas and are extensively used in the empirical literature. Importantly, they provide annual observations for a large cross-section of countries over the 1960-2025 period, ensuring both broad geographical coverage and long-run consistency.

Table 1: Variables and Sources for SGR Index Construction and Validation

Group	Subgroup	Variable	Source	
SGR Index Construction	Political Risk	Political Polarization	V-DEM Database	
		Electoral Democracy Index	V-DEM Database	
		Rule of Law	V-DEM Database	
	Military Readiness	Inequality (Gini coefficient)	World Bank (+Other)	
		Military Expenditure (% GDP)	SIPRI (+World Bank)	
	Weighting Variables	Military Expenditure (% total gov. exp.)	SIPRI (+World Bank)	
		Population	UN (+WB + IMF)	
		Country Area	World Bank	
		Distance	CEPII Gravity Database	
		Ideology Distance	Bailey et al. (2017)	
	Others	Frontiers	CEPII Gravity Database	
		Nominal GDP (USD)	World Bank, IMF, CEPII	
	Validation: Economic Correlations	Real and Financial Channels	Trade, Imports and Exports (% GDP)	Global Macro Database
			Total FDI, Inflows and Outflows (% GDP)	IFS-IMF
Credit Default Swaps			Market	
Total Portfolio, Inflows and Outflows (% GDP)			IFS-IMF	
Additional Variables		Long-term Interest Rates	Global Macro Database	
		Geopolitical Risk Index (GPR)	Caldara & Iacoviello, 2022	
		Armed Inter- and Intra-state Conflicts	UCDP PRIO Dataset	
		Fiscal Balance (% GDP)	IFS-IMF	
		Public Debt (% GDP)	IFS-IMF	
		VIX	Oxford Economics	
BAA Spread	FRED			
Historical Defaults	Reinhart & Rogoff, 2009			

4 Measuring Structural Geopolitical Risk (SGR)

4.1 Definition

In order to measure structural geopolitical risk (SGR) we first need to define precisely the object of interest. Borrowing and adapting from [Caldara and Iacoviello \(2022\)](#), we conceptualize SGR as *the latent factor underlying the occurrence of adverse events associated with wars, tensions, and conflicts among states and political actors, which may disrupt the peaceful course of international relations*.

The central premise of this framework is the existence of a latent factor capturing structural geopolitical risk, such that increases in this indicator are associated with a higher probability of adverse geopolitical events. These events include, but are not limited to, instances in which a country threatens or engages in hostile actions against another (for example, to acquire territory or achieve domestic political objectives), situations in which internal conflicts spill across national borders, and cases where persistent rivalries or tensions escalate to the point of confrontation or the breakdown of normal diplomatic relations. This characterization aligns with the international relations literature on conflict onset and escalation ([Vasquez, 1995](#)).

We construct a structural measure of geopolitical risk composed of two inter-related dimensions: an internal (national country-specific) component that we will denote as ISGR, and an external component (ESGR) reflecting threats originating from the international environment and affecting country i .

The **internal structural geopolitical risk (ISGR)** component aims to capture the structural characteristics that lead any given country i more likely to become involved in international conflicts, such as:

1. Being an autocracy
2. Being more politically polarized
3. The rule of law is weak
4. Income is highly unequally distributed

5. Being better prepared to start a war or to defend itself if a conflict arises
6. Prioritize military spending over other public expenditures

These mechanisms are consistent with a large body of research showing that politically unstable or weakly institutionalized regimes are more prone to both internal and external conflict (Mansfield and Snyder, 2005; Schultz, 2001). In addition, greater military capability-either in terms of offensive or defensive capacity-is also assumed to raise the likelihood of participation in conflict, in line with empirical evidence on regime type, leader incentives, and conflict behavior (Weeks, 2012; Chiozza and Goemans, 2011).

The **external structural geopolitical risk (ESGR)** component intends to reflect the exposure of country i to risks arising from its interactions with other countries.

To clarify the concepts we intend to capture, it is necessary to define what makes a foreign country j a source of external risk to a given country i , and what characteristics of country j increases the likelihood of countries i and j to experience any sort of geopolitical conflict.

1. Types of countries that could pose a threat:

For any given country i , a conflict is more likely to arise with another country j if the latter falls under one the following categories:

- (a) Contiguity (C): countries that share a border
- (b) Neighbors (N): geographic proximity without sharing a border
- (c) Global Rivals (R): rivalry for global hegemony among militarily powerful countries

2. Factors that increase the risk posed by another country j :

A given country i is more likely to engage in conflict with any of the country types (C), (N) or (R) if any of them:

- (a) Is more politically polarized, is an autocracy, the rule of law is weak, its income inequality is substantial, or all of them together
- (b) Is better prepared militarily and prioritizes military expenditure
- (c) Is more ideologically distant: e.g. between two political rivals or two countries sharing a border with country i , a conflict is more likely to occur with the one that is more ideologically distant.

Finally, we consider that any given country is more likely to engage in conflict if it exhibits higher levels of risk across both dimensions, internal and external. Thus the total SGR index will add up the risks entailed by the internal and external components.

4.2 Construction

To operationalize the conceptual framework described above, we construct a composite index of structural geopolitical risk (SGR) by combining empirical proxies that capture each of the underlying dimensions. These proxies are assembled for nearly all countries worldwide on an annual basis over the period 1960-2025.

A key step in the construction of the index is the assignment of weights to all the individual sub-components. We adopt a hierarchical weighting strategy designed to remain as agnostic as possible while ensuring economic interpretability. Specifically, the choice of weights follows a sequence of criteria applied in order of priority.

First, whenever the set of variables admits a meaningful common factor structure, weights are determined using Principal Components Analysis (PCA). This approach is employed in cases where the resulting components are readily interpretable, such as in the construction of an internal risk index.

Second, when PCA-derived weights are not economically or statistically interpretable, we assign symmetric (equal) weights across variables. Third, in cases where there are strong theoretical or empirical grounds to prioritize certain variables, we depart from the symmetric weighting scheme.

Finally, in some particular cases we let the weights be functions of idiosyncratic variables as we will explain in the construction of the external risk index.

In all cases, all variables are standardized prior to aggregation to ensure comparability across countries and over time. Formally, each variable is transformed as follows:

$$\tilde{x}_{i,t} = \frac{x_{i,t} - \mu_t(x)}{\sigma_t(x)}, \quad (1)$$

where $\mu_t(x)$ and $\sigma_t(x)$ denote the cross-sectional mean and standard deviation of variable x at time t , respectively.

In the [Appendix](#) we describe how we deal with missing values in the main variables used to construct the indexes.

Internal Structural Geopolitical Risk, ISGR. This component captures two key dimensions underlying a country’s domestic contribution to geopolitical risk: political and institutional vulnerability, and the accumulation of military capabilities. The first component of a PCA analysis appears to be interpretable in the sense that the resulting weights assigned to the underlying variables coincide with the concepts defined previously for the internal risk component.

$$ISGR_{i,t} = \sum_{k \in \{EDI, RoL, POLAR, GINI, MIL/GDP, MIL/GOV\}} \alpha_k k_{i,t}, \quad (2)$$

where *EDI* denotes the electoral democracy index, *RoL* denotes the rule of law, *POLAR* denotes political polarization (with higher values indicating greater polarization), *GINI* is the Gini index of income inequality, *MIL/GDP* is the military expenditure as % of GDP, and *MIL/GOV* is the military expenditure as % of the total government expenditure.

In [Table 2](#) we can observe the variables and weights (α_k) from the PCA that generates our internal risk component (ISGR). According to the resulting weights, higher values of *EDI* and *RoL* are associated with lower levels of risk. Higher values of *POLAR* and *GINI* are associated to higher levels of risk. Finally, higher

levels of *MIL/GDP* and *MIL/GOV* are also associated with higher risk.

Table 2: First component of the PCA used to construct the ISGR

	Weight	(%)	Correlation
Electoral Democracy Index (logistic)	-0.512	22%	-0.85
Rule of Law	-0.494	21%	-0.82
Political Polarization (logistic)	0.375	16%	0.62
Gini Index (logs)	0.130	6%	0.22
Military expenditure % of GDP (logs)	0.354	15%	0.59
Military expenditure % of Gov. Expend. (logs)	0.459	20%	0.76

The variables that carry a higher importance are, in order, *EDI*, *RoL*, *MIL/GOV*, *POLAR*, *MIL/GDP* and *GINI*. The variables more related to internal politics, i.e. *EDI*, *RoL*, *POLAR*, and *GINI*, carry a combined weight of around 65%, whereas the ones related to military expenditure have a combined weight of around 35%.

We use this decomposition between political and military risk to generate two separate sub-components that are later used in the construction of the external risk component (ESGR). In Tables 3 and 4 we can observe the correlation of those sub-components with the underlying idiosyncratic variables. This decomposition is only used in the construction of the external component and both sub-components are standardized again prior to be used.

Table 3: Description of the political risk sub-component

	Weight	(%)	Correlation
<i>EDI</i>	-0.512	34%	-0.88
<i>RoL</i>	-0.494	33%	-0.94
<i>POLAR</i>	0.375	25%	0.69
<i>GINI</i>	0.130	9%	0.32

Table 4: Description of the military risk sub-component

	Weight	(%)	Correlation
<i>MIL/GDP</i>	0.354	44%	0.95
<i>MIL/GOV</i>	0.459	56%	0.97

External Structural Geopolitical Risk, ESGR. This component aims to quantify, for each country, the geopolitical risk originating from other countries that constitute relevant sources of external threat. Unlike the internal dimension, the construction of external risk is inherently more complex, as it requires identifying which foreign countries are most relevant for each country and modeling the structure of interdependencies across countries.

Indeed, we believe this is the most relevant contribution of the SGR to the geopolitical risk literature. Our approach builds on the same underlying indicators used in the internal component, i.e. political and military risk, while adding a new dimension based on the bilateral ideological distance or proximity, the latter being proxied using differences in foreign policy preferences derived from UN General Assembly voting data (Bailey, Strezhnev and Voeten, 2017)

For each country i , we compute weighted averages, across all foreign countries, of three dimensions of geopolitical risk: i) political risk; ii) ideological distance; and iii) military risk. The bilateral weights connecting country i to each foreign country j are computed using the previously defined alternative notions of interconnection, i.e. contiguity, neighbors and global military rivals.

The first two notions are strongly supported by the empirical literature, which identifies shared borders and spatial proximity as key determinants of interstate conflict (Bremer, 1992; Vasquez, 1995; Bailey and Voeten, 2018).

The third one intends to capture the idea that conflicts arise not only between geographically close countries, but usually between military powers competing for geopolitical supremacy and between their respective allies and foes. For instance, the political environment in China greatly affects the geopolitical risk of the US given that they are the largest military powers in the World, but the political situation in China might be less geopolitically relevant for small and distant countries such as Chile or Paraguay. This does not imply that a small country such as Myanmar, who is not a military power, is unaffected by developments in China. Rather, the idea is that China's importance for Myanmar would, in such a case, be captured

by the fact that the two countries share a border.

Formally, for each country i , foreign country j , and dimension of geopolitical risk X , we compute the following:

$$X \in \{\text{Political Risk, Ideological Distance, Military Risk}\}$$

$$\overline{X}_{i,t}^C = \sum_j \omega_{ij,t}^C X_{j,t}, \quad \overline{X}_{i,t}^N = \sum_j \omega_{ij,t}^N X_{j,t}, \quad \overline{X}_{i,t}^R = \sum_j \omega_{ij,t}^R X_{j,t} \quad (3)$$

where $\omega_{ij,t}^C$, $\omega_{ij,t}^N$, and $\omega_{ij,t}^R$ denote the weights assigned to country j under the contiguity, proximity, and rivalry criteria, respectively. These bilateral weights capture the importance of country j as an external source of risk for country i along each type of interconnection.

C denotes Contiguous, N denotes Neighboring and R denotes (Global) Rivals. Therefore, the indicator denoted as $\overline{Political Risk}_{i,t}^C$ would capture the political risk originating from contiguous countries, while $\overline{Political Risk}_{i,t}^R$ would capture the political risk originating from militarily powerful rivals, and $\overline{Political Risk}_{i,t}^N$ would reflect the risk stemming from neighboring countries that do not share a border. The same notation applies for military risk and ideological distance.

The weighting scheme is a key element of the construction and is designed to reflect both structural relationships and country-specific characteristics. In particular, weights depend on bilateral linkages as well as on country size and population:

$$\omega_{ij,t}^C = [B_{ij}(0,1) = 1] \frac{\sqrt{A_j} \cdot \log f(P_{j,t})}{\exp(D_{ij}/1000)}, \quad (4)$$

$$\omega_{ij,t}^N = [B_{ij}(0,1) = 0] \frac{\sqrt{A_j} \cdot \log f(P_{j,t})}{\exp(D_{ij}/1000)}, \quad (5)$$

$$\omega_{ij,t}^R = (ID_{ij} - \overline{ID})^4 \cdot \log((MS_{j,t}) + 1), \quad (6)$$

where $B_{ij}(0,1)$ is a binary indicator equal to one if countries i and j share a

border and zero otherwise, A_j denotes the surface area of country j in square kilometers, D_{ij} is a measure of the bilateral geographic distance between countries i and j in kilometers¹, and ID_{ij} denotes ideological distance measured by the distance in the UN Votes. Finally, $MS_{j,t}$ denotes country j 's share of the World's total military expenditure in US dollars, reflecting its military power.

The function $\log f(P_{j,t})$ is a logistic curve transformation of country j 's population, defined as:

$$\log f(P_{j,t}) = \frac{L}{1 + \exp(-k(P_{j,t} - m_0))} \quad (7)$$

with parameters $L = 10$, $k = 0.000225$, and m_0 equal to the 90th percentile of the population distribution. This transformation ensures that larger countries receive greater weight while avoiding excessive influence from outliers.

According to the weights given by equations (4) and (5), the geopolitical relevance of a foreign country j is higher when its population and area are higher, and when its distance to country i is smaller.

Similarly, according to (6) the relevance of a foreign rival j depends on its share in the world's military expenditure, and on a function of the ideological distance to country i .

In tables 13 and 14 in the [Appendix](#), we can see some examples of how these functions work and of how the use of the logistic transformation improves the weighting scheme compared to other alternatives.

The next step in the construction of the index is aggregating the previous computed indicators based on each type of interconnection, into a single indicator reflecting the total external risk on each dimension. Simply put, we compute a specific indicator for each political, military, and ideological dimensions.

