Financial Cooperation in a Fragmented World

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The views expressed herein are those of the authors and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

Motivation

- The world economy is increasingly fractured along geopolitical lines
  - Trade and capital flows shaped by political alliances and strategic rivalries, not just economic fundamentals

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

This Paper

New dyadic dataset of **official (government-to-government) lending**, 1910–2020.

- Trace multilateral borrowing to ultimate creditor

We construct a **financial fragmentation index** and document **three facts:**

Fact 1. During high geopolitical risk, official lending follows geopolitical alignment

Fact 2. Geopolitically aligned countries have more synchronized business cycles

Fact 3. Fragmentation limits the scope for international risk-sharing

Theory of fragmentation: Limited-commitment sovereign debt model with a geopolitical externality

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Related Literature

- **Geoeconomics:** Bianchi & Sosa-Padilla (2024, 2025); Broner, Martin, Meyer, & Trebesch (2024); Clayton, Coppola, Maggiori & Schreger (2024); Clayton, Maggiori & Schreger (2024, 2025); Gopinath, Gourinchas, Presbitero, and Topalova (2024); O'Connor & Sturm Becko (2024); Sturm Becko (2023, 2024)

  We provide new data on official flows, facts and theory of fragmentation

- **Global Financial Safety Net:** Coppola, Maggiori, Neiman & Schreger (2021); Horn, Reinhart & Trebesch (2021, 2024); Scheubel & Stracca (2017)

  We map multilateral lending to the dyadic level using funding structures

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

  We introduce a geopolitical externality and study the implications for capital flows

The Dataset

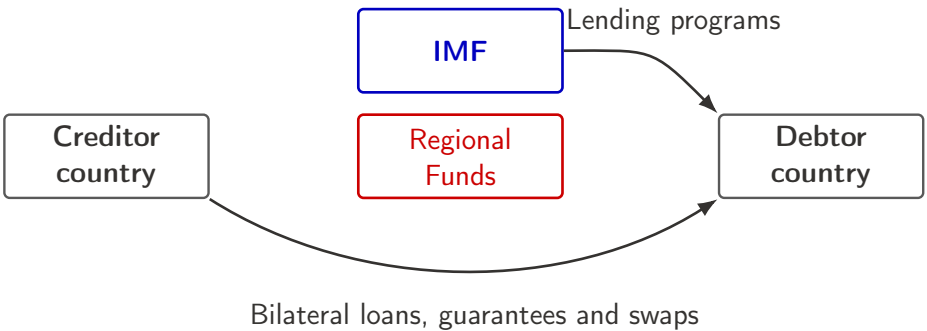
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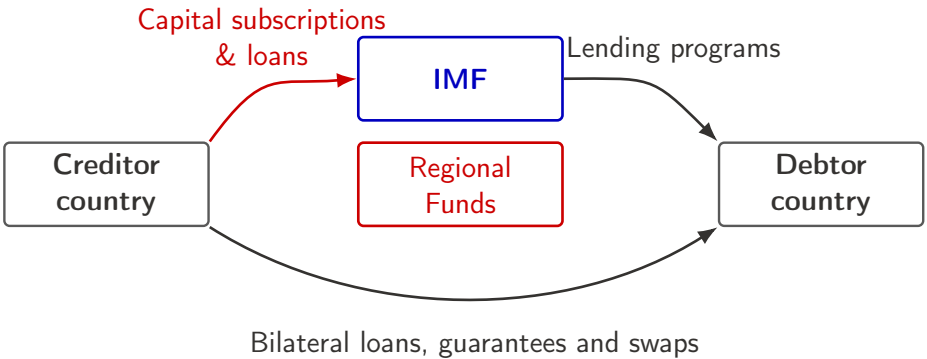
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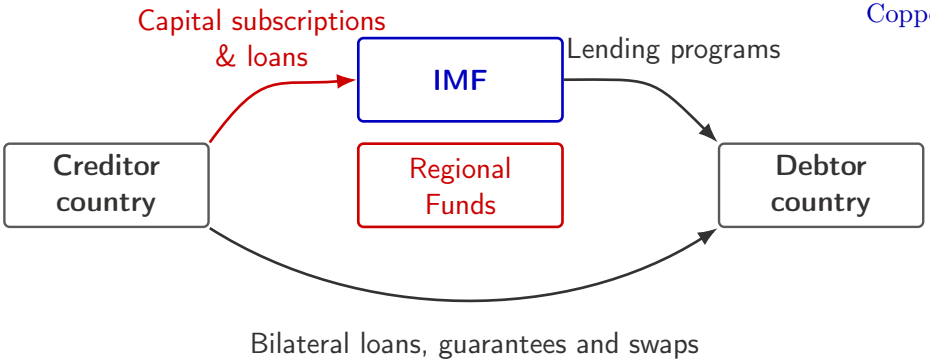
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Related approach:
Coppola et al. (2021)



Construction of the Dataset

- We first compute the funding share of a 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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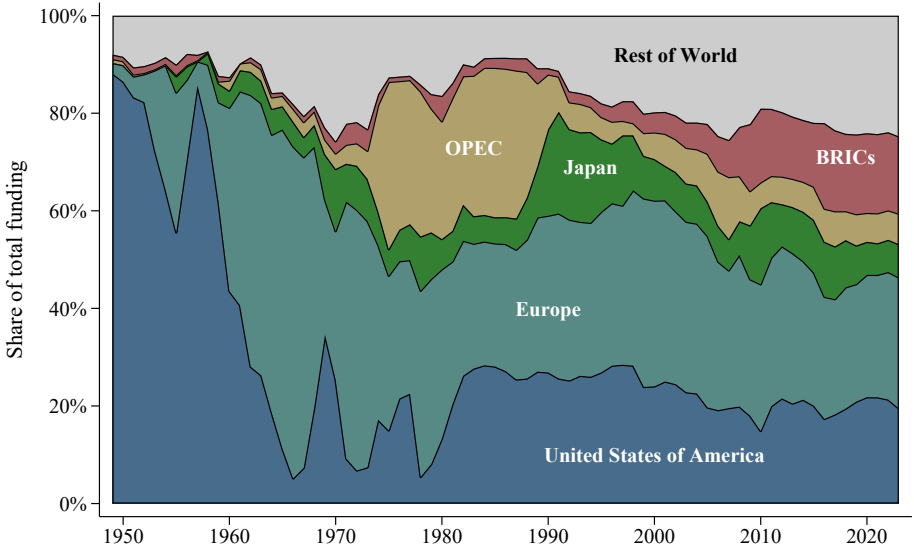
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- Finally, we aggregate total multilateral loan from country j to country i in period t

