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INTERNATIONAL RISK-SHARING IN A FRAGMENTED WORLD

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

This paper studies how geopolitical risk shapes financial fragmentation and international risk-sharing, using bilateral official lending data from 1910 to 2024. We document that when geopolitical risk is high, bilateral lending increasingly follows geopolitical alignment. Because geopolitically aligned countries experience more synchronized shocks, this fragmentation limits the effectiveness of international risk-sharing. To rationalize these patterns, we introduce geopolitical considerations into a limited-commitment model of sovereign borrowing. The model shows that, even with non-discriminatory default, higher geopolitical tensions redirect international lending toward allied countries and weaken risk-sharing.

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1 Introduction

The world economy is increasingly fractured along geopolitical lines. Trade and capital flows are shaped not only by economic fundamentals, but also 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., Clayton, Maggiori, and Schreger, 2025a; Broner, Martin, Meyer, and Trebesch, 2024).

Yet, a number of key questions remain unanswered by this literature: How does geopolitical risk shape the international allocation of capital? To what extent does financial fragmentation hinder countries' ability to absorb shocks and share risk? And what are the broader welfare implications?

In this paper, we study the relationship between geopolitical risk and international capital flows over the past century, using a long-run dataset of bilateral (government-to-government) lending from Horn et al. (2026). Bilateral official lending is especially well-suited for an analysis of geoeconomic fragmentation. Because these flows are directly controlled by governments and observed at the creditor–debtor level, they allow us to trace how state-directed lending varies with geopolitical risk and political alignment—that is, whether lending occurs within or across geopolitical blocs. The data also span more than a century, allowing us to look beyond the recent decades of relative peace and globalization—and beyond the current turbulence—to study how financial fragmentation evolves during episodes of heightened geopolitical tension, including the two World Wars.

To measure fragmentation, we compare bilateral official lending within geopolitical blocs with lending across blocs over the past century. We construct a simple index of financial fragmentation, defined as the difference between lending within allied country pairs and non-allied ones, scaled by total bilateral official lending. The index reveals large swings in the geopolitical structure of international official lending. Fragmentation rises sharply during periods of high geopolitical risk. It reached especially high levels during the two World Wars and remained elevated during parts of the Cold War. It then declined steadily after the collapse of the Soviet Union, reaching its lowest point around 2020. Since Russia's invasion of Ukraine in early 2022, the financial fragmentation index has increased again, consistent with a renewed role for geopolitical alignment in shaping official capital flows.

We then estimate the dynamic response of country-level financial fragmentation to geopolitical risk, using panel local projections. The results show that increases in geopolitical risk lead countries to borrow more from allies, relative to non-allies. This effect is persistent and economically meaningful. A 10% increase in geopolitical risk is associated

with an increase in fragmentation by about 1.5 percentage points, and the effect lasts more than a decade. Comparing with other types of capital flows, we find that the response is strongest for bilateral official lending, weaker for private flows, and largely absent for multilateral official lending. This pattern suggests that fragmentation is most pronounced in the parts of the international financial system where governments directly allocate capital.

This fragmentation has important implications for international risk-sharing. We document that politically aligned countries have more synchronized business cycles and more correlated macroeconomic tail risks. This means that when official lending shifts toward allies, it increasingly connects countries that are likely to face adverse shocks at the same time. We then show directly that, without fragmentation, bilateral official lending normally has risk-sharing properties: flows tend to move from relatively safer creditor economies to relatively riskier debtor economies. However, this risk-sharing property is significantly weaker when lending occurs between allied countries. Fragmentation therefore reduces the scope for risk-sharing.

To interpret these empirical patterns and assess their implications, we develop a model of sovereign borrowing with limited commitment and geopolitical considerations. In the model, the Home country can enter into state-contingent bilateral debt contracts with an Allied bloc, a Rival bloc, or both, and cannot commit to repaying its debts. We make two key assumptions. First, the Home country places a negative weight on the Rival bloc's welfare. This captures the government's desire to gain an advantage over its geopolitical rivals, and we refer to it as a "geopolitical externality". Second, the Home country cannot discriminate across creditors: it must either repay or default on all creditors. The geopolitical externality implies that when deciding whether to repay or default, the government cares about the composition of its liabilities — who gets repaid — not just their total size. Default triggers an income loss at Home, but it also eliminates debt payments to the Rival, thereby reducing the Rival's payoff. As a result, the Home country faces a stronger temptation to default when the Rival holds a large share of its debt.

We characterize the optimal state-contingent bilateral contracts in this environment. We show that an increase in geopolitical tensions—modeled as a rise in the disutility from the Rival bloc—shrinks the Home country's borrowing set and tilts the composition of feasible equilibrium portfolios toward the Allied bloc. In line with our empirical findings, heightened geopolitical tensions fragment capital flows along geopolitical lines. Moreover, when the geopolitical shock is sufficiently large, fragmentation is accompanied by a decline in international risk-sharing.

We show that fragmentation can take two forms. Under partial fragmentation, the Home country exhausts the insurance available from the Allied bloc but continues to obtain some insurance from the Rival bloc; in this region, higher geopolitical tensions reduce Rival-bloc borrowing and increase consumption dispersion across states. Under complete fragmentation, the no-default constraint binds before the Allied bloc's resources are exhausted, and the Home country borrows only from allies. Thus, fragmentation can arise partially, as borrowing tilts away from rivals, or completely, when lending across geopolitical lines disappears altogether.

Taken together, the paper makes three contributions. First, we construct a long-run measure of financial fragmentation in official lending. Second, we document that heightened geopolitical risk is associated with a reallocation of official bilateral credit toward allies, where the scope for risk-sharing is more limited because macroeconomic risks are more synchronized. Third, we provide a mechanism in a limited-commitment model of sovereign borrowing in which creditors' geopolitical alignment affects repayment incentives and generates endogenous fragmentation.

Related literature. This paper contributes to the literature on geoeconomics. The idea that international economic relationships can be used as instruments of political power goes back at least to Hirschman (1945), who emphasized how trade dependence can create influence on and provide leverage over other countries. Recent work has formalized this logic in modern economic models of geoeconomics. In particular, Clayton et al. (2025a) develop a general framework in which governments use economic power as a strategic instrument. We bring this logic to international official lending and show that geopolitical forces shape both the allocation of capital and the scope for risk-sharing. A fast-growing body of work studies economic coercion, sanctions, geopolitical risk, and geoeconomic fragmentation more broadly (Aiyar, Presbitero, and Ruta, 2023; Aiyar, Malacrino, and Presbitero, 2024; An and Huber, 2026; Becko and O'Connor, 2024; Bianchi and Sosa-Padilla, 2024, 2025; Broner, Martin, Meyer, and Trebesch, 2024; Caldara and Iacoviello, 2022; Catalán, Fendoglu, and Tsuruga, 2024; Clayton, Maggiori, and Schreger, 2024; Clayton, Coppola, Maggiori, and Schreger, 2025; De Souza, Hu, Li, and Mei, 2024; Fernandez-Villaverde, Mineyama, and Song, 2024; Gopinath, Gourinchas, Presbitero, and Topalova, 2024; Kempf, Luo, Schäfer, and Tsoutsoura, 2023; Kleinman, Liu, and Redding, 2024; Kooi, 2024; Pflueger and Yared, 2024). See Aiyar, Presbitero, and Ruta (2023), Clayton et al. (2025b), and Mohr and Trebesch (2025) for overviews of the literature. Our contribution to the literature is twofold. First, on the empirical side, we provide long-run evidence that

geopolitical tensions come with fragmented international official lending, with consequences for the scope for international risk-sharing. Second, on the theoretical side, we develop a simple theory of fragmentation in capital flows.

This paper is also related to the large literature on international risk-sharing (Backus, Kehoe, and Kydland, 1992; Obstfeld and Rogoff, 2000). While this literature has focused primarily on private international capital flows (Lewis, 1996; Kose, Prasad, and Terrones, 2009; Bai and Zhang, 2012), our focus is on government-to-government lending and its risk-sharing properties.[1] In this respect, our paper builds on the long-run study of international official lending by Horn et al. (2026) and related models of official lending (Gourinchas, Martin, and Messer, 2025; Abraham, Carceles-Poveda, Liu, and Marimon, 2024; Arellano and Barreto, 2024; Liu, Liu, and Yue, 2024; Roldan and Sosa-Padilla, 2025), which we extend with geopolitical considerations.

Finally, our paper also relates to the sovereign default literature in the tradition of Eaton and Gersovitz (1981), Aguiar and Gopinath (2006), and Arellano (2008). A central aspect of our model—shared with Brutti (2011), Broner, Martin, and Ventura (2010), and Gennaioli, Martin, and Rossi (2014)—is the inability to discriminate across lender types. In our model, this takes the form of an inability to discriminate across aligned and misaligned countries. While this work emphasizes that domestic intermediaries' holdings of government bonds make default costly for the sovereign, we instead study how geopolitical frictions shift borrowing toward aligned countries. In a different vein, Broner, Erce, Martin, and Ventura (2014) develop a framework with creditor discrimination and link it to the post-crisis nationalization of sovereign debt in the euro area.

Outline. This paper is structured as follows. Section 2 introduces the data and explains how we construct the financial fragmentation index. Section 3 presents the long-run evolution of the index, analyzes the relationship between geopolitical risk and fragmentation, and studies its implications for international risk-sharing. Section 4 develops a model of limited commitment with geopolitical considerations. Section 5 concludes. The Appendix contains details on the construction of the dataset and the financial fragmentation index, robustness exercises, and the proofs of the theoretical results.

[1] Also related is the literature on risk-sharing between households, following Cochrane (1991) and Townsend (1994), which analyzes risk-sharing networks and the role of preexisting family and kinship ties.

2 Measuring fragmentation in capital flows

This section explains how we compile data on international capital flows and how we measure fragmentation. We focus on the key definitions, sources, and principles of data construction, and point interested readers to Appendix Section B for further details.

2.1 Data on international capital flows

Our analysis focuses on bilateral official (government-to-government) lending, using data compiled by Horn et al. (2026). The data record cross-border lending commitments between sovereign creditors and borrowers at the country-pair-year level. More specifically, our empirical analysis is based on roughly USD 9 trillion in bilateral lending between 120 creditor governments and 190 debtor governments from 1910 to 2024 (see Appendix B and Horn et al. (2026) for details). The dyadic structure of the data allows us to trace lending patterns across creditor–debtor relationships and study how capital allocation varies with geopolitical alignment and risk.

Official international lending is defined following the standard definition of the OECD. According to this definition, "international lending" consists of all cross-border financial transactions, in the form of direct loans or financial guarantees, undertaken by central governments and their public sector entities.[2] The defining feature of these lending transactions is that the government exercises direct control over the creditor entity "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 dataset offers several distinct advantages for studying geopolitically induced fragmentation. First, because lending decisions are directly controlled by governments, bilateral official flows are particularly responsive to (geo-)political considerations. A large literature shows that official lending is systematically shaped by political relationships, such as military alliances, UN voting alignment and close ties to major powers (e.g. Alesina and Dollar, 2000; Alesina and Weder, 2002; Kuziemko and Werker, 2006; Barro and Lee, 2005; Dreher

[2]These data focus on transactions that create a direct financial claim between sovereigns and exclude secondary market holdings of government debt, which cannot be traced systematically at the dyadic level over long time horizons (see Horn et al. (2026) for details). Standard definitions of official finance typically also include non-repayable grants. In line with our theoretical framework, which focuses on debt contracts between sovereigns, the main-text empirical analysis restricts attention to official *loans*. Appendix A.4 extends the analysis to grants and shows that the main empirical findings are qualitatively similar across both forms of official finance.

et al., 2009b; Horn et al., 2026). As we show below, this makes official finance a particularly sensitive indicator of changes in geopolitical alignment and financial fragmentation. Second, the data span more than a century, allowing us to analyze episodes of great power rivalry and war, when private capital flows are often limited or disrupted (Horn et al., 2026). And third, the dyadic structure of bilateral lending data naturally lends itself to studying how lending relationships vary across countries with different degrees of political alignment.

Beyond its suitability for studying geoeconomic fragmentation, bilateral official lending is also of particular interest for the study of international risk-sharing. While official capital flows are typically smaller than private capital flows during normal times, they tend to be highly countercyclical and often surge when private financing retreats, especially during major macroeconomic disasters such as financial crises or wars (Horn et al., 2026). As a result, official creditors frequently act as lenders of last resort, extending credit precisely when marginal utilities of consumption are highest and access to private capital markets is most constrained. This pattern is not limited to emerging-market and developing economies but has historically also characterized today's advanced economies during periods of severe economic distress, most notably in postwar Europe, where large-scale official assistance through the Marshall Plan played a central role in economic reconstruction (e.g. De Long and Eichengreen, 1993).

2.2 Financial Fragmentation Index

To measure fragmentation in international capital flows, we exploit the dyadic structure of the bilateral official lending data. This allows us to distinguish between capital flows that occur within geopolitical blocs and those that cross geopolitical lines. Intuitively, a more fragmented financial system is one in which governments allocate a larger share of capital toward politically aligned partners rather than across blocs.

More specifically, we construct a geopolitical lending fragmentation index, which captures the extent to which official lending is concentrated *within* rather than *across* geopolitical blocs. To this end, we classify country pairs as allies or non-allies in each year and aggregate bilateral lending flows along these two dimensions. The index then compares lending between these two groups, normalized by total lending:

$$\text{Fragmentation Index}_t = \frac{\text{Lending between allies}_t - \text{Lending between non allies}_t}{\text{Total lending}_t}. \tag{1}$$

This measure resembles External-Internal (E-I) indices, commonly used in network analysis (Krackhardt and Stern, 1988). Positive values indicate that lending is concentrated within blocs (i.e., it is fragmented), whereas negative values signal a high share of lending across blocs and therefore a high degree of international diversification or globalization.

In addition to the global index across the full sample, we can also construct the corresponding country-level measure for all countries in our sample. Consistent with our theoretical model, we take the debtor country's perspective: For each country i, we distinguish between financial inflows from allies and financial inflows from non-allies, thereby tracking the extent to which each debtor country's borrowing structure shifts along geopolitical lines over time.[3] Formally,

$$\text{Borrower Fragmentation}_{i,t} = \frac{\text{Allied borrowing}_{i,t} - \text{Non-allied borrowing}_{i,t}}{\text{Total borrowing}_{i,t}}. \tag{2}$$

Measuring alliances. To measure geopolitical alignment, we combine our lending data with information on political relationships between countries. Our baseline measure relies on formal and actual military alliances from the Correlates of War project (Gibler and Sarkees, 2004; Gibler, 2009; Sarkees and Wayman, 2010), which offers consistent coverage over almost our full 100-year sample period (see Appendix Section B.4.1 for details). As a robustness check, we also use similarity in voting behavior in the United Nations General Assembly, following Bailey et al. (2017). While this variable has the advantage of providing a continuous measure of alignment, an important drawback for our application is that it is available only since 1945 and therefore does not enable long-run analysis.

One potential concern is that changes in the index may be driven by changes in alignment rather than changes in lending patterns across allied and non-allied countries. To address this, we decompose the index into a component driven by time variation in lending flows and a component driven by changes in alliances. We show that over the full sample, two-thirds of the time variation in the index comes from changes in lending flows. This confirms that the fragmentation index primarily reflects capital flow fragmentation rather than the evolving structure of international alliances. Appendix A.6 provides details on the decomposition.

Comparison to other fragmentation measures. Our measure complements a growing set of indices and empirical approaches used to quantify geoeconomic fragmentation.

[3] An analogous index can also be constructed from the creditor's perspective by comparing each country's lending to allied and non-allied borrowers.

