# Financial Cooperation in a Fragmented World*

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*Preliminary and incomplete - please do not share*

**Abstract**

This paper studies the risk-sharing benefits of financial cooperation through official (government-to-government) lending. We construct a new dyadic dataset of the global financial safety net from 1920 to 2020 and document that official lending contributes to international risk-sharing by directing funds from countries with low disaster risk to countries with high disaster risk. During times of high geopolitical risk, however, official lending 'fragments' and increasingly follows patterns of geopolitical alignment. This fragmentation limits the risk-sharing benefits of international cooperation, as aligned countries tend to have highly correlated business cycles. To rationalize these facts, we introduce geopolitical considerations into a model of endogenous default in which a country can borrow from friendly or rival countries. Even if countries cannot discriminate on which lenders to default on, the theory predicts the observed redirection of capital flows towards politically aligned countries in the face of increased geopolitical tensions.

**Keywords:** *capital flows, financial cooperation, risk-sharing, fragmentation, geoeconomics, sovereign default.*

**JEL classification:** *F34, H63, G01*

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# 1 Introduction

The international order is undergoing a fundamental shift, with the world economy increasingly fractured along geopolitical lines. This process of geoeconomic fragmentation marks a departure from integrated markets and multilateral economic cooperation toward a world where trade and capital flows are shaped less by economic fundamentals and more by political alliances, strategic rivalries, and national security concerns. In response, a fast-growing literature is beginning to examine the economic ramifications of a more fragmented global order (see, e.g., Aiyar, Presbitero, and Ruta (2023) and Mohr and Trebesch (2025) for overviews).

Yet, key questions remain: To what extent does capital flow fragmentation hinder countries' ability to smooth shocks and share risk? What are the broader welfare implications? And what role does official lending play in fostering financial cooperation while potentially deepening geopolitical divides?

Our paper contributes to this debate by examining the risk-sharing benefits of financial cooperation based on a new long-run dataset of official (government-to-government) lending over the past 100 years. This historical perspective allows us to look beyond the past decades of relative peace and stability and to study risk-sharing gains from cooperation in both eras of low geopolitical tensions and global cooperation, as well as in times of heightened tensions and fragmented cooperation within competing blocs (e.g., the 1930s and the Cold War).

We document that financial cooperation through official lending contributes to the sharing of international consumption risk by directing capital from countries with low crisis risk and low marginal utility of consumption to countries with high crisis risk and high marginal utility of consumption. At the same time, our data also reveals large heterogeneity in the risk-sharing effectiveness over time and across different lending arrangements. During times of high geopolitical risk, countries increasingly rely on bilateral instead of multilateral means of cooperation and lending increasingly follows patterns of geopolitical alignment. We show that such fragmentation of cooperation is detrimental to risk-sharing since geopolitically aligned countries tend to be subject to highly correlated shocks and exhibit closely correlated business cycles.

To rationalize these facts and assess their welfare implications, we develop a simple framework for analyzing geoeconomic fragmentation in capital flows. Specifically, we present a model of sovereign borrowing with potential default, extended to incorporate geopolitical considerations, and use it to identify the mechanisms through which rising geopolitical tensions lead to more fragmented capital flows. Even when default is non-discriminatory—meaning all lenders, regardless of political alignment, face equal treatment—the model predicts a redirection of capital flows toward politically aligned countries as geopolitical tensions intensify.

In the model, the home country can borrow from either "friendly" or "rival" countries and cannot commit to repaying its debts. We assume that the utility of the home country is decreasing in the utility of the rival country. We refer to this as a "geopolitical externality." The main mechanism is the following. Imagine that the home country is going through bad times (low income, high debt, etc.) and is therefore facing substantial default risk. If the home country were to keep

receiving negative shocks, it would be more tempted to default if its debts were mostly in the hands of the geopolitical rivals, other things equal. From an ex ante perspective, this means that rival countries would only buy these sovereign bonds at a significantly discounted price. Therefore, the home country has the incentive to borrow more from "friendly" countries (i.e., those with whom it is more politically aligned) to stop itself from defaulting in the future, and in that way face better borrowing terms ex ante. These dynamics emerge in equilibrium even if we assume there is no discrimination when it comes to defaulting on foreign lenders (i.e., if default happens it affects all lenders; friends and rivals). Interestingly, while the return on bonds is the same for all lending countries (friends or rivals), the presence of geopolitical tensions makes the marginal cost of borrowing for the government different.

We find that an increase in the geopolitical externality shrinks the borrowing set for the home country and tilts the set of possible equilibrium portfolios toward friendly countries. In this way, heightened geopolitical tensions create more fragmented capital flows, in line with our empirical findings.

In ongoing work, we further extend the model to study the risk-sharing implications of this finding. For this purpose, we assume curvature in the preferences for all countries and introduce uncertainty in the form of disaster risk. As in the data, the disaster risk processes for the home and the friendly countries are positively correlated, while the process for the rival country is independent of the processes of the other two countries. If the home country could sell Arrow securities that pay out in disaster states, the natural buyer would be the rival country. If the geopolitical externality increases, however, the home country trades fewer of these securities with the rival country and this worsens risk sharing, consistent with our empirical findings.

**Related literature.** This paper contributes to a large literature on international risk-sharing (Backus et al., 1992; Obstfeld and Rogoff, 2000; Farhi and Werning, 2017). While this literature has primarily focused on private international capital flows (Lewis, 1996; Kose et al., 2009; Bai and Zhang, 2012), our focus is on government-to-government lending and the risk-sharing properties of financial cooperation and the global financial safety net. In this sense, our paper is closely related to other empirical (Barro and Lee, 2005; Horn et al., 2024) and theoretical studies of international official lending (Gourinchas et al., 2023; Abraham et al., 2024; Arellano and Baretto, 2024; Liu et al., 2024; Roldán and Sosa-Padilla, 2025).

Our findings on the interaction of political alignment and risk-sharing have an interesting analogy in a large literature that studies risk-sharing networks between households. Going back to the seminal contributions of Cochrane (1991) and Townsend (1994), this literature has studied how households use gifts and loans to share idiosyncratic income risk in environments of limited enforcement. While theoretical work has emphasized the role of reciprocity and repeated interaction in overcoming enforcement problems (Kocherlakota, 1996; Ligon et al., 2002; Dubois et al., 2008), empirical studies show that risk-sharing networks predominantly follow preexisting family and kinship ties which come with highly correlated income profiles and shock exposures and therefore limit the scope for risk-sharing.

Finally, our paper contributes to the rapidly growing literature on geopolitical risk and fragmentation (Caldara and Iacoviello, 2022; Clayton et al., 2024a,b; Broner et al., 2024), in both trade (Aiyar et al., 2023; Fernandez-Villaverde et al., 2024; Kleinman et al., 2024; De Souza et al., 2024) and finance (Aiyar et al., 2024; Catalán et al., 2024; Gopinath et al., 2024; Kempf et al., 2023; Bianchi and Sosa-Padilla, 2024, 2023). We contribute to this literature by providing a long-run view on how geopolitical tensions drive fragmentation in international capital flows and by studying the potential ramifications of fragmentation, in particular its impact on the international sharing of consumption risk.

**Layout.** This paper is structured as follows. Section 2 introduces our new dyadic dataset of international official lending through bilateral and multilateral channels. Section 3 presents the key empirical findings. Section 4 presents a simple model of sovereign default extended with geopolitical considerations. Section 5 concludes. The Appendix has details on the construction of the new dataset.

# 2 A new dataset of official international cooperation

This section introduces our new dyadic dataset of international official (government-to-government) lending. We present the key definitions, sources, and principles of data construction and point interested readers to Appendix Section B for further details.

## 2.1 Definitions and concepts

Our data collection focuses on international *official* lending, that is lending between governments, either bilaterally or through an international organization.[1] We aim to capture all loans, guarantees and swap lines that governments (and their state-owned agencies including central banks) extend to foreign governments. Official financial assistance can take two distinct forms - bilateral and multilateral lending. Bilateral lending refers to transactions that are directly extended by a creditor country sovereign to the recipient country sovereign. In contrast, multilateral lending is extended by international financial institutions that are established through political agreements among multiple member countries (IMF, 2014; OECD, 2018).

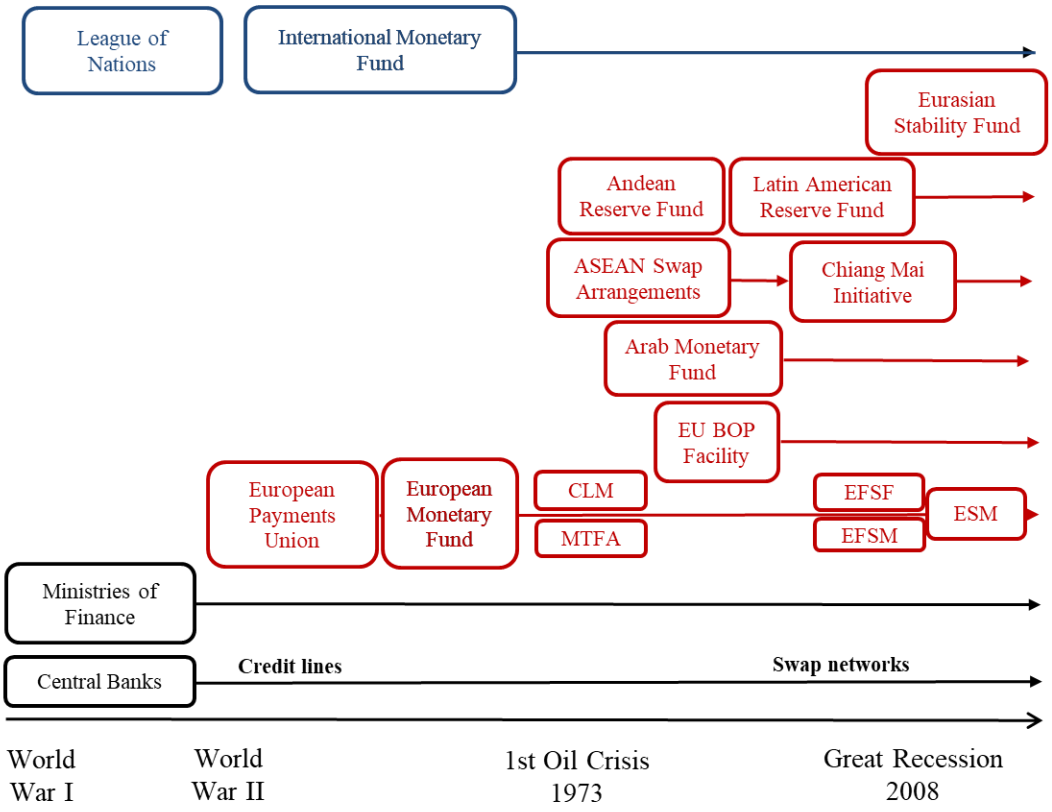
Figure 1 provides a stylized overview of the key institutions and arrangements over the past 100 years, which together are commonly referred to as the "Global Financial Safety Net" (Scheubel and Stracca, 2019). In the first half of the 20$^{th}$ century, official lending was almost exclusively carried out through bilateral channels.[2] After World War II, multilateral arrangements—most notably the IMF—began to play a central role in official lending. Additionally, a growing number of regional

[1] Our data collection largely follows the widely used definition of official lending by OECD (2018). See Appendix Section B for details.

[2] The one notable exception are stabilization loans extended under "the auspices of the League of Nations' during the 1920s. See Appendix B.3.1 for details.

financial arrangements such as the European Stability Mechanism (ESM) and its predecessor institutions in Europe or the Fondo Latinamericano de Reservas in Latin America have emerged as important expansions of the Safety Net.

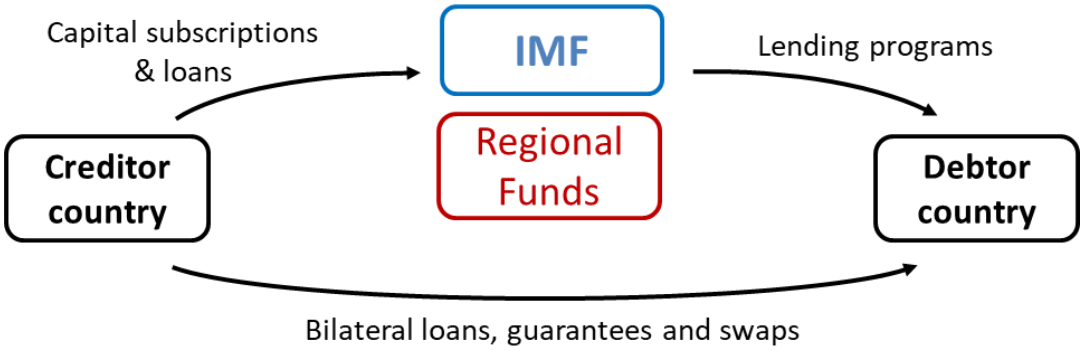
**Figure 1:** The Global Financial Safety Net, 1920-2020




*Note:* This Figure provides a stylized representation of the Global Financial Safety Net over the past 100 years. It distinguishes between bilateral lending arrangements (in black), regional lending arrangements (in red), and global multilateral forms of lending (in blue). See Appendix Section B.3 for details and abbreviations.

