

Multilateral financial integration and political conflict: a 3-player game of debt negotiation

PETER CLAEYS*, JAVIER ARAMBURU, AND GONZALO GÓMEZ-BENGOECHEA

Geopolitical tensions abound, even since the end of the Cold War, as globalization has shifted the power balance between old and new hegemons like the US, the EU and China. Contrary to the belief that globalization would promote peace, we argue that multilateral dependencies can increase the likelihood of conflict by making countries more vulnerable as financial integration entwines economic and political destinies. We propose a 3-player model of sovereign debt holdings to show how multilateral financial integration might exacerbate political conflict when political negotiation is possible, and multilateral organisations are absent. We find evidence that political relations between the US, EU, and China are unlikely to be strained by tensions on sovereign bond markets, as there are limited interdependencies, but find sovereign risk moves with geopolitical risk in line with the model's predictions.

Keywords: war, bargaining, game theory, sovereign debt.

JEL codes: C57; C79; D74; H56; H87.

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* Financial support by the Universidad Pontificia Comillas is gratefully acknowledged. We would like to thank the seminar participants at Universidad Pontificia Comillas for their useful comments and suggestions. We also thank Alvaro Ortiz Vidal-Abarca and the BBVA Research team for making available their dataset. The usual disclaimer applies.

I. Introduction

In spite of the optimism following the end of the Cold War, geopolitical tensions have never completely dissipated. Many countries have suffered from regional and domestic conflict, often as the result of a proxy war. The influence of a string of direct political conflict between hegemon – the superpower of the US, the decline of Russia, and the rise of BRICS – has raised the prospect of war again. This may come as a surprise: the speed with which trade and financial globalization have integrated the world economy should create incentives for democratization and disincentivize military conflict. Under this liberal view – that can be traced back to Montesquieu (1748) and Kant (1795) – “*two nations who traffic with each other become reciprocally dependent...their union is founded on their mutual necessities*” (Montesquieu, 1748). Most of the literature that examines the effect of trade integration on conflict, focuses on bilateral relationships and confirms this insight (Kimbrough *et al.*, 2020). However, this view ignores the possibility that many multilateral channels of dependence exist under current levels of globalisation. Globalisation has spun a net of global trade and financial connections and has thus created more dependencies, making everyone more vulnerable to the repercussions of conflict, but also more likely the escalation of a conflict. Multilateral dependence alters the trade-offs countries face: the main tenet of Martin *et al.* (2008) is that multilateral trade makes war more likely, especially if trade is diversified among different partners.¹ Gopinath *et al.* (2024) find that despite trade fragmentation in recent years, there are third ‘connector’ countries that are gaining importance and serving as a bridge between the main blocs.

While trade integration has been examined closely, much less attention has been paid to the role that financial integration has played in shaping peaceful international relations. Some papers have looked into the role that political visits to a certain country can have on its financial position (Fuchs and Kahn, 2013). Others have examined the role of political elements behind the allocation of FDI across countries, or on the role that FDI plays in fostering peaceful relations (Polachek *et al.*, 2007). However, for most countries, opening up the financial account and integrating into international financial markets has been linking the country’s economic and political destiny to the major financial centres, and as a consequence, has far-reaching consequences. Research on the Global Financial Cycle shows how strong spillover effects of US monetary policy – and to a lesser extent the Eurozone’s policies - have become on other

¹ Martin *et al.* (2008) argue smaller local conflicts become more likely when taking into account the type of multilateral trade agreements that have occurred or the spread of regional FTAs.

countries' financial markets (Miranda-Agrippino and Rey, 2020). The increasing involvement of the Global South in international investment over the last two decades shows that this is not just a development in one direction (Broner *et al.*, 2023). Cross-border holdings – whether or not in financial centres (Pogliani *et al.*, 2022) – have increased, in particular between the US and the large emerging markets.

This paper examines how mutual economic interdependence could induce peaceful relations or escalate war. We develop a 3-player model of political negotiation as in Lockwood (2006), and include dependence via sovereign debt holdings, following Eaton and Gersovitz (1981). Countries having conflicting interests over goods' consumption financed by debt, issued either domestically or internationally. Multilateral organisations or continued political negotiation gives countries scope to reduce the probability of escalation of conflict. However, political anarchy between sovereigns raises the chances of war, as peaceful outcomes can be negotiated away. Nevertheless, multilateral financial integration might in many cases be the preferred outcome under geopolitical power play.

We then apply the model to the relations between the US, EU and China. We in particular test the possible interdependencies between their sovereign bond markets. We find the effect of geopolitical risk on sovereign spreads to be limited, as most of the impact is due to domestic factors. Specific political tension between the lender (China) and the borrower (US) can give rise to a shift in sovereign risk, in line with the predictions of the theoretical model. Interestingly, the impact of geopolitical risks on spillover is limited but episodes such as the European sovereign debt crisis raise geopolitical tension.

This paper is structured as follows. Section 2 discusses the role of domestic and international policy uncertainty. Section 3 then details the methods to test the effect of domestic or international policy uncertainty on spillover via the Global Financial Cycle. Section 4 discusses the main results and a few robustness checks. Section 5 concludes.

II. The model

We develop a simple set-up –similar to Lockwood (2006)– of a 3-player game² with countries having conflicting interests over goods' consumption financed by debt, issued either domestically or internationally. A default on debt can trigger a war. Mutual debt holdings can curb conflict as multiple wars become ever more costly, yet adding political negotiations

² Some attempts at higher-order games have been made in debt as in Welburn and Hausken (2017).

between hegemons that compensate some countries for losses or keeping neutrality can exacerbate conflict.

The model combines different lines of research on economics and politics.³ Firstly, it is similar to a model of sovereign debt as in Eaton and Gersovitz (1981) as countries finance consumption by borrowing from international debt markets, yet the government lacks a commitment to repay. Secondly, and in contrast to most other conflict models that look at bilateral relations only, we show that the presence of a third player can affect equilibrium payoffs. Following Elard (2020), we develop a 3-player model, that allows for the formation of coalitions between players, and potentially war, to claim resources.^{4,5} Finally, as in Herbst *et al.* (2020), we develop a simple static model of debt negotiation without shocks under complete information. The game involves different bargaining strengths that depend on the level of investment abroad, and players bargain in the shadow of conflict.

A. The set-up

The world consists of 3 countries that are equal in size. Within each country, households have identical preferences θ and obtain utility from consuming goods c , and finance this consumption from income. The country can lend money abroad and gain additional income from other countries' debt B_{-i} . If income is insufficient, they can borrow on domestic or international markets by issuing debt B_i , but they also have to make payments on outstanding debt.⁶ The utility of a country is thus given by (1):

$$U_i = \theta_i c_i + \alpha_{ij} B_{-i} - \alpha_{ii} B_i - \alpha_{ij} B_i \quad 1)$$

Consumption is purely domestic, so there is no trade in goods. All agents have full information on preferences and costs.

³ In economics of conflict, several papers have studied the connections between international integration and conflict. Theoretical papers include Skaperdas and Syropoulos (2001), Syropoulos (2006), Garfinkel *et al.* (2012), Garfinkel *et al.* (2015), Jackson and Nei (2015), Lopez Cruz and Torrens (2022).

⁴ Elard (2020) models sovereign debt negotiations between a debtor country, an international official sector, and private-sector creditors. His is a dynamic stochastic bargaining model from the literature on robust control but does not allow for the prevention of default.

⁵ Syropoulos (2006), Garfinkel *et al.* (2012) and Garfinkel *et al.* (2015) develop models of conflict over resources between multiple countries, to show the mitigating effect of free trade on war.

