International Risk-Sharing in a Fragmented World

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Motivation

- The world economy is increasingly fractured along geopolitical lines
  - Economic relations are shaped not only by economic fundamentals, but also by political alliances and strategic rivalries

- **Key questions:**
  - How does geopolitical risk shape the international allocation of capital?
  - Does financial fragmentation hinder international risk-sharing?
  - What are the welfare implications?

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  - Does financial fragmentation hinder international risk-sharing?
  - What are the welfare implications?
- This paper: **fragmentation in official bilateral lending** — facts and theory.

What we do

Fragmentation of official government-to-government lending

- Long-run dyadic dataset (Horn, Reinhart & Trebesch, 2024)
- Financial fragmentation index

Findings:

1. A rise in geopolitical risk leads to higher financial fragmentation
2. Geopolitically aligned countries have more synchronized business cycles
3. Fragmentation weakens lending flows from low-risk to high-risk countries

Theory of fragmentation:

- Geopolitical rivalry ⇒ creditor identity matters for repayment incentives
- Rising geopolitical risk ⇒ endogenous fragmentation

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Related Literature

- **Geoeconomics:** Aiyar, Malacrino, and Presbitero (2024); Aiyar, Presbitero, and Ruta (2023); An and Huber (2026); Sturm Becko and O'Connor (2024); Bianchi and Sosa-Padilla (2024, 2025); Broner, Martin, Meyer, and Trebesch (2024); Caldara and Iacoviello (2022); Catalán, Fendoglu, and Tsuruga (2024); Clayton, Coppola, Maggiori, and Schreger (2024, 2025); Clayton, Maggiori, and Schreger (2024, 2025); De Souza, Hu, Li, and Mei (2024); Fernandez-Villaverde, Mineyama, and Song (2024); Gopinath, Gourinchas, Presbitero, and Topalova (2024); Kempf, Luo, Schäfer, and Tsoutsoura (2023); Kleinman, Liu, and Redding (2024); Pflueger and Yared (2024); Sturm Becko (2024)

  Fragmentation of official lending: facts and theory

- **Sovereign debt and limited commitment:** Aguiar & Amador (2011); Aguiar & Gopinath (2006); Arellano (2008); Broner, Martin & Ventura (2010); Eaton & Gersovitz (1981)

  Geopolitical risk and implications for capital flows and risk-sharing

Data

Bilateral govt.-to-govt. lending data from Horn, Reinhart & Trebesch (2024)

- Loans, grants, and guarantees by governments and state-controlled agencies
- Lending flows between 120 creditor and 190 debtor countries, 1910–2024

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Official lending is an ideal laboratory for studying geoeconomic fragmentation

- Dyadic: creditor identity is directly observed
- Long-run coverage spans major geopolitical episodes
- State control makes geopolitics first-order

Measuring fragmentation

Goal: measure whether official lending follows geopolitical alignment

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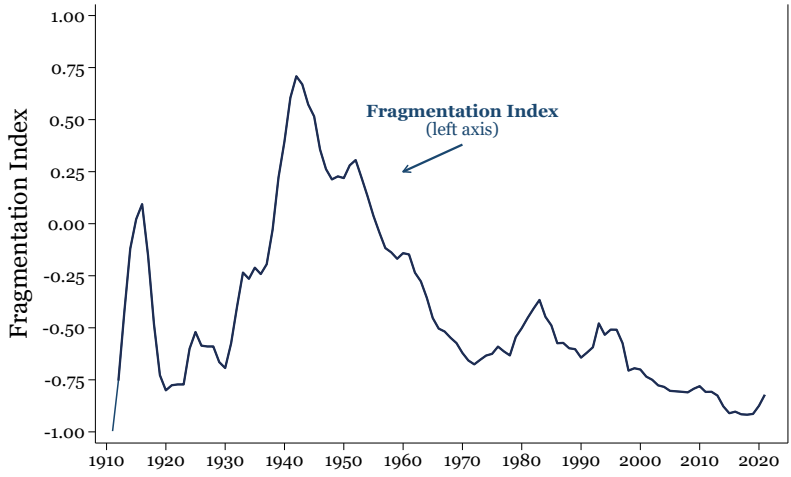
Identifying Allies and Non-Allies:

- Military alliances as coded by the Correlates of War Project (Gibler & Sarkees 2004)
- Robustness: UN General Assembly voting similarity (Bailey et al. 2017)

Fragmentation and geopolitical risk, 1910–2020



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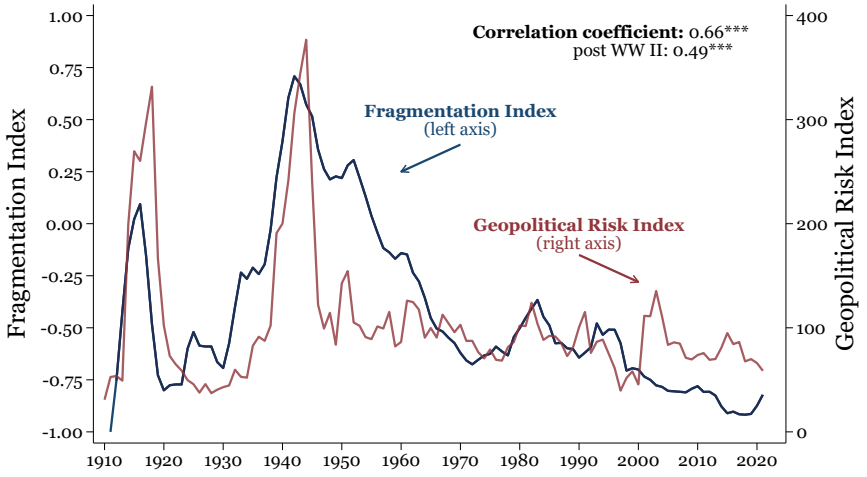

