Financial Cooperation in a Fragmented World

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Geoeconomic Fragmentation

- **Context:** The global economic order is undergoing a fundamental shift, with increasing geoeconomic fragmentation.
- **Key Trend:** Economic relations are shaped less by fundamentals and more by political alliances, strategic rivalries, and national security concerns.
- **Emerging Literature:** A growing body of research explores the implications of this fragmentation on global capital flows and trade.

Some Questions:

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Our paper

Empirics: novel dyadic dataset on official (gov-to-gov) lending, 1920–2020

- Official lending contributes to international risk sharing
- When geopolitical tensions ↑, lending follows political alignments (fragmentation)
  - New index: **Financial Fragmentation Index**
- Aligned countries have + synchronized bus. cycle so, ↑ fragmen. $\implies$ ↓ risk-sharing

Theory: simple framework of borrowing w/ default risk + geopol. considerations

- Result: governments want to borrow more from friends than rivals, ex ante.
  - this holds even though we assume no discrimination in defaulting
- Mechanism:
  - ex post you want to default more on rivals, so . . .
  - ex ante you borrow more from friends to stop yourself from defaulting
    $\Rightarrow$ lower borrowing costs
- Insight: bond return same for friends/rivals but mg cost of borrow. for the gov is $\neq$

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Empirics: a novel dyadic dataset on official lending

A dyadic dataset of the Global Financial Safety Net, 1920–2020

We construct a novel, micro-level dataset of international financial cooperation by tracing government-to-government lending through the Global Financial Safety Net, 1920 to 2020

Definition of GFSN: Government-to-government lending in response to financial crises:

1. Bilateral credit lines and swap lines
2. Lending through regional financial arrangements
3. Lending through the IMF

Why look at long-run data?

Our new dataset allows us to look beyond recent decades of relative peace and stability and study financial cooperation during episodes of geopolitical turmoil and fragmentation (e.g., the World Wars, 1930s, Cold War).

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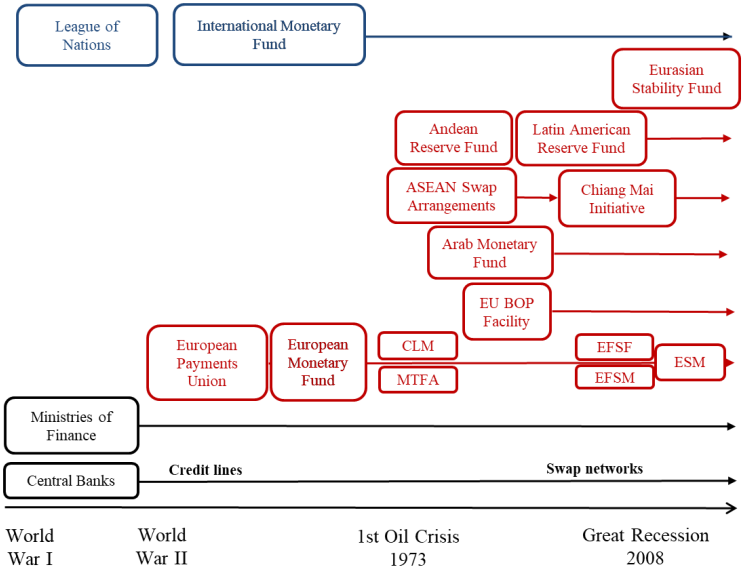

Sources: Horn, Reinhart & Trebesch (2024); Scheubel & Stracca (2017)

Novelty of the dataset

- We combine data on bilateral and multilateral lending with a granular new dataset on the funding structures of international financial institutions

- Allows to map multilateral lending to the dyadic level: creditor gov $\leftrightarrow$ borrower gov

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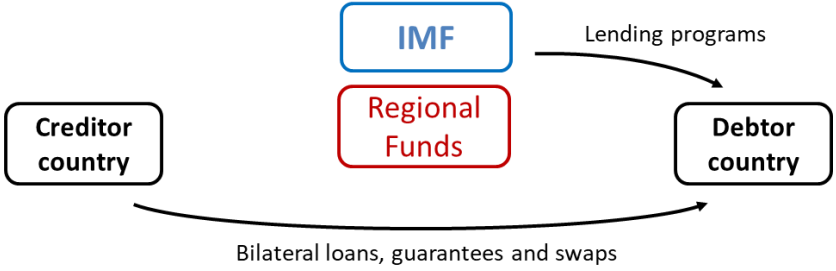

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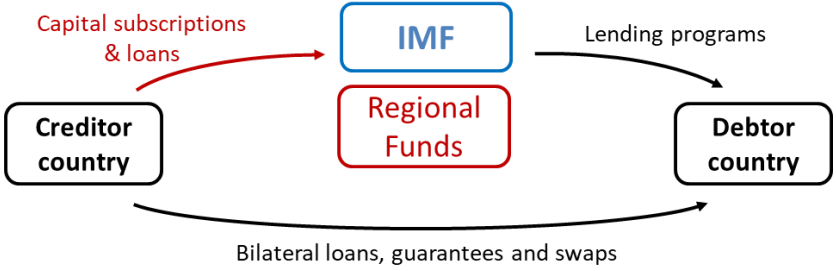

Construction of the Dataset

- First, we construct a new database of paid-in quota resources and outstanding lending to multilateral creditors
- We define each member country's funding share as

$$\omega_{jto} = \frac{PAID.IN_{jto} + CREDIT_{jto}}{\sum_{k}^{N} (PAID.IN_{kto} + CREDIT_{kto})}$$

- Once funding shares are constructed, we can map multilateral flows into bilateral flows by using the following approach