⁶ Krainin *et al.* (2020) develop a similar model of international relations, commitment problems, and sovereign default, but in their case, the 'rising' country is not able to borrow. Declining states have then an incentive to wage war on the rising power in order to starve it of resources. Our model allows for financial markets to transfer resources between countries in a 3-player game instead. In our case, the borrower can starve the lender of resources by renegeing on debt. There is a vast body of literature within the field of international relations on the interactions between an established power and a rising challenger (Ikenberry, 2011).

B. Multilateral financial integration

Different situations can arise concerning financing consumption. The model is static, so debt is just another way of paying for consumption, and only implicitly does debt allow for smoothing consumption over time. The coefficients α measure the degree to which a country is financially developed and integrated into financial markets.

The coefficient α_{ii} indicates the level of financial development of a country: domestic debt allows a transfer between patient savers and impatient consumers, and raises welfare in a country by raising consumption overall. In countries with no domestic financial system, $\alpha_{ii} = 0$, welfare is lower than if such a maturity transformation would exist.

Similarly, for a country in autarky $\alpha_{ij} = 0$ for all $i \neq j$, and it has no access to international debt markets. If the debt is only issued domestically, only a transfer from some households to others within the country is involved, but there is no international exchange. In this case, there is no conflict over resources. This state of financial autarky implies the country foregoes smoothing across markets, and as a result, welfare is lower than if it were financially integrated. Welfare is highest under complete financial development and integration into financial markets, but it then exposes a country to possible international conflict on financial resources.

C. International political order

Political relations between countries can be organised in different ways. There exist three possible systems to organise the financial relations between countries. Government is concerned with the allocation of resources to citizens, and this is at the root of the conflict. We assume countries are identical but for a single characteristic. Without loss of generality, assume that country 1 has a much stronger preference for consumption, or θ_1 is larger than in other countries, making it much less patient to save.⁷ This difference is at the root of the political conflict between the three countries.

The first political order is a fully centralised ‘world government’. The government would in this case just allocate resources to consumers in country 1, by taking them from the savers in countries 2 and 3. By reallocating goods to the country in need and as the social planner has full information, it can maximise total welfare, and there is no political conflict.

⁷ Similar models can be found in Krainin *et al.* (2022), for example, where the rising power is less patient. In our case, country 1 issues more debt to finance its consumption hence its share of international debt is higher.

A second political order is ‘democratic multilateral governance’ by which countries vote in a general assembly on transfers across countries. Country 1 would like to get additional resources as its citizens value consumption, but it must find sufficient political support to get its position adopted. The original Lockwood (2006) model proposes a voting mechanism to solve the political conflict between the three players⁸. The outcome of democratic governance is that coalition building between the net losers results in a vote against the country with the highest preference for the good. As a result, welfare is lower than under a world government scenario since there is no transfer to finance the greater economic payoff in country 1. Countries 2 and 3 managed to obtain better outcomes by voting together.

Claeys and Martire (2015) then introduce in this model a political conflict – in their case a possible secession of country 1 – to show that conflict might allow country 1 to recover part of the lost transfers by starting further negotiations with countries 2 and 3.

A third possible system, and the one we are developing in this paper, is ‘international anarchy’ in which countries are fully sovereign, and there is no multilateral organisation with elected delegates to channel conflict. Full sovereignty means that a country can resort to other means - including war- to obtain its aims. Waging a war carries a fixed cost f . We first develop the subgame perfect Nash equilibrium of the 3-player game of anarchy, to show the outcome of a debt war. We then add to this model the possibility for countries to negotiate and offer compensations between them, and even form coalitions.

D. Debt wars

We start with the root of conflict stemming from the heterogeneity in preferences in country 1: its citizens would like to get additional resources as they value consumption more highly. As in Eaton and Gersovitz (1981), country 1 could gain an advantage by defaulting on its debt. The net gain from default can then be spent on consumption goods. Country 1 can decide to default fully on all international debt that citizens in countries 2 and 3 hold, or just partially, on debt in either country 2 or 3.⁹

A benevolent social planner would not allow such an allocation, but in the absence of external enforcement under ‘international anarchy’, countries 2 or 3 run the risk of losing their debt holdings. Without loss of generality, let us start with a partial default on debt held by country

⁸ Lockwood (2006) use a voting rule that results in a unique equilibrium. Under this rule, one country proposes an allocation for all countries and puts it at a vote against the status quo. If this proposal is voted down, another region proposes an alternative allocation and lets it vote. This voting continues until some proposal is accepted.

⁹ We assume country 1 cannot offer a haircut to the other countries.

2. As country 2 might decide to go to war to claim back its loss, country 1 knows that for the default to be credible, the net gain from default must be larger than the cost of war, i.e. if the outstanding debt is sufficient to pay for the war.

$$\alpha_{21}B_1 + \alpha_{31}B_1 > f \quad (2)$$

This will only be necessary though if country 2 sees a benefit of solving the conflict militarily, and its net financial loss is larger than the cost of war:

$$\alpha_{21}B_1 - \alpha_{12}B_2 > f, \quad (3)$$

which is the difference between the holdings by country 2 of the debt of country 1, minus the payments country 2 must make to country 1 on its debt.

If this were just a bilateral conflict, the outcome would be very straightforward: only if country 1 values consumption so much, that it outstrips the cost of conflict, would it be willing to go to war. And unless country 2 values consumption highly too, the cost of war makes both worse off. Hence, under bilateral financial integration, war is becoming less likely, and the more integrated the more costly the conflict.

D.1. The subgame perfect Nash equilibrium with a third player

This outcome does not take into account the role of the third country. The partial default on the country's 1 debt exposes that country to two effects now.

On the one hand, if there is a war, one of the two countries loses, therefore the losing country will suffer a loss on its debt holdings, with a certain probability. Call this probability of country 2 losing the war, λ .

On the other hand, the winning country might decide to default as well and hence realise a net gain on its consumption (or to finance the expense of war).

Country 3 further knows that the winning country – having suffered a first war – now has to prepare for a potential second war, at a similar cost f .

What are the consequences for country 3? Firstly, if country 2 decides not to go to war, then for country 3, the same condition as for country 2 holds, and if its net loss is smaller than the cost of war, it will accept the full default on debt by country 1. This outcome of acceptance of default replicates the equilibrium in section II.C under ‘world governance’. Small-sized defaults that do not merit a major conflict would fall under this category.

Secondly, if country 2 does go to war with country 1, then the expected loss for country 3 now becomes:

$$\lambda(\alpha_{32}B_2 - \alpha_{23}B_3) + (1 - \lambda)(\alpha_{31}B_1 - \alpha_{13}B_3), \quad (4)$$

and (4) is a linear combination of the expected net loss of financial exposure to countries 2 and 1 respectively. If this expected loss is larger than the cost of war, f , then country 3 will wage a war on the winner.