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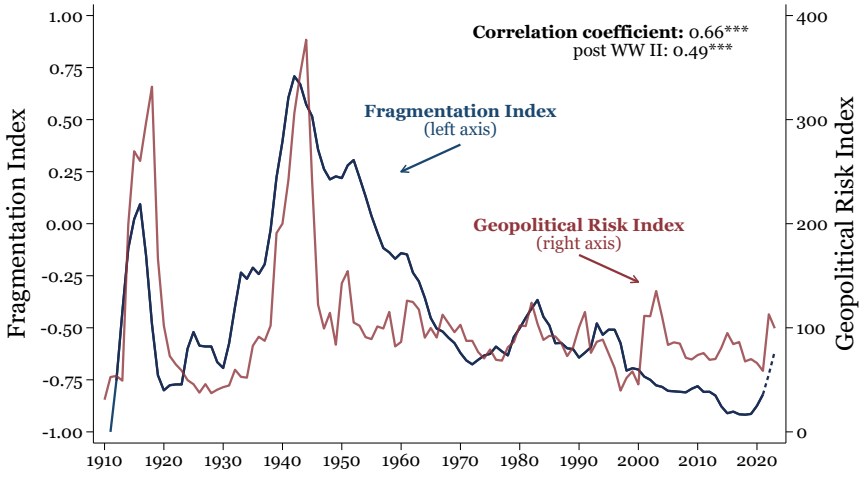

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FINDING 1: A rise in geopolitical risk leads to higher financial fragmentation

Panel evidence: impact of GPR on Fragmentation

Panel Local Projections

$$\text{Fragm}_{i,t+h} - \text{Fragm}_{i,t-1} = \alpha^h + \beta^h \log \text{GPR}_{i,t} + \text{controls}_{i,t} + \eta_i^h + \psi_t^h + \epsilon_{i,t}^h$$

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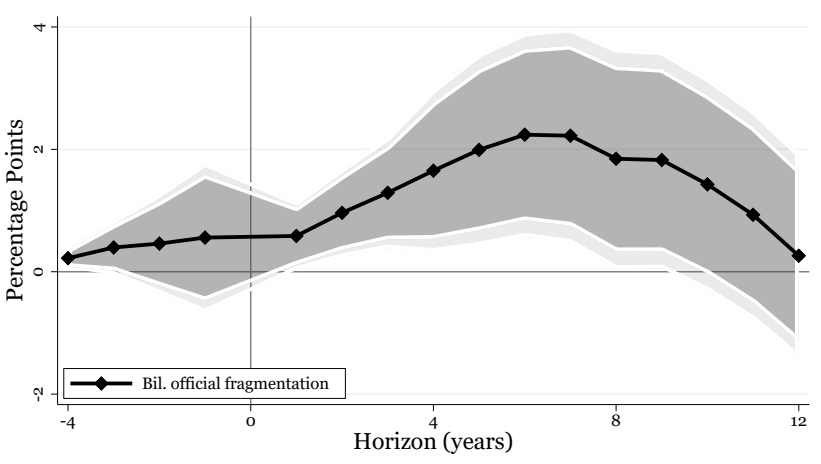

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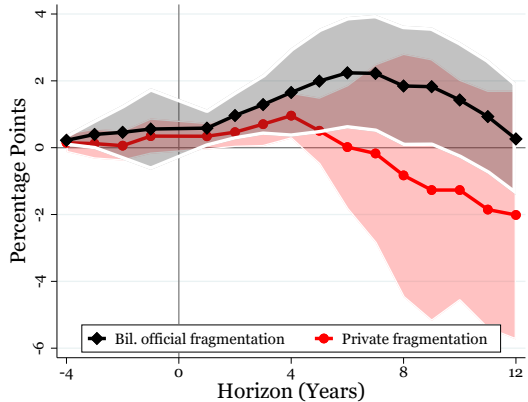

Bilateral vs. private lending

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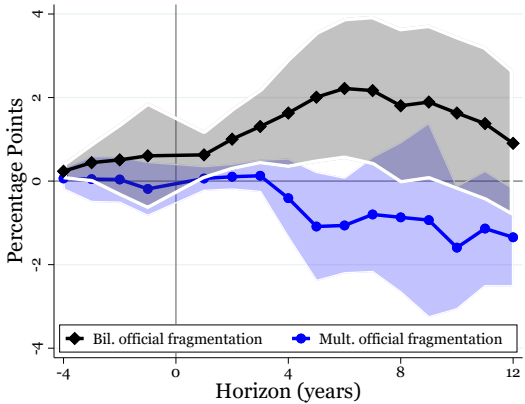
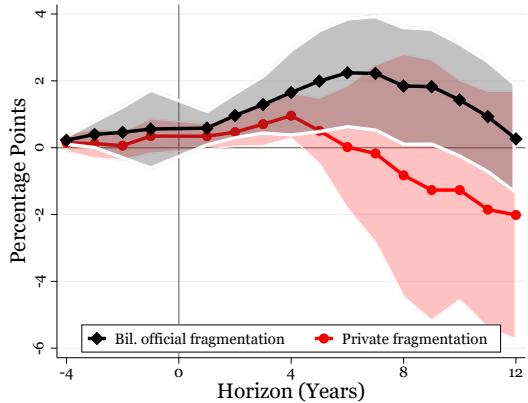


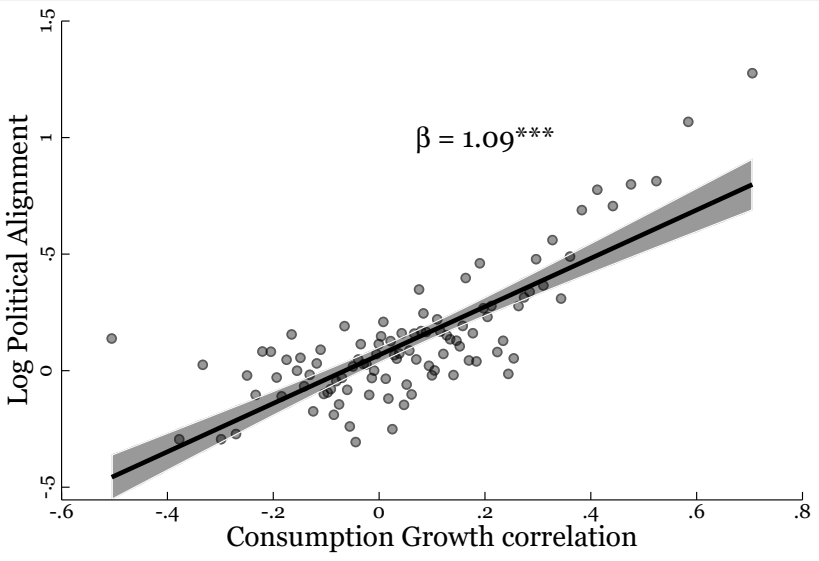
Bilateral vs. multilateral lending



Bilateral vs. private lending

FINDING 2: Aligned countries have synchronized business cycles

Geopolitical alignment and consumption correlations



FINDING 3: Fragmentation weakens lending flows from low-risk to high-risk countries