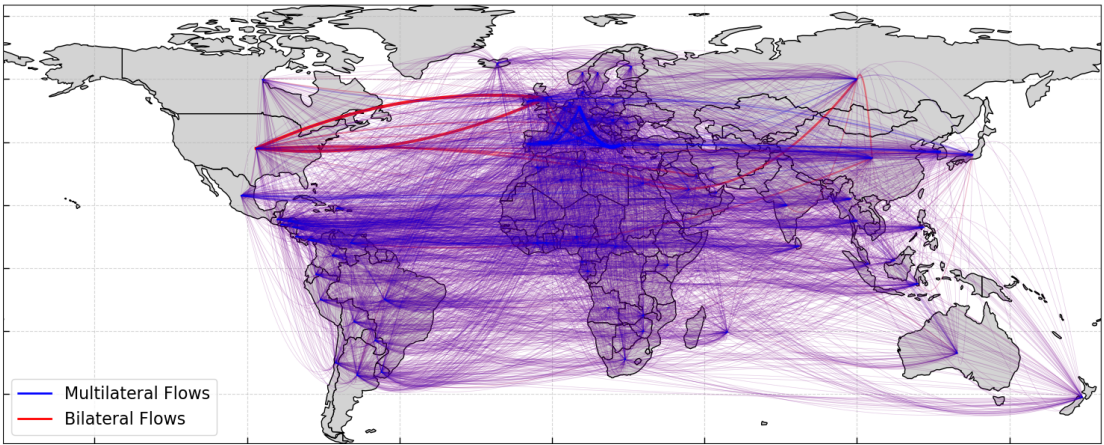
$$\sum_{o} LOAN_{ijot}$$

Example: Who funds the IMF?

IMF BALANCE-SHEET

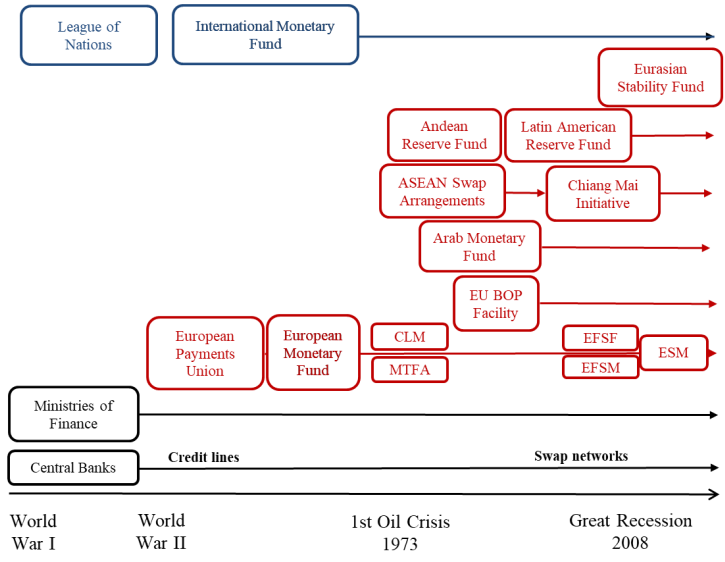


Official lending through the Global Financial Safety Net, 1910–2020



▸ Sources ▸ Coverage ▸ RFA Map ▸ WWII ▸ 2008

The Global Financial Safety Net, 1910–2020



Sources: Horn, Reinhart & Trebesch (2024); Scheubel & Stracca (2017)

Empirical findings

1. **Fact 1.** During episodes of high geopolitical risk, official flows follow geopolitical alignment
   - New Financial Fragmentation Index

2. **Fact 2.** Aligned countries have synchronized business cycles

3. **Fact 3.** Fragmentation in official lending limits the scope of risk-sharing
   Financial cooperation among aligned countries worsens risk-sharing

Measuring fragmentation

Share of lending that flows *within* political blocs minus share that flows *across* blocs.

$$\text{Fragmentation Index}_t = \frac{\text{Lending between allies}_t - \text{Lending between non-allies}_t}{\text{Total lending}_t}$$

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$+1 \Rightarrow$ Complete fragmentation

- **Positive values:** lending concentrated within blocs
- **Negative values:** lending diversified across blocs

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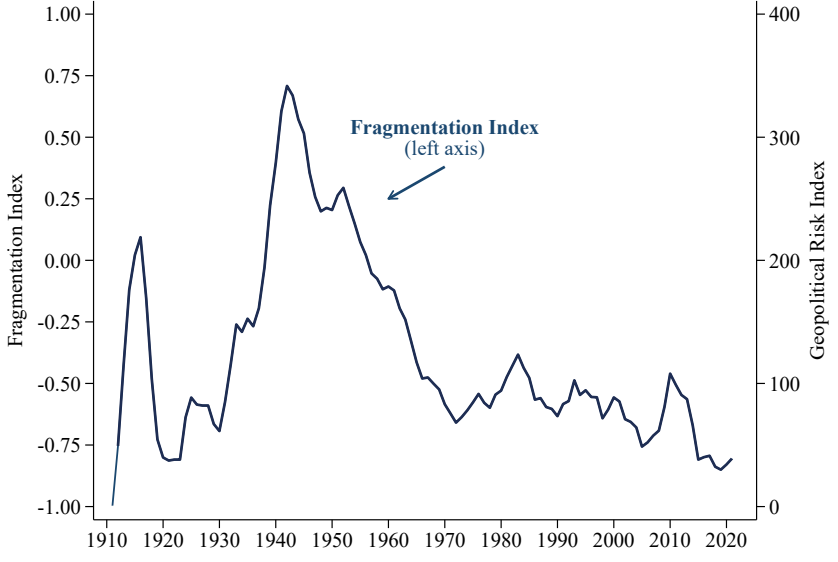
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Identifying Allies and Non-Allies:

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

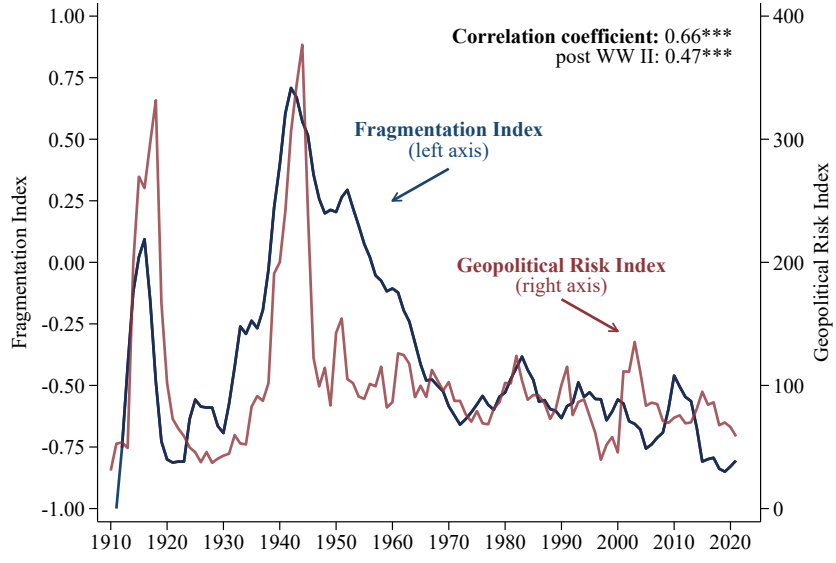
Fragmentation and geopolitical risk, 1910–2020

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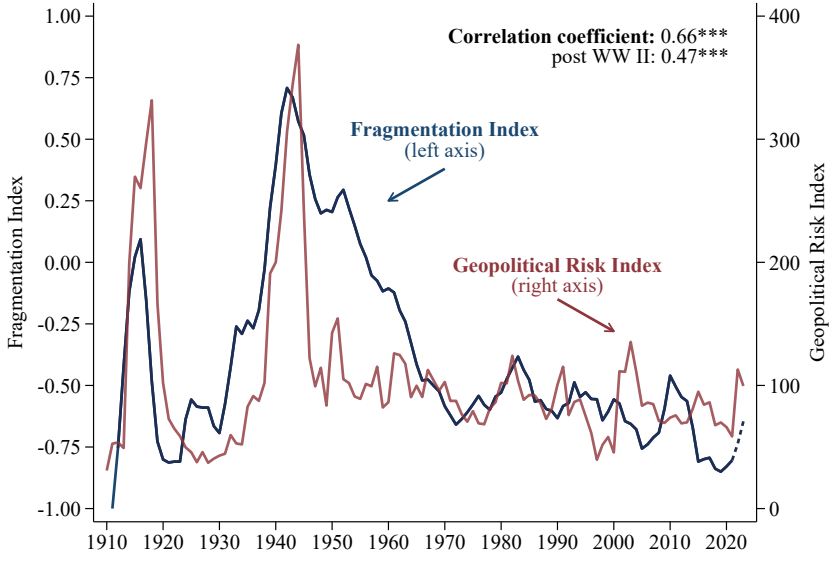
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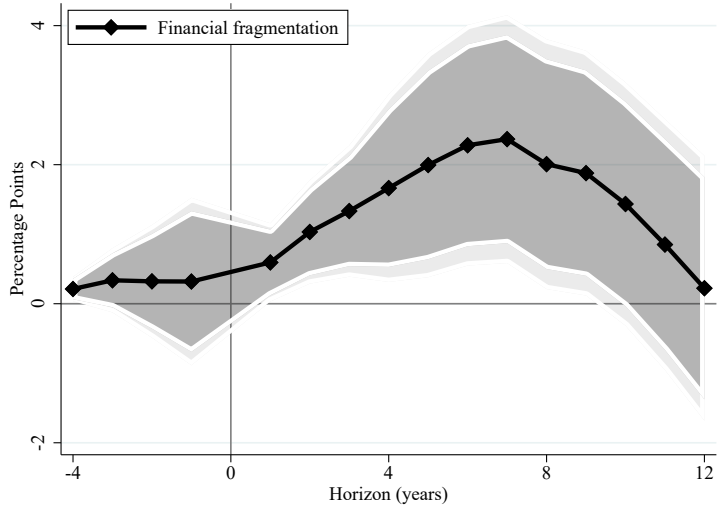
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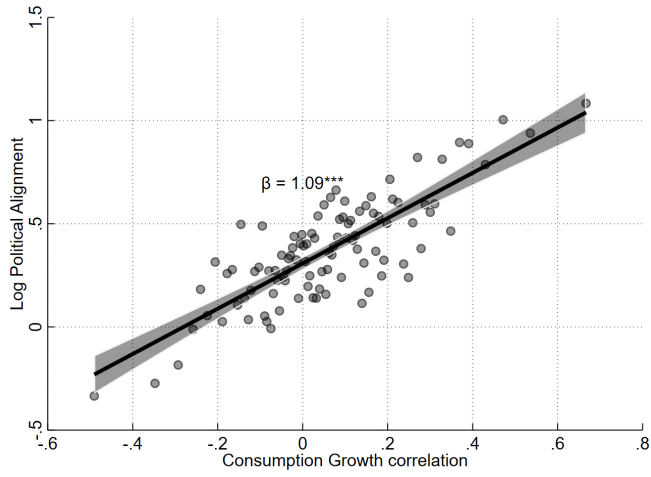
Country-level fragmentation

$$Fragm_{i,t+h} - Fragm_{i,t-1} = \alpha^h + \beta^h GPR_{i,t} + controls_{i,t} + \eta_i^h + \psi_t^h + \epsilon_{i,t}^h$$