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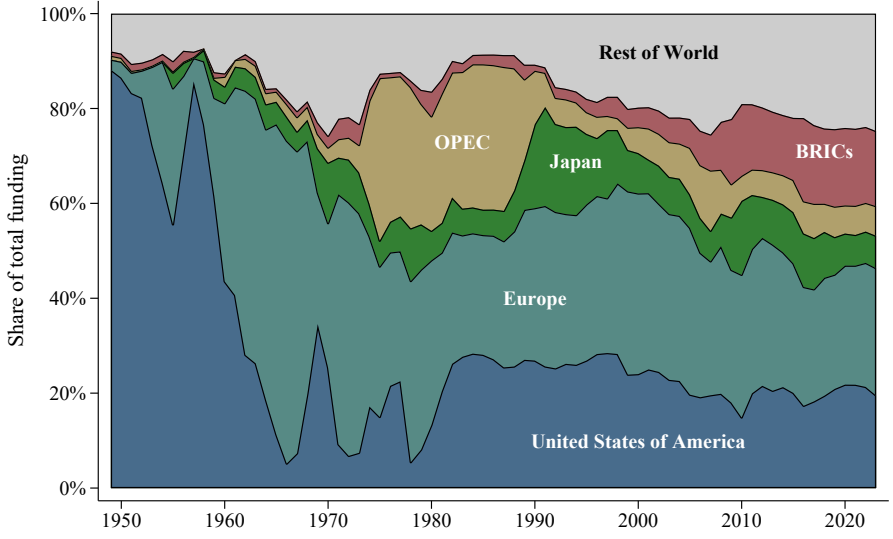
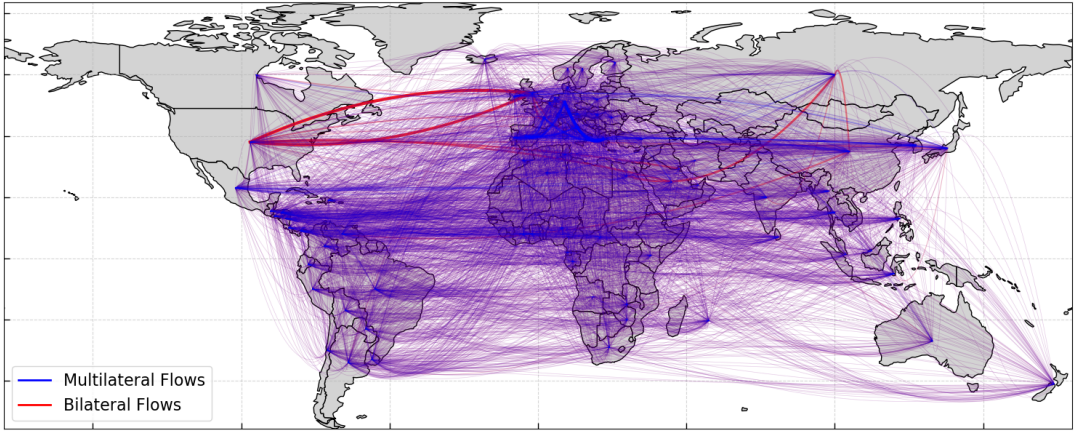
Example: Who funds the IMF?

▸ IMF balance-sheet



Official lending through the Global Financial Safety Net, 1920 - 2020



▸ Sources ▸ Coverage ▸ RFA Map

▸ 1930s ▸ 2008

Empirical findings

1. **Financial cooperation contributes to international risk-sharing**
   - Channeling funds from low-risk to high-risk countries
   - Lending amounts are *positively* correlated with *recipient* country risk
   - Lending amounts are *negatively* correlated with *creditor* country risk

2. **Geopolitical risk and fragmentation**
   - During episodes of high geopolitical risk, official flows follow political alignment (cf. Horn, Reinhart & Trebesch 2024)

3. **Financial fragmentation limits the scope for risk-sharing**
   - Financial cooperation with non-aligned countries improves risk-sharing

Financial cooperation contributes to international risk-sharing

$$\text{Flow}_{ijt} = \alpha_{ij} + \gamma\, \text{Tail.Risk}_{it}^{debtor} + \theta_{jt} + \epsilon_{ijt}$$

$$\text{Flow}_{ijt} = \alpha_{ij} + \delta\, \text{Tail.Risk}_{jt}^{creditor} + \theta_{it} + \epsilon_{ijt}$$

	Dep. var: Dyadic lending flows	
Tail risk of debtor economy	0.42***	
Tail risk of creditor economy		-0.38***
Observations	106,263	102,542
R^2	0.13	0.17
Debtor-Creditor FE	Yes	Yes
Creditor-Year FE	Yes	No
Debtor-Year FE	No	Yes

Note: PPML gravity regressions of dyadic official lending flows on (lagged) measures of recipient and creditor economy macroeconomic tail risk (1920–2020). Standard errors are clustered at the creditor-debtor dyad level. Specs also include gravity controls. Macroeconomic tail risk variable based on Marfe & Penasse (JFE, 2024).

▸ Macroeconomic tail risk, 1900 – 2020 ▸ Consumption growth rates, 1920 – 2020

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Measuring fragmentation

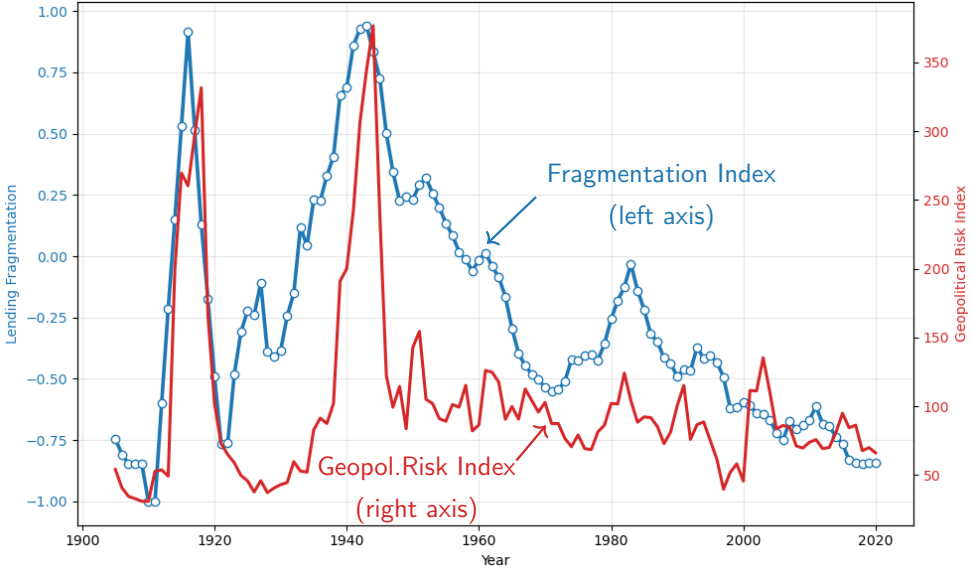
A simple, non-parametric approach to measuring fragmentation:

$$\text{Financial Fragmentation Index}_t = \frac{\text{Flows btw Allies}_t - \text{Flows btw Non-Allies}_t}{\text{Total flows}_t}$$