Existing work has mostly focused on aggregate indicators of geopolitical fragmentation (Fernandez-Villaverde et al., 2024), on trade and FDI reallocation across geopolitical blocs (Gopinath et al., 2024; Aiyar et al., 2024), or on the role of geopolitical distance in private portfolio and investment-fund allocations (Catalán et al., 2024; Kempf et al., 2023). Relative to these approaches, our index has three distinct features. First, it is based on a transparent, non-parametric measure of observed bilateral capital flows and does not rely on a latent factor or model-based estimation. Second, it focuses on government-to-government lending, a segment of international finance in which capital allocation is directly shaped by states and should therefore be especially sensitive to geopolitical considerations. And third, it is available over a long time horizon of more than 100 years and therefore enables the study of fragmentation during major wars and episodes of great power rivalry.

3 Empirical Results

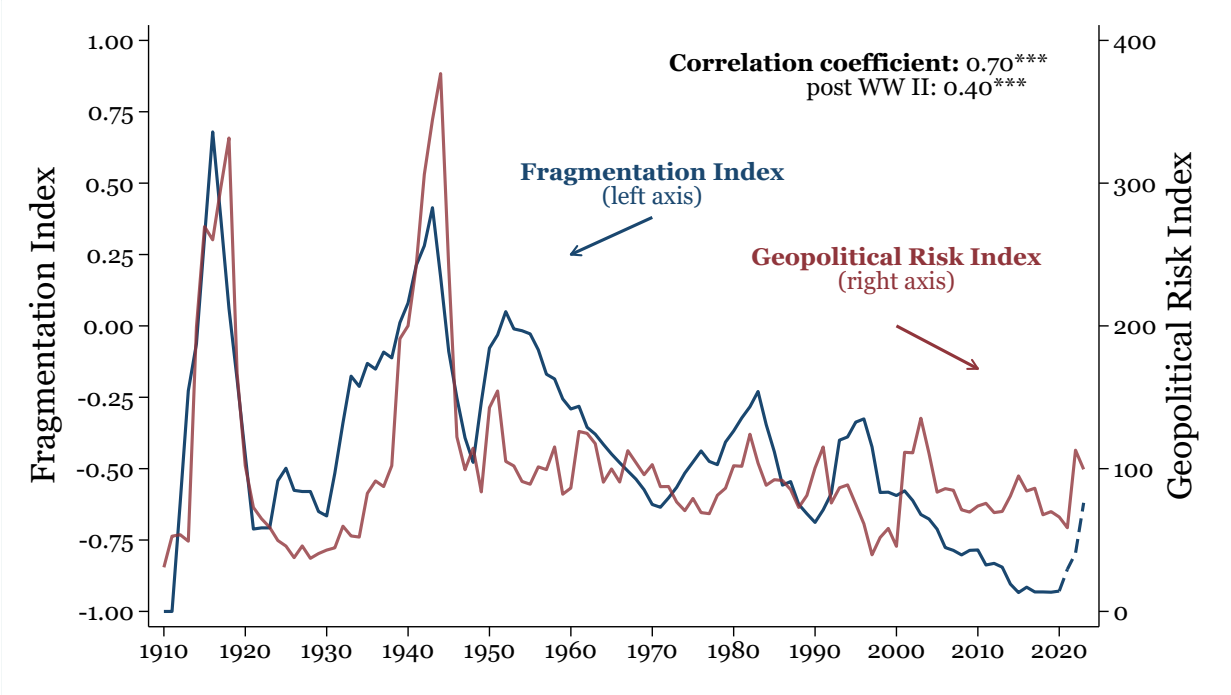
In this section, we present the key empirical findings from our analysis. First, we document that international lending fragments along geopolitical lines during periods of heightened geopolitical risk. Second, we show that politically aligned countries tend to exhibit more synchronized business cycles and more correlated macroeconomic tail risks. As a result, fragmentation in lending limits the scope for international risk-sharing.

3.1 Geopolitical risk and fragmentation

This section documents that international capital flows become more fragmented during periods of heightened geopolitical risk. To quantify this pattern, we use our new fragmentation index and estimate panel local projections to trace out the dynamic response of fragmentation to changes in geopolitical risk.

Figure 1 shows the new fragmentation index over the past 100 years (in blue) and plots its co-movement with geopolitical risk (in red) as measured by Caldara and Iacoviello (2022). Both indices show a strong and positive correlation of 0.70. This positive co-movement is particularly strong during the two World Wars, which stand out as times when official lending almost exclusively followed geopolitical alignment (see Horn et al., 2026) and geopolitical risk spiked. Fragmentation of lending remained elevated throughout the height of the Cold War, in the 1950s and 1960s, and then began a slow and persistent downward trajectory in an environment of low geopolitical risk after the collapse of the Soviet Union. By 2020, before Russia's full-scale invasion of Ukraine, the fragmentation of the global

Figure 1: Fragmentation and geopolitical risk, 1910-2024



Notes: This figure shows our fragmentation index (blue line) and geopolitical risk (red line) as measured by Caldara and Iacoviello (2022). To ease visualization, the fragmentation index is displayed as a five-year moving average. The dashed line for the years 2022 to 2024 indicates that data collection is still preliminary. See text and Appendix B for details on sources and data construction.

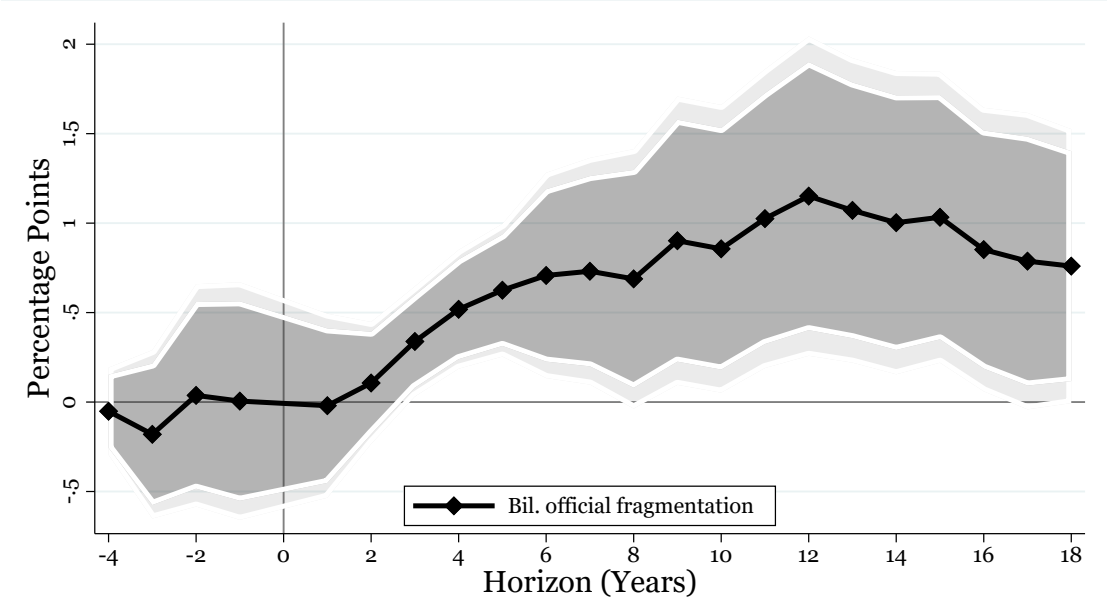
official lending landscape was lower than at any point in the preceding century. Russia's war against Ukraine has recently altered this long-run downward trend and triggered a pronounced uptick in financial fragmentation, driven by increased lending between Western allies and Ukraine (Trebesch et al., 2023).[4]

The aggregate dynamics displayed in Figure 1 conceal large heterogeneity in lending patterns at the country and country-dyad level. They also leave open the question of whether the association of fragmentation with geopolitical risk is driven by other—observed or unobserved—factors. To address these questions, we leverage the country-level fragmentation index to estimate the dynamic impact of geopolitical risk on fragmentation, using the following panel local projection specification:

$$Fragm_{i,t+h} - Fragm_{i,t-1} = \alpha^h + \sum_{l=1}^{4} \gamma_l^h Fragm_{i,t-l} + \beta^h \ln GPR_{i,t} + controls_{i,t} + \epsilon_{i,t}^h \,, \quad (3)$$

[4]The values for our fragmentation index after 2021 are still preliminary, given that some of the underlying data sources on bilateral lending are only published with considerable time lags (see Horn et al. (2026) for details). For those subsets of the data, where no recent updates are yet available, we construct the index under the assumption that the share of allied versus non-allied lending has remained constant.

Figure 2: Dynamic impact of geopolitical risk on financial fragmentation



Notes: This figure shows the dynamic response of financial fragmentation—measured at the country level—to increases in geopolitical risk in a panel local projection specification. Controls include real GDP, imports, exports, tail risk, and several crisis indicators. All specifications include country fixed effects. The shaded areas represent 90% and 95% confidence intervals. Standard errors follow Driscoll and Kraay (1998).

where $Fragm_{i,t}$ is the country-level borrower-side fragmentation index (as defined in equation 2), and the dependent variable is the h-years ahead cumulative change in $Fragm_{i,t}$. The coefficient that captures this effect is β^h, which multiplies country-specific geopolitical risk from Caldara and Iacoviello (2022) and Caldara et al. (2026). The controls we include in the specification encompass country i's real GDP, its exports and imports expressed in constant USD, and several indicators for financial, banking, and sovereign debt crises. We also control for 4 lags of the dependent variable. Standard errors are heteroscedasticity and autocorrelation robust following Driscoll and Kraay (1998).

Figure 2 shows that a 10% increase in a country's geopolitical risk is associated with an increase in borrowing fragmentation within one year, with the effect peaking at around 1.5 percentage points and persisting for several years.[5] That is, a 100% increase in geopolitical risk would correspond to roughly a 10.4 percentage points increase in fragmentation.[6]

[5]In Appendix A.3, we present the regression analysis with a fragmentation index constructed from the lender side instead of the borrower side. The lender-side results are qualitatively similar but smaller and less precisely estimated.

[6]This comes from the fact that GPR enters in logs, hence the effect is $0.15 \times 100 \times \ln(2) = 10.4$.

Taken together, these results provide strong evidence for the fragmentation of bilateral official lending under high geopolitical risk. When geopolitical tensions rise, bilateral lending increasingly follows geopolitical fault lines.

Comparison with multilateral and private flows

The evidence so far shows that bilateral official lending becomes significantly more fragmented when geopolitical risk is high. An important question is whether other international capital flows exhibit this pattern or if it is specific to bilateral government-to-government lending. To address this, we compare the response of bilateral official lending to that of *multilateral* official flows (1920-2024) and *private* capital flows (1970-2024).

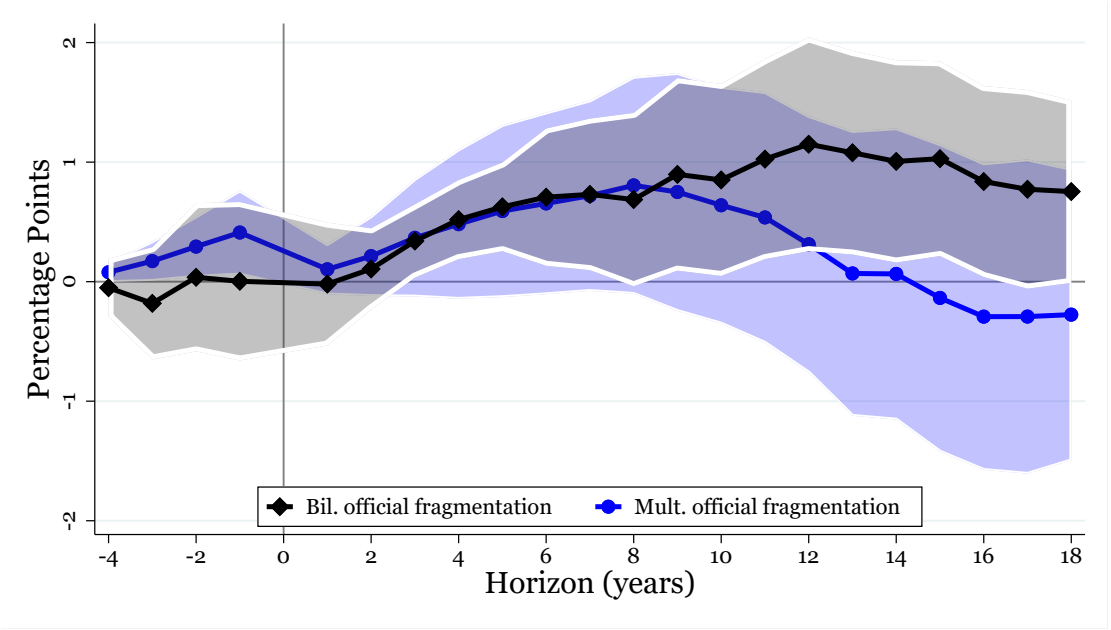
To compare impulse responses to the same set of geopolitical shocks, we also limit the estimation sample for bilateral official flows to these time horizons.

Multilateral flows. We compare bilateral official lending to *multilateral* official capital flows, which are mediated by international financial institutions, such as the International Monetary Fund or the European Stability Mechanism (ESM). As shown by Horn et al. (2026), multilateral lending has grown in importance in the last few decades. Unlike bilateral lending, these flows are not directly observed at the creditor–debtor country level, as they are channeled through institutions with multiple member states. To construct a dyadic measure, we follow the approach in Bianchi et al. (2026), which combines data on the funding composition of multilateral lenders with an imputation approach that assigns ultimate creditor shares according to each member country's contribution to the institution's financing. This allows us to approximate underlying creditor–debtor relationships. Details on the data construction are provided in Appendix B.

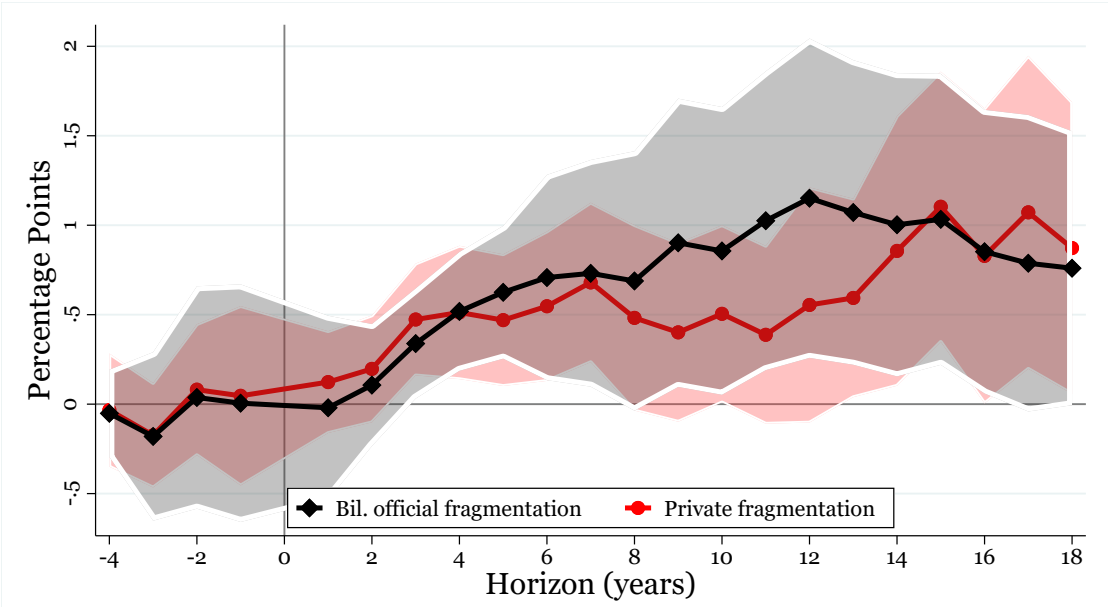
We use this dataset to assess whether multilateral lending exhibits similar fragmentation patterns as bilateral official lending in response to geopolitical risk. While a large literature shows that multilateral lending decisions are not immune to geopolitical considerations (e.g. Barro and Lee, 2005; Dreher et al., 2009a,b), multilateral institutions pool resources across a broad membership and allocate capital through formal governance structures rather than through direct bilateral relationships. As a result, one may expect multilateral lending to be less sensitive to geopolitical alignment between individual creditor and debtor countries than bilateral official lending. Indeed, Panel A of Figure 3 shows that, in contrast to bilateral lending, multilateral lending exhibits little systematic fragmentation in response to geopolitical risk.