Fact 2. Aligned countries have more synchronized business cycles

Tail risk



Political alignment (UN voting similarity) vs. pairwise consumption growth correlation

Fact 3. Fragmentation worsens risk-sharing

$$Flow_{ijt} = \alpha + \beta \times (TailRisk_{i,t}^{debtor} - TailRisk_{j,t-1}^{creditor}) + \gamma \times alliance_{ij} + \psi \times alliance_{ij} \times (TailRisk_{i,t}^{debtor} - TailRisk_{j,t-1}^{creditor}) + \theta_{ij} + \delta_t + \epsilon_{ijt}$$

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- $\beta > 0$: official lending contributes to risk-sharing
- $\gamma > 0$: higher lending between allied countries
- $\psi < 0$: risk-sharing is weaker when flows occur between aligned countries

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	(1)	(2)	(3)	(4)
Tail risk difference	4.08***	3.74***	4.48***	4.28***
	(0.32)	(0.40)	(0.35)	(0.43)
Alliance			0.74***	0.25**
			(0.13)	(0.10)
Tail risk × Alliance			−1.49**	−1.66*
			(0.71)	(0.95)
Observations	75,749	72,262	75,749	72,262
Dyad FE		✓		✓
Year FE		✓		✓

▸ Tail risk series

Taking Stock

1. **Fact 1.** During episodes of high geopolitical risk, official flows follow geopolitical alignment

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3. **Fact 3.** Fragmentation in official lending limits international risk-sharing

Geopolitical risk increases fragmentation of official flows and hinders risk-sharing

Model Environment

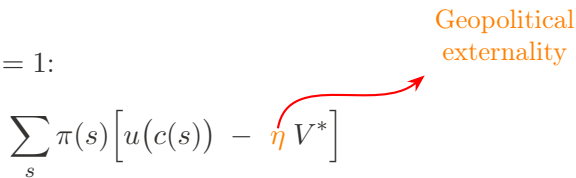
- Two periods, two aggregate shocks, three countries (home, allied, and rival)

Model Environment

- Two periods, two aggregate shocks, three countries (home, allied, and rival)
- **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 on all creditors

Geopolitical Externality

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



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

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

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

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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Positive consumption in each state for both blocs:

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

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

The Incentive Constraint

Incentive constraint binds in the good state:

$$u\big(y(s_g) - \tilde{a} - a^*\big) - \eta\, a^* \;\geq\; u\big((1-\phi)\, y(s_g)\big)$$

The Incentive Constraint

$$u\big(y(s_g) - \tilde{a} - a^*\big) \qquad \geq \; u\big((1-\phi)\, y(s_g)\big)$$

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

The Incentive Constraint

Geopolitical cost of repaying Rival

$$u\big(y(s_g) - \tilde{a} - a^*\big) - \eta\, a^* \;\geq\; u\big((1-\phi)\, y(s_g)\big)$$

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

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

(IC) No-default: $u(c(s)) - \eta(y^*(s) + a^*(s)) \geq u\big((1-\phi)y(s) - a^*_-(s) - \tilde{a}_-(s)\big)$
$-\eta\big(y^*(s) + a^*_-(s)\big) \quad \forall s$

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

Main Result

Assume for simplicity:

- $\pi(s_g) = \pi(s_b) = 0.5 \quad \Rightarrow \quad \tilde{a}(s_g) = -\tilde{a}(s_b) \quad \text{and} \quad a^*(s_g) = -a^*(s_b)$
- $y(s_g) = \tilde{y}(s_g) = y^*(s_g)$
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- $y(s_g) = \tilde{y}(s_g) = y^*(s_g)$
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In addition, $\quad \tilde{y}(s_b) \; < \; \dfrac{y(s_g) - y(s_b)}{2} \; \leq \; y^*(s_b)$

Ally country alone cannot fully insure Home; Rival alone can

Main Result

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

Proposition

(i) If $\phi \geq \hat{\phi}$, we have **full insurance**

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

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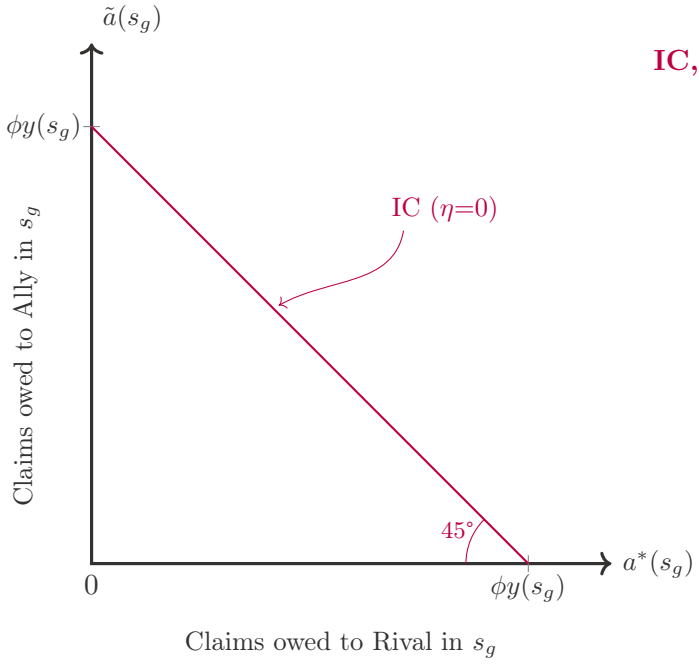
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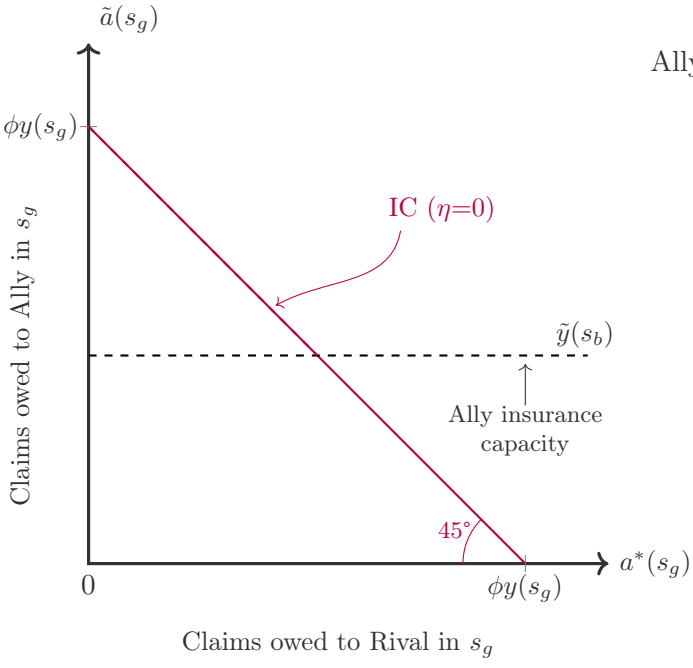
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If $\phi \leq \underline{\phi}$, home borrows only from ally: $\tilde{a}(s_g) = \phi y(s_g) \leq \tilde{y}(s_b)$ and $a^*(s_g) = 0$