Country 3 has to assess the outcomes under each scenario. The winning country would have to wage a second war, and it would only default if

$$\alpha_{3j}B_j - \alpha_{j3}B_3 > 2f \quad (5)$$

Country 3 knows this outcome could benefit its stance, as has a better chance of winning now. Countries 1 and 2 would anticipate such an outcome, of course, so they would not start a war in the first stage if they cannot win at a later stage. The overall condition then for credible threatening and starting a war is that

$$\alpha_{ij}B_j - \alpha_{ji}B_i > 2f. \quad (6)$$

In other words, having to fight multiple wars exacerbates the cost of a conflict so much, that anticipating that several conflicts might come up raises the hurdle for any country wanting to engage in conflict. The subgame perfect Nash equilibrium under complete information has a simple outcome that can be completely tracked in the static game. In comparison to a situation of bilateral financial integration, war becomes less likely when more countries have financial linkages. i.e., unless preferences are very different, the cost of fighting several wars curbs incentives to start a war. This is reminiscent of the liberal view on trade integration and peace. Only small-sized defaults without a costly war are possible in this case.¹⁰

D.2. The role of political negotiations

The political conflict between countries is the consequence of different needs to smooth consumption, which cannot be controlled or enforced by a multilateral organization. Nevertheless, bilateral or multilateral political negotiation between countries is an alternative way to look at compensation.¹¹ A simple way to model such negotiations is to allow for side payments – introduced by Harstad (2008). We show that the subgame perfect Nash equilibrium changes substantially once the countries can offer compensation.

The first change is that country 1 – if it cannot credibly threaten to wage war on countries 2 or 3 – could be in a position to offer a haircut to the two other countries. They might accept a

¹⁰ This describes well historical defaults where the creditor would seize a few assets with a quick military intervention, or the current situation of default by smaller countries in Africa or Latin America.

¹¹ In particular, when considering the conflict between a rising and declining power, compensation would naturally arise for economist, as new channels exist for international trade and FDI, yet the declining power might find it hard to grant more political influence to the rising power.

haircut that just avoids them a more costly war. The size of the haircut thus depends on the cost of war, and the international share of debt issued to both countries.

The second change is that in case a war is possible between countries 1 and 2, then both may reconsider their position regarding the third country.

Country 2 knows that it might get into a coalition with the third country, to fight the war against country 1. This would raise the barrier for country 1. But country 1 also knows that it can ask country 3 to stay neutral during the war, but it must then reassure the third country it will not default afterwards: country 1 can only do so by paying compensation to the third country. For both countries 1 and 2, offering compensation might be cheaper than going to war.

The compensation they must offer for being in the coalition or to stay neutral must offset the potential financial loss that country 3 might suffer. As Harstad (2008) shows, the compensation must be complete, and country 3 is going to be able to extract the rents that either country 1 or 2 might obtain from default, or waging war.

In equilibrium, countries will then have to transfer the gains from default or not waging war to their partners, and as a result, compensation between countries can create coalitions, but it comes at the expense of making default (and war) more likely. In contrast to the Nash equilibrium, multilateral financial integration gives them outside opportunities to exploit and mobilise additional resources. Negotiation does not raise the prospects of peace but of war.

The finding is similar to Elard's (2020) model: in the static game, he shows that the presence of creditors whose involvement contributes significantly to successful negotiations with a small debtor country, can pay off other negotiation participants against one another and, in the limit, allow the country to capture all the gains from trade.

This result recalls the findings from the literature on international conflict and cooperation.¹² Most importantly, it is akin to the findings in Martin *et al.* (2008) that in a multilateral world, additional trade opportunities lower the cost of going to war.

Also note that in contrast to the war-as-bargaining theory, in our model, rational agents with complete and perfect information will not always settle (Fearon, 1995). A surplus from cooperation exists but war starts not because of information asymmetries (Spaniel and Bils, 2018) but because of a lack of commitment (Carey *et al.*, 2022).

¹² The insights carry over to some papers have looked into the coordination of monetary policies in the presence of global financial intermediaries using a simple Nash equilibrium (Caldara *et al.*, 2024).

E. Extensions

This static game of complete information is simple, but it is able to show the impact of multilateral financial integration. There are a few aspects that could make the model more realistic and sharpen its trade-offs.

First, war carries a cost, but winning a war does not make a country win resources with which to compensate third countries. Using additional resources for international negotiation could expand the scope of war, and make bilateral conflict (in the presence of neutral third partners) more likely.

Second, the debt war just involves 3 countries, but adding more countries could increase the prospects of peace. The reason is that in the simple game, countries would have to wage several wars, and this raises the cost of conflict; but in the game with compensation, countries would have to compensate many more partners for staying neutral and therefore curb the gains of a default. In this way, and as argued in Garfinkel *et al.* (2015), multilateralism -and international financial integration- could surge as an equilibrium.

Third, if international trade in consumption goods is added, countries finance streams of consumption with inputs from other countries, then the net gains of peace are likely larger, as in Martin *et al.* (2008).

Fourth, debt defaults have been considered in dynamic games, in which the parties to the conflict use attrition in non-cooperative games. In this case, the continuation of the negotiation or the war depends on interest rates and the discounted utility of consumption flows.

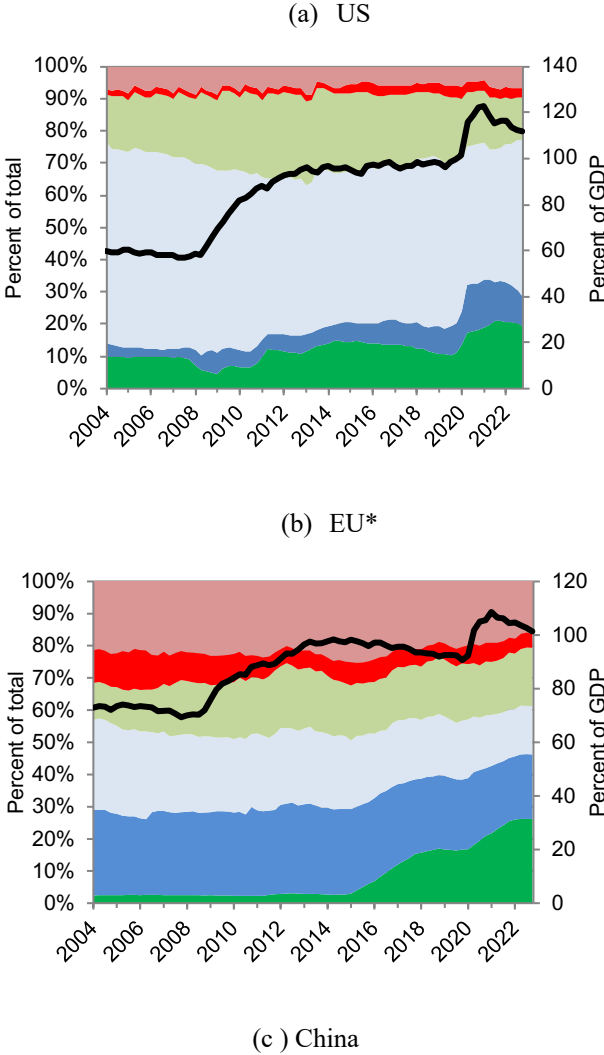
Other assumptions of the model that could be relaxed but complicate the analysis would be to model strategic negotiation to extract additional resources from defaulters or coalition partners. Strategic negotiation might raise the cost of war, and increase the chance of peace negotiations.