Fragmentation and Risk-Sharing

Gravity specification: official credit flows, tail-risk gaps, and political alliance

$$\text{Flow}_{ijt} = \alpha + \beta \left(\text{TailRisk}_{i,t}^{debtor} - \text{TailRisk}_{j,t}^{creditor} \right) + \gamma \, \text{Alliance}_{ijt}$$
$$+ \psi \, \text{Alliance}_{ijt} \times \left(\text{TailRisk}_{i,t}^{debtor} - \text{TailRisk}_{j,t}^{creditor} \right) + \theta_{ij} + \delta_t + \epsilon_{ijt}.$$

- $\beta > 0$: official credit flows from lower-risk creditors to higher-risk borrowers

$$\Rightarrow \text{ official lending provides insurance}$$

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- $\beta > 0$: official credit flows from lower-risk creditors to higher-risk borrowers

  $\Rightarrow$ official lending provides insurance

- $\gamma > 0$: allied countries lend more to each other

- $\psi < 0$: the response to tail-risk differences is weaker inside alliances

  $\Rightarrow$ within-bloc lending provides weaker insurance

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Tail-risk difference	2.32***	2.47***	3.12***
	(0.54)	(0.54)	(0.63)
Alliance		0.38***	0.41***
		(0.14)	(0.14)
Tail-risk difference × Alliance			−2.13*
			(1.26)
Observations	45,461	45,461	45,461
Sample	1910–2020	1910–2020	1910–2020
Dyad FE	✓	✓	✓
Year FE	✓	✓	✓

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Taking Stock

1. A rise in geopolitical risk leads to higher financial fragmentation

2. Aligned countries have synchronized business cycles

3. Fragmentation weakens lending flows from low-risk to high-risk countries

Geopolitical risk leads to a reallocation of capital within geopolitical blocs and this fragmentation hinders risk-sharing

Model

Model Environment

- Two periods, two aggregate shocks, three countries (home, allied, and rival)

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- **Period 1:** Home signs bilateral state-contingent contracts
  - Home: risk-averse. Allied and Rival: risk-neutral
- **Period 2:** Aggregate shock $s \in \{s_g, s_b\}$ with $y(s_b) < y(s_g)$
  - Home repays or defaults

Geopolitical Externality

Home country's objective at $t = 1$:

Geopolitical externality

$$\sum_s \pi(s) u\big(c(s)\big) \; - \; \eta \, V^*$$

where V^* is the Rival's expected payoff.

- $\eta > 0$ captures the desire to gain strategic advantage over geopolitical rivals

Repayment and Default

Repayment, $d(s) = 0$:

$$c(s) = y(s) - \tilde{a}(s) - a^*(s)$$

Payments To Ally

Payments To Rival

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Payments To Ally — Payments To Rival

Default, $d(s) = 1$:

Keep assets if positive

$$c(s) = (1 - \phi)\, y(s) - \tilde{a}_-(s) - a^*_-(s), \qquad x_- \equiv \min\{0, x\}$$

Income cost of default

- **Non-discriminatory default:** Home cannot selectively default on Rival alone

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  - Empirical support ▸ Arrears

Ally and Rival Countries

- Period-1 utility values is given by expected consumption

$$\tilde{V}(\tilde{a}, s) = \sum_{s \in S} \pi(s) \left[\tilde{y}(s) + (1 - d(s))\tilde{a}(s) + d(s)\tilde{a}_{-}(s)\right]$$

$$V^*(a^*, s) = \sum_{s \in S} \pi(s) \left[y^*(s) + (1 - d(s))a^*(s) + d(s)a^*_{-}(s)\right]$$

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- Consumption must be positive in each state

$$\tilde{y}(s) + (1 - d(s))\tilde{a}(s) + d(s)\tilde{a}_{-}(s) \geq 0$$

$$y^*(s) + (1 - d(s))a^*(s) + d(s)a^*_{-}(s) \geq 0$$

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The Incentive Constraint

Geopolitical cost of repaying Rival

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When $\eta = 0$: IC depends only on total repayment $\tilde{a} + a^*$

When $\eta > 0$: defaulting becomes more tempting the larger is the share of debt owed to rival

Optimal Bilateral Contracts

$$\max_{c(s),\,\tilde{a}(s),\,a^*(s)} \sum_s \pi(s)u(c(s)) \;-\; \eta V^*$$

subject to

Participation: $\displaystyle\sum_s \pi(s)\,\tilde{a}(s) \geq 0, \quad \sum_s \pi(s)\,a^*(s) \geq 0$

Incentives: $u(c(s)) - \eta(y^*(s) + a^*(s)) \geq u\big((1-\phi)y(s) - a^*_-(s) - \tilde{a}_-(s)\big)$

$$-\eta\big(y^*(s) + a^*_-(s)\big) \quad \forall s$$

Feasibility: $c(s) = y(s) - \tilde{a}(s) - a^*(s), \quad \tilde{a}(s) \geq -\tilde{y}(s), \quad a^*(s) \geq -y^*(s) \quad \forall s$

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Incentive constraint binds in the good state because govt. repays in good state

$\Rightarrow$ limits insurance in the bad state

Simplifying Assumptions

- **Equal state probabilities:**

$$\pi(s_g) = \pi(s_b) = 0.5$$

$$\Rightarrow \quad \tilde{a}(s_g) = -\tilde{a}(s_b) \quad \text{and} \quad a^*(s_g) = -a^*(s_b)$$

  - Good-state repayment equals the bad-state insurance transfer.

- **Same good-state endowment across countries:**

$$y(s_g) = \tilde{y}(s_g) = y^*(s_g)$$

  - Insurance capacity determined by bad state output.