Identifying Allies and Non-Allies:

Military alliances as coded by Correlates of War Project (Gibler and Sarkees 2004, Gibler 2009)

Fragmentation and geopolitical risk, 1910-2020



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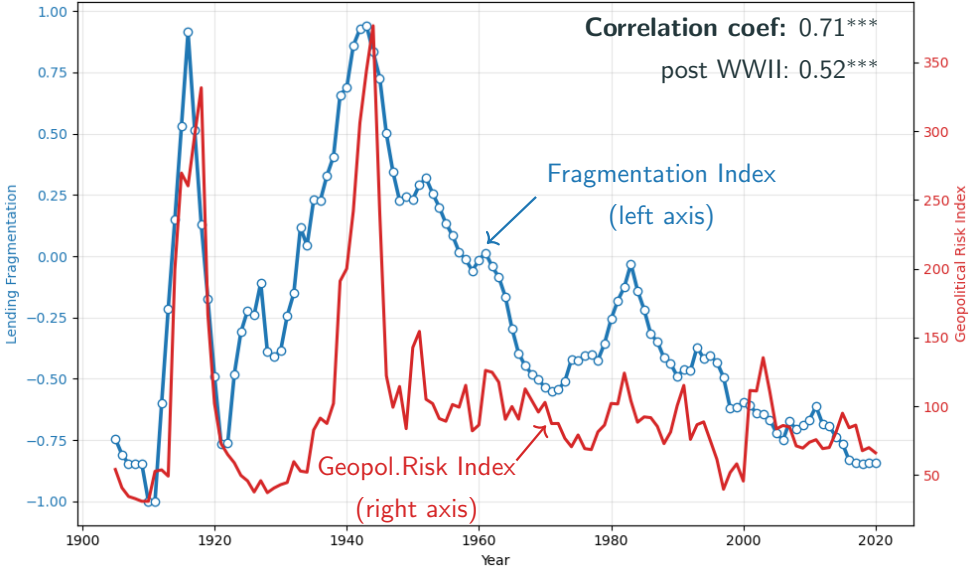

When geopolitical risk is high, lending follows political alignment

$$\text{Flow}_{ijt} = \alpha_{ij} + \gamma\ \text{Pol.Alignment}_{ijt} + \delta\ \text{Pol.Alignment}_{ijt} \times \text{Geopolitical.Risk}_{ijt} + \theta_{it} + \epsilon_{ijt}$$

	Total	Bilateral	Multilateral	Mult. share of lending
Pol. alignment				
Pol. alignment x Geo risk				
Observations				
Country Pair FE				
Debtor x Year FE				
Creditor x Year FE				

NOTE: This table presents results from a PPML gravity regression of dyadic official lending flows on a measure of political alignment based on absolute distance in UN general assembly voting. Political alignment is further interacted with a country-pair specific measure of geopolitical risk from Caldara and Iacoviello (2023). All regressions include country pair fixed effects and debtor-year fixed effects. Standard errors are clustered at the creditor-debtor dyad level.

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	Total	Bilateral	Multilateral	Mult. share of lending
Pol. alignment	0.42***			
Pol. alignment x Geo risk	0.18***			
Observations	126,602			
Country Pair FE	Yes			
Debtor x Year FE	Yes			
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	Total	Bilateral	Multilateral	Mult. share of lending
Pol. alignment	0.42***	0.64***	0.098***	
Pol. alignment x Geo risk	0.18***	0.34***	0.026	
Observations	126,602	44,337	35,436	
Country Pair FE	Yes	Yes	Yes	
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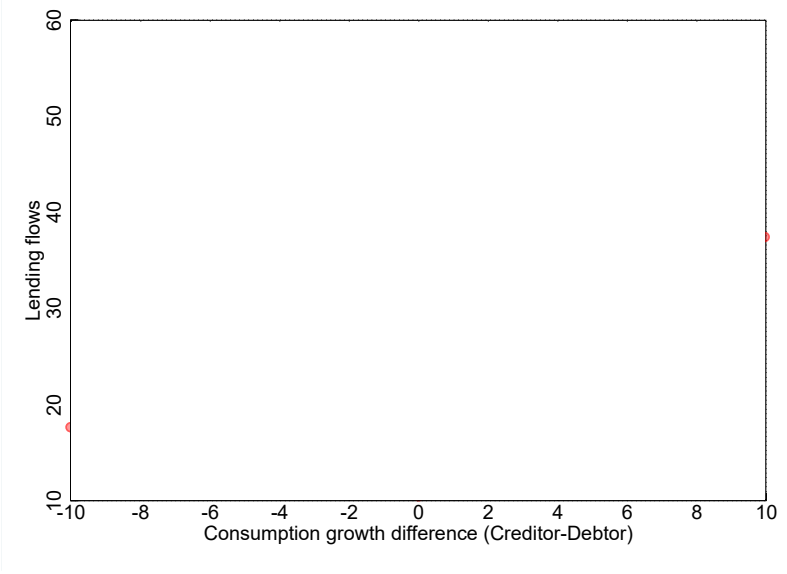
Politically aligned countries have more synchronized business cycles