Multilateral lending institutions collect and pool funds from their member countries (and private markets) and lend them on to other member countries, acting as intermediaries. Figure 2 illustrates this process. A key contribution of this paper is to introduce a new database on the liability structure of multilateral creditors that allows to trace multilateral lending back to its original funding source. This data allows for a mapping of multilateral flows to their country of origin and thus for the creation of a dyadic (creditor-to-debtor country), micro-level dataset of official lending.

**Figure 2:** Bilateral and multilateral official lending




*Note:* This figure provides a stylized illustration of the official lending process through bilateral and multilateral arrangements. See Appendix Section B.3 for a detailed discussion at the creditor entity level.

## 2.2 Data construction

Our data collection builds on and expands the official international lending data collected by Horn et al. (2024). This data source features granular information on cross-border official lending by bilateral creditors and multilateral creditor organizations since 1800. We expand this data source by merging it with newly collected data on the funding structure of multilateral creditors that allows us to trace official lending flows through international organizations and back to their original source.

Specifically, we track the funding structure of the 16 different multilateral creditor organization that are shown in Figure 1 above.[3] For this purpose, we first conduct a systematic review of the funding structures of these organizations by tracking their annual reports and balance sheets over the full life cycle of each institution's existence. Our review reveals that multilateral creditors have primarily relied on two different forms of financing from their member countries. First, and most importantly, member countries provide paid-in capital in the form of hard currency. With respect to the IMF, for example, member countries put a share of their foreign exchange reserves at the disposal of the IMF (the so-called reserve tranche). Secondly, multilateral creditors have supplemented paid-in capital by borrowing through standing credit lines. Borrowing either takes the form of direct borrowing from member country treasuries and central banks or of borrowing in private capital markets against the paid-in capital or explicit financial guarantees of member countries (James, 1996; Cheng and Lennkh, 2019).

[3]We focus on these multilateral creditors since they are explicitly mandated to provide funding to help recipients cope with negative shocks and crisis. The analysis could be extended to other multilateral institutions that provide financing for development (e.g., the World Bank or Regional Development Banks) or for other public goods (e.g., the World Health Organization or the United Nations) (see Horn et al., 2024, for a broad overview of different multilateral lending agencies). These institutions, however, are arguably less relevant for the mitigation of financial crisis and the international sharing of risk.

As explained in much greater detail in Appendix Section B, we use dozens of country and organization-specific sources to track both paid-in quota resources and outstanding lending to multilateral creditor by their member countries. On this basis, we derive each member country's funding share in a multilateral creditor institution as follows:

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

where $PAID.IN_{jto}$ represents the capital that country $j$ has paid into multilateral creditor organization $o$ in year $t$ and $CREDIT_{jto}$ presents any outstanding credit by country $j$ to organization $o$. Once funding shares are constructed, we map multilateral into dyadic flows by assuming that each sovereign creditor's share in a multilateral loan is proportional to its funding share of the corresponding multilateral organization in the same year.

**Tracing in- and outflows to the IMF:** To illustrate our novel database on the liability structure of multilateral creditors, we proceed by presenting data on lending by and through the International Monetary Fund.[4] Panel A of Figure 3 shows the liabilities and assets of the IMF as a share of US GDP and illustrates the time-variation in IMF funding and lending. While the IMF's outstanding lending programs (in grey) have received considerable attention in the literature (see e.g. Barro and Lee, 2005; Reinhart and Trebesch, 2016; Horn et al., 2024), much less is known about the IMF's funding operations (shown in red).

Panel A of Figure 3 shows that the IMF's lending operations increase in response to widespread global crisis and that these increases in outstanding credit need to be met with comparable increases in member country contributions to the IMF, which primarily come in the form of paid-in reserve tranches. During times of high demand for IMF funds, however, the IMF has repeatedly activated borrowing facilities and drawn additional funding from selected members.[5]

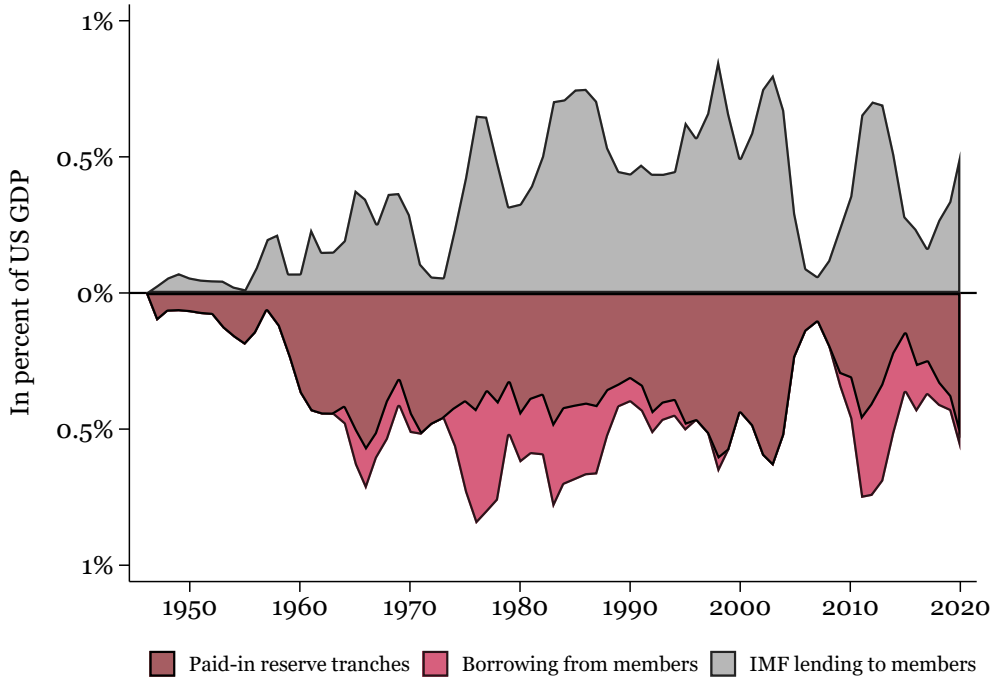
As a consequence of these distinct funding modes, funding shares in the IMF display significant time variation. Panel B of Figure 3 illustrates this point by showing IMF funding shares of different country groups over the course of the Fund's history. During the oil price crises of the 1970s, for example, the Fund substantially increased its funding from OPEC countries, by setting up bilateral borrowing lines. Official recycling of petrodollars allowed oil importers such as Western European countries and the US to reduce their contributions to the Fund at times, in which they faced high demand for reserve assets themselves. Similarly, during the 1960s, when the US and the UK along with other advanced countries came under market pressure and sought IMF assistance to finance the defense of the Bretton Woods system, selected Western European surplus countries, such as Germany and the Netherlands, stepped in and provided the Fund with additional resources via bilateral credit (James, 1996). In recent decades, a larger part of the IMF's financing burden

[4] Appendix Sections B.3.1 and B.3.3 provide similar discussions of lending by the League of Nations and regional financial arrangements.

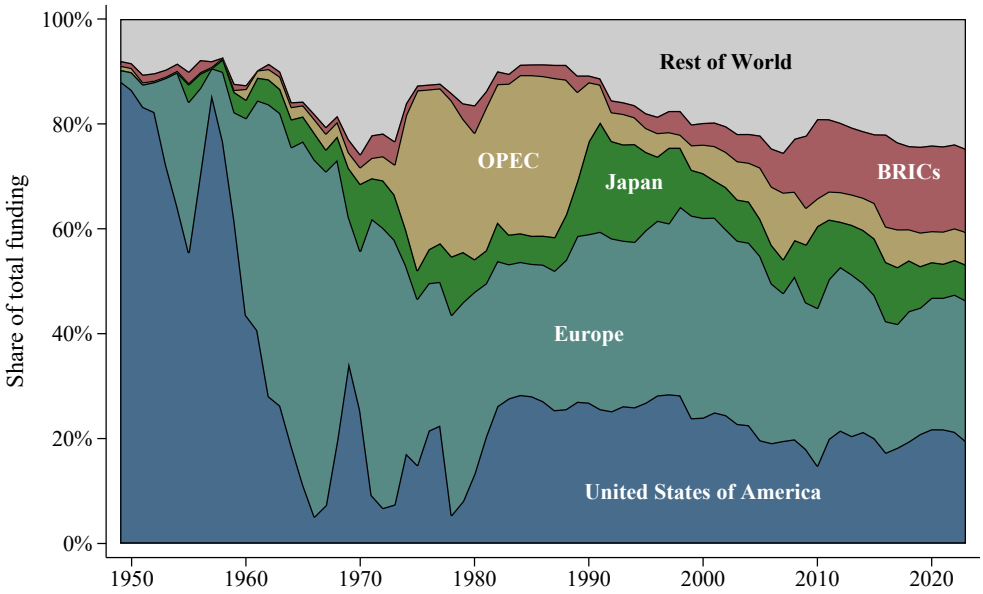
[5] Prominent examples of IMF borrowing arrangements include the General Agreements to Borrow (established during the defense of Bretton Woods exchange rate arrangements in 1962) and the Oil Facilities, through which the IMF borrowed additional funds from OPEC countries during the Oil Crises of the 1970s. See Appendix Section B.3.2 for a detailed list and James (1996) for a detailed historic account of these episodes.

**Figure 3:** International official lending through the IMF

**Panel A.** IMF: Outstanding assets and liabilities, 1945-2020




**Panel B.** Who funds the Fund? IMF liabilites by region



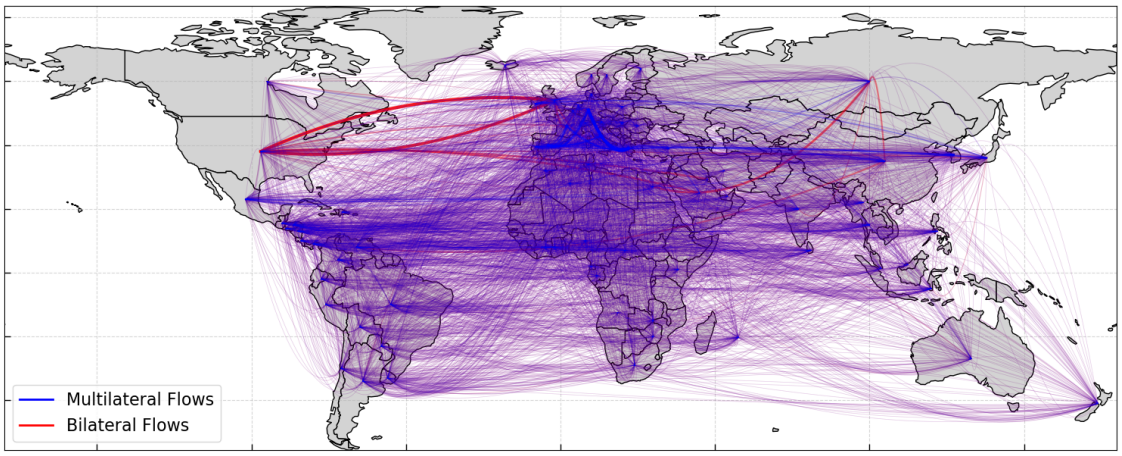

*Note:* This figures shows how the IMF functions as an intermediary for international official lending. Panel A shows IMF assets (in grey) and liabilites (in red) in the form of reserve tranches and credit lines. All values are scaled by the GDP of the largest shareholder, the US. Panel B shows the share of funding $\omega$ - as defined above - by different regional groups over time.

shifted towards Japan (in the 1990s) and China (in the 2000s) that made use of bilateral credit lines with the IMF to recycle parts of their large current account surpluses.

## 2.3 Final dataset

Our final dataset covers a total of 52,592 transactions extended by 132 creditor economies to 198 debtor economies since 1920. 20,351 of these transactions are instances of direct bilateral lending, whereas 34,454 transactions are extended through one of the multilateral creditor institutions shown in Figure 1. The total value of lending that we capture amounts to more than 8 trillion USD in 2015 terms. The entire dataset is dyadic, i.e., the observational unit is the creditor-debtor-year level. Figure 4 illustrates the data and the magnitude of flows through bilateral and multilateral arrangements over the past 100 years.

**Figure 4:** Official lending through the Global Financial Safety Net, 1920 - 2020




*Notes:* This figure shows our dyadic official lending data through bilateral (in red) and multilateral (in blue) channels. Line width is proportional to total lending amounts. See text and Appendix Section B for details on sources and data construction.

To study risk-sharing properties, we combine the official capital flow data with different measures of creditor and debtor economy business cycles and macroeconomic tail risk. Most importantly, we use creditor and debtor economy consumption growth data from the Penn World Tables (Feenstra et al., 2015) and measures of macroeconomic tail risk developed by Marfè and Pénasse (2024). This measure has the advantage of being available for more than 100 years and for a broad cross-section section of more than 40 major emerging and advanced countries. For further details on these variables see Appendix Section C.3.

# 3 Official lending, risk-sharing and fragmentation

In this section we present three new insights on the interaction of official lending, international risk-sharing and the effects of geopolitical risk and fragmentation. First, we show that financial cooperation contributes to international risk-sharing by channeling funds from low-risk to high-risk countries (stylized fact I). During times of high geopolitical tension, however, official lending increasingly follows lines of geopolitical alignment (stylized fact II). This impairs the scope for international risk-sharing, since geopolitically aligned countries tend to have more closely correlated business cycle dynamics and tail risk patterns (stylized fact III). We discuss each of these findings in turn.