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- **Log utility:**

$$u(c) = \log(c)$$

Proposition, part i: Full Insurance

If $\phi \geq \hat{\phi}$, we have **full insurance**:

$$c(s_g) = c(s_b) = \frac{y(s_g) + y(s_b)}{2}$$

$$\tilde{a}(s_g) + a^*(s_g) = \frac{y(s_g) - y(s_b)}{2}$$

Thresholds: $\hat{\phi} \equiv 1 - \frac{y(s_g)+y(s_b)}{2y(s_g)} \exp\left(-\eta \left[\frac{y(s_g)-y(s_b)}{2} - \tilde{y}(s_b)\right]\right)$ $\underline{\phi} \equiv \frac{\tilde{y}(s_b)}{y(s_g)}$

Proposition, part ii: Imperfect Insurance

If $\phi < \hat{\phi}$, we have **imperfect insurance**:

$$c(s_g) > c(s_b)$$

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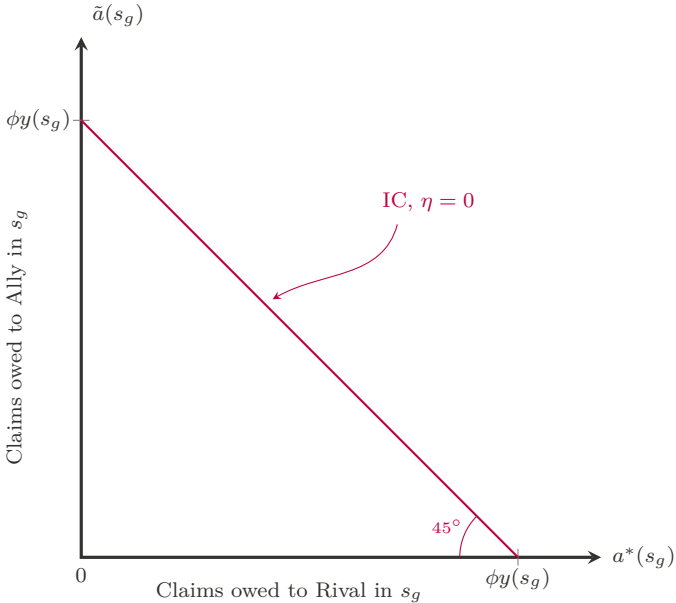
- Complete fragmentation, $\phi \leq \underline{\phi}$: No borrowing from rival

$$\tilde{a}(s_g) = \phi y(s_g) \leq \tilde{y}(s_b), \qquad a^*(s_g) = 0$$

Thresholds: $\hat{\phi} \equiv 1 - \frac{y(s_g)+y(s_b)}{2y(s_g)} \exp\left(-\eta \left[\frac{y(s_g)-y(s_b)}{2} - \tilde{y}(s_b)\right]\right)$ $\qquad \underline{\phi} \equiv \frac{\tilde{y}(s_b)}{y(s_g)}$

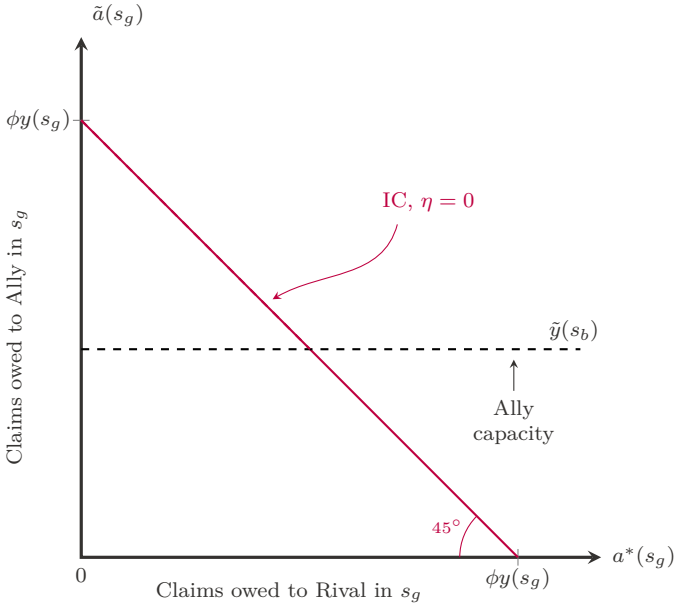
How Geopolitical Risk leads to Fragmentation



Benchmark: $\eta = 0$

Only **total debt** matters: split between Ally and Rival is irrelevant

How Geopolitical Risk leads to Fragmentation



Ally capacity

The Ally cannot fully insure Home on its own.

So full insurance requires some lending from the Rival.

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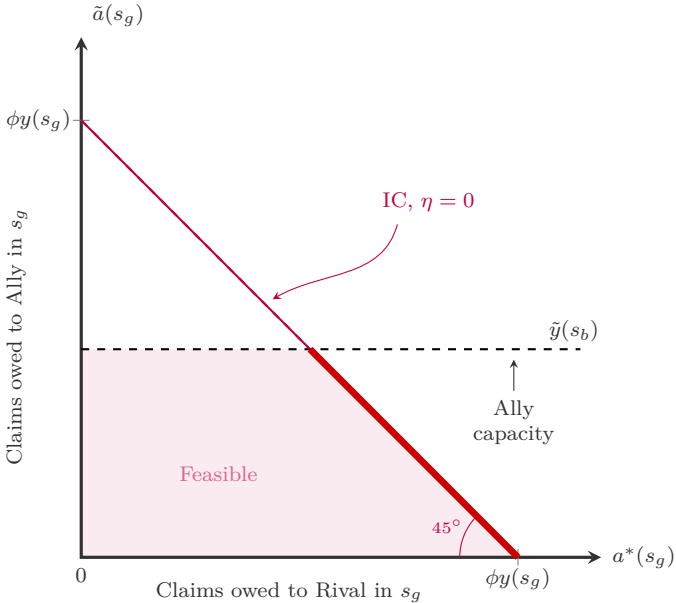