▸ Tail risk

Geopolitical fragmentation worsens risk-sharing



▸ Debtor consumption growth ▸ Creditor consumption growth

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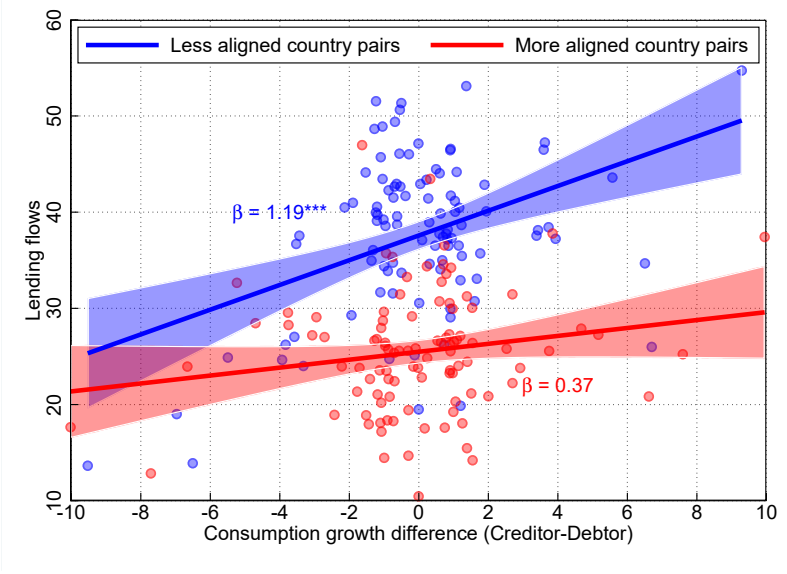

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Theory: A Simple Model of Geopolitical Fragmentation

Model

- Home country, borrows from two lenders: friendly and rival countries (govs)
- Two periods, no uncertainty

  $t = 1$ borrowing/lending

  $t = 2$ settlement (repay or default)

- Home country can't commit to repay
  - If it defaults, it can't discriminate among lenders

▸ Supporting evidence

Rival Country, $*$

- In $t = 1$ it invests y^* between two alternatives:

  i) lending to Home country, b^*

  ii) risk-free investment, k^*

$$y^* = \frac{b^*}{R_t} + \frac{k^*}{R^f}$$

- R^f: exogenous risk-free rate; R_t: endogenous

- In $t = 2$ its welfare is

$$V_2^*(b^*, k^*; d) = u\left(k^* + (1 - d)\, b^*\right)$$

  d: Home's default decision

Home Country (I)

$$u\left(\frac{b^* + \tilde{b}}{R_t}\right) + \beta V_2(b^*, \tilde{b}) - \eta V_2^*(b^*, k^*; d)$$

b^* : debt to rival country; $\tilde{b}$: debt to friendly country

η : degree of "geopolitical externality"

The home country's welfare in period 2 is determined by its default decision

$$V_2(b^*, \tilde{b}) = \max_{d \in \{0,1\}} (1-d)\, V_2^R(b^*, \tilde{b}) + d\, V_2^D(b^*)$$

with

$$V_2^R(b^*, \tilde{b}) = u(y - (b^* + \tilde{b})) - \eta V_2^*(b^*, k^*; 0)$$

$$V_2^D(b^*) = u\left((1-\phi)y\right) - \eta V_2^*(b^*, k^*; 1)$$

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Home Country (II)

No uncertainty $\Rightarrow$ no default in equilibrium

Investors impose a borrowing constraint on the Home country:

$$V_2^R(b^*, \tilde{b}) \geq V_2^D(b^*)$$

Assuming linear utility in $t = 2$, this becomes:

$$\tilde{b} + (1 + \eta)b^* \leq \phi y$$

One additional unit of debt owed to a rival country (e.g., China) tightens the constraint more than when it is owed to friendly countries (e.g., Europe)

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Equilibrium

Simplifying assumption: log-utility in Home in $t = 1$

Optimality condition:

$$\frac{1}{b^* + \tilde{b}} \geq \beta \qquad \text{w/ equality if } \tilde{b} + b^*(1+\eta) < \phi y$$

Implies that unconstrained solution characterized by an undefined portfolio that respects $\tilde{b} + b^* = 1/\beta$.

Proposition 1. The equilibrium is such that:

i) If $\frac{1}{\beta} \geq \phi y$, $b^* = 0$ and $\tilde{b} = \phi y$

ii) If $\frac{1}{\beta} < \phi y$, any combination $\{b^*, \tilde{b}\}$ such that $\tilde{b} + b^*(1+\eta) \leq \phi y$ and $\tilde{b} + b^* = \frac{1}{\beta}$

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Fragmentation

We can show that the maximum fraction of debt borrowed from the rival country is

$$\frac{b^*}{b^* + \tilde{b}} \leq \frac{1}{\eta}\left[\frac{\phi y}{b^* + \tilde{b}} - 1\right]$$

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Result: higher geopolitical tensions $\rightarrow$ more fragmented capital flows

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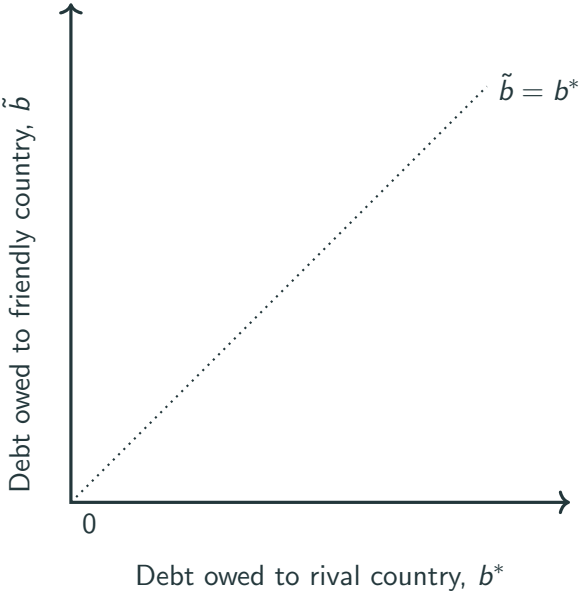
Illustration – Heightened geopolitical tensions increase fragmentation