III. Empirical tests

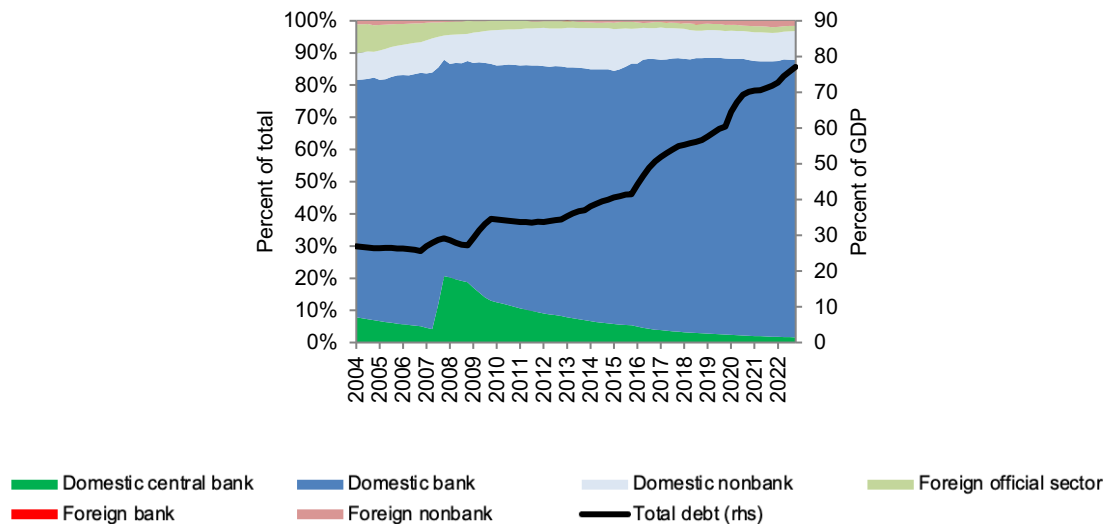
We apply the model now to the specific situation of the three major economic hegemonies, the US, the EU and China, and look at the interlinkages on their sovereign bond markets. Political and economic commentators have often expressed concern about the growing Chinese holdings of US government bonds. The European Sovereign Debt crisis not only caused upheaval within Europe, but also raised concerns in the US and China about political and economic stability in

Europe.¹³ If we look at sovereign debt holdings across the three blocs, we see that most holdings are actually domestic (Arslanalp and Tsuda, 2014)(see Figure 1), and range between a negligible percentage of foreign holdings in China, around 30% in the US, and close to 45% in the EU. For the EU, this higher range does not come as a surprise, as most of these are cross-European holdings, yet a strong home bias is present even in the eurozone (Mai, 2023). Of course, not all holdings through the domestic (non-)banking system are by US or EU holders. Substantial parts of these holdings are in the hands of the shadow banking system (Hodula and Libich, 2023).

Figure 1. Sovereign debt holdings by origin.



¹³ Interestingly, the US and China have coalesced in Spring 2024 in their debt negotiations with several African countries, denying a partial default on their sovereign debt (Kargman, 2023), which shows precisely the coalition argument developed in section II.



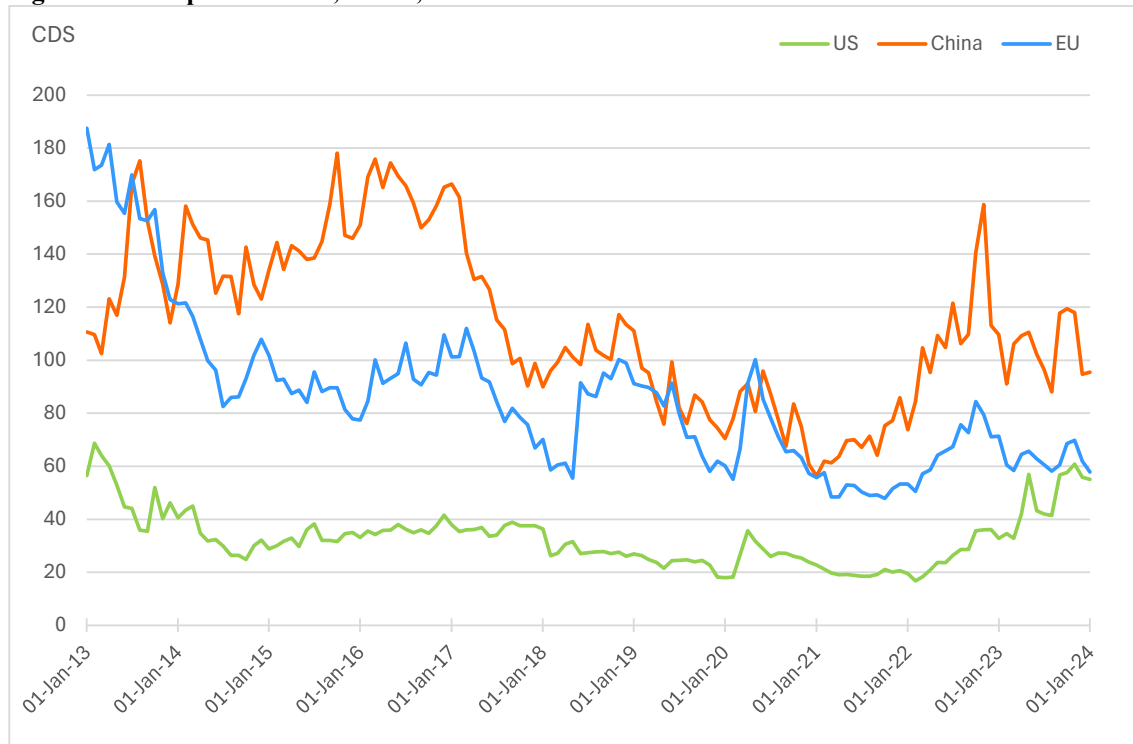
Notes: data constructed from the updated version of Arslanalp and Tsuda (2014).

There are two specific propositions we want to test on the linkages between the three blocs. Firstly, we examine if geopolitical risk influences sovereign risk. For a country that lends a lot bilaterally to another sovereign, geopolitical tension coming from that sovereign should raise the sovereign risk in the country, as it might lead to trouble in claiming resources in the future. However, if the same lender ignites geopolitical conflict to assert its claims, it should reduce its sovereign risk as expectations of future repayments are more certain. A significant impact of such risk on one bond market – or all three markets – could hint at a possibility of escalation. Secondly, if geopolitical risk determines spillover, it implies risk spreads from one market to another, and indicates an escalation of the initial conflict beyond the specific event.

A. Data

We use credit default swap spreads to measure sovereign risk, as is standard in most studies. We have collected daily data from Bloomberg since December 2012. The composite CDS series for the EU is a weighted average of the 4 main EU member states (Germany, France, Italy and Spain), by annual GDP. The sovereign risk in Figure 2 shows that spreads have been rather contained in the US for most of the sample. By contrast, sovereign risk rose to extreme levels during the European sovereign debt crisis but since late 2013, it has fallen below 100 points and has fluctuated between 50 and 100 points since. Sovereign risk in China drops substantially in late 2016, similar to EU levels, but rises much more than in the US or the EU during the second year of the Pandemic, due to the severe lockdown and disruption of industry. US and EU CDS have converged over the last year.

Figure 2. CDS spreads in US, China, and the EU.



Source: Bloomberg.