**Fact 1.** *Official lending is positively correlated with recipient country risk and negatively correlated with creditor country risk.*

We begin our analysis of the risk-sharing properties of official lending flows by studying their cyclical co-movement with macroeconomic tail risk in both the debtor and creditor economies. More specifically, we exploit the dyadic structure of our data and estimate the following two gravity models:

$$Flow_{ijt} = \alpha_{ij} + \gamma \times TailRisk_{it}^{debtor} + \theta_{jt} + \epsilon_{ijt} \tag{1a}$$

$$Flow_{ijt} = \alpha_{ij} + \delta \times TailRisk_{jt}^{creditor} + \theta_{it} + \epsilon_{ijt} \tag{1b}$$

The dependent variable in both models is the lending flow in constant USD by creditor country $j$ to debtor country $i$ in year $t$ (through both bilateral and multilateral channels). The main explanatory variable of interest are country-level measures for the risk of experiencing a macroeconomic tail event by Marfè and Pénasse (2024) (see Appendix Section C.3 for details on this measure). A key advantage of our long-run dyadic data is that it allows for the inclusion of high-dimensional fixed effects to isolate the correlation between official lending flows and our debtor and creditor economy risk measures. When we test the correlation with debtor tail risk (equation 1a), we control for creditor-year fixed effects $\theta_{jt}$ that absorb all observed and unobserved time variation in the creditor economy. Likewise, when we test for the correlation with creditor tail risk (equation 1b), we use debtor-year fixed effects $\theta_{it}$. In both specifications, we additionally control for time-constant debtor-creditor characteristics by including fixed effects $a_{ij}$ and include additional time-varying controls such as real GDP, which are commonly used in gravity models (Head and Mayer, 2014).

Table 1 shows results from Poisson Pseudo Maximum Likelihood (PPML) estimation of the gravity models. As expected, countries receive larger official lending flows when they are facing higher macroeconomic tail risk. To the contrary, countries that face low macroeconomic tail risk contribute more official lending to the rest of the world. In this sense, financial cooperation through bilateral and multilateral official lending contributes to the international sharing of crisis risk. This is also true if we move from financial risk to realized macroeconomic outcomes. Countries with low consumption growth, i.e. in a negative business cycle realisation, tend to receive more lending

**Table 1:** International risk-sharing through official lending

| | Dyadic lending flows | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Tail risk of debtor | 0.42*** | | | |
| Tail risk of creditor | | -0.38*** | | |
| Consumption growth of debtor | | | -0.18*** | |
| Consumption growth of creditor | | | | 0.10*** |
| Observations | 106,263 | 102,542 | 149,262 | 127,790 |
| Gravity Controls | Yes | Yes | Yes | Yes |
| Debtor-Creditor FE | Yes | Yes | Yes | Yes |
| Creditor-Year FE | Yes | No | Yes | No |
| Debtor-Year FE | No | Yes | No | Yes |

NOTE. This table presents results from a PPML gravity regression of dyadic official lending flows on (lagged) measures of recipient and creditor economy macroeconomic tail risk and consumption growth. Our measure of macroeconomic tail risk is based on Marfè and Pénasse (2024). Data on consumption growth is from the Penn World Tables (Feenstra et al., 2015). All regressions include country pair fixed effects as well as creditor-year fixed effects (columns 1 and 3) or debtor-year fixed effects (columns 2 and 4). Standard errors are clustered at the creditor-debtor dyad level.

flows, while countries in a benign realization of the business cycle provide more funding (columns 3 and 4).[6]

Our regression results for official flows stand in striking contrast to the dynamics of international lending by private creditors that is largely procyclical with respect to recipient economies and thus tends to amplify rather than smooth business cycles in recipient economies (Calvo et al., 1993; Kaminsky et al., 2004; Reinhart et al., 2017).

**Fact 2.** *During episodes of high geopolitical risk, official flows follow geopolitical alignment.*

We next turn to the dynamics of official lending flows during episodes of high geopolitical risk. A key advantage of the long-run lending data is that it allows to look beyond recent decades of relative peace and stability and towards episodes of high geopolitical tension when great power rivalry and conflict were the norm. With respect to private capital flows, Catalán et al. (2024) and Aiyar et al. (2024) show that private investment is increasingly allocated towards geopolitically friendly countries when geopolitical risk is high. To test whether official flows exhibit similar dynamics, we run the following gravity model specification on our long-run dataset.

$$Flow_{ijt} = \alpha_{ij} + \gamma \times PoliticalAlignment_{ijt} + \delta \times PoliticalAlignment_{ijt} \times GeopoliticalRisk + \theta_{jt} + \epsilon_{ijt}$$

[6]These result are robust in an alternative specification where we do not control for granular debtor-year and creditor-year fixed effects, but simultaneously include the risk measures for both debtor and creditor.

**Table 2:** Official lending, geopolitical risk and fragmentation

| | Dyadic lending flows | | | Mult. share of lending |
|---|---|---|---|---|
| | Total | Bilateral | Multilateral | |
| Pol. alignment | 0.42*** | 0.64*** | 0.098*** | -0.03*** |
| Pol. alignment x Geopolitical risk | 0.18*** | 0.34*** | 0.026 | -0.01*** |
| Observations | 126,602 | 44,337 | 35,436 | 23,280 |
| Country Pair FE | Yes | Yes | Yes | Yes |
| Debtor x Year FE | Yes | Yes | No | Yes |
| Creditor x Year FE | No | No | No | No |

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 (Bailey et al., 2017). Political alignment is further interacted with a country-pair specific measure of geopolitical risk from Caldara and Iacoviello (2022). All regressions include country pair fixed effects and debtor-year fixed effects. Standard errors are clustered at the creditor-debtor dyad level.

where political alignment between two countries is measured using UN general assembly votes and calculated as the absolute distance between ideal points as in Bailey et al. (2017). Geopolitical risk is a country-pair average constructed from Caldara and Iacoviello (2022). Again we include debtor-creditor fixed effects to control for time-invariant country pair characteristics as well as debtor-year fixed effects to control for all observed and unobserved time-variation in the debtor country. In the baseline specification we look at the average geopolitical risk of the debtor and creditor country, but we show in Table A1 in the appendix that our findings are robust to looking at geopolitical risk in the creditor and debtor economy separately.

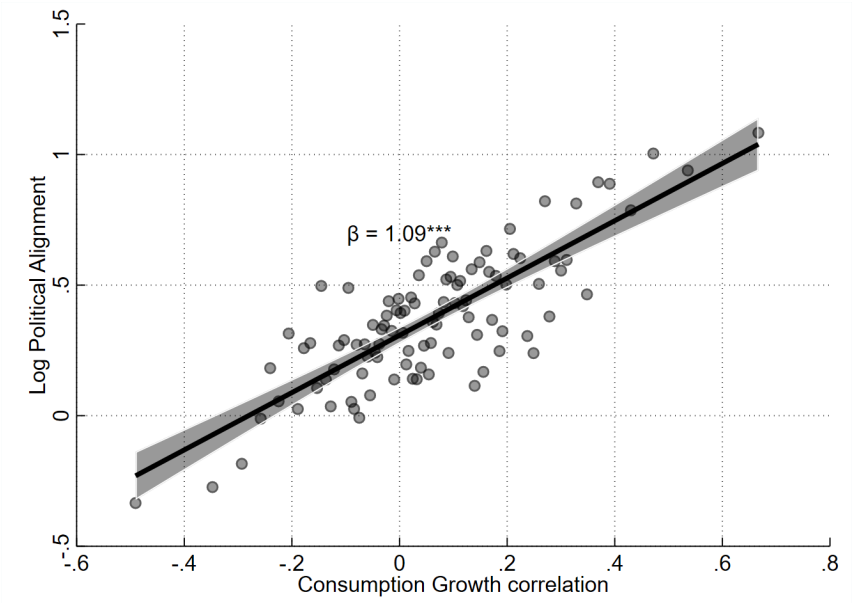
Table 2 presents the results. Across all specifications, we can see that geopolitical alignment between states is an important driver of official lending. Crucially, this association between alignment and lending is particularly strong during periods of high geopolitical risk. Columns 2 and 3 look at bilateral and multilateral lending separately and document strong differences. While bilateral lending is strongly driven by alignment and particularly sensitive to variation in geopolitical risk, the estimated coefficients are much smaller for lending intermediated by multilateral organizations. Still, even multilateral flows show some degree of association with geopolitical alignment, which is consistent with a large academic literature on political economy influences on the decision making of international organizations (see e.g. Dreher et al., 2009; Lang and Presbitero, 2018). Column 4 takes a different perspective and asks whether political alignment affects the share of lending that is transmitted through bilateral or multilateral channels. We find that lending within aligned country pairs is more likely to be carried out through bilateral means, in particular during times of high geopolitical risk.

Taken together, these results provide strong evidence for the fragmentation of official lending under high geopolitical risk. When geopolitical tensions rise, bilateral lending increasingly follows geopolitical fault lines. In addition, a larger share of lending is provided bilaterally and reliance on multilateral creditors decreases.

**Fact 3.** *Fragmentation in official lending limits the scope for risk-sharing.*

We have established that official lending tends to follow geopolitical alignment in response to rising geopolitical risk. What does this imply for the risk-sharing benefits of financial cooperation? We begin our analysis by plotting the correlation between average political alignment and average business cycle synchronization at the country-pair level. Figure 5 shows that countries with close political ties also tend to exhibit closely synchronized business cycles.[7]

**Figure 5:** Politically aligned countries have more synchronized business cycles



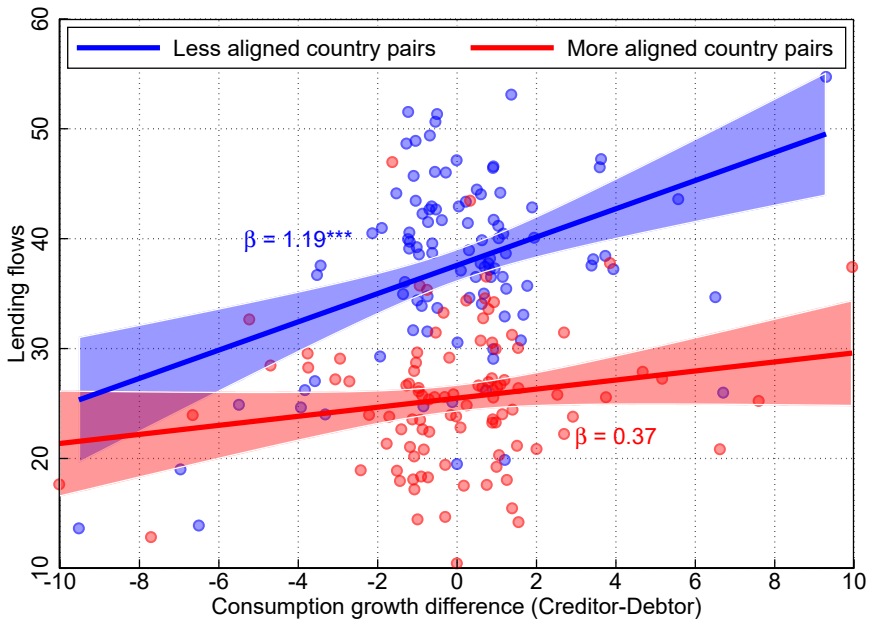

NOTE. This figure shows the correlation between (log) average political alignment and the correlation of consumption growth at the country-pair level. Data points are grouped in 100 bins. We also show a linear fitted line and a 95% confidence interval. Data on UN voting is from Bailey et al. (2017), and consumption is from the Penn World Tables (Feenstra et al., 2015).

This pattern implies that financial cooperation with aligned countries yields less scope for international sharing of consumption and disaster risk. Figure 6 shows this explicitly by plotting the interaction of official lending, geopolitical alignment and differences in country-level consumption growth. To divide debtor-creditor country pairs into aligned and non-aligned pairs, we distinguish the top (in red) and the bottom half (in blue) of the political proximity distribution.[8] The horizontal axis shows the difference in consumption growth between creditor and debtor. That is, a positive value corresponds to a flow in which a country in a relatively better business cycle position is lending to a worse-off country. Vice versa, a marker to the left of zero identifies an instance of a better-off country borrowing from a worse-off one. The figure shows that less aligned countries exhibit a markedly positive relationship between lending flows and consumption growth difference, and therefore exhibit favorable risk sharing properties. The slope of the red line is

[7] Figure A3 in Appendix Section A confirms this result for the correlation of geopolitical alignment and synchronization of disaster risk.

[8] Results are robust to other distributional assumptions (tercile, quartile, quintile) or narrative identification of geopolitical blocks as in Gopinath et al. (2024).

**Figure 6:** Geopolitical Fragmentation and Risk-Sharing




NOTE. This figure shows the correlation between consumption growth difference and lending flows at the country-pair level. The data are plotted separately for two groups: in blue country-pairs in the bottom half of political alignment and in red the top half. Data points are grouped in 100 bins for each group. We also show a linear fitted line and a 95% confidence interval. Data on UN voting is from Bailey et al. (2017), and consumption is from the Penn World Tables (Feenstra et al., 2015).

significantly flatter, confirming that transfers between aligned countries with high business cycle synchronization offer much less scope for international risk-sharing.