We first define the weight given to the global rivalry dimension. We are interested in reflecting that more militarily powerful countries should be more affected

¹The geographic distance D_{ij} is actually an average of four definitions of distance: The simple distance between capital cities, the harmonic and arithmetic population-weighted distance between most populated cities, and the simple distance between most populated cities.

by the external risk stemming from other military powers, and that militarily irrelevant countries should be less affected.

In order to capture this concept we let the weight given to the "global rivalry" interconnection be a function of the military power of country i in the following way:

$$\theta_{i,t}^R = \delta * (\log(MS_{i,t} + 1)) / \max(\log(MS_t + 1)); \quad \theta_{i,t}^R \in \{0, \delta\}, \quad (8)$$

where $\max(\log(MS_t + 1))$ is the global maximum of the log of the share of military expenditure in a given year and δ equals $2/3$. Therefore, $\theta_{i,t}^R$ will be equal to δ for the largest military power in the World at any given year, which historically is the US². This would imply that for the US, we assign two thirds of its external risk to the one originating from other military powers. Thus, $1/3$ of its risk would originate from contiguous or nearby countries.

The value of $\theta_{i,t}^R$ decreases with the share of military expenditure. In 2025, it is around 50% for China and around 38% for Russia. For several countries in the World $\theta_{i,t}^R$ is equal to zero, which implies that all their external risk originates only from contiguous and neighboring countries.

Since $\theta_{i,t}^R \in \{0, 2/3\}$, the remaining weight $(1 - \theta_{i,t}^R)$ is divided into risk originating from contiguous and neighboring countries. Since most of the international conflicts occur between countries sharing a border, we assign more weight to that source of risk and the smallest weight to neighboring countries, in the following way:

$$\begin{aligned} \theta_{i,t}^C &= 2/3 * (1 - \theta_{i,t}^R) \\ \theta_{i,t}^N &= 1/3 * (1 - \theta_{i,t}^R) \end{aligned} \quad (9)$$

Weights selection is consistent with the literature emphasizing the dominant role of borders and rivalry in conflict formation (Vasquez, 1995; Bremer, 1992).

In a similar way than in (3), for each country i and dimension of geopolitical

²43% of the World's total military expenditure on average between 1960 and 2025

risk X , we compute the following:

$$X \in \{\text{Political Risk, Ideological Distance, Military Risk}\}$$

$$X_{i,t} = \theta_{i,t}^C * \overline{X}_{i,t}^C + \theta_{i,t}^N * \overline{X}_{i,t}^N + \theta_{i,t}^R * \overline{X}_{i,t}^R \quad (10)$$

Using (3) and (10), the total weight assigned to a foreign country j on each external dimension would be equal to:

$$\Omega_{ij,t} = \theta_{i,t}^C * \omega_{ij,t}^C + \theta_{i,t}^N * \omega_{ij,t}^N + \theta_{i,t}^R * \omega_{ij,t}^R \quad (11)$$

Table 5 shows the average of these weights between 2015 and 2025 for the US, China, Russia and Ukraine. The first three columns present weights $\omega_{ij,t}^C$, $\omega_{ij,t}^N$ and $\omega_{ij,t}^R$, respectively. Columns 4 to 6 display $\theta_{i,t}^C * \omega_{ij,t}^C$, $\theta_{i,t}^N * \omega_{ij,t}^N$ and $\theta_{i,t}^R * \omega_{ij,t}^R$, and finally, the last column includes the total weight of each foreign country $\Omega_{ij,t}$, as given by equation (11).

Finally, the overall external risk indicator (ESGR) is defined as a weighted aggregation of these three components:

$$ESGR_{i,t} = \phi * Pol. Risk_{i,t} + (1 - \phi)/2 * Ideo. Risk_{i,t} + (1 - \phi)/2 * Mil. Risk_{i,t}, \quad (12)$$

where ϕ equals 0.4, thus assigning slightly greater weight to the external political instability environment. The chose of a higher weight to the external political sub-component follows the weighting assigned by the PCA analysis in the construction of the internal component (ISGR) where the political sub-component also has a slightly higher weight than the military one. This formulation captures the multidimensional nature of external geopolitical exposure, integrating spatial, political, and strategic channels through which risk propagates across countries.

Finally, the internal and external subcomponents are aggregated additively to construct the Structural Geopolitical Risk (SGR) index:

Table 5: Top 10 Countries Contributing Most to External Risk by Selected Countries

Country	Contiguous (%)	Neighbors (%)	Global Rivals (%)	Contiguous Total (%)	Neighbors Total (%)	Global Rivals Total (%)	Total Weight (%)
USA (Rivals' Weight = 66%)							
China	0.0	0.1	35.6	0.0	0.0	23.7	23.7
Canada	81.5	0.0	0.0	18.1	0.0	0.0	18.1
Saudi Arabia	0.0	0.0	9.3	0.0	0.0	6.2	6.2
Mexico	18.5	0.0	0.4	4.1	0.0	0.3	4.4
Russia	0.0	1.8	6.0	0.0	0.2	4.0	4.2
Iran	0.0	0.0	5.4	0.0	0.0	3.6	3.6
India	0.0	0.0	4.9	0.0	0.0	3.3	3.3
Cuba	0.0	13.6	2.4	0.0	1.5	1.6	3.1
United Arab Emirates	0.0	0.0	3.8	0.0	0.0	2.5	2.5
Algeria	0.0	0.6	3.4	0.0	0.1	2.3	2.3
China (Rivals' Weight = 48%)							
United States	0.0	0.0	94.6	0.0	0.0	45.1	45.1
India	20.8	0.0	0.0	7.3	0.0	0.0	7.3
Vietnam	17.9	0.0	0.0	6.3	0.0	0.0	6.3
Japan	0.0	30.3	0.0	0.0	5.3	0.0	5.3
Mongolia	14.7	0.0	0.0	5.1	0.0	0.0	5.1
North Korea	13.2	0.0	0.0	4.6	0.0	0.0	4.6
Myanmar (Burma)	9.4	0.0	0.0	3.3	0.0	0.0	3.3
Philippines	0.0	17.7	0.0	0.0	3.1	0.0	3.1
South Korea	0.0	16.4	0.1	0.0	2.9	0.0	2.9
Pakistan	6.1	0.0	0.0	2.1	0.0	0.0	2.1
Russia (Rivals' Weight = 38%)							
United States	0.0	0.2	96.1	0.0	0.0	28.7	28.7
Ukraine	27.6	0.0	0.1	12.9	0.0	0.0	13.0
Poland	12.2	0.0	0.0	5.7	0.0	0.0	5.7
Kazakhstan	10.7	0.0	0.0	5.0	0.0	0.0	5.0
Finland	10.3	0.0	0.0	4.8	0.0	0.0	4.8
Belarus	10.1	0.0	0.0	4.7	0.0	0.0	4.7
Norway	6.3	0.0	0.0	2.9	0.0	0.0	2.9
Turkey	0.0	11.5	0.0	0.0	2.7	0.0	2.7
Iran	0.0	10.6	0.2	0.0	2.5	0.1	2.5
Lithuania	4.4	0.0	0.0	2.1	0.0	0.0	2.1
Ukraine (Rivals' Weight = 26%)							
Russia	86.9	0.0	3.0	51.1	0.0	0.7	51.7
Turkey	0.0	15.1	0.0	0.0	4.4	0.0	4.4
China	0.0	0.4	23.6	0.0	0.1	4.0	4.1
Iran	0.0	7.1	15.4	0.0	2.1	1.0	3.1
Poland	4.2	0.0	0.0	2.5	0.0	0.0	2.5
United States	0.0	0.1	18.2	0.0	0.0	2.5	2.5
Egypt	0.0	7.1	1.5	0.0	2.1	0.1	2.2
Germany	0.0	7.2	0.0	0.0	2.1	0.0	2.1
Romania	3.0	0.0	0.0	1.8	0.0	0.0	1.8
Belarus	2.8	0.0	0.1	1.6	0.0	0.0	1.7

Note: Values represent averages over the 2015-2025 period. The percentage reported next to each country's Rivals Weight indicates the weight assigned to the rivalry component ($\theta_{i,t}^R$). The first three columns report the bilateral linkage weights ($\omega_{ij,t}^C$, $\omega_{ij,t}^N$, and $\omega_{ij,t}^R$, respectively), while columns 4 to 6 present the resulting weights applied to each bilateral linkage ($\theta_{i,t}^C \omega_{ij,t}^C$, $\theta_{i,t}^N \omega_{ij,t}^N$, and $\theta_{i,t}^R \omega_{ij,t}^R$, respectively). Column 7 reports the total weight ($\Omega_{ij,t}$), computed as the sum of the resulting weights shown in columns 4 to 6. Minor discrepancies between the sum of columns 4 to 6 and the reported total weight are due to rounding.

$$SGR_{i,t} = ISGR_{i,t} + ESGR_{i,t} \quad (13)$$

Thus, this additive formulation reflects the assumption that structural geopolitical risk increases with both domestic vulnerabilities and exposure to external threats, each contributing independently to the overall risk environment.

4.3 Descriptive Analysis

In this section, we proceed to descriptively analyze the historical evolution of the ISGR, ESGR, and SGR during 1960-2025 across groups of countries and at the global level. To this end, we select a set of relevant countries and regions. Specifically, we focus on Western Europe (Belgium, France, Germany, Italy, the Netherlands, and Spain), Eastern Europe (Belarus, Latvia, Lithuania, and Poland), including Russia and Ukraine, the Americas (Argentina, Brazil, Canada, Colombia, Mexico, and the United States), and Asia (China, India, Indonesia, Iran, Israel, and Japan).

Internal Risk. Figure 1 displays the evolution of ISGR across the aforementioned countries. Western European countries (panel a) exhibit historically low levels of internal geopolitical risk, largely reflecting institutional stability, limited political polarization, and restrained military expenditure. Spain constitutes a notable exception during the Franco dictatorship (1939-1975). The post-1980s peace dividend era is captured as well, which gradually faded after the reactivation of military expenditure in 2015 and the substantial resurgence of political polarization across EU.

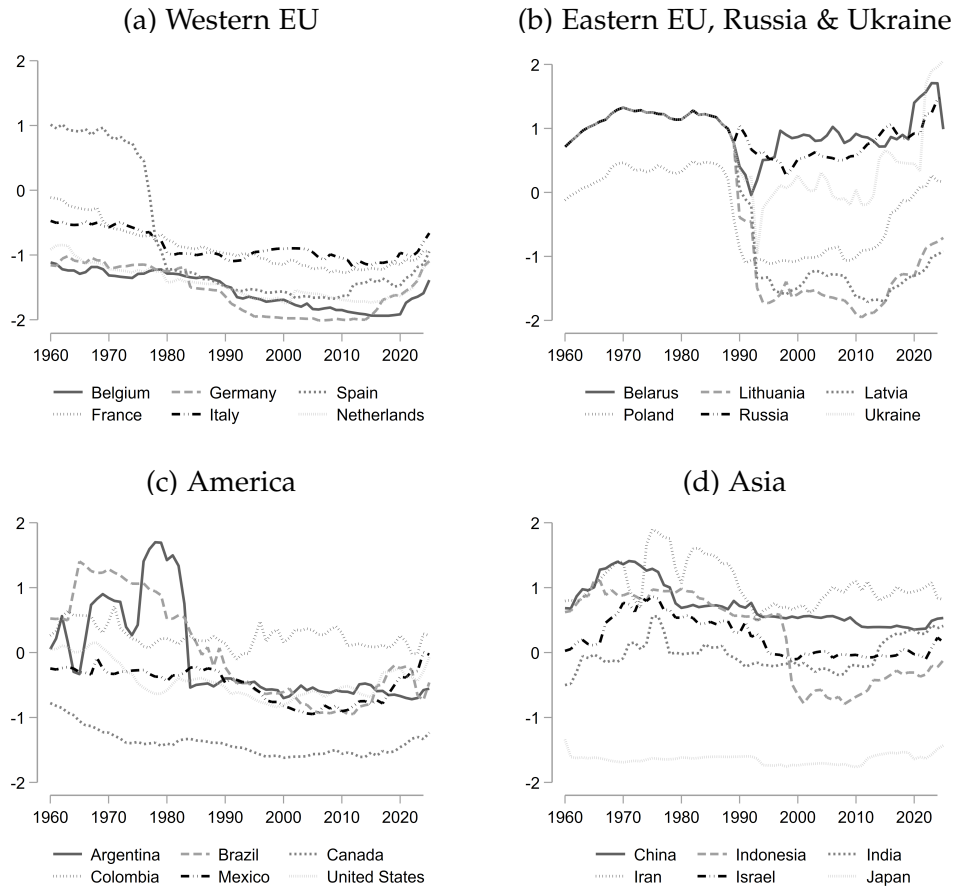
Eastern Europe (panel b) displays a pronounced post-Soviet divergence. Poland and the Baltic states experienced a sustained decline in internal geopolitical risk driven by democratic consolidation and rule of law strengthening, whereas Russia and Belarus maintained persistently high levels of risk. Ukraine exhibits the sharpest recent increase, primarily explained by the surge in military expenditure following the conflict with Russia. More broadly, internal risk has increased across

the region in recent years due to rising political polarization and military buildup.

In the Americas (panel c), ISGR was historically shaped by periods of military regimes, particularly in Argentina (1976-1983) and Brazil (1964-1985). Following democratic transitions, most countries in the region experienced relatively low and stable levels of internal risk. The United States constitutes an important exception, displaying persistently elevated levels of ISGR and a renewed upward trend since the 2010s. This increase is primarily explained by rising political polarization and a deterioration in the rule of law, partially offset by the relative stabilization of military expenditure and the decline in its share of global military spending. Canada, by contrast, exhibits historically low levels of internal geopolitical risk comparable to those observed in Western Europe.

Asian economies (panel d) generally exhibit higher historical levels of ISGR than Western Europe and the Americas. Japan stands out as a clear exception due to its institutional stability, low polarization and limited military effort. By contrast, Middle Eastern countries such as Iran and Israel display persistently elevated risk levels, reflecting chronic security tensions alongside comparatively low levels of electoral democracy and rule of law. China reached exceptionally high levels during the Cultural Revolution (1966-1976), a period characterized by intense political polarization and severe institutional disruption.

Figure 1: Historical Evolution of Internal Risk (1960–2025)



Note: Each panel displays a representative selection of countries within the corresponding region, focusing on the most economically and geopolitically relevant jurisdictions.

External Risk. Figure 2 displays the evolution of ESGR across the same group of countries. Western European (panel a) economies experienced their highest levels of external geopolitical risk during the Cold War period (1960-1980), driven by elevated ideological fragmentation, rising Soviet military capabilities, and widespread external political instability. This risk declined substantially after the collapse of the Soviet Union, although the trend gradually reversed after 2000 and accelerated markedly after 2016, reflecting the resurgence of military tensions associated with the Russia-Ukraine conflict.

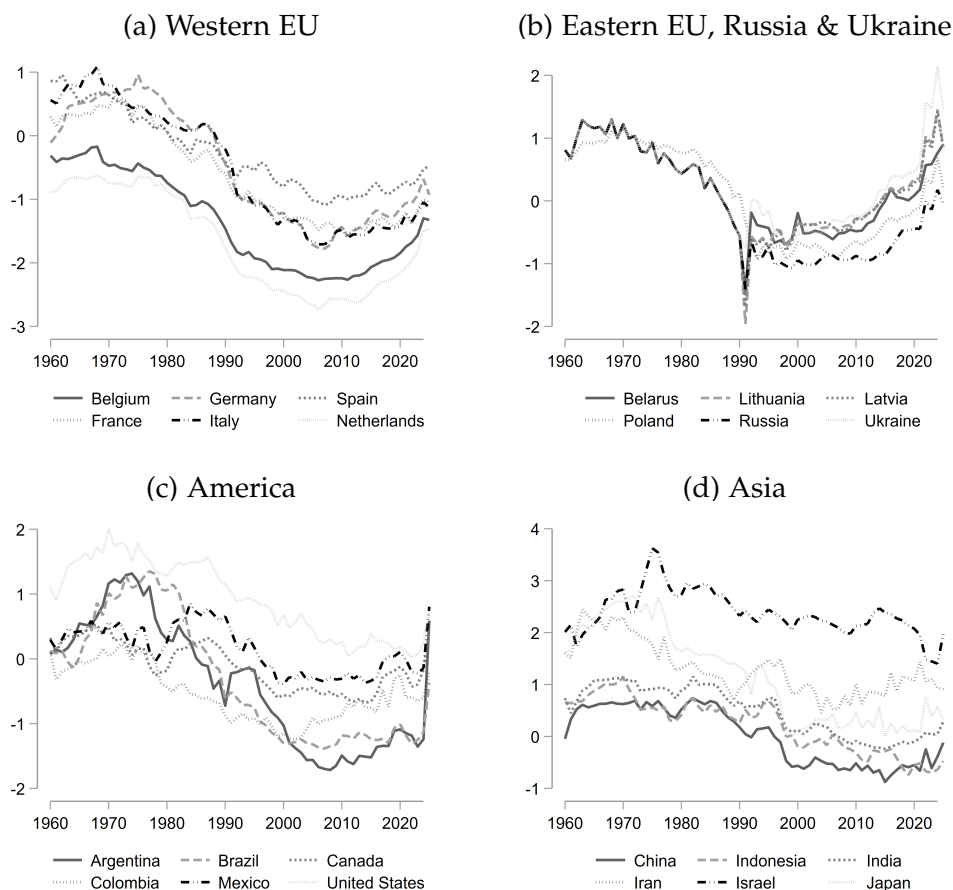
Eastern Europe (panel b) exhibits substantially higher levels of external geopo-

litical risk, primarily reflecting exposure to Russian geopolitical influence and military expansion. Russia itself displays comparatively lower ESGR levels, consistent with its role as a source rather than a recipient of external geopolitical risk. Ukraine experiences the sharpest increase in ESGR following the Russian military buildup after 2022. The subsequent moderation observed after 2024 is partly explained by a reduction in ideological external risk, associated with a gradual convergence in international voting patterns away from the United States-led bloc.

In the Americas (panel c), external geopolitical risk has increased sharply in recent years, largely driven by intensifying ideological polarization. A substantial reconfiguration of ideological clusters emerged in 2025, characterized by a growing alignment between the United States, Israel, and Argentina, alongside a broader geopolitical distancing between this bloc and several Latin American economies. Argentina consequently experienced a pronounced increase in ESGR due to its ideological divergence from neighboring countries, a pattern that, to varying degrees, is also observable across the rest of Latin America.

Asian economies (panel d) generally display elevated levels of external geopolitical risk relative to the global distribution. Israel stands out due to the combination of persistent regional instability and growing ideological divergence from neighboring countries, consistent with its increasing alignment with the United States. China also experienced a marked increase in ESGR after 2025, largely explained by widening ideological distance from the United States, which accounted for 45.1% of China's external geopolitical risk exposure in 2025, as reported in Table 5. Similarly, economies such as India, Indonesia, and Japan exhibit comparatively high ESGR levels, reflecting both regional geopolitical tensions and exposure to global ideological fragmentation.

Figure 2: Historical Evolution of External Risk (1960–2025)



Note: Each panel displays a representative selection of countries within the corresponding region, focusing on the most economically and geopolitically relevant jurisdictions.

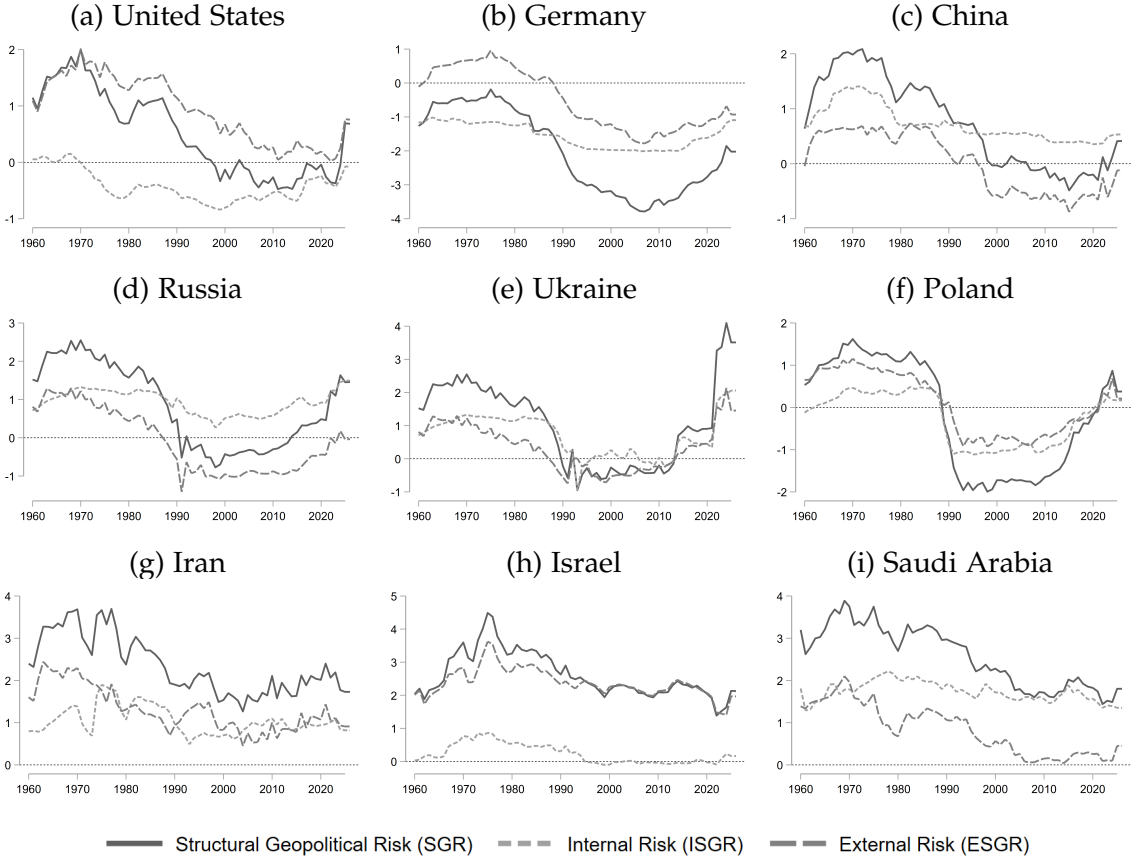
The natural next step is to jointly analyze ISGR and ESGR together with the resulting SGR. Figure 3 presents the evolution of the three indicators for a selection of geopolitically relevant countries³. A first notable result is the substantial heterogeneity in both the levels and composition of geopolitical risk across countries. In the United States, Germany, Israel, and Turkey, structural geopolitical risk is predominantly driven by the external component, reflecting exposure to ideological fragmentation, regional instability, and geopolitical rivalry. By contrast,

³See for more country-specific details Figures 14, 15 and 16 in the Appendix, which present heatmaps illustrations of the ISGR, ESGR and SGR, respectively, for an extended coverage of countries.

China and Russia exhibit comparatively higher contributions from internal geopolitical risk, associated with political polarization, institutional characteristics, and sustained military buildup, to a larger extent in Russia.

More broadly, the figure reveals a generalized upward trend in SGR since the early 2000s, intensifying after 2015. This increase reflects the simultaneous resurgence of both internal and external sources of geopolitical tension, including rising ideological polarization, renewed military competition, and the reconfiguration of global geopolitical alignments.

Figure 3: Historical Evolution of Structural, Internal, and External Geopolitical Risk (1960–2025)

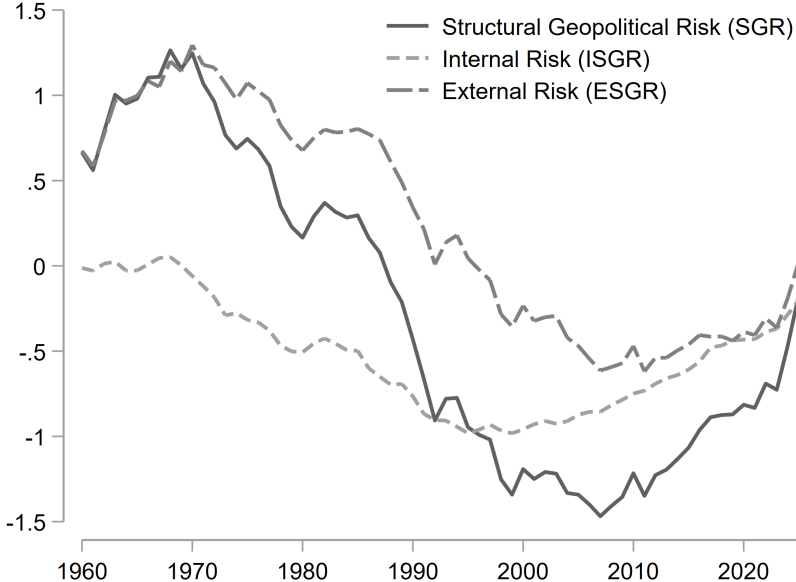


Note: Each panel reports the historical evolution of structural geopolitical risk together with its internal and external components for the selected country over the period 1960–2025.

From a global perspective, we aggregate country-specific ISGR, ESGR, and SGR

measures using nominal US dollars GDP weights for each year in the sample. Figure 4 shows that global SGR reached in 2025 levels comparable to those observed during the final stage of the Cold War. Another noteworthy aspect is the convergence of internal and external global risk, reflecting a widespread increase in political polarization and a decline in the rule of law. Notably, global internal risk began to accelerate earlier than external risk (during the 2000s versus the 2010s), suggesting that domestic political instability and national rearmament may gradually translate into externally generated risk with a substantial time lag, potentially contributing to the emergence of future conflicts.

Figure 4: Historical Evolution of Global SGR and components (1960-2025)



Note: The global measure is constructed as a GDP-weighted average, with country weights based on their respective annual real GDP levels.

4.4 Sensitivity Analysis of SGR to Construction Weights

As explained in the introduction, many of the ideas developed here are new and there are several methodological options that we had to take without being able to support them on previous exercises or references. Therefore, we want to make sure

that our indicators are robust to changes in some of those methodological options.

In this context, we perform a sensitivity analysis in which we modify in a systematic fashion some of the main parameters that define the weights given to different variables or components in the construction of the SGR.

In this sensitivity analysis we estimate several different versions of our main indicator SGR and its two main components, the ISGR and the ESGR. More specifically, in these simulations we modify three of the main parameters used in the construction:

1. the total weight of the variables related to political risk in the internal component ISGR, which is equal to 65% in the benchmark case
2. the weight given to the global rivalry dimension, which we denoted as $\theta_{i,t}^R$ in the ESGR
3. the weight given to the political risk in the external component (ESGR), which we denoted as ϕ , in a parallel fashion to the sensitivity analysis of the ISGR

Even though the ISGR is the first component of a PCA described in the Section (Construction), we also have used the weights of the PCA to separate it into two sub-components related to internal political risk and military risk. Therefore, we can also express the ISGR in the following way:

$$ISGR_{i,t} = \alpha \text{ Internal Political Risk}_{i,t} + (1 - \alpha) \text{ Internal Military Risk}_{i,t} \quad (14)$$

In our benchmark case, the weight given to the political risk sub-component is $\alpha = 0.65$, and the weight given to the military risk sub-component is $(1 - \alpha) = 0.35$. In the simulations, we modify α so that it takes ten different values in range between 0.4 and 0.85.

Then for each one of those ten versions of the ISGR, we modify the parameter $\theta_{i,t}^R$, the one determining how much the global-rivalry dimension weighs in the ESGR, so that it takes six different values between 0.4 and 0.8.

Finally, for each combination of the ten parameters of α and the six parameters of $\theta_{i,t}^R$, we modify the parameter ϕ , the one determining how much the political component weighs in the ESGR so that it takes six values between 0.25 and 0.666.

Therefore, we compute a total of 10 versions of the ISGR, and 36 versions of the ESGR for a total of 360 versions of the SGR. In Table 6 we can see the different values assigned to parameters α , $\theta_{i,t}^R$ and ϕ respectively.

Table 6: Parameters range in sensitivity analysis

Parameter	1	2	3	4	5	6	7	8	9	10
α	0.4	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85
$\theta_{i,t}^R$	0.4	0.5	0.6	0.666	0.75	0.8				
ϕ	0.25	0.3	0.333	0.4	0.5	0.666				

Using the 360 alternative parameterizations, we compute the mean indicator value and a sensitivity band based on one and 1.6 standard deviation around the mean. In Figure 5 we can see the historical evolution of the SGR and its sensitivity bands over the period 1960-2025. It is clear that US is the country that displays the highest sensitivity to the different parameterization, whereas the SGR from countries such as Poland or Turkey barely varies around the baseline.

In Table 7 we can see the correlation of each one of the indicators, SGR, ISGR and ESGR, with the other simulated versions of themselves across all the different parameterizations. It is clear that despite the obvious variations arising when changing the parameters, all the different versions display a very high average correlation among themselves. The average correlation in the case of the ESGR is 97%, 98% in the case of the ISGR and 98.5% in the SGR case.

Table 7: Average correlation between simulated versions of each indicator across different parameterizations

	Mean	Std.Dev.	Min	Max
<i>ISGR</i>	0.979	0.019	0.943	0.997
<i>ESGR</i>	0.971	0.031	0.904	0.999
<i>SGR</i>	0.985	0.012	0.944	0.999

The lowest correlation among two different versions occurs in the ESGR case and it is still around 90%, which shows that even after significant changes in some of the main parameters, all the different versions of the indicators still share the lion share of the information.

One of the possible applications of the SGR is to estimate country rankings to assess which countries are more exposed to the different dimensions of geopolitical risk. In this regard, it could be a concern that such rankings are too sensitive to changes in the parameters used in the construction of the indicators. Therefore, we have also performed a sensitivity analysis of the estimated country rankings based on the SGR for the year 2025. We have performed the same exercise for other years and the results remain very similar.

In this sensitivity analysis we rank all countries under each one of the parameterizations and then estimate its standard deviation by country and for the whole sample. Figure 5 displays the baseline ranking in 2025 together with a sensitive band using 1 and 1.6 standard deviations around the baseline case. We show the top 10, the bottom 10 and the 10 countries in the middle of the ranking. The main result that could be highlighted is that the ranking is more sensitive for countries in positions around the middle, since they are probably more similar among each other, while the ranking of countries at the top of the bottom are less sensitive.

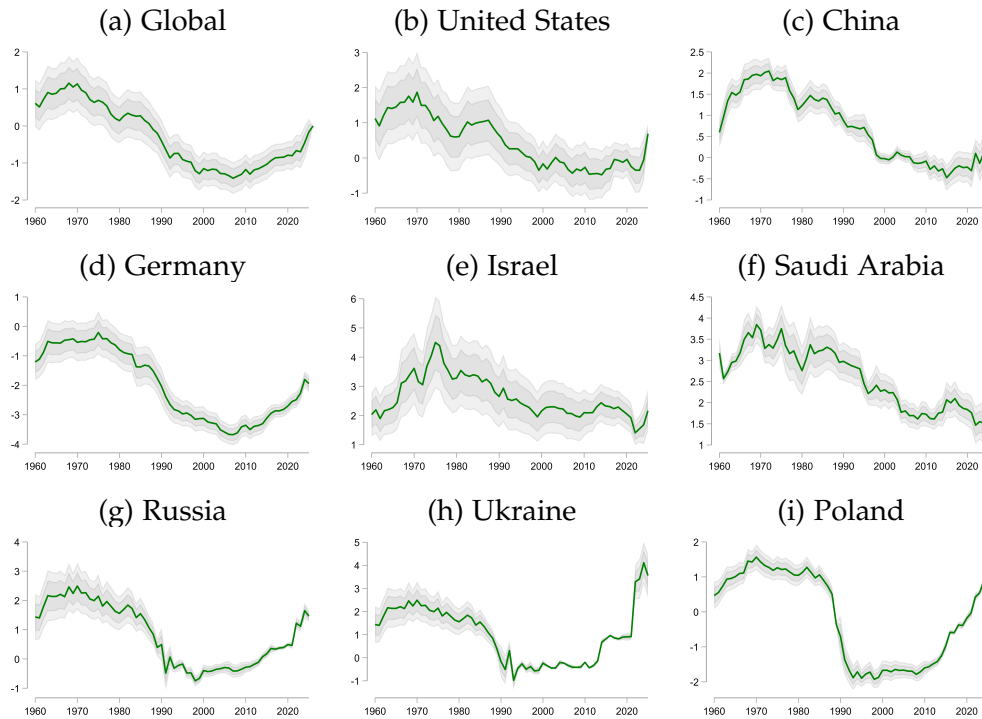
Overall, Table 8 shows that the average standard deviation of the ranking based on the SGR is around 7 positions. This means that, on average, the ranking of a country typically moves 7 positions across the 360 versions and within the 160 countries included in the ranking in 2025. We can see that this standard deviation decreases if we only consider countries with a top 20, mid 20 or bottom 20 ranking, which indicates that more homogeneous countries move less positions, and confirms that countries in the middle of the rankings are more sensitive, again, something that it could be expected.

Table 8: Standard Deviation of 2025 Rankings based on SGR, ISGR and ESGR

	Total	Top 20	Mid 20	Bottom 20
ISGR	7.02	1.91	2.67	2.43
ESGR	8.19	2.09	3.18	3.04
SGR	6.84	2.36	3.92	2.45

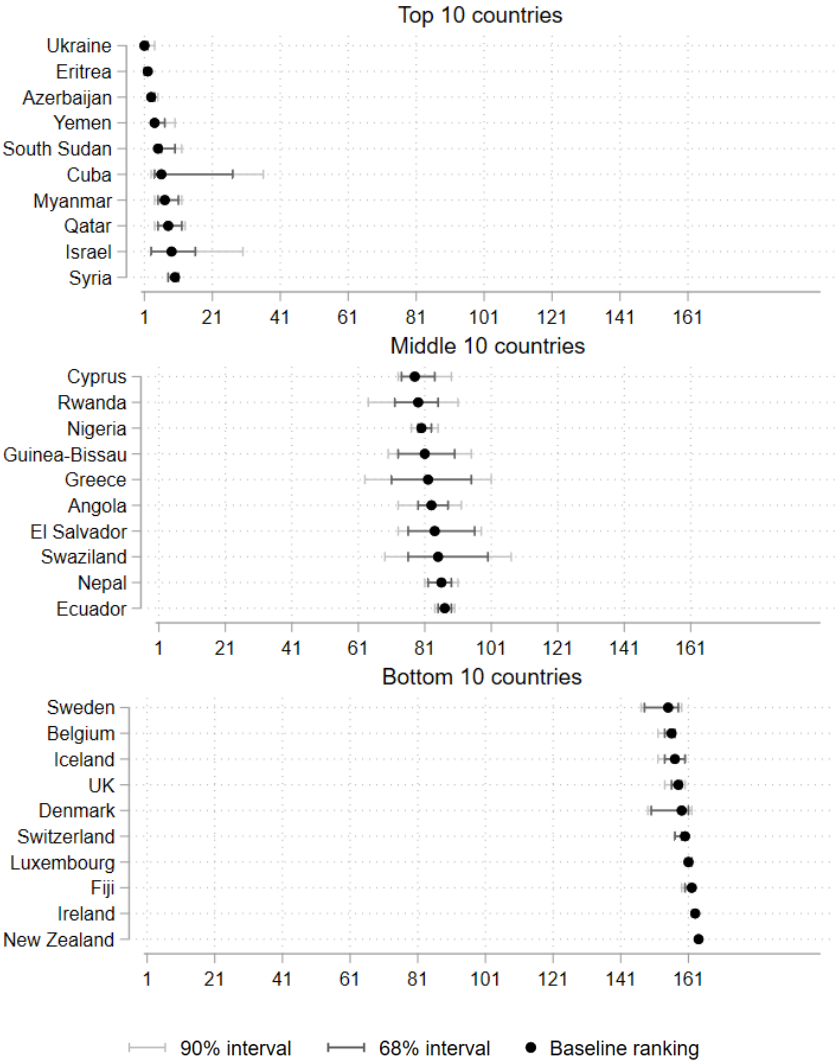
In summary, the sensitivity analysis shows that: i) the different versions of the SGR are still very highly correlated among themselves; ii) the temporal dynamics and variability in the world-wide country rankings remain fairly stable, and iii) they keep a very similar correlation with macroeconomic variables, as we will see in the following section.

Figure 5: Historical Evolution of Structural Geopolitical Risk (SGR) (1960-2025): Sensitivity Analysis under Different Parameterizations



Note: Each plot reports the historical evolution of Structural Geopolitical Risk (SGR) from a global perspective (GDP-weighted) and selected relevant countries from a geopolitical perspective over the period 1960-2025. Sensitivity bands containing the 68% and 90% of all simulations, computed on the basis of the distribution of the variable derived from the alternative parameterizations of the indicator.

Figure 6: Distribution of Global Ranking of SGR (2025): Sensitivity Analysis under Different Parameterizations



Note: The first, second and third plots presents the ranking position from higher to lower levels of the SGR in 2025 of the top 10, middle 10 and bottom 10 countries in the world-wide sample, respectively. In turn, all plots include the uncertainty associated with the baseline ranking of countries with regard to the distribution of SGR under different parameterizations. Specifically, the I-beams represent the 68% and 90% intervals.

5 The Relation of SGR with Macroeconomic Outcomes, Conflicts and Geopolitical Events

Once the construction of the SGR and its sensitivity to alternative parametrizations have been presented, we proceed to investigate its relation to several other variables that can help validate the SGR and its components based on the theoretical correlation of geopolitical risk with those variables. First, we explore the short-, medium-, and long-term macroeconomic impacts of the SGR and its underlying components. Second, we assess whether the SGR effectively behaves as a latent factor underlying the occurrence of military conflicts. Third, we evaluate whether the SGR improves the in-sample predictability of realized geopolitical events, as measured through the news-based GPR index. Finally, we explore whether the impact of the GPR on economic activity is itself conditioned by the latent level of SGR prevailing in the economy.

5.1 Impulse Response Functions to Shocks in SGR

In this section, we estimate the impulse response functions of several macroeconomic real and financial variables to the SGR and its components, -internal and external risk-, via Panel Local Projections using long-differences of the dependent variable, [Jordà and Taylor \(2025\)](#). Specifically, for each horizon h from 0 to 10 years, we estimate the response of an outcome variable $y_{i,t}$ for all countries i and years t in the sample following:

$$y_{i,t+h} - y_{i,t-1} = \beta_h SGR_{i,t-1} + \sum_{p=2}^3 \beta_{h,p} SGR_{i,t-p} + \theta_h' \mathbf{X} + \epsilon_{i,t+h}, \quad (15)$$

where y alternatively denotes trade-to-GDP, FDI-Inflows-to-GDP, credit default swaps (CDS), and long-term real interest rates⁴. The objective is to characterize

⁴Note that trade to GDP is calculated as the sum of imports and exports over GDP. Note as well

the timing and persistence of the transmission of SGR across different outcomes. We expect these responses to be inherently heterogeneous: financial variables such as CDS should react rapidly to geopolitical shocks, whereas trade, FDI inflows, and long-term real rates are likely to adjust more gradually and display greater persistence over time. Coefficient β_h is interpreted as the response of outcome $y_{i,t}$ to a one standard deviation shock of $SGR_{i,t}$ ⁵.

The effects are evaluated over the long differences of $y_{i,t}$ and the shock enters the specification in (15) with one lag under the assumption that the response starts with a delay in the case of macroeconomic variables. However, the shock is assumed to have a contemporaneous impact in the case of financial variables. Moreover, equation (15) includes two additional lags of the SGR to control for an omitted variable bias due to the persistence of the shock⁶.

Additionally, we estimate a modification of equation (15) were we allow the SGR shock to be divided into its components; internal and external risks ($ISGR$ and $ESGR$, respectively):

$$y_{i,t+h} - y_{i,t-1} = \beta_{1,h} ISGR_{i,t-1}^{int} + \beta_{2,h} ESGR_{i,t-1}^{ext} + \sum_{p=2}^3 \beta_{1,h,p} ISGR_{i,t-p}^{int} + \sum_{p=2}^3 \beta_{2,h,p} ESGR_{i,t-p}^{ext} + \theta_h' \mathbf{X} + \epsilon_{i,t+h}, \quad (16)$$

where the specification features remain analogous to (15), with the exception that the coefficients associated with the internal and external risks, $\hat{\beta}_{1,h}$ and $\hat{\beta}_{2,h}$,

that Trade-to-GDP, FDI-Inflows-to-GDP and CDS enter the equation in logs to control for extreme observations

⁵The variables ESGR, ISGR and SGR are all standard normal because they have been standardized

⁶Control variables given by $\mathbf{X}_{i,t}$ for trade, FDI-flows and long-term real rates include the GDP growth rate decomposed into a World's average and each country deviation to account for a global trend in economic activity and a more idiosyncratic component plus the log of the GDP per capita in US dollars to account for institutional quality. The specification CDS includes a measure of institutional quality not captured by our indicators, the GDP growth rate, an indicator of the fiscal balance and public debt levels to GDP, and the BAA spread to account for global movements in risk aversion.

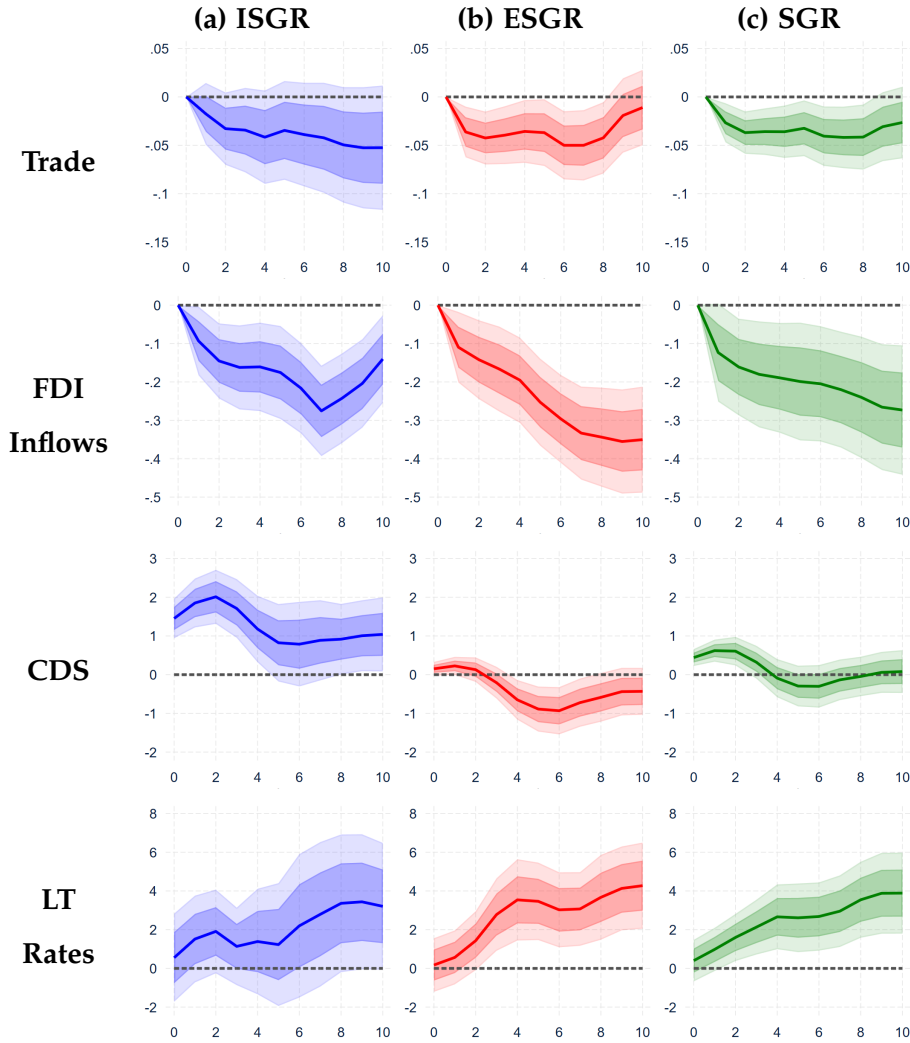
are jointly estimated for each horizon h to maintain the specification as close as possible and to avoid any possible omitted variable problem.

Results. Figure 7 reports the impulse response functions of the selected outcomes following internal risk, external risk, and SGR shocks (columns (a), (b), and (c), respectively).

Real variables such as trade and FDI inflows exhibit gradual and persistent declines following geopolitical shocks, suggesting that geopolitical risk operates through uncertainty, fragmentation, and the weakening of cross-border economic integration, consistent with previous evidence on the disruptive effects of geopolitical and trade-related uncertainty on international economic activity (Glick and Taylor, 2010; Novy and Taylor, 2020; Gupta et al., 2019). These contractionary effects are stronger and more persistent under external risk shocks, supporting the view that international geopolitical tensions directly disrupt global trade and investment networks. The persistence of the responses further points to medium- and long-run reallocations in international economic activity rather than purely temporary disruptions (Alesina and Perotti, 1996; Rodrik, 1999; Gulen and Ion, 2016).

Financial variables display a markedly different adjustment pattern, reacting faster and more abruptly to structural geopolitical shocks. CDS spreads increase almost immediately, particularly after internal risk shocks, reflecting the forward-looking nature of sovereign risk pricing and the rapid incorporation of geopolitical information into financial markets (Demiralay, Kilincarslan and Umar, 2024). Interestingly, external risk shocks generate negative effects on CDS spreads at medium-term horizons, potentially reflecting safe-haven or relative-risk effects when geopolitical tensions originate abroad. By contrast, long-term interest rates rise more gradually but remain persistently above baseline levels specially after an increase in external risk and SGR, suggesting that geopolitical risk also affects broader macro-financial expectations and the long-run pricing of sovereign risk. Together, these findings highlight the heterogeneous transmission of structural geopolitical risk across real and financial dimensions of the economy.

Figure 7: IRFs to a shock in SGR and Components



Note: Each row reports the estimated impulse response functions obtained via Local Projections (equations XX and XX) of the effect of the components (internal and external risk) of SGR, and the SGR itself on macroeconomic and financial variables (trade over GDP, the log of FDI over GDP, the log of CDS and long-term interest rates). Note that columns a, b and c represent the impact of internal risk, external risk and SGR (blue, red and green) on the selected outcome variables, respectively. Solid lines indicate the estimated IRFs (columns (a) and (b) present estimated coefficients $\hat{\beta}_{1,h}$ and $\hat{\beta}_{2,h}$ from equation 16, and column (c) $\hat{\beta}_h$ from equation 15) and shaded areas the 68% and 90% confidence bands for time horizon h from 0 to 10 years.

5.2 SGR and the Onset of Military Conflicts

A central feature of the SGR is that it should capture the latent factor underlying the occurrence of conflicts among political actors. Under this interpretation, increases in SGR should translate into a higher probability of future conflict occurrence. This section formally evaluates this hypothesis.

The analysis relies on the UCDP/PRIO Armed Conflict Dataset, from which we construct three categories of military conflict at the country-year level for the period 1960-2025. Specifically, we distinguish between: (i) *internal conflicts*, involving exclusively domestic actors within national borders; (ii) *geopolitical conflicts*, involving more than one country or interstate actors; and (iii) *all conflicts*, defined as the aggregation of the previous two categories.

Our objective is to estimate whether SGR shocks increase the predicted probability of military conflict occurrence, the magnitude of these effects, and their statistical significance over different horizons. To this end, we estimate a Panel Data Logit Local Projections model of the following form:

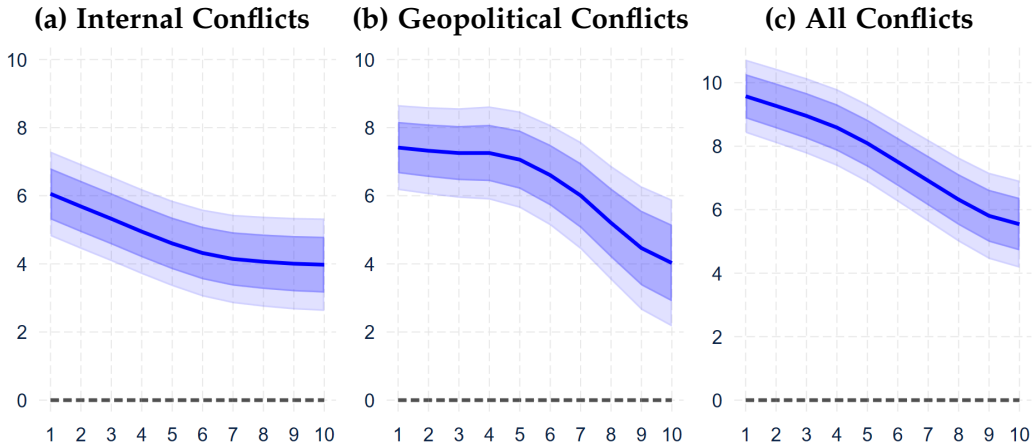
$$\Pr(\text{Conflict}_{i,t+h} = 1 \mid X_{i,t}) = \Lambda(\alpha_{i,h} + \delta_{t,h} + \beta_h \text{SGR}_{i,t-1} + \beta_{h,2} \text{SGR}_{i,t-2}) \quad (17)$$

where $\Lambda(\cdot)$ denotes the logistic cumulative distribution function, $\alpha_{i,h}$ corresponds to country fixed effects controlling for time-invariant heterogeneity across countries, and $\delta_{t,h}$ captures horizon-specific time fixed effects accounting for common global shocks and international geopolitical cycles. The coefficients β_h trace the dynamic response of the predicted probability of conflict occurrence to a one standard deviation SGR shock at horizon h from 1 to 10 years. The inclusion of lagged values of SGR accounts for persistence in geopolitical risk dynamics. Estimated effects are evaluated at the sample means and interpreted as marginal changes in predicted probabilities, expressed in percentage points.

Results. Figure 8 reports the estimated impulse responses for the three con-

flict categories. The results show that positive SGR shocks significantly increase the probability of future military conflict occurrence, thereby validating the interpretation of SGR as a latent driver of geopolitical instability. The estimated effects are economically meaningful and highly persistent across horizons. Following a SGR shock, the predicted probability of internal conflicts increases by approximately 6 percentage points on impact and remains significantly above baseline levels even ten years after the shock. Geopolitical conflicts display even stronger responses, with predicted probabilities rising by almost 8 percentage points at short horizons before gradually declining over time. The largest effects are observed for the aggregate category of all conflicts, where the probability of conflict occurrence increases by nearly 10 percentage points on impact and remains persistently elevated throughout the forecast horizon. Overall, these findings suggest that elevated SGR systematically translates into a substantially higher likelihood of future military conflict realization.

Figure 8: Effect of SGR on the Probability of Occurrence of Military Conflict



Note: Each column reports the estimated effect of SGR on the probability of conflict, represented by estimated coefficients $\hat{\beta}_h$ from equation 17. Effects are evaluated on the margins, thus, the interpretation of the coefficient is the increased probability of military conflict occurrence after SGR shocks in percentage terms. Panels (a), (b) and (c) correspond to the probability of internal conflicts (only the internal country involved), geopolitical conflicts (more than one country is involved), and all conflicts (the combination of internal and geopolitical conflicts), respectively. Solid lines indicate the estimated effects and shaded areas represent the 68% and 90% confidence bands for time horizon h from 1 to 10 years.

5.3 Does SGR Help Predict Future GPR Shocks?

To further evaluate whether the SGR effectively captures the latent factor underlying the emergence of geopolitical tensions, adverse events, and military conflicts, we analyze its relationship with the occurrence of large geopolitical risk events identified through the Geopolitical Risk (GPR) index of [Caldara and Iacoviello \(2022\)](#). Specifically, we rely on the country-specific GPR series aggregated at annual frequency by averaging.

We define a geopolitical risk shock event, denoted by $GPR_{i,t}^{shock} = 1$, as any year in which the country-specific GPR index exceeds its country-specific historical mean (μ_i) plus one standard deviation (σ_i). Formally, the shock variable is constructed as follows:

$$GPR_{i,t}^{shock} = \begin{cases} 1, & \text{if } GPR_{i,t} > \mu_i + \sigma_i \\ 0, & \text{if } GPR_{i,t} \leq \mu_i + \sigma_i. \end{cases} \quad (18)$$

Figure 17 in the Appendix illustrates the identified geopolitical shock events for a selected set of representative countries. These identified events are subsequently used as the dependent variable in a Panel Data Logit Local Projections framework designed to estimate the dynamic effect of SGR shocks on the predicted probability of future GPR shock occurrence from year 1 to 10:

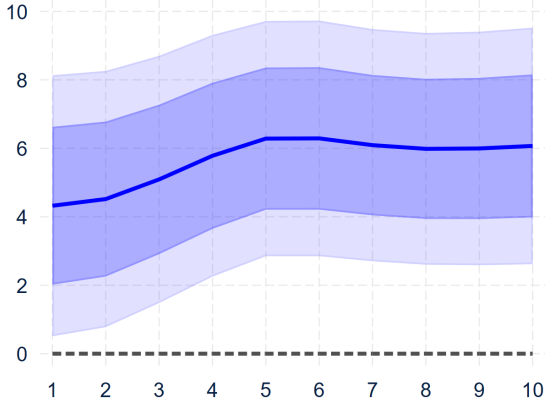
$$\Pr(GPR_{i,t+h}^{shock} = 1 | X_{i,t}) = \Lambda(\alpha_{i,h} + \delta_{t,h} + \beta_h SGR_{i,t-1} + \beta_{h,2} SGR_{i,t-2}), \quad (19)$$

where the inclusion of the second lag of SGR accounts for persistence in structural geopolitical conditions, while the use of the first lag as the evaluated shock mitigates potential simultaneity and feedback effects between contemporaneous geopolitical events and SGR dynamics.

Results. Figure 9 reports the estimated effects of SGR shocks on the predicted probability of future GPR shock occurrence. The results show that increases in

SGR significantly raise the likelihood of subsequent geopolitical risk events identified through the GPR index, further supporting the interpretation of SGR as a latent structural factor. Quantitatively, a positive SGR shock increases the predicted probability of a large GPR event by approximately 4-5 percentage points one year after the shock, with the effect rising to around 6 percentage points at medium horizons before stabilizing at persistently elevated levels. The estimated responses remain statistically significant over most of the forecast horizon, indicating that structural geopolitical conditions not only predict the occurrence of geopolitical stress episodes but also exert persistent effects on the likelihood of future adverse geopolitical events.

Figure 9: Effect of SGR on the Occurrence Probability of GPR Shocks



Note: the plot reports the estimated effect of SGR on the probability of occurrence of GPR shocks, represented by estimated coefficients $\hat{\beta}_h$ from equation 19. Effects are evaluated on the margins, thus, the interpretation of the coefficient is the increased probability of GPR shocks occurrence after SGR shocks in percentage terms. The solid line indicate the estimated effect and shaded areas represent the 68% and 90% confidence bands for time horizon h from 1 to 10 years.

Complementarily, we estimate a distributed lag Panel Data Logit model to provide additional evidence on the dynamic predictability of GPR shocks following increases in SGR. Specifically, we evaluate whether lagged values of SGR significantly predict the probability of future geopolitical risk shock events identified through the GPR index. The estimated specification is given by:

$$\Pr(GPR_{i,t}^{shock} = 1 | X_{i,t}) = \Lambda(\beta SGR_{i,t-l} + \alpha_i + \gamma_t), \quad (20)$$

where $SGR_{i,t-l}$ represents lagged values of the SGR evaluated at different horizons $l \in (2, 4, 6, 8, 10)$. The model is estimated separately for alternative lag structures in order to assess the temporal persistence of the predictive content embedded in SGR dynamics.

Results. Table 9 reports the estimated coefficients, marginal effects, and classification performance of the distributed lag logit specifications. Lagged SGR coefficients are positive and statistically significant across all models, with effect sizes increasing from approximately 0.4 at shorter horizons to around 0.6 at intermediate horizons. The estimated marginal effects indicate that SGR shocks raise the predicted probability of future GPR shock events by roughly 4 to 6 percentage points, consistent with the local projection results. In addition, the models exhibit strong predictive performance, with ROC AUC values consistently around 0.81-0.82 and highly statistically significant, indicating substantial discriminatory power between periods with and without future geopolitical risk shock realizations. Overall, the findings provide robust evidence that SGR behaves as a persistent latent structural factor underlying the occurrence of geopolitical tensions and adverse international events.

5.4 Nonlinear Effects of GPR on Economic Activity Driven by SGR?

As documented in [Caldara et al. \(2022\)](#), GPR can be treated as largely exogenous to domestic economic conditions, as the estimated macroeconomic effects obtained from narratively identified geopolitical events do not differ significantly from those derived using the GPR index itself. In particular, they document negative and statistically significant effects of GPR shocks on real GDP growth.

Building on this evidence, we investigate whether SGR acts as a latent structural

Table 9: Logit Estimates of GPR Shocks After SGR Shocks

Dependent variable: GPR Shock	Logit				
	(1)	(2)	(3)	(4)	(5)
SGR_{t-2}	0.38* (1.71)				
SGR_{t-4}		0.42** (2.02)			
SGR_{t-6}			0.59*** (3.00)		
SGR_{t-8}				0.60*** (2.88)	
SGR_{t-10}					0.55*** (2.73)
Marginal effect (dy/dx)	0.04* (1.73)	0.04** (2.03)	0.06*** (3.08)	0.06*** (2.99)	0.06*** (2.79)
ROC AUC	0.81*** (23.35)	0.81*** (24.13)	0.82*** (24.30)	0.82*** (23.56)	0.82*** (22.92)
Observations	1807	1767	1725	1683	1641

Note: Reported coefficients are logit estimates from equation 20; numbers in parentheses are t-statistics. Marginal effects are changes in predicted probabilities of GPR shocks following SGR shocks at different horizons. ROC AUC (Receiver Operating Characteristic Area Under the Curve) measures a model's ability to distinguish between positive and negative classes, with a value of 0.5 indicating random classification and 1.0 indicating perfect discrimination.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

factor shaping the persistence and macroeconomic transmission of geopolitical risk shocks. Specifically, our hypothesis is that the adverse economic effects of GPR shocks are amplified during periods of elevated SGR, implying that SGR constitutes an important source of non-linearity in the transmission of geopolitical shocks to economic activity.

To analyze this mechanism, we first convert the annual SGR indicator to quarterly frequency through linear interpolation and combine it with the quarterly country-specific GPR index. We begin by estimating a standard Panel Data Local Projections model evaluating the dynamic effects of GPR shocks on economic activity:

$$y_{i,t+h} = \alpha_{i,h} + \delta_{i,h} + \beta_h GPR_{i,t} + \theta_h' \mathbf{X}_{i,t} + \epsilon_{i,t+h}, \quad (21)$$

where $GPR_{i,t}$ corresponds to the logarithm of the country-specific GPR index and $y_{i,t+h}$ denotes the year-on-year growth rate of real GDP at horizon $t + h$. The

specification includes country and quarter fixed effects, while the vector $\mathbf{X}_{i,t}$ contains four lags of both the dependent variable and the GPR index.

We then estimate the following state-dependent Panel Data Local Projections specification in order to evaluate whether the economic effects of GPR shocks differ across periods of low and high structural geopolitical risk:

$$y_{i,t+h} = \alpha_{i,h} + \delta_{t,h} + D_{i,t} \beta_h^{LowSGR} GPR_{i,t} + (1 - D_{i,t}) \beta_h^{HighSGR} GPR_{i,t} + \boldsymbol{\theta}_h' \mathbf{X}_{i,t} + \epsilon_{i,t+h}, \quad (22)$$

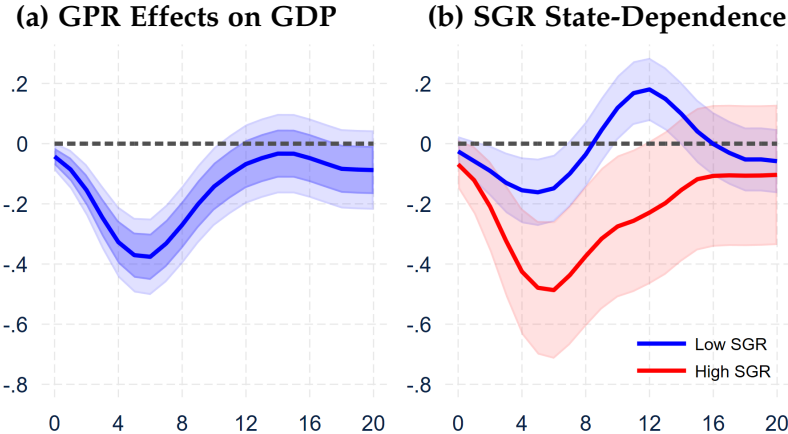
where $D_{i,t}$ is a dummy variable equal to one when country i at time t exhibits an SGR level below the historical median of the overall SGR distribution, and zero otherwise. The rest of equation features remain equivalent to those from equation 21. Accordingly, the coefficients β_h^{LowSGR} and $\beta_h^{HighSGR}$ capture the effects of GPR shocks on real GDP growth during periods of low and high SGR, respectively. The dynamic responses are evaluated over horizons ranging from $h = 0$ to $h = 20$ quarters.

Results. Figure 10 reports the estimated impulse responses. Panel (a) presents the coefficients β_h obtained from equation 21, corresponding to the average effect of GPR shocks on real GDP growth. Consistent with the findings of Caldara et al. (2022), GPR shocks generate negative and statistically significant effects on economic activity, with GDP growth declining by approximately 0.4 percentage points at peak impact around 5-6 quarters after the shock before gradually reverting toward baseline levels.

Panel (b) reports the state-dependent coefficients β_h^{LowSGR} and $\beta_h^{HighSGR}$ from equation 22. The results reveal substantial non-linearities in the transmission of geopolitical risk shocks across different structural geopolitical environments. In periods characterized by high SGR, GPR shocks exert substantially larger and more persistent negative effects on GDP growth, with peak declines approaching 0.5 percentage points. By contrast, during low-SGR periods, the adverse effects are consid-

erably weaker and become statistically indistinguishable from zero at medium horizons, with even temporary positive responses emerging at longer horizons. Overall, these findings suggest that SGR acts as a latent structural amplification mechanism that intensifies the macroeconomic consequences of geopolitical risk shocks during periods of elevated structural geopolitical fragility.

Figure 10: SGR-Driven State-Dependent Effects of GPR on Economic Activity



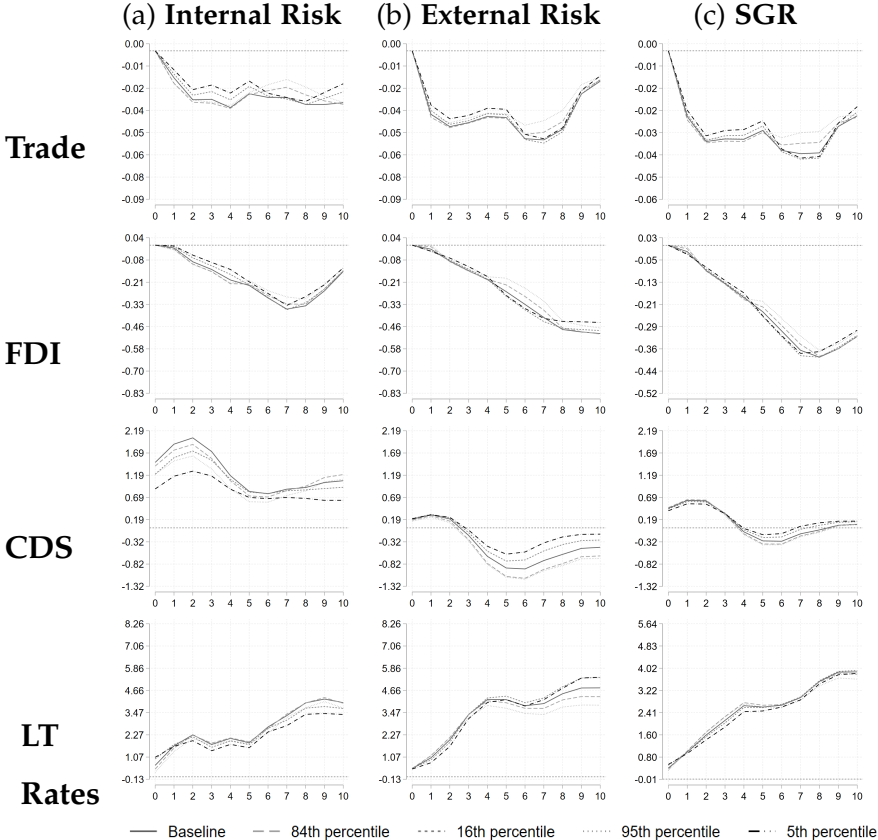
Note: Plot (a) reports the estimated effect ($\hat{\beta}_h$ from equation 21) of the log of GPR on year-on-year real GDP growth rate as well as its 68% and 90% confidence bands (blue-shaded areas). Plot (b) reports the state-dependent effects of the log of GPR on real GDP growth rates, represented by estimated coefficients $\hat{\beta}_h^{LowSGR}$ and $\hat{\beta}_h^{HighSGR}$ from equation 22. The categorization into low and high SGR states is constructed by classifying observations below and above the median of the overall SGR indicator distribution. Accordingly, the solid blue and red lines represent the impact of a GPR shock on real GDP growth when the economy is in a low- and high-SGR state, respectively. The shaded areas denote the 90% confidence intervals. The effects are evaluated from quarter 0 to 20.

5.5 Sensitivity Analysis of the Economic Impact Under Different Parameterizations

In line with the sensitivity analysis of the SGR conducted in Section 4.4, this section estimates the economic impact of all alternative versions of the SGR and its underlying components on the real and financial macroeconomic variables presented in Section 5.1. To this end, we estimate Equations 15 and 16 for different percentiles of the distribution obtained from the preceding iterative simulation ex-

ercise. Specifically, we assess the effects associated with the 5th, 16th, 84th, and 95th percentiles, thereby constructing a pseudo-distribution of the economic impact of the SGR and its constituent components.

Figure 11: Economic Impact of SGR and Components via Local Projections: Sensitivity Analysis under Different Parameterizations



Note: All plots include the impact of the baseline shocks (internal risk, external risk and SGR in columns a, b and c, respectively) and their respective percentiles calculated by computing different parameterizations, as described above, on different dependent variables via Local Projections (equations 16 and 15). In particular, the first row presents the economic impact on trade over GDP, the second on the log of FDI over GDP, the third on the log of CDS and the fourth on long-term interest rates. Note that confidence bands of each respective estimated IRF are not included due to illustrative reasons.

Figure 11 reports, for each outcome variable (rows), the estimated effects of the ISGR, ESGR, and SGR (columns) under both the baseline specification of the indicator and the corresponding percentile realizations of the SGR and its compo-

nents. As can be readily observed, both the magnitude and the persistence of the estimated responses remain remarkably stable across specifications, leading to the same qualitative conclusions regarding the macroeconomic and dynamic effects of the SGR.

6 Conclusion

This paper proposes a new framework for measuring structural geopolitical risk and introduces a novel country-level indicator covering a large set of economies over the period 1960-2025. While the growing literature on geopolitical risk has produced important advances in the measurement of geopolitical shocks, uncertainty, and fragmentation, most existing indicators focus on realized events, media attention, or market perceptions. By contrast, our objective has been to construct a measure of the underlying structural conditions that increase the likelihood of future geopolitical tensions, conflicts, and disruptions.

The proposed Structural Geopolitical Risk (SGR) index combines two complementary dimensions. The first captures domestic political and institutional vulnerabilities associated with conflict propensity, including political polarization, democratic quality, rule of law, inequality, and military preparedness. The second captures exposure to risks originating abroad through neighboring countries, contiguous states, and global rivals, incorporating both geographical proximity and ideological distance. We consider this external dimension to be the principal innovation of the indicator, as it explicitly recognizes that geopolitical risks are inherently relational and often arise from interactions between states rather than from domestic conditions alone.

The historical evolution of the SGR reveals several noteworthy patterns. At the global level, the SGR declined substantially after the end of the Cold War but rebounded during the early 2000s, accelerating after the mid-2010s. By 2025, global SGR had reached levels comparable to those observed during the final stages of

the Cold War. This increase reflects the simultaneous rise in domestic political instability and polarization, ideological fragmentation, military competition, and therefore, external geopolitical tensions across many regions of the world.

A series of validation exercises provides evidence that the SGR captures economically meaningful dimensions of geopolitical risk. Countries exhibiting higher levels of SGR tend to experience weaker trade integration, lower foreign investment, tighter financial conditions, and higher sovereign risk. In addition, increases in SGR are associated with a significantly greater probability of future military conflicts and geopolitical risk events. We also find that the adverse effects of realized geopolitical shocks on economic activity are substantially larger when the underlying level of structural geopolitical risk is elevated, suggesting that SGR acts as a latent amplification mechanism.

Given the novelty of the framework, we place particular emphasis on robustness. The results remain remarkably stable across a large set of alternative parameterizations affecting the relative importance of political, military, and external dimensions. The different versions of the indicator display high correlations, similar economic relationships, and relatively stable country rankings, suggesting that the main conclusions do not depend on specific methodological choices.

Naturally, the construction of a structural measure of geopolitical risk involves important limitations. Geopolitics is a multidimensional and contested concept, and any attempt to summarize it in a single indicator necessarily requires simplifying assumptions regarding variable selection, weighting schemes, and the modeling of interactions between countries.

Several avenues for future research remain open. Further work could explore alternative measures of ideological distance and more sophisticated weighting structures derived from network methods. Crucially, the availability of a long-run structural indicator opens new possibilities for a more thorough and careful assessment of the impacts of structural geopolitical risk on different macroeconomic and financial variables.

Overall, we view the Structural Geopolitical Risk index as a complement rather than a substitute for existing geopolitical indicators. News-based measures such as the GPR are particularly effective at capturing realized geopolitical shocks and fluctuations in public attention. The SGR instead seeks to capture the deeper structural forces that shape the geopolitical environment and influence the probability and consequences of those shocks. By providing a systematic measure of those underlying conditions, we expect this framework to contribute to a deeper understanding of the evolving geopolitical landscape and its economic implications.

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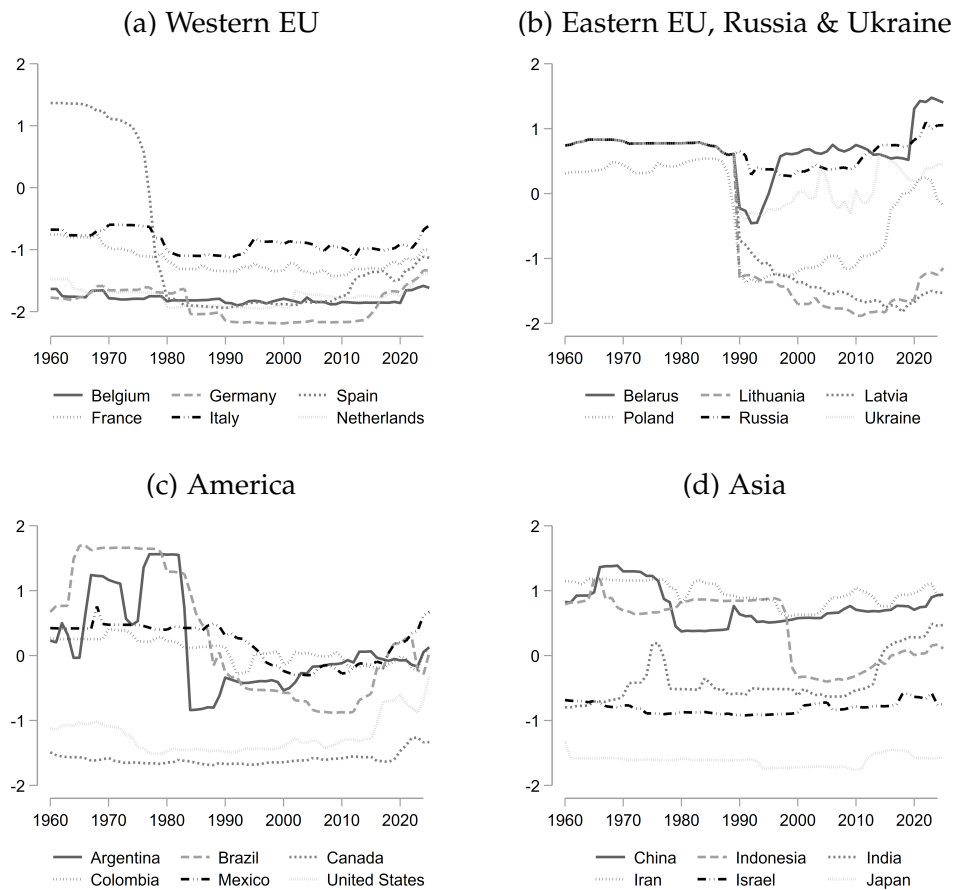
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Appendix

A.1 Data Descriptives

Figure 12: Historical Evolution of Internal Political Risk (1960–2025)



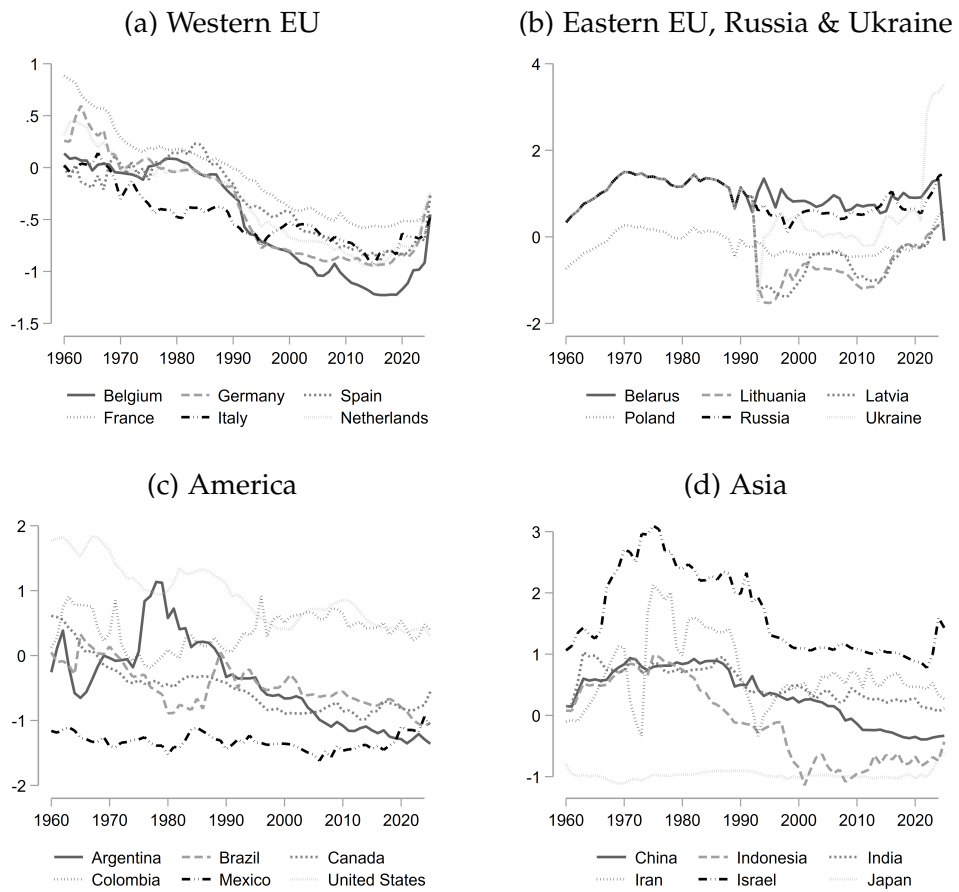
Note: Each panel displays a representative selection of countries within the corresponding region, focusing on the most economically and geopolitically relevant jurisdictions.

Table 10: Internal Political Risk & Subcomponents (2021-2025 Average): Top & Bottom 20

Country	Rank (Global)	Internal Political Risk	Subcomponents			
			Polarization	Electoral Democracy	Rule of Law	Gini
Nicaragua	1	2.06	3.14	0.16	0.01	46.20
Myanmar	2	1.88	3.35	0.09	0.07	34.91
Venezuela	3	1.75	1.95	0.20	0.01	
Yemen	4	1.68	2.84	0.12	0.06	36.65
Eritrea	5	1.51	1.21	0.07	0.08	
Chad	6	1.46	1.69	0.18	0.03	37.41
Belarus	7	1.43	3.18	0.16	0.10	23.31
Afghanistan	8	1.42	2.25	0.09	0.11	27.26
Turkey	9	1.39	3.36	0.29	0.15	44.48
South Sudan	10	1.38	1.69	0.14	0.09	43.77
Libya	11	1.32	2.56	0.20	0.13	
Swaziland	12	1.30	1.72	0.12	0.26	54.60
Syria	13	1.25	2.05	0.14	0.12	26.81
Azerbaijan	14	1.19	1.33	0.18	0.06	30.47
Equatorial Guinea	15	1.16	0.58	0.18	0.05	38.50
Bangladesh	16	1.15	2.46	0.24	0.14	30.95
Guinea	17	1.14	2.19	0.19	0.12	29.13
Cameroon	18	1.13	1.70	0.28	0.09	42.19
Somalia	19	1.11	1.20	0.16	0.15	
North Korea	20	1.08	-1.04	0.08	0.03	
Canada	155	-1.32	-0.27	0.84	0.96	32.17
Vanuatu	156	-1.34	-1.93	0.81	0.84	32.30
Germany	157	-1.44	-0.11	0.85	0.99	33.18
Barbados	158	-1.46	-1.92	0.80	0.93	34.10
Netherlands	159	-1.49	-0.34	0.84	0.98	25.44
Latvia	160	-1.53	-1.41	0.83	0.97	34.00
Uruguay	161	-1.54	-2.10	0.84	0.94	40.46
Japan	162	-1.58	-1.74	0.82	0.96	31.11
Belgium	163	-1.63	-0.78	0.89	0.97	26.68
Iceland	164	-1.63	-1.27	0.83	0.98	27.61
Australia	165	-1.68	-1.16	0.84	0.99	33.80
Estonia	166	-1.72	-0.86	0.89	0.98	31.24
New Zealand	167	-1.76	-1.24	0.87	0.99	32.14
Luxembourg	168	-1.77	-2.02	0.87	0.98	33.52
Finland	169	-1.79	-1.24	0.85	0.99	27.56
Sweden	170	-1.83	-1.10	0.89	0.99	29.86
Switzerland	171	-1.90	-1.45	0.89	0.99	33.80
Norway	172	-2.04	-2.11	0.89	0.99	27.10
Ireland	173	-2.05	-2.49	0.89	0.98	29.26
Denmark	174	-2.20	-1.75	0.92	1.00	29.46

Note: The selection of the top and bottom 20 countries is based on those with the highest and lowest values, respectively, of the Internal Political Risk variable.

Figure 13: Historical Evolution of Internal Military Risk (1960–2025)



Note: Each panel displays a representative selection of countries within the corresponding region, focusing on the most economically and geopolitically relevant jurisdictions.

Table 11: Internal Military Risk & Subcomponents (2021-2025 Average): Top & Bottom 20

Country	Rank (Global)	Internal Military Risk	Subcomponents		
			Military Exp. (% GDP)	Military Exp. (% Gov.)	Military Exp. (% Global)
Ukraine	1	2.69	27.93	42.73	2.01
Qatar	2	1.56	6.49	25.89	0.56
Saudi Arabia	3	1.52	6.94	22.77	3.30
Algeria	4	1.30	6.63	18.69	0.64
Oman	5	1.26	5.74	19.09	0.24
Myanmar	6	1.24	5.12	22.03	0.12
United Arab Emirates	7	1.17	5.64	17.04	1.16
Armenia	8	1.13	5.13	17.93	0.05
Israel	9	1.13	6.27	15.23	1.33
Russia	10	1.06	5.63	15.36	4.85
Azerbaijan	11	1.02	5.02	15.55	0.14
Jordan	12	0.94	4.73	14.41	0.10
Belarus	13	0.90	1.90	37.10	0.06
Yemen	14	0.82	3.97	14.28	0.03
Syria	15	0.80	4.06	13.62	0.04
Kuwait	16	0.77	5.03	10.70	0.33
Mali	17	0.76	3.66	14.25	0.03
Singapore	18	0.73	2.73	17.55	0.56
North Korea	19	0.71	4.83	10.01	0.05
Pakistan	20	0.69	3.01	15.38	0.45
Kazakhstan	145	-1.24	0.53	2.41	0.05
Bosnia and Herzegovina	146	-1.25	0.77	1.84	0.01
Mongolia	147	-1.25	0.66	2.06	0.01
Cape Verde	148	-1.29	0.57	2.02	0.00
Argentina	149	-1.30	0.65	1.84	0.16
Nicaragua	150	-1.32	0.55	1.95	0.00
Luxembourg	151	-1.34	0.74	1.58	0.03
Ghana	152	-1.46	0.40	1.76	0.01
Moldova	153	-1.54	0.49	1.30	0.00
Papua New Guinea	154	-1.54	0.35	1.54	0.00
Malta	155	-1.58	0.45	1.23	0.00
Haiti	156	-1.75	0.09	1.48	0.00
Ireland	157	-1.79	0.23	1.00	0.05
Laos	158	-1.90	0.19	0.78	0.00
Sierra Leone	159	-1.94	0.52	0.50	0.00
Mauritius	160	-2.06	0.15	0.49	0.00
Costa Rica	161	-2.46	0.00	0.00	0.00
Iceland	162	-2.46	0.00	0.00	0.00
Hong Kong	163	-2.46	0.00	0.00	0.00
Panama	164	-2.46	0.00	0.00	0.00

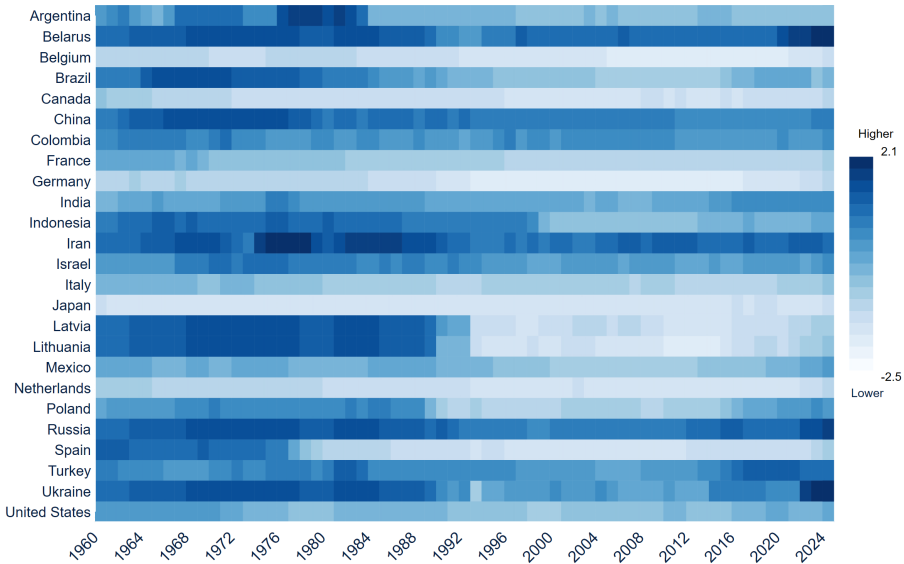
Note: The selection of the top and bottom 20 countries is based on those with the highest and lowest values, respectively, of the Internal Military Risk variable. The first subcomponent refers to the share of military expenditure over GDP, the second over total government expenditure and the third to total global military expenditure.

Table 12: External Risk (ESGR) & Subcomponents (2021-2025 Average):
Top & Bottom 20

Country	Rank (Global)	External Risk (ESGR)	Subcomponents		
			Political Risk	Ideological Risk	Military Risk
Israel	1	1.65	0.97	3.06	-0.72
Georgia	2	1.48	1.32	0.64	0.85
Ukraine	3	1.44	0.96	0.47	1.42
Syria	4	1.44	1.21	1.65	-0.10
Lebanon	5	1.36	1.22	0.59	0.80
Armenia	6	1.21	1.44	0.34	0.40
Iran	7	1.09	1.07	0.63	0.35
South Korea	8	1.04	1.41	0.62	-0.21
Qatar	9	1.02	1.19	-0.74	1.39
Oman	10	1.01	1.21	-0.66	1.27
Moldova	11	0.96	0.40	-0.32	1.89
Iraq	12	0.95	1.27	-0.11	0.50
Lithuania	13	0.92	0.48	0.66	0.74
Estonia	14	0.90	0.41	0.63	0.79
Latvia	15	0.88	0.41	0.61	0.76
Azerbaijan	16	0.85	1.13	-0.24	0.58
Yemen	17	0.84	1.13	-0.95	1.29
Turkey	18	0.83	0.72	0.72	0.14
Cyprus	19	0.81	0.91	0.55	0.01
Jordan	20	0.80	1.10	-0.28	0.58
Togo	144	-1.16	-0.20	-0.90	-1.41
France	145	-1.16	-0.82	-0.49	-1.01
Austria	146	-1.16	-1.06	-0.52	-0.65
Italy	147	-1.19	-0.82	-0.59	-0.98
Switzerland	148	-1.25	-1.31	-0.31	-0.72
Ireland	149	-1.25	-1.83	0.15	-0.49
Paraguay	150	-1.29	-0.63	-0.37	-1.65
Haiti	151	-1.31	-0.90	-0.36	-1.35
Chile	152	-1.35	-0.20	-0.54	-2.21
Lesotho	153	-1.42	-0.25	-1.09	-1.71
Uruguay	154	-1.45	-0.47	-0.68	-1.90
Belgium	155	-1.52	-1.50	-0.62	-0.77
Luxembourg	156	-1.58	-1.63	-0.59	-0.72
Sweden	157	-1.60	-1.84	-0.69	-0.41
Portugal	158	-1.60	-1.54	-0.70	-0.80
Denmark	159	-1.63	-1.56	-0.80	-0.73
Netherlands	160	-1.77	-1.60	-0.81	-0.96
United Kingdom	161	-1.83	-1.54	0.08	-2.10
Fiji	162	-2.34	-2.65	-0.24	-1.41
New Zealand	163	-2.46	-2.98	-0.54	-0.94

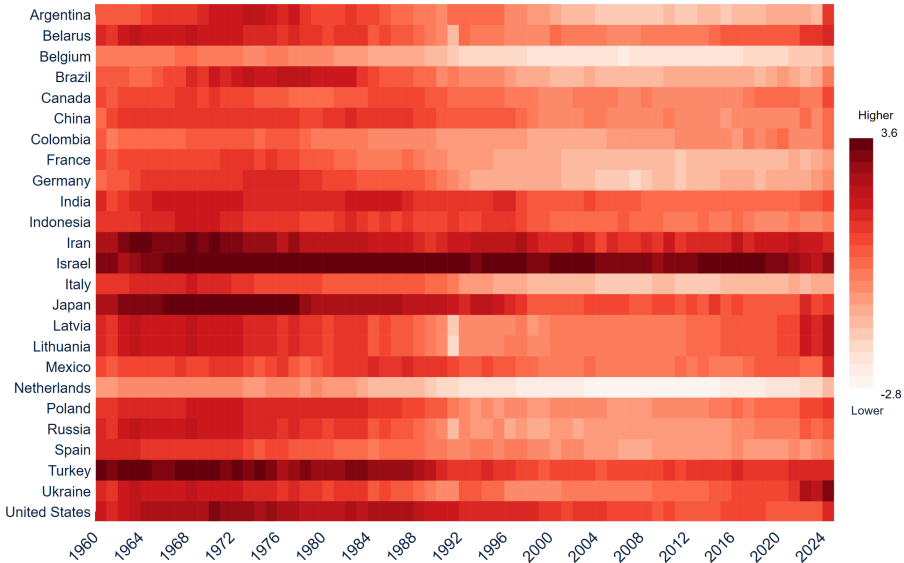
Note: The selection of the top and bottom 20 countries is based on those with the highest and lowest values, respectively, of the External Risk (ESGR) variable. The three subcomponents correspond to Political Risk, Ideological Risk and Military Risk, which jointly conform the ESGR.

Figure 14: Historical Evolution of Internal Risk (1960-2025): Heatmap Representation



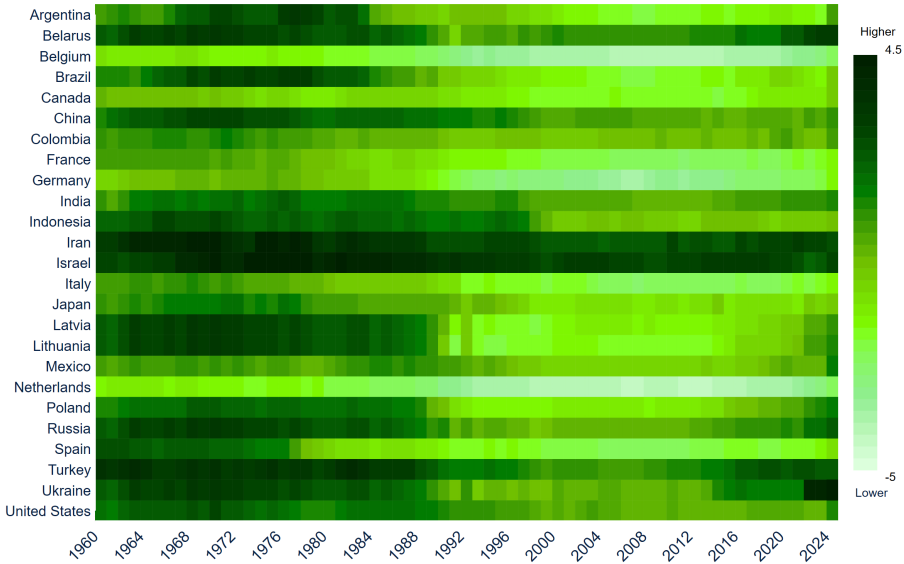
Note: The color scale is calibrated using the full-sample distribution of internal risk, computed across all countries and years in the dataset, thereby allowing for consistent comparison across observations.

Figure 15: Historical Evolution of External Risk (1960-2025): Heatmap Representation



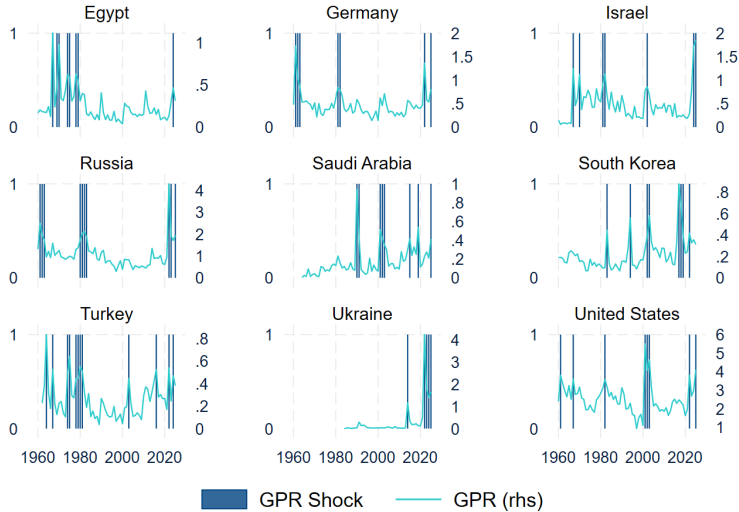
Note: The color scale is calibrated using the full-sample distribution of external geopolitical risk, computed across all countries and years in the dataset, thereby allowing for consistent comparison across observations.

Figure 16: Historical Evolution of Structural Geopolitical Risk (1960-2025): Heatmap Representation



Note: The color scale is calibrated using the full-sample distribution of structural geopolitical risk, computed across all countries and years in the dataset, thereby allowing for consistent comparison across observations.

Figure 17: Does SGR Help Predict Future GPR Shocks?: Identified GPR Shocks



Note: Each plot presents the GPR events identified according to equation XX (vertical dark blue bars in the left hand-side axis) and the evolution of the country-specific GPR (Caldara and Iacoviello, 2022) (light blue lines in the right hand-side axis) for a selection of relevant geopolitical countries.

A.2 Methodological Appendix

Construction of foreign countries weights

In order to illustrate why we make use of a logistic transformation of population when constructing the weights of foreign countries in equations (4) and (5), we show the results of those equations for the case of China in Tables 13 and 14 respectively, for the year 2025.

In the first three columns we show the three variables included in the calculation of $\omega_{ij,t}^C$ and $\omega_{ij,t}^C$. Then, in column "Logst. Transf. (%)" we show the actual weights used. In columns "Level (%)" and "Nat. Log (%)" we show the alternative weights that we would have obtained if we have used the population in levels or its natural logarithm.

As illustrated in Table 13, if we had used the population in levels, India would have had an absolute dominant weight (73%) given its huge relative population, while other countries would have had only a residual importance. On the other hand, if we had used the population in logs, India would have had only a weight of 8%, while Mongolia would have become the most relevant country for China despite having only a small population. However when we use the logistic transformation, India is actually the most relevant country given its population, size and area, but it is not as dominant or as irrelevant as in the other alternatives.

Moreover, when we look at the results for the neighboring countries (Table 14), i.e. those that do not share a border with China, the weights that we obtain by using the logistic transformation are very similar to those obtained when using the population in levels, something that we consider desirable when there are not huge outliers that distort the weights.

We perform a similar exercise to illustrate the advantage of our transformation choice for the geographical distance. As seen in equations (4) and (5), the weights $\omega_{ij,t}^C$ and $\omega_{ij,t}^C$ depend on the inverse of the exponential of the distance. In this case we calculate hypothetical weights based only on the geographical distance

Table 13: Weight ($\omega_{ij,t}^C$) of countries bordering China according to different transformations of population

	Dist. (kms)	\sqrt{Area} (kms)	Popul. (thous.)	Logist. Transf. (%)	Level (%)	Nat. Log (%)
India	3,953	1,813	1,463,866	22.8	72.6	8.0
Vietnam	2,314	576	102,161	18.7	8.3	10.6
Mongolia	1,802	1,251	3,584	13.3	1.1	27.3
North Korea	1,062	347	26,571	12.2	4.5	19.7
Myanmar	2,732	823	55,182	9.1	4.2	9.4
Pakistan	4,412	892	240,490	6.8	3.7	2.2
Russia	5,826	4,135	145,632	5.8	2.5	2.3
Laos	2,295	487	7,788	3.4	0.5	7.1
Kazakhstan	3,875	1,651	20,380	3.1	1.0	5.5
Nepal	3,153	384	29,645	1.8	0.7	2.7

Table 14: Weight ($\omega_{ij,t}^N$) of countries nearby China, but without a border, according to different transformations of population

	Dist. (kms)	\sqrt{Area} (kms)	Popul. (thous.)	Logist. Transf. (%)	Level (%)	Nat. Log (%)
Japan	2,006	615	123,291	30.1	28.8	21.4
Philippines	2,296	548	114,374	18.5	17.8	14.2
South Korea	1,097	317	51,681	15.2	15.4	25.3
Bangladesh	2,861	384	173,736	10.8	10.8	5.8
Indonesia	4,512	1,385	284,439	8.8	12.2	4.2
Thailand	2,774	716	70,329	8.6	8.9	11.0
Cambodia	2,774	425	17,354	2.0	1.3	5.7
Malaysia	3,734	575	33,852	1.4	1.3	3.2
Uzbekistan	4,268	670	37,701	1.1	1.0	2.2

according to two different transformations. In the first case we use the inverse of the exponential and in the second case we use the inverse of the distance. We show the results in Table 15 for the countries neighboring China, but that do not share a border.

We can observe that the two main issues of using just the inverse of distance is that the weights do not differentiate sufficiently between all the countries. In column " $(1/dist)(\%)$ " the country with the highest importance is South Korea with only a 4.1%, and importantly, the sum of the weights of all countries closer to 5,000 kms. is only 22% while in our choice the aggregated weight of those same countries is 93%. If we had used the inverse of the distance, we would need to take into account countries up to 14,000 kms. to account for the same aggregated weight of 93%.

Table 15: Weights derived from different transformations of distance for countries nearby China, but without a border

	Dist. (kms)	\sqrt{Area} (kms)	$(1/exp(dist))$ (%)	$(1/dist)$ (%)
South Korea	1,097	317	34.1	4.1
Japan	2,006	615	13.8	2.2
Philippines	2,296	548	10.3	1.9
Cambodia	2,774	425	6.4	1.6
Thailand	2,774	716	6.4	1.6
Bangladesh	2,861	384	5.8	1.6
Brunei	3,226	76	4.1	1.4
Palau	3,476	21	3.2	1.3
Malaysia	3,734	575	2.4	1.2
Singapore	3,875	27	2.1	1.1
Uzbekistan	4,268	670	1.4	1.0
Indonesia	4,512	1,385	1.1	1.0
Timor-Leste	4,802	122	0.8	0.9
Sri Lanka	4,870	256	0.8	0.9
Sum			92.7	21.8

Finally, we also illustrate with an example the advantage of our transformation choice for the global rivalry dimension. As seen in equation (6), the weight $\omega_{ij,t}^R$

depends on a non-linear function of the ideological distance, in particular, on a function $(ID_{ij} - \overline{ID})^4$. In this particular case we aim to magnify the differences in the ideological distance between countries, because the ideological distance variable without any transformation would generate only a very small differentiation between different countries.

We again calculate hypothetical weights based only on the ideological distance according to the original variable and according to the proposed transformation that amplifies the distance. We show the results in Table 16 for the case of China.

If we had use the ideological distance without any transformation to identify the ideological rivals we would end up with almost half of the countries in the World being consider rivals of others. When we use a power of the original variable (demeaned) we clearly identify the US and Israel as the main ideological rivals of China. Moreover, the first fifteen countries with a higher weight represent around 70% of all the countries with a positive ideological distance to China, whereas these countries would only accumulate half of that weight under the original definition. It is important to remind that the actual weight $\omega_{ij,t}^R$ also includes country j 's share of the World's military expenditure.

Table 16: Weights derived from different transformations of ideological distance versus China

	Ideology Distance	$ID_{ij} - \overline{ID}$ (%)	$(ID_{ij} - \overline{ID})^4$ (%)
United States	2.97	3.53	20.85
Israel	2.76	3.18	13.72
UK	2.43	2.65	6.59
Czechia	2.27	2.38	4.28
France	2.14	2.16	2.92
Micronesia	2.12	2.14	2.82
Hungary	2.11	2.12	2.69
Ukraine	2.08	2.07	2.47
Lithuania	2.06	2.04	2.32
Croatia	2.06	2.04	2.30
Germany	2.04	1.99	2.14
Romania	2.03	1.99	2.11
Italy	2.01	1.96	1.99
Latvia	1.99	1.94	1.88
Sweden	1.96	1.87	1.64
Sum		34.09	70.75

Treatment of missing values

Due to the long-term and extensive cross-country scope of the analysis, we inevitably face multiple cases of missing values in the data. We follow different strategies to minimize observations loss given the sometimes compounding effect of missing values in different variables.

The first strategy was to use a linear interpolation when there are short gaps in the data in any of the variables. The more problematic variables were the ones related to military expenditure (MIL/GDP and MIL/GOV), in particular the second one, and the $GINI$ index.

When there were missing values in one of the military expenditure variables, but not in the other, we approximated the missing values applying the dynamic variation from the other one.

In some countries, no data was available for the variable MIL/GOV . In such cases, if the variable MIL/GDP was not missing, we used the latter as a proxy to

replace the former in the PCA-derived indicators using the two original weights of *MIL/GDP* and *MIL/GOV* but applied to the same variable *MIL/GDP*.

We followed a similar strategy when the variable *GINI* was completely missing. We recalculated the weights of the PCA analysis assuming that the weight given to *GINI* was zero.

In cases of countries that were part of a no longer existing larger country, i.e. URSS, Yugoslavia, Czechoslovakia, we assumed that all the new countries shared the same values when they belonged to the same nation, in the variables related to political risk, ideological distance and military expenditure.

Finally, there were a couple of countries, Cuba and North Korea, for which no data were available for either the military expenditure variables or the Gini index. Given their relevance from a geopolitical point of view, we replaced their values in those variables with the corresponding global average.

Nevertheless, most of the missing data problems pertain mainly to the earliest periods of the analysis, particularly to the period between 1960 and 1980, or before 1990 in the case of the new countries in Eastern Europe.

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