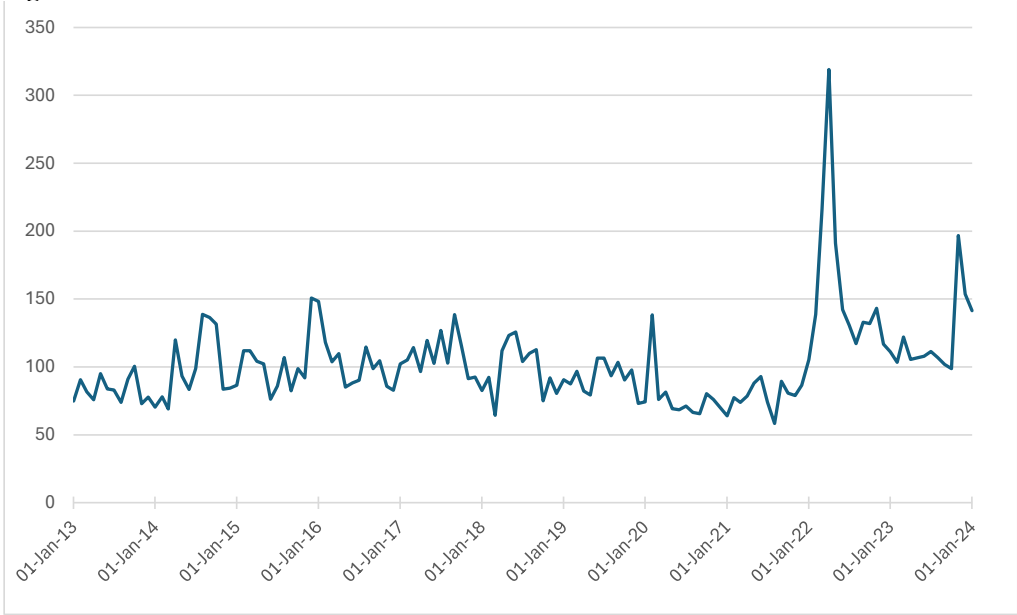
A standard measure in the literature for measuring geopolitical risk is the index Caldara and Iacoviello (2022) developed. The GPR reflect geopolitical uncertainty as perceived by media, market participants, and policymakers. The global index is based on newspaper coverage by counting the frequency of articles that discuss key terms related to geopolitical changes in 11 leading national and international newspapers. Figure 3 shows the GPR index over the sample period we will use (January 2012 to December 2023), and spiked just at the start of the Russian invasion of the Ukraine, and since October 2023.

We mostly use the country-specific index for the US, the EU and China, which gives specific geopolitical events related to those countries. The country-specific index reflects automated text-search results of the electronic archives of just three US newspapers: The New York Times, Chicago Tribune and The Washington Post. The fact that the GPR index uses a US perspective helps in our identification of the empirical model, as we look at the EU and China, which both have strong trade and financial linkages with the US. Hence, any tension between the US and the EU or China is going to be reflected in the index.¹⁴ While the global index is computed daily, the country-specific indices are updated only once every month.

¹⁴ Using just a few sources in the US, the GPR index ignores the perceptions of such tensions in other countries. For this reason, we also use as an alternative indicator the BBVA Geopolitics Monitor.

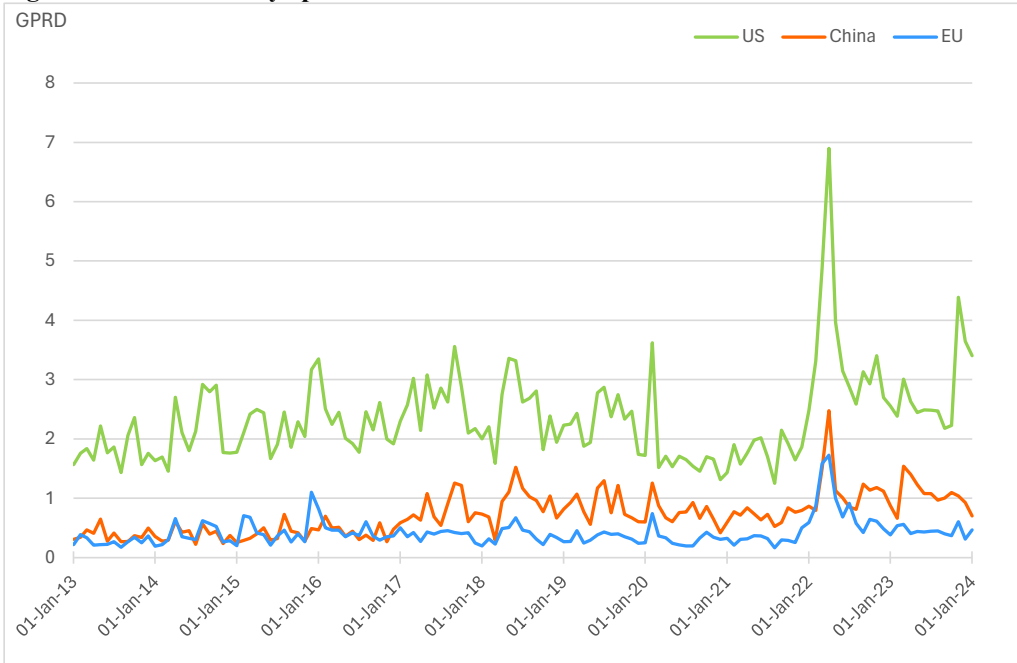
Figure 4 shows the country-specific indices. These changes reflect starkly different country-risk levels: geopolitical risk is overall higher in the US than China or the EU. While geopolitical risk in the EU fades away after a few specific episodes related to the sovereign debt crisis in 2013 and 2014, Chinese geopolitical risk keeps rising. A period of relatively low risk since the start of the Pandemic comes to an abrupt end in March 2022. Geopolitical risk is not strongly correlated across the three blocs, with US-China correlation only 0,41, EU-China 0,54 and EU-US 0,60.

Figure 3. Global GDPR index.



Source: Caldara and Iacoviello (2022), download from <https://www.matteoiacoviello.com/gpr.htm> (March 15th, 2024).

Figure 4. GDPR country-specific index.



Source: Caldara and Iacoviello (2022), download from <https://www.matteoiacoviello.com/gpr.htm> (March 15th, 2024).

B. The effect of geopolitical risk on CDS

In the first step, we test the effect of different factors that can drive CDS, among which international geopolitical risk, and a series of other variables that control for other types of uncertainty and economic conditions, as in (7):

$$r_t = \alpha + \beta X_t + \theta G_t + \varepsilon_t, \quad (7)$$

where r_t is the measure of sovereign risk, G_t is the measure of geopolitical risk, and X_t is a vector of control variables, and ε_t the error term. Among the other control variables, we include the ones typically considered in the literature, i.e. the monetary policy stance to quantify the stance of monetary policy (or the shadow rate in the US and EU, as in Wu and Xia (2017)), expectations of future volatility in stocks markets ($Vstoxx$), an indicator of bond volatility ($MOVE$), the cross-currency basis swap spread at 5-year ($CCBSS5y$) as a proxy for funding liquidity stress.

To test the model developed in section II, we are interested in longer-term geopolitical tensions in different markets, and not just day-to-day fluctuations, so we can use the monthly country-specific geopolitical risk indices.¹⁵ This also allows us to include the economic policy uncertainty index (EPU) which could reflect policy decisions that are not necessarily related to geopolitical events.¹⁶

We test the impact for each of the three blocs with OLS. Results in Table 1 show that the impact of country-specific geopolitical risk on sovereign risk in the US and the EU is not significant. Nevertheless, for China, geopolitical tension from the US raises its spreads, and the impact is about 11 basis points for every percentage increase in the index (which is large, given that the standard deviation of CDS in China is 32 basis points). This reflects the tense bilateral relations and seems to make markets reconsider the sovereign risk for China, which is in line with the model. Moreover, geopolitical tension coming from China itself tends to curb sovereign risk, and substantially so, with a 29 basis points drop for every percentage change in the index (for a standard deviation of just 11 basis points). This could indicate that as China asserts its claims,

¹⁵ In Appendix A, we look in into the results with the daily global geopolitical risk index.