# 4 Model

We consider the problem of a home country that borrows from two sources: friendly and rival countries. There are two periods: borrowing and lending take place in the first period ($t = 1$), and the second period ($t = 2$) is when debt settlement happens, either through repayment or default. We first describe the payoffs to the home and the rival countries and then characterize the equilibrium.

## 4.1 The Home Country

The home country consumes in both periods and its discount factor is $\beta \in (0, 1)$. We assume this country has no income (nor initial debt) in the first period, so it relies on borrowing to finance

$t = 1$ consumption.[9] This borrowing is done by selling defaultable bonds to two types of lenders, friendly countries ($\tilde{b}$) and rival countries ($b^*$). The home country preferences are given by

$$u\left(\frac{b^* + \tilde{b}}{R}\right) + \beta V_2(b^*, \tilde{b}) - \eta V_2^*(b^*, k^*; d)\,, \tag{2}$$

where consumption in the first period is given by the revenue obtained from borrowing, $\frac{b^*+\tilde{b}}{R}$, with $R$ denoting the (endogenous) gross rate of return on the home country bond. $V_2$ is the home country's value in period 2, and $\eta \geq 0$ measures the degree to which the utility in the home country is decreasing in the utility of the rival country, $V_2^*$.[10] Following Bianchi and Sosa-Padilla (2024), we refer to this as a "geopolitical externality." The home country's welfare in period 2 is determined by its default decision

$$V_2(b^*, \tilde{b}) = \max_{d \in \{0,1\}} (1-d)\, V_2^R(b^*, \tilde{b}) + d\, V_2^D(b^*)\,. \tag{3}$$

The values from repayment and default are respectively

$$V_2^R(b^*, \tilde{b}) = u\left(y - (b^* + b)\right) - \eta V_2^*(b^*, k^*; 0) \tag{4}$$

and

$$V_2^D(b^*) = u\left((1-\phi)y\right) - \eta V_2^*(b^*, k^*; 1)\,, \tag{5}$$

where $\phi \in [0, 1)$ represents a proportional income cost of default.

## 4.2 The Rival Country

All the variables pertaining to the rival country are denoted with an asterisk, $*$. For simplicity, we assume that the rival country only consumes in $t = 2$. The problem in the first period is to decide how to invest its resources, $y^*$. This country has access to two investment options, lending to the home country, $b^*$, or a risk-free investment, $k^*$. Therefore, the $t = 1$ budget constraint is

$$y^* = \frac{b^*}{R} + \frac{k^*}{R_f}\,, \tag{6}$$

where $R_f$ is the (exogenous) gross risk-free rate. In period 2, the rival country's welfare depends on its portfolio and on the home country's default decision, $d$, in the following way

$$V_2^*(b^*, k^*; d) = u\left(k^* + (1-d)\, b^*\right) \tag{7}$$

[9] Assuming zero income in $t = 1$ is without loss of generality. An alternative interpretation is that the home country needs to finance a trade deficit in the first period and borrows to do so.

[10] The rival country's utility, $V_2^*(b^*, k^*; d)$, is derived in section 4.2. As explained there, it depends on the rival country's investment in home country bonds ($b^*$), its risk-free investments ($k^*$), and the home country's default decision ($d$).

where we already make explicit the assumption that default is total, and so the rival gets no return from its holdings of $b^*$ if that occurs.

### 4.3 Characterization

**Borrowing constraint.** Notice that since there is no uncertainty, investors will impose a borrowing constraint on the home country in period 1. We now characterize that borrowing constraint. To do so, we need to understand how the level of debt in the home country and its composition affect the incentives to repay and default in period 2. For the home country to repay, it must be that

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

Using (4), (5), and (7), we can rewrite the expression above as:

$$u\left(y - (b^* + \tilde{b})\right) - \eta\, u\,(k^* + b^*) \geq u\,((1-\phi)y) - \eta\, u(k^*)\,.$$

Assuming utilities are linear in the second period (in both home and rival countries), we arrive to

$$\tilde{b} + b^*(1+\eta) \leq \phi y\,. \tag{8}$$

If $\eta = 0$, the borrowing constraint would limit the total debt to the amount of income losses in the event of a default. However, with the geopolitical externality, the government is more reluctant to repay the debt when it is owed to the rival country, reflected in the term $1+\eta$. A one-unit increase in debt owed to a friendly country (e.g., Europe) tightens the constraint less than when it is owed to a rival country (e.g., China).

**Equilibrium.** Since there is no uncertainty in the model, there is no default in equilibrium. Therefore, the equilibrium rate of return on the debt of the home country will be equal to the risk-free return, $R = R_f$. For simplicity, from this point onward we assume quasi-linear utility in the home country (logarithmic in period 1, linear in period 2) and linear utility in the foreign country.

The problem of the Home country in period 1 can be rewritten as

$$\max_{\{b^*, \tilde{b}\}} \log\left(\frac{b^* + \tilde{b}}{R_f}\right) + \beta\left(y - (b^* + \tilde{b})\right) - \eta\,(k^* + b^*)$$

$$\text{subject to}$$

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

Using the rival country's resource constraint in the first period (equation 6) we obtain[11]

$$\max_{\{b^*,\tilde{b}\}} \log\left(\frac{b^*+\tilde{b}}{R_f}\right)+\beta\left(y-(b^*+\tilde{b})\right)-\eta y^* R_f \tag{9}$$

$$\text{subject to}$$

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

The first-order condition reads as

$$\frac{1}{b^*+\tilde{b}}\geq \beta\,,$$

with equality if $\tilde{b}+b^*(1+\eta)<\phi y$. This implies that the unconstrained solution is characterized by an undefined portfolio that respects $b^*+\tilde{b}=1/\beta$.

**Proposition 1.** *The equilibrium is such that:*

*i) If $\frac{1}{\beta}>\phi y$, the equilibrium features $b^*=0$ and $\tilde{b}=\phi y$ (constrained case),*

*ii) If $\frac{1}{\beta}\leq\phi y$, then any pair $(b^*,\tilde{b})$ is part of an equilibrium if $\tilde{b}+b^*(1+\eta)\leq\phi y$ and $\tilde{b}+b^*=1/\beta$.*

*In this second case, we can manipulate the borrowing constraint (equation 8) to derive the maximum fraction of debt borrowed from the rival country as*

$$\frac{b^*}{b^*+\tilde{b}}\leq\frac{1}{\eta}\left[\frac{\phi y}{b^*+\tilde{b}}-1\right], \tag{10}$$

*which decreases if the degree of geopolitical externality $\eta$ increases. This occurs as long as the Home country is unconstrained.*

*Proof.* Part (i). If the unconstrained portfolio is not feasible (which is the case if $1/\beta>\phi y$), then the optimal policy is to choose the best 'constrained' portfolio. Absent the geopolitical externality (i.e., if $\eta=0$), this portfolio would be indeterminate. However, in the presence of $\eta>0$ a one unit increase in $b^*$ tightens the borrowing constraint more than a one unit increase in $\tilde{b}$. Therefore, the optimal thing to do is to set $b^*=0$ and borrow using $\tilde{b}$ up to the constraint, $\tilde{b}=\phi y$.

Part (ii). If the unconstrained solution is feasible (which is true if $1/\beta\leq\phi y$), then the optimal policy is (by definition) to choose this unconstrained portfolio. That is to say, any portfolio satisfying $b^*+\tilde{b}=1/\beta$ and $\tilde{b}+b^*(1+\eta)\leq\phi y$ is consistent with equilibrium. The expression for the maximum fraction of debt borrowed from the rival country follows immediately from (8).

□

[11] Notice that, in equilibrium, the rival country is getting the risk-free return on all its investments and it is therefore indifferent regarding its holdings of debt issued by the home country.

## 4.4 Discussion and connection to the empirical results

The results of Proposition 1 are illustrated in Figure 7. This figure shows combinations of debt owed to a friendly country ($\tilde{b}$) and a rival country ($b^*$). The downward-sloping solid black line depicts the default threshold: the debt portfolios at which the country is indifferent between repaying and defaulting. Above this line, the government chooses to default, and below this line, the government chooses to repay. In the absence of geopolitical externalities, the slope of that line is $-1$: the home country cares about total debt, but not about its composition. However, as we introduce a geopolitical externality, the default threshold steepens and the borrowing set for the home country shrinks. If we start from a point of indifference, reducing one unit of debt from a rival country and increasing one unit of debt from a friendly country moves the home country away from the default region.

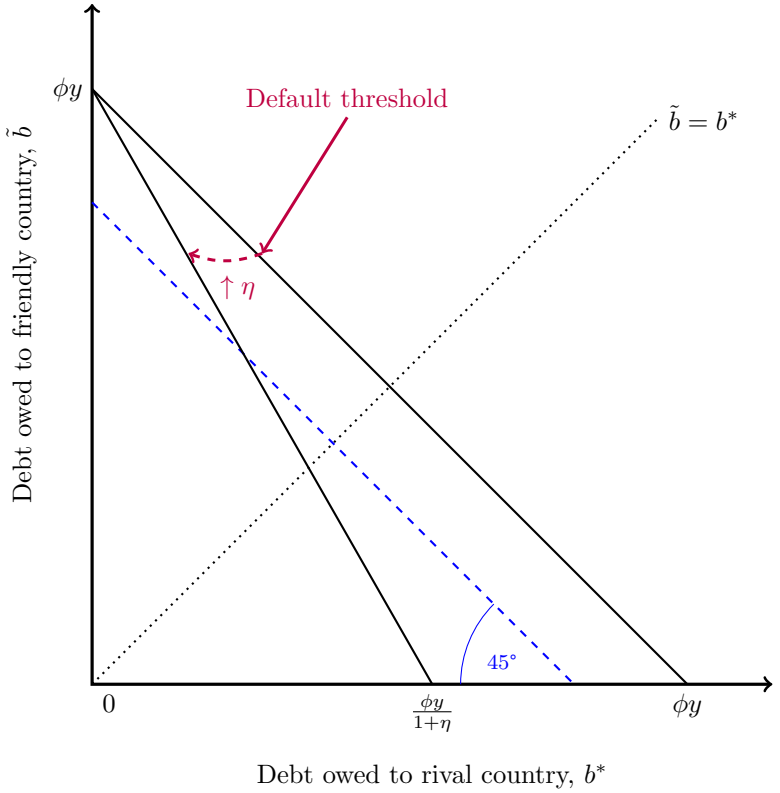



**Figure 7:** Heightened geopolitical tensions increase capital flows fragmentation

Consistent with the empirical findings in Section 3 (especially with fact 2), Figure 7 illustrates that in periods of high geopolitical risk (that is, as the geopolitical distance between the home and rival countries increases, reflected in a higher value of the geopolitical externality parameter $\eta$), the set of possible equilibrium portfolios shifts towards friendly countries (those that are better geopolitically aligned with the home country). This is shown by the segment of the dashed blue line that lies within the borrowing set. Although the return on bonds is the same for investors of any country (friends or rivals), increasing geopolitical tensions make the marginal cost of borrowing for

the government different. In this way, heightened geopolitical risk creates more fragmented capital flows.

**Model extensions.** The model presented in this section has no uncertainty and is therefore not well suited to study the implications for risk sharing. Here we sketch a simple extension to our model that will allow us to use the theory to understand the effects of geopolitical fragmentation on risk sharing.

Starting with the model described above, assume curvature in the preferences for all countries and consider introducing uncertainty in the form of a disaster risk: with probability $p_i$ the endowment of country $i$ decreases substantially. Following the evidence in Figure 5, assume that the disaster processes for the home and friendly countries are positively correlated, and, for simplicity, assume that this process for the rival country is independent of the processes of the other two countries. If the home country could sell Arrow securities that pay out in disaster states, the natural buyer would be the rival country. If the geopolitical externality increases, the home country trades fewer of these securities with the rival country and this worsens risk sharing. These dynamics would be consistent with fact 3 in Section 3.

# 5 Conclusion

Recent international events have sparked concerns and debates about the potential redrawing of the map of capital flows based on geopolitical affiliations, where nations prioritize trade and investments with partners sharing close diplomatic and political ties.

Our paper contributes to this debate in two ways. Firstly, we construct a new dyadic dataset of the global financial safety net from 1920 to 2020 and document that official lending contributes to international risk-sharing. However, during times of high geopolitical risk official lending 'fragments' and increasingly follows patterns of geopolitical alignment. This fragmentation limits the risk-sharing benefits of international cooperation, as geopolitically aligned countries tend to have highly correlated business cycles. Secondly, to rationalize these facts, we provide a simple model to articulate how heightened geopolitical considerations can reshape borrowing behavior, leading to more fragmented capital flows with countries prioritizing relationships with politically aligned partners. By incorporating a geopolitical externality into a standard sovereign default framework, we show how countries facing increased geopolitical risks may strategically choose their borrowing partners to mitigate default risk and secure more favorable borrowing terms.

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## Online Appendix for:

# Financial Cooperation in a Fragmented World

by Javier Bianchi, Sebastian Horn, Giovanni Rosso and César Sosa-Padilla

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# A Additional results

This section presents additional empirical results as well as robustness checks for the empirical facts presented in Section 3.