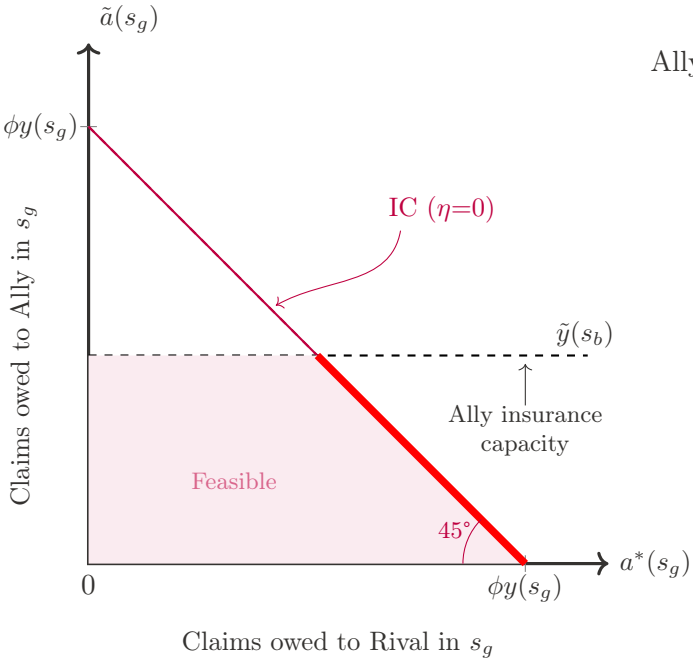


IC, η=0: Only *total* debt matters.

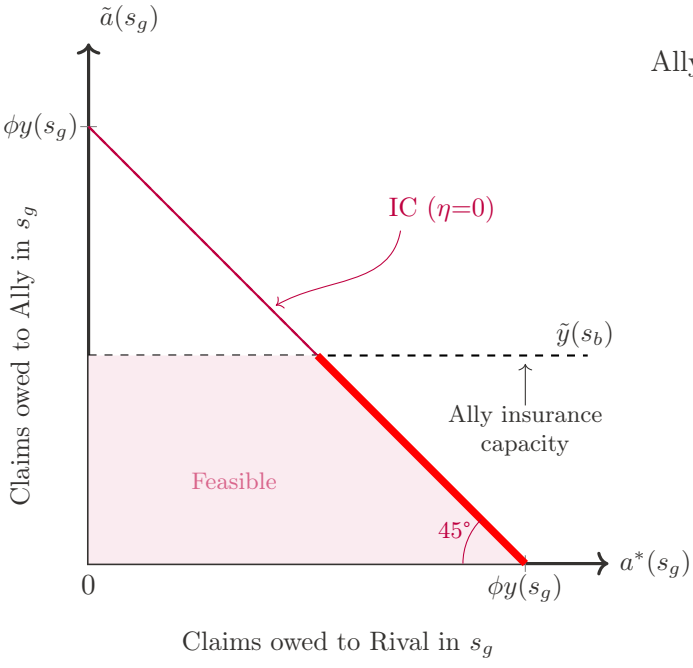
Ally insurance capped at $\tilde{y}(s_b)$.

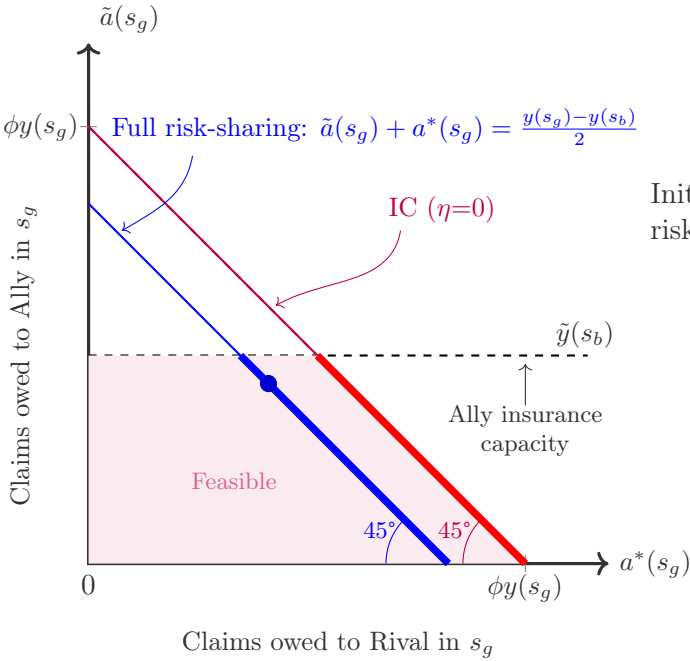


Ally insurance capped at $\tilde{y}(s_b)$.