¹⁶ The overall results of the literature following Pastor and Veronesi (2013) suggest that more economic policy uncertainty causes volatility and risk to rise, and negatively impacts returns.

markets perceive the Chinese government as more creditworthy. The role of the EU in this relation is inexistent.^{17,18}

There are further interesting effects of economic political uncertainty. Policy trouble during the European Sovereign Debt crisis seems to have pushed up CDS in all countries, yet its impact is not large, at least in comparison to the effects of the US or China. By contrast, higher economic policy uncertainty in China seems to curb significantly CDS in both the EU and the US, and its impact is as large as the one of the European Sovereign Debt crisis. This could indicate that uncertainty about China's decision strengthens sovereign markets in the EU and US. This result is again in line with the model, as a lack of clarity on what stance China might take, favours the countries that are borrowing. For the US, both domestic uncertainty as well as uncertainty in the EU raise sovereign risk (with the former effect triple as strong as the latter). However, and in line with the model, uncertainty about China's economic policies reduces US sovereign risk.

Table 1. Effect of geopolitical risk on CDS (monthly data).

	(a) China	(b) EU	(c) US
GPR EU	-4.155	-14.194	-5.759
GPR US	10.599*	1.464	-0.273
GPR China	-29.337**	-7.081	2.853
EPU EU	0.093**	0.123***	0.032**
EPU US	-0.198**	0.098	0.061**
EPU China	-0.081***	-0.078***	-0.032***
Shadow rate EU	5.801**	-1.686	3.575***
Shadow rate US	6.692***	4.793**	2.482***
Interest rate China	53.751**	163.484***	15.422*
MOVE	0.084	-0.374***	-0.172***
VIX	0.294	-0.716*	-0.252**
VSTOXX	0.590	0.120	0.027
CCBBSS 5year	-25.378***	1.793	-5.670**
constant	-18.467	-390.292***	10.344
N	133	133	133
Adjusted R ²	0.553	0.499	0.653

Notes: significance at 0.01 - ***, 0.05 - **, 0.1 - *.

Table A.1 in Appendix shows the results for the same model on daily data, but in this case, we can only use the global GPR index, and no economic policy uncertainty index is available in

¹⁷ Some papers have looked into the role that geopolitical risk has on sovereign risk. Afonso *et al.* (2023) or Demiralay *et al.* (2024) found on a sample of 26 EU respectively 39 countries that increased political tensions in a certain country raises its sovereign risk, especially in turbulent political times or economic crises. We argue that such an effect depends on the type of linkages between countries and how this affects their mutual political relation. Ambrocio and Hasan (2021) show that lower-income countries with close economic and political ties to the US experience lower yields on sovereign bond spreads, reflecting that economic and political support for the country is strong, raising its creditworthiness.

¹⁸ We confirm these results with the BBVA geopolitical risk index.

this case. Global geopolitical risk reduces for the three big blocs their sovereign risk significantly, yet the impact is rather small, and the largest for the US. This indicates a flight to safety into all blocs, but mostly so into US assets during political turmoil and underlines the position of the US dollar as the world's reserve currency (Rey and Gourinchas, 2022). Feng *et al.* (2023) show that geopolitical risk curbs capital flows overall, but in addition to this 'flight home' effect investors seem to rebalance their portfolios globally and prefer direct investment in advanced over emerging markets, a result also confirmed in Wang *et al.* (2019) for investment, or Yu and Wang (2023) for FDI. As a consequence, and in addition to the costs for international business, a similar negative effect on international trade flows is found by Glick and Taylor (2010) or Gupta *et al.* (2019).

C. The spillover effect on sovereign markets

In the second step, we now relate the spillover of risk across sovereign markets to the same geopolitical and control factors, as in (8):

$$s_t = \alpha + \beta X_t + \theta G_t + \varepsilon_t, \quad (8)$$

where s is the measure of bilateral spillover, G_t is a measure of geopolitical risk, and X_{it} is a vector of control variables, with ε_t the error term.

In order to measure spillover, we use the approach proposed by Diebold and Yilmaz (2009, 2011) that computes spillover from the forecast variance decomposition of a VAR model including different asset prices (x_t). A covariance stationary variable VAR(p) can be rewritten in its moving average representation. The decomposition of the variance of the forecast error of some variable i , at h steps ahead, records how much of the variance owes to shocks in another variable included in the VAR h periods after the shock. Therefore, it shows the percentage contribution of a shock to one variable to the time series variation of another variable. Call θ_{ij}^h this h -step ahead forecast error variance decomposition, and $\lambda_{ij}^h = \theta_{ij}^h / \sum_{j=1}^n \theta_{ij}^h$ the percentage contribution of θ_{ij}^h in the effect of error variances in forecasting x_i due to shocks to x_j , over all n variables.

The method allows us to study the general spillover between different asset markets, and dissect the strength and direction of the spillover between any two markets. Let us define our *own variance shares* to be the fractions of the h -step-ahead error variances in forecasting x_i due to

shocks to x_i , for $i=1, 2, \dots, n$, and *cross variance shares* to be the fractions of the h -step-ahead error variances in forecasting x_i due to shocks to x_j , for $i, j = 1, 2, \dots, n$, such that $i \neq j$. Diebold and Yilmaz (2009) suggest using these cross-variance shares to measure the spillover from one series x_i to another x_j . In particular, we can compute the percentage contribution of a change in daily quoted asset prices on the variation in asset prices of each particular market included in the VAR model. The matrix Λ of all λ_{ij} contains all bilateral linkages to and from two different markets.¹⁹ The column for market A contains λ_{Aj} and can be read as the contribution from a shock to market A to asset prices in other markets. The entry λ_{AA} is the percentage contribution of a shock in explaining the movement of the market's asset price. The row for some market B contains λ_{iB} and can be read as the spillover market B receives from a shock to the spreads in other markets. The dimensions of Λ grow quickly when adding new markets, so we need some summary statistics.

The total spillover index measures the contribution of spillover of shocks between all variables included in the VAR to the total forecast error variance and is nothing else than the sum of the cross-variance shares across all variables (at a certain forecast horizon h). When we express it as a ratio to the total forecast error variation, we get the total spillover index, i.e.:

$$TS^h = 100 \cdot \frac{\sum_{i \neq j}^n \lambda_{ij}^h}{\sum_{i,j=1}^n \lambda_{ij}^h} \quad (1)$$

The *bilateral spillover* BS^h between two markets is then,

$$DS_{\rightarrow i}^h = 100 \cdot \frac{\sum_{j \neq i}^n \lambda_{ij}^h}{\sum_{i,j=1}^n \lambda_{ij}^h} \quad (2)$$

and is the sum of the row elements of the matrix Λ . Similarly, we can measure the spillover a market i transmits to all other $n-1$ markets by

