Spheres of Influence*
(Preliminary Draft)

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Abstract

The rise of China's foreign influence is raising concerns about the potential return to a world shaped by geopolitical considerations. But what would such a world look like? This paper proposes and tests a theory where countries make optimal foreign policy decisions to manage the foreign influence of the great powers (say the US and China). First, we show that countries will optimally self-organize into spheres of influence (SOI), choosing foreign policies that are either biased in favor of the US or China. Second, we show that the extent of such biases depends on the balance of power between GPs. In particular, such biases increase when there is a rising power catching up with an established one, implying that SOI should become more visible in times of geopolitical competition. Finally, we demonstrate the empirical relevance of the analysis by introducing a new measure for the extent of bilateral cooperation between 1979 and 2013. The model correctly predicts how countries adjusted their foreign policies in response to the fall of the Soviet Union and China's rise.

Keywords: Geopolitics, International Fragmentation, Geopolitical Competition, Spheres of Influence, Foreign Influence, Rise of China, Cold War

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1 Introduction

The rise of China on the global stage and its growing foreign influence are raising concerns about the potential return to a world where geopolitical considerations play a dominant role in shaping international exchanges, with potentially large effects on the pattern of trade, capital flows, and foreign aid. But what would such a world look like? To answer this question, a natural starting point is to expect that great powers (GPs) with more foreign influence should receive more favorable foreign policies from other countries. Thus, as China catches up with the US, we should expect countries to treat them more equally. This is however in stark contrast with the historical experience, where the rise of a GP typically leads to the formation of two increasingly distinct spheres of influence (SOI), where countries adopt foreign policies heavily skewed in favor of one or the other GP, thus appearing to 'pick sides'. The objective of this paper is to understand the drivers of this fragmentation process.

This paper proposes and tests a model where SOI endogenously emerge from how countries design their foreign policies when exposed to the GPs' foreign influence. We make three key contributions. First, we show that even if countries can cooperate with all GPs (say the US and China), they will optimally choose foreign policies that are biased in favor of the GP they are most exposed to. In particular, even if a country is equally exposed to the US and China, we show that its optimal foreign policies would treat either the US or China (selected arbitrarily) much more favorably than the other GP. Thus, our model predicts that countries 'self-organize' into SOI, where their policies can be thought of as either being pro-US or pro-China. Second, we show that the extent of such biases depends on the balance of power between GPs. For instance, our model predicts that as China's foreign influence catches up with the United States, we should expect pro-US countries to become even more biased in favor of the US. In general, we show that SOI should be expected to become more marked (thus visible) in times of geopolitical competition, i.e., when there are two (or more) GPs with similar foreign influence. Finally, we demonstrate the empirical relevance of the model showing that it can correctly predict how countries adjusted their foreign policies in response to the fall of the Soviet Union and China's rise. We introduce a new measure for the extent of bilateral cooperation between 1979 and 2013. Consistent with the model, we document that the fall of the Soviet Union led countries to adopt more similar policies towards the US, even if they previously had very different ones (SOI became less clearly distinct) whereas the rise of China has ignited the opposite process which has been gradually contributing to the formation of two increasingly distinct SOI since the early 2000s.

To clarify the intuition behind our results, we start by distinguishing between two types of actors: (regular) countries and the great powers (GPs). For concreteness, we will discuss the

case where there are only two GPs, the United States and a competitor (the Soviet Union or China), but multiple GPs are allowed in the model. Our theory focuses on the governments of regular countries exposed to foreign influence, i.e., governments whose probability of political survival depends on whether GPs support or oppose them. In order to manage foreign influence, each government selects a foreign policy vector, where each element is simply a *transfer* of utility from the government to a particular GP. To analyze the impact of foreign influence on the optimal foreign policy, we consider a simple sequential game. First, the government announces its vector of transfers; then, the GPs simultaneously choose whether to support or oppose the government. Opposing GPs obtain an outside option. On the other hand, supporting GPs obtain the promised transfer if the government survives, and less than the outside option otherwise. Thus, a higher transfer makes a GP more willing to support the government. Finally, because not all GPs have the same influence over all countries, we introduce a (common knowledge) dimension of heterogeneity which we call *exposure*, measuring the impact of a GP on the government's survival probability. Specifically, we assume that the government's probability of survival is increasing in its exposure to all supporting GPs, and decreasing in its exposure to all opposing GPs.

A key feature to consider when characterizing a government's foreign policy decisions is that the willingness of one GP to support a government depends on the probability of the government's survival, which in turn depends on the decisions of all GPs. In this setting, a government might adopt a defiant foreign policy towards the United States without jeopardizing its political survival, simply because the US knows that that country is supported by the Soviet Union (e.g., Egypt in 1956). Conversely, a government might lose the support of the United States just because the US fears that the Soviet Union is preparing an action against that government (e.g., Iran in 1953). While these strategic complementarities capture an important dimension of international relations, they also pose an analytical challenge, as they will typically generate multiple equilibria. Following the unique implementation literature in mechanism design, we assume that governments deal with such complications by choosing a strategy that is robust to 'bad equilibria.'[1]

As we show, the optimal robust strategy requires governments to obtain the *unconditional* support of the GP they are most exposed to: a transfer so high that the strongest GP would keep supporting the government, even if the other GP opposes it. Given this, the government can give a lower transfer (the outside option) to the other GP. While this strategy may seem abstract, note that it has very simple observable implications. Split the world into two groups: the set of countries more exposed to the United States than the Soviet Union, and

[1]Specifically, we follow Segal (1999) and subsequent literature and characterize the smallest transfer vector that obtains the support of all GPs in all equilibria consistent with it.

the others. The theory predicts that the US will receive a discretely greater transfer from the first group, compared to the other. And the opposite would happen to the Soviet Union. In other words, the model can explain the origin of foreign policy biases and why we sometimes observe the splitting of the world into two spheres of influence (SOIs), where countries can be thought of as providing either pro-US or pro-Soviet transfers. Even in the extreme case of a government equally exposed to the US and the Soviet Union, we can show that its foreign policy would display a bias in favor of one or the other GP (picked arbitrarily).

In addition, the model can explain why such SOIs appear to become more or less distinct (thus visible) in different periods. Indeed, we show that obtaining the unconditional support of one GP requires the government to compensate for its exposure to the other GP. Thus, 'pro-US transfers' will be increasing in the foreign influence of the Soviet Union, whereas 'pro-Soviet transfers' will be increasing in the foreign influence of the US. With this in mind, we can see that the difference between transfers and outside options (the foreign policy bias) increases as the two GPs become more symmetric, and it decreases when they become more asymmetric. Thus, a world where two great powers are becoming more symmetric will tend to be characterized by two increasingly distinct SOIs. On the other hand, SOIs will tend to disappear when the two great powers become more asymmetric: a world with larger GP imbalances will be characterized by fewer foreign policy biases, reducing the value of being a great power, including for the strongest one. In this sense, our model is consistent with the observation that international politics becomes negligible in a world with one dominant GP, and then becomes important again when a new GP rises.

Our theory highlights the role of foreign policy decisions as a mechanism linking the extent of geopolitical fragmentation to shifts in the balance of power between great powers. In our empirical analysis, in order to quantify foreign policy decisions, we turn to the GDELT dataset of international interactions, a dataset generated from news articles reporting the occurrence of a particular type of interaction for different country pairs between 1979 and 2013.[2] In our main empirical analysis we focus on a variable that we call *bilateral foreign policy (BFP)*: the number of times over a year in which GDELT reports that a country has increased its economic and military cooperation or signed a treaty with another country. Given the time coverage of the dataset, we have the opportunity to test whether the BFPs of countries in the US and Soviet SOIs converged after the collapse of the Soviet Union (a reduction in foreign policy biases), and to assess whether two SOIs are emerging once again as China is rising. To do this comparison, we need to identify which countries should be expected to be in one SOI rather than the other, even in periods when such SOIs are not particularly visible. Following our theory, we know that this will depend on whether

[2]The GDELT dataset can be accessed from https://www.gdeltproject.org

a country is more exposed to the United States or its competitor. We thus construct the American and Soviet *potential* SOI by splitting countries based on whether they were trading more with the US or the Soviet Union in 1988, just before the collapse of the Soviet Union, and again into an American and Chinese *potential* SOI, based on whether countries were trading more with the US than China in 2000, just before China acceded to the WTO.

Consistent with the theory, we show that countries in the American potential SOI *decreased* their cooperation with the United States relative to the countries in the Soviet/Russian potential SOI during the period 1989-1994. In particular, we show that the adjustment is large enough that it can account, in just 5 years, for the full convergence in foreign policy towards the United States of countries in Eastern and Western Europe. We then show that countries in the American potential SOI *increased* their cooperation with the United States relative to the countries in the Chinese potential SOI during the period 2001-2013. Also in this case, the adjustment is large: comparing two countries who are identical in 2000 except that one is in the American potential SOI and the other in the Chinese one, we would find that in the 2001-2013 period, the former reached 65% more cooperation with the US and 65% less cooperation with China than the latter. These results provide strong and robust evidence in favor of the theory and emphasize that the process of geopolitical fragmentation driven by China's rise is already underway.