## A.1 Using different geopolitical risk measures

Table A1 re-estimates the specifications presented in Table 2 with different sets of fixed effects and a debtor-specific geopolitical risk index (column 1) as well as a creditor-specific risk index (column 2). We confirm that political alignment matters in explaining the international allocation of official lending and that this link is particularly pronounced during epsiodes of high geopolitical risk.

**Table A1:** Official lending, geopolitical risk and fragmentation

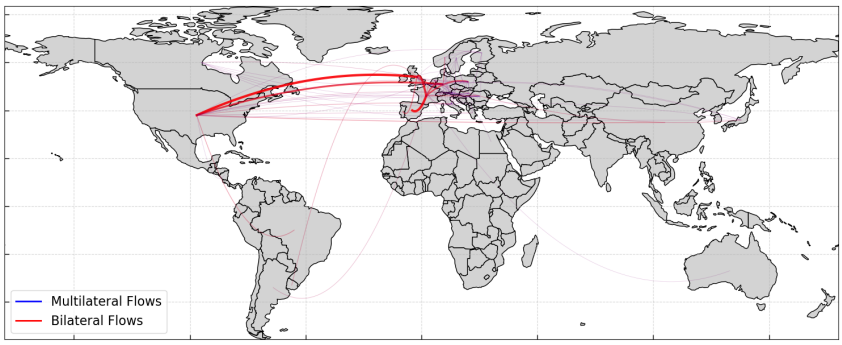
| | Dyadic lending flows | |
|---|---|---|
| | (1) | (2) |
| Pol. alignment | 0.39*** | 0.32*** |
| Pol. alignment x Geopolitical risk of debtor | 0.06*** | |
| Pol. alignment x Geopolitical risk of creditor | | 0.11*** |
| Observations | 97,891 | 91,975 |
| Country Pair FE | Yes | Yes |
| Debtor x Year FE | No | Yes |
| Creditor x Year FE | Yes | No |

*Notes:* 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 (Bailey et al., 2017). Political alignment is interacted with a debtor-specific measure of geopolitical risk in column 1, and interacted with a creditor-specific measure in column 2. Data is from Caldara and Iacoviello (2022). Both regressions include country pair fixed effects plus creditor-year fixed effects (column 1) or debtor-year fixed effects (column 2). Standard errors are clustered at the creditor-debtor dyad level.

## A.2 International financial cooperation in a globalized and a fragmented world

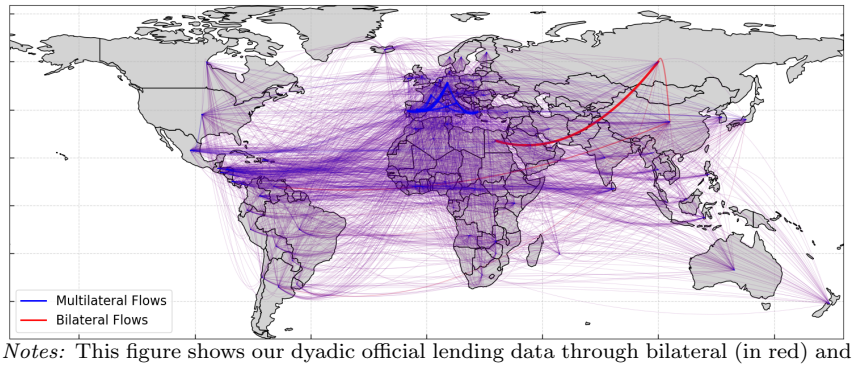
Figures A1 and A2 illustrate how patterns of international financial cooperation between governments have differed over the past 100 years. Figure A1 shows official flows during the inter-war period—an era with comparatively high geopolitical tensions. Figure A2 shows official lending flows during the decade of the Global Financial Crisis – an episode of intense global, multilateral cooperation.

**Figure A1:** Fragmented cooperation, 1920-1935




*Notes:* This figure shows our dyadic official lending data through bilateral (in red) and multilateral (in blue) channels. Line width is proportional to total lending amounts.

**Figure A2:** Global cooperation, 2008




*Notes:* This figure shows our dyadic official lending data through bilateral (in red) and multilateral (in blue) channels. Line width is proportional to total lending amounts.

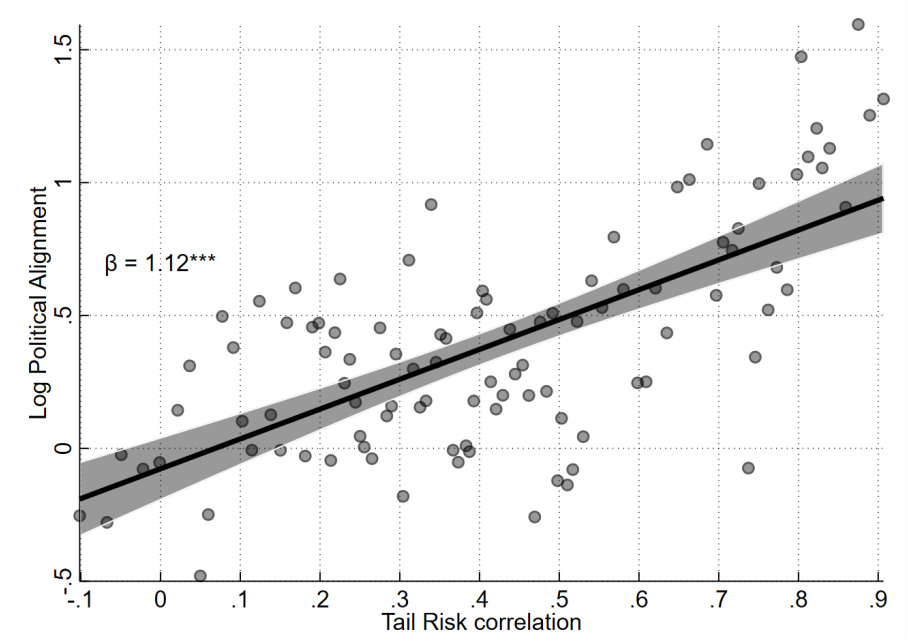
## A.3 Political alignment and business cycle synchronization

In Section 3 we showed that geopolitically aligned countries exhibit closely synchronized business cycle patterns, as measured by a high degree in consumption growth correlation. In this appendix subsection, we show that this is also the case for correlation in macroeconomic tail risk. For that purpose, Figure A3 shows a binned scatter plot for the relation of geopolitical alignment (vertical axis) and the pairwise correlation of macroeconomic tail risk (horizontal axis). Both measures show a strong positive and statistically significant correlation.

Figure A4 builds on this analysis and confirms that official lending flows between less aligned country pairs offer more scope for the sharing of tail risk.

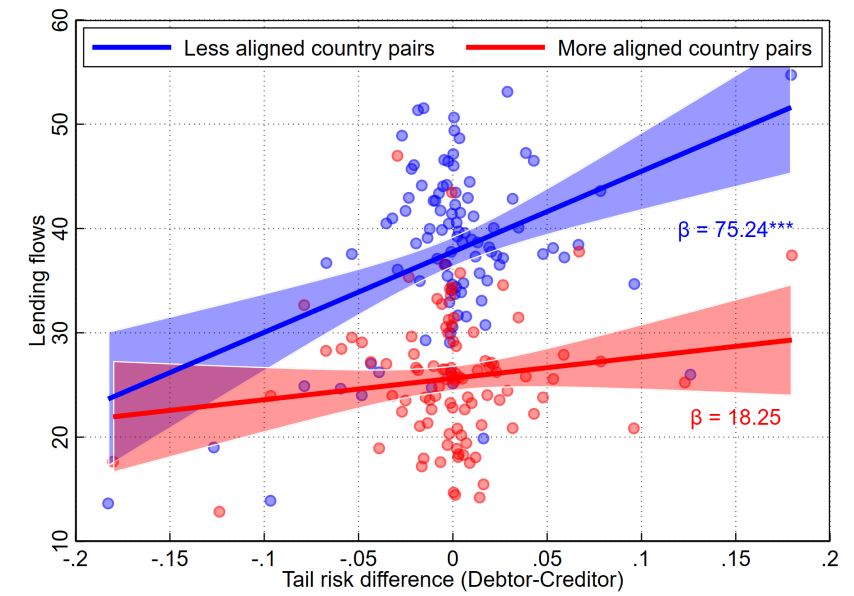
Figure A5a and A5b go one step further and investigate the the relationship between lending, alignment and risk-sharing by considering debtor and creditor consumption growth separately. The plots show that both lending between aligned and non-aligned countries is negatively correlated with debtor consumption growth. With respect to creditor consumption growth, however, lending between aligned countries is mostly acyclical. In contrast, lending between non-aligned countries is strongly positively correlated with creditor consumption growth. When lending to non-aligned

**Figure A3:** Geopolitical alignment and synchronization of macroeconomic tail risk




*Notes:* This figure shows the correlation between (log) average political alignment and the correlation of macroeconomic tail risks at the country-pair level. Data points are grouped in 100 bins. We also show a linear fitted line and a 95% confidence interval. Data on geopolitical alignment is from Bailey et al. (2017) and data on macroeconomic tail risks is from Marfè and Pénasse (2024).

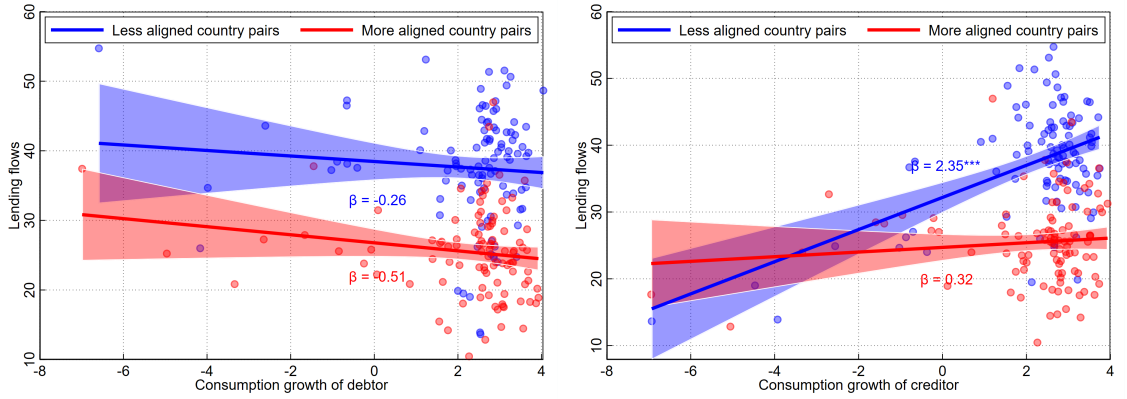
**Figure A4:** Geopolitical alignment, official lending and macroeconomic tail risks




*Notes:* This figure shows the correlation between tail risk difference and lending flows at the country-pair level. The data are plotted separately for two groups: in blue country-pairs in the bottom half of political alignment and in red the top half. Data points are grouped in 100 bins for each group. We also show a linear fitted line and a 95% confidence interval. Data on UN voting is from Bailey et al. (2017), and data on macroeconomic tail risks is from Marfè and Pénasse (2024).

countries, official lending is high when the creditor is in a comparatively strong state of the world. Figure A6 confirms this result with respect to creditor and debtor tail risk.

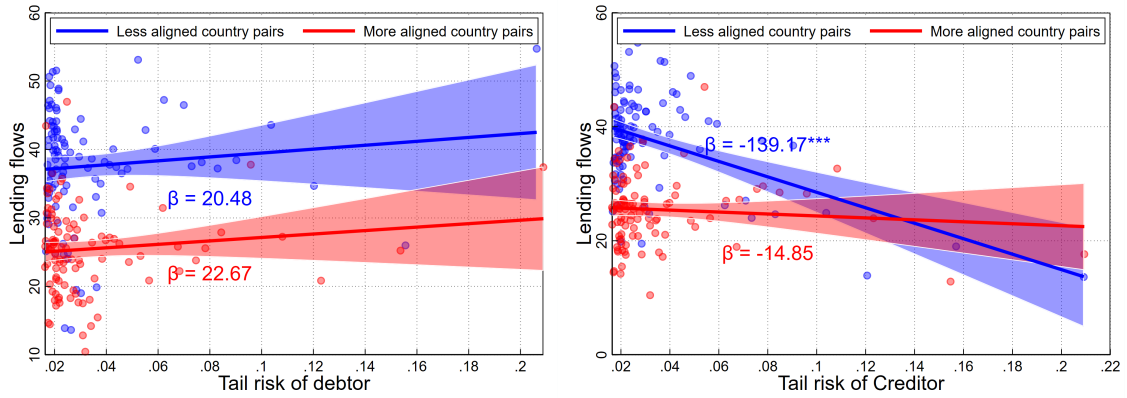
**Figure A5:** Geopolitical alignment and risk-sharing: debtor vs. creditor consumption growth




**(a)** Debtor consumption growth **(b)** Creditor consumption growth

*Notes:* This figure shows the correlation between consumption growth of debtor and creditor respectively, and lending flows at the country-pair level. The data are plotted separately for two groups: in blue country-pairs in the bottom half of political alignment and in red the top half. Data points are grouped in 100 bins for each group. We also show a linear fitted line and a 95% confidence interval. Data on UN voting is from Bailey et al. (2017), and data on consumption growth is from the Penn World Tables (Feenstra et al., 2015).