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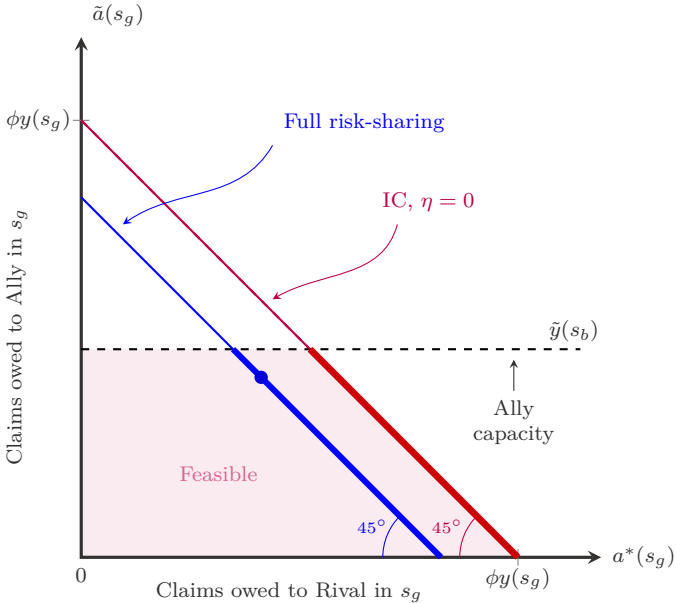
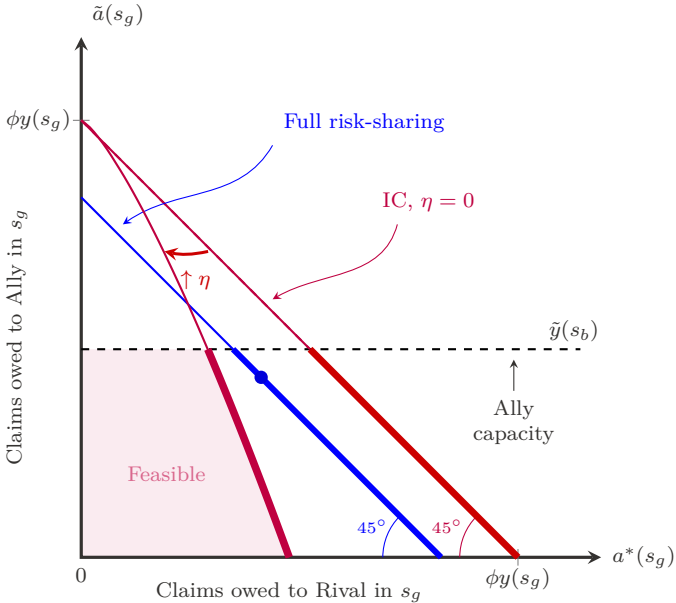


Full insurance is feasible

Home uses both creditors.

Consumption can be fully smoothed across states.

How Geopolitical Risk leads to Fragmentation

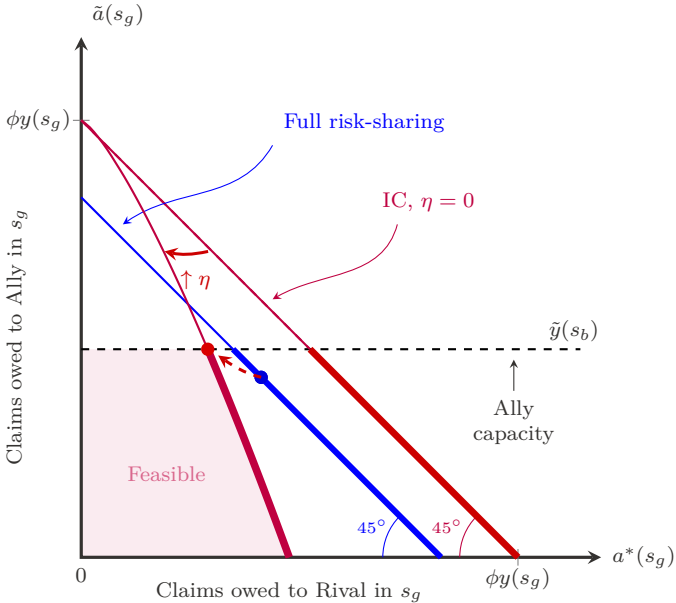


Increase in η

Repaying Rival becomes more costly.

More borrowing from Ally

How Geopolitical Risk leads to Fragmentation

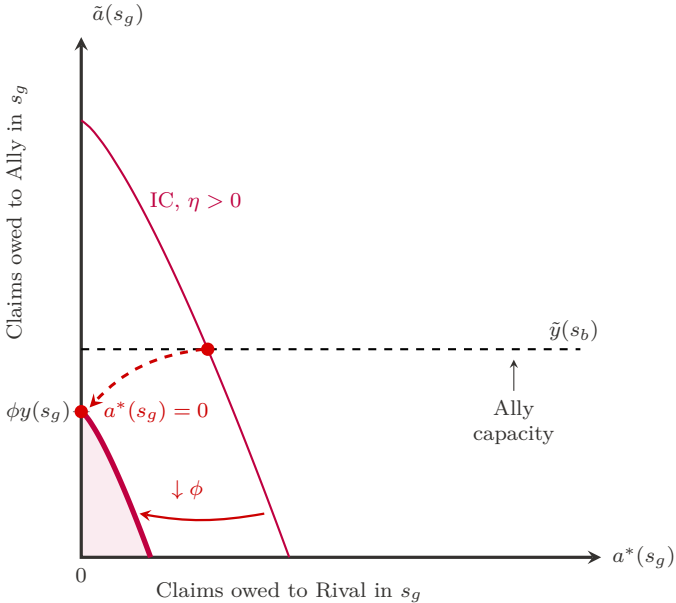


Full insurance breaks down

The Ally maxes out.

Rival lending falls.