Finally, we extend the theory and the empirical analysis to allow for an indefinite number of great powers (both global and regional). Even in this more complicated analysis, we confirm that the theory can correctly predict how countries have adjusted their BFPs in response to China's rise and the Soviet collapse. As we discuss, results are robust to both simpler and more complicated ways of constructing potential SOIs, for instance using geographic distance or the Formal Bilateral Influence Capability Index developed by Moyer et al. (2018). Moreover, we confirm our predictions even when we look at broader measures of bilateral foreign policy, adding state visits and commitments towards future cooperation agreements. Lastly, we confirm the robustness of our results using a variety of specifications. Several extensions show the flexibility of the theory. Our key result can be established when countries are free to choose whether to 'buy' the support of only a subset of the GPs, and also in a case where favoring one GP negatively affects another one. We demonstrate that the fragmentation result is reinforced if countries expect that a more favorable foreign policy towards a particular GP also increases a country's exposure to it. Finally, we show that soft power (e.g., ideological or institutional affinity) also plays a role in determining which countries will side with one rather than another GP.

The rest of the paper is structured as follows. Section 2 presents the theory and Section 3 derives its applied implications. Section 4 includes our empirical exercises, a discussion of

their robustness, and the various validation tests that we perform. Section 5 presents future research directions. Section 6 concludes. The main Figures and Tables are collected after the references and before the Appendices. All proofs are in the Appendices.

Related Literature. Our project is at the intersection of international economics and political economy. After the seminal work of Hirschman (1945, 1958), a large share of the modern literature studied how various international exchanges are linked to political considerations and power.[3] More recently, a literature is emerging studying the determinants of foreign influence. For instance, Antràs and Miquel (2023) studies how a government's preferences can shape its decision to exert more or less international influence, whereas Clayton, Maggiori and Schreger (2023) studies how economic links translate into foreign influence. This strand of literature is entirely complementary to our work, as we develop a theory that takes for granted the existence of some measure of 'influence' and we study how the distribution of such measure affects foreign policies. The focus of our paper is closest to Kleinman, Liu and Redding (2020) and Antràs and Padró i Miquel (2011). The former studies how trade dependence can lead to political realignment, whereas the latter studies how the foreign influence of a great power affects the welfare of a country by constraining the policies of its government. Our contribution to this debate is to provide a simple (and empirically relevant) way to account for the complex way in which foreign influence constrains a government's policies when there is more than one country capable of exerting influence. In particular, we show that foreign influence becomes an important constraint on government policies only when such a government is subject to multiple sources of foreign influence, underscoring the key role of geopolitical competition.

Finally, our paper contributes to the vast literature in international relations that studies the determinants of foreign policy biases ('alignment'). The cornerstone of this literature is the work of Waltz (1979), introducing the concepts of bandwagoning (aligning with the strongest) and balancing (aligning with the weakest to balance out the exposure to the strongest GP). Since the early 2000s, scholars tried to explain the more nuanced pattern of alignment that emerged after the Cold War with the concept of hedging, a strategy where countries do not 'pick sides' but maintain good relations with all GPs (Roy, 2005; Wohlforth et al., 2007; Goh, 2006, 2007; Wivel, 2008; Nexon, 2009; Tessman, 2012; Selden, 2013; Guzansky, 2015; Kuik, 2016; Koga, 2018; Lim and Mukherjee, 2019; Smith, 2020;

[3]The literature has studied effects on various outcomes, including exports and imports (Yeats, 1990; Berger et al., 2013; Fuchs and Klann, 2013; Mityakov, Tang and Tsui, 2013; Du et al., 2017; Didier and Koenig, 2019; Davis, Fuchs and Johnson, 2019), economic and financial aid (Kuziemko and Werker, 2006; Dreher and Jensen, 2007; Kilby, 2009; Faye and Niehaus, 2012; Rommel and Schaudt, 2020), loans (Li and Ngo, 2018; Garmaise and Natividad, 2013; Ambrocio and Hasan, 2021), and even the extent of media coverage of human rights violations (Qian and Yanagizawa, 2009; Qian and Yanagizawa-Drott, 2017)

Strating, 2020; Hamdi and Salman, 2020; Ambrosio, 2021). We contribute to this literature by proposing and testing a theory that can speak to all these strategies and relate them to the optimal foreign policy.[4] Our key contribution is to show that the optimal strategy features elements of both balancing and bandwagoning: countries should be expected to align more with stronger great powers (as with bandwagoning), and the extent of their alignment should 'balance out' (be increasing in) the influence of the other GPs. Furthermore, we discuss how the combination of these features can explain the link between geopolitical competition and international fragmentation.

2 A model of bilateral foreign policies

Our model studies the determinants of the relation between a government d and multiple great powers (GPs) $f \in F$. We consider a game with the following timing and characteristics:

- The government publicly announces a transfer for each GP, $\mathbf{B} = (B_f)_{f \in F}$.
- Given the offer, GPs simultaneously choose whether to support the government ($f \in IN$) or oppose it ($f \in OUT$).
- Given the decisions of the GPs, with probability $Pr(FAIL)$ the government fails and with probability $1 - Pr(FAIL)$ it survives.
- A GP that supports the government obtains $-\kappa < 0$ when the government fails and obtains $B_f - \kappa$ when it survives. A great power that opposes the government obtains an outside option of 0, regardless of whether the government fails or survives.

We interpret the event $FAIL$ as the local ruler d losing power in its country (regime change or failure) and B_f as the benefit that great power f obtains from its relation with d. The assumptions that the benefit B_f is received only if the local ruler remains in power and that $-\kappa < 0$ imply that supporting a government when the government fails is worse than opposing it. This captures the idea that supporting a local ruler exposes to the risk that it fails. To focus on this feature in the simplest way, we assume that rejecting the offer yields a fixed outside option of 0.

[4] Lacking a formal theory this literature runs into several problems: different authors have conflicting views of what these strategies are, what purposes they serve, how they are related, and consequently, it is virtually impossible to test their relevance in world politics (for the latest review highlighting these issues see Haacke and Ciorciari, 2022; but see also Kang, 2009; Selden, 2013; Lim and Cooper, 2015; Liff, 2016; Haacke, 2019; or Jones and Jenne, 2021).

2.1 Exposure to foreign influence

To model how the probability of success depends on the choices of the GPs, we introduce an element of heterogeneity which we call *power* or *exposure* and denote by W_f. We assume that the power of the government, W_d, and the distribution of power of the great powers, $\mathbf{W} = (W_f)_{f \in F}$, is common knowledge.

Given the GPs' decisions, i.e., sets $IN \subseteq C$ and $OUT = F \setminus IN$, we define w_{OUT} as the share of total power controlled by the GPs that oppose the government, i.e., we let

$$w_{OUT} = \frac{\sum_{j \in OUT} W_j}{\sum_{j \in F} W_j + W_d}$$

Given a continuous and strictly increasing function $F(\cdot)$, we make the following assumption:

$$Pr(FAIL) = F(w_{OUT})$$

This assumption justifies our interpretation of W_f as the power that f has over d. Indeed, the characteristic W_f measures how the probability of d's survival depends on f's decision. In other words, W_f measures the importance for d of inducing f's support, capturing the intuitive idea that the decisions of *stronger* great powers are more important. Note that we are modeling power by its effect on the final outcome, not as an endowment of some specific resource. This allows us to think of power as generated by different types, or even by a different mix, of coercive resources. To simplify the notation, we set $F(0) = 0$ and $F(1) = 1$.

2.2 The GPs' problem: supporting or opposing a local ruler

A crucial feature of our setting is that the incentive of a GP to support a government depends on its expectations about what other GPs do. Given the vector of offers, $\mathbf{B}$, and the set of GPs that are expected to oppose the government, $OUT \subseteq F$, the decision of great power f on whether to support the government is as follows

$$f \in IN \quad \Longleftrightarrow \quad [1 - F(w_{OUT})]B_f - \kappa \geq 0$$

Naturally, this condition is more likely to be satisfied when B_f is greater. This means that B_f is a tool for the government to induce f to support it. But also, this condition is more likely to hold when w_{OUT} is smaller. Thus, the game features strategic complementarities: a GP is more willing to support the government when it expects the government to be supported by a more powerful coalition of GPs.

In international relations, there are at least two sources of strategic complementarities. One is the simple idea that that a country is more likely to reach its objectives when it convinces other countries to join its action, rather than to oppose it. Another more subtle source of strategic complementarity can be appreciated from the foreign policy stances of the United States and the Soviet Union during the Cold War (the so-called Truman and Brezhnev doctrines). Both powers pledged a military intervention whenever they *feared* that the other great power was about to make an intervention. In this case, the source of the strategic complementarity comes from the fear that the opponent might gain an advantage by catching the other power off guard.

2.3 The government's problem: buying the support of the GPs

Rather than restricting ourselves to a particular specification of the government's payoff, we will simply make the assumption that the objective of the government is to maximize its probability of survival at the minimum cost $\sum_{f \in F} B_f$.