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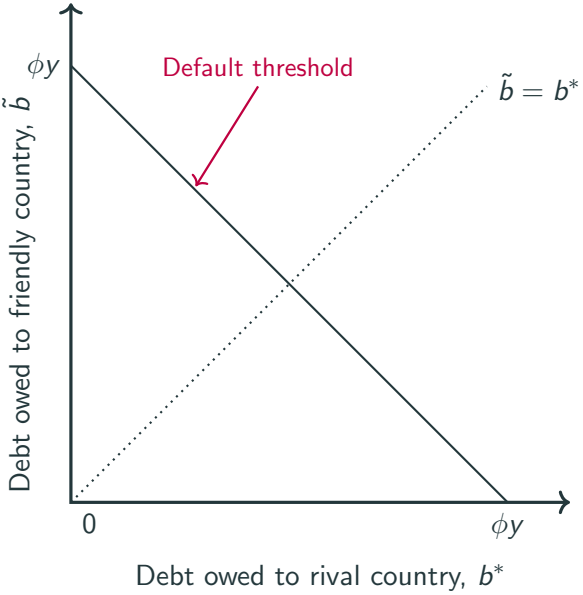

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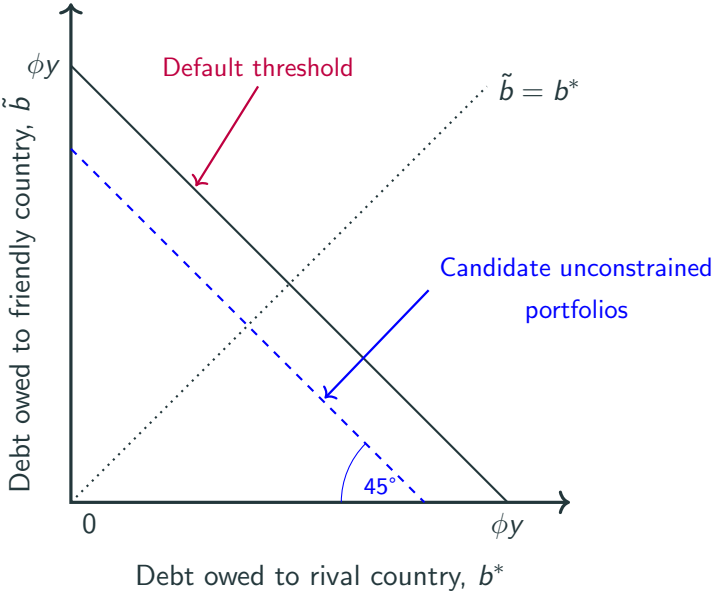

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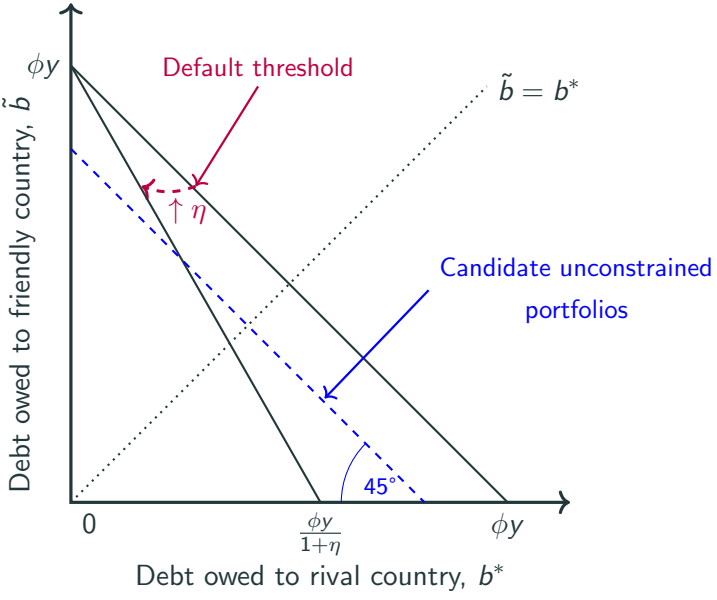

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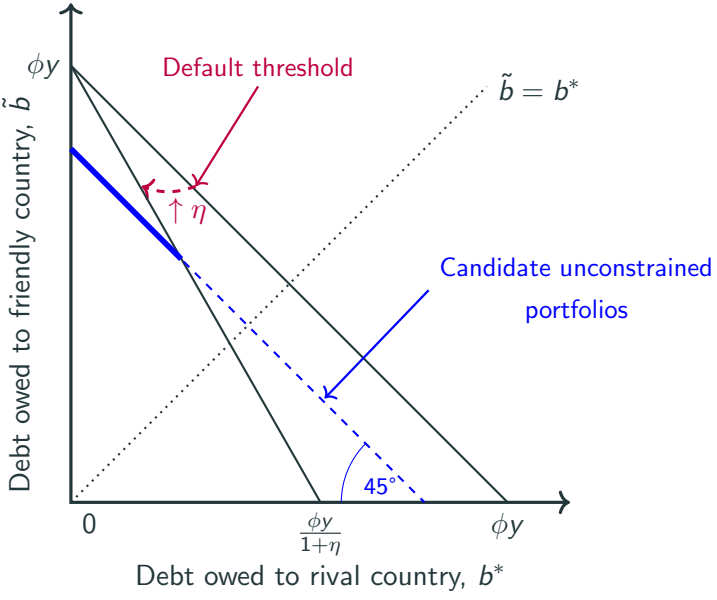


Model Extension

- Model presented has no uncertainty $\rightarrow$ no predictions for risk-sharing
- Extension:
  - Disaster risk (sharp drop in income for country i)
  - Assume Home and Friend have highly correlated income processes (as shown). Rival's income process is independent of Home/Friend (simplicity)
  - IF Home can issue state-contingent assets, natural buyer is Rival
  - $\uparrow$ Geopol. externality $\implies$ $\downarrow$ trading btw Home and Rival $\implies$ worse risk-sharing
- Consistent with empirical finding 3: $\uparrow$ fragmen. $\implies$ $\downarrow$ risk-sharing

Conclusions

We contribute to the geoeconomic fragmentation debate in two ways:

First: construct a new dyadic dataset of the GFSN (1920–2020) **and** propose a new Financial Fragmentation Index

i. Document that official lending contributes to international risk-sharing

ii. However, if geopolitical risk is high, lending fragments

iii. This fragmentation worsens risk-sharing

Second: provide simple theory to account for these facts

- Introduce geopolitical considerations in standard default model

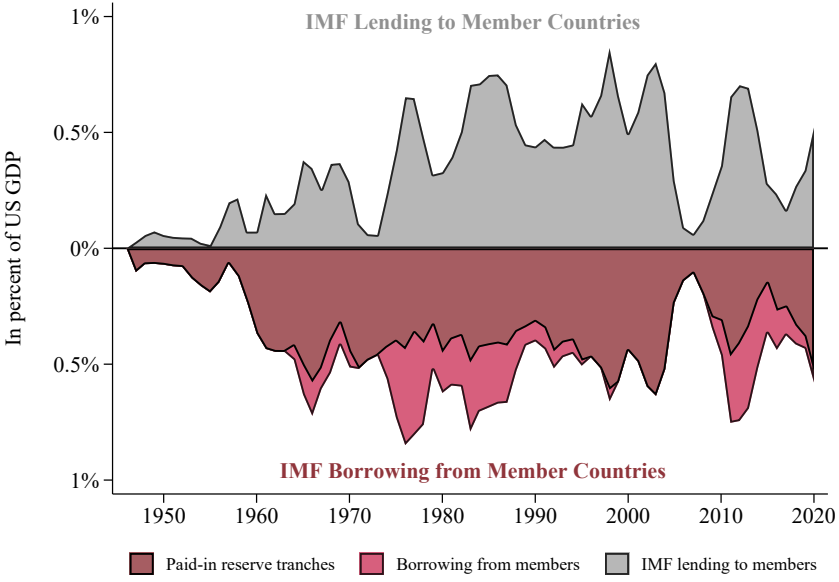
  $\nearrow$ geopolitical risk $\rightarrow$ strategically fragment to ensure better borrowing terms

Coming next: richer model to account for the effect of fragmentation on risk sharing

Thanks!

Example: 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

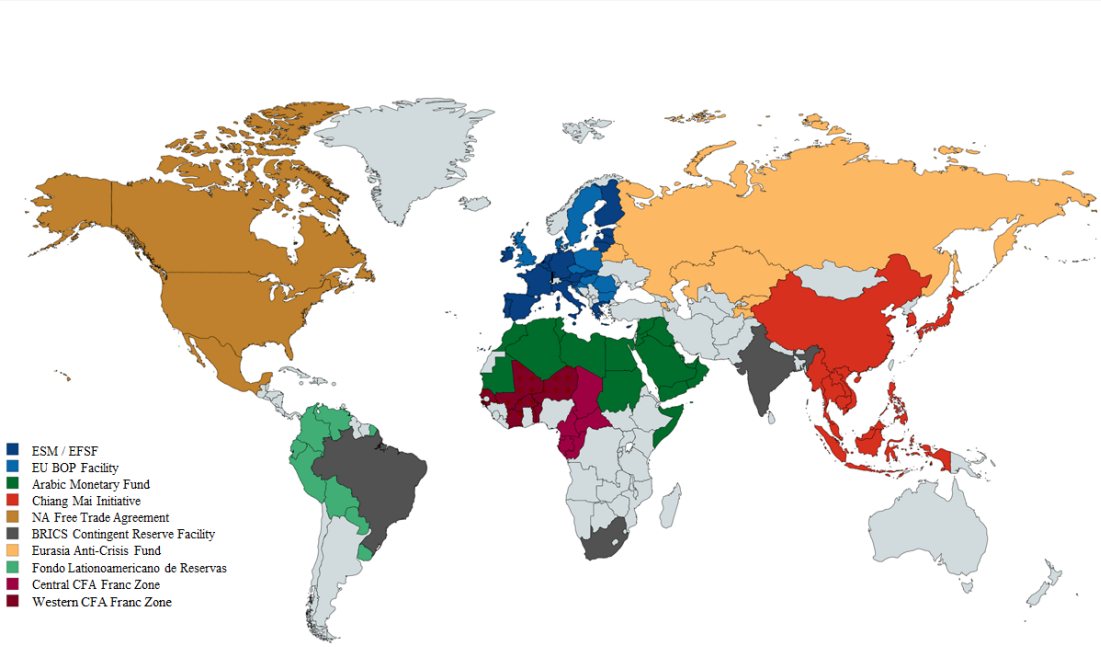
Coverage - International Financial Institutions

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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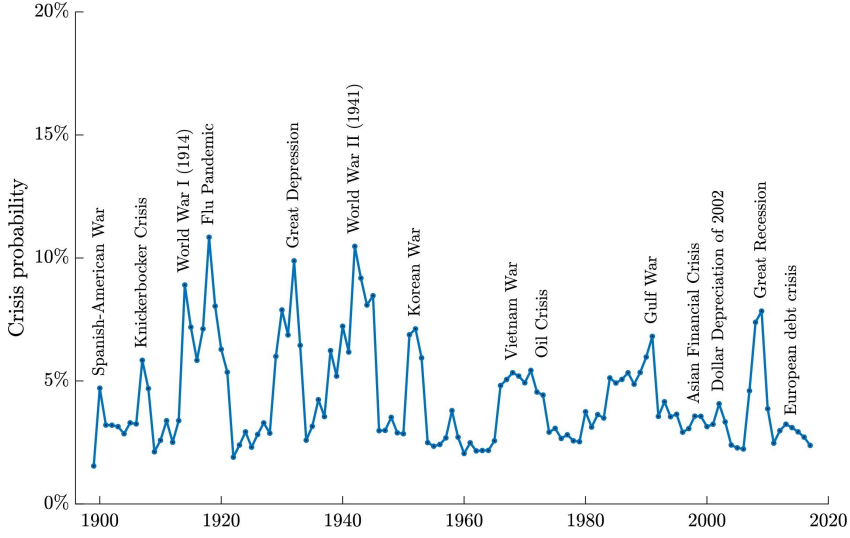
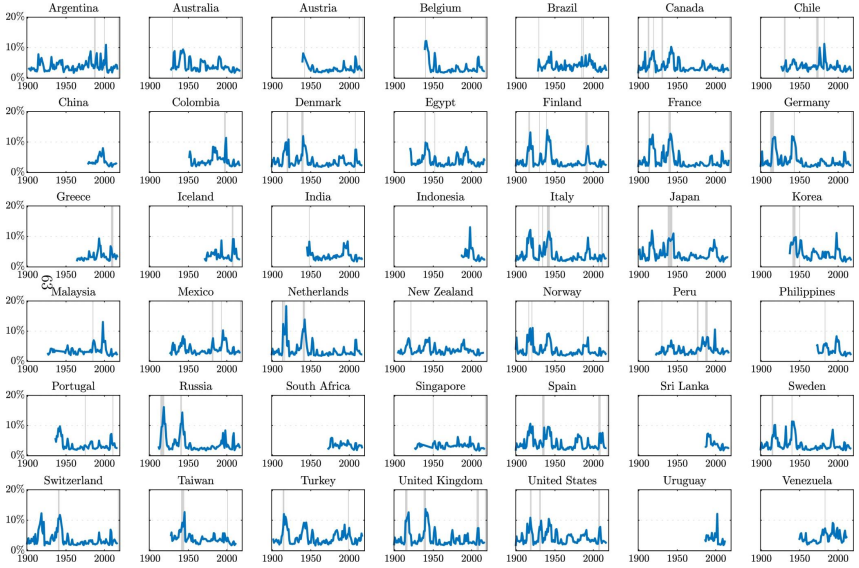


Source: Marfe & Penasse (JFE, 2024)

Macroeconomic tail risk, 1900 - 2020, Country by country

back



Source: Marfe & Penasse (JFE, 2024)

Using Consumption Growth Instead of Tail Risk

back

	Offical lending flow	
Consumption growth of debtor economy	-0.18***	
Consumption growth of creditor economy		0.10***
Observations	149,262	127,790
R^2	0.14	0.16
Debtor-Creditor FE	Yes	Yes
Debtor-Year FE	No	Yes
Creditor-Year FE	Yes	No

NOTE. This table presents results from a regression of dyadic official lending flows on (lagged) measures of recipient and creditor economy consumption growth between 1920 and 2020. Both regressions include country pair fixed effects as well as creditor-year fixed effects (column 1) or debtor-year fixed effects (column 2). Standard errors are clustered at the creditor-debtor dyad level.

Fragmentation and geopolitical risk, 1910-2020 – Normalized

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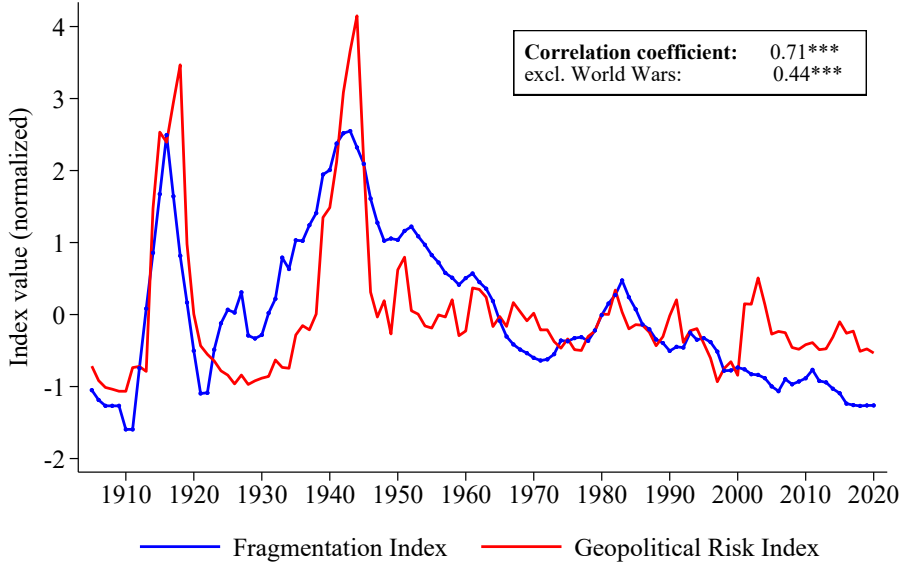
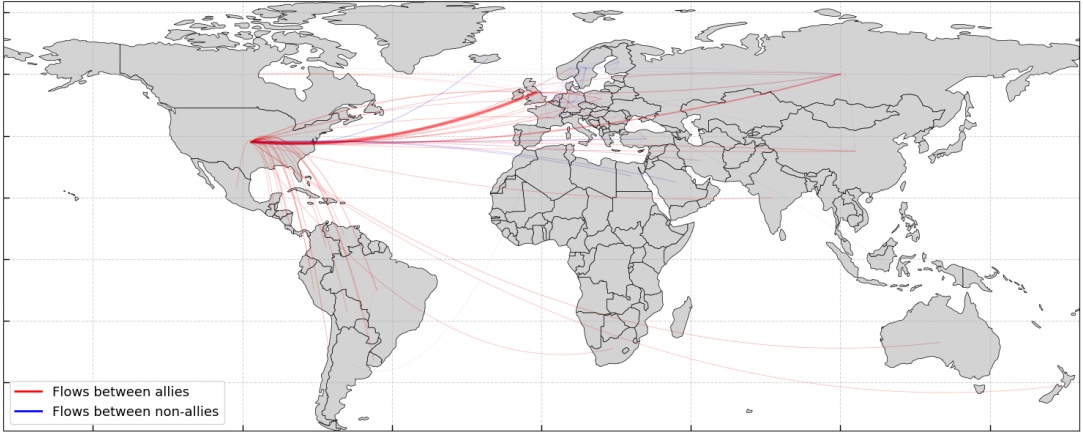


Financial cooperation in a fragmented world: World War II

back



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

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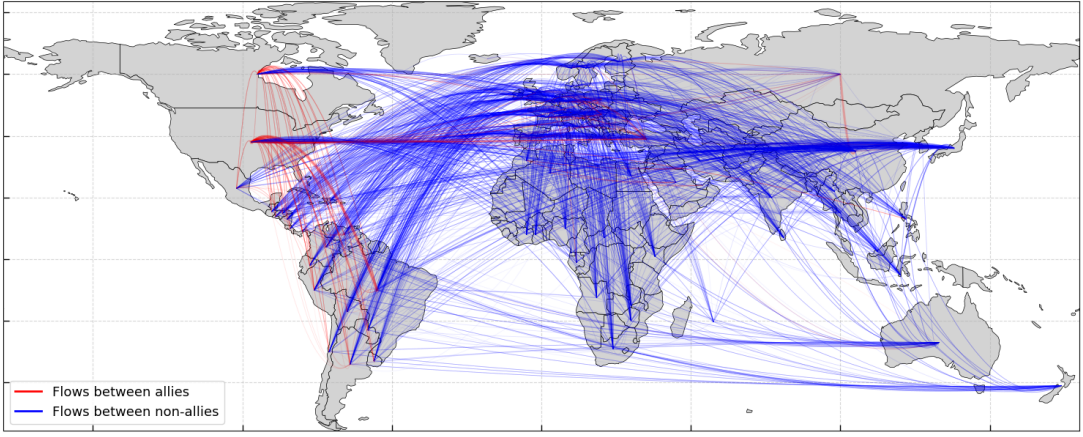

... and more synchronized macroeconomic tail risk

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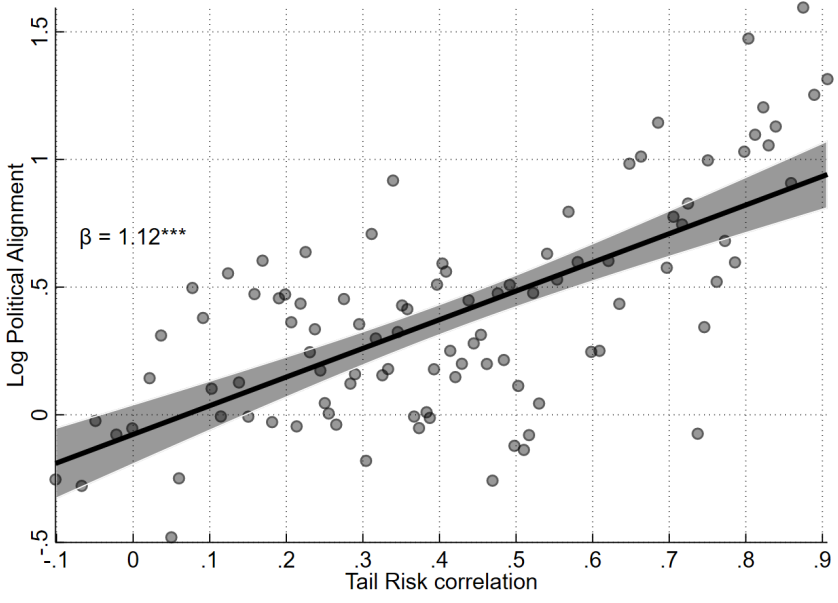

Official lending and debtor consumption growth

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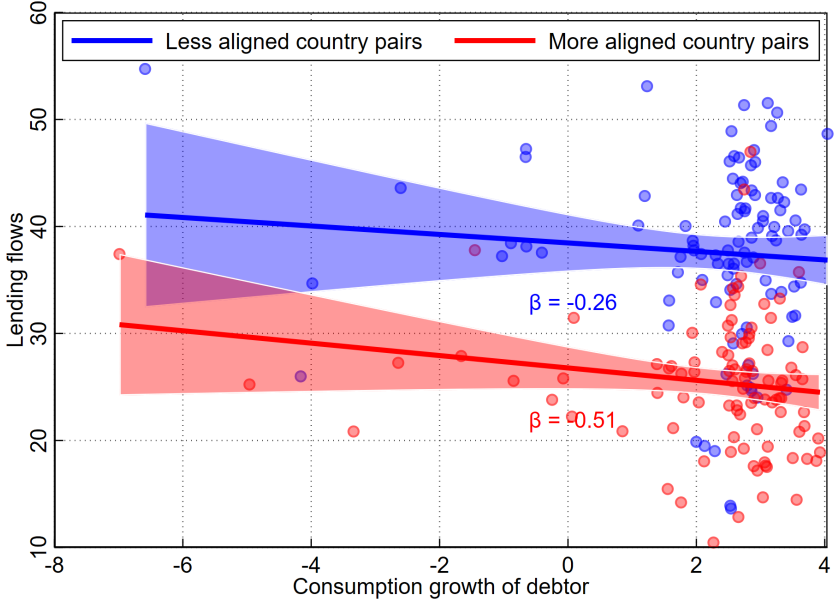

Official lending and creditor consumption growth

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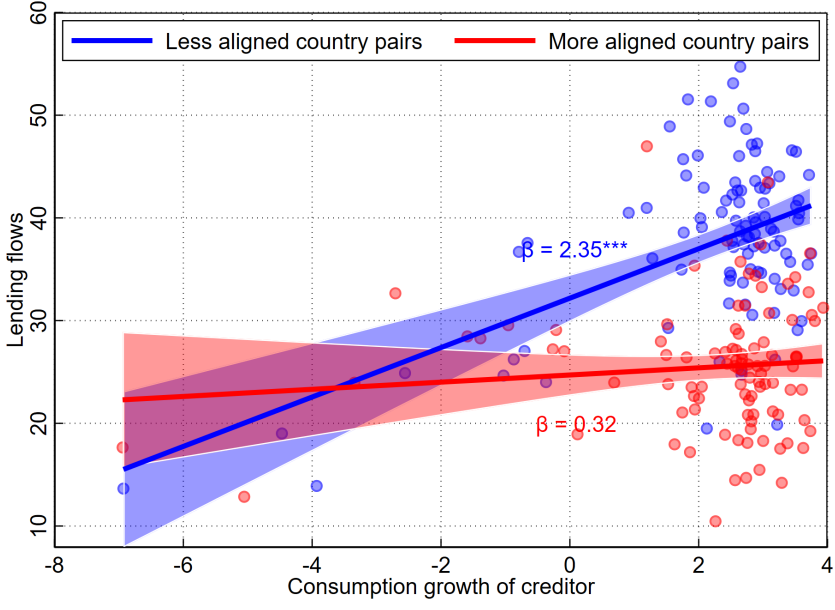

Accumulation of payment arrears on allied and rival countries

back