**Figure A6:** Geopolitical alignment and risk-sharing: debtor vs. creditor tail risk




**(a)** Debtor tail risk **(b)** Creditor tail risk

*Notes:* This figure shows the correlation between tail risk of debtor and creditor repspectively, and lending flows at the country-pair level. The data are plotted separately for two groups: in blue country-pairs in the bottom half of political alignment and in red the top half. Data points are grouped in 100 bins for each group. We also show a linear fitted line and a 95% confidence interval. Data on UN voting is from Bailey et al. (2017), and data on macroeconomic tail risks is from Marfè and Pénasse (2024).

# B A New Dyadic Dataset of Official International Lending, 1920-2020

A key contribution of this paper is the construction of a new, dyadic dataset of international financial cooperation through official (government-to-government) lending from 1920 to 2020. This appendix section explains our data construction approach and summarizes the scope and key properties of the resulting database.

## B.1 Definitions and concepts

**Defining official lending:** Our data collection efforts focus on cross-border, official lending flows, which we define according to the OECD's widely used approach: *"Official transactions are those undertaken by central, state or local government agencies at their own risk and responsibility, regardless of whether these agencies have raised the funds through taxation or through borrowing from the private sector. This includes transactions by public corporations i.e. corporations over which the government secures control by owning more than half of the voting equity securities or otherwise controlling more than half of the equity holders' voting power; or through special legislation empowering the government to determine corporate policy or to appoint directors"* (OECD, 2018).

This definition captures a wide array of different financial transactions between two sovereigns, including both loans and grants. Loans are defined as all transfers for which the recipient incurs legal debt and the resulting liability is not traded in secondary markets (see for example OECD, 2018). This definition includes concessional and non-concessional instruments, trade advances and credits as well as drawdowns under standing credit lines and foreign currency swaps.[12] We also include in our database cases of private creditor lending that are explicitly guaranteed by the creditor government. In contrast, and since we are primarily interested in financial assistance for stabilization and risk-sharing purposes, we do not trace development or humanitarian aid in the form of cross-border grants – e.g., transfers of goods or services, for which no repayment needs to be made (OECD, 2018).[13]

**Bilateral versus multilateral lending:** Official capital flows can be transferred through both *bilateral* and *multilateral* channels (see Figure 2). Bilateral lending refers to transactions that are directly extended by a creditor country sovereign to the recipient country sovereign. In contrast, multilateral lending is extended by international financial institutions that are established through political agreements among multiple member countries (IMF, 2014; OECD, 2018). Multilateral lending institutions collect funds from their member countries (and private markets) and lend them on to other member countries – fulfilling an intermediary function similar to that performed by banks.

[12] We follow standard practice and only count credit lines and foreign currency swap lines to the extent that they are being drawn down (IMF, 2014).

[13] Our data collection also does not entail secondary market purchases of other countries' sovereign debt. Portfolio investments, for example by centrals banks or sovereign wealth, are sizeable but there is no sufficiently large data to trace or quantify such investments at a dyadic level. See Alfaro et al. (2014) for a discussion of sovereign-to-sovereign portfolio flows.

For the first half of the 20th century, *bilateral* lending constituted the main means of official cross-border lending. Only after World War II and the foundation of multilateral creditor organizations, such as the IMF, did multilateral lending increase in importance. During the 1970s, total multilateral lending exceeded total bilateral lending for the first time and during the past decade accounted for around half of total official lending (Horn et al., 2024). The next two subsections discuss our data collection of both types of flows in turn.

## B.2 Bilateral lending

Our key source for data on bilateral official lending transactions is the data collected by Horn et al. (2024). This data is granular and recorded at the transaction level. For each transaction, we know the creditor country, the debtor country, the year of commitment, the commitment amount, and - in most cases - the financial terms of the transaction, i.e., the interest rate, grace period and time to maturity. Since bilateral lending comes in a dyadic data format by definition, no further adjustments to this data are needed for the purpose of our analysis.

Overall, this data captures 26,339 bilateral lending transactions by more than 130 bilateral creditors to more than 190 different debtor country sovereigns from 1920 to 2020.

## B.3 Tracking official lending through international organizations

From a risk-sharing perspective, international organizations are intermediaries that channel funds from sovereign creditors to sovereign debtors. A key contribution of this paper is to introduce a new database on the liability structure of multilateral creditors that allows to trace multilateral lending back to its original funding source. This data allows for a mapping of multilateral into bilateral flows and thus for the creation of a dyadic, micro-level dataset of official lending. This subsection provides a detailed explanation of our sources and approach.

To create a dyadic dataset of multilateral lending, this paper constructs country-specific funding shares in 16 multilateral creditor organizations. As illustrated in Figure 2, multilateral creditors generally rely on two distinct financing mechanisms:

- The primary source of financing for most multilateral creditors is provided in the form of paid-in capital subscriptions of member countries. In most creditor organizations, paid-in capital is proportional to a predefined country quota that reflects the member country's economic size and financial strength.
- Quota resources are often supplemented by borrowing through standing credit lines. Borrowing either takes the form of direct borrowing from member country treasuries and central banks or of borrowing in private capital markets with the guarantees of the member countries.

By combining dozens of country and organization-specific sources that are listed below, we construct a new database on paid-in quota resources and outstanding lending to multilateral creditor

that allows to derive each member country's funding share in multilateral creditor organizations as follows:

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

where $PAID.IN_{jto}$ represents the capital that country $j$ has paid into multilateral creditor organization $o$ in year $t$ and $CREDIT_{jto}$ presents any outstanding credit by country $j$ to organization $o$. Once funding shares are constructed, we can map multilateral into bilateral flows by using the following approach that assumes that each sovereign creditor's share in a multilateral loan is proportional to its funding share of the corresponding multilateral organization in the same year:

$$TRANSFER_{ijto} = \omega_{jto} * LOAN_{ito}$$

where $TRANSFER_{ijto}$ denotes a loan by creditor country $j$ to debtor country $i$ through organization $o$ in year $t$ and $\omega_{jto}$ is sovereign $j$'s funding share of organization $o$. $Loan_{ito}$ refers to a multilateral loan commitment by organization $o$ to debtor country $i$.

In its current state, the data collection covers the liabilities of 16 multilateral creditor organizations over the past seven decades (see table B2 for a list of the analyzed arrangements).

**Table B2:** List of analyzed multilateral lending arrangements

| Name | Operating time | Authorized capital (in bn USD) | Number of member countries |
|---|---|---|---|
| **Global membership** | | | |
| League of Nations | 1920 - 1946 | n.a. | 63 |
| International Monetary Fund | 1946 - 2020 | 1350 | 189 |
| **Regional membership** | | | |
| 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 |

*Note:* This table shows all multilateral official lending arrangements covered in the analysis of this paper. See text for details.

Our focus on these 16 institutions is guided by our focus on official lending for stabilization and risk-sharing purposes. The multilateral creditors listed in Table B2 all have a clear mandate to stabilize member country economies and to contain the effects of crisis. Besides the IMF, this includes all past and present regional safety nets that have constantly expanded their geographic reach and now span almost the entire globe. While the analysis and data collection could be extended to other multilateral providers of global public goods such as the World Bank or Regional Development Banks (for development and humanitarian aid) or the World Health Organization and the UN, these institutions arguably play a less important role in the sharing of cross-border consumption

and financial crisis risks. The next subsections discuss data collection for each arrangement in turn.

### B.3.1 The League of Nations

During the 1920s, several Central European countries implemented stabilization programs 'under the auspices of the League of Nations'. In this context, the League endorsed nine macroeconomic adjustment programs that were supported by external loans and guarantees (see Myers 1945 and Flores). Two of these programs qualify as official lending under our definition described above. The two lending programs for Austria in 1923 and 1934 both used financial guarantees from European neighboring countries to help Austria access private capital markets. Guarantees were provided proportional to the market share of the issued amounts in different bond markets across Europe, the US and Japan. Table B3 summarizes these shares.

**Table B3:** Creditor guarantees for League of Nations adjustment programs

| Guarantor | Debtor | Year | Amount in USD million | Funding share |
|---|---|---|---|---|
| United Kingdom | Austria | 1923 | 36.1 | 25 |
| France | Austria | 1923 | 36.1 | 25 |
| Italy | Austria | 1923 | 30.2 | 21 |
| Czecho-Slovakia | Austria | 1923 | 36.1 | 25 |
| Belgium | Austria | 1923 | 36.1 | 2 |
| Sweden | Austria | 1923 | 2.9 | 2 |
| Denmark | Austria | 1923 | 1.5 | 1 |
| Netherlands | Austria | 1923 | 1.5 | 1 |
| UK | Austria | 1934 | 29.6 | 41 |
| France | Austria | 1934 | 29.5 | 41 |
| Italy | Austria | 1934 | 8.9 | 12 |
| Switzerland | Austria | 1934 | 2.2 | 3 |
| Belgium | Austria | 1934 | 1.5 | 2 |
| Netherlands | Austria | 1934 | 0.9 | 1 |

*Note:* This table summarizes the contributions of different creditor governments to the guarantees provided for two stabilization loans to Austria under the auspices of the League of Nations. Data is from Myers (1945), Flores Zendejas and Decorzant (2006) and Horn et al. (2024).

### B.3.2 International Monetary Fund

IMF lending operations are financed through two distinct mechanisms:[14]

[14]Our focus here is on IMF lending programs under the General Resource Account. The IMF also extends funding through the Poverty Reduction and Growth Trust that is financed through trust fund contributions from member countries. Since PRGT lending is primarily directed at addressing structural issues, we do not consider it here.

*IMF quota finance:* The main funding source for IMF lending is the paid-in in capital of member countries (the so-called reserve tranche). Each member country pays a share of its reserve assets into the Fund and the Fund uses these resources to extend credit. A country's capital subscription in the Fund is given by its IMF quota which reflects its relative position in the world economy and represents its maximum financial commitment to the IMF. IMF credit essentially involves a transfer of foreign exchange from creditor members to borrowing members. These transfers reduce the available quota resources from creditors and increase their positions with the IMF by the same amount. Members receive a market-related return on their creditor positions with the IMF. Analogously, the repayment and servicing of IMF credit results in the receipt of foreign exchange from borrowing members. In this case, the foreign exchange is passed on to IMF creditor members, reducing their creditor positions with the IMF (IMF, 2018).

*IMF borrowing arrangements:* In addition to resources pooled by member states as part of the quota system, the IMF has borrowed extensively from member countries when demand for IMF resources was high. For this purpose, the IMF has standing credit lines with selected member states that it can activate to draw additional resources. Table B4 provides an overview of past and present IMF borrowing agreements.

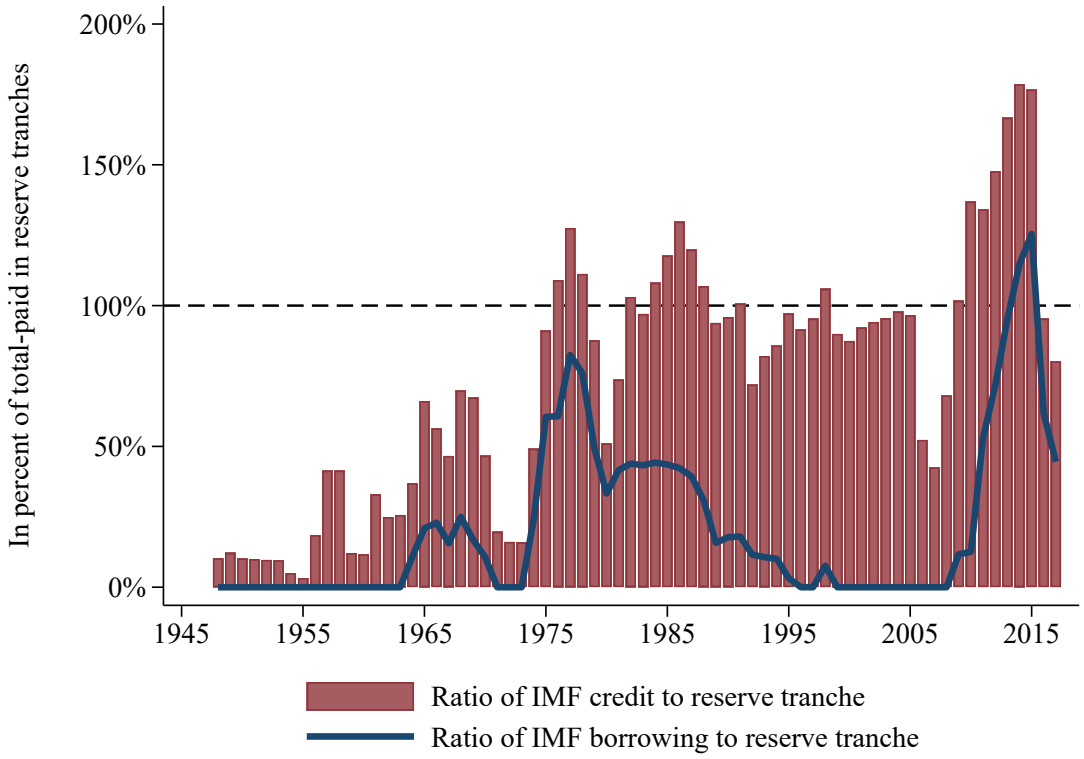
Figure B8 further illustrates the use of quota resources and borrowing from member countries by showing the share of quota resources needed to finance outstanding credit to member countries (red bars). Whenever this share approaches 100 percent and paid-in reserve assets are at the risk of depletion, the IMF has activated its standing borrowing arrangements to supplement its resources (blue line). The cyclical pattern illustrates that the use of borrowing arrangements has been largest during systematic crises, when the distribution of surpluses was skewed towards a comparatively small number of members with relatively small quotas such as during the Oil Crises of the 1970s or the recent Great Financial Crisis.