However, because our model features strategic complementarities and GPs choose simultaneously, then the same offer $\mathbf{B}$ will typically be consistent with multiple equilibria. Thus, whether a particular offer $\mathbf{B}$ maximizes the probability of survival will typically depend on whether the government expects the GPs to coordinate on one particular equilibrium or on another one. In line with the unique implementation literature (Segal, 2003; Winter, 2004), we impose a robustness refinement.

Definition 1 (Robust offers) *A vector of offers $\boldsymbol{B}$ is robust if all GPs support the government in all SPE where the government offers $\boldsymbol{B}$.*

In the context of our game, this requirement is the same as imposing that the offers must be such that the only rationalizable response for each great power is to support the ruler. In other words, a local ruler that makes robust offers must not only make sure that each great power wants to support it individually but also that they do not end up withdrawing their support out of fear that another great power will do so.

An important feature to highlight is that this approach is equivalent to assuming that the government's objective is to maximize its probability of survival in the worst-case equilibrium compatible with the given offer, but it is different than assuming that the government makes worst-case *assessments*, as robust offers are only robust with respect to possible equilibrium responses.[5]

[5]There is a large literature in International Relations that focuses on worst-case scenarios (Tang, 2008).

2.4 Key intuition: the origin of foreign policy biases

To build intuition for our main result, we discuss a simple example where a government deals with two identical GPs f and $-f$, each with (relative) foreign influence w.

A natural strategy to buy off the support of the two GPs could be to simply match the value of their outside options. In this case, the government would offer

$$B_2 \quad \text{such that} \quad B_2 - \kappa = 0$$

Offering B_2 to both GPs is part of an equilibrium: if the two GPs actually expect the other to support the government, then it is rational for them to accept B_2. But the offer $\mathbf{B} = (B_2, B_2)$ is not robust: there is an equilibrium where neither of the two GPs accepts B_2 as they expect that the other will not.

An offer $\mathbf{B}$ that certainly satisfies our robustness requirement is $\mathbf{B} = (B_1, B_1)$, where $B_1 > B_2$ is the smallest transfer that induces f to support the government when $-f$ is expected not to support the government:

$$B_1 \quad \text{such that} \quad [1 - F(w)] B_1 - \kappa = 0$$

While by construction $\mathbf{B} = (B_1, B_1)$ is a robust offer, it is not cost-minimizing. Once the government offers B_1 to f, then $-f$ will anticipate that f will always support the government. As a consequence, the government can reduce the offer that it makes to $-f$ from B_1 to $B_2 < B_1$, without compromising the robustness of its offer. Note that, in this example, f and $-f$ are identical. Yet, one receives $B_1 > B_2$ and the other B_2. In this sense, the optimal robust foreign policy is biased in favor of one or the other GP.

Finally, note that, because f and $-f$ are identical, the government is indifferent between offering (B_1, B_2) or (B_2, B_1). So, this suggests that there may be multiple robust optimal policies. However, as we state in the next section, all robust optimal policies can be thought of as the result of a two-step procedure: assign a rank to each GP and then offer B_1 to rank 1 and B_2 to rank 2.

2.5 The optimal foreign policy

Generalizing the logic of Section 2.4 to the case with multiple and heterogeneous GPs, we reach our main result:

Theorem 1 *Any cost-minimizing robust offer can be constructed as follows:*

- *Assign a rank to each f so that more powerful GPs obtain a higher rank;*

- *To each GP, offer the smallest B that induces it to support the government when all and only higher-ranked GPs support the government.*

The result generalizes the logic discussed for the case with two identical GPs. Once the government makes an offer that guarantees the support of a GP even when all other GPs oppose it, the government can reduce the offers that it makes to the other GPs, without reducing its probability of survival and without compromising the robustness of its offer.

By dealing with heterogeneous GPs, Theorem 1 uncovers a relation between the optimal ranking and the foreign influence of the GPs. In particular, the ranking is pinned down by the distribution of power: higher ranks are assigned to stronger GPs. To understand this, note that every equilibrium offer must be increasing in the power of all lower-ranked GPs and decreasing in the power of all higher-ranked GPs. Thus, to minimize total costs, the government prefers to assign higher ranks to stronger rather than weaker GPs.

The next section provides a characterization of the optimal transfers in terms of the balance of power between GPs, applying it to various applied questions.

3 Applications: observable implications of the theory

This Section applies our model to explain how the rise and fall of international fragmentation can be linked to the rise and fall of great powers. As a first step in this direction, we expand the model to account for multiple governments and multiple periods. We will do this in the simplest possible way, to stay as close as possible to Theorem 1. To this end, we assume that, in every period, every government makes its foreign policy decisions independently of the other governments. Additionally, we abstract away from the complexities of repeated games and we simply assume that every government will make offers consistent with Theorem 1 in every period, given its vector of exposures in that period. Note that the repetition of the (unique) SPE of the static game corresponds to an equilibrium of the associated repeated game for every discount factor.

For concreteness, we study the case with two great powers, f and $-f$, which can be thought of as the United States and a competing GP (the Soviet Union or China). We denote the transfer received by f from d in period t as $B_{d,f,t}$ and we let $w_{f,d,t}$ be government d's exposure towards GP f in period t. In this setting, the rise and fall of a GP can be captured by shifts in $w_{f,d,t}$ and/or $w_{-f,d,t}$. Finally, to simplify the exposition we assume that $w_{f,d,t} \neq w_{-f,d,t}$ and $w_{f,d,t} + w_{-f,d,t} = 1$ for every d and t. The first assumption gets rid of ties, implying that there is always a unique SPE in the static game. The second helps us clarify that all of our comparative statics exercises are about relative shifts in the balance of

power between GPs (the same results could be established with alternative approaches).

3.1 Characterization of the optimal foreign policy

We start by characterizing the optimal foreign policy in terms of the balance of power. To ease notation, define $\beta(w) := \frac{F(w)}{1-F(w)}$; note that $\beta(w)$ is strictly increasing in w, and $\beta(w) > 0$ for every $w > 0$.

Corollary 1 *The optimal strategy of government d in period t is as follows:*

$$\text{if } w_{f,d,t} > 0.5, \qquad B_{d,f,t} = [1 + \beta(w_{-f,d,t})]\kappa_{d,t} \qquad \text{and} \qquad B_{d,-f,t} = \kappa_{d,t},$$

and

$$\text{if } w_{f,d,t} < 0.5, \qquad B_{d,f,t} = \kappa_{d,t} \qquad \text{and} \qquad B_{d,-f,t} = [1 + \beta(w_{f,d,t})]\kappa_{d,t}$$

Note that this characterization is derived directly from Theorem 1. A government more exposed to GP f will give the smallest transfer that induces GP f to support it even when $-f$ does not. As a result, such transfer must be such that $[1 - F(w_{-f,d,t})]B_{d,f,t} = \kappa_{d,t}$, i.e., $B_{d,f,t} = [1 + \beta(w_{-f,d,t})]\kappa_{d,t}$. Instead, the optimal transfer for $-f$ must induce $-f$ to support d when f supports it. Because the probability of government survival is 1 when every GP supports the government, d simply offers $B_{d,-f,t} = \kappa_{d,t}$.

3.2 The changing importance of geopolitics: foreign policy biases

The impact of foreign influence ('geopolitics') can be thought of as being more (less) important when it creates greater distortions in international allocations. A natural expectation is that GPs who are more capable of exerting foreign influence should obtain more favorable treatments, and thus distort more allocations in their favor: a simple monotonic relation between foreign influence and such distortions. This section argues that this intuition might be misguided.

We start by defining the concept of foreign policy bias (FPB) using as a benchmark the transfer that matches the value of the outside option (which is just $\kappa_{d,t}$):[6]

[6]Note that $\kappa_{d,t}$ corresponds to what governments give to the GP they are least exposed to. Thus, defining FPB using $\kappa_{d,t}$ as a benchmark means that a reduction in d's FPB towards f means that government d is treating f and $-f$ more similarly, and that d is adopting more similar policies towards f compared to the policies of governments that are instead biased in favor of $-f$. In this sense, our definition of FPB captures two 'types' of biases. Another desirable feature of using $\kappa_{d,t}$ as a benchmark is that it also gives an indication of the extent to which robustness concerns are shaping a government's foreign policy. Indeed, as discussed

Definition 2 *The extent of foreign policy bias of government d towards GP f in period t is*

$$FPB_{f,d,t} := B_{f,d,t} - \kappa_{d,t}.$$

Note that the definition allows governments to display FPBs in favor of all the GPs they are exposed to, which would be consistent with a setting where FPB towards f is increasing in f's foreign influence. However, Corollary 1 shows that (with two GPs), governments only bias their foreign policies in favor of the GP they are most exposed to. In particular, we have

$$FPB_{f,d,t} = \mathbf{1}\{w_{f,d,t} > 0.5\}\beta(w_{-f,d,t})\kappa_{d,t}$$

Thus, according to our model, any attempt to posit a monotonic relation between a country's exposure to foreign influence and its FPB will be problematic. For instance, if we try to identify such a relation using 'small' changes in foreign influence (i.e., for fixed $\mathbf{1}\{w_{f,d,t} > 0.5\}$), we would typically detect a negative relation between a country's exposure to f and its FPB towards f. On the other hand, changes that are sufficiently large to affect $\mathbf{1}\{w_{f,d,t} > 0.5\}$ may turn out to be compatible with a positive relation.