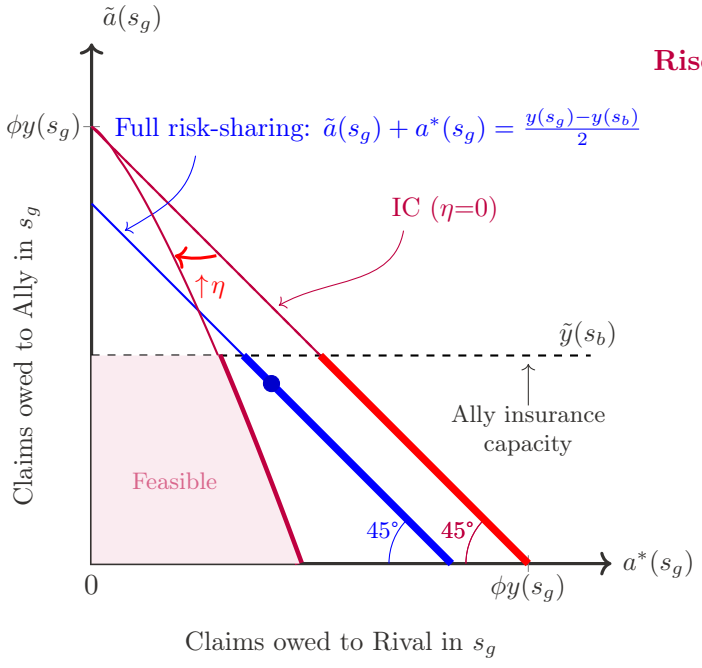


Ally insurance capped at $\tilde{y}(s_b)$.

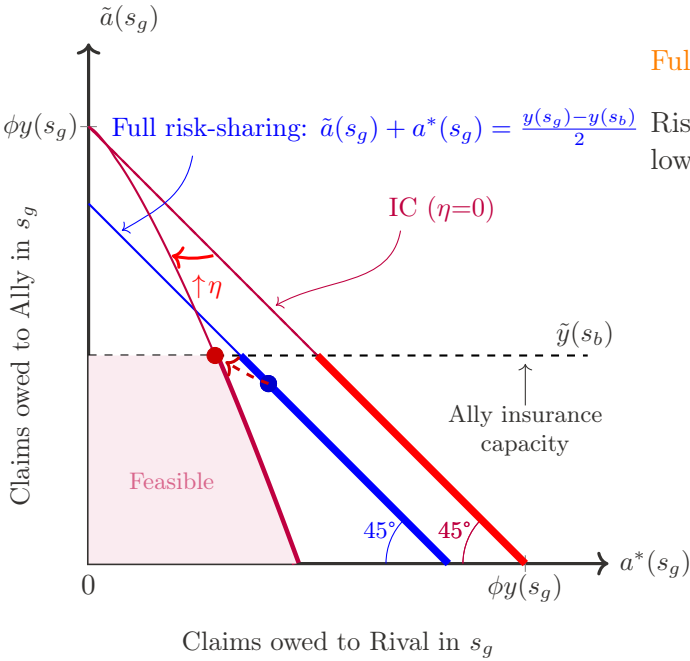




Initial optimum consistent with full risk-sharing.



Rise in η tightens IC constraint



Full insurance no longer attainable.

Rise in η leads to fragmentation and lower risk-sharing.

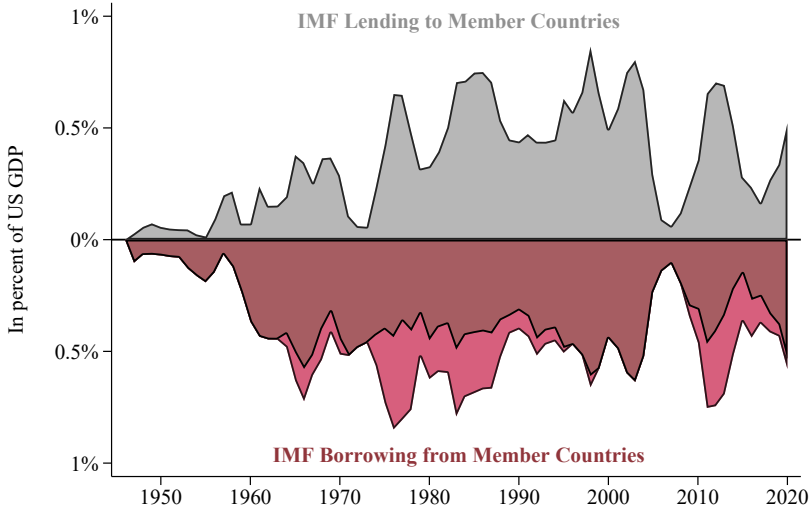
Conclusions

- **New dataset:** dyadic official lending, Global Financial Safety Net, 1910–2020, which traces multilateral flows back to their ultimate sovereign creditors
- We construct a **financial fragmentation index** and document that increases in geopolitical risk lead to fragmentation in official lending and lower risk-sharing.
- **Theory:** we build a sovereign debt model with limited-commitment model that links geopolitical risks to fragmentation and limits to risk-sharing.

Appendix

IMF BORROWING AND LENDING FROM MEMBER COUNTRIES

BACK



SOURCES

BACK

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

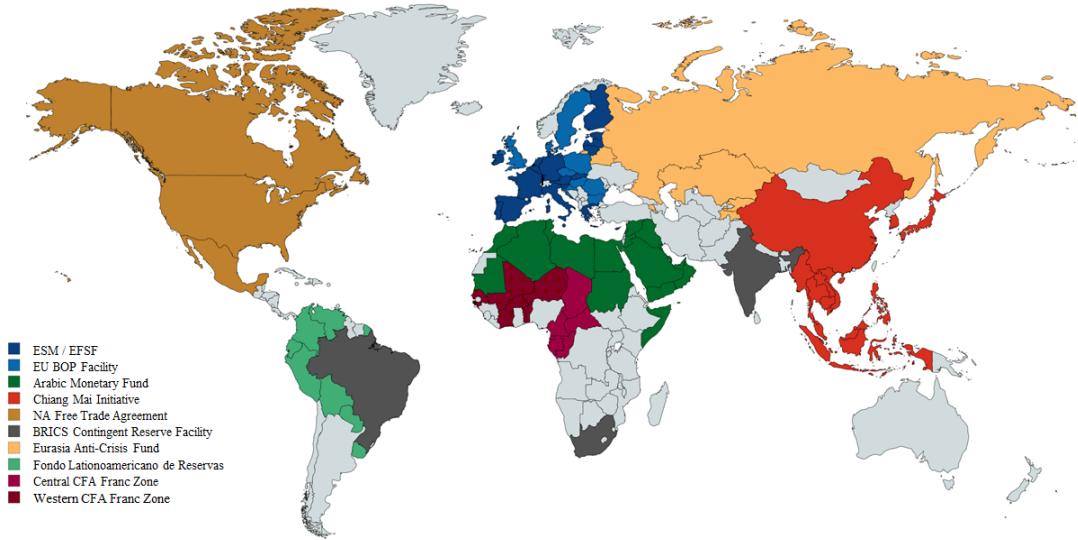
Coverage - International Financial Institutions

BACK

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

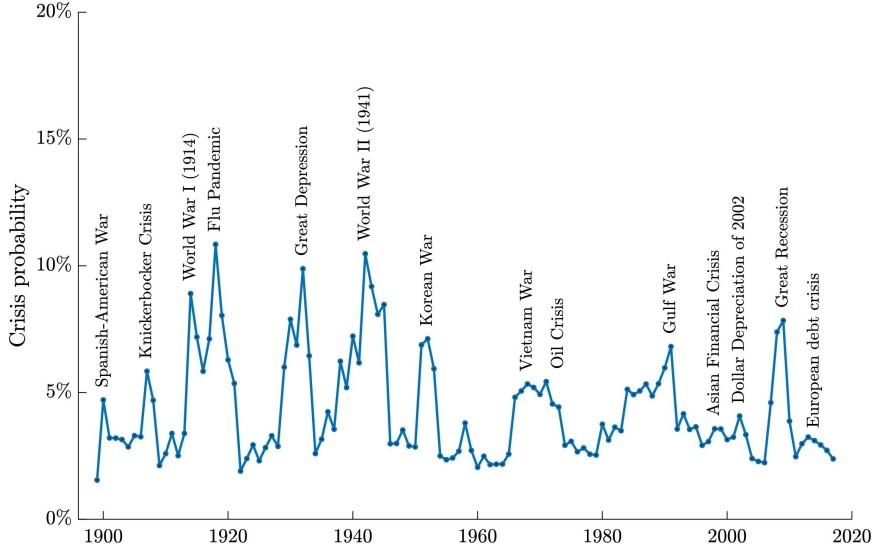
Regional financial safety nets

BACK



Macroeconomic tail risk, 1900 - 2020, Aggregate

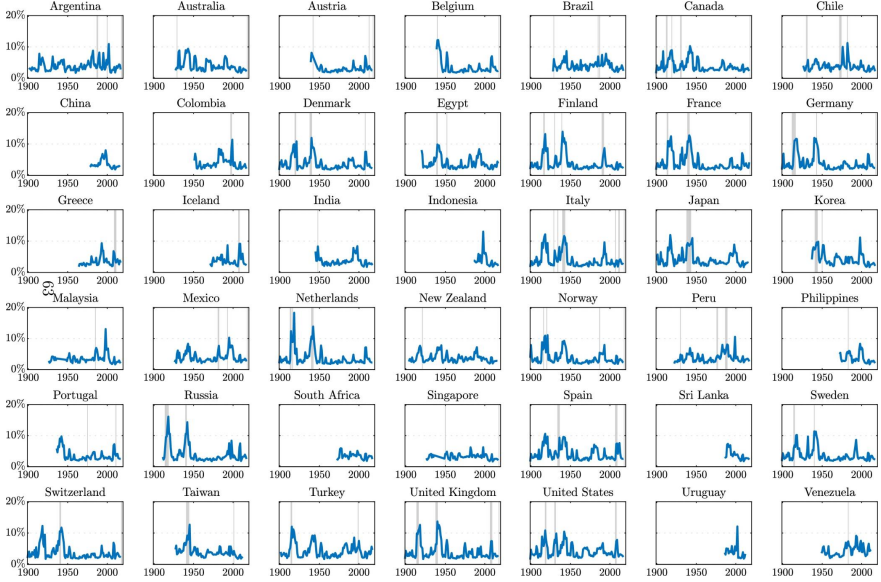
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Source: Marfe & Penasse (JFE, 2024)

Macroeconomic tail risk, 1900 - 2020

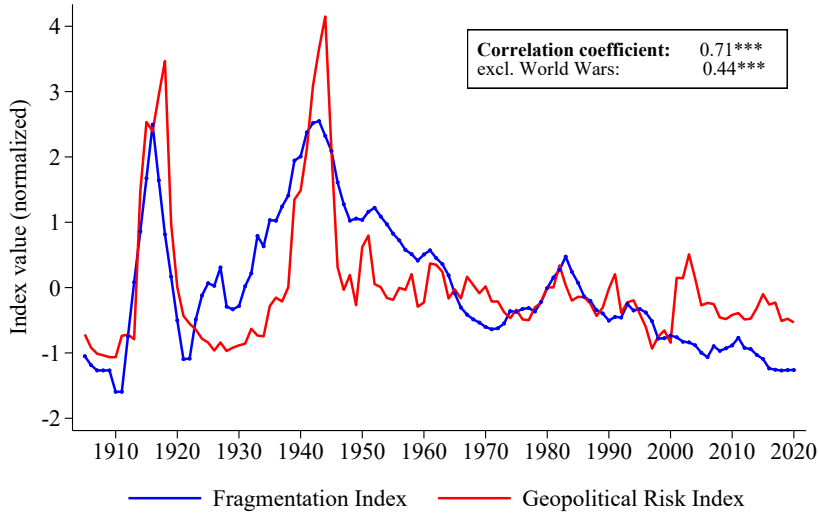
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Source: Marfe & Penasse (JFE, 2024)