How Geopolitical Risk leads to Fragmentation



Complete fragmentation

If the default cost is sufficiently low, Home borrows only from the Ally.

$$a^*(s_g) = 0.$$

Conclusions

- We use a long-run dyadic dataset on government-to-government lending to examine financial fragmentation
- We document that increases in geopolitical risk lead to fragmentation in official lending and lower risk-sharing
- We build a sovereign debt model with limited commitment that links strategic rivalry to fragmentation in official lending and limits to risk-sharing

Appendix

Data on private lending

Back to LPs

- Measuring private international lending at the dyadic (creditor-debtor country) level is complicated by:
  - active trading in secondary markets
  - intermediation through offshore financial centers (e.g. Coppola et al. 2021)

Data on private lending

Back to LPs

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- Our comparison exercise focuses on an extract from the World Bank's International Debtor Reporting System:
  - Cross-border lending by commercial banks, bond issuance and supplier credits to public and publicly-guaranteed entities in 120 emerging market and developing countries, 1970–2024
  - Creditor country identified on a residency basis
  - USD 1.7 trillion by private creditors from 116 countries to 120 recipients

Data on private lending

Back to LPs

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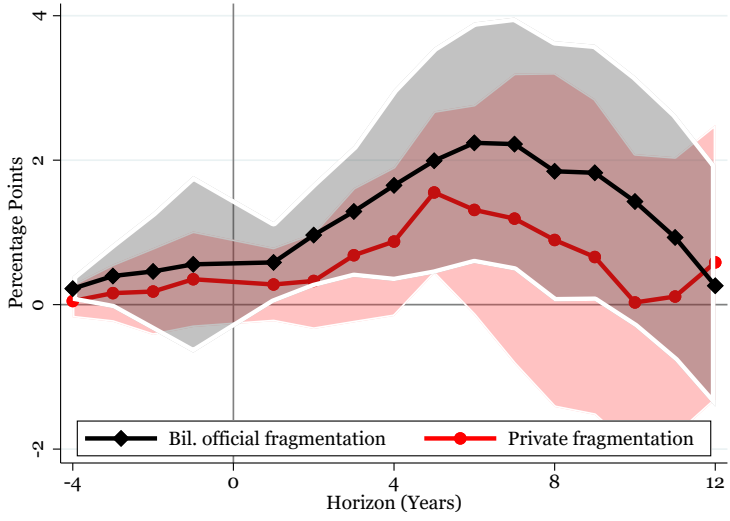
- Robustness in 1970–1990 syndicated bank lending sample

Fragmentation in syndicated bank lending, 1970-1990



Back to LPs

Data on multilateral lending flows

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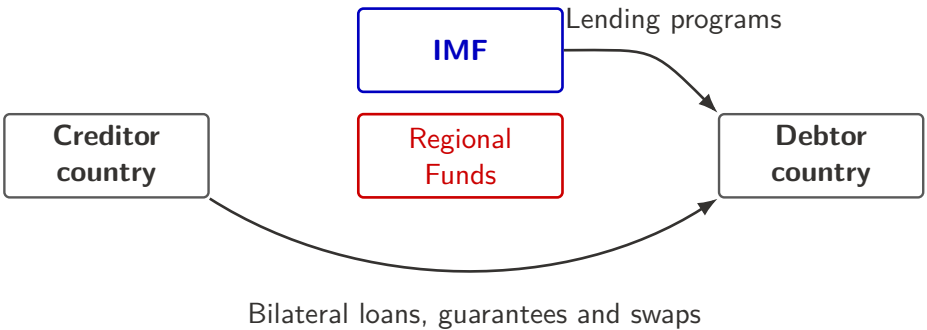

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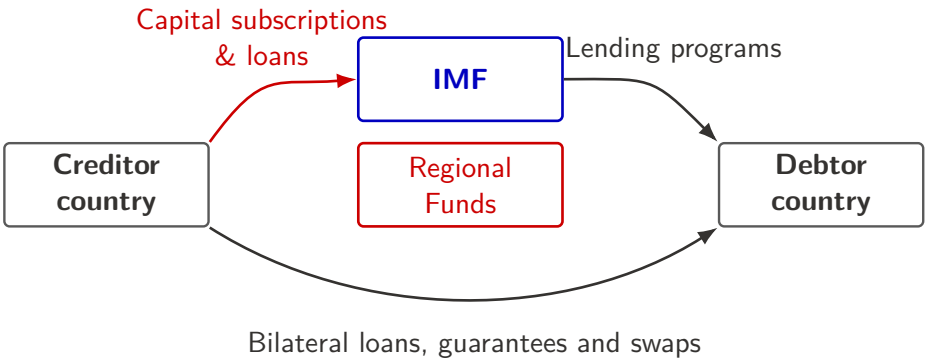

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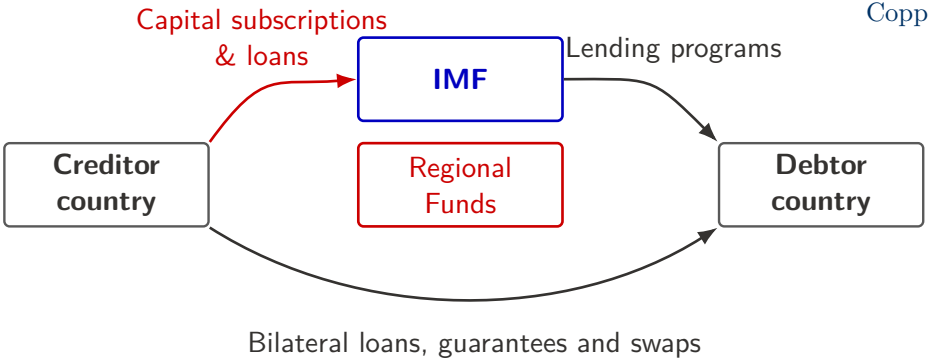
Related approach:
Coppola et al. (2021)



Imputing lending through multilateral institutions

- We compute the funding share of creditor country j in organization o in period t

$$\omega_{jot} = \frac{PAID.IN_{jot} + CREDIT_{jot}}{\sum_{k=1}^{N}(PAID.IN_{kot} + CREDIT_{kot})}$$

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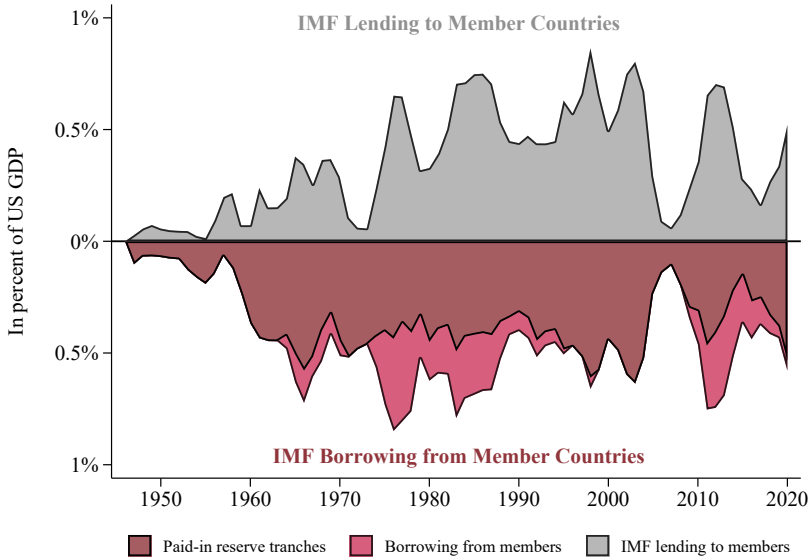
- Finally, total multilateral lending from country j to country i in period t is:

$$\sum_{o} LOAN_{ijot}$$

Back to LPs

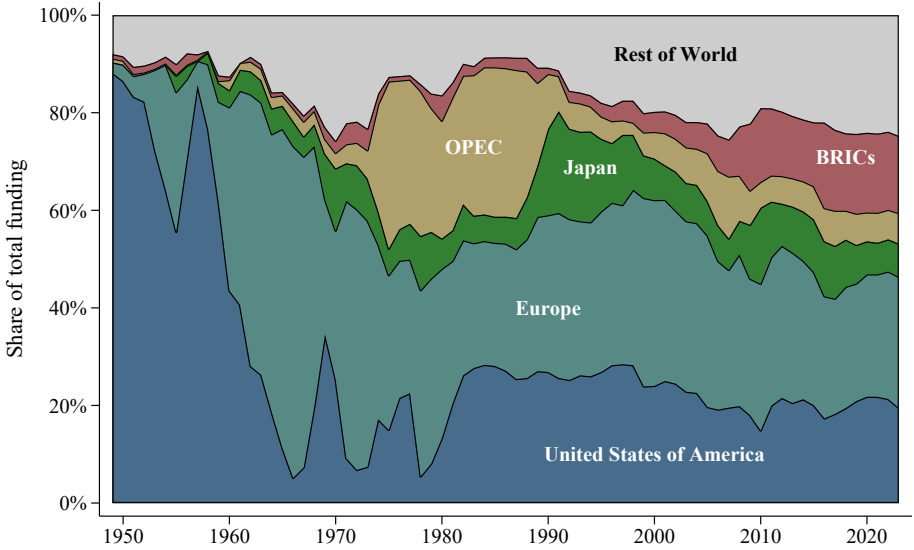
IMF borrowing and lending

Back to LPs



Example: Who funds the IMF?

Back to LPs



Sources

Back to LPs

Agreement to establish Andean Reserve Fund, 1976

Capital

Article 5. The initial capital of the Fund is five hundred million ($500,000,000) dollars of the United States of America, suscribed as follows:

Bolivia:	sixty-two million five hundred thousand ($62,500,000) dollars.
Colombia:	one hundred twenty-five million ($125,000,000) dollars.
Ecuador:	sixty-two million five hundred thousand ($62,500,000) dollars.
Peru:	one hundred twenty-five million ($125,000,000) dollars.
Venezuela:	one hundred twenty-five million ($125,000,000) dollars.

Agreement to establish Euopean Monetary Fund, 1955

CONTRACTING PARTIES	AMOUNT OF CONTRIBUTIONS *(in units of account)*
Germany	42,000,000
Austria	5,000,000
B.L.E.U.	30,000,000
Denmark	15,000,000
France	42,000,000
Greece	2,850,000
Iceland	1,000,000
Italy	15,000,000
Norway	15,000,000
Netherlands	30,000,000
Portugal	5,000,000
United Kingdom	86,575,000
Sweden	15,000,000
Switzerland	21,000,000
Turkey	3,000,000
TOTAL	328,425,000

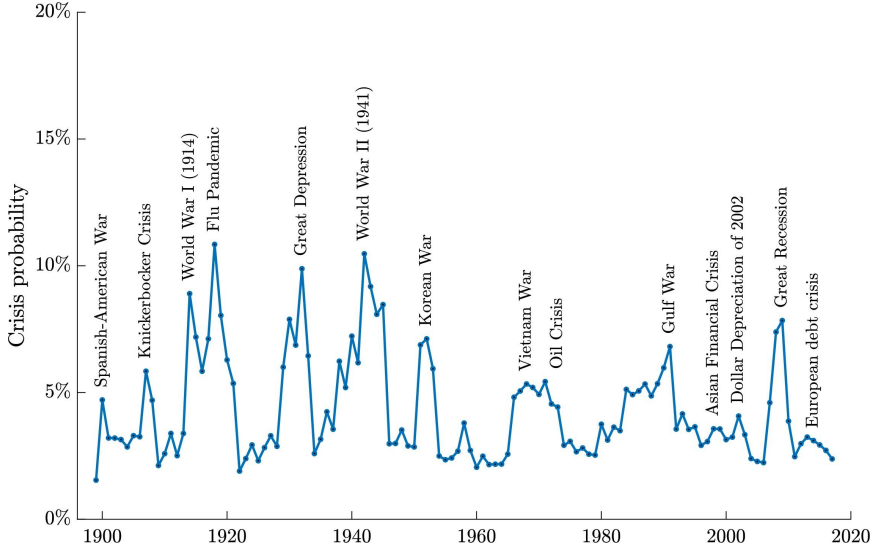
Coverage - International Financial Institutions

Back to LPs

Institution	Operating time	Authorized capital (in bn USD)	Number of member countries
League of Nations	1920 - 1946	n.a.	63
International Monetary Fund	1946 - 2020	1350	189
Andean Reserve Fund	1978 - 1991	2	5
Arab Monetary Fund	1977 - 2020	5	22
BRICS Contingent Reserve Arrangement	2014 - 2020	100	5
Chiang Mai Initiative	2000 - 2020	240	10
Eurasian Anti-Crisis Fund	2009 - 2020	9	6
European Monetary Fund	1958 - 1973	0.6	16
European Community Loan Mechanism	1975 - 1988	n.a.	12
European Financial Assistance Facility	1975 - 1988	n.a.	12
European BOP Facility	1988 - 2020	60	28
European Financial Stability Facility	2010 - 2013	1040	19
European Financial Stability Mechanism	2010 - 2013	75	28
European Stability Mechanism	2012 - 2020	780	19
Latin American Reserve Fund	1991 - 2020	4	8
NAFTA Swap Facility	1994 - 2020	7	3

Macroeconomic tail risk, 1900 - 2020, Aggregate

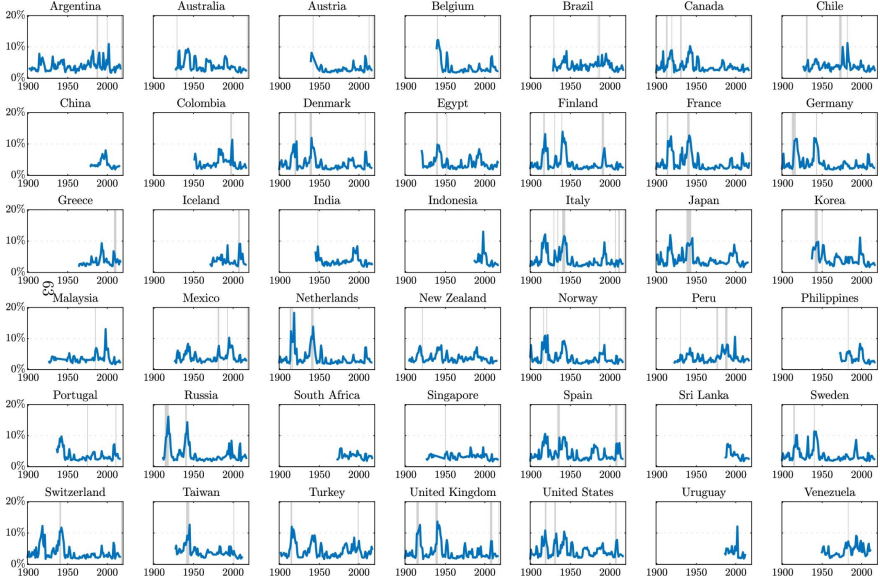
back



Source: Marfe & Penasse (JFE, 2024)

Macroeconomic tail risk, 1900 - 2020

back



Source: Marfe & Penasse (JFE, 2024)

Fragmentation and geopolitical risk – Normalized

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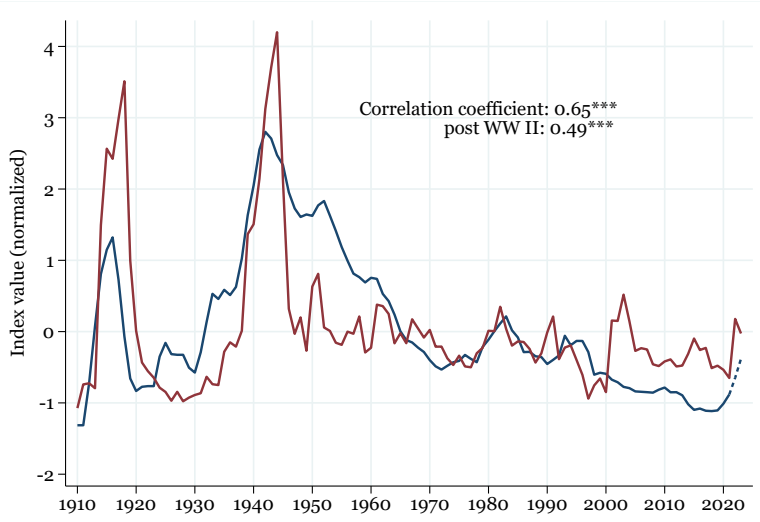
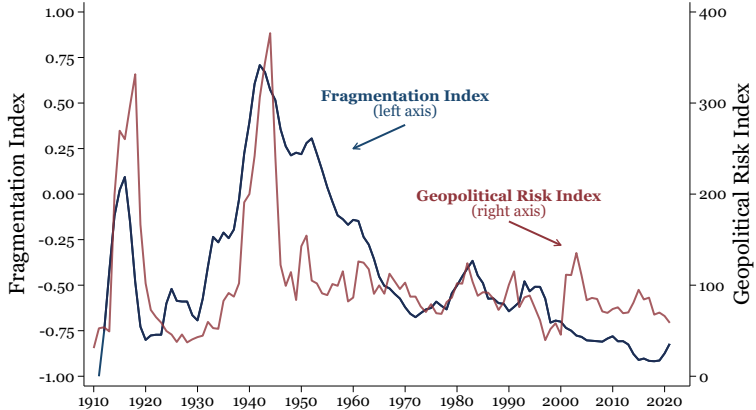


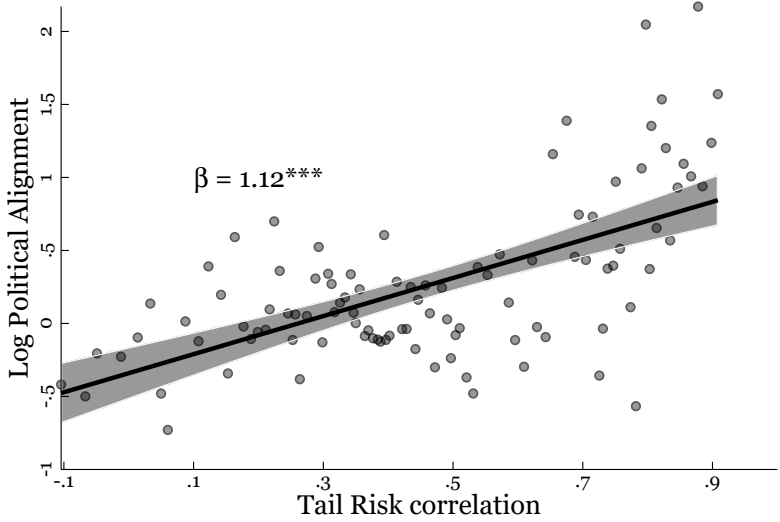
Fragmentation and geopolitical risk – bilateral + multilateral

back



... and more synchronized macro tail risk

back



Accum. of payment arrears on allies and rivals

back