The next result characterizes the relatively complex link between the overall extent of a government's FPBs and the balance of power between GPs.

Corollary 2 *For every d, $FPB_{f,d,t} + FPB_{-f,d,t} = \min\{\beta(w_{f,d,t})\kappa_{d,t}, \beta(w_{-f,d,t})\kappa_{d,t}\}$*

From this result, we can see that, in a context where all governments are more exposed to GP f than GP $-f$, then any increase (decrease) in the foreign influence of GP f will decrease (increase) the overall extent of FPB. Thus, according to our model, a world with larger GP imbalances will be characterized by fewer FPBs, reducing the value of being a great power, including for the strongest one. This result can explain why the fall of the Soviet Union led to a period where foreign policies became more neutral (less biased), rather than extremely biased in favor of the United States. In this sense, our model is consistent with the observation that international politics becomes negligible in a world with one dominant GP, and then becomes important again when a new GP rises, underscoring the idea that foreign policy biases are not generated by foreign influence but rather by geopolitical competition.

in Section 2.4 an offer of $\kappa_{d,t}$ to all GPs is the minimal transfer for which there is an equilibrium where all GPs support the government.

3.3 From potential to actual spheres of influence

The most typical form of international fragmentation is a scenario where countries appear to 'organize' into spheres of influence (SOI), apparently picking sides between great powers. This is such a common pattern in history that researchers are already thinking about the effects of the US-China competition by assuming that countries must pick sides between them, even if most countries currently have deep ties with both.[7] While there is no consensus on the definition of a SOI, two typical features are:

(a) f has a *predominant* level of influence over the countries in its SOI;

(b) Countries in f's SOI display *deference* towards f, but not towards $-f$.

The objective of this section is to show that this type of polarization naturally emerges from the optimal foreign policy decisions of all countries in the international system. As a first step, we introduce the notion of a *potential* sphere of influence, which will also be important for our empirical analysis.

Definition 3 *The potential SOI of GP f in period t is the set of countries that are more exposed to f than $-f$, i.e., $D_{f,t} = \{d \in D : w_{f,d,t} > w_{-f,d,t}\}$*

Note that a GP's potential SOI is simply defined in terms of the geographic area (the set of countries) where such GP is more or less powerful than its competitor. So, this definition only captures feature (a) of what constitutes a SOI (and in a very narrow sense). Yet, from Corollary 1, we see that by combining this definition with the optimal foreign policy of the countries involved, we can also account for feature (b). In particular,

$$B_{d,f,t} = \begin{cases} [1+\beta(w_{-f,d,t})]\kappa_{d,t} & \text{if } d \in D_{f,t} \\ \kappa_{d,t} & \text{if } d \in D_{-f,t} \end{cases} \qquad B_{d,-f,t} = \begin{cases} \kappa_{d,t} & \text{if } d \in D_{f,t} \\ [1+\beta(w_{f,d,t})]\kappa_{d,t} & \text{if } d \in D_{-f,t} \end{cases}$$

Recall that $\beta(w) > 0$ for every $w > 0$. So, the result implies that countries will display qualitatively different behaviors depending on whether they are more exposed to f or to $-f$. Countries in the potential SOI of f will have a much more favorable foreign policy towards f compared to the countries outside of it, even if, in principle, they might have the same exposure towards f. At the same time, countries in the SOI of f will treat $-f$ with much less deference than the other countries. In this sense, even if our theory studies a setting where countries can cooperate with all GPs, the optimal strategy implies that they will behave as if they are 'picking sides' between them.

[7] See, for instance, the analyses in Garcia-Saltos et al. (2023). For historical examples of periods characterized by SOI, see Etzioni (2015) or Jackson (2020).

Importantly, note that the extent to which the countries in the two potential SOI behave differently towards the two GPs is itself determined by the balance of power between GPs. This is especially evident when we compare the transfers received by the two GPs:

$$B_{d,f,t} - B_{d,-f,t} = \begin{cases} \beta(w_{-f,d,t})\kappa_{d,t} & \text{if } d \in D_{f,t} \\ -\beta(w_{f,d,t})\kappa_{d,t} & \text{if } d \in D_{-f,t} \end{cases}$$

The above expression implies that when two GPs reach similar levels of influence, countries in their 'potential' SOI adopt increasingly more distinct foreign policies, leading to the formation of 'actual' SOI. This is consistent with the observation that when a rising power catches up with an established GP, we typically observe that the world splinters into spheres of influence. More in general, our model is consistent with very heterogeneous situations. For instance, it can rationalize a situation where some countries have (almost) unbiased foreign policies, whereas others have extremely biased foreign policies. Such a scenario could emerge in a setting where there is a global hegemon capable of projecting influence everywhere, and then a regional GP who is stronger than the hegemon in its own region, but who cannot project any meaningful amount of influence outside of it.

Finally, the next result connects our discussion about SOI to the previous section.

Corollary 3 *For every d,* $|B_{d,f,t} - B_{d,-f,t}| = FPB_{d,f,t} + FPB_{d,-f,t}$

This result immediately follows from the optimal foreign policy of countries: they bias their policies in favor of only one GP, so the difference in what GPs obtain from each country is also the entire foreign policy bias of that country. In this sense, we can say that the optimal foreign policy of countries *creates* competition between GPs, endogenously leading to a zero-sum-like environment. In particular, this discussion clarifies that such competition can be thought of as competition over potential SOI, as adding one extra country to a GP's SOI leads that GP to capture the whole benefit of being a GP (the whole foreign policy bias). Because potential SOI are only defined in terms of whether one GP is stronger than the other GP, it should not come as a surprise if such competition leads to 'races', where GPs seem particularly interested in outdoing each other and showing their superiority.

3.4 Observable implications

As it is clear from the previous sections, the most peculiar feature of our theory is that the extent of transfers that GP f receives from a particular country depends on whether that country is in the potential SOI of f or $-f$ *and* that country's exposure to the influence of

$-f$. For this reason, our empirical focus will be on how countries adjust their foreign policy towards a particular GP when we observe changes in another GP's influence.

For clarity, consider a case with only two countries, d, and $-d$. Consider two periods, T_0 and T_1, we assume that $w_{-f,d',T_0} \neq w_{-f,d',T_1}$ for $d' \in \{d, -d\}$. So, T_0 is before the 'collapse' or the 'rise' of $-f$, whereas T_1 is afterward. For simplicity, we assume that d is in f's SOI in both T_0 and T_1, whereas $-d$ is in $-f$'s SOI both in T_0 and T_1. In other words, we are abstracting away from the possibility that such events will change the SOI of the GPs.[8]

First, note that for d in f's SOI, we have

$$\ln(B_{f,d,T_1}) - \ln(B_{f,d,T_1}) = \ln(1 + \beta(w_{-f,d,T_1})) - \ln(1 + \beta(w_{-f,d,T_0})) + \ln(\kappa_{d,T_1}) - \ln(\kappa_{d,T_0})$$

Instead, for $-d$ in $-f$'s SOI,

$$\ln(B_{f,-d,T_1}) - \ln(B_{f,-d,T_1}) = \ln(\kappa_{d,T_1}) - \ln(\kappa_{d,T_0})$$

Subtracting the left-hand side in the above equations and rearranging, we obtain:

$$\ln(B_{f,d,T_1}) - \ln(B_{f,d,T_1}) - (\ln(B_{f,-d,T_1}) - \ln(B_{f,-d,T_1})) = \ln\left(\frac{1 + \beta(w_{-f,d,T_1})}{1 + \beta(w_{-f,d,T_0})}\right)$$

This discussion leads to the following result:

Corollary 4 *Suppose that the potential SOI of f and $-f$ do not change between T_0 and T_1. Then:*

- *If $w_{-f,d,T_1} < w_{-f,d,T_0}$, then* $\ln(B_{f,d,T_1}) - \ln(B_{f,d,T_1}) - (\ln(B_{f,-d,T_1}) - \ln(B_{f,-d,T_1})) < 0$
- *If $w_{-f,d,T_1} > w_{-f,d,T_0}$, then* $\ln(B_{f,d,T_1}) - \ln(B_{f,d,T_1}) - (\ln(B_{f,-d,T_1}) - \ln(B_{f,-d,T_1})) > 0$

These predictions imply that, with an event like the collapse of the Soviet Union, the difference between the transfers received by the United States from countries in its potential SOI and the countries outside of it should be smaller than before the collapse of the Soviet Union. Instead, we should expect the rise of China to affect the United States in the opposite way: the difference in policies towards the US of countries in the potential SOI of the US and the other countries should increase as China grows.

As we can see in Figure 1, the observed pattern of cooperation towards the United States is consistent with the predictions in Corollary 4. Indeed, the cooperation towards the US of countries in the Soviet (potential) SOI converged with that of countries in the US (potential)

[8] In the empirical analysis we discuss how potential changes in the SOI affect the estimates, and how to detect such changes.

sphere starting in 1989 (the year of the fall of the Berlin Wall). Instead, we see a gradual divergence in the cooperation towards the US of the potential SOI of the US and China. Such divergence became visible in the mid-2000s.