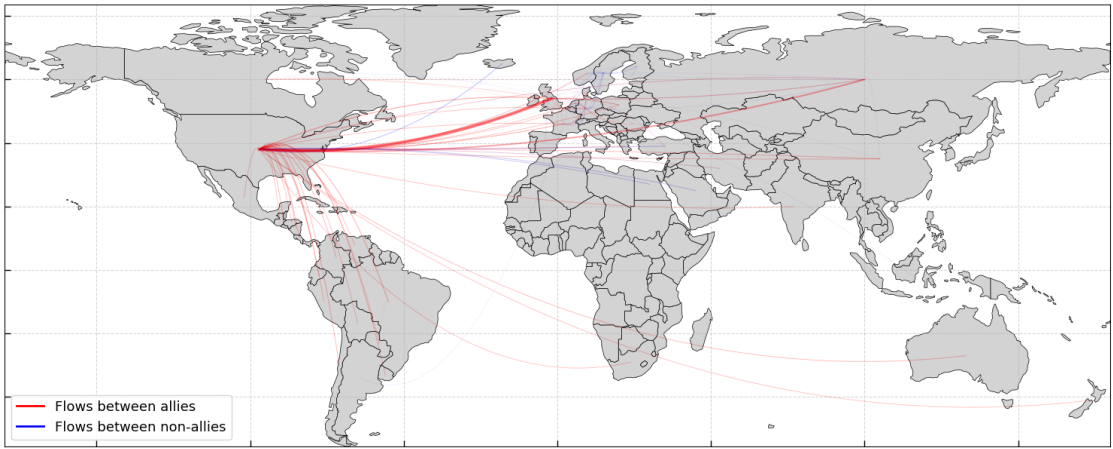
Fragmentation and geopolitical risk, 1910-2020 – Normalized

BACK



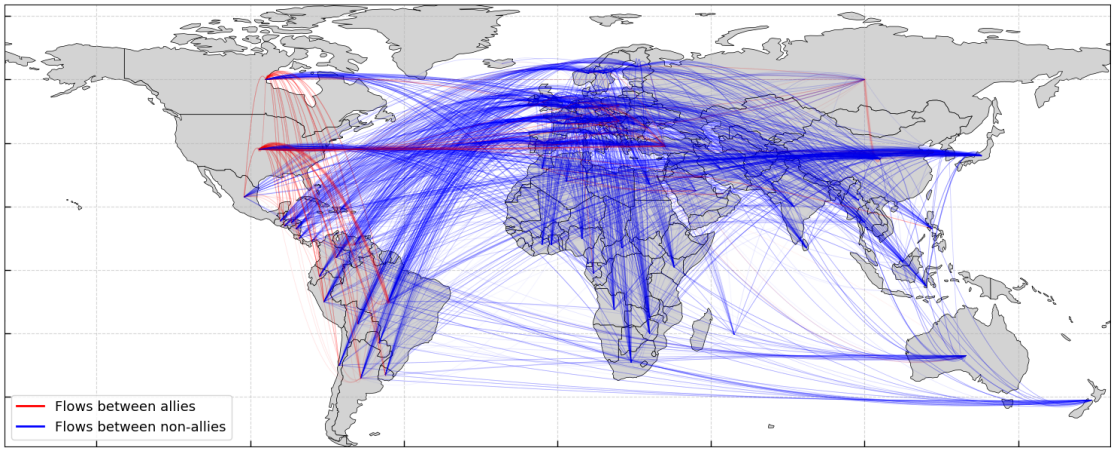
Financial cooperation in a fragmented world: World War II

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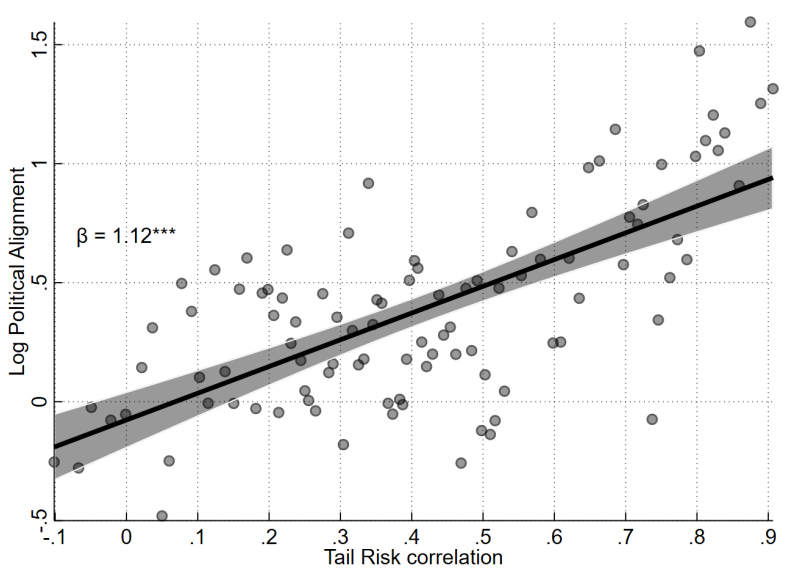
Financial cooperation in a globalized world: The Financial Crisis of 2008

BACK



... AND MORE SYNCHRONIZED MACRO TAIL RISK

BACK



Accum. of payment arrears on allies and rivals

BACK