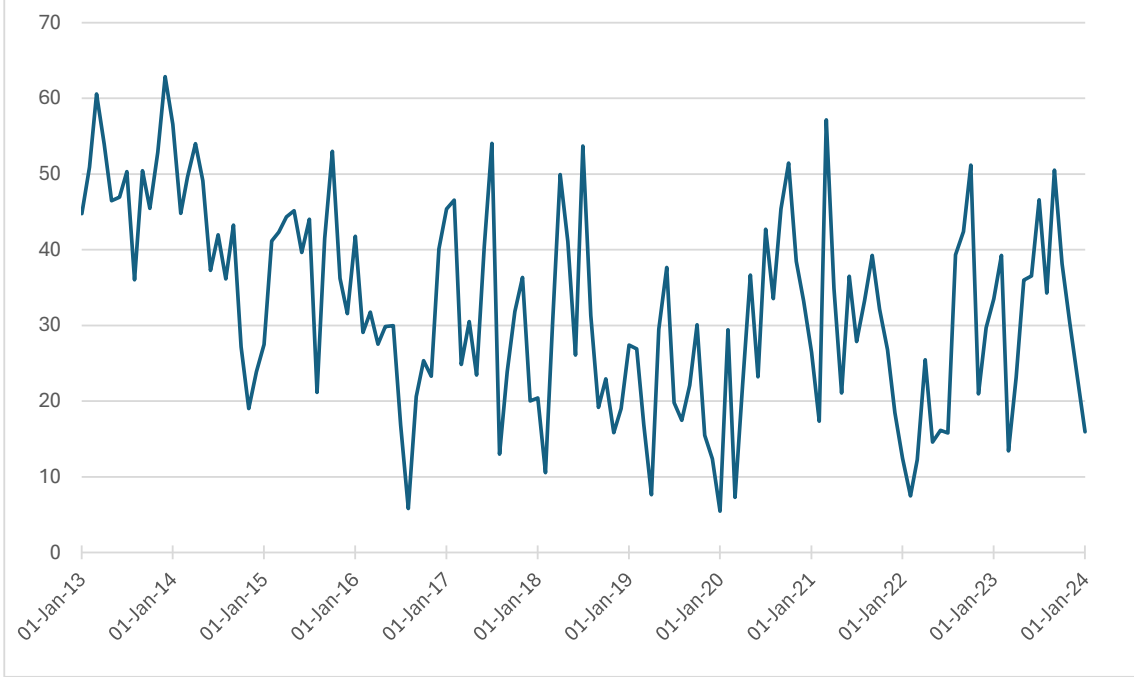
$$DS_{\leftarrow i}^h = 100 \cdot \frac{\sum_{j \neq i}^n \lambda_{ji}^h}{\sum_{i,j=1}^n \lambda_{ji}^h} \quad (3)$$

Measure (5) is the sum of each column of the matrix Λ , not including the own contribution of each market.²⁰ The directional spillover details how much of the total spillover comes from, or goes to, a particular source. Figure 5 shows the total spillover between the three blocs over time. We see that sovereign markets experienced a high spillover of over 50% only during the European Sovereign Debt crisis, but since then, spillover on average has just been 30%.

¹⁹ It is like the weight matrix measuring distance spatial econometrics.

²⁰ Alternatively, one may include the own effect of the shock.

Figure 5. Total spillover between US, EU and China.

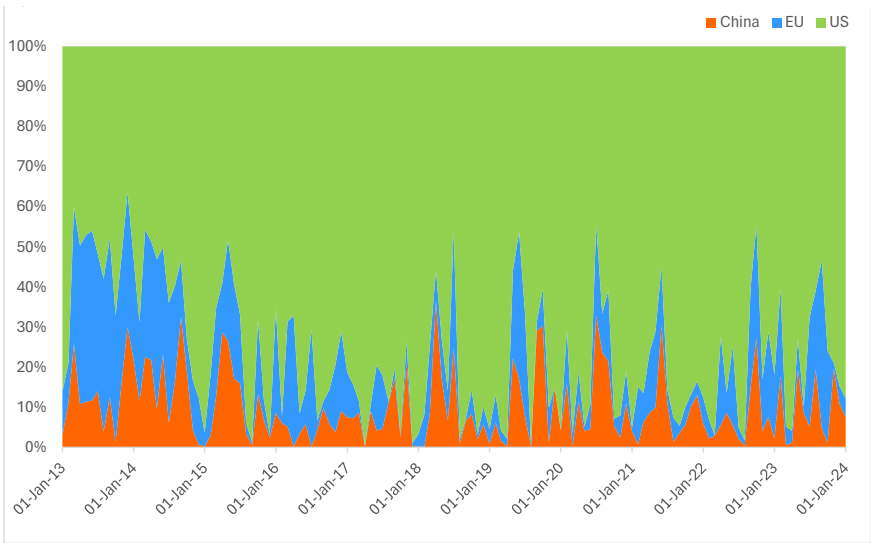


Notes: author’s calculations.

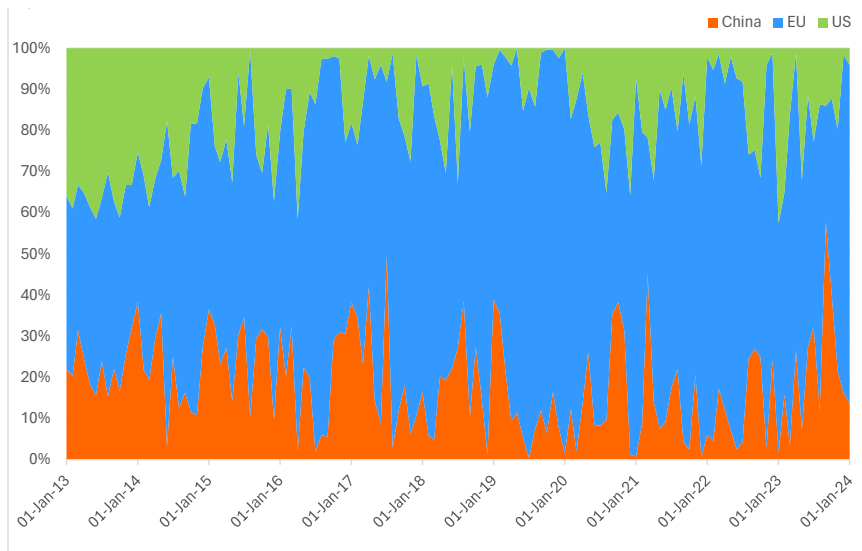
We then also plot the directional spillover between the three markets, together with the impact on the own domestic market. Figure 6 shows that the latter effect dominates, hence sovereign risk dynamics mostly are internal. This is most outspoken in the US, where with the exception of the start of the European Sovereign Debt crisis, the impact of the EU or China is limited to less than 20%. For Europe or China, the foreign impact is substantially higher at around 35%. We also observe that there is quite some variation, even month by month, between the three markets.

Figure 6. Bilateral spillover between US, EU and China.

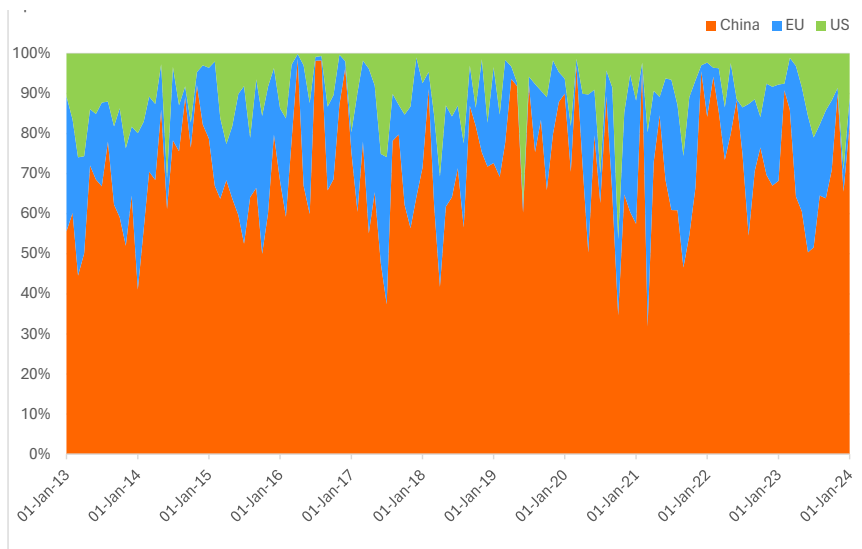
(a) US



(b) EU



(c) China



Notes: author's calculations.