4 Empirical analysis

From Theorem 1 we can see that Corollary 4 can be easily generalized to the case with multiple GPs. In particular, we can show that a country's foreign policy towards a particular GP f after the fall of the Soviet Union and China's rise will follow opposite trajectories depending on whether that country is more exposed to GP f or the Soviet Union and whether it is more exposed to f or China, respectively. Our empirical analysis will focus on testing this peculiar prediction.

4.1 Measuring potential spheres of influence

For our empirical analysis, we need to determine the potential SOI of each GP relative to the Soviet Union/Russia and then relative to China. Note that, as we are considering the case with multiple GPs, potential SOI are not an absolute characteristic of a GP, but rather a relative one. In particular, when we consider the potential SOI of GP f to study the effect of the collapse of the Soviet Union, we will be referring to those countries that are more exposed to GP f than the Soviet Union, which is likely a different set of countries than those more exposed to GP f than China.

As a first step to determine every GP's potential SOI we must settle on a measure of 'exposure' or 'power'. In our model, we considered a great power as more powerful than another one when its decision to support/oppose the government had a larger impact on the probability of survival of the government (the government's political stability) compared to another GP. For the empirical analysis, we must abandon this fairly general definition and measure power from observable characteristics. In our main baseline specification, we focus on economic power, the ability of a country to destabilize another one by harming its economy. A simple way to measure this is to define the power of every great power f over a government d in period t as the value of the trade flow between the two, $Trade_{fdt}$.[9] In other words, this measures power as the ability of a country to manipulate trade flows causing economic imbalances in another country. Note that we only wish to determine whether a

[9]Our source of data is the publicly available CEPII Gravity, http://www.cepii.fr/. Such a dataset includes yearly observations at the country pair level on imports, exports, population, GDP, and many other variables used in Gravity models. The dataset covers the 1949-2019 period. Appendix B details the construction of trade flows.

country is more exposed to one GP or another. For this reason, using trade flows to construct potential SOI will give the same result as using any country-specific increasing function of trade (e.g., trade dependence). With this in mind, we will say that a country d is in the potential SOI of GP f (relative to the Soviet Union) if $Trade_{f,d,1988} > Trade_{RU,d,1988}$ and in the Soviet/Russian potential SOI (relative to f) if $Trade_{RU,d,1988} > Trade_{f,d,1988}$. Instead, it is in the potential SOI of f (relative to China) if $Trade_{f,d,2001} > Trade_{CN,d,2001}$ and in the Chinese potential SOI (relative to f) if $Trade_{CN,d,2001} > Trade_{f,d,2001}$.

4.2 Measuring bilateral foreign policies

For what concerns our outcome variable, we introduce a new measure which we call bilateral foreign policy. We construct this measure using data on news articles from the GDELT dataset.[10] The GDELT dataset employs a machine-learning algorithm to infer the occurrence of a specific type of interaction (e.g., a state visit) between country pairs using news articles from multiple media agencies (see Leetaru and Schrodt 2013 for details). GDELT generates a separate variable for each type of interaction of the CAMEO taxonomy of international interactions (Gerner, Schrodt and Ömüur Yilmaz, 2009). From all these categories we select a subset of relevant cooperative interactions and construct an index based on the number of times in a year in which a particular country pair engages in the different types of interaction that we focus on.

Table 1 reports the interactions that we consider. Our guiding principle in selecting such variables was to keep our final result as simple as possible while still capturing those events that unambiguously reflect a country's active effort to increase/decrease its cooperation (current or future) with another country, which we take as the main manifestation of a country's foreign policy.[11] To construct an index out of all these different interaction types, we weigh each type using a standard measure of cooperativeness of international interactions, the Goldstein score, which we also report in Table 1.[12] Our final index is a country pair-year-specific variable computed as the weighted sum of the number of interactions of the types in Table 1 that are reported for that country pair in that year.

[10] The GDELT dataset is publicly available, https://www.gdeltproject.org

[11] We focus on events that represent a government's normal/routine operations, rather than some action dictated by contingencies. Thus, we ignore cooperative events related to incidents or conflicts, such as intelligence sharing, mediation activities, aid provision, diplomatic recognitions/breaks, and judicial cooperation.

[12] The score is based on aggregating the responses of a panel of International Relations scholars who were asked to give a score from -10 to 10 for every event, where positive scores are for cooperative interactions, negative scores are for conflictual events, and the magnitude captures the extent of cooperation (conflict) in an interaction (Goldstein, 1992).

4.3 Baseline analysis

This section presents the empirical evidence of how countries adjusted their foreign policies in response to the collapse of the Soviet Union and the rise of China.

Let $-f$ be either China or the Soviet Union (Russia, after 1991), and let f be any GP except for $-f \in \{RUS, CHN\}$.[13] We define $\underline{T}_{-f}$ and $\bar{T}_{-f}$ as the first and last year of the event of interest: $\underline{T}_{-f} = 1989$ and $\bar{T}_{-f} = 1994$ for the fall of the Soviet Union and $\underline{T}_{-f} = 2001$ and $\bar{T}_{-f} = 2013$ (the last year in our sample) for the rise of China. While, of course, many things happened in each $t \in [\underline{T}_{-f}, \bar{T}_{-f}]$, our key assumption is that (conditional on observables) the foreign policy shifts of these periods are responses to a reduction in the relative power of the USSR/Russia (for $t \in [1989, 1994]$) and an increase in China's relative power (for each $t \geq 2001$).

Let $\mathbf{X}_{ft}$ and $\mathbf{X}_{ft}$ be the vectors of 'gravity controls' (the log of GDP, the log of Population, and GDP per capita). Letting $\ln(Y_{fdt})$ be the log of our outcome of interest, our baseline specification estimates the following equation:

$$\begin{aligned}\ln(Y_{fdt}) =& \beta_1^{-f} \times \mathbf{1}\{Trade_{f,d,\underline{T}_{-f}} > Trade_{-f,d,\underline{T}_{-f}}\} \times \mathbf{1}\{\underline{T}_{-f} \leq t \leq \bar{T}_{-f}\} + \\ &+ \alpha_1 \ln Trade_{f,d,t} + \alpha_2 \mathbf{X}_{ft} + \alpha_3 \mathbf{X}_{dt} + \alpha_t + \alpha_{fd} + \varepsilon_{fdt} \end{aligned} \tag{1}$$

With this specification, β_1^{-f} captures a Diff-in-Diff type of variation.[14] The first difference is the change during $t \in [\underline{T}_{-f}, \bar{T}_{-f}]$ of the foreign policy towards f of countries in the potential SOI of f, the second difference is the change during $t \in [\underline{T}_{-f}, \bar{T}_{-f}]$ of the foreign policy towards f of countries in the potential SOI of $-f$. A positive (negative) coefficient β_1^{-f} means that the first change is larger (smaller) than the second. Our model predicts $\beta_1^{RUS} < 0$ and $\beta_1^{CHN} > 0$ (see Corollary 4 for the intuition).

Finally, our model also tells us that the rise and fall of GPs should affect how countries treat one GP relative to another GP. To test this, we can simply estimate the following:

$$\begin{aligned}\ln(Y_{fdt}) - \ln(Y_{-fdt}) =& \beta_2^{-f} \times \mathbf{1}\{Trade_{\underline{T}_{-f},f,d} > Trade_{\underline{T}_{-f},-f,d}\} \times \mathbf{1}\{\underline{T}_{-f} \leq t \leq \bar{T}_{-f}\} + \\ &+ \alpha_1 \ln Trade_{f,d,t} + \alpha_2 \mathbf{X}_{ft} + \alpha_3 \mathbf{X}_{dt} + \alpha_t + \alpha_{fd} + \varepsilon_{fdt} \end{aligned} \tag{2}$$

In this case, $\beta_2^{-f} < 0$ is consistent with countries in both f's relative SOI and $-f$'s SOI treating f and $-f$ more equally; on the other hand, $\beta_2^{-f} > 0$ is consistent with countries in

[13] In our baseline specification we do not restrict attention to a particular set of countries, so f can be any country. We perform various validation exercises to make sure that our results also hold when we restrict attention to countries that can be unambiguously defined as great powers.

[14] The variation in $\mathbf{1}\{Trade_{\underline{T}_{-f},f,d} > Trade_{\underline{T}_{-f},-f,d}\}$ and $\mathbf{1}\{\underline{T}_{-f} \leq t \leq \bar{T}_{-f}\}$ is captured by the inclusion of α_{fd} and α_t, respectively.

both f's relative SOI and $-f$'s relative SOI treating f and $-f$ more unequally. In this case, our model predicts $\beta_2^{RUS} < 0$ and $\beta_2^{CHN} > 0$.

4.3.1 Discussion of the specifications

First of all, it is worth noting that the tests implied by Equation 1 and 2 are not redundant: β_1^{-f} and β_2^{-f} look at two different 'types' of polarization. Indeed, β_1^{-f} is about convergence/divergence in the attitudes of different countries towards f, instead β_2^{-f} is about convergence/divergence in a particular country's attitudes towards f relative to $-f$. Our model shows that the dynamics of these two types of polarization should respond in the same way to changes in the balance of power between GPs, but from an empirical perspective, these two tests look at different variations.

The combination of specifications 1 and 2 allows us to perform a test that sets our model apart from alternative theories. In particular, if transfers were simply a function of a GP's foreign influence, then we would find that all our coefficients are zero. Instead, if the transfers received by GP f are an increasing function of f's relative influence $\tau(w_{f,d,t})$, then it becomes important to estimate both 1 and 2. Indeed, if such a model were correct, then the fall of the Soviet Union would lead all countries to increase their transfer towards GP f, whereas the rise of China would lead them to reduce it. In such a world, we would find $\beta_1^{RUS} < 0$ and $\beta_1^{CHN} > 0$ (as predicted by our model) if and only if $\tau(\cdot)$ were concave. However, by the same argument, concavity should lead to the opposite pattern for $-\ln(Y_{-fdt})$, thus $\beta_2^{RUS} > \beta_1^{RUS}$ and $\beta_1^{CHN} > \beta_2^{CHN}$, and potentially even $\beta_2^{RUS} > 0 > \beta_2^{CHN}$.[15]

Finally, a potential concern might emerge from the fact that we do not observe the actual transfer of utility that we characterize in the model, but only the number of news reports about cooperation agreements between countries. While we focused on events that are likely to make the news for any country pair, there is no doubt that our data will tend to be affected by the propensity of the media to report about some countries more than others. This might affect our estimated coefficients if media coverage changes over time, and if it correlates with whether a country is more exposed to one GP or another one. For instance, the collapse of the Soviet Union might have increased the media attention on countries in the 'Soviet-sphere', leading to an increase in news coverage in the 1989-1994 period for countries in SOI_{-f} relative to the countries in SOI_f, which might explain $\beta_1^{RUS} < 0$. On the other hand, $\beta_1^{CHN} > 0$ would require that media attention towards countries in the 'Chinese-

[15]This discussion is implicitly assuming that countries in SOI_f are on average more exposed to f than countries in SOI_{-f}. Note that if the exposure to f and $-f$ mirror each other in their respective SOI, then with $\tau(\cdot)$ concave we would have $\beta_2^{RUS} \approx 0$ and $\beta_2^{CHN} \approx 0$. In our robustness checks we show that including a measure of relative power in our specification does not change the results, even when we allow a flexible specification that allows for a concave function, and when we interact it with $\mathbf{1}\{\underline{T}_{-f} \leq t \leq \bar{T}_{-f}\}$.

sphere' decreased in the 2000s. To address these issues, we show in our robustness checks that our results cannot be driven by any country-year-specific change in media attention, as the estimated coefficients are hardly affected by the inclusion of country-year fixed effects.

4.3.2 Results

Table 2 shows that our model accurately describes how countries adjusted their foreign policy in response to the collapse of the Soviet Union and the rise of China.

We see that the fall of the Soviet Union de-polarized the international environment in two ways. First, countries in the SOI of GP f and countries in the SOI of the Soviet Union started treating f more similarly (Columns (1) and (2) in Panel A). Second, both groups started treating f and the Soviet Union more similarly (Columns (3) and (4) in Panel A). In particular, note that the estimated coefficients in Panel A are not only negative in a statistically significant way, but they also imply large effects; for instance, the coefficients imply a 2/3 reduction in the extent of polarization in Europe in the 1989-1994 period, after conditioning on observables and fixed effects.[16]

Table 2 shows that the rise of China has instead triggered a process of repolarization. Indeed, we find a positive and statistically significant coefficient which also implies large effects. In particular, the coefficients of Panel B Columns (1) and (2) imply that a country in the potential SOI of f would have a 66% larger cooperation index with GP f relative to another (near) identical country who is in the Chinese potential SOI. Finally, just as in the case of the Soviet Union, we see that such polarization is also evident in how countries treat GP f relative to China. In particular, the coefficients in Columns (3) and (4) of Panel B imply that a country in f's potential SOI would not only have a 66% higher cooperation with f than a similar country in the Chinese SOI, but only 34% of the other country's level of cooperation with China.[17] Finally, to understand how to interpret these differences, note that they can explain more than 40% of the observed post-2001 polarization even if we start from a scenario with zero polarization and conditioning on observables and fixed effects.[18]

Table 3 shows that we find even larger coefficients when we focus on the United States

[16]This number can be deduced by the following operation: $0.66 = 1 - \frac{-0.40+0.61}{0.61}$ and $0.60 = 1 - \frac{-0.97+1.62}{1.62}$ where -0.41 and -0.97 are the estimated coefficients in Column (1) and (3) and 0.61 and 1.62 are our benchmark: the pre-1989 difference (in the respective outcome) between the average European country in f's SOI and the average European country in the Soviet SOI.

[17]For this, we are using the coefficient of Panel B columns (2) and (4). In particular, coefficient 0.66, Column (2), tells us that a country in f's SOI (say A) would have 66% more cooperation with f than a similar country (say B) in the Chinese SOI and who started from the same pre-2001 cooperation towards f. Column (4) further tells us that country A would have 130% more cooperation with f than with China compared to country B, which is consistent with B having 66% higher cooperation with China than A.

[18]This is derived from comparing the estimated coefficients with the benchmark, which is the post-2001 average polarization (difference in the outcomes across potential SOI).

as the unique GP. In this case, the coefficients imply a full convergence in foreign policies towards the US of the European countries in the US vs Russian SOI. The only exception to the observation that the coefficients for the US-only analysis are greater is in Panel B, columns (3) and (4), i.e., the analysis of how countries treated the US relative to China in the years following 2001. However, even in this case, we find large coefficients, and larger than when we only look at the foreign policies towards the United States. This latter observation, which can also be appreciated from Table 2, is important, as in the previous section we discussed that this is inconsistent with an alternative theory where transfers are simply a result of a country's relative exposure to the GPs.

4.4 Robustness: definitions, specifications, inference

In this Section, we summarize our robustness checks (collected in Appendix **??**).

Outcome definitions. As discussed in Appendix B, before analyzing our outcomes derived from GDELT, we apply a transformation to avoid dropping the observed zeros when taking the log. In Section **??** we show that our results do not change when we avoid any transformation or when we make other standard transformations.

Fixed effects. Section **??** shows that all the results are robust to every fixed effect specification that is less stringent than our baseline specification, but also a specification that is more stringent than our baseline. Panel D in Table **??** shows that the results are robust to the inclusion of a GP-year fixed effect, a country-year fixed effect, and a time-varying fixed effect for each pair of geopolitical regions.[19] As we discuss in Section **??**, these exercises make sure that our results do not depend on time-varying changes to media attention, or the formation/dissolution of supranational institutions (e.g., the European Union or the USSR).

Additional Controls. Section **??** studies relatively minor deviations from our baseline specification. It shows that our results do not change when we change controls (e.g., omitting trade flows, adding trade dependence, etc.). Moreover, Section **??** shows that results are robust to the inclusion of the lagged outcome.[20]

Standard Errors. Section **??** shows that the statistical significance of our estimates is robust to alternative standard error specifications. In our baseline analysis, we use two-way clustered standard errors (country-pair and year). This choice does not account for the possibility of dependence across country pairs of the errors, which is likely if our model

[19]The netting out of all time-varying characteristics of a great power-government pair (say f and d) that are the same across other great power-government pairs (say f' and d'), where great powers f and f' are in the same geopolitical region S, and governments d and d' are also in the same geopolitical region S'.

[20]Results are robust even when allowing outcome lags to have a time-varying effect, a great power-specific effect, or a government-specific effect.

is correct.[21] Tables **??** and Table **??** show that our inference is robust to accounting for dependence across country pairs, as we show our coefficients to be significant even when we adopt three-way clustered standard errors (country, GP, year), or Driscoll-Kraay standard errors (Driscoll and Kraay, 1998).[22]

4.5 Validation: power, outcomes, subsamples

Appendix **??** validates our results by replicating the analysis with an alternative measure of power, other outcomes from GDELT, and restricting the analysis to some subsamples.

Alternative measure of power. To make our baseline analysis as transparent and straightforward as possible, we designed SOI using trade flows. Thus, our analysis ignores military power and the possibility that different trade compositions (e.g. exporting arms rather than luxury goods) with the same value can generate different power levels. We address these limitations in two validation exercises. First, we design potential SOI with a relatively sophisticated measure of power: the Formal Bilateral Influence Capability (FBIC).[23] Such variable is a composite measure of power, based on arms transfers, aid dependence, membership in intergovernmental organizations, and other similar features (Moyer et al., 2018). Second, we use a much less sophisticated measure of exposure: geographic distance. For both exercises, we successfully replicated our results.

Alternative outcomes from GDELT. In our main analysis, we used a weighted index computed from cooperative events between country pairs. In Section **??**, we show that we can replicate our analysis by focusing on alternative definitions of such an index.

Subsamples. Our final validation exercise replicates our analyses in different subsamples of interest. In line with our interpretation of the model describing how great powers affect domestic decision-making, we focus on subsamples where only great powers can be great powers, and they cannot be (regular) countries. Section **??** shows that our results hold for various definitions of great powers. In the most restrictive definition of great powers, we consider only 8 great powers and we thus lose more than 85% of our entire sample. In the least restrictive case, we study 40 great powers (and lose 70% of our sample).[24] Finally, Section **??** replicates the analysis focusing on asymmetric relations: country pairs where

[21] Recall that the key testable prediction of our model is that bilateral outcomes depend on third-party characteristics.

[22] As discussed in Section **??**, unlike three-way clustering (by great power, government, and year), Driscoll-Kraay standard errors allow for a very general form of dependence across country pairs *and* auto-correlation in such component. In our robustness checks, we allow for up to seven lags of dependence across country pairs.

[23] This measure is freely accessible from `https://korbel.du.edu/fbic`.

[24] We define as great powers those countries that are ever in the top 5, 10, 20, or 30 in terms of GDP. See Table **??** for a list of all countries that qualify as great powers and the sample size of each subsample.

country d is more trade dependent on f than vice versa.

5 Future directions and model's extensions

One of the main objectives of this paper is to provide an empirically-grounded foundation to study various applications related to geopolitical competition. We now discuss some of these applications highlighting the unique perspective offered by our model.

5.1 Great Power Wars and arms' races

The first natural extension of our model would be to endogenize the distribution of power. For instance, we could study great powers (great powers) who invest in their coercive capacities or can spend resources to harm the coercive capacities of other great powers (e.g., with a conflict).

Our model provides a unique perspective on this theme because the payoff of a country jumps up (down) when its power rank increases (decreases). As a first implication, note that arms race are very likely occurrences in our model: the incentive to invest in power crucially depends on whether other countries invest in power, as countries compete to obtain higher power ranks. Second, within our model, countries might be willing to invest resources into weakening their competitors, e.g., participating in costly conflicts that can only destroy the opponent's resources.

In addition, note that our model would make predictions on the conflict pattern that are very different from the standard wisdom that conflicts occur when strong countries find it profitable to prey on small ones. First, within our model, the source of tension is asymmetric but in the opposite direction: conflicts emerge from the desire of a country to overcome a stronger one. Thus, we should expect countries to display aggression towards stronger ones, a puzzling pattern that has spurred an entire literature in international relations (Paul, 1994). Second, great powers should be more likely to fight when they are more symmetric, as in that case, a small change in the distribution of power (a less costly conflict) can lead to a change in rank, thus a large change in the equilibrium payoff. Again, the idea that power parity may be conducive to war is at odds with the standard theory but not with the evidence on both historical and modern conflicts (Organski and Kugler, 2015; Lemke, 2002; Allison, 2017; Renshon, 2017).

5.2 Geopolitical polarization and strategic protectionism

Another natural way to endogenize the distribution of power is to take the perspective of a local power (a government) who can change its relative dependence on the various great powers (e.g., with its trade policies).

In this case, we can show that when the local ruler has the opportunity to redirect its trade away from one great power and towards another one, it would always want to increase its relative dependence on the more powerful of the two. In other words, our model introduces a force that pushes local rulers to prefer polarization to diversification. Such finding is consistent with episodes of geopolitical polarization such as the Cold War: the formation of separate blocs that barely interact with one another.

Finally, this extension would highlight that countries have an incentive to reduce their overall exposure towards great powers (e.g., reduce trade volumes), speaking to the existence of *strategic industries* that receive protection from foreign competition. Importantly, such incentive would depend on the overall distribution of power.

5.3 Ideological competition

In our model, we take a reduced-form perspective assuming that local rulers send transfers to great powers. But these relationships are more complicated in the real world. For instance, the same transfer might be more costly if given to one GP rather than another one, depending on whether such GP is viewed with favor or disfavor by the local population. Thus, in an extension, it would be natural to assume heterogeneity in this type of cost and to assume that GPs can invest in reducing it (e.g., with ideological and cultural propaganda).

Importantly, this type of heterogeneity should be reflected in the equilibrium transfers. Indeed, recall from Section 2.4 that the local ruler is indifferent on which great power to favor when they have the same power. Adding cost heterogeneity would break the indifference and lead the local ruler to align itself with the least costly of the two powers. But this implies an incentive for great powers to invest in this dimension, which can explain why ideological competition is another important aspect of geopolitical rivalries.

6 Conclusions

This paper proposes and tests a model where spheres of influence endogenously emerge from how countries design their foreign policies when exposed to the GPs' foreign influence. We make three key contributions.

First, we show that even if countries can cooperate with all GPs (say the US and China), they will optimally choose foreign policies that are biased in favor of the GP they are most exposed to. In particular, even if a country is equally exposed to the US and China, we show that its optimal foreign policies would treat either the US or China (selected arbitrarily) much more favorably than the other GP. Thus, our model predicts that countries 'self-organize' into SOI, where their policies can be thought of as either being pro-US or pro-China.

Second, we show that the extent of such biases depends on the balance of power between GPs. For instance, our model predicts that as China's foreign influence catches up with the United States, we should expect pro-US countries to become even more biased in favor of the US. In general, we show that SOI should be expected to become more marked (thus visible) in times of geopolitical competition, i.e., when there are two (or more) GPs with similar foreign influence.

Finally, we demonstrate the empirical relevance of the model showing that it can correctly predict how countries adjusted their foreign policies in response to the fall of the Soviet Union and China's rise. We introduce a new measure for the extent of bilateral cooperation between 1979 and 2013. Consistent with the model, we document that the fall of the Soviet Union led countries to adopt more similar policies towards the US, even if they previously had very different ones (SOI became less clearly distinct) whereas the rise of China has ignited the opposite process which has been gradually contributing to the formation of two increasingly distinct SOI since the early 2000s.

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Figures and Tables

Table 1: List of interactions included in our main outcome variable. The first column reports the exact CAMEO Code of each interaction, the second reports the instruction for coders, and the final column reports the Goldstein score (the weight assigned to each type)

Code	Coding Instruction	Score
057	Ratify, sign, finalize an agreement, treaty. (Events should be coded under this category only when agreements are reportedly finalized or signed. This event code is typically reciprocal. Even when the agreement in question implies a formal commitment to boost material cooperation, provide aid, or yield in some way, the event of signing the agreement or treaty is still coded here since signing of an agreement or treaty represents diplomatic cooperation but does not guarantee implementationâwhatever its terms.)	8
061	Initiate, resume, improve, or expand economic exchange or cooperation. (Trade relations and other economic exchanges that are reciprocal in natureâeven if the particular event in question cannot be coded as reciprocalâshould be coded here)	6.4
062	Initiate, resume, improve, or expand military exchange or cooperation (Military exchanges such as joint military games and maneuvers should be coded here)	7.4
160	All reductions in normal, routine, or cooperative relations not otherwise specified	-4
042	Travel to another location for a meeting or other event	1.9
043	Host or receive a visitor at residence, office or home country	2.8

Table 2: differential responses to the Soviet fall or China's rise of countries in f's SOI relative to those in the Soviet/Russia's SOI or China's SOI.

	$\ln(Y_{f,d,t})$		$\ln(Y_{f,d,t}) - \ln(Y_{-f,d,t})$	
	(1)	(2)	(3)	(4)
Panel A: fall of USSR				
SOI_f^{1989} vs SOI_{RUS}^{1989}	-0.41***	-0.40***	-0.97***	-0.98***
	[0.026]	[0.024]	[0.035]	[0.035]
Benchmark (pre-1989 gap)	0.61	0.61	1.62	1.62
α_{fd}	✓	✓	✓	✓
α_t		✓		✓
Observations	169,283	169,283	148,016	148,016
Adjusted R-2	0.62	0.64	0.73	0.74
Panel B: rise of China				
SOI_f^{2001} vs SOI_{CHN}^{2001}	0.72***	0.66***	1.30***	1.32***
	[0.038]	[0.037]	[0.039]	[0.039]
Benchmark (post-2001 gap)	1.46	1.46	3.24	3.24
α_{fd}	✓	✓	✓	✓
α_t		✓		✓
Observations	235,709	235,709	221,134	221,134
Adjusted R-2	0.62	0.65	0.72	0.75

Note: the unit of observation is a country pair in a given year (f, d, t). The row 'SOI_f^{1989} vs SOI_{RUS}^{1989}' reports our estimates for β_1^{RUS} in Columns (1) and (2) and for β_2^{RUS} in Columns (3) and (4); instead, 'SOI_f^{2001} vs SOI_{CHN}^{2001}' reports the estimates for β_1^{CHN} in Columns (1) and (2) and for β_2^{CHN} in Columns (3) and (4). The benchmark is based on the difference in the average outcome variables of each SOI. In particular, for Panel A we restrict attention to countries in Europe and $t \geq 1988$, for Panel B we focus on $t > 2001$. $Y_{f,d,t}$ is the bilateral foreign policy of d towards f in year t. All specifications condition on the log of $f - d$ trade, and f and d's log of GDP, log of Population, and GDP per capita. Standard errors (in parenthesis) are two-way clustered based on country-pair and year. Stars represent statistical significance of the single hypothesis test: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 3: differential responses to the Soviet fall or China's rise of countries in f's SOI relative to those in the Soviet/Russia's SOI or China's SOI (only country pairs with $f = USA$).

	$\ln(\tilde{Y}_{USA,d,t})$		$\ln(\tilde{Y}_{USA,d,t}) - \ln(\tilde{Y}_{-f,d,t})$	
	(1)	(2)	(3)	(4)
Panel A: fall of USSR				
SOI^{1989}_{USA} vs SOI^{1989}_{RUS}	-0.90***	-0.87***	-1.20***	-1.23***
	[0.047]	[0.046]	[0.077]	[0.077]
Benchmark (pre-1989 gap)	0.96	0.96	2.55	2.55
α_{fd}	✓	✓	✓	✓
α_t		✓		✓
Observations	3,655	3,655	2,667	2,667
Adjusted R-2	0.04	0.04	0.05	0.05
Panel B: rise of China				
SOI^{2001}_{USA} vs SOI^{2001}_{CHN}	0.93***	0.88***	0.99***	1.01***
	[0.042]	[0.038]	[0.039]	[0.045]
Benchmark (post-2001 gap)	0.77	0.77	1.21	1.21
α_{fd}	✓	✓	✓	✓
α_t		✓		✓
Observations	4,879	4,879	4,148	4,148
Adjusted R-2	0.11	0.12	0.12	0.11

Note: the unit of observation is a country pair (USA, d) in a given year. The row 'SOI^{1989}_{USA} vs SOI^{1989}_{RUS}' reports our estimates for β_1^{RUS} in Columns (1) and (2) and for β_2^{RUS} in Columns (3) and (4); instead, 'SOI^{2001}_{USA} vs SOI^{2001}_{CHN}' reports the estimates for β_1^{CHN} in Columns (1) and (2) and for β_2^{CHN} in Columns (3) and (4). The benchmark is based on the difference in the average outcome variables of each SOI (restricted to $f = US$). In particular, for Panel A we restrict attention to countries in Europe and $t \geq 1988$, for Panel B we focus on $t > 2001$. $\ln(\tilde{Y}_{f,d,t})$ is the residual of a regression (inclusive of all country pairs) of the bilateral foreign policy of d towards f in year t conditioning on the log of f-d trade, and both f and d's log of GDP, log of Population, and GDP per capita, and the set of fixed effects specified above. Standard errors (in parenthesis) are two-way clustered based on country-pair and year. Stars represent statistical significance of the single hypothesis test: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Appendices

A Proofs

Proof of Theorem 1. Consider a robust cost-minimizing offer $\hat{\mathbf{B}}$. Without loss of generality, relabel the great powers so that $i > j$ if $\hat{B}_i > \hat{B}_j$ (arbitrarily if $\hat{B}_i = \hat{B}_j$). Let $n = |C|$ be the label of the great power that received the highest offer, let 1 be the label of the great power with the smallest offer, and let $n+1$ be the label of the government. Note that a robust cost-minimizing offer must be such that the following condition holds:

$$\left[1 - F\left(\frac{\sum_{j=1}^{n-1} W_{n-1}}{\sum_{j=1}^{n+1} W_j}\right)\right] \hat{B}_n = \kappa \tag{3}$$

Any smaller $\hat{B}_n$ would give up robustness, as any such $\hat{\mathbf{B}}$ would be consistent with an SPE in which every great power oppose the government. Any larger $\hat{\mathbf{B}}$ would not be cost-minimizing. Now, given that any cost-minimizing robust offer must satisfy the above condition, we know that any robust cost-minimizing offer must also satisfy the following requirement:

$$\left[1 - F\left(\frac{\sum_{j=1}^{n-2} W_j}{\sum_{j=1}^{n+1} W_j}\right)\right] \hat{B}_{n-1} = \kappa \tag{4}$$

Any smaller $\hat{B}_{n-1}$ would give up robustness, as any such $\hat{\mathbf{B}}$ would be consistent with an SPE in which every great power except n oppose the government. However, if $\hat{\mathbf{B}}$ satisfies Equation 3 (which must be true as $\hat{\mathbf{B}}$ is robust and cost-minimizing), then any greater $\hat{B}_{n-1}$ would not be cost-minimizing.

Iterating this argument, we see that any robust cost-minimizing offer must be such that $[1 - F(0)]\hat{B}_1 = \kappa$, and for every $c \in C$ we have:

$$\left[1 - F\left(\frac{\sum_{j=1}^{c-1} W_f}{\sum_{j=1}^{n+1} W_f}\right)\right] \hat{B}_f = \kappa \tag{5}$$

The argument so far showed that any cost-minimizing robust offer can be constructed by relabeling great powers (assigning ranks) and making the smallest offer that induces each great power to support the government when all and only governments with a greater label support the government. We are left with showing that that $B_1 > B_2$ if $W_1 > W_2$, i.e. that higher labels are assigned to stronger great powers. For notational convenience, let $w_j = \frac{W_j}{\sum_{j=1}^{n+1} W_f}$. Given the above characterization, we can derive the total cost associated with any offer $\hat{B}$ that satisfies the conditions above. Such total cost takes the following

form:

$$\sum_{j=2}^{n} \hat{B}_f = \frac{\kappa}{[1 - F(0)]} + \frac{\kappa}{[1 - F(w_1)]} + \frac{\kappa}{[1 - F(w_1 + w_2)]} + ... + \frac{\kappa}{[1 - F(w_1 + w_2 + .. + w_n)]}$$

Because $F(\cdot)$ is strictly increasing, this expression implies that if there are two great powers i and j such that $i < j$ but $w_i > w_j$ then the government could reduce its total costs by switching the offers that it makes to them. By construction, such deviation would not have effect on the robustness of the offers, as this total cost structure already reflects the necessary conditions summarized by Equation 5. This leads to the conclusion that if $W_i > W_j$ then it must be that $B_i > B_j$.

■

B Data appendix: description and construction

This Section provides details on how we constructed our variables of interest. Appendix **??** shows that our analysis is robust to alternative transformations.

B.1 Trade flows

Trade flows are constructed from the CEPII Gravity dataset. The dataset reports trade flows from multiple sources (IMF, UN, BACI). These sources do not always agree with each other and sometimes one source features missing values when another one does not. Additionally, IMF and UN data distinguishes between the trade value as reported by the origin vs. the destination country. For our baseline analysis we integrated the various sources to obtain the largest dataset possible. Importantly, all these trade flows are highly correlated and results are robust to alternative choices.

When building our measure of power over a given government from trade flows, we prioritized information on the value of trade flows as reported by the government. Specifically, we started from IMF data on government-reported trade flows. If missing, we added the UN Comtrade government-reported value of the trade flow. If missing, we added the great power-reported IMF figure. If missing, we added the great power-reported observation from the UN dataset. And finally we integrated missing observations using the BACI dataset.

We used a similar procedure when building flows of imports and exports to use as our outcomes. As in this case our focus is on the effect on the great power, we followed the precedure outline above but prioritizing great power-reported figures.

B.2 GDELT data

As mentioned, the GDELT dataset contains information on different types of international interactions (each defined as a distinct CAMEO category) between 1978 to 2013 at the country pair level and with a daily frequency. To derive a dataset with a yearly frequency, we sum up all the interactions of the same type taking place between any two countries on distinct days but in the same year. In addition to such aggregation, every variable from GDELT is transformed to avoid dropping the zeros. The following provides details and discusses the logic of each of these exercises.

Aggregation. Let $\mathbf{y}_{d,fh,\tau(t)}$ be the vector where $y_{d,fh,\tau(t)} = 1$ when we observe an interaction of type d (e.g., one of those described in Table 1) between any country f and any country d in any day τ of any year t, and $y_{d,fh,\tau(t)} = 0$ when we do not. We construct our yearly variables with the following procedure. We aggregate over the given year t for every country f, country d and event of type d, i.e. we compute $\tilde{Y}_{fdt} = \sum_{\tau:\tau^{-1}(\tilde{t})=t} y_{d,fh,\tau(t)}$. In an unreported robustness check, we show that our results are robust to alternative aggregation rules. For instance, we show that we can replicate our results when constructing outcomes by summing up, for each great power-government pair, the interactions of the same kind happening in the same year but in distinct half-weeks, weeks, half-months, months or trimesters.

Substitution. The second transformation replaces every observed 0 with 0.5, a transformation that avoids dropping the zeros when taking the log, while still preserving the shape of the log. The interpretation for this transformation is that any observed zeros does not really correspond to a situation with no interactions, but rather to a situation with very few of them. Importantly, our analysis also holds when we simply take the log (thus dropping all zeros) or when we employ the more standard transformation of adding 1 to each variable before taking the log. Finally, note that in our baseline specification we control for $ln(Trade_{fdt})$, we are thus dropping all observations with a small treatment (i.e. any great power-government pair where the great power has zero economic power over the government). Define $\underline{Y}_{fdt}$ so that $\underline{Y}_{fdt} = \tilde{Y}_{fdt}$ if $\tilde{Y}_{fdt} > 0$, and set $\underline{Y}_{fdt} = 0.5$ if $\tilde{Y}_{fdt} = 0$.

Figure 1: Trajectories of average ln B_{US} in different potential SOI