Figure 3: Comparison with other types of capital flows

Panel A: Bilateral versus multilateral official lending



Panel B: Bilateral official versus private lending



Notes: This figure compares the dynamic response of financial fragmentation to increases in geopolitical risk across different types of international capital flows, estimated using the panel local projection specification described in equation (3). Panel A compares bilateral official lending fragmentation (black line) with multilateral lending fragmentation (blue line) over the post-1920 period. Panel B compares bilateral official lending fragmentation (black line) with private lending fragmentation (red line) over the post-1970 period. Controls include real GDP, imports, exports, tail risk, and several crisis indicators. Shaded areas represent 90% and 95% confidence intervals. Standard errors follow Driscoll and Kraay (1998). See Appendix B for details on data construction.

Private flows. We construct a complementary dataset on *private* dyadic capital flows, using data from the World Bank's International Debt Statistics (IDS). This dataset captures cross-border lending by private creditors—primarily commercial banks and suppliers—to sovereign borrowers in developing and emerging market economies over the period from 1970 to 2024. The IDS data allow us to identify lending relationships at the creditor–debtor level and therefore provide a dyadic measure of private capital flows that is directly comparable to our bilateral official lending data.[7]

While it has been shown that private flows respond to geopolitical risk (see, e.g., Aiyar et al., 2024; Gopinath et al., 2024; Catalán et al., 2024; An and Huber, 2026), they are driven by market-based incentives and are less directly controlled by governments. Panel B of Figure 3 is consistent with this. While private lending shows significant fragmentation dynamics in response to a geopolitical risk shock, the response is smaller than that of state-directed bilateral lending.

These results show that fragmentation is most pronounced in the segments of the international financial system where governments play a direct role in allocating capital. The results also suggest that the fragmentation of bilateral lending may be a particularly useful indicator for the changing structure of the international financial system.

3.2 Fragmentation and international risk-sharing

We have established that bilateral lending tends to follow geopolitical alignment when geopolitical risk rises. What does this imply for the risk-sharing benefits of official bilateral lending? A key determinant of the scope for international risk-sharing is the degree to which countries experience correlated shocks. If countries face highly synchronized business cycle dynamics, the scope for mutually beneficial insurance is limited (Backus et al., 1992; Obstfeld and Rogoff, 2000).

To examine whether geopolitical alignment is associated with more synchronized macroeconomic fluctuations, we analyze the relationship between political alignment and business cycle co-movement at the country-pair level. Specifically, we compute the pairwise correla-

[7] This measure captures only a subset of international private capital flows. Two features of global capital markets make it difficult to construct a more comprehensive dyadic dataset of private lending. First, a substantial share of cross-border financial flows pass through offshore financial centers and tax havens, which obscure their ultimate origin (Coppola et al., 2021). Second, much of sovereign borrowing from private creditors takes place through the issuance of bonds, which are actively traded in secondary markets, so that the counterparty is not systematically observed at the dyadic level. See Appendix B.3.2 for a discussion.

tion of real output growth between countries and relate it to their average level of political alignment, measured using similarity in UN General Assembly voting (Bailey et al., 2017).

Panel A of Figure 4 plots this relationship. Each observation represents a bin of country pairs, with the horizontal axis reporting the correlation of output growth and the vertical axis showing the average degree of political alignment. The figure reveals a clear positive relationship: countries that are more closely aligned politically tend to exhibit significantly more synchronized business cycles. Panel B of Figure 4 shows that this relationship extends beyond business cycle fluctuations. Politically aligned countries also exhibit more strongly correlated macroeconomic disaster risk, measured using the tail-risk indicator of Marfè and Pénasse (2024). We also document that the result holds when we use military alliances from Gibler and Sarkees (2004) as before (see Figure A2).

Synchronization of business cycles and tail risk may arise through multiple channels, including stronger trade integration, shared geopolitical shocks, or shorter geographic distance. The observed positive association between political alignment and macroeconomic synchronization, however, remains statistically significant even after controlling for bilateral trade, geographic distance, common language, and other standard gravity variables (see Appendix Figure A3). The results suggest that lending within geopolitical blocs provides less scope for risk-sharing, because lenders and borrowers are more likely to experience similar shocks at the same time.

We show this explicitly by studying the cyclical co-movement of bilateral lending with macroeconomic tail risk in both the debtor and creditor economies. In particular, we ask whether lending reallocates resources from countries facing relatively low macroeconomic tail risk to countries facing higher risk, and whether this pattern changes when lending occurs between geopolitically aligned partners.

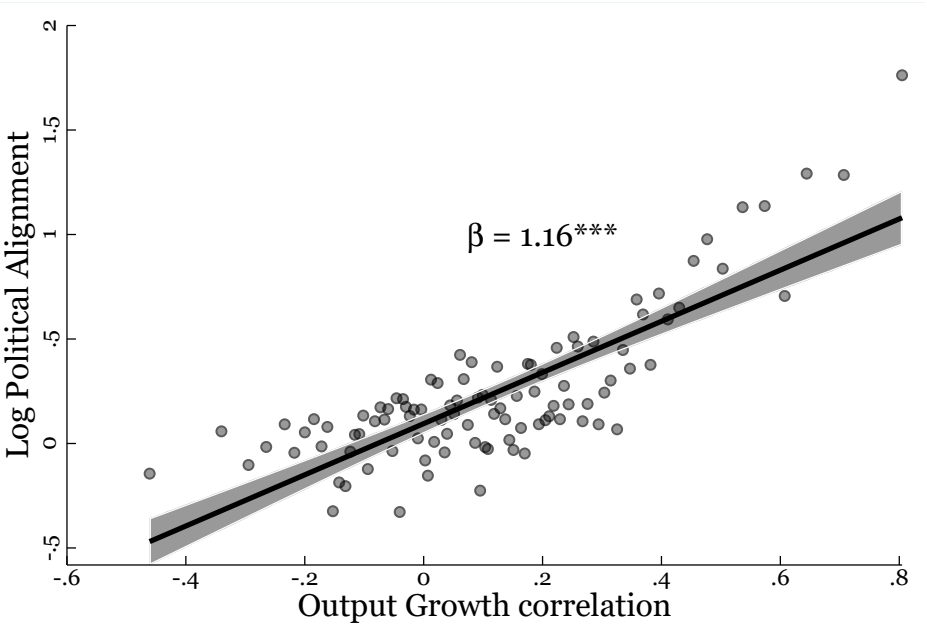
As we did before, we exploit the dyadic structure of our data and estimate the following specification:

$$Flow_{i,j,t} = \exp\Big[\beta \times (TailRisk_{i,t}^{debtor} - TailRisk_{j,t}^{creditor}) + \gamma \times alliance_{i,j,t} + \psi \times alliance_{ij,t} \times (TailRisk_{i,t}^{debtor} - TailRisk_{j,t}^{creditor}) + \theta_i + \delta_j\Big]\epsilon_{ij,t}\,. \quad (4)$$

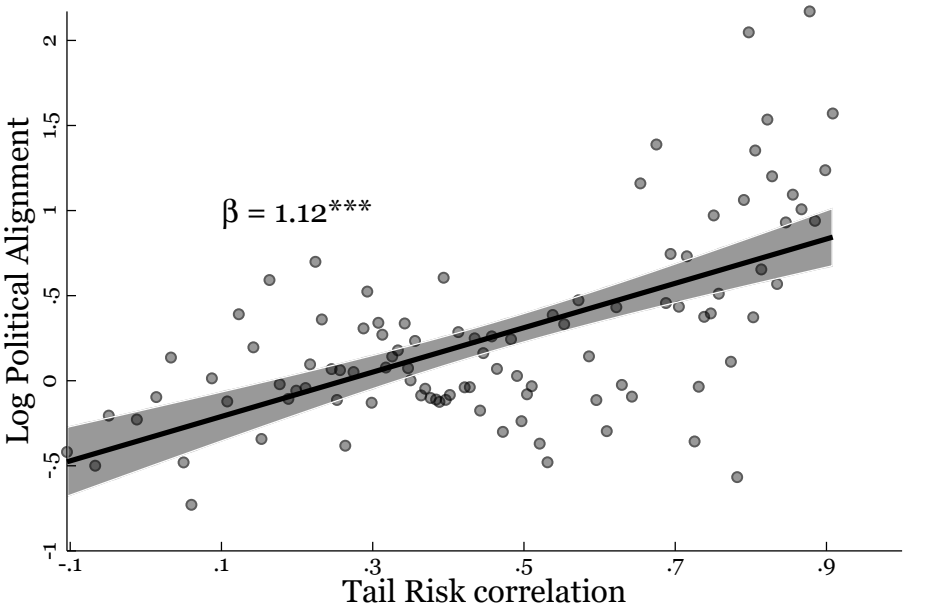
The dependent variable is the gross bilateral lending commitment in constant USD by creditor country j to debtor country i in year t. The main explanatory variable of interest is the difference between debtor country i's and creditor country j's level of macroeconomic tail risk, as measured by Marfè and Pénasse (2024). This differential captures the scope for forward-looking risk-sharing: when a country facing relatively low macroeconomic risk

Figure 4: Politically aligned countries have more synchronized business cycles

Panel A: Political alignment and output growth correlation



Panel B: Political alignment and tail risk correlation



Notes: This figure shows the relationship between political alignment and business cycle synchronization at the country-pair level. Political alignment is measured using ideal point distances from UN General Assembly voting, following Bailey et al. (2017). Panel A plots pairwise output growth correlation against log political alignment. Output growth data are taken from Müller et al. (2025) and HP-filtered at the per capita level. Panel B plots pairwise macroeconomic tail risk correlation against log political alignment, where tail risk is estimated following Marfè and Pénasse (2024). Each observation represents a bin of country pairs. The reported coefficients are obtained from OLS regressions of log political alignment on the respective pairwise correlation measure. *** denotes significance at the 1% level.

lends to a country facing higher risk, lending serves as a form of insurance against adverse shocks. We also include debtor and creditor country fixed effects to control for time-invariant country characteristics.

Table 1: International risk-sharing through official lending

	Dep. variable: Bilateral Official Lending		
	(1)	(2)	(3)
Tail risk difference	3.840***	3.788***	4.222***
	(0.388)	(0.405)	(0.435)
Alliance		0.406***	0.427***
		(0.0935)	(0.0947)
Tail risk × Alliance			-2.206*
			(1.162)
Observations	60,108	60,108	60,108
Sample	1910-2024	1910-2024	1910-2024
Debtor FE	✓	✓	✓
Creditor FE	✓	✓	✓

Notes: PPML regression results using gross bilateral lending commitments as dependent variable (in real USD). The models include debtor and creditor fixed effects. Robust standard errors, clustered at the creditor-debtor dyad, are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

Table 1 reports the results from Poisson pseudo-maximum likelihood (PPML) estimations with debtor country and creditor country fixed effects. Across specifications, the coefficient on the tail-risk differential is positive and statistically significant. This indicates that official lending tends to flow from relatively safe to relatively risky economies. In this sense, official lending contributes to international risk-sharing.

Columns (2) and (3) examine how this relationship changes when lending occurs between allied countries. Consistent with a large empirical literature showing that official financing is systematically shaped by political relationships and geopolitical considerations, the coefficient on the alliance dummy is positive and statistically significant (Alesina and Dollar, 2000; Alesina and Weder, 2002; Kuziemko and Werker, 2006; Horn et al., 2023, 2026). Column (3) adds an interaction term between the alliance dummy and the tail-risk differential. The corresponding coefficient is negative and statistically significant, implying

that the risk-sharing properties of official lending are weaker when flows occur between geopolitically aligned countries.[8]

Takeaway. Taken together, our empirical analysis reveals the state-contingent nature of bilateral lending as a global stabilizer. Bilateral lending flows reallocate resources from safer to riskier economies, but the capacity to insure against shocks depends on geopolitical risk and fragmentation. When geopolitical risk rises, lending shifts toward politically aligned partners with highly synchronous business cycles, thereby limiting the scope for international risk-sharing.

4 Model

In this section, we present a model of sovereign borrowing with limited commitment and geopolitics. The empirical facts documented above motivate the key ingredients of the model: geopolitical alignment maps to the Allied/Rival bloc structure, and the degree of geopolitical tension is captured by a "geopolitical externality," controlled by parameter η. We use the model to articulate how rising geopolitical tensions lead to more fragmented capital flows and a reduction in risk-sharing.

4.1 Environment

There are three country blocs: a Home country, an Allied bloc, and a Rival bloc. The total mass of the world economy is normalized to one, and each bloc has equal measure. The key distinction between the Allied bloc and the Rival bloc is that the Home country places a negative value on the welfare obtained by the Rival bloc. We think about Europe as the Home country, the US as the Allied bloc, and China as the Rival bloc.

Endowments, shocks, and timing. There are two dates, $t = 1, 2$. At $t = 2$, the economy is hit by an aggregate income shock, with state $s \in S$ occurring with probability $\pi(s)$. We assume that households in the Home country are risk-averse, which gives them

[8] Appendix Section A.4 shows that this result extends to other forms of official financing. Re-estimating the specification for official (non-repayable) grants, which are typically linked to specific aid projects, yields qualitatively similar results, suggesting that the weaker risk-sharing properties of lending within geopolitical blocs also hold for forms of official finance that are not explicitly aimed at sharing risk.

a motive to smooth consumption across states, whereas foreign households are risk-neutral and therefore value payoffs only in expected terms.

At $t = 1$, before the resolution of uncertainty, the Home country signs a bilateral state-contingent contract with each of the foreign blocs. We abstract from trade between the Allied and the Rival blocs.[9] At $t = 2$, given the realized state and the outstanding debt positions, the Home country either repays or defaults.

Home country. The Home country's preferences over period-2 consumption $\{c(s)\}_{s\in S}$ are given by

$$\sum_{s\in S} \pi(s)u(c(s)) - \eta V^*\,,$$

where u is a continuously differentiable, strictly increasing, and strictly concave utility function, and V^* denotes the welfare of the Rival bloc, to be explained below. Following Bianchi and Sosa-Padilla (2024), we refer to η as a "geopolitical externality," which captures, in a simple way, a country's efforts to prevail over its geopolitical rivals.

In period $t = 2$, the Home country receives its income $y(s)$, collects the returns of the claims, chooses to make payments or not on its debt, and consumes. As is standard in the literature on sovereign default (e.g., Brutti, 2011, Broner et al., 2010, and Gennaioli et al., 2014), we assume the Home country government cannot default selectively; if it defaults on any lender, it defaults on all lenders. In Appendix A.7, we test this assumption in bilateral data of missed principal and interest payments during sovereign default episodes over the past 50 years. In line with the non-discriminatory default assumption, we find no evidence that sovereigns systematically discriminate against rival countries when accumulating arrears. In addition, we assume that if the country defaults on the claims it owes to a certain bloc, it keeps any positive claims it may hold against the other bloc.

We let $\tilde{a}(s)$ and $a^*(s)$ denote the state-contingent payoffs owed to the Allied and Rival blocs, respectively, where a positive value represents a debt for the Home country. If the Home country repays in state s, its period-2 budget constraint is

$$c(s) = y(s) - \tilde{a}(s) - a^*(s)\,. \tag{5}$$

[9]Because both foreign blocs are risk-neutral, there would be no trade between foreign blocs in the absence of geopolitical factors. However, it is possible to extend the framework to allow for trade between the two foreign blocs. If the Allied bloc does not feature a disutility over the Rival bloc's welfare, it could act as an intermediary between the Home and Rival blocs. To the extent that the Allied bloc faces the same disutility as the home country, our results would remain qualitatively unchanged.

If the Home country defaults instead, income is reduced by the proportional cost $\phi \in [0, 1)$, and only claims in the home country's favor (i.e., negative positions on $\tilde{a}(s)$ and $a^*(s)$) are honored. The period-2 budget constraint in this case is

$$c(s) = (1 - \phi)\, y(s) - \tilde{a}_-(s) - a^*_-(s)\,, \tag{6}$$

where the payoff of each contingent claim in default is defined by

$$\tilde{a}_-(s) := \min\{0, \tilde{a}(s)\}, \quad a^*_-(s) := \min\{0, a^*(s)\}.$$

Foreign blocs. At $t = 1$, the foreign blocs trade state-contingent claims with the home country. We denote by $\tilde{y}(s)$ and $y^*(s)$ the endowments of the Allied and Rival blocs, respectively. At $t = 2$, foreign blocs collect any returns on the claims or make payments. The expected utility is given by

$$\tilde{V}(\tilde{a}) = \sum_{s \in S} \pi(s) \left[\tilde{y}(s) + (1 - d(s))\tilde{a}(s) + d(s)\tilde{a}_-(s)\right]\,, \quad \text{and} \tag{7}$$

$$V^*(a^*) = \sum_{s \in S} \pi(s) \left[y^*(s) + (1 - d(s))a^*(s) + d(s)a^*_-(s)\right]\,, \tag{8}$$

where a repayment decision by the Home country is given by $d(s) = 0$, and a default decision is given by $d(s) = 1$.

We assume that the Allied and Rival blocs must have positive consumption in each state. That is,

$$\tilde{y}(s) + (1 - d(s))\tilde{a}(s) + d(s)\tilde{a}_-(s) \geq 0\,, \quad \text{and} \tag{9}$$

$$y^*(s) + (1 - d(s))a^*(s) + d(s)a^*_-(s) \geq 0\,. \tag{10}$$

These two constraints will impose restrictions on the amount of insurance that the foreign blocs can provide to the home country.[10]

[10] These constraints can also be motivated by limited commitment on the side of the foreign blocs.

4.2 Equilibrium

We solve for the optimal bilateral contracts subject to incentive-compatibility and participation constraints. At $t = 2$, given the realized state s and portfolio $(\tilde{a}(s), a^*(s))$, the Home country decides whether to repay ($d(s) = 0$) or default ($d(s) = 1$). Its value in state s is

$$V_2(\tilde{a}, a^*; s) = \max \left\{ \underbrace{u\Big(y(s) - \tilde{a}(s) - a^*(s)\Big) - \eta\Big(y^*(s) + a^*(s)\Big)}_{\text{repay}}, \right.$$
$$\left. \underbrace{u\left((1-\phi)y(s) - \tilde{a}_-(s) - a^*_-(s)\right) - \eta(y^*(s) + a^*_-(s))}_{\text{default}} \right\}. \quad (11)$$

Crucially, because of the geopolitical externality, the home country needs to keep track of the composition of its claims and not just the total amount.

We consider, without loss of generality, a situation where the home country does not default in equilibrium.[11] The optimal bilateral contracts for the home country satisfy

$$\max_{\{\tilde{a}(s), a^*(s)\}_{s\in S}} \sum_{s\in S} \pi(s) \left[u\left(y(s) - \tilde{a}(s) - a^*(s)\right) - \eta\left(y^*(s) + a^*(s)\right) \right], \quad (12)$$

subject to

$$\sum_{s\in S} \pi(s)\, \tilde{a}(s) \geq 0\,, \quad (13)$$

$$\sum_{s\in S} \pi(s)\, a^*(s) \geq 0\,, \quad (14)$$

$$u(y(s) - \tilde{a}(s) - a^*(s)) - \eta(y^*(s) + a^*(s)) \geq u\Big((1-\phi)y(s) - a^*_-(s) - \tilde{a}_-(s)\Big) - \eta\Big(y^*(s) + a^*_-(s)\Big) \quad \forall s\,, \quad (15)$$

$$\tilde{a}(s) \geq -\tilde{y}(s) \quad \forall s\,, \quad (16)$$

$$a^*(s) \geq -y^*(s) \quad \forall s\,. \quad (17)$$

[11] If default were to happen, the price of the security would be zero, in which case the government would not want to borrow in the first place.

Constraints (13) and (14) represent the participation constraints for the foreign blocs, where risk neutrality implies that they must receive, on expectation, non-negative payments from the home country. Constraints (16) and (17) are the non-negativity constraints for consumption in the foreign blocs. Finally, constraint (15) reflects the no-default (or incentive compatibility) constraint of the Home country in state s. Crucially, a higher geopolitical externality, η, induces a tighter constraint, as foreign blocs realize that the Home country perceives that repaying the claims would increase the value for the Rival bloc and hurt its own welfare.

Definition 1. An equilibrium in this economy is given by a set of state contingent claims $\{a^*(s), \tilde{a}(s)\}$ that solve (12)–(17).

4.3 Results

To simplify the characterization, we assume that the aggregate shock can take only two values, denoted s_g ("good") and s_b ("bad"), with $y(s_g) > y(s_b)$. Each state occurs with equal probability, $\pi(s_g) = \pi(s_b) = 1/2$. Moreover, we assume that good–state income is identical across blocs, so that $y(s_g) = \tilde{y}(s_g) = y^*(s_g)$.

We first show the following Lemma.

Lemma 1. *In equilibrium, both participation constraints,* (13) *and* (14)*, hold with equality. Moreover, we have that*

$$\tilde{a}(s_g) = -\tilde{a}(s_b), \quad \textit{and} \quad a^*(s_g) = -a^*(s_b)\,.$$

Proof. In Appendix C.1 □

In addition, assume that $u(c) = \log(c)$ and that the following holds.

Assumption 1.

$$\tilde{y}(s_b) < \frac{y(s_g) - y(s_b)}{2} \leq y^*(s_b)$$

The expression in the middle corresponds to the net resources that the Home country needs to receive in the bad state to achieve constant consumption across states (i.e., full consumption insurance). The first inequality states that the Allied bloc alone does not have sufficient resources to lend to the Home country and enable it to equalize consumption across states. On the other hand, the second inequality implies that the Rival bloc has

enough resources in the bad state to fully insure the Home country. Under this assumption, we can dispense with constraint (17) in the characterization of the optimal contract and focus on the no-default constraints and on the resources that the Allied bloc has available in bad times.

We present the main results in the following proposition.

Proposition 1 (Global equilibrium fragmentation)**.** *Suppose that Assumption 1 holds. Let* $\hat{\phi} \equiv 1 - \frac{\bar{y}}{y(s_g)} e^{-\eta\left[\frac{y(s_g)-y(s_b)}{2} - \tilde{y}(s_b)\right]}$ *and* $\underline{\phi} = \frac{\tilde{y}(s_b)}{y(s_g)}$*. We have the following results:*

(i) If $\phi \geq \hat{\phi}$*, the optimal contract features full insurance:*

$$c(s_g) = c(s_b) = \frac{y(s_g) + y(s_b)}{2} \equiv \bar{y}\,. \tag{18}$$

(ii) If $\phi < \hat{\phi}$*, the full-insurance contract cannot be implemented, and we get consumption dispersion across states:*

$$c(s_g) > c(s_b)\,. \tag{19}$$

Moreover, we have two regimes:

(a) Partial fragmentation: if $\phi > \underline{\phi}$*, the home country maxes out its borrowing from the ally:*

$$\tilde{a}(s_g) = \tilde{y}(s_b), \quad a^*(s_g) < \frac{y(s_g) - y(s_b)}{2} - \tilde{y}(s_b)\,. \tag{20}$$

In this case, an increase in the geopolitical externality η *leads to lower borrowing from the Rival bloc and to higher consumption dispersion.*

(b) Complete fragmentation: if $\phi \leq \underline{\phi}$*, the home country borrows only from the ally:*

$$\tilde{a}(s_g) = \phi y(s_g) \leq \tilde{y}(s_b), \quad a^*(s_g) = 0. \tag{21}$$

Proof. In Appendix C.2 □

The first element of the proposition states that when default costs are sufficiently high, the Home country can implement full insurance and equalize consumption across the good and bad states. The threshold $\hat{\phi}$ is the default cost required to make the full-insurance

allocation incentive compatible when the Home country uses as much insurance as possible from the Allied bloc and obtains the remaining insurance from the Rival bloc. Since borrowing from the Rival bloc tightens the no-default constraint, a higher geopolitical externality η raises this threshold. Thus, higher geopolitical tensions make full risk-sharing harder to sustain.

The second element considers the case in which default costs are too low to support full insurance, $\phi < \hat{\phi}$. In this region, the Home country chooses the largest feasible amount of insurance, but this amount falls short of the full-insurance level. As a result, consumption remains higher in the good state than in the bad state: $c(s_g) > c(s_b)$. The composition of the optimal contract depends on whether the Allied bloc has enough resources to provide all the insurance that is consistent with the no-default constraint.

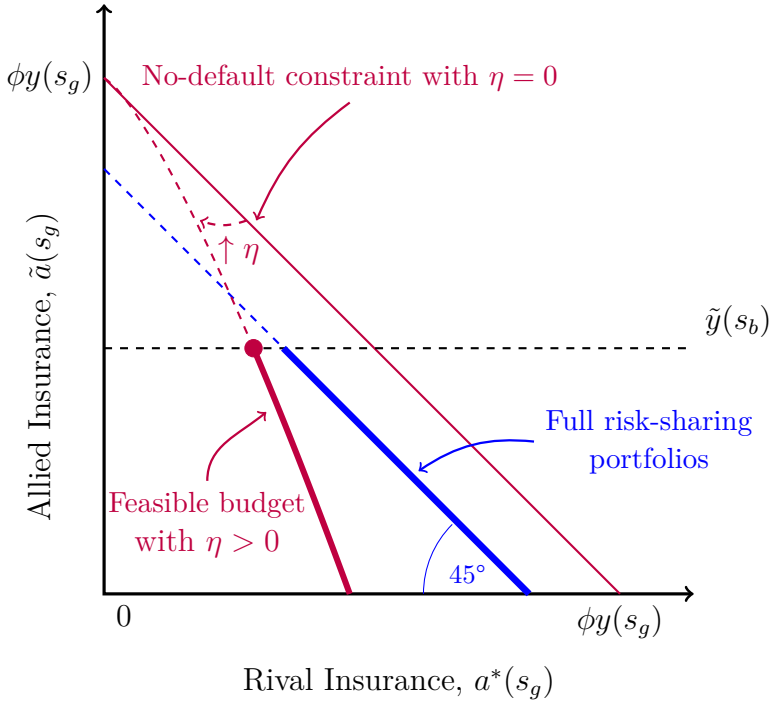
If $\phi > \underline{\phi}$, the Home country can first exhaust the Allied bloc's resources without violating the no-default constraint. The optimal contract therefore maxes out borrowing from the Allied bloc and obtains additional insurance from the Rival bloc. In this case, both the Allied resource constraint and the no-default constraint bind. An increase in η makes Rival-bloc borrowing more costly (in incentive terms), reducing $a^*(s_g)$ and increasing consumption dispersion across states.

If instead $\phi \leq \underline{\phi}$, the no-default constraint binds before the Home country exhausts the Allied bloc's resources. The optimal contract can then be implemented entirely with Allied-bloc borrowing: $\tilde{a}(s_g) = \phi y(s_g) \leq \tilde{y}(s_b)$, and $a^*(s_g) = 0$.

Illustration. The results of Proposition 1 are illustrated in Figure 5. This figure displays the set of feasible insurance contracts. On the x-axis, we have the amount of borrowing from the Rival bloc, $a^*(s_g)$, and on the y-axis, we have the amount of borrowing from the Allied bloc, $\tilde{a}(s_g)$. Recall that the higher these values are, the larger the claims received by the Home country in the bad state (i.e., the higher the insurance). The figure illustrates a situation where η is initially zero and then there is a geopolitical shock that induces $\eta > 0$.

The blue line denotes the set of bilateral insurance contracts that would achieve the full-risk sharing allocation – that is, the pairs of $\{a^*, \tilde{a}\}$ that deliver consumption equal to mean income in each state. The red, straight line indicates an initial no-default constraint when $\eta = 0$ (i.e., when there are no geopolitical externalities). For bilateral insurance contracts on that line, the home 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:

Figure 5: How a geopolitical shock generates fragmentation and lower risk-sharing



the decision to default depends on total debt, but not its composition. Notice then that under $\eta = 0$, we start from a situation where full risk-sharing is feasible. Finally, the black, dashed, horizontal line indicates the maximum amount of insurance that is feasible for the Allied country to provide, per condition (16).

Consider now a geopolitical shock, where $\eta > 0$. In response, the no-default constraint steepens. Starting from a point of indifference between repaying and defaulting, a one-unit increase in the insurance from the Rival bloc and an equal reduction from the Allied bloc moves the home country into a default state. As the figure shows, an increase in the geopolitical externality η shrinks the borrowing set for the Home country and tilts the set of possible equilibrium portfolios toward Allied countries.[12] Given the limit on the insurance that the Allied bloc can provide, we have that a full risk-sharing portfolio is not feasible, and the feasible set is depicted by the thick red line. The optimal portfolio is at the point of the line with the lowest insurance provided by the Rival bloc, depicted by the solid red dot in Figure 5.

[12]Notice that with the geopolitical externality, the no-default constraint becomes non-linear, which stems from risk aversion in the Home country.

5 Conclusion

Recent geopolitical shocks have intensified concerns that international capital flows are becoming more fragmented along geopolitical lines. Using more than a century of bilateral government-to-government lending, we document that official lending becomes more concentrated among geopolitical allies when geopolitical risk is high. Because politically aligned countries tend to have more synchronized business cycles and more correlated macroeconomic tail risks, this reallocation reduces the scope for international risk-sharing.

To interpret these patterns, we introduce geopolitical considerations into a limited-commitment model of sovereign borrowing. In the model, creditor identity matters because repayment incentives depend on who holds the claims. When a larger share of claims is held by a geopolitical rival, repayment transfers more resources to an opponent, making such borrowing relationships harder to sustain. As geopolitical tensions rise, borrowing shifts away from rivals and toward allies. Fragmentation can therefore emerge endogenously from the interaction of strategic default incentives and geopolitical rivalry.

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Online Appendix

"International Risk-Sharing in a Fragmented World"

Appendix Contents

A Additional results **App.2**

A.1 International lending in a globalized vs fragmented world App.2

A.2 Political alignment and business cycle synchronization App.3

A.3 Geopolitical risk: lender-side fragmentation App.6

A.4 Geopolitical risk and fragmentation: grants vs loans App.6

A.5 Commitments versus disbursements App.10

A.6 Decomposition of fragmentation index App.13

A.7 Sovereign defaults on allied and rival countries App.14

B Data **App.18**

B.1 Definitions and concepts App.18

B.2 Bilateral official lending App.19

B.3 Other capital flow measures App.20

B.3.1 Multilateral official lending App.20

B.3.2 Private international lending App.22

B.4 Other data App.24

B.4.1 Geopolitical alignment App.24

B.4.2 Geopolitical risk App.24

B.4.3 Other macroeconomic variables App.25

C Proofs **App.28**

C.1 Proof of Lemma 1 . . . . . App.28

C.2 Proof of Proposition 1 . . . . . App.28

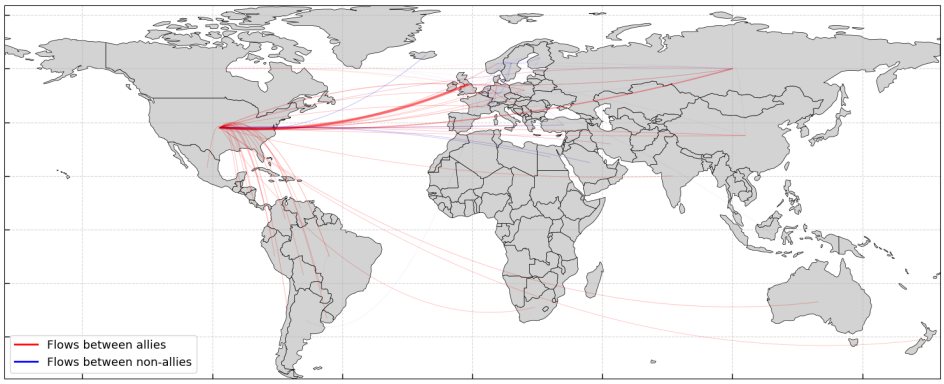
A Additional results

A.1 International lending in a globalized vs fragmented world

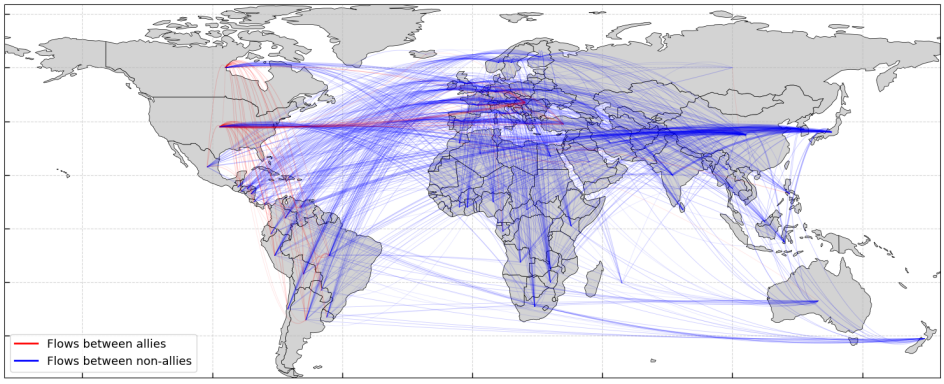
Figure A1 illustrates how patterns of international financial cooperation between governments have differed over the past 100 years. Panel A shows official flows during the interwar period, an era with comparatively high geopolitical tensions. Panel B shows official lending flows during the Global Financial Crisis, an episode of widespread international official lending.

Figure A1: International lending in a globalized vs. fragmented world

Panel A: Fragmented international lending, 1920-1935



Panel B: Global international lending, 2007-2008



Notes: This figure shows international official lending between allies (in red) and non-allies (in blue). Line width is proportional to total lending amounts. For details on the data see Horn et al. (2026) and Appendix Section B.

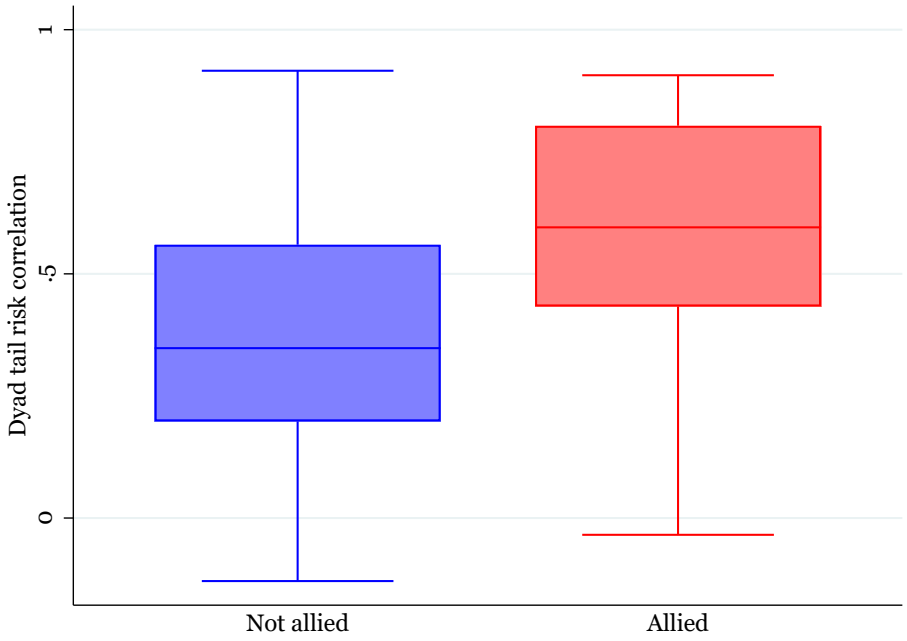
A.2 Political alignment and business cycle synchronization

In Section 3.2, we showed that geopolitically aligned countries, as measured by similarity in UN voting behavior, exhibit closely synchronized business cycle patterns, as measured by a high degree of output growth correlation. In this subsection, we show that the same is true when looking at allied versus non-allied countries (using the data on military alliances from Gibler and Sarkees (2004) and Gibler (2009)). The box plots in Figure A2 show that allied countries have more correlated business cycles than non-allies.

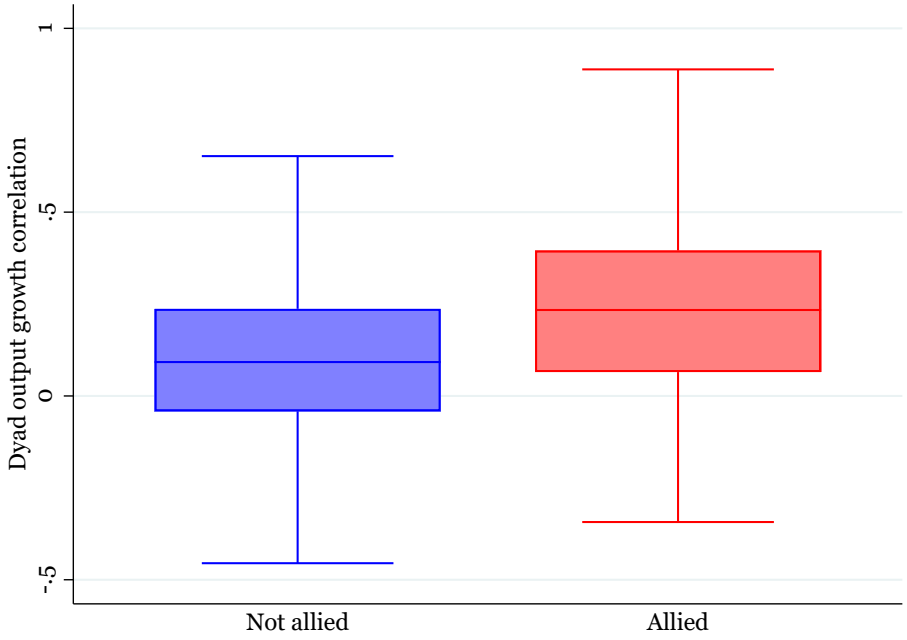
We can also show that the positive co-movement between political alignment and business cycle synchronisation shown in Figure 4 is robust to using consumption growth correlation on the x-axis (Panel A of Figure A3) and to controlling for traditional gravity controls, like geographical distance, common language, colonial linkages, and trade exposure (Panel B of Figure A3).

Figure A2: Alliances and synchronization of business cycles

Panel A: Alliances and synchronization of macroeconomic tail risk



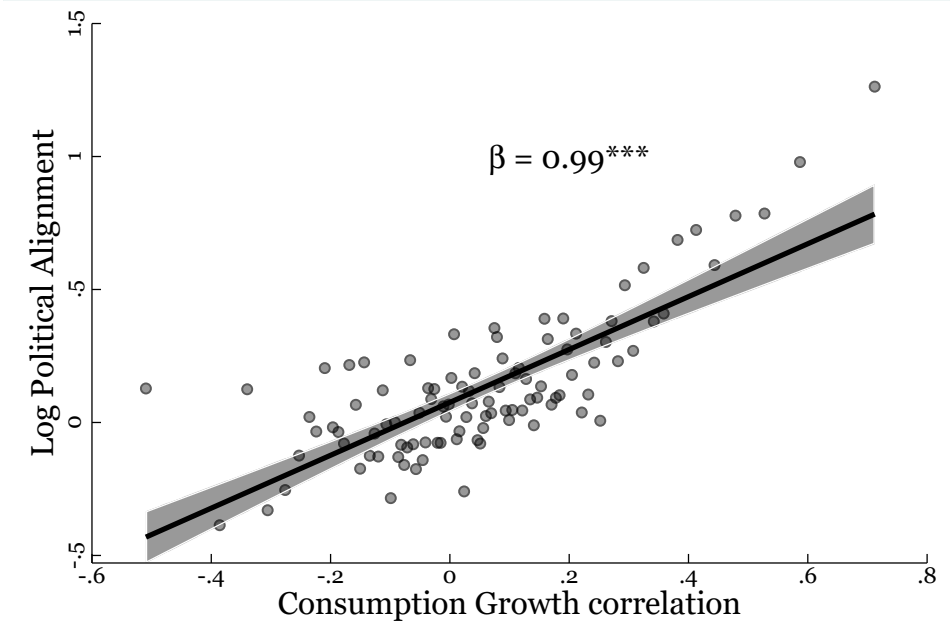
Panel B: Alliances and synchronization of output growth



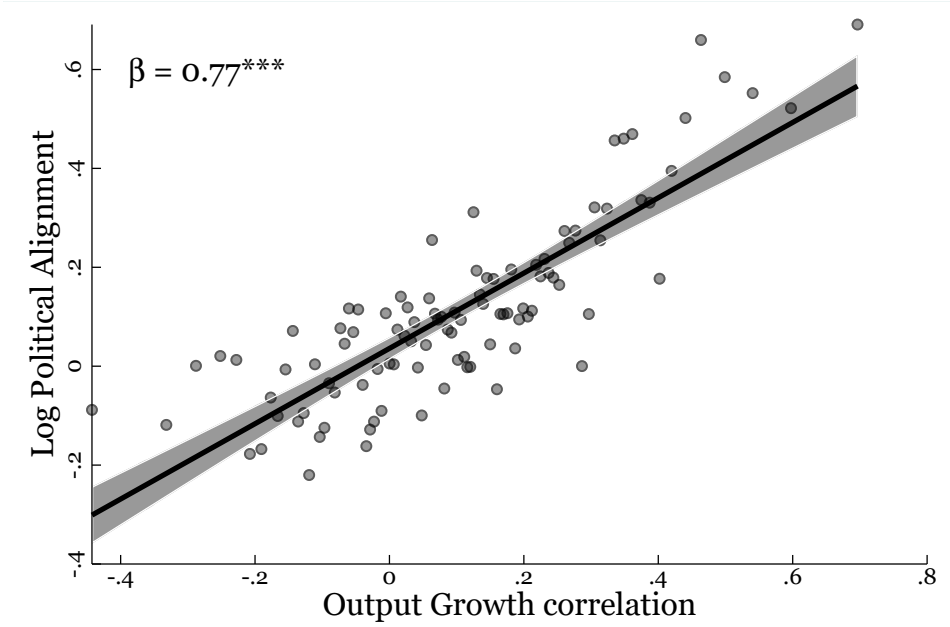
Notes: This figure shows the distribution of pairwise tail risk correlations for allied and non-allied country pairs, as measured by formal and actual military alliances from the Correlates of War project (Gibler and Sarkees, 2004; Gibler, 2009; Sarkees and Wayman, 2010). Business cycle synchronization is measured using the pairwise correlation of macroeconomic tail risk as estimated by Marfè and Pénasse (2024) in panel A and output growth in panel B. Each box displays the interquartile range; the horizontal line indicates the median. The whiskers extend to the 5th and 95th percentiles.

Figure A3: Politically aligned countries have more synchronized business cycles

Panel A: Consumption growth correlation



Panel B: After controlling for gravity variables

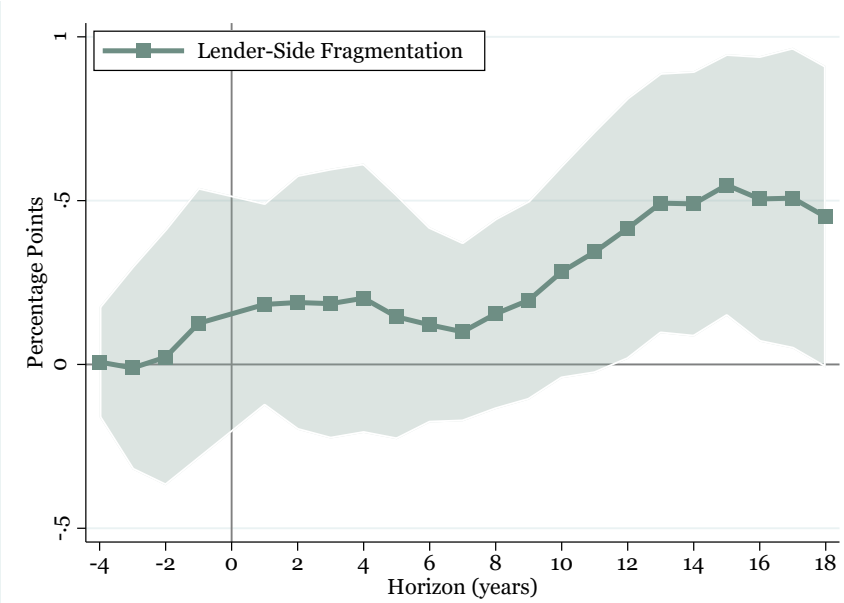


Notes: This figure shows the relationship between political alignment and business cycle synchronization at the country-pair level. Political alignment is measured using ideal point distances from UN General Assembly voting, following Bailey et al. (2017). Panel A plots pairwise consumption growth correlation against log political alignment. Consumption growth data are taken from Müller et al. (2025). Panel B plots pairwise output growth correlation against log political alignment, after controlling for dyadic gravity regressors (geographical distance, common language, colonial linkages, trade exposure). Each observation represents a bin of country pairs. The reported coefficients are obtained from OLS regressions of log political alignment on the respective pairwise correlation measure. *** denotes significance at the 1% level.

A.3 Geopolitical risk: lender-side fragmentation

In Figure 2, we showed that an increase in a country's geopolitical risk corresponds with an increase in its borrower-side fragmentation—that is, the extent to which a country borrows from allies rather than non-allies. In this subsection, we study the effect of geopolitical risk on lender-side fragmentation—that is, whether a country lends more to allies or non-allies. Figure A4 shows that lender-side fragmentation exhibits a similar reaction to geopolitical risk, but quantitatively smaller than what we document for borrower-side fragmentation. The effect is also estimated with considerably less precision and is less robust to variations in specifications or weightings. Our reading is that bilateral lending is heavily concentrated among a small number of large, predominantly advanced-economy creditors (most notably the United States and China), which implies that there is substantially less variation, making lender-side fragmentation more difficult to estimate precisely.

Figure A4: Dynamic impact of geopolitical risk on lender-side fragmentation



Notes: This figure shows the dynamic response of lender-side financial fragmentation—measured at the country level—to increases in geopolitical risk in a panel local projection specification. Controls include real GDP, imports, exports, tail risk and several crisis indicators. The shaded areas represent 95% confidence intervals. Standard errors follow Driscoll and Kraay (1998).

A.4 Geopolitical risk and fragmentation: grants vs loans

Official lending encompasses a broad range of transactions that differ substantially in their objectives and terms. Some forms of official finance are explicitly designed to provide insur-

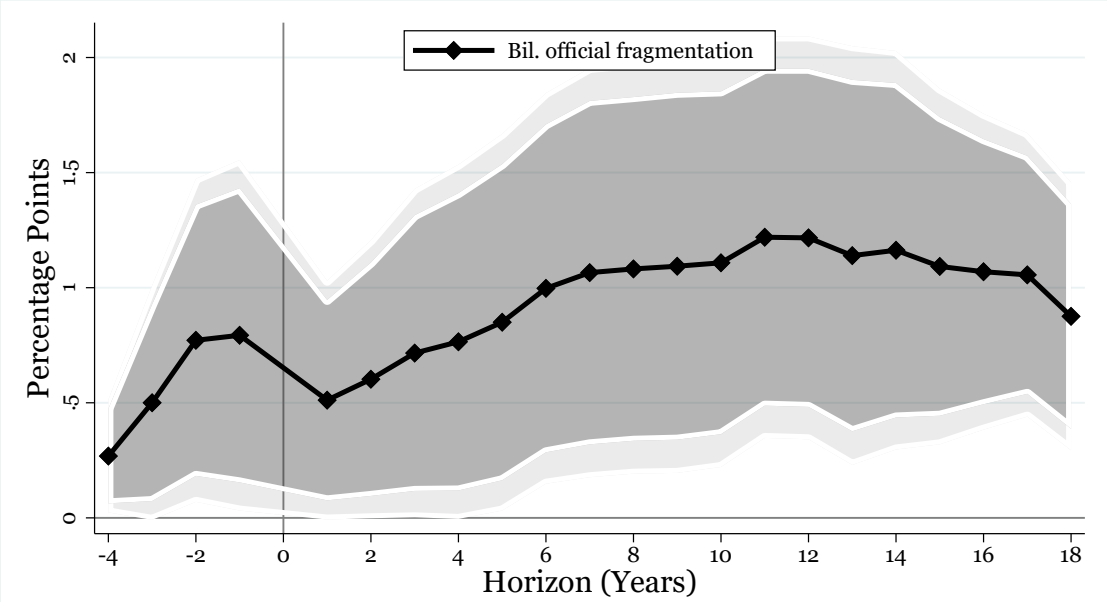
ance and crisis support, while others target development, political, or military objectives. An important question is therefore whether the empirical results reported in the main text reflect a particular subset of official flows or are a more general feature of official finance.

A natural extension would be to distinguish between different purposes of official financing, such as balance-of-payments support, development assistance, or military aid. However, such classifications are difficult to establish because the *de facto* purpose and the macroeconomic effects may not coincide with a transaction's stated purpose (see e.g. Horn et al., 2026). Since funds are fungible, the resources provided under a specific program may indirectly relax budget constraints in other areas of government spending. Very often, transactions will therefore simultaneously support financial, humanitarian and/or strategic objectives. For example, development assistance can provide foreign exchange resources during periods of financial stress, while balance-of-payments support may ultimately finance military expenditures.

For this reason, we focus our appendix analysis on the contractual distinction between loans and grants. While grants are highly concessional transfers that typically finance specific development projects and do not create repayment obligations, loans encompass a broader range of financing instruments, including export finance and crisis-related support. In the main body, in line with the model mechanisms, we focus the analysis on loans only; we replicate here the results using data on grants.

To study the effect of geopolitical risk on fragmentation in grants, we re-construct the financial fragmentation index using only grant finance. Figure A5 shows that official grants exhibit statistically significant—and qualitatively similar—fragmentation dynamics as official loans in the main body. The same holds true for the analysis of risk-sharing properties. Although official grant financing is typically tied to specific economic projects with no explicit mandate to share risk, Table A1 shows that it exhibits meaningful risk-sharing properties as flows are directed from low-risk to high-risk economies. As for loans, the risk-sharing properties of these flows are weakened when the transactions occur between allied countries, although the coefficient is considerably smaller than the one found for the case of loans.

Figure A5: Dynamic impact of geopolitical risk on debtor fragmentation: grants



Notes: This figure shows the dynamic response of financial fragmentation—measured at the country level—to increases in geopolitical risk in a panel local projection specification. Controls include real GDP, imports, exports, and several crisis indicators. The shaded areas represent 90 and 95% confidence intervals. Standard errors follow Driscoll and Kraay (1998). We report results for the fragmentation index constructed using only grants.

Table A1: International risk-sharing through official lending: grants

	Dep. variable: Bilateral Official Grants		
	(1)	(2)	(3)
Tail risk difference	2.851***	2.655***	2.920***
	(0.351)	(0.334)	(0.381)
Alliance		0.913***	0.922***
		(0.106)	(0.107)
Tail risk × Alliance			-1.368
			(0.852)
Observations	42,081	42,081	42,081
Sample	1910-2024	1910-2024	1910-2024
Debtor FE	✓	✓	✓
Creditor FE	✓	✓	✓

Notes: PPML regression results using gross bilateral grants commitments as the dependent variable (in real USD). The models include debtor and creditor fixed effects. Robust standard errors, clustered at the creditor-debtor dyad, are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

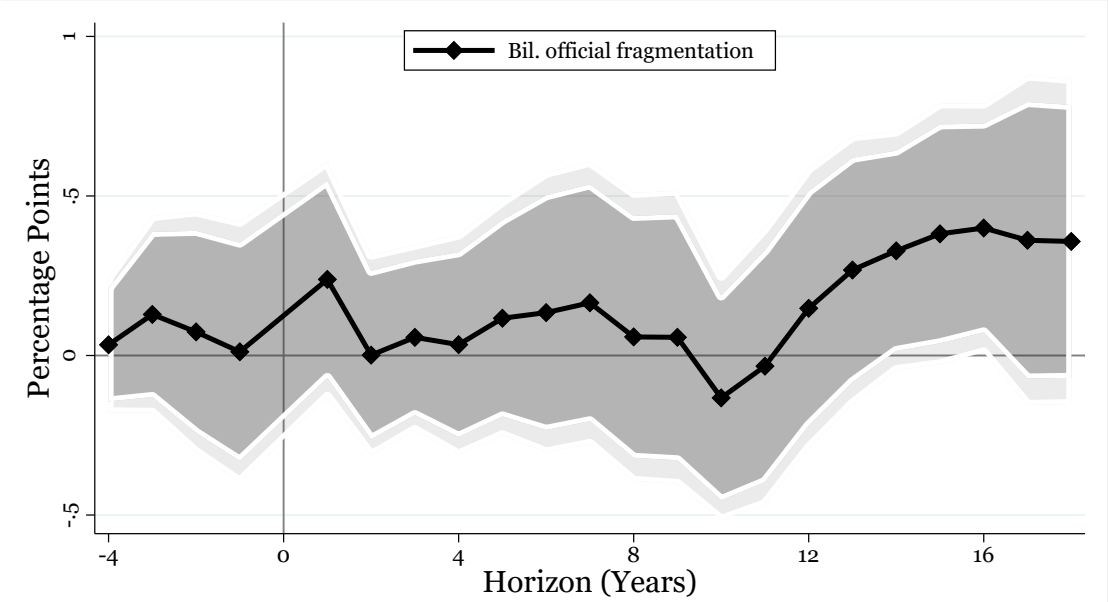
A.5 Commitments versus disbursements

Our main measure of lending flows is *commitment* amounts, i.e., the total amount of loan or grant finance for which contracts are signed in a given year. Besides being available over a long time horizon and for a large cross-section of creditor and debtor countries, commitments also have conceptual advantages over other flow measures. Most importantly, we view commitments as the more appropriate empirical counterpart to the model, since they capture the moment at which governments agree on a financing arrangement and determine the allocation of capital across potential borrowers. As such, commitment series are more informative about cyclical or structural co-variation of lending flows with other macroeconomic or political time series (also see Horn et al., 2024). In contrast, other flow measures, such as disbursements, often occur gradually over the life of a loan and may take place several years after the underlying political decision. The timing and magnitude of disbursements can also be influenced by project implementation, administrative delays, procurement procedures, and the fulfillment of policy conditions (Gelpern et al., 2021). As a result, disbursements provide a noisier measure of the geopolitical allocation decisions.

Still, and in particular with respect to the risk-sharing benefits of official lending, it is the actual resource transfers, in the form of disbursements, that are arguably most important. As a robustness check, we therefore repeat the analysis from the main text using disbursement data, which can be drawn from the World Bank IDS for a subset of debtor countries and years. Specifically, we use series DT.DIS.BLAT.CD, disbursements on public and publicly guaranteed (PPG) debt from bilateral official creditors (current USD).

The results are shown in Figure A6 and Table A2. As expected, the qualitative results remain unchanged, although estimation becomes substantially noisier. Countries experiencing higher geopolitical risk continue to exhibit greater fragmentation in official financing, but the estimated effects are substantially smaller, occur with a significant lag, and are much more short-lived than in the commitment data. We interpret this pattern as consistent with the timing distinction discussed above. Because geopolitical considerations are most likely to affect the contracting decision itself, their imprint should be strongest at the commitment stage and attenuate as funds are gradually disbursed over time.

Figure A6: Dynamic impact of geopolitical risk: disbursement data



Notes: This figure shows the dynamic response of financial fragmentation—measured at the country level—to increases in geopolitical risk in a panel local projection specification. Controls include real GDP, imports, exports, and several crisis indicators. The shaded areas represent 95% confidence intervals. Standard errors are clustered at the country level.

Table A2 shows that our main risk-sharing result remains highly similar when using bilateral disbursements instead of commitment amounts. The tail risk difference between the debtor and the creditor economy is a highly significant predictor of official disbursements and the interaction term between alliances and tail risk is negative and qualitatively similar, although it is estimated with less precision.

Table A2: International risk-sharing: disbursement data

	Dep. variable: Bilateral Official Disbursements		
	(1)	(2)	(3)
Tail risk difference	2.275***	2.281***	2.412***
	(0.563)	(0.567)	(0.650)
Alliance		0.453***	0.462***
		(0.166)	(0.168)
Tail risk difference × Alliance			-0.606
			(1.246)
Observations	18,870	18,870	18,870
Sample	1970-2024	1970-2024	1970-2024
Debtor FE	✓	✓	✓
Creditor FE	✓	✓	✓

Notes: PPML regression results using gross bilateral loan disbursements from World Bank IDS statistics as dependent variable (DT.DIS.BLAT.CD, disbursements on public and publicly guaranteed (PPG) debt from bilateral official creditors (current USD)). The models include debtor and creditor fixed effects. Robust standard errors, clustered at the creditor-debtor dyad, are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% level.

A.6 Decomposition of fragmentation index

We can decompose changes in the headline fragmentation index from Figure 1 into changes due to (i) variation in the matrix of alliances or (ii) re-orientation of lending flows. The decomposition works as follows. We compute allied lending I and non-allied lending E under four scenarios:

1. Time t lending and time t alliances (this is the baseline case at time t); let us call the resulting index $F(A_t, L_t)$.
2. Time t alliance and time $t-1$ lending (the counterfactual if alliances updated but lending stayed frozen); let us call the resulting index $F(A_t, L_{t-1})$.
3. Time $t-1$ alliance and time t lending (the counterfactual if lending updated but alliances stayed frozen); let us call the resulting index $F(A_{t-1}, L_t)$.
4. Time $t-1$ alliance and time $t-1$ lending (this is the baseline case at time $t-1$); let us call the resulting index $F(A_{t-1}, L_{t-1})$.

The decomposition then follows as

$$\textbf{Alliance Effect}_t = \frac{1}{2}\left[(F(A_t, L_t) - F(A_{t-1}, L_t)) + (F(A_t, L_{t-1}) - F(A_{t-1}, L_{t-1}))\right] . \quad (22)$$

This averages two counterfactual indices: (i.) only alliances change, with lending frozen at old levels, and (ii.) only alliances change, but evaluated using current lending weights. Similarly, for the lending effect,

$$\textbf{Lending Effect}_t = \frac{1}{2}\left[(F(A_t, L_t) - F(A_t, L_{t-1})) + (F(A_{t-1}, L_t) - F(A_{t-1}, L_{t-1}))\right] . \quad (23)$$

We can check that this decomposition is exact:

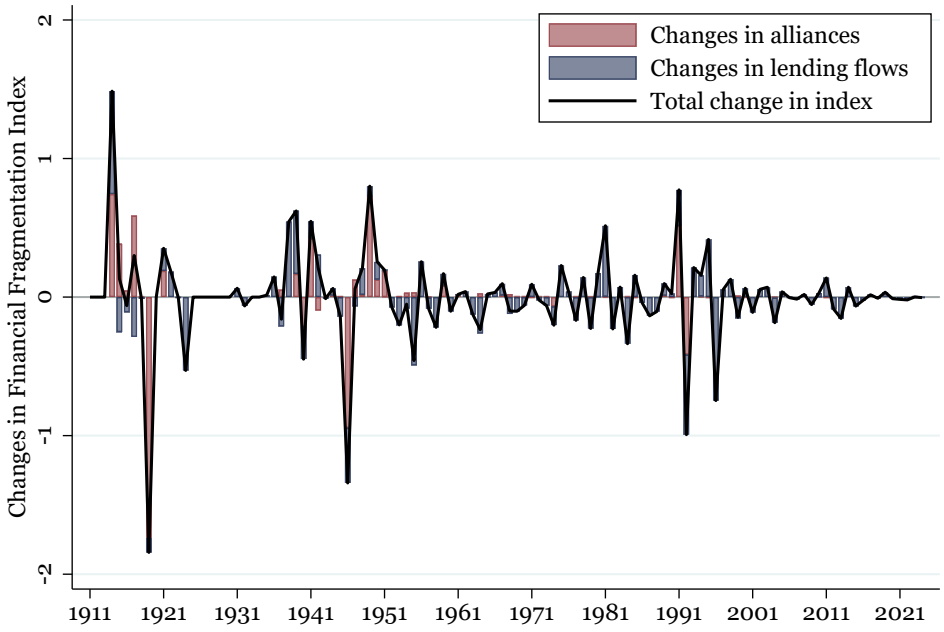
$$\begin{aligned}\textbf{Alliance Effect}_t + \textbf{Lending Effect}_t = &\frac{1}{2}\Big[F(A_t, L_{t-1}) - F(A_{t-1}, L_{t-1}) \\ &+ F(A_t, L_t) - F(A_{t-1}, L_t)\Big] \\ &+ \frac{1}{2}\Big[F(A_{t-1}, L_t) - F(A_{t-1}, L_{t-1}) \\ &+ F(A_t, L_t) - F(A_t, L_{t-1})\Big]. \end{aligned} \quad (24)$$

Grouping terms, note that $F(A_t, L_{t-1})$ cancels with $-F(A_t, L_{t-1})$, and $F(A_{t-1}, L_t)$ cancels with $-F(A_{t-1}, L_t)$. What remains is:

$$
\begin{aligned}
&= \frac{1}{2}\Big[- F(A_{t-1}, L_{t-1}) + F(A_t, L_t)\Big] + \frac{1}{2}\Big[- F(A_{t-1}, L_{t-1}) + F(A_t, L_t)\Big] \\
&= F(A_t, L_t) - F(A_{t-1}, L_{t-1}) \\
&= \Delta Fragm_t. \qquad (25)
\end{aligned}
$$

Figure A7 shows the contribution of changes in alliances and changes in lending to changes in the overall index, with the former in red and the latter in blue. Overall, changes in lending flows dominate, accounting for 65% of total index changes.

Figure A7: Decomposition of changes in the headline index



Notes: The figure decomposes annual changes in the fragmentation index into changes in alliances (red) and changes to the pattern of lending (blue), using the decompositions described in the text. Each component averages counterfactual indices that hold one dimension fixed, ensuring that their sum equals the total change in the index (black line) in each year.

A.7 Sovereign defaults on allied and rival countries

This section empirically tests whether sovereigns engage in selective or discriminatory defaults based on political alignment. The official sovereign lending market is particularly

well suited for this analysis, as the absence of a secondary market allows us to directly trace missed payments to both rival and allied creditor countries.

Data. Our analysis is based on a subset of our new database on dyadic official lending. Specifically, we use bilateral data on missed principal and interest payments ("arrears") from the World Bank's International Debt Statistics, covering the period 1970 to 2020. In this dataset, arrears are defined as late payments on long-term external debt obligations of public or publicly guaranteed debtors, thus including both central government debt and the debt of the broader public sector.

We merge this data with the database on sovereign default episodes compiled by Asonuma and Trebesch (2016). The resulting dataset allows us to trace the accumulation of missed payments towards all bilateral creditors in the years preceding and following a default event. As in the main text, we distinguish between "Rival" and "Allied" creditor countries by separately tracking missed payments to creditor countries with above- and below-average levels of voting similarity in the UN General Assembly (Bailey et al., 2017).

Approach. For each debtor country i, creditor country j, and year t, we calculate the arrears-to-debt ratio – i.e., the sum of missed principal and interest payments as a share of the outstanding debt stock to that creditor:[13]

$$ATD_{ijt} = \frac{PrincipalArrears_{i,j,t} + InterestArrears_{i,j,t}}{Debt_{i,j,t}} \tag{26}$$

To analyze whether sovereigns accumulate more arrears on rival countries, we separately estimate the following fixed effects model for both aligned and non-aligned countries:

$$ATD_{ijt} = \sum_{k=t-10}^{t+10} \beta_k \times default_{i,t+k} + \theta_j + \omega_t + \epsilon_{ijt}\,, \tag{27}$$

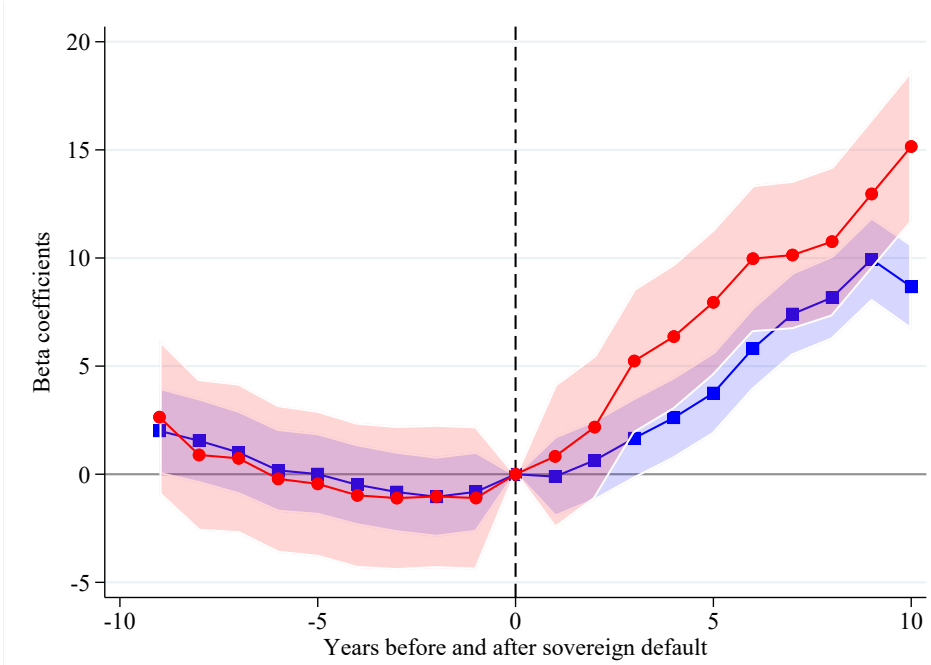
where the dependent variable is the arrears-to-debt ratio as defined above, $default_{i,t}$ is the beginning of a default episode as defined by Asonuma and Trebesch (2016), and θ_j and ω_t are creditor and year fixed effects, respectively.

Our analysis of arrears patterns does not provide evidence of discriminatory payment defaults. Figure A8 presents the estimated β_k coefficients and 95 percent confidence intervals from the regression model described above. Panel A shows results for all default

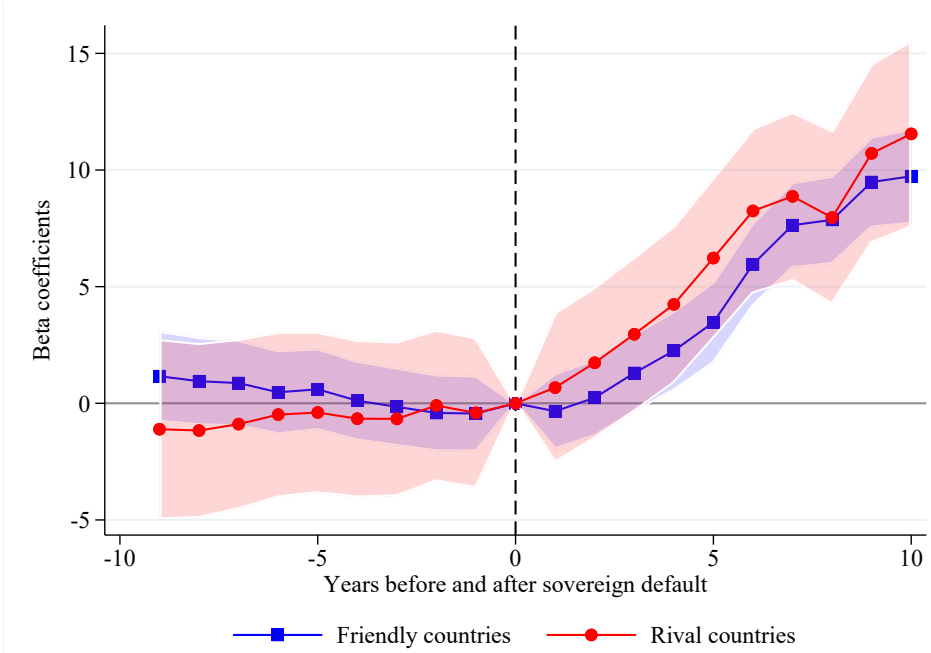
[13] See Schlegl et al. (2019) and Arellano et al. (2023) for similar analyses of arrears patterns.

Figure A8: Missed payments on friendly and rival countries, 1970-2020

Panel A: All sovereign default episodes



Panel B: High geopolitical risk episodes



Notes: This figure shows beta coefficients from a regression of the arrears-to-debt ratio on years before and after sovereign default events for both allied (in blue) and rival (in red) bilateral creditor countries. Shaded areas show 95% confidence intervals. All regressions include creditor country and year fixed effects. Panel A includes all default episodes from Asonuma and Trebesch (2016) with available arrears data. Panel B focuses on the subset of default episodes during which the global geopolitical risk index from Caldara and Iacoviello (2022) is above the sample mean. See text for details on sources.

episodes of the past 50 years with available arrears data. Panel B focuses on the subset of defaults that occurred during times of above-average geopolitical risk, as measured by Caldara and Iacoviello (2022).

In both samples, our regression results suggest that sovereign debtors accumulate arrears proportionally across all bilateral creditors, without systematically discriminating against rival countries. While we cannot rule out that debtors have discriminated against rival creditor countries along other margins (e.g., by negotiating less favorable debt restructuring agreements) or have done so during earlier parts of our sample, we interpret this finding as support for our model's assumption of non-discriminatory sovereign defaults.

B Data

This appendix section provides details on the capital flow data that we use in this paper — in particular, on the official bilateral lending data from Horn et al. (2026). Section B.1 starts our discussion with a primer on the key definitions and concepts.

B.1 Definitions and concepts

Our primary empirical analysis of fragmentation in international lending focuses on international official (government-to-government) lending.

Defining official lending. According to the OECD's widely used approach, official lending 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 for which 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.[14] The definition also includes cases of private creditor lending that are explicitly guaranteed by the creditor government and development 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).[15] In line with our theoretical model, however, the main text empirical analysis focuses on debt-creating flows only, whereas the analysis of non-repayable grants is left to Appendix Section A.4.

[14]Standing credit lines are included only to the extent that they are being drawn down (International Monetary Fund, 2014).

[15]In contrast, the definition does not cover secondary market purchases of other countries' sovereign debt. Portfolio investments—for example, by central banks or sovereign wealth funds—are sizeable, but there are no sufficiently detailed 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.

The dataset follows standard definitions used in international debt statistics and records official financing commitments with original maturities exceeding one year. Consequently, the analysis focuses on medium- and long-term official financing. One implication of this definition is that most forms of central bank lending—including, for example, the Federal Reserve's swap lines—are excluded by construction, as these instruments typically have maturities of less than one year.

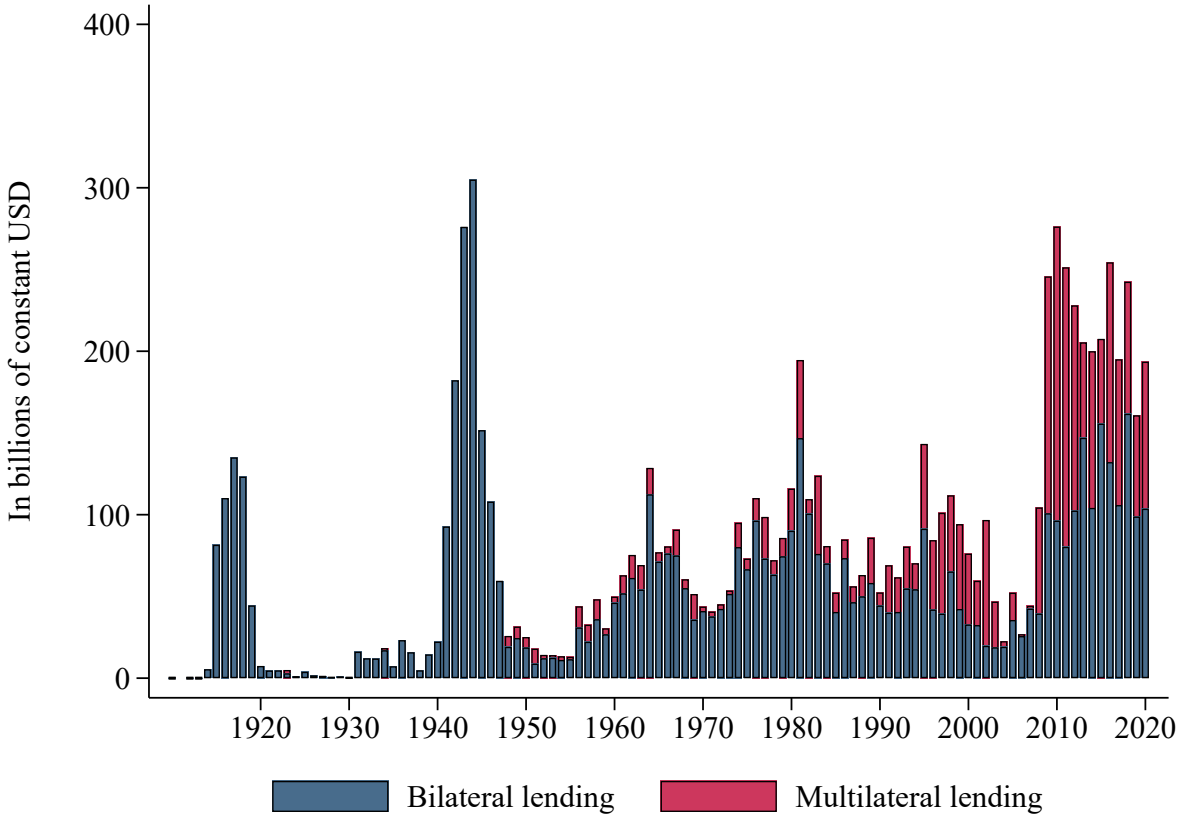
Bilateral versus multilateral lending. Official capital flows can be transferred through both *bilateral* and *multilateral* channels. "Bilateral lending" refers to transactions that are directly extended by a creditor country sovereign to the recipient country sovereign. In contrast, multilateral lending is extended by international financial institutions, which are established through political agreements among multiple member countries (International Monetary Fund, 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.

For the first half of the 20$^{\text{th}}$ 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, it accounted for around half of total official lending (Horn et al., 2026).

B.2 Bilateral official lending

Our key source for data on bilateral official lending transactions is the data collected by Horn et al. (2026). For each transaction, we know the creditor country, the debtor country, the year of commitment, and the commitment amount. More specifically, our empirical analysis is based on roughly USD 9 trillion in bilateral lending between 120 creditor governments and 190 debtor governments from 1910 to 2024 (see Figure B9). The dyadic structure of the data allows us to trace lending patterns across creditor–debtor relationships and study how capital allocation varies with geopolitical alignment and risk.

Figure B9: Financial cooperation through official lending, 1910-2024



Note: This figure shows the evolution of bilateral and multilateral official lending over the past 100 years. All amounts are expressed in billions of constant USD to make amounts comparable over time. Data are from Horn et al. (2026)

B.3 Other capital flow measures

In Section 3.1, we compare the response of bilateral lending fragmentation to geopolitical risk with the responses of *multilateral* official lending and private international lending. This subsection describes in detail how we construct these comparison data samples.

B.3.1 Multilateral official lending

To study the degree of geopolitical fragmentation in multilateral lending, we follow the approach in Bianchi et al. (2026), which maps multilateral loans into a dyadic set using the ownership structure of official institutions. The approach consists of first collecting paid-in quota resources and outstanding lending to each multilateral creditor. These data allow us

to derive each member country's funding share in each multilateral creditor organization as follows:

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

where $PAID.IN_{jot}$ represents the capital that country j has paid into multilateral creditor organization o in year t and $CREDIT_{jot}$ represents any outstanding credit by country j to organization o. Given these funding shares, multilateral loans are mapped into *implied* bilateral flows by assigning each sovereign creditor a share of a multilateral loan proportional to its funding share in the corresponding multilateral organization in the same year. Specifically, for a loan $LOAN_{iot}$ extended by organization o to borrower country i in year t, the implied dyadic lending flow from creditor country j to borrower country i is given by

$$LOAN_{ijot} = \omega_{jot} * LOAN_{iot}\,,$$

where $LOAN_{ijot}$ denotes a loan by creditor country j to debtor country i through organization o in year t and ω_{jot} is country j's funding share of organization o. Finally, we aggregate total loans from country j to country i, which go through multilateral organizations in period t, as

$$LOAN_{ijt} = \sum_o LOAN_{ijot}\,.$$

In its current state, the data collection covers the liabilities of 16 multilateral creditor organizations over the past seven decades (Table B3). Our focus on these 16 institutions is guided by our interest in official lending for stabilization and risk-sharing purposes. The multilateral creditors listed in Table B3 all have a clear mandate to stabilize member country economies and to contain the effects of crises. Besides the IMF, these include 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, regional development banks (for development and humanitarian aid), the World Health Organization, or the UN, these institutions arguably play a less important role in the sharing of cross-border consumption and financial crisis risks.

The resulting database covers imputed multilateral lending commitments by 130 creditor countries to 190 debtor countries, worth USD 2.3 trillion in constant 2020 USD, for the years 1920-2024.

Table B3: Multilateral lending arrangements

Name	Operating period	Authorized capital (bn USD)	Members
Global			
League of Nations	1920–1946	n.a.	63
International Monetary Fund	1946–2024	1350	189
Regional			
Andean Reserve Fund	1978–1991	2	5
Arab Monetary Fund	1977–2024	5	22
BRICS Contingent Reserve Arrangement	2014–2024	100	5
Chiang Mai Initiative	2000–2024	240	10
Eurasian Anti-Crisis Fund	2009–2024	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	1988–2024	60	28
European Financial Stability Facility	2010–2013	1040	19
European Financial Stability Mechanism	2010–2013	75	28
European Stability Mechanism	2012–2024	780	19
Latin American Reserve Fund	1991–2024	4	8
NAFTA Swap Facility	1994–2024	7	3

Notes: This table lists all multilateral official lending arrangements covered in the analysis. See text for details.

B.3.2 Private international lending

We also construct a complementary dataset on *private* dyadic capital flows, using data from the World Bank's International Debt Statistics (IDS) and from Graf von Luckner and Horn (2026). This dataset captures long-term, cross-border lending by private creditors to public and publicly guaranteed recipient entities in developing and emerging market economies over the period 1970 to 2024. More specifically, this series includes commercial bank loans from private banks and other private financial institutions; bonds that are either publicly issued or privately placed; other types of private credit from manufacturers, exporters, and other suppliers of goods; bank credit covered by a guarantee of an export credit agency. Long-term external debt is defined as debt that has an original or extended maturity of more than one year. External debt is defined on a residency basis. Overall, our data extract captures 1.69 trillion in private lending (in constant 2020 USD) from 116 different creditor countries to 115 different debtor countries from 1970 to 2024.

As with bilateral *official* lending, these data allow us to identify lending relationships at the creditor–debtor level and therefore provide a dyadic measure of private capital flows

that is directly comparable to our official lending data. However, this measure captures only a subset of total international private capital flows and has two main shortcomings.

First, the data are compiled on a residency basis, which does not account for the increasing share of cross-border financial flows that are mediated through offshore financial centers and tax havens, which obscure the ultimate origin of capital in recent decades (Coppola et al., 2021).[16]

Second, a considerable share of sovereign borrowing from private creditors takes place through internationally traded bonds. These securities are widely held and actively traded in secondary markets, so it is difficult to systematically trace the identity of the ultimate creditor at the bilateral level—particularly over long time horizons. As a result, secondary market trading introduces an additional margin for fragmentation that is not captured in our baseline analysis.

[16]For recent years (2007–2020), a restatement of capital flows is possible following the pioneering work of Coppola et al. (2021). However, such adjustments are not available for longer time horizons, which are central to our analysis of geopolitical risk and fragmentation.

B.4 Other data

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

B.4.1 Geopolitical alignment

To measure geopolitical alignment, we combine our lending data with information on political relationships between countries. Our baseline measure relies on formal and actual military alliances from the Correlates of War (COW) project, which provides consistent coverage across almost our full sample period. The COW Formal Alliances dataset (v4.1) records all formal alliances among states between 1816 and 2012, including mutual defense pacts, non-aggression treaties, and ententes (Gibler and Sarkees, 2004; Gibler, 2009). We complement this measure with all military allies that fight on the same side of an inter-state war, again using data from the Correlates of War project (Sarkees and Wayman, 2010).

One drawback of the alliance measure is that coverage of COW v4.1 dataset ends in 2012. To extend coverage to the recent past, we rely on several distinct extrapolation approaches, which all yield similar results.

In Figure 1 in the main text, we update our alliance measure until 2023 by relying on voting patterns in the United Nations General Assembly. 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. To map voting alignment into a binary alliance indicator, we pick the alliance threshold so that the overall share of allied dyads in the sample is preserved after 2012.

As a robustness test, we also take the conservative approach of carrying forward each country pair's 2012 alliance status until the end of the sample in 2023. Our regression results are robust to this alternative, and even to restricting the sample to the pre-2013 period entirely.

B.4.2 Geopolitical risk

To measure geopolitical risk, 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, on a monthly basis, the share of newspaper articles that discuss adverse geopolitical events or threats, on the basis of a dictionary-based method. Figure B10 plots the aggregate geopolitical risk measure over 120 years. In the local projections presented in the main text, we use the expanded dataset with country-level risk measures for 44 countries, built in Caldara et al. (2026).

Figure B10: Index of geopolitical risk, 1900 - 2020

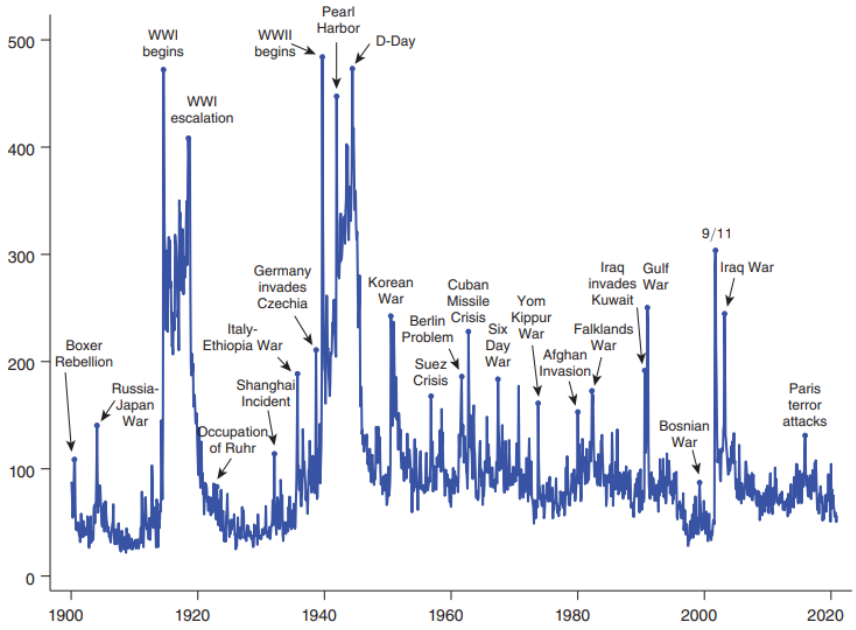


FIGURE 3. HISTORICAL GPR INDEX FROM 1900

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. (2026).

B.4.3 Other macroeconomic variables

In all the local projection specifications, we control for country-level macro indicators. With the exception of tail risk (described below), they all come from the Global Macro Database of Müller et al. (2025). More specifically, we use the following variables.

Real GDP: Country i's real GDP in millions of local currency units, rebased so that 2015 = 100 as the reference year (variable name `rGDP`). Constructed by splicing the IMF WEO series with historical sources going back to the 1800s. The results are robust to controlling for real GDP expressed in constant USD instead of local currency.

Exports: Country i's exports of goods and services in millions of US dollars (variable name `exports_USD`).

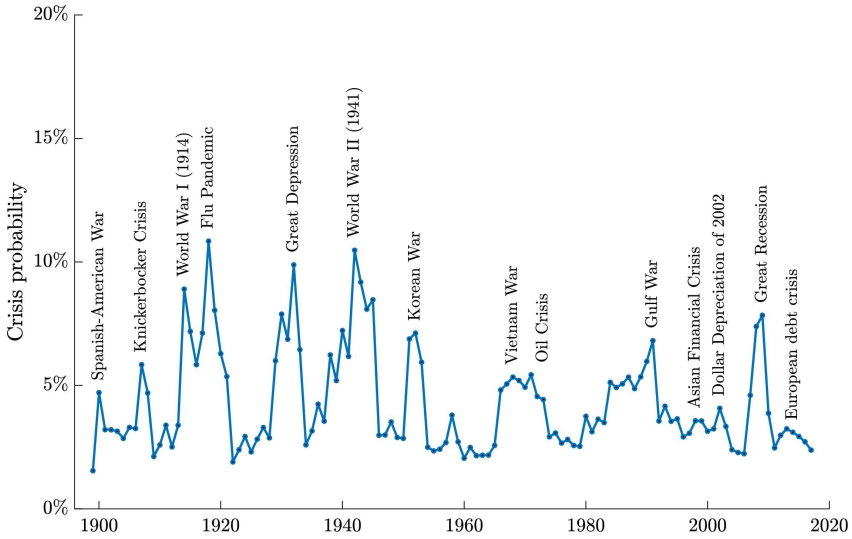
Imports: Country i's imports of goods and services in millions of US dollars (variable name `imports_USD`).

Current account: Country i's current account balance in millions of local currency units (variable name `CA`).

Crisis indicators: Our local projection specifications also control for indicators of financial crises, including a sovereign debt crisis dummy variable, a currency crisis dummy variable, and a banking crisis dummy variable. These dummies cover the years 1800-2020 and are taken from Reinhart and Rogoff (2009).

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 consumption growth. This approach has the advantage of being available for a large international panel of countries and over longer time horizons than the ones in traditional measures of disaster risk based on asset prices. Specifically, their sample includes 42 countries and covers the years 1900-2020. Figure B11 shows the average macroeconomic tail risk for this sample.

Figure B11: 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 Müller et al. (2025). We normalize real consumption by dividing it by total population and then use a Hodrick-Prescott filter to extract the cyclical component.

C Proofs

C.1 Proof of Lemma 1

Proof. The objective function in (12) is strictly decreasing in $\tilde{a}(s)$ and $a^*(s)$ for all s, since u is strictly increasing. Assume, by way of contradiction, that in an optimum we have $\sum_{s\in S}\pi(s)\tilde{a}(s) > 0$. Then, the Home country can strictly increase its own welfare by decreasing $\tilde{a}(\bar{s})$ for some state $\bar{s}$, in such a way that the participation constraint is still satisfied. So, that initial allocation cannot be optimal. It then follows that in equilibrium, we must have that $\sum_s \pi(s)\tilde{a}(s) = 0$. The same argument implies that (14) must also hold with equality.

Having (13) and (14) holding with equality, we can then show that for the case $\pi(s_g) = \pi(s_b) = 1/2$, we have $\tilde{a}(s_g) = -\tilde{a}(s_b)$, and $a^*(s_g) = -a^*(s_b)$. □

C.2 Proof of Proposition 1

Proof. At an optimum, the participation constraints must hold with equality, by Lemma 1. In addition, the no-default constraint can bind only in the good state. Furthermore, because positive debt in the good state ($\tilde{a}(s_g) > 0$ or $a^*(s_g) > 0$) tightens the no-default constraint, we can focus on contracts where the Home country is a creditor of both countries in the bad state and a debtor of both countries in the good state.

This implies we can write the problem as

$$\max_{\tilde{a}(s_g)\geq 0,\, a^*(s_g)\geq 0} u\left(y(s_g) - \tilde{a}(s_g) - a^*(s_g)\right) \;+\; u\left(y(s_b) + \tilde{a}(s_g) + a^*(s_g)\right)\,, \tag{28}$$

subject to

$$u\left(y(s_g) - \tilde{a}(s_g) - a^*(s_g)\right) - \eta a^*(s_g) \geq u\left((1-\phi)y(s_g)\right) \tag{29}$$

$$\tilde{a}(s_g) \leq \tilde{y}(s_b)\,. \tag{30}$$

First-order conditions yield

$$-u'(c_g) + u'(c_b) - \lambda u'(c_g) - \mu = 0,$$

$$-u'(c_g) + u'(c_b) - \lambda u'(c_g) - \lambda\eta = 0\,,$$

where λ and μ are the non-negative Lagrange multipliers on (29) and (30). When the solution is interior in $a^*(s_g)$, the FOCs imply that $\mu = \lambda\eta$. Hence, for $\eta > 0$, whenever the no-default constraint binds with a positive multiplier, so does the Allied resource constraint. If both multipliers are zero, then $u'(c(s_g)) = u'(c(s_b))$, which implies that

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

and using the budget constraint, we obtain that (18) holds. Notice that there may be multiple bilateral contracts that can ensure full risk-sharing. To obtain the minimum value of ϕ that satisfies the no-default constraint, we set $\tilde{a}(s) = \tilde{y}(s_b)$ and obtain

$$\log(\bar{y}) - \eta\left(\frac{y(s_g) - y(s_b)}{2} - \tilde{y}(s_b)\right) \geq \log(y(s_g)(1-\phi)),$$

from which we arrive at

$$\phi \geq 1 - \frac{\bar{y}}{y(s_g)} e^{-\eta\left(\frac{y(s_g)-y(s_b)}{2} - \tilde{y}(s_b)\right)} \equiv \hat{\phi},$$

which is the threshold defined in the proposition.

If $\phi < \hat{\phi}$, then full insurance cannot be implemented. To see this, recall that the full-insurance allocation requires

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

Since borrowing from the Rival bloc tightens the no-default constraint, the full-insurance portfolio that makes repayment easiest is the one that sets $\tilde{a}(s_g) = \tilde{y}(s_b)$. But when $\phi < \hat{\phi}$, even this portfolio violates the no-default constraint. Hence, no full-insurance contract is feasible.

Since the objective in (28) depends on $\tilde{a}(s_g)$ and $a^*(s_g)$ only through their sum, and since it is strictly increasing in this sum whenever

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

the optimum chooses the largest feasible amount of insurance below the full-insurance level. As we show below, this leads to consumption dispersion, $c(s_g) > c(s_b)$.

We now distinguish two cases.

(a) First, suppose that

$$\phi > \underline{\phi} \equiv \frac{\tilde{y}(s_b)}{y(s_g)}.$$

Then, $\tilde{y}(s_b) < \phi y(s_g)$, so the contract with $a^*(s_g) = 0$ and $\tilde{a}(s_g) = \tilde{y}(s_b)$ strictly satisfies the no-default constraint:

$$\log\Big(y(s_g) - \tilde{y}(s_b)\Big) > \log\Big(y(s_g)(1-\phi)\Big).$$

Thus, the Home country can borrow up to the Allied bloc's resource constraint without borrowing from the Rival bloc and without making the no-default constraint bind. Since full insurance is not feasible and the objective function is increasing in total insurance below the full-insurance level, optimality implies that the Home country maxes out its borrowing from the Allied bloc,

$$\tilde{a}(s_g) = \tilde{y}(s_b),$$

and borrows the remaining feasible amount from the Rival bloc. The no-default constraint binds and $a^*(s_g)$ is implicitly defined by

$$\log(y(s_g) - a^*(s_g) - \tilde{y}(s_b)) - \eta a^*(s_g) = \log(y(s_g)(1-\phi)). \tag{31}$$

Moreover, since full insurance is not feasible, we have

$$a^*(s_g) < \frac{y(s_g) - y(s_b)}{2} - \tilde{y}(s_b). \tag{32}$$

It follows immediately that consumption is dispersed across states:

$$c(s_g) - c(s_b) = y(s_g) - y(s_b) - 2\Big[\tilde{y}(s_b) + a^*(s_g)\Big] > 0,$$

where the inequality follows from (32). Hence, $c(s_g) > c(s_b)$. Totally differentiating (31), we obtain

$$\frac{da^*(s_g)}{d\eta} < 0,$$

so borrowing from the Rival bloc decreases as η rises. Since

$$c(s_g) = y(s_g) - \tilde{y}(s_b) - a^*(s_g), \qquad c(s_b) = y(s_b) + \tilde{y}(s_b) + a^*(s_g),$$

we have

$$\frac{dc(s_g)}{d\eta} > 0 \qquad \text{and} \qquad \frac{dc(s_b)}{d\eta} < 0.$$

Thus, consumption dispersion increases with η.

(b) Now suppose instead that

$$\phi \leq \underline{\phi} \equiv \frac{\tilde{y}(s_b)}{y(s_g)}.$$

Then,

$$\phi y(s_g) \leq \tilde{y}(s_b).$$

For any feasible contract with $a^*(s_g) \geq 0$, the no-default constraint implies

$$\log(y(s_g) - \tilde{a}(s_g) - a^*(s_g)) - \eta a^*(s_g) \geq \log(y(s_g)(1-\phi)).$$

Since $-\eta a^*(s_g) \leq 0$, this implies

$$\log(y(s_g) - \tilde{a}(s_g) - a^*(s_g)) \geq \log(y(s_g)(1-\phi)),$$

or equivalently,

$$\tilde{a}(s_g) + a^*(s_g) \leq \phi y(s_g).$$

Thus, the largest feasible amount of total insurance is $\phi y(s_g)$. Because $\phi y(s_g) \leq \tilde{y}(s_b)$, this amount can be provided entirely by the Allied bloc. Since the objective function is increasing in total insurance below the full-insurance level and because borrowing from the Rival bloc only tightens the no-default constraint, the optimal contract sets

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

This allocation also features consumption dispersion. Under this contract,

$$\tilde{a}(s_g) + a^*(s_g) = \phi y(s_g) \leq \tilde{y}(s_b).$$

By Assumption 1,

$$\tilde{y}(s_b) < \frac{y(s_g) - y(s_b)}{2}.$$

Therefore,

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

Hence,

$$c(s_g) - c(s_b) = y(s_g) - y(s_b) - 2\left[\tilde{a}(s_g) + a^*(s_g)\right] > 0.$$

Thus,

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

The two cases $\phi > \underline{\phi}$ and $\phi \leq \underline{\phi}$ exhaust all possibilities when $\phi < \hat{\phi}$. Since in both cases, we have that $c(s_g) > c(s_b)$, the optimal contract features consumption dispersion across states whenever $\phi < \hat{\phi}$. □