**Table B4:** IMF borrowing arrangements: past and present

| | Year | Number of participating creditors | Maximum amount in bn USD |
|---|---|---|---|
| **Current borrowing arrangements** | | | |
| Bilateral Loan Agreements | since 2009 | 35 | 440 |
| New Arrangements to Borrow | since 1998 | 40 | 250 |
| **Past borrowing arrangements** | | | |
| General Arrangements to Borrow | 1962 - 2018 | 10 | 23 |
| Supplementary financing line with Saudi Arabia | 1983 - 2018 | 1 | 2 |
| First Oil Facility | 1974 | 7 | 3 |
| Second Oil Facility | 1975 - 1976 | 12 | 3.5 |
| Supplementary financing facility | 1979 - 1984 | 14 | 10.5 |
| Enlarged access to resources | | | |
| Medium-term facility with Saudi-Arabia | 1981 | 1 | 10.5 |
| Short-term facility | 1981 | 19 | 1.5 |
| Short-term facility with Japan and Belgium Saudi Arabia and BIS | 1984 | 4 | 8 |
| Bilateral borrowing agreement with Japan | 1986 | 1 | 4 |

*Note:*This table shows past and present IMF borrowing arrangements. The data is taken from IMF Annual Reports (multiple years), IMF (2018) and James (1996).

**Figure B7:** IMF financing through quotas and borrowing




*Note:* This figure shows IMF lending and financing over time. Red bars show the degree to which quota resources are used for credit extension. Whenever this share approaches or exceeds a hundred percent, borrowing arrangements are activated and supplement quota resources (blue line). Sources: IMF Annual Reports (multiple years), IMF International Financial Statistics, and IMF (2018)

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Data on paid-in capital, quotas and lending to the IMF comes from the IMF's International Financial Statistics and the IMF's annual reports (multiple years). Data on IMF lending program comes from Reinhart and Trebesch (2016) and from Horn et al. (2024).

### B.3.3 Regional financial arrangements

Regional financial arrangements differ with respect to their financing structure (Cheng and Lennkh, 2019). Some RFAs are exclusively financed by the paid-in capital of member countries, while others leverage paid-in capital by taping into private capital markets.

*Arab Monetary Fund:* The Arab Monetary Fund was established in 1976 by 22 different member countries in response to the first oil crisis. It is exclusively financed through paid-in capital from its members and has not made use of market borrowing. Financing is predominantly provided by a small number oil exporters: Algeria, Egypt, Iraq, Kuwait and Saudi Arabia jointly provide more than 50 percent of the Fund's capital. The Fund has been activated 174 times to provide loans to

16 different member countries. Data on subscribed and paid-in capital by each member country was hand-coded from the Fund's annual reports. Data on lending operations is from Horn et al. (2024) and Scheubel and Stracca (2019).

*Andean Reserve Fund & Latin American Reserve Fund:* The Andean Reserve Fund was established in 1978 by Bolivia, Colombia, Ecuador, Peru and Venezuela as a Reserve Pooling Fund. It was renamed into the Latin American Reserve Fund in 1991 and membership was broadened to include Costa Rica and Uruguay. After the accession of Paraguay in 2014, the Fund currently has 8 members. In terms of financing, both the Andean and the Latin American Reserve Fund have predominantly relied on member country capital subscriptions, although the Fund has the statutory possibility to tap into private capital markets and has repeatedly done so in the 1980s and 1990s. Since its establishment in 1978, the Andean and Latin American Reserve Funds have extended 45 financial assistance programs. Data on subscribed and paid-in capital by each member country were hand-coded from the Andean and Latin American Reserve Funds' annual reports and the inter-governmental treaties that concluded its establishment. Data on lending operations is from annual reports, Horn et al. (2024) and Scheubel and Stracca (2019).

*BRICS Contingent Reserve Arrangement:* The BRICS CRF was founded in 2014 by Brazil, Russia, India, China and South Africa as an additional liquidity back-stop for its member countries. The facility does not possess any paid-in resources but relies on standing financial commitments in the form of currency swaps by its five member countries that amount to 100 billion USD. The facility has not been activated. Data on capital shares has been coded from the multilateral treaty establishing the facility.

*Chiang Mai Initiative:* The Chiang Mai Initiative was founded in 2000 in response to the experiences of the Asian Financial Crisis and later expanded into the Chiang Mai Initiative Multilateralization. It consists of 14 member countries that have committed 240 billion USD to the arrangement. Similar to the BRICS Contingent Reserve Facility, the CMIM does not possess paid-in capital, but relies on promissory notes by member central banks that are only activated when a member country seeks the Iniative's assistance. As of 2019, the CMIM remains inactivated. Data on member commitments has been downloaded from the website of the ASEAN Macroeconomic Research Office.

*Eurasian Anti-Crisis Fund:* The Eurasian Anti-Crisis Fund was founded in 2009 in response to the Great Financial Crisis. It consists of six member states and is exclusively financed through member countries' subscribed and paid-in capital. With a capital share of 88 percent, Russia is the Fund's key provider of resources. Since its establishment, the Fund has been activated seven times and provided loans to Armenia, Belarus, the Kyrgyz Republic and Tajikistan. Data on subscribed and paid-in capital was taken from the Fund's Annual reports. Data on lending operations is from the Fund's Annual reports and from Horn et al. (2024).

*European Monetary Fund:* The European Monetary Fund was founded in 1958, when Western European countries returned to current account convertibility. Its main purpose was the provision of official financing to overcome current account deficits. The Fund was terminated in 1973 and replaced by the European Union's Community Loan Mechanism and the Medium-Term Financial

Assistance Facility (see below). During the 15 years of its history, the European Monetary Fund provided financial assistance programs to four different member countries: Greece, Iceland, Spain and Turkey. At the liability side, these programs were mainly financed through contributions of member countries. A unique feature of the European Monetary Fund was the contribution of the USA that provided 45 percent of the Fund's initial paid-in capital. Data on the financing and operations of the European Monetary Fund were coded from the Bank for International Settlement's annual reports, data on lending operations is from Horn et al. (2024).

*EEC Medium-Term Financial Assistance Facility:* The European Economic Union introduced the medium-term financial assistance facility in 1971 to provide mutual financial assistance to members in balance-of-payments difficulties. It was funded through a pre-defined capital key that put most weight on the UK, France, and Germany (22 percent each) and Italy (16 percent). Data on financing and loan provision was coded from the Official Journal of the European Communities (multiple editions).

*EU Community Loan Mechanism:* In 1975 the European Economic Community established a Community Loan Mechanism that allowed the Community to borrow funds in private markets backed by the Community budget and pass on the funds to member in balance-of-payments crisis. The mechanism existed until 1988, when it was replaced with the Balance-of-Payments Facility (see below). The mechanism was activated several time and used to provide financial assistance to Italy, Ireland, France and Greece. The EEC's borrowing in private markets was guaranteed by the EEC budget and thus followed a pre-defined capital key. With a joint contribution of more than 80 percent, guarantees were mainly provided by the UK, France, and Germany (22 percent each) and by Italy (16 percent). Data on financing and loan provision was coded from the Official Journal of the European Communities (multiple editions).

*European Union Balance-of-Payments Facility:* In 1988, the Community Loan Mechanism and the Medium-Term Financial Assistance Facility were merged into the EEC's and - several years later - the EU's Balance-of-Payments Facility. The total lending capacity was initially capped at 16 billion ECU, but was increased to 50 billion EUR in 2009. The facility is financed by member country contributions that are proportional to their funding share in the EU budget. The facility was used to provide financial assistance to Greece and Italy in the 1990s and more recently to Hungary, Latvia and Romania during the Global Financial Crisis. Data on financing and loan provision was coded from the Official Journal of the European Communities and yearly budget reports of the European Commission. Data on lending operations comes from the website of the European Commission and from Horn et al. (2024).

*European Financial Stability Facility:* The EFSF was created as a temporary fiscal backstop and crisis resolution mechanism by the Euro Area in 2010 to provide financial assistance to Greece, Ireland and Portugal. The assistance programs were financed by bond issuance in private capital markets that was backed by joint and several guarantees from member state with commitments amounting to 780 billion Euros or more than 1 trillion USD. With the foundation of the European Stability Mechanism, the EFSF has stopped to provide new financial assistance programs, but continues to exist in order to manage outstanding loans. Data on financing and lending has been taken from the EFSF's website and from annual reports.

*European Financial Stability Mechanism:* The EFSM was set up as an emergency financial assistance fund by the European Union in 2010. The fund is backed by guarantees from the 28 member countries of the EU and has borrowed in private capital markets to fund financial assistance loans to Ireland, Portugal and Greece. Data on financing and loan provision was coded from the Official Journal of the European Communities and yearly budget reports of the European Commission.

*European Stability Mechanism:* The ESM was founded by Euro Area sovereigns in 2012 to serve as a permanent rescue lending mechanism. It is funded through bond issuances in the private capital market that are guaranteed by the Fund's total callable capital of 620 billion Euro. Member countries have only been required to pay 80 billion Euro into the Fund, but have provided explicit and irrevocable guarantees to pay the full amount if required by the Managing Director. The ESM has provided financing packages to Cyprus, Greece and Spain. Data on financing and loan provision was downloaded from the ESM's website and its annual reports (multiple editions).

**Table B5:** Capital subscription shares to regional financial arrangements

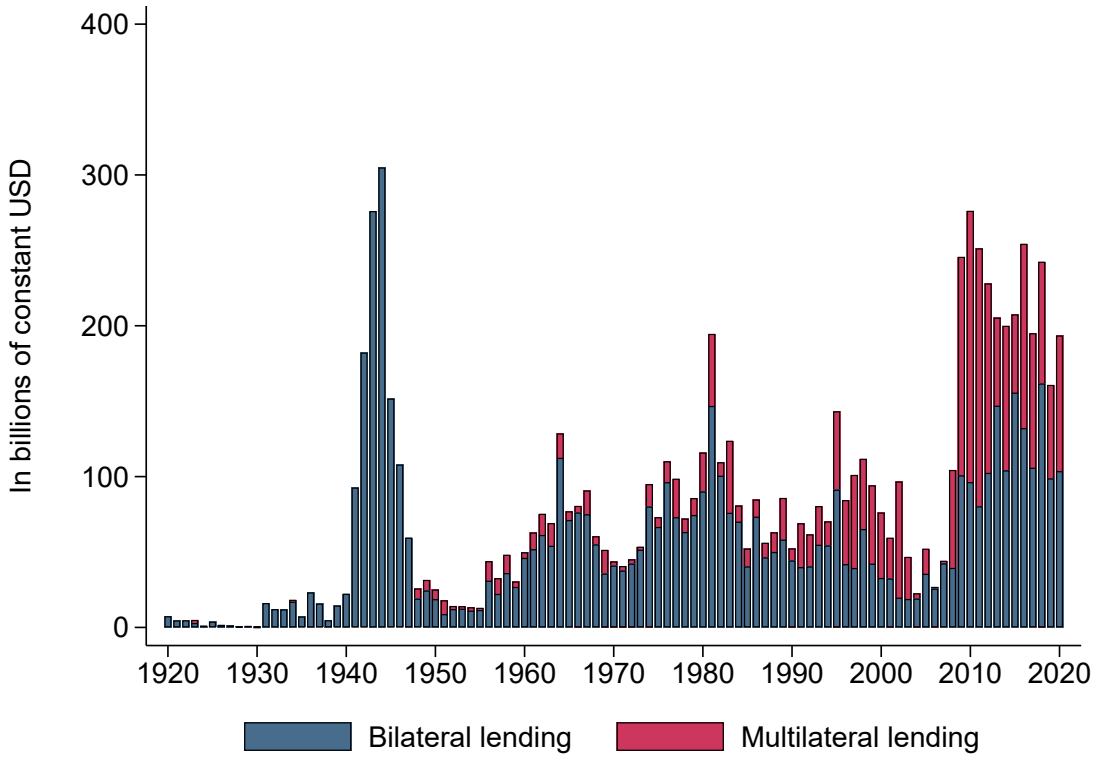
| **AMF** | | **BRICS CRA** | | **FLAR** | | **EEC CLM** | | **EU BOP** | |
|---|---|---|---|---|---|---|---|---|---|
| Algeria | 13.0 | Brazil | 18.0 | Bolivia | 8.3 | Belgium | 7.3 | Austria | 2.6 |
| Bahrain | 1.5 | China | 41.0 | Colombia | 16.7 | Denmark | 3.3 | Belgium | 3.6 |
| Comoros | 0.1 | India | 18.0 | Costa Rica | 16.7 | France | 22.0 | Bulgaria | 0.3 |
| Djibouti | 0.1 | Russia | 18.0 | Ecuador | 8.3 | Germany | 22.0 | Croatia | 0.4 |
| Egypt | 9.8 | South Africa | 5.0 | Paraguay | 8.3 | Ireland | 1.2 | Cyprus | 0.1 |
| Iraq | 13.0 | | | Peru | 16.7 | Italy | 14.7 | Czech Republic | 1.3 |
| Jordan | 1.7 | | | Uruguay | 8.3 | Netherlands | 7.3 | Denmark | 1.8 |
| Kuwait | 9.8 | **ARF** | | Venezuela | 16.7 | United Kingdom | 22.0 | Estonia | 0.2 |
| Lebanon | 1.5 | Bolivia | 12.5 | | | | | Finland | 1.7 |
| Libya | 4.1 | Colombia | 25.0 | | | | | France | 18.3 |
| Mauritania | 1.5 | Ecuador | 25.0 | **EMF** | | **ESM** | | Germany | 19.0 |
| Morocco | 4.6 | Peru | 12.5 | Austria | 0.8 | Austria | 2.8 | Greece | 1.4 |
| Oman | 1.5 | Venezuela | 25.0 | Belgium | 5.0 | Belgium | 3.5 | Hungary | 0.9 |
| Palestine | 0.7 | | | Denmark | 2.5 | Cyprus | 0.2 | Ireland | 1.7 |
| Qatar | 3.1 | | | France | 8.3 | Estonia | 0.2 | Italy | 13.2 |
| Saudi Arabia | 14.8 | **CMI** | | Germany | 8.3 | Finland | 1.8 | Latvia | 0.2 |
| Somalia | 1.2 | Brunei | 0.0 | Greece | 0.5 | France | 20.2 | Lithuania | 0.3 |
| Somalia | 1.2 | Cambodia | 0.1 | Iceland | 0.2 | Germany | 27.0 | Luxembourg | 0.3 |
| Sudan | 3.1 | China | 28.5 | Italy | 4.2 | Greece | 2.8 | Malta | 0.1 |
| Syria | 2.2 | Hong Kong | 3.5 | Netherlands | 5.0 | Ireland | 1.6 | Netherlands | 2.3 |
| Tunisia | 2.1 | Indonesia | 4.0 | Norway | 2.5 | Italy | 17.8 | Poland | 3.3 |
| United Arab Emirates | 5.9 | Japan | 32.0 | Portugal | 0.8 | Latvia | 0.3 | Portugal | 1.5 |
| Yemen | 4.7 | Korea | 16.0 | Spain | 1.3 | Lithuania | 0.4 | Romania | 1.3 |
| | | Laos | 0.0 | Sweden | 2.5 | Luxembourg | 0.2 | Slovakia | 0.6 |
| **EACF** | | Malaysia | 4.0 | Switzerland | 3.5 | Malta | 0.1 | Slovenia | 0.3 |
| Armenia | 0.0 | Myanmar | 0.1 | Turkey | 0.5 | Netherlands | 5.7 | Spain | 8.9 |
| Belarus | 0.1 | Philippines | 3.1 | United Kingdom | 10.1 | Portugal | 2.5 | Sweden | 2.4 |
| Kazakhstan | 11.7 | Singapore | 4.0 | United States | 45.3 | Slovakia | 0.8 | United Kingdom | 12.0 |
| Kyrgyz Republic | 0.0 | Thailand | 4.0 | | | Slovenia | 0.4 | | |
| Russia | 88.1 | Vietnam | 0.8 | | | Spain | 11.8 | | |
| Tajikistan | 0.0 | | | | | | | | |

*Note:* This table shows the capital subscriptions of members to regional financial arrangements in percent of total capital. AMF: Arab Monetary Fund; EACF: Eurasian Anti-Crisis Fund; BRICS CRA: BRICS Contingent Reserve Arrangement; ARF: Andean Reserve Fund; CMI: Chiang-Mai Initiative; FLAR: Fondo Latino-Americano de Reservas; EMF: European Monetary Fund; EEC CLM: Community Loan Mechanism of the European Economic Commission; ESM: European Stability Mechanism; EU BOP: Balance-of-Payments Facility of the European Union. For information on sources, see text and reference list below.

## B.4 Scope of dataset

This subsection summarizes the scope of our final dataset of dyadic, government-to-government lending after combining all data on bilateral and multilateral loans and after aggregating the data to the country pair-year level. We cover a total of 52,592 transactions (20,351 direct bilateral lending transactions and 34,454 transactions through multilateral creditors) extended by 132 creditor countries to 198 debtor economies. Figure B8 shows the evolution of total lending amounts over the past 100 years, while Figure 4 in the main text illustrates the dyadic nature of the data.

**Figure B8:** Financial cooperation through official lending, 1920-2020




*Note:* This figure shows the evolution of bilateral and multilateral official lending – as measured in our dataset – over the past 100 years. All amounts are expressed in billions of constant USD to make amounts comparable over time.

## B.5 List of data sources

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# C Other data

This appendix section introduces all other variables and measures that we use in the empirical analysis of Section 3.

## C.1 Geopolitical alignment

To measure geopolitical alignment, we rely on voting patterns in at the United Nations General Assembly (UNGA). In particular, we follow Bailey et al. (2017) and use the ideal point distance. This measure accounts for the changing agenda of the UN General Assembly so that differences in alignments over time are not driven by changes in the topics discussed at the UN, but by actual changes in geopolitical alignment between country pairs over time.

## C.2 Geopolitical risk

To measure geopolitical risks, we rely on the widely used Geopolitical Risk Index (GPRI) developed by Caldara and Iacoviello (2022). The GPRI is a news-based measure of adverse geopolitical events and associated risks. It is constructed by counting the share of newspaper articles on a monthly basis that discuss adverse geopolitical events or threats on the basis of a dictionary-based method. Figure C9 plots the aggregate geopolitical risk measure over 120 years. In the regressions underlying Table 2 in Section 3 we use the expanded dataset with country-level risk measures for 44 countries built in Caldara et al. (2023).

**Figure C9:** Index of Geopolitical Risk, 1900 - 2020

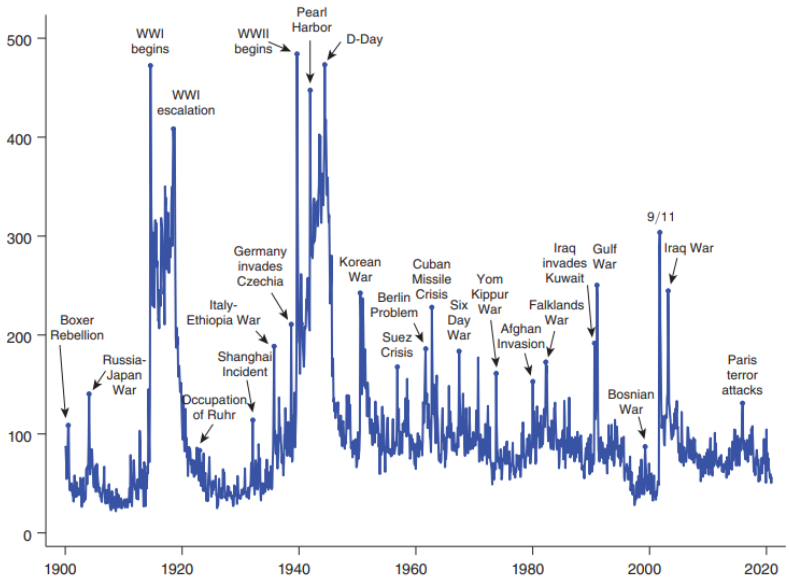



FIGURE 3. HISTORICAL GPR INDEX FROM 1900

*Notes:* Historical GPR Index from January 1900 through December 2020. Index is normalized to 100 throughout the 1900–2019 period.

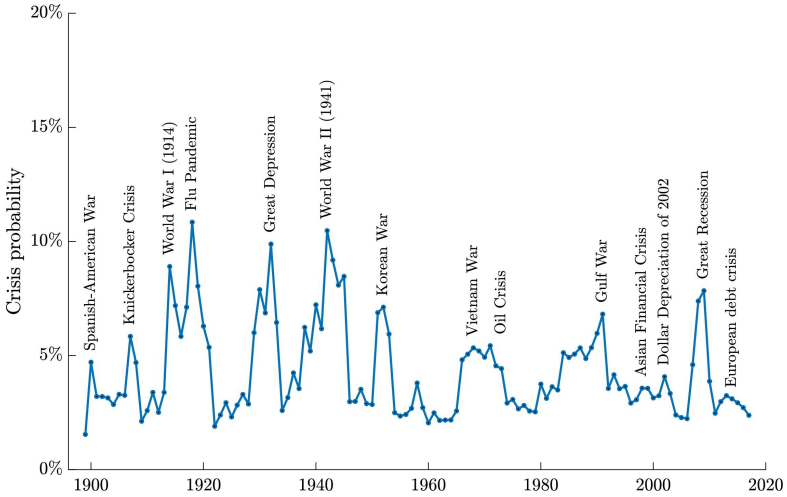
*Note:* This figure shows the aggregate Geopolitical Risk Index developed by Caldara and Iacoviello (2022) and Caldara et al. (2023).

## C.3 Macroeconomic variables

To study the cyclical properties of official lending flows with respect to both creditor and debtor economies we make use of two distinct variables.

**Macroeconomic tail risk:** To measure macroeconomic tail risks, we rely on estimates of consumption and GDP tail risks developed by Marfè and Pénasse (2024). Marfè and Pénasse (2024) use a predictive approach to estimate time-varying macroeconomic tail risk based on variables that forecast the lower quantiles of conumption growth. This approach has the advantage of being available for a large international panel of countries and over longer time horizons than traditional asset price-based measures of disaster risk. Specifically, their sample includes 42 countries and covers years 1900-2020. Figure C10 shows average macroeconomic tail risk for this sample.

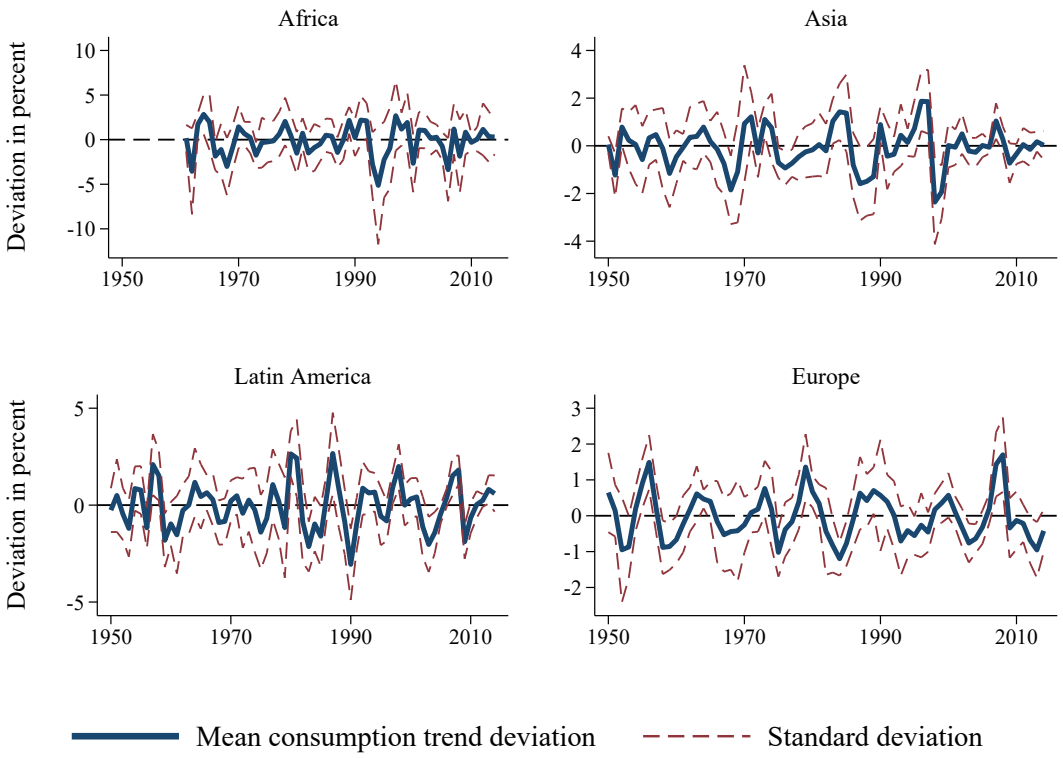
**Figure C10:** Macroeconomic tail risk, 1900 - 2020




*Note:* This figure shows macroeconomic tail risk as estimated by Marfè and Pénasse (2024).

**Consumption growth:** Our data on consumption growth rates is taken from version 9.1 of the Penn World Table. We normalize real consumption by dividing it through total population. We then use a Hodrick-Prescott filter to extract the cyclical component. Figure C11 shows averages of the resulting time series by region.

**Figure C11:** Real per capita consumption growth - cyclical components by region




*Note:* This graph shows the cyclical component of real per capita consumption growth. The blue solid lines show averages by region, and the red dashed lines give the corresponding standard deviations. Data is from the Penn World Tables (Feenstra et al., 2015). See text for details.