We are now ready to test the role of geopolitical risk in the spillover. We test the impact of country-specific risk on the bilateral spillover -at monthly frequency- with a seemingly unrelated regression as this might increase efficiency between correlated markets.

The findings in Table 2 show that most spillovers between markets are not affected by geopolitical risk. The only exception is the positive effect of Chinese geopolitical risk on the spillover from the EU to China, and the opposite impact of US risk on the Chinese-EU spillover. This comes as no surprise in our model: the major political tensions that led to concerns about the possible break-up of the eurozone in 2010 show that a possible bail-out of several eurozone countries could affect sovereign risk in the US and China, but if there is geopolitical risk in China, this channel is exacerbated. According to our model, this would indicate that a possible default in Europe, might likely spur sovereign risk in China first due to a possible conflict with

the EU. The impact of European economic policy uncertainty itself confirms this: the EPU index for Europe lowers the linkages between the US and China significantly.^{21,22}

The opposite effect occurs with US geopolitical tensions: they reduce the spillover from China to the EU. As we saw in Table 1, higher US geopolitical tensions raise sovereign risk in China. This seems to have as a result a decoupling of the Chinese from the EU sovereign risk. Our interpretation, using the theoretical model, is that the US and the EU would then be in a possible coalition to address potential conflict with China.²³

Table 2. Effect of geopolitical risk on spillover on sovereign markets.

	China to US	China to EU	US to China	US to EU	EU to China	EU to US
GPR EU	-9.204	-9.712	-3.849	-0.036	4.955	16.912
GPR US	2.701	-1.956*	0.869	-3.450	-5.448	-4.705
GPR China	1.100	-2.060	2.809	6.904	7.892**	-0.661
EPU EU	-0.013	-0.017	-0.040*	0.017	0.065	-0.040
EPU US	0.024	0.009	0.038	-0.065	-0.010	0.144
EPU China	-0.005	-0.020**	0.002	0.004	-0.043	-0.033
Shadow rate EU	-0.831	-1.754	-0.359	1.005	0.870	0.170
Shadow rate US	-0.846	-2.490	-0.446	-0.353	2.262	-2.269
Interest rate China	0.367	-29.167	8.239	18.356	46.491	20.416
MOVE	-0.059	0.054	0.113	-0.049	-0.182	-0.032
VSTOXX	-0.112	-0.441	-0.205**	0.197	0.023*	-0.145
VIX	0.094	0.588	0.059	0.054	0.065	0.075**
CCBBSS 5year	4.895	8.776	0.370	0.196	-3.481**	7.521*
constant	8.342	110.132*	-20.375	-34.243	-99.059	-36.250
N			133			
Adjusted R ²	0.055	0.103	0.081	0.197	0.147	0.349

Notes: significance at 0.01 - ***; 0.05 - **; 0.1 - *;

Our results are close to the ones in Hao *et al.* (2024). They test a similar model of spillover between the US and China – but not the EU – in a TVP-VAR, but test the impact of geopolitical risk on the spillover between exchange, commodity and stock markets. Their findings suggest that geopolitical tensions first strain commodity markets in China, and this is then passed on to the other markets, yet – as in our results - these tensions do not affect spillover between the US and China directly.²⁴

The results are to some extent complementary to the findings in Afonso *et al.* (2023). They consider a sample of 26 EU countries, and find spatial effects in the spread of turbulence from

²¹ This is in contrast to the findings in Gong *et al.* (2023) who found spillover between global economic policy uncertainty and CDS spreads in 21 major markets.

²² Results with the BBVA Geopolitical Monitor confirm these results.

²³ Results with the BBVA Geopolitical Monitor instead show that only geopolitical risk from China affects the spillover of sovereign risk, with higher spillover flowing from the US to China and a strong reduction in spillover between the EU and the US.

²⁴ Their result does suggest however the importance of claims on (natural) resources as a way to obtain political control.

conflict in the border zones of the EU, as well as from Latin America and Asia, but not from China or the US. However, we find that the spillover effect is the other way around, with the trouble in the EU sovereign market affecting the two major economic blocs.

Table A.2 in Appendix shows the results for the same model on daily data, but in this case, we can only use the global GPR index, and no economic policy uncertainty index is available. Global geopolitical risk reduces spillover significantly from China to the US or the EU, or from the US to China, but raises spillover from the EU to China, and the US, albeit the impact on the latter is scarcely relevant. This confirms the finding that the EU Sovereign Debt Crisis had the potential to ignite the escalation of its trouble to a planetary scale.

IV. Conclusion

Geopolitical competition in the absence of a single great power has moved the world to multilateralism. Globalisation has woven markets into global trade and financial connections and created many dependencies, making countries more vulnerable to the repercussions of conflict. There are many potential instabilities in a multilateral system that could escalate conflict.

Our small static 3-player model of default helps to understand how linkages on sovereign bond markets could lead to escalation over financial resources. Unless the cost of conflict is small, hegemons may find it in their self-interest to maintain peace by compensating one of the players for losses and playing on different coalitions. This could destabilise conflict, and reduce the prospects of peace. The model could be extended to incorporate other fields of cooperation that could lead to compensation (like granting more political power), or to dynamic models of debt negotiation, or to include also trade linkages.

An empirical test of the linkages on the sovereign bond markets of the US, EU and China shows us that at present, interdependencies are limited, yet the geopolitical conflict between the US and China does shift sovereign risk between lenders (China) and borrowers (US), in line with the theoretical predictions. Policy uncertainty also plays a role. In particular, the spillover of risk in the eurozone also confirms the stakes other countries may have in stable monetary and fiscal policies.

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Appendix A: Estimation results using data at daily frequency.

Table A.1. Effect of geopolitical risk on CDS (daily data).

	(a) China	(b) EU	(c) US
Global GPR	-0.029***	-0.057***	-0.014***
Interest rate EU	-14.691***	-9.708***	5.146***
Interest rate US	3.234***	2.365***	-1.077***
Interest rate China	29.691***	87.646***	6.853***
MOVE	0.087***	-0.417***	-0.167***
VSTOXX	5.398***	2.370***	0.988***
VIX	-5.339***	-1.779***	-0.910***
CCBBSS 5year	15.108***	15.769***	5.598***
constant	-0.409	-164.685***	17.419***
N	2,651	2,651	2,651
Adjusted R ²	0.545	0.496	0.578

Notes: significance at 0.01 - ***; 0.05 - **; 0.1 - *

Table A.2. Effect of geopolitical risk on spillover of sovereign risk (daily data).

	China to US	China to EU	US to China	US to EU	EU to China	EU to US
Global GPR	-0.016***	-0.013**	-0.010***	-0.004	0.025***	0.003
Interest rate EU	2.716***	2.537***	-0.732*	0.396	3.639***	-2.169***
Interest rate US	0.869**	1.815***	2.881***	-1.445***	2.435***	0.642
Interest rate China	-2.007	30.554***	-6.661***	-23.088***	23.272***	5.332*
MOVE	0.051***	0.222***	-0.164***	-0.110***	0.126***	0.104***
VSTOXX	0.485***	0.212*	0.609***	0.370***	0.355***	0.124
VIX	-0.370***	0.190*	-0.295***	-0.263***	-0.446***	0.181*
CCBBSS 5year	-5.131***	-9.196***	1.337**	6.633***	-6.753***	1.183
constant	13.036*	-93.411***	31.712***	82.943***	-63.313***	-15.008
N			2,651			
Adjusted R ²	0.062	0.128	0.104	0.126	0.081	0.071

Notes: significance at 0.01 - ***; 0.05 - **; 0.1 - *