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A New Set of Structural Indicators: Geopolitical Risk and Economic Fragmentation

BBVA Research

Summary section

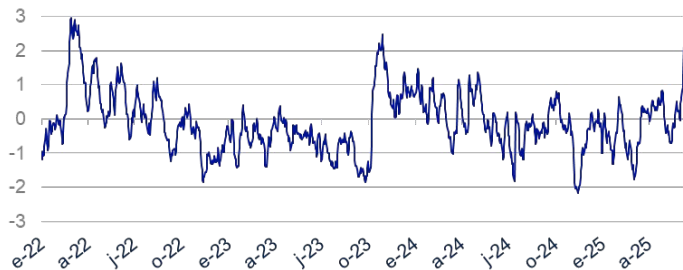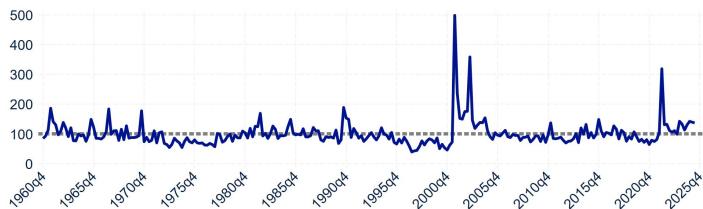# Motivation and key questions to address

- Over recent years there is a **growing concern about the impact of geopolitical events and stress** over economic variables. **Building indicators of geopolitical risk and economic fragmentation** becomes essential for economic analysis and scenario building exercises.

- **Typically,** short-term changes in geopolitical risk are monitored by **high-frequency, news-based indices** (eg. Caldara & Iacoviello, 2022; BBVA Research Geopolitics Monitor), which usually revert to the mean after some time. We need to **complement those measures with indicators that capture longer-term, structural shifts in geopolitical risks** and economic fragmentation**.**

- To do so, **we develop structural indices since the 1960s for a large number of countries and regions of Structural Geopolitical Risk (SGR) and economic fragmentation (SEF).** We use long time series variables such as indices of democracy, inequality, rule of law and military spending (for geopolitical stress index) and of trade and no-trade barriers capital controls and financial sanctions (for the fragmentation index).

- **Crucially, the main innovation of these indices** is that they take into account, for each country X, not only the internal dimension of these variables (say, rule of law or military spending in country X), **but also their external dimension** (variables for all the partners and geostrategic rivals of country X); **we weigh those variables for all the other countries with different measures of geospatial and ideological distance, thus providing a more comprehensive and relational assessment.** We apply the same logic for both the SGR and SEF and construct a long series of country-regional and global indices with both an internal and external component.

- **We integrate the SGR indices with other existing short-term news-based geopolitical risk indices,** providing a fully comprehensive assessment of geopolitical risk in another indicator called **Composite Geopolitical Risk index (CGR).**

News-based geopolitical indices,

Very useful to follow short-term trends, need to be complemented with indicators that reflect long-term political, ideological and military structural changes
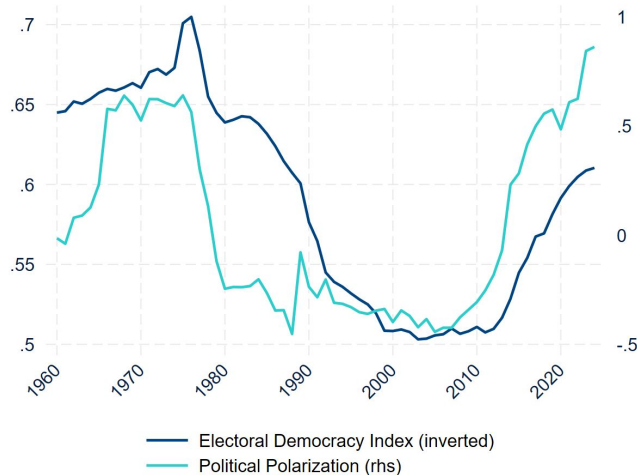
GEOPOLITICAL RISK INDEX
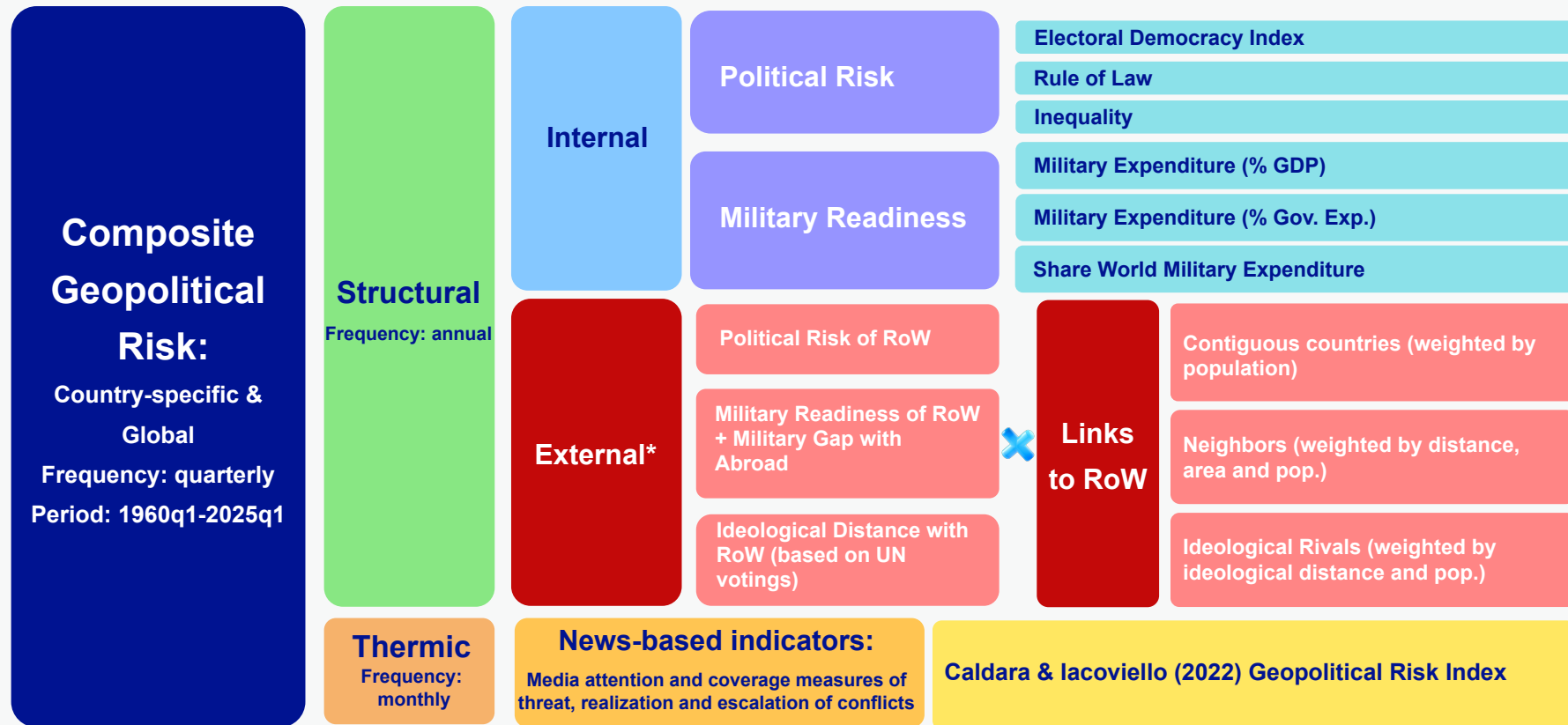(CALDARA & IACOVIELLO; BBVA RESEARCH*)

**ELECTORAL DEMOCRACY
(1 = AUTOCRACY, 0 = LIBERAL
DEMOCRACY) & POLITICAL POLARIZATION**
(1960-2024, POPULATION WEIGHTED)

— Electoral Democracy Index (inverted)
— Political Polarization (rhs)

Composite Geopolitical Risk index (CGR) framework

Composite Geopolitical Risk:

Country-specific & Global
Frequency: quarterly
Period: 1960q1-2025q1

Structural
Frequency: annual

Internal

Political Risk
- Electoral Democracy Index
- Rule of Law
- Inequality

Military Readiness
- Military Expenditure (% GDP)
- Military Expenditure (% Gov. Exp.)
- Share World Military Expenditure

External*

- Political Risk of RoW
- Military Readiness of RoW + Military Gap with Abroad
- Ideological Distance with RoW (based on UN votings)

Links to RoW
- Contiguous countries (weighted by population)
- Neighbors (weighted by distance, area and pop.)
- Ideological Rivals (weighted by ideological distance and pop.)

Thermic
Frequency: monthly

News-based indicators:
Media attention and coverage measures of threat, realization and escalation of conflicts

Caldara & Iacoviello (2022) Geopolitical Risk Index

Summary of estimated country-specific indicators:

Structural Geopolitical Risk (SGR)

Countries recently involved in conflict and wars present the highest geopolitical risk levels (Ukraine, Russia, Iran, Israel) driven by a combination of internal political turmoil and geography: being located in conflict-ridden regions
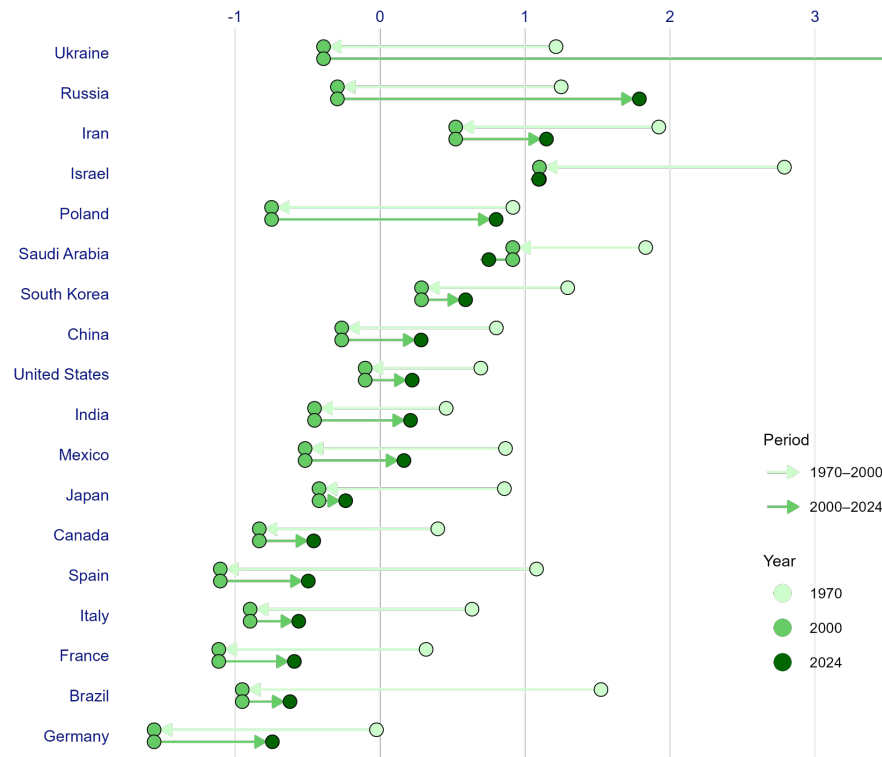
South Korea and China currently have similar levels of structural risk, although the risk in the former is due to external factors while in the latter is mainly due to internal ones

STRUCTURAL GEOPOLITICAL RISK*

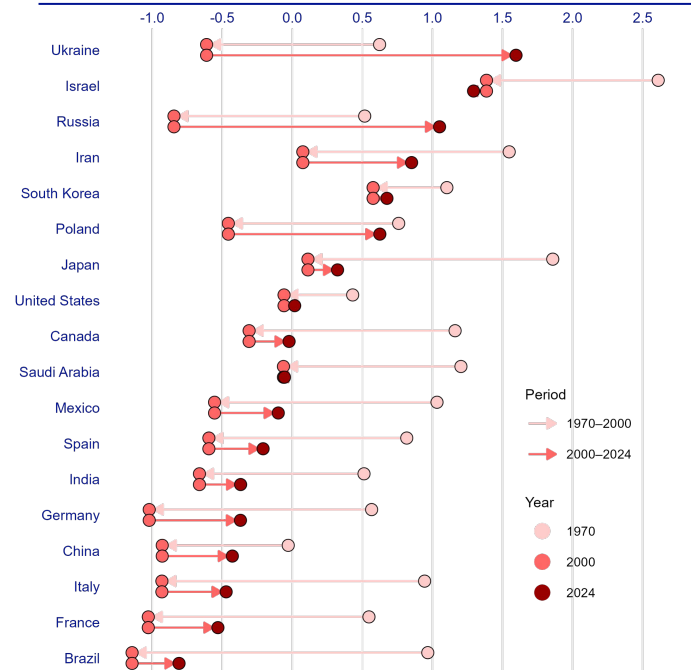
* Standardized values.
Source: BBVA Research. Ordered in descending order of 2024 values.

Summary of country-specific indicators:
Structural Geopolitical Risk (SGR)

Note: the graphs include a selection of countries. Moreover, we have calculated all indices for a set of around 150 countries from 1960 to 2024.
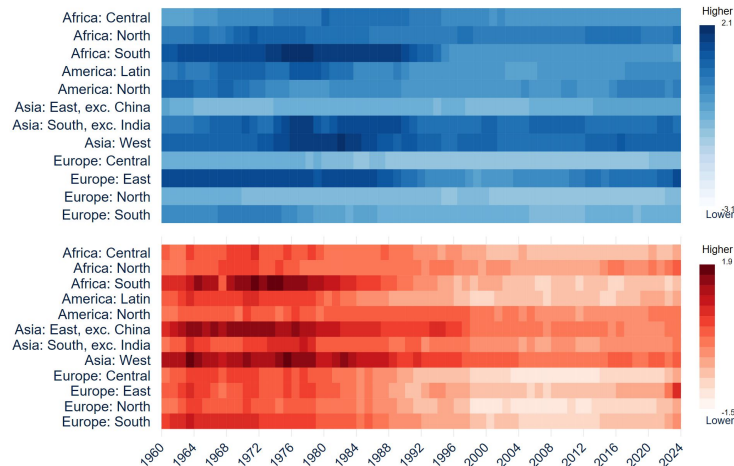Source: BBVA Research. Ordered in descending order of 2024 values.

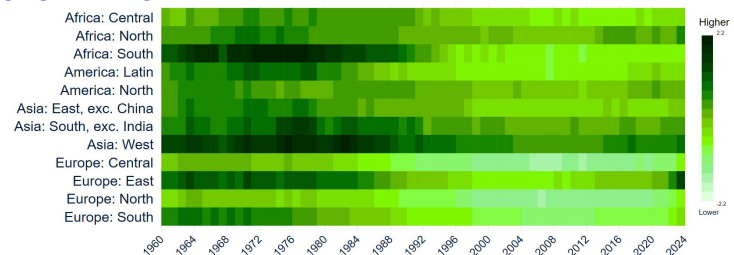# Regional aggregates provide an insightful world-wide geopolitical picture

- Political turbulence in Middle East has kept **West Asia as one of the regions with higher internal and external stress** for all the period

- Stress in **Eastern Europe has surged recently** mainly due to a rise in external risk

- **Southern Africa** has seen a dramatic **reduction** in geopolitical risk since the 90s

REGIONAL HISTORICAL STRUCTURAL GEOPOLITICAL RISK (SGR) (1960-2024) (HIGHER VALUE INDICATES GREATER RISK)

INTERNAL (BLUE) & EXTERNAL (RED)

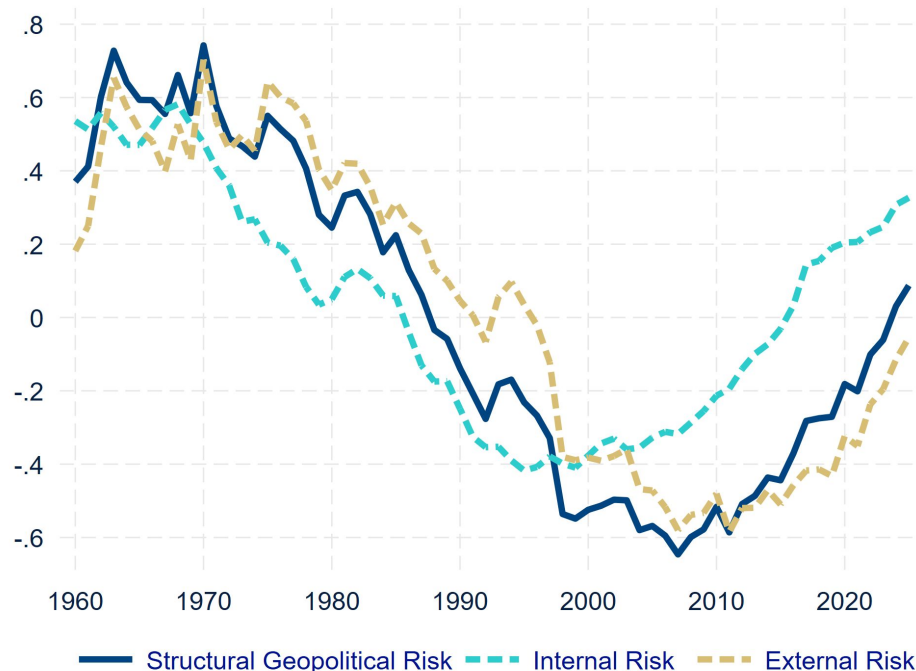STRUCTURAL RISK

Source: BBVA Research.

Global structural geopolitical shows that stress has risen since the GFC

Thus confirming prior beliefs, driven by institutional tensions and military buildups

- The global structural geopolitical stress has reached **levels not seen since the late 1980s**

- The escalation of **internal risks** seems to ultimately **translate into** an increase in overall **external risk**

GLOBAL STRUCTURAL GEOPOLITICAL RISK (SGR) (1960-2024) (GDP WEIGHTED)

Note: total geopolitical risk is calculated by equally-weighting internal and external risk.
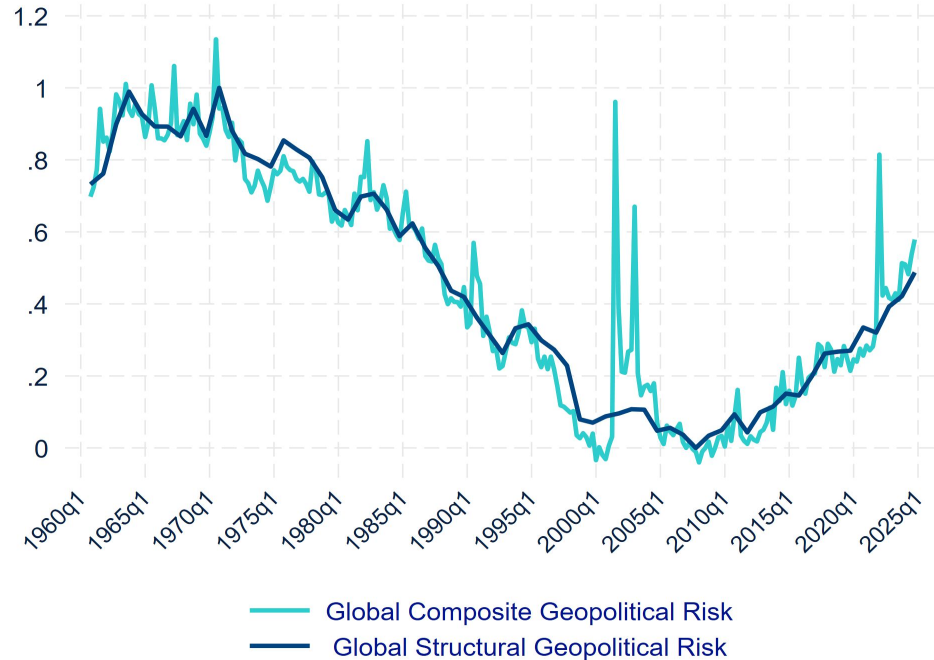Source: BBVA Research.

Combining news-based GPR with SGR accounts more accurately for changes in geopolitical risk

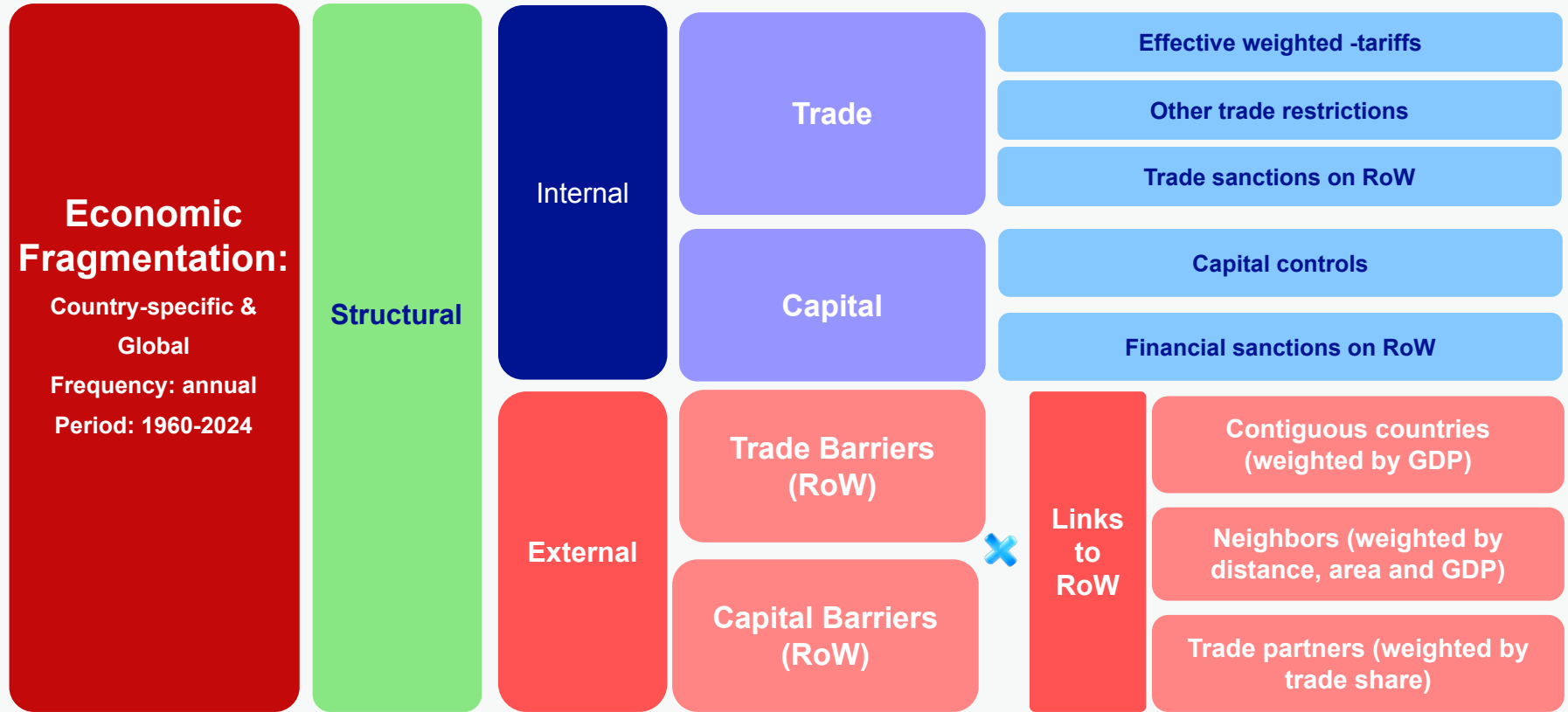through different historical periods and at particular episodes

- The combined stress indicator changes the relative risk conveyed by each indicator separately.

- For instance, the **Sept-11 attacks episode does not show the highest peak as it does in the GPR**, since the structural risk was around the trough of the analyzed period.

- On the contrary, the **stress level attained at the beginning of the Ukraine invasion is higher than the level during the second Iraq war**, due to the much higher structural risk seen recently

GLOBAL COMPOSITE GEOPOLITICAL RISK (CGR) 1960Q1-2025Q1 (STANDARDIZED VALUES - GDP WEIGHTED)

— Global Composite Geopolitical Risk
— Global Structural Geopolitical Risk

Notes: both variables are standardized, and the implicit geopolitical risk index is additional demeaned, thus, letting the variable fluctuate around 0 (which adds volatility to the total geopolitical stress variable).
Source: BBVA Research calculations and Caldara and Iacoviello (2022).

Economic Fragmentation Framework:

Economic Fragmentation:

Country-specific & Global

Frequency: annual

Period: 1960-2024

Structural

Internal

Trade
- Effective weighted -tariffs
- Other trade restrictions
- Trade sanctions on RoW

Capital
- Capital controls
- Financial sanctions on RoW

External

Trade Barriers (RoW)

Capital Barriers (RoW)

Links to RoW
- Contiguous countries (weighted by GDP)
- Neighbors (weighted by distance, area and GDP)
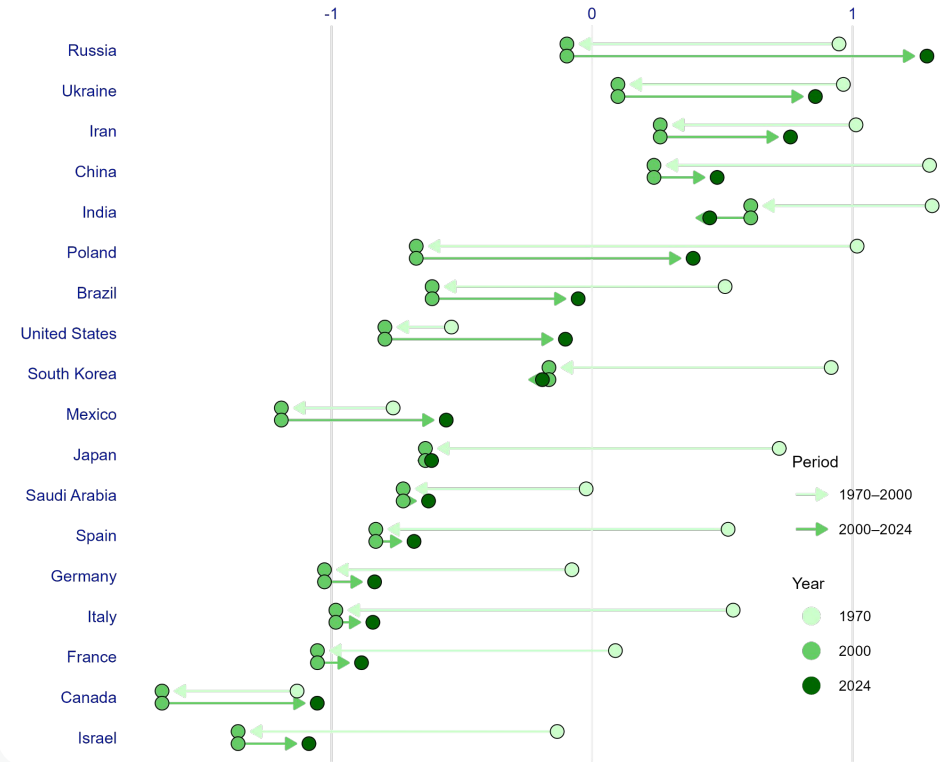- Trade partners (weighted by trade share)

Summary of country-specific indicators:

Economic Fragmentation

- The most **advanced economies**, such as Canada, France or Germany rank among the ones with the **highest openness**, aside from the **United States**, whose most recent policies have placed it near traditionally more isolated economies such as India or Brazil.

- **South Korea is again an atypical economy**: financially very open, but it has traditionally imposed high trade barriers
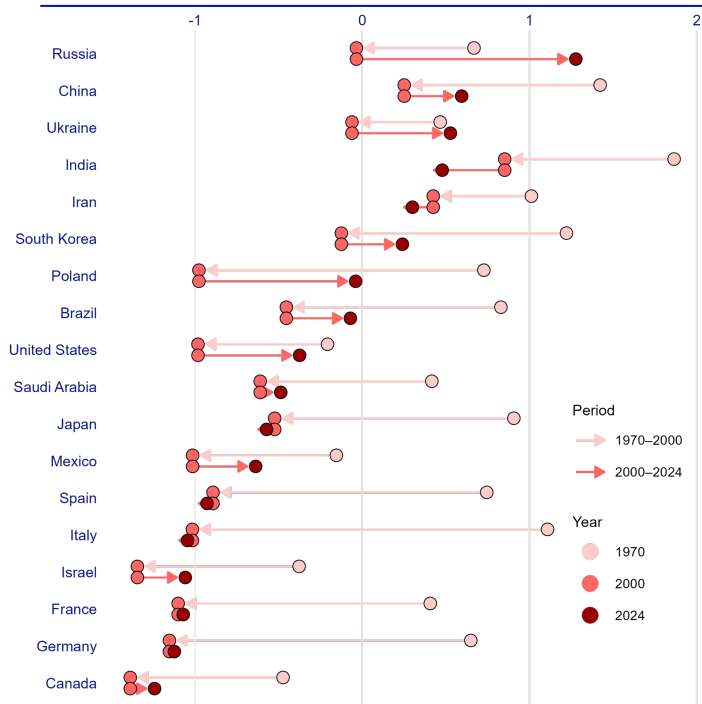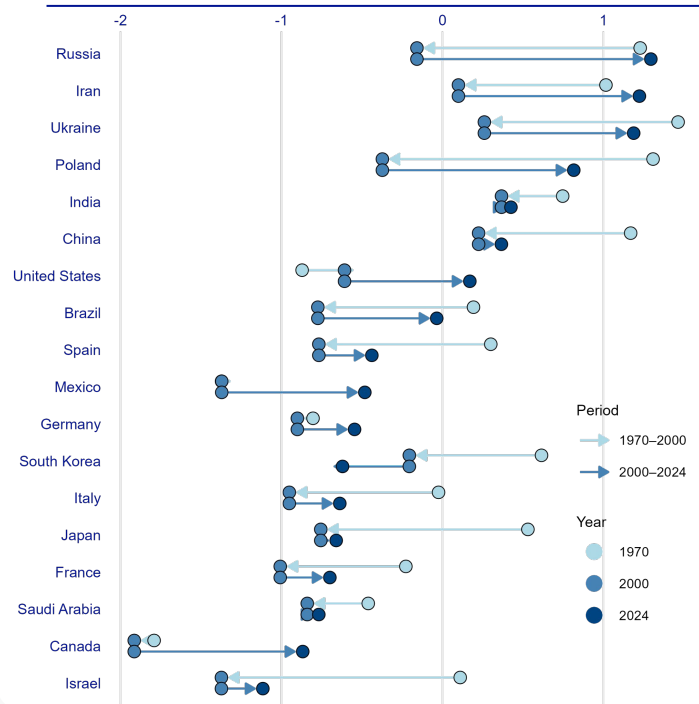

GLOBAL STRUCTURAL ECONOMIC FRAGMENTATION RISK

Summary of country-specific indicators:
Economic Fragmentation

TRADE BARRIERS

Countries (top to bottom): Russia, China, Ukraine, India, Iran, South Korea, Poland, Brazil, United States, Saudi Arabia, Japan, Mexico, Spain, Italy, Israel, France, Germany, Canada

Period: 1970–2000, 2000–2024

Year: 1970, 2000, 2024

FINANCIAL BARRIERS

Countries (top to bottom): Russia, Iran, Ukraine, Poland, India, China, United States, Brazil, Spain, Mexico, Germany, South Korea, Italy, Japan, France, Saudi Arabia, Canada, Israel

Period: 1970–2000, 2000–2024

Year: 1970, 2000, 2024

Note: the graphs include a selection of countries. Moreover, we have calculated all indices for a set of around 150 countries from 1960 to 2024.
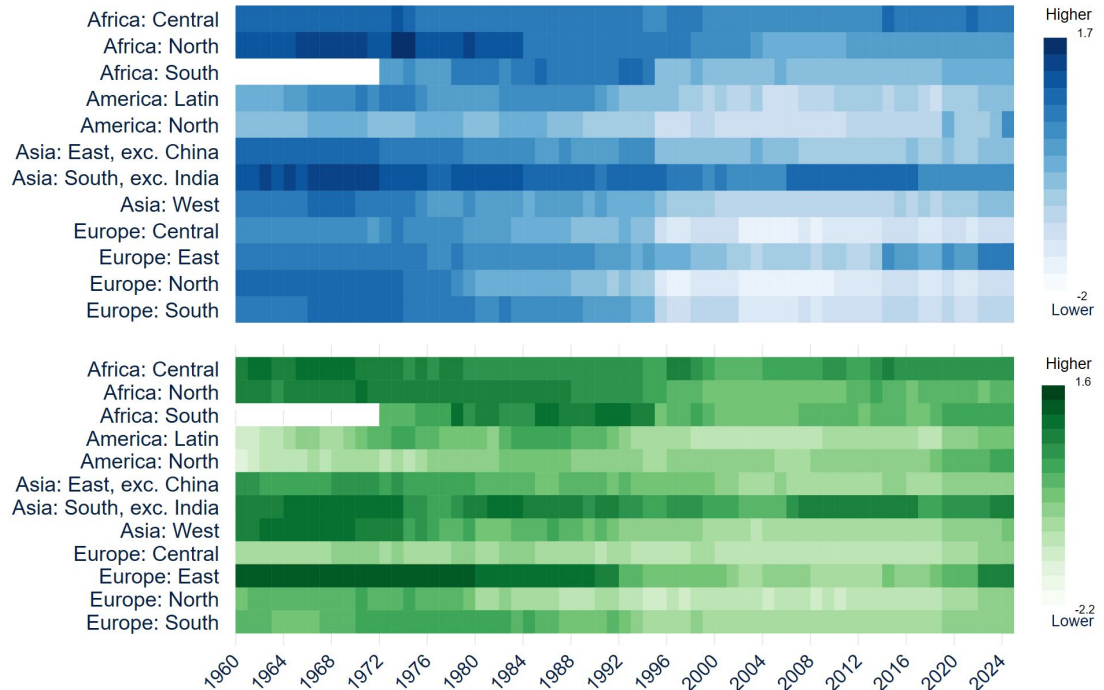Source: BBVA Research. Ordered in descending order of 2024 values.

Regional aggregates show similar patterns in trade and financial barriers

- **South Asia and Central Africa** have been consistently among the less open regions, both in terms of trade and financial barriers.

- Meanwhile, **most of Europe, the rest of Asia and North America** have historically being the most open ones.

- **East Europe** was almost completely closed financially during the communist era. It lived a great opening afterwards, but it is now experiencing a new upsurge in trade and financial barriers

REGIONAL ECONOMIC FRAGMENTATION (1960-2024)
(HIGHER VALUE INDICATES GREATER BARRIERS)

TRADE (BLUE) & FINANCIAL (GREEN) BARRIERS

Source: BBVA Research

Key messages stemming from the geopolitical and fragmentation indicators:

INTERNAL RISKS

Driven by a **deterioration in democratic** standards, a pronounced **increase in political polarization**, and recent **military rearmament,** internal risks have **flourished** in Ukraine, Russia, Eastern Europe, Iran, West Asia, and China (summary presented in slide 22).

EXTERNAL RISKS

Stemming from contiguous states, neighboring countries, and **ideological rivals,** external-originated geopolitical risks are **most pronounced along the Russia–Ukraine border**, Israel, in the Middle East, and in West Asia (historical evolution in slide 30).

STRUCTURAL GEOPOLITICAL STRESS

Ukraine, Russia, Israel, Iran, and Eastern Europe have the greatest geopolitical risk (slide 32). After declining from 1960 to 2000, the GDP-weighted **global Structural Geopolitical Risk (SGR) index has upticked since 2000**, peaking in the early 2020s, explained by **internal and external institutional and political tensions, and military buildups**.

STRUCTURAL GEOPOLITICAL STRESS & NEWS-BASED GPR

The **combination** of news-based geopolitical risk indicators and structural indicators provides a **highly comprehensive view of the historical evolution of geopolitical risk.** The recent conflicts between **Ukraine and Russia** are reflected in both perspectives, indicating that the **risk is even greater than that captured by the media** (slide 35).

ECONOMIC FRAGMENTATION

Global risk of fragmentation has been on the rise, explained by the sharp increase since 2000 in the number of **trade and financial sanctions imposed** by countries such as the United States, Russia, China, the United Kingdom, and Europe, thereby returning to the levels of economic fragmentation experienced in the **1990s** (slide 49).

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Index

Geopolitical Risk

Economic Fragmentation

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1. Geopolitical risk: internal risk

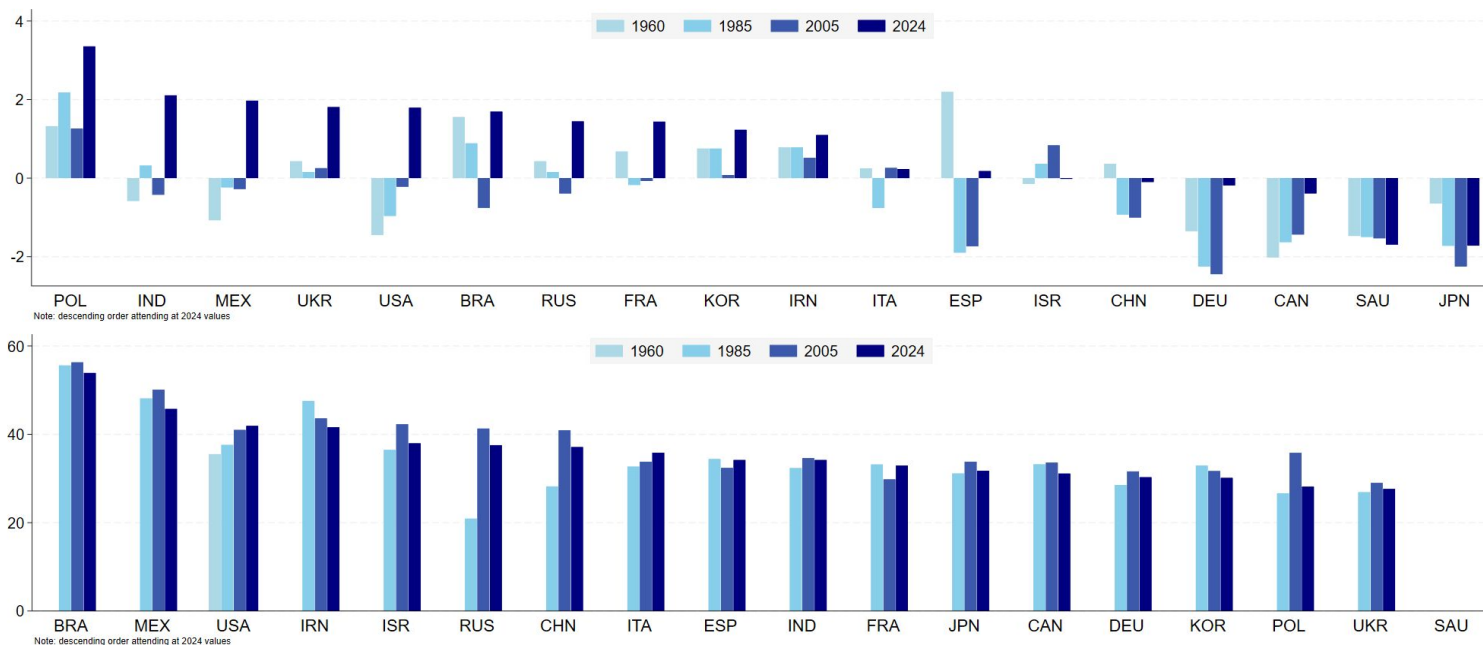# Internal political risk components:

Electoral Democracy and Rule of Law

COUNTRY-SPECIFIC ELECTORAL *DEMOCRACY* INDEX (*UPPER*) AND *RULE OF LAW (LOWER)* FOR SELECTED YEARS (HIGHER VALUE INDICATES CLOSER TO FULL DEMOCRACY AND GREATER RULE OF LAW)

Note: ascending order attending at 2024 values

Note: ascending order attending at 2024 values

Source: BBVA Research from V-Dem (Varieties of Democracy) Database.

Internal political risk components:

Political Polarization and Income Inequality

POLITICAL POLARIZATION (UPPER) AND INEQUALITY GINI COEFFICIENT (LOWER) FOR SELECTED YEARS (HIGHER VALUE INDICATES GREATER POLARIZATION AND HIGHER INCOME INEQUALITY)
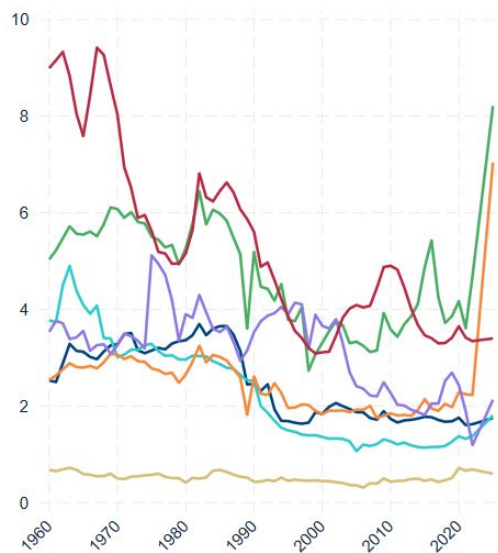
Note: descending order attending at 2024 values

Source: BBVA Research from V-Dem (Varieties of Democracy) Database and World Bank.

Internal military readiness

Ways of gauging country-level military capabilities
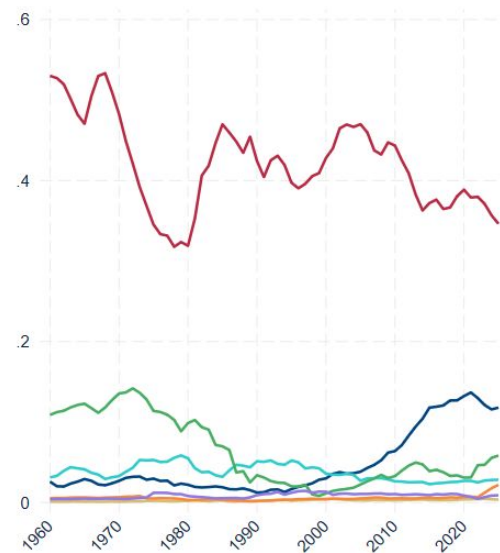
MILITARY EXPENDITURE
(1960-2023)

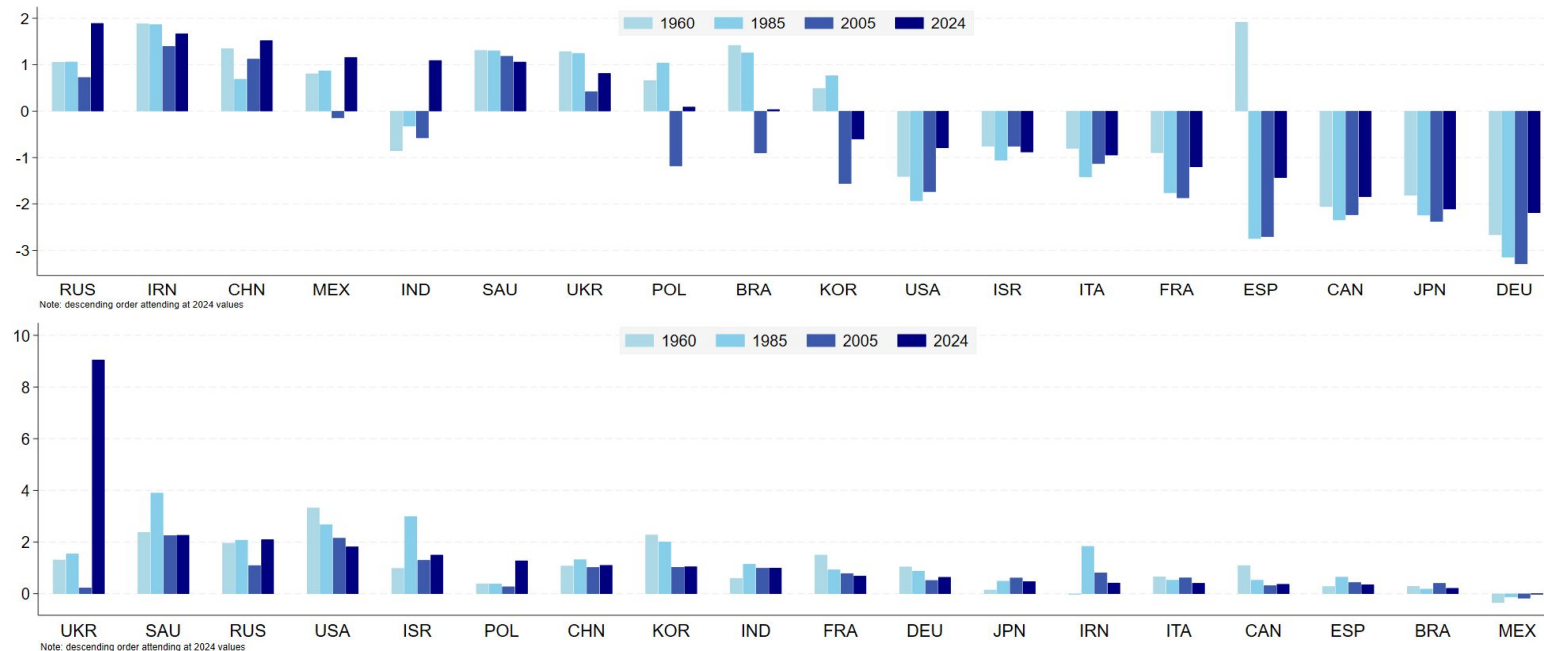% GDP

% TOTAL GOV. EXPENDITURE

% WORLD EXPENDITURE

Legend: China — Germany — Iran — Mexico — Poland — Russia — USA
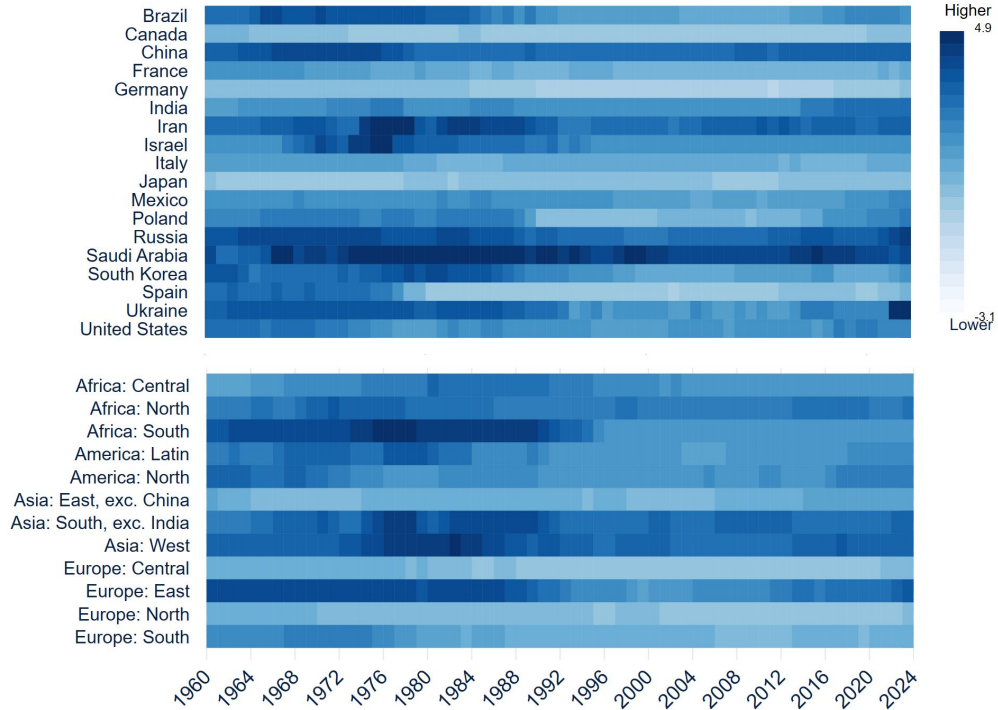
Internal risk

Political risk and military readiness

POLITICAL RISK (UPPER) AND MILITARY READINESS (LOWER) FOR SELECTED YEARS
(HIGHER VALUE INDICATES GREATER RISK)

Note: descending order attending at 2024 values

Note: descending order attending at 2024 values

Internal Risk: selected countries and regions

COUNTRY-SPECIFIC AND REGIONAL HISTORICAL INTERNAL RISK (1960-2024) (HIGHER VALUE INDICATES GREATER RISK)

Source: BBVA Research

2. Geopolitical risk: external risk

How do we construct the External Risk index?

For each country, we estimate weighted averages of the political risk, the ideological distance and the military risk of every other foreign country in the world, following three definitions of interconnection:

1. **Contiguous**: countries that share a border
2. **Neighboring**: nearest countries according to a measure of geographical distance
3. **Ideological Rivalry**: Most distant countries according to their votes in the UN Assembly

For each variable X : {Political Risk, Ideological Distance, Military Risk} , country (i) and foreign countries (j)

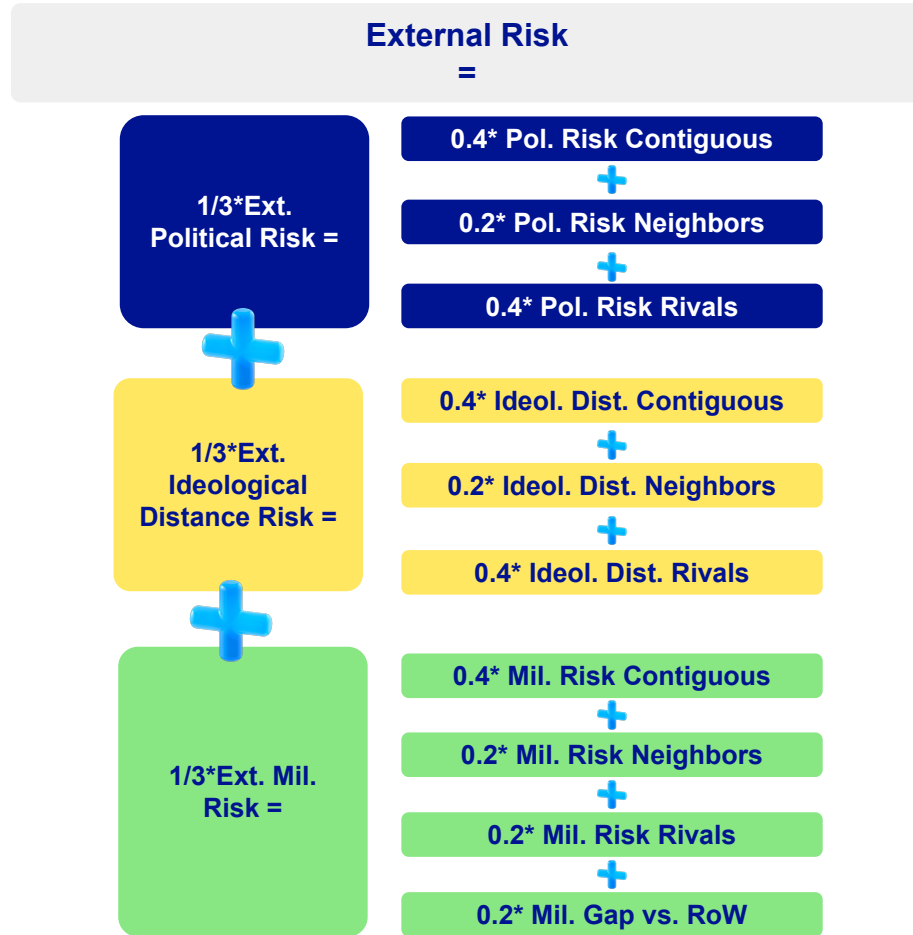|	
*Weighted Avg. of X, Contiguous (i) = ∑ [CW (j) * X (j)]*	*CW (j) = (Border (1,0) (j)) * Logistic(Pop(j))*
*Weighted Avg. of X, Neighboring (i) = ∑ [NW (j) * X (j)]*	*NW (j) = (Surface Area(j)^(1/2)) * Logistic(Pop(j))/ exp(DISTANCE(j)/1000)*
*Weighted Avg. of X, Rivalry (i) = ∑ [RW (j) * X (j)]*	*RW (j) = ((Ideological Distance(j) - Mean)^2) *Logistic(Pop(j))*

Where: *Logistic(Pop(j)) = (10/(1+exp(-0.000225*(Population(j)-Percentile90))).*   (See Appendix for more details)

Additionally we also estimate the military gap of every country vs. the rest of the world as:

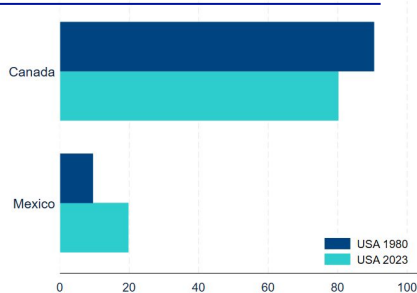*Mil. Gap (i) = ∑ [Mil. Exp./GDP (i) - (⅓* NW (j) + ⅓* CW(j) + ⅓*RW(j))*Mil. Exp/GDP(j)]*

How do we construct the External Risk index?

External Risk =

1/3*Ext. Political Risk =

- 0.4* Pol. Risk Contiguous
- **+**
- 0.2* Pol. Risk Neighbors
- **+**
- 0.4* Pol. Risk Rivals

+

1/3*Ext. Ideological Distance Risk =

- 0.4* Ideol. Dist. Contiguous
- **+**
- 0.2* Ideol. Dist. Neighbors
- **+**
- 0.4* Ideol. Dist. Rivals

+

1/3*Ext. Mil. Risk =

- 0.4* Mil. Risk Contiguous
- **+**
- 0.2* Mil. Risk Neighbors
- **+**
- 0.2* Mil. Risk Rivals
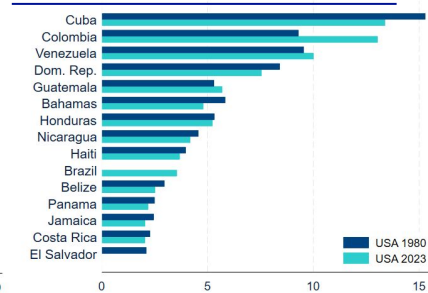- **+**
- 0.2* Mil. Gap vs. RoW

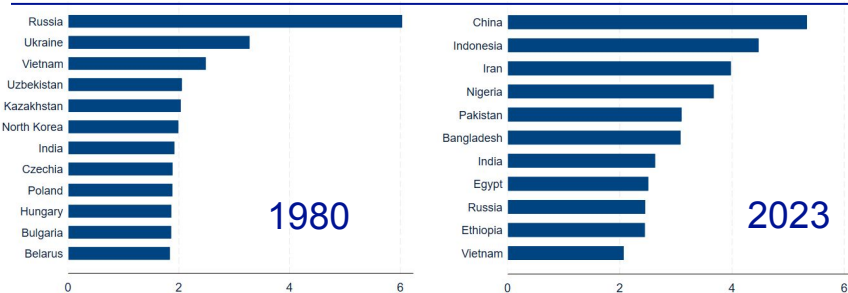# Weights that define geospatial and ideological interconnectedness: US & China
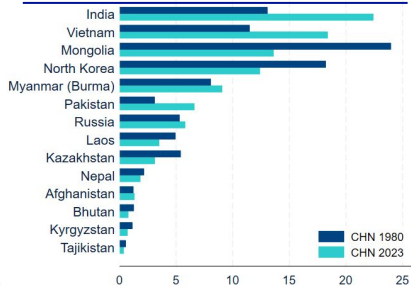

USA contiguous countries weights (%)
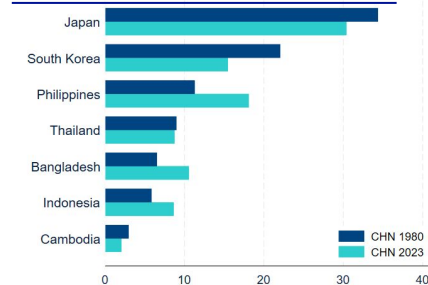
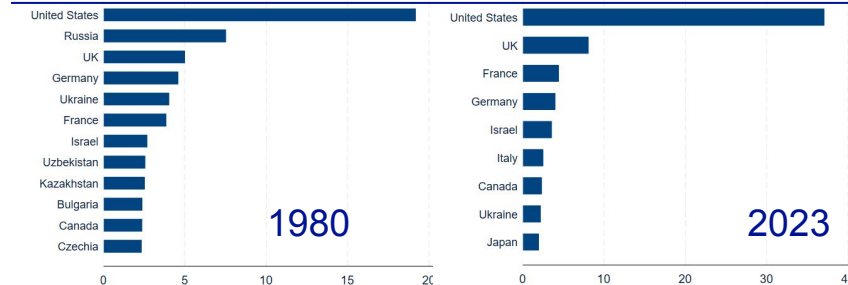### USA neighboring countries weights (%)

USA ideological rivals weights (%)

China contiguous countries weights (%)
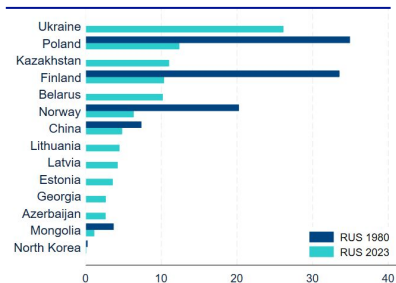
China neighboring countries weights (%)
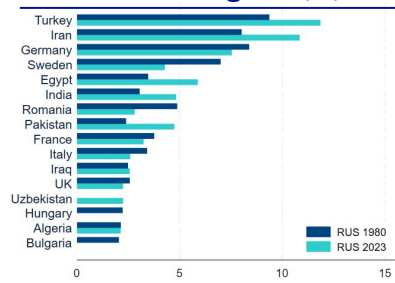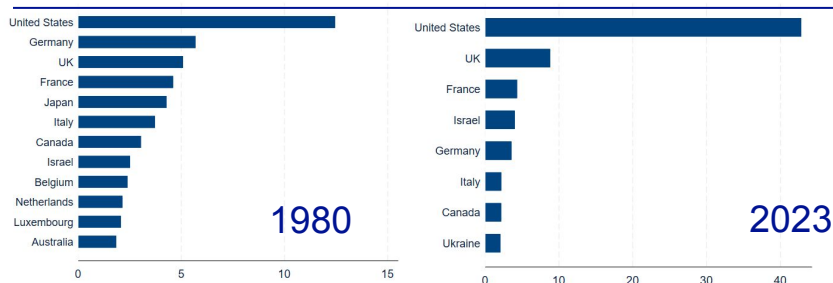
China ideological rivals weights (%)

Source: BBVA Research.

Weights that define geospatial and ideological interconnectedness: Russia & Ukraine

Russia contiguous countries weights (%)

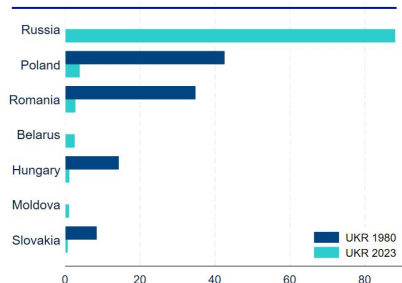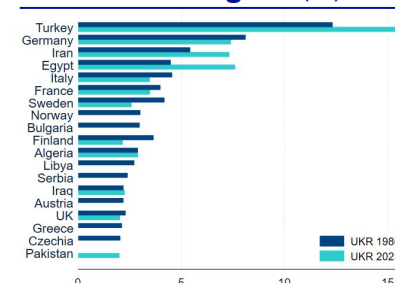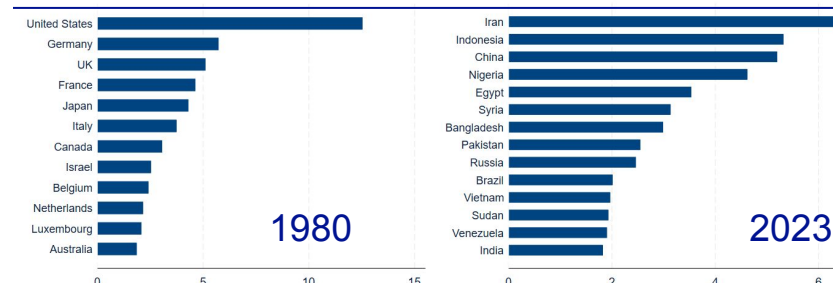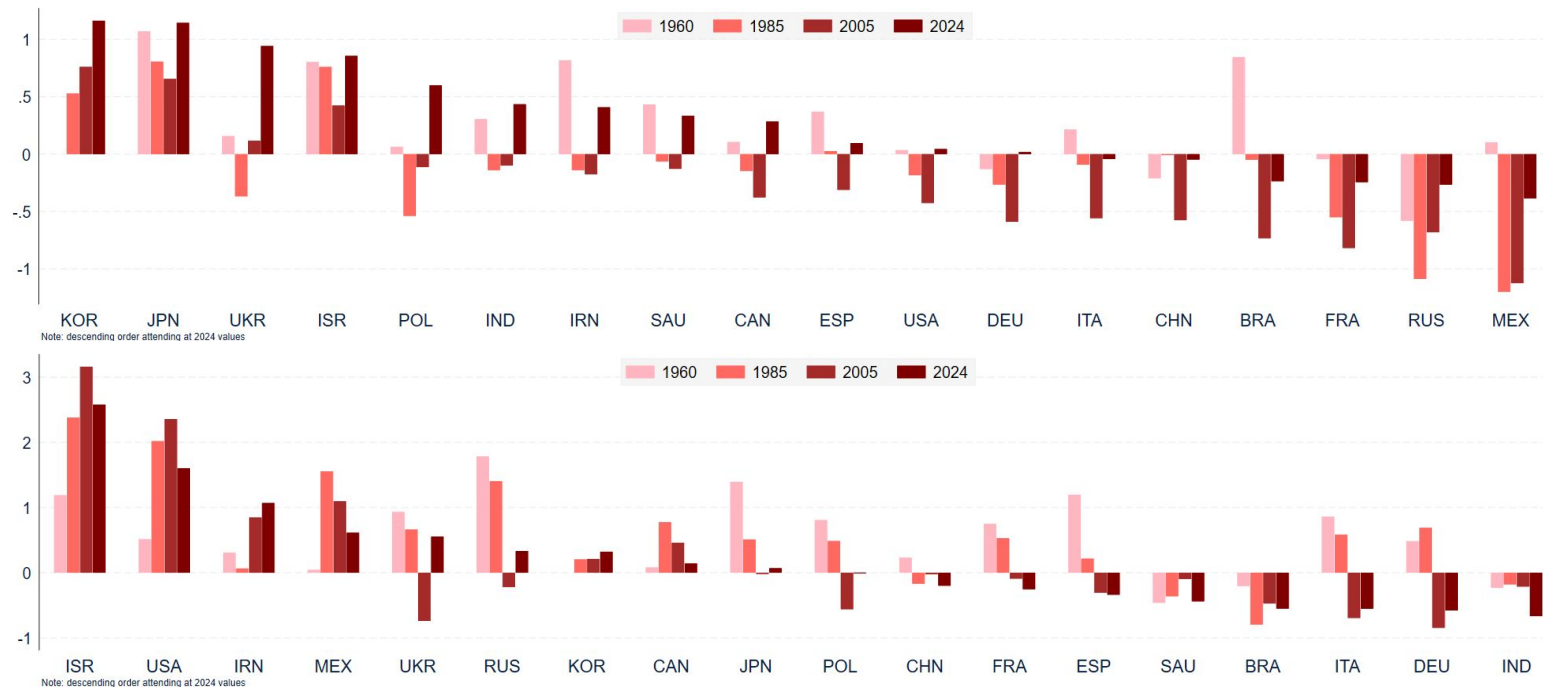Countries (top to bottom): Ukraine, Poland, Kazakhstan, Finland, Belarus, Norway, China, Lithuania, Latvia, Estonia, Georgia, Azerbaijan, Mongolia, North Korea

Legend: RUS 1980, RUS 2023

Axis: 0, 10, 20, 30, 40

Russia neighboring countries weights (%)

Countries (top to bottom): Turkey, Iran, Germany, Sweden, Egypt, India, Romania, Pakistan, France, Italy, Iraq, UK, Uzbekistan, Hungary, Algeria, Bulgaria

Legend: RUS 1980, RUS 2023

Axis: 0, 5, 10, 15

Russia Ideological rivals weights (%)

1980 — Countries (top to bottom): United States, Germany, UK, France, Japan, Italy, Canada, Israel, Belgium, Netherlands, Luxembourg, Australia

Axis: 0, 5, 10, 15

2023 — Countries (top to bottom): United States, UK, France, Israel, Germany, Italy, Canada, Ukraine

Axis: 0, 10, 20, 30, 40

Ukraine contiguous countries weights (%)

Countries (top to bottom): Russia, Poland, Romania, Belarus, Hungary, Moldova, Slovakia

Legend: UKR 1980, UKR 2023

Axis: 0, 20, 40, 60, 80

Ukraine neighboring countries weights (%)

Countries (top to bottom): Turkey, Germany, Iran, Egypt, Italy, France, Sweden, Norway, Bulgaria, Finland, Algeria, Libya, Serbia, Iraq, Austria, UK, Greece, Czechia, Pakistan

Legend: UKR 1980, UKR 2023

Axis: 0, 5, 10, 15

Ukraine Ideological rivals weights (%)

1980 — Countries (top to bottom): United States, Germany, UK, France, Japan, Italy, Canada, Israel, Belgium, Netherlands, Luxembourg, Australia

Axis: 0, 5, 10, 15

2023 — Countries (top to bottom): Iran, Indonesia, China, Nigeria, Egypt, Syria, Bangladesh, Pakistan, Russia, Brazil, Vietnam, Sudan, Venezuela, India

Axis: 0, 2, 4, 6
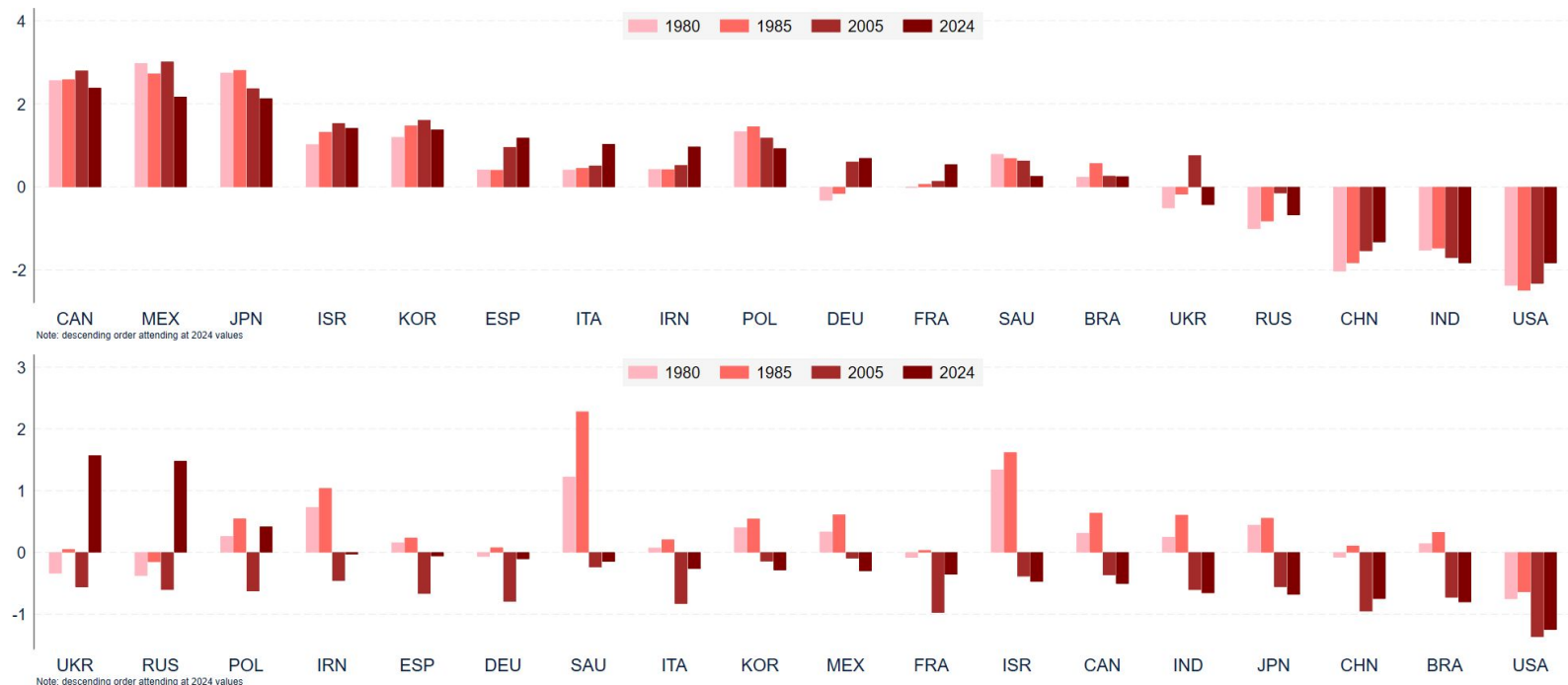
External risk components: political and ideological risk

EXTERNAL *POLITICAL RISK (UPPER)* AND *IDEOLOGICAL RISK (LOWER)* FOR SELECTED YEARS
(HIGHER VALUE INDICATES HIGHER RISK)

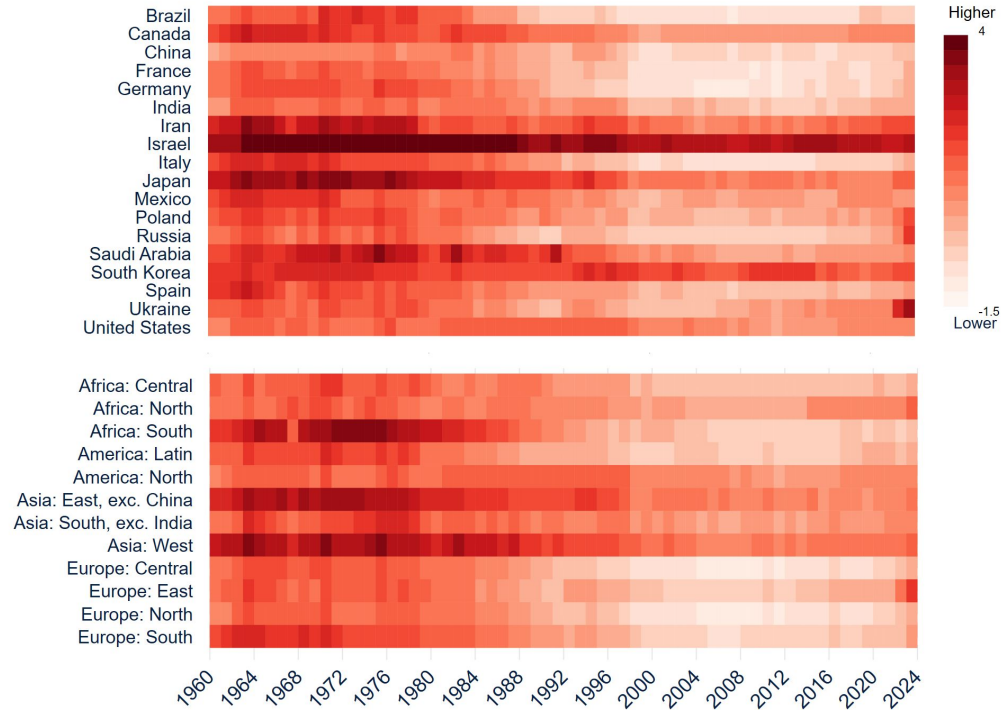Note: descending order attending at 2024 values

External risk: deep dive on external military risk

MILITARY RISK GAP WITH RoW (UPPER), COUNTRY-SPECIFIC *EXTERNAL MILITARY RISK (LOWER)*
(% GDP; ADJUSTED BY RELATIVE POPULATION OF DESTINY TO ORIGIN COUNTRY)

Note: descending order attending at 2024 values

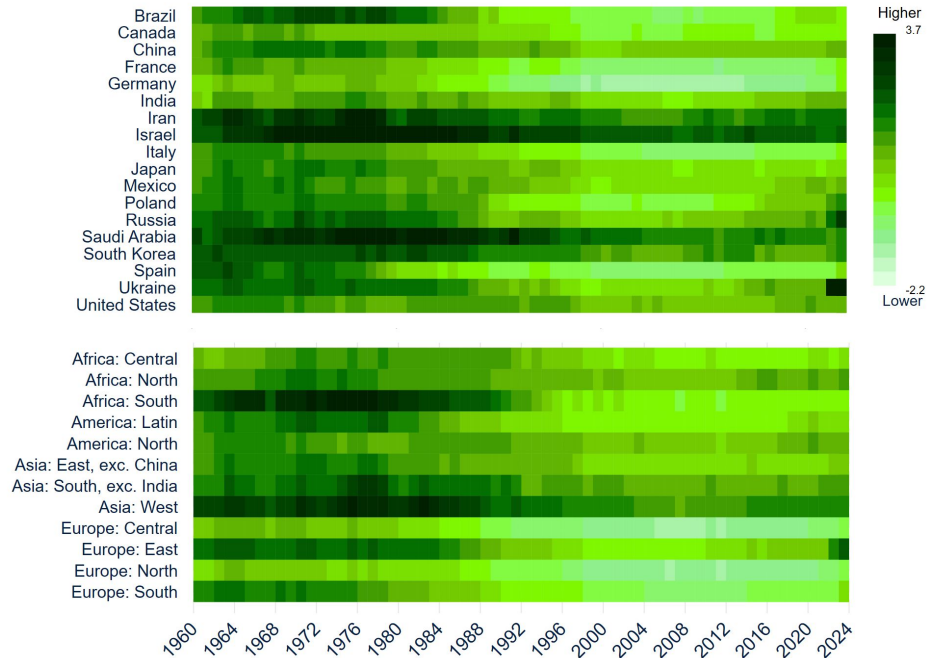# External risk: selected countries and regions

COUNTRY-SPECIFIC AND REGIONAL HISTORICAL EXTERNAL RISK (1960-2024) (HIGHER VALUE INDICATES GREATER RISK)

Source: BBVA Research

3. Structural geopolitical risk (SGR)

Structural Geopolitical Risk (SGR)

COUNTRY-SPECIFIC AND REGIONAL HISTORICAL STRUCTURAL GEOPOLITICAL RISK (1960-2024)
(HIGHER VALUE INDICATES GREATER RISK)

How do we construct Total Structural Geopolitical Risk?
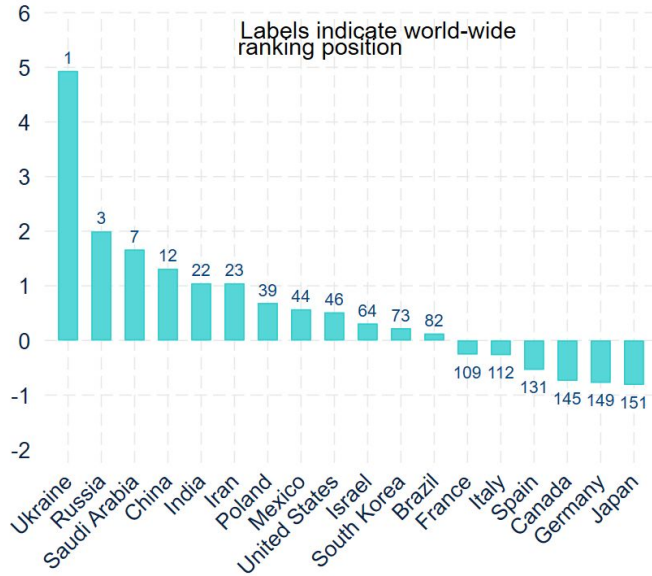
Structural Geopolitical Risk =

1/2 * Internal Risk

+

1/2 * External Risk
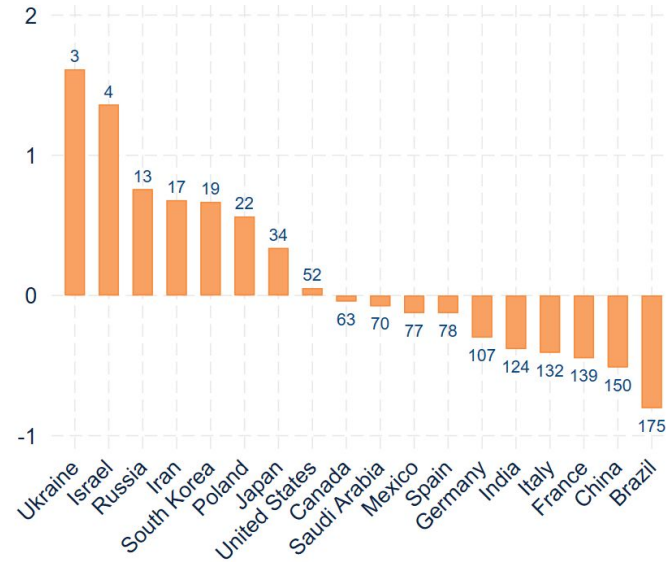
Source: BBVA Research.

Structural Geopolitical Stress: world-wide ranking

COUNTRY-SPECIFIC STRUCTURAL GEOPOLITICAL STRESS INDICATORS (2024)
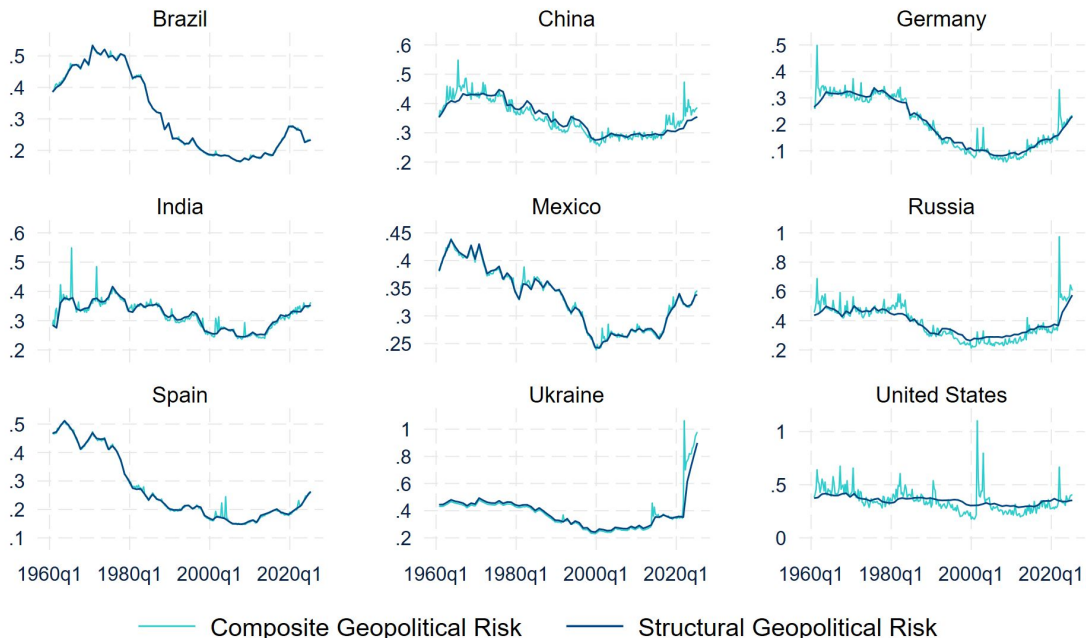(HIGHER VALUE INDICATES GREATER RISK)

INTERNAL RISK

EXTERNAL RISK

Labels indicate world-wide ranking position

4. Composite geopolitical risk (CGR)

Country-specific Total Geopolitical Risk

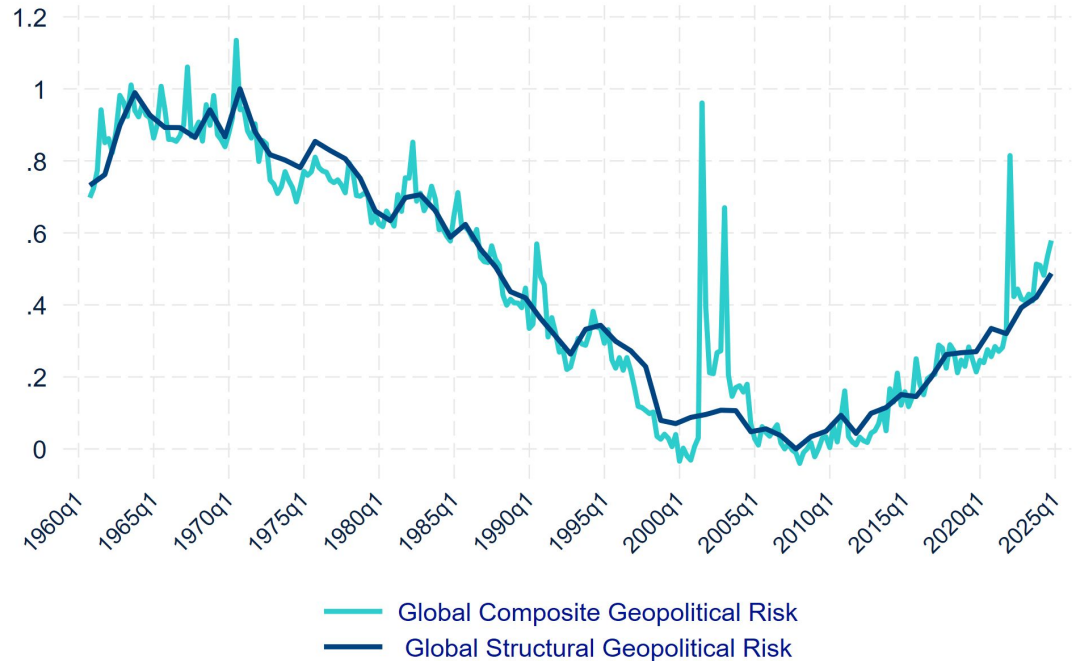**COUNTRY-SPECIFIC COMPOSITE GEOPOLITICAL RISK (CGR) 1960Q1-2025Q1** (STANDARDIZED VALUES)

Notes: both variables are standardized, and the implicit geopolitical risk index is additional demeaned, thus, letting the variable fluctuate around 0 (which adds volatility to the total geopolitical stress variable).
Source: BBVA Research calculations and Caldara and Iacoviello (2022).

Combining news-based GPR with structural risk shows aggregate changes are notably larger when the structural dimension is included

GLOBAL COMPOSITE GEOPOLITICAL RISK (CGR) 1960Q1-2024-Q4
(STANDARDIZED VALUES - GDP WEIGHTED)

— Global Composite Geopolitical Risk
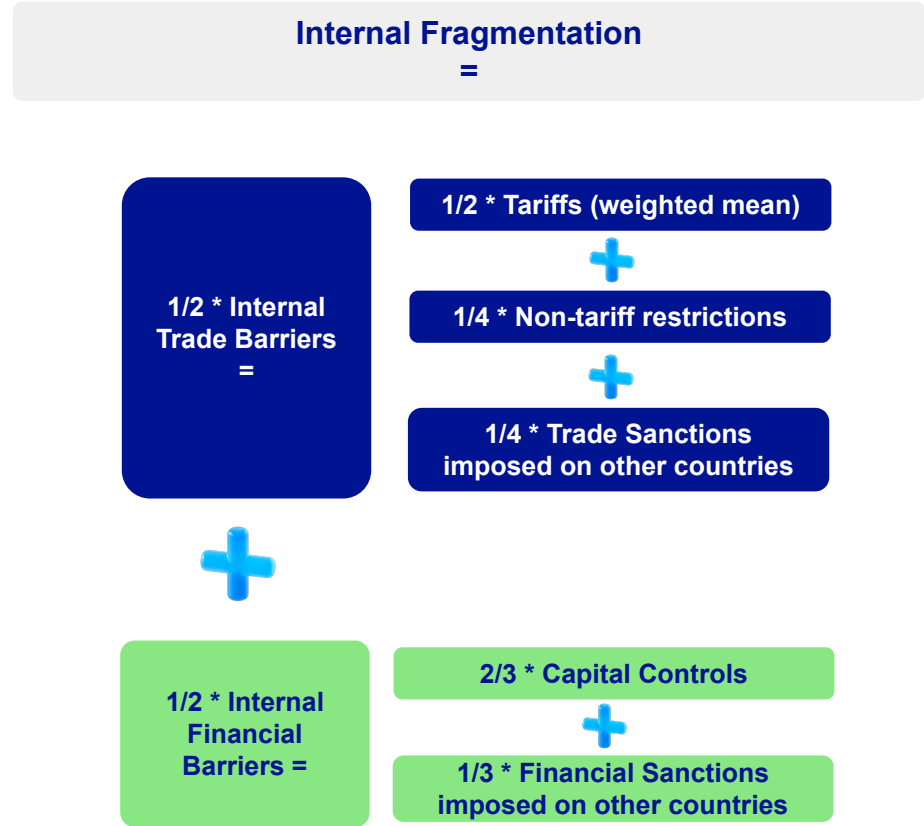— Global Structural Geopolitical Risk

Notes: both variables are standardized, and the implicit geopolitical risk index is additional demeaned, thus, letting the variable fluctuate around 0 (which adds volatility to the total geopolitical stress variable).
Source: BBVA Research calculations and Caldara and Iacoviello (2022).

5. Internal trade & financial barriers

How do we construct Internal Fragmentation?

Internal Fragmentation =

1/2 * Internal Trade Barriers =

1/2 * Tariffs (weighted mean)

+

1/4 * Non-tariff restrictions

+

1/4 * Trade Sanctions imposed on other countries

+

1/2 * Internal Financial Barriers =

2/3 * Capital Controls

+

1/3 * Financial Sanctions imposed on other countries

Fragmentation indicators: self imposed trade barriers

COUNTRY-SPECIFIC WEIGHTED TARIFF FOR SELECTED YEARS
(%)

Legend: 1960 — 1985 — 2005 — 2025

Note: descending order attending at 2025 values
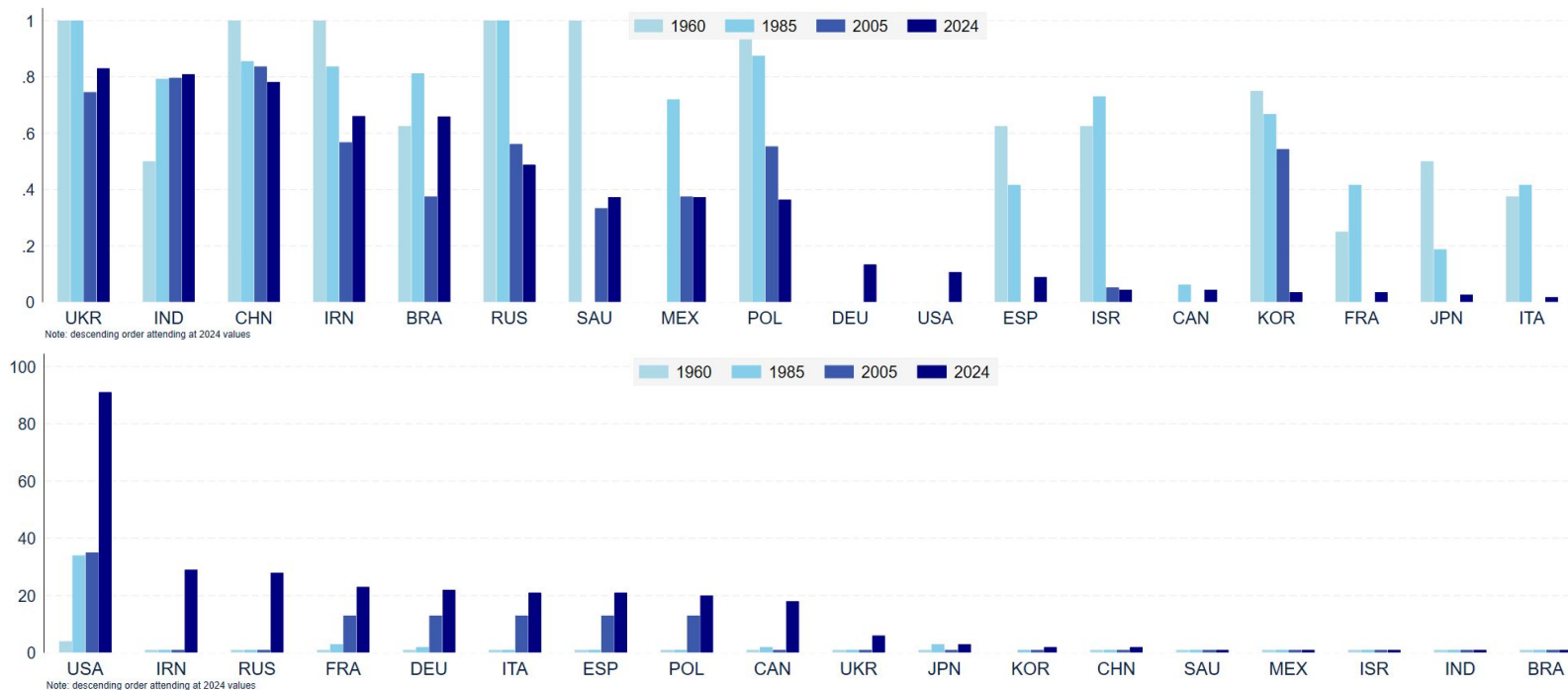
Source: BBVA Research.

Fragmentation indicators: self imposed trade barriers

TRADE RESTRICTIONS (UPPER) AND TRADE SANCTIONS IMPOSED (LOWER), SELECTED YEARS
(%; HIGHER VALUE INDICATES GREATER NUMBER OF IMPOSED RESTRICTIONS (20 MAX.))

Note: descending order attending at 2024 values

Source: BBVA Research.

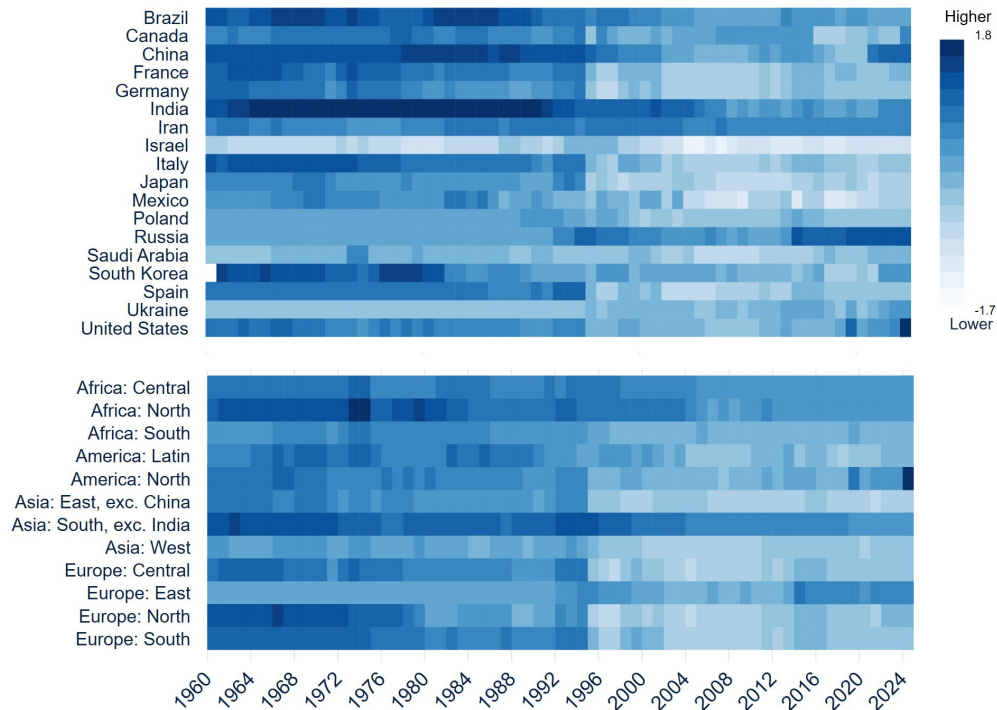# Fragmentation Indicators: self imposed financial barriers

CAPITAL CONTROLS (UPPER) & FINANCIAL SANCTIONS IMPOSED (LOWER), SELECTED YEARS
(FROM 0 (LOWEST) TO 1 (HIGHEST))

Note: descending order attending at 2024 values

Source: BBVA Research.

Fragmentation indicators

COUNTRY-SPECIFIC HISTORICAL SELF-IMPOSED TRADE BARRIERS (1960-2025) (HIGHER VALUE INDICATES GREATER BARRIERS)
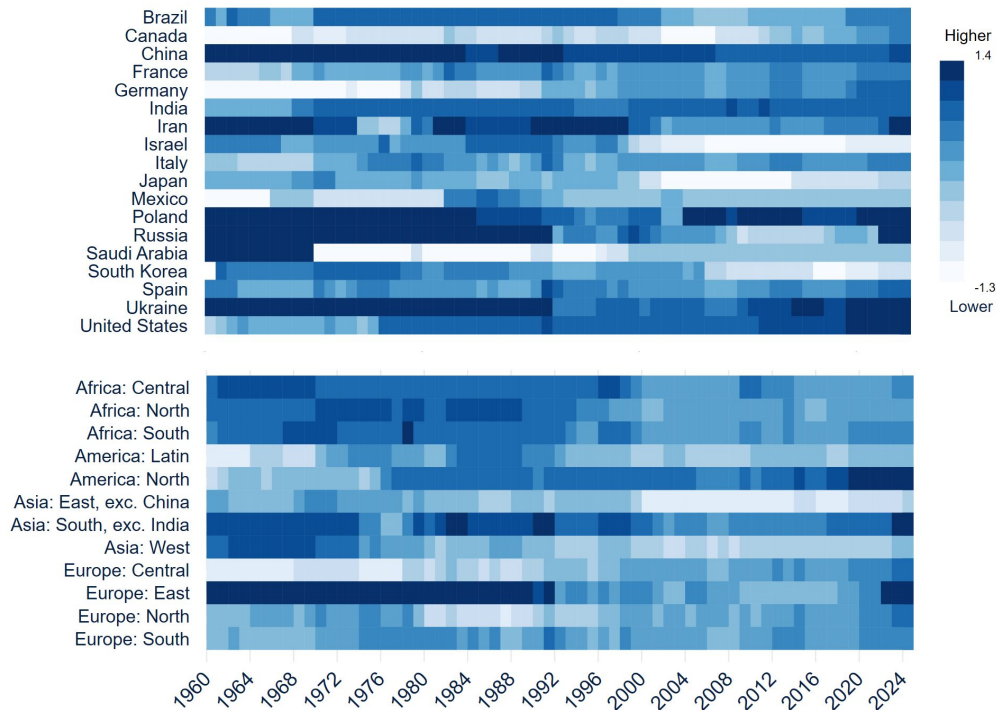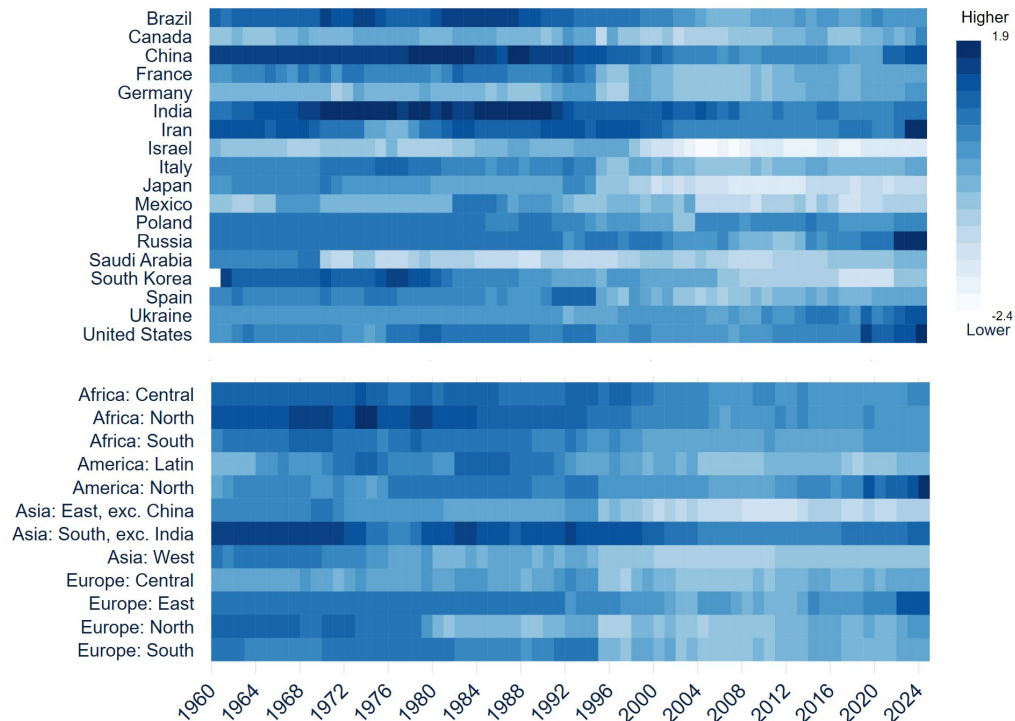
Source: BBVA Research

Fragmentation indicators

COUNTRY-SPECIFIC HISTORICAL SELF- IMPOSED FINANCIAL BARRIERS (1960-2025) (HIGHER VALUE INDICATES GREATER BARRIERS)

Fragmentation indicators

COUNTRY-SPECIFIC HISTORICAL INTERNAL FRAGMENTATION (1960-2025) (HIGHER VALUE INDICATES GREATER BARRIERS)

Source: BBVA Research

6. External trade & financial barriers

How do we construct External Trade Barriers?

External Trade Barriers =

1/2*Ext. Tariffs =

+ 0.4* Tariffs Contiguous
+ 0.2* Tariffs Neighbors
+ 0.4* Tariffs Trade Partners

1/4*Ext. Trade Restrictions =

+ 0.4* Trade Restr. Contiguous
+ 0.2* Trade Restr. Neighbors
+ 0.4*Trade Restr. Trade Partners

1/4*Trade Sanctions Imposed by RoW =

+ 0.4* Trade Sanctions Contiguous
+ 0.2* Trade Sanctions Neighbors
+ 0.4* Trade Sanctions Rivals

Neighbors, Contig. & Partners=

$Var\ X\ Neighbours\ (i) = \sum [\ NW\ (j) * Var\ X\ (j)\ ]$

$Var\ X\ Contiguous\ (i) = \sum [CW\ (j) * Var\ X\ (j)\ ]$

$Var\ X\ Trade\ Part.(\ i) = \sum [TW\ (j) * Var\ X\ (j)\ ]$

Weights & Transformations =

$CW\ (j) = (Border\ (1,0)\ (j)) * Log(GDP(j))$

$NW\ (j) = (\ Surface\ Area(j)^{(1/2)}\ ) * Log(GDP(j))/ exp(DISTANCE(j)/1000)$

$TW\ (j) = [\ X(\ ij\ )+ M(\ ij\ )]\ /\ \sum [X(\ j\ )+ M(\ j\ )]$

How do we construct External Financial Barriers?

External Financial Barriers =

2/3* Ext. Cap. Controls =

+

1/3* Financial Sanctions imposed by RoW =

0.4* Capital Controls Contiguous

+

0.2* Capital Controls Neighbors

+

0.4* Capital Controls Trade Partners

0.4* Fin. Sanctions Contiguous

+

0.2* Fin. Sanctions Neighbors

+

0.4* Fin. Sanctions Trade Partners

Neighbors, Contig. & Partners=

*Var X Neighbours (i) = $\sum$ [DW (j) * Var X (j)]*

*Var X Contiguous (i) = $\sum$ [CW (j) * Var X (j)]*

*Var X Trade Part.(i) = $\sum$ [IW (j) * Var X (j)]*
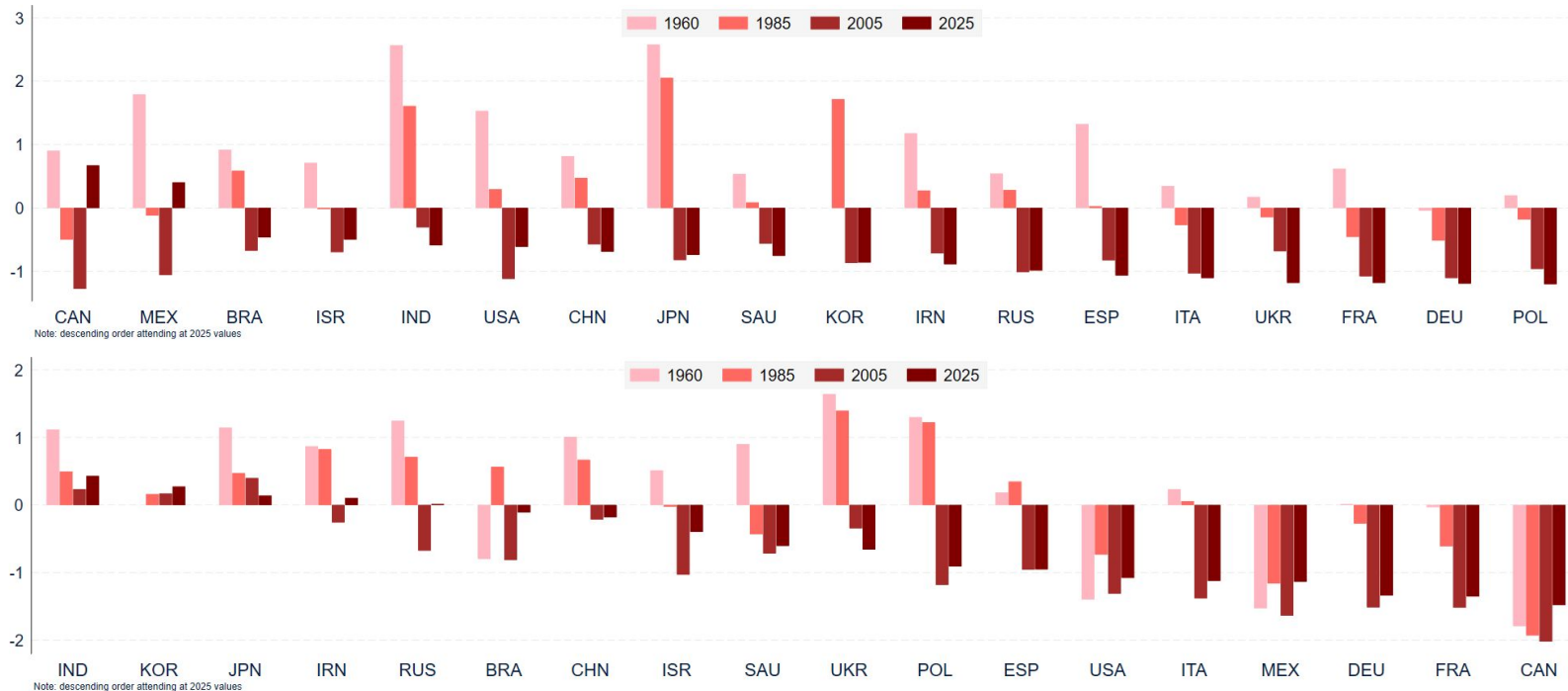
Weights & Transformations =

*CW (j) = (Border (1,0) (j)) * Log(GDP(j))*

*NW (j) = (Surface Area(j)^(1/2)) * Log(GDP(j))/ exp(DISTANCE(j)/1000)*

TW (j) = [X(ij)+ M(ij)] / $\sum$ [X(j)+ M(j)]

External Fragmentation Indicators

EXTERNAL TARIFFS (ROW - PEERS, *UPPER*) & *CAPITAL CONTROLS* (ROW- PEERS, *LOWER*)

Note: descending order attending at 2025 values
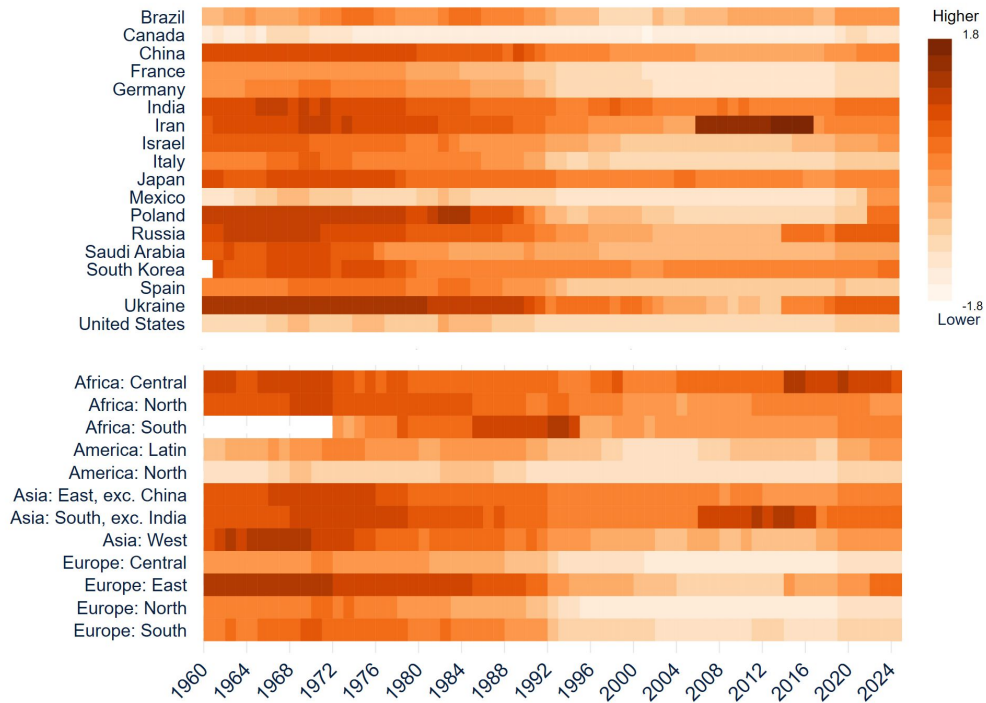
Fragmentation indicators

COUNTRY-SPECIFIC HISTORICAL EXTERNAL TRADE BARRIERS INDEX (1960-2025) (HIGHER VALUE INDICATES GREATER BARRIERS)

Source: BBVA Research

Fragmentation indicators

COUNTRY-SPECIFIC HISTORICAL EXTERNAL FINANCIAL BARRIERS (1960-2025) (HIGHER VALUE INDICATES GREATER BARRIERS)

Source: BBVA Research

7. Economic fragmentation index

How do we construct the Total Economic Fragmentation index?

Structural Economic Fragmentation =

1/2 * Trade Barriers =

1/2* Internal Trade Barriers

+

1/2* External Trade Barriers

+

1/2 * Financial Barriers

1/2* Internal Financial Barriers

+

1/2* External Financial Barriers

Total Economic Fragmentation

COUNTRY-SPECIFIC HISTORICAL TOTAL ECONOMIC FRAGMENTATION INDEX (1960-2025)
(HIGHER VALUE INDICATES GREATER RISK)

How do we construct Structural Economic Fragmentation Index?

Structural Economic Fragmentation =

1/2 * Trade Barriers

+

1/2 * Financial Barriers

Our fragmentation indicators seem to track closely the evolution of international trade

GLOBAL HISTORICAL ECONOMIC FRAGMENTATION INDEX AND TRADE (1960-2025)
(INVERTED FRAGMENTATION; % GDP RHS)

Total Fragmen. Risk — — Trade Barriers — — Financial Barriers

Inverse Fragmentation Risk — World Trade/GDP

JUNE 2025

Miguel Jiménez, David Sarasa & Alfonso Ugarte

A New Set of Structural Indicators: Geopolitical Risk and Economic Fragmentation

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Appendix

Variables and sources

Group	Variable	Source
Political Risk	Political Polarization	V-DEM DATABASE
	Electoral Democracy Index	V-DEM DATABASE
	Rule of Law	V-DEM DATABASE
	Inequality (Gini coefficient)	World Bank (+Other)
Military Readiness	Military Expenditure (% GDP)	SIPRI (+World Bank)
	Military Expenditure (% total government expenditure)	SIPRI (+World Bank)
Weighting Variables	Population	UN (+ WB + IMF)
	Country Area	World Bank
	Distance	CEPII Gravity Database
	Ideology Distance	Bailey et al. (2017) (UN Votes)
	Frontiers	CEPII Gravity Database
Others	Nominal GDP USD	World Bank (+ IMF + Gravity)
Economic Fragmentation	Bilateral Exports and Imports	IMF (UNCTAD)
	Weighted Mean Applied Tariff	World Bank
	Financial & Trade Sanctions	Global Sanctions Database (GSDB)
	Non-Tariff Restrictions	Measure of Aggregate Trade Restrictions (MATR)
	Capital Controls	IMF
Cyclical Variables	Geopolitical Risk Index (GPR)	Caldara & Iacoviello (2022)
	Economic Policy Uncertainty Index (EPU)	Bloom et al. (2013)

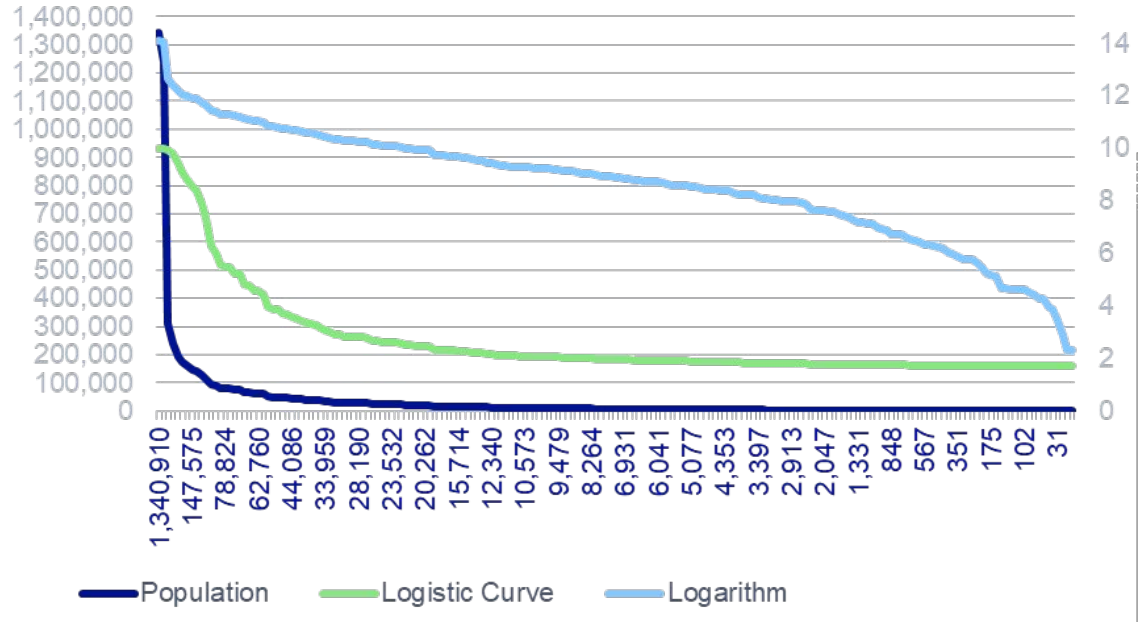# How do we assigns weights to each variable in the different indexes?

We try to construct the indexes in the most agnostic possible way, according to the following criteria:

-   Weights given by a Principal Components Analysis (PCA) when the components are easily interpretable. This has only be the case for the political risk indexes. In some other cases of only two variables, the PCA just assigns the same weight to each one of them.

-   If the PCA weights are not interpretable, we assign symmetric (equal) weights to each variable. Moreover, if the indexes are not derived from a PCA, all variables are standardized before being combined into an index.

-   If in some cases we have strong reasons to consider that one of the variables is more important than the rest, then we deviate from the symmetric weights option. For instance, we give more weight to the political risk of contiguous countries and ideological rivals than to neighboring countries, since the literature on war and conflicts usually identify sharing a border as one of the main determinants of being involved in an inter-states conflict (*"Why Do Neighbors Fight? Proximity, Interaction, or Territoriality", Journal of Peace Research, Vol. 32, No. 3 (Aug., 1995)*)

-   Similarly, for the external barriers (fragmentation) indexes we also give more weight to trade partners and contiguous countries than to neighboring ones.

How do we transform variables used as weights for weighted-means?

- Weighting directly by population can obviously generate weighted means that are too heavily concentrated in a few large countries and drastically undervalue the risk pose by some small countries. However, the logarithmic transformation induces the opposite problem, since it flattens large numbers too much.

- We thus use a logistic transformation, that creates a distribution in which most countries under about 10 million people have a similar value (around 1.5). From then on, it grows much faster, reaching a median value of 5 for countries with populations nearing the 90 percentile at each year, around 70 million in 2020, and reaching a maximum value of 10 for China and India.

Gompertz Population = 10 / (1+exp(-0.0000225*(Pop-Per90))

Maximum = 10   Per90 (1980) = 47 million
Percentile 90 = 5   Per90 (2000) = 60 million
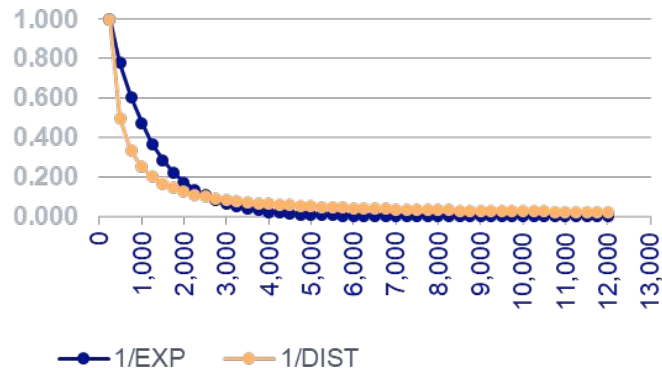Minimum = 1.5   Per90 (2020) = 70 million

Source: xxxxxxxxxxxxxxxxxxxxx

How do we transform variables used as weights?

- In a similar fashion to population, weighting by geographical distance (inverse) might be problematic as well. The ratio (1/distance) decreases too fast and converges also too quickly, so we use the inverse of the exponential divided by 1000.
- Finally, instead of weighting by ideological rivalry, which does not vary much between countries, we use the square of the deviation from the sample mean, ignoring the values below the mean.

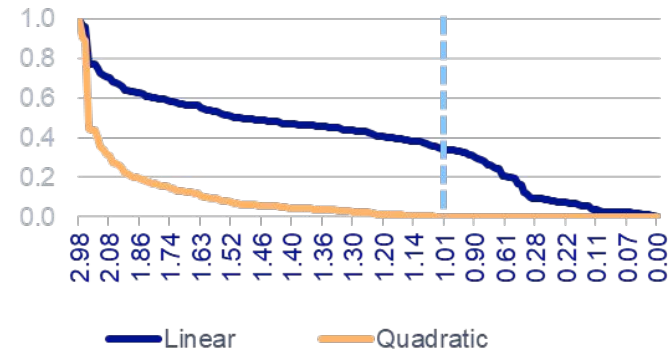### WEIGHTING BY GEOGRAPHICAL DISTANCE & AREA

Distance_Area_Pop = (Surface Area^(1/2)) * Logistic(Pop) / **exp(Distance / 1000**)
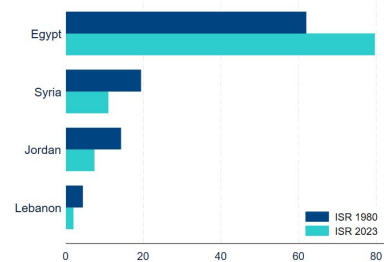

WEIGHTING BY IDEOLOGICAL DISTANCE

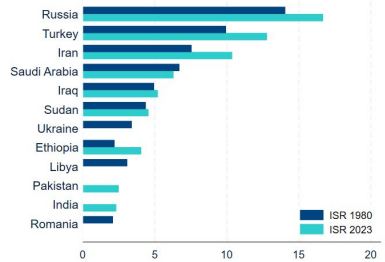Ideology_Population = ((**Ideol.Distance - Mean)^2**) * Logistic(Population)

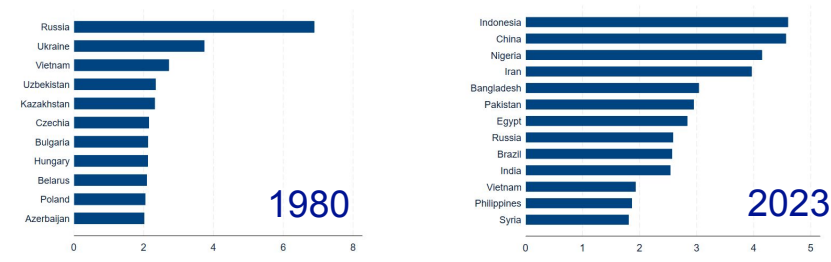# Weights that define geospatial and ideological interconnectedness: Israel & Iran
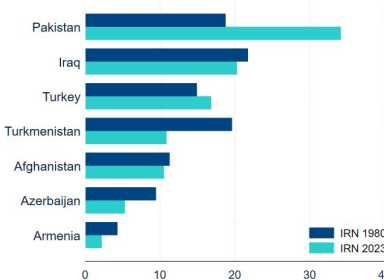
Israel contiguous countries weights (%)

Egypt, Syria, Jordan, Lebanon — ISR 1980, ISR 2023

Israel neighboring countries weights (%)

Russia, Turkey, Iran, Saudi Arabia, Iraq, Sudan, Ukraine, Ethiopia, Libya, Pakistan, India, Romania — ISR 1980, ISR 2023

Israel ideological rivals weights (%)

1980: Russia, Ukraine, Vietnam, Uzbekistan, Kazakhstan, Czechia, Bulgaria, Hungary, Belarus, Poland, Azerbaijan

2023: Indonesia, China, Nigeria, Iran, Bangladesh, Pakistan, Egypt, Russia, Brazil, India, Vietnam, Philippines, Syria

Iran contiguous countries weights (%)

Pakistan, Iraq, Turkey, Turkmenistan, Afghanistan, Azerbaijan, Armenia — IRN 1980, IRN 2023

Iran neighboring countries weights (%)

Russia, India, Saudi Arabia, Egypt, Ukraine, Kazakhstan, Uzbekistan, Ethiopia, Oman, Syria, Georgia, Sudan — IRN 1980, IRN 2023

Iran ideological rivals weights (%)

United States, UK, Germany, France, Israel, Canada, Switzerland, Italy, Belgium, Luxembourg, Russia, Netherlands (left)

United States, UK, Germany, France, Japan, Italy, Israel, Canada, Ukraine, Spain (right)

Source: BBVA Research.

Note on data availability issues and imputations

Not all the variables have the same availability regarding the time-span or in terms of countries, given the long-term period and the high number of countries that are covered in the analysis.

Variables also differ regarding the most recent date with available figures.

The strategy to deal with missing values is the following:

1. Complementing the information from different sources if more than one is available
2. In some cases, for example in the case of internal political risk, where the Gini index is only available from 1980 onwards for most countries, we estimate two different indexes, one including the Gini and one without it. The index including the Gini index is then extended using the variations in the one excluding it.
3. Linear interpolation when a few number of missing values are present
4. Extrapolating the most recent data available into the present or the earliest data available into the past.

Regarding the weighted effective tariffs that we show for 2025, we have used an estimate based on the most recent tariff announcements from the US administration and the composition of trade flows from each country.

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