A Theory of Economic Coercion and Fragmentation

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Abstract

Hegemonic powers, like the United States and China, exert influence on other countries by threatening the suspension or alteration of financial and trade relationships. Mechanisms that generate gains from integration, such as external economies of scale and specialization, also increase the hegemon's power because in equilibrium they make other relationships poor substitutes for those with a global hegemon. Other countries can implement economic security policies to shape their economies in order to insulate themselves from undue foreign pressure. Countries considering these policies face a tradeoff between gains from trade and economic security. While an individual country can make itself better off, uncoordinated attempts by multiple countries to limit their dependency on the hegemon via economic security policies lead to inefficient fragmentation of the global financial and trade system. We study financial services as a leading application both as tools of coercion and an industry with strong strategic complementarities. We estimate that U.S. geoeconomic power relies on financial services, while Chinese power relies on manufacturing. Since power is nonlinear and increases disproportionally as the hegemon approaches controlling the entire supply of a sectoral input, we estimate that much economic security could be achieved with little overall fragmentation by diversifying the input sources of key sectors controlled by the hegemons.

Keywords: Geoeconomics, Geopolitics, Anti-Coercion Policy, Industrial Policy, Economic Security, Economic Statecraft, Payment Systems, Dollar Diplomacy.

JEL Codes: F02, F05, F12, F15, F33, F36, F38, P43, P45.

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1 Introduction

The emergence of China as a world power, the increased use of sanctions and economic coercion by the United States, and large technological shifts are leading governments around the world to re-evaluate their policies on economic security and global integration. Governments fear their economies becoming dependent on inputs, technologies, or financial services ultimately controlled by a hegemonic country, such as the U.S. or China. They worry about being pressured by these foreign powers into taking actions against their interest as a condition for continued access to these inputs. As a result, governments are pursuing economic-security policies in an attempt to insulate their economies from undue foreign influence. For example, the European Commission set forth a European Economic Security Strategy to counter the "risks of weaponisation of economic dependencies or economic coercion."[1]

In this paper, we show that traditional rationales for the gains from integration, such as economies of scale and specialization, can lead to interdependent global systems that become instruments of economic coercion. For example, consider global payments systems, a service with strong strategic complementarities: each entity wants to be part of a system the more that everyone else is also part of it. It is a standard argument that a globally dominant system is efficient by coordinating all participants in one system and fully realizing the economies of scale. This efficiency gain also makes other alternative systems poor substitutes for the dominant one by being under-scaled. If a country effectively controls the dominant system, like the U.S. does in practice, it can be a source of power over foreign firms and governments by threatening suspension of access. The targeted entities have on the margin only poor alternative payment systems.

Countries anticipate that hegemonic powers will seek to influence them using these strategic inputs and have incentives to build domestic alternatives. Each country faces a tradeoff between economic security and gains from integration. This tradeoff is at the core of our theory and arises from the same force, economies of scale and strategic complementarities, generating *both* gains from trade and economic dependency. In this sense we think of this paper as a "Krugman (1979, 1980) meets Geoeconomics" intellectual framework. We show that uncoordinated pursuit of economic security, via subsidies on home alternatives or restrictions on the use of foreign inputs, fragments the global economy, destroying too much of the gains from trade and financial integration. We demonstrate that there is a "fragmentation doom loop": as each country breaks away from the globally integrated system, the system itself becomes less attractive to all other participants, increasing the incentives of other countries to also break away. The resulting fragmentation is inefficient as each country over-secures its own economy.

We build a model of the world economy with input-output linkages among productive sectors located in different countries. We allow for both production externalities, such as external

[1] See the June 2023 announcement and January 2024 proposals. Relatedly, see the G7 governments communique on Economic Resilience and Economic Security. Appendix A.1 reviews recent economic security policy initiatives.

economies of scale and strategic complementarities in the usage of some inputs, and externalities on consumers, which allow us to capture geopolitical spillovers. The model has a Stackelberg timing. Ex-ante all countries, including the hegemon, pursue policies on their domestic sectors that shape production. Formally, these policies are revenue-neutral wedges in the firms' first order conditions for the production problem. These wedges capture industrial, financial, and trade policies.

Our model features a hegemonic country that can, ex-post, use threats to stop or alter the provision of inputs to other entities to induce them to take costly actions. These actions take the form of monetary transfers to the hegemon, tariffs or quantity restrictions on trade of goods or services, and political concessions, and cover the most frequently used actions in geoeconomics in practice. The hegemon country in our model is special in both being the only country that moves second in the Stackelberg timing and in being able to make threats and coerce foreign entities (i.e. offer the hegemonic contract). This set-up provides a theoretical foundation for the broad hegemonic powers exerted by countries such as the U.S. and China as well as the ex-ante policies that smaller countries adopt in attempting to insulate themselves.

Since the hegemon has no direct legislative control over foreign entities, the hegemon's power to induce these entities to agree to its demands is limited by a participation constraint, reflecting that the cost of compliance cannot exceed the cost of losing access to the hegemon's network as in Clayton, Maggiori and Schreger (2023). In practice, secondary sanctions often put forward to targeted entities a stark choice: comply or stop doing business with the hegemon and its network. In the end, in each country production takes place subject to not only the domestic government's policies, but also those successfully imposed by the hegemon.

Our main analysis studies the interaction between the policies and threats of the hegemon and the ex-ante policies of the countries in the rest of the world. For example, a government could restrict its firms from purchasing the hegemon's goods, or could provide a subsidy on the use of a home (or foreign) alternative to the hegemon's goods. We assume that each government takes into account the equilibrium impact of its domestic policies not only through changes in the behavior of private agents, but also through the change in the threats and demands made by the hegemon. We refer to policies adopted by each government for the purpose of altering the hegemon's demands as anti-coercion policies.

There is a fundamental tension between the objectives of the hegemon and those of foreign entities. The hegemon cares about its power, which arises from the gap between the foreign entities inside and outside option. At the inside option, the foreign entity accepts the hegemon's demands and produces with access to all inputs. At the outside option, the foreign entity rejects the hegemon's demands, thus undertaking no costly actions, but loses access to the hegemon's controlled inputs. The hegemon, therefore, increases its power by either making the inside option better or the outside option worse. The foreign entity, instead, cares about the level of the value it retains in equilibrium. Formally, we show that the optimal contract of the hegemon leaves the foreign entity's value equal to its outside option.

The hegemon uses its policies to build up its power and extract maximal surplus from the rest of the world. Intuitively, the hegemon seeks to make foreign economies dependent on its own inputs, a hegemon-centric globalization, so that threats of withdrawal of its inputs are most powerful. Formally, this means manipulating the world equilibrium, via production externalities and terms of trade, so that foreign entities find it privately more attractive to use the hegemon's inputs and costly to be excluded. Such a policy from the hegemon can include a demand that trading with the hegemon involves reducing the use of domestically produced alternative goods, or a subsidy to the hegemon producers to make their inputs cheap on world markets.

In contrast, the government of a foreign country, anticipating that the hegemon will attempt to influence its domestic firms, values increasing the outside options of its domestic firms if they refuse the hegemon's offer. This can lead a country towards protectionism or anti-coercion focused industrial policy because the anticipation of hegemonic influence leads countries to adopt policies that raise their firms' payoffs when they resist hegemonic influence.

Compared to a global planner, the hegemon pursues policies that aim to lower the rest of the worlds' outside options even when doing so destroys some inside option value. This is, of course, inefficient from a global welfare perspective. Yet, the hegemon is not purely predatory: all else equal, the hegemon pursues policies that increase the inside option by coordinating global production externalities. It does so to make its hegemony attractive to the rest of the world. We show that optimal anti-coercion policy pursued by foreign governments can result in global welfare destruction. Each country wants to insulate its economy, increasing its outside option, to improve its position vis a vis the hegemon. In doing so, each government ignores the spillover effects on other countries. In the presence of positive spillovers from integration, anti-coercion policy over-fragments the world economy.

A view from the political science literature is that hegemonic countries establish and utilize international organizations to set rules that improve their own welfare (Baldwin (1985)). We show in our model that the hegemon values rules even if they only constrain its own behavior. By limiting its own ability to engage in economic coercion, the hegemon disincentivizes other countries from adopting economic security policies. In the presence of cross-country externalities, each country reduces its own economic security policies without taking into account the effect on other countries. As a result, the hegemon extracts surplus as other countries collectively over rely on the commitments made by international organizations. In our model, the liberal world order and its multilateral institutions are an incarnation of hegemonic economic statecraft, rather than its absence. This contrasts with the more common view in economics that these institutions are incarnations of a benevolent global planner.

Before providing a general theory, we start the paper with a basic model applied to financial services as a strategic geoeconomic sector. The model is intentionally streamlined to provide the key intuition. Financial services have become a major tool of either implicit or explicit coercion by the United States. Instances have included extensive financial sanction packages on Iran and

Russia, pressure on HSBC to reveal business transactions related to Huawei and its top executives, as well as pressure on SWIFT to monitor potential terrorists' financial transactions.[2]

The heavy use of American financial services to pressure foreign governments and private companies arises from the dominance of the United States and the dollar-centric financial system.[3] This dominance has started to increase incentives for some countries to pursue anti-coercion policy. For example, following an earlier sanctions package applied to Russia in 2014, Russia developed a domestic messaging system called SPFS (System for Transfer of Financial Messages) that potentially helped Russia to cushion the blow of having some of its banks disconnected from SWIFT in 2023. China has been developing its own messaging and settlement system CIPS (Chinese Cross-Border Interbank Payment System) in an attempt to isolate itself from potential U.S. coercion, but also as a means to offer an alternative to other countries that might fear U.S. pressure. For now, these alternatives are inefficient substitutes, but highlight the incentives to build alternatives and fragment the system.

In the basic model, intermediaries in a country can use both a domestic financial service and also a global one provided by the hegemon in order to provide intermediation services to domestic manufacturers. A key characteristic of financial services is that they exhibit strong strategic complementarities in adoption. We capture gains from international integration by assuming that the hegemon's global financial services sector features an international strategic complementarity from adoption, whereas home alternatives can only be used by domestic intermediaries and so only feature a local strategic complementarity. This set-up captures the notion of a globally efficient payment system and multiple home-alternative versions that are imperfect substitutes. We show that, in the absence of anti-coercion policy, the hegemon uses its power to induce foreign intermediaries to shift away from their domestic alternative and towards the hegemon's global services. The hegemon thus coordinates global financial integration and induces intermediaries to internalize the global strategic complementarity. At the same time, the hegemon attempts to excessively integrate the global payment system in order to reduce the attractiveness of alternative payment systems. This hyper-globalization maximizes the hegemon's power and increases the transfers or political concessions that it can demand.

In this basic model, anti-coercion policies of foreign countries take the form of restrictions on the use of the hegemon's services and subsidies on the use of the home alternative. We provide

[2]These examples are discussed in detail by Farrell and Newman (2023). The pressure and legal actions often involved either sub-entities of the foreign group that are present in the U.S. (e.g. a U.S. based SWIFT data center) or the threat of suspension of dealing with U.S. entities (see also Scott and Zachariadis (2014) and Cipriani et al. (2023)).

[3]For example, in a report assessing the feasibility of U.S. sanctions on China, former Deputy Assistant U.S. Trade Representative for Investment and member of the National Security Council Emily Kilcrease stresses that: "The United States has a distinct advantage in sanctions intended to place pressure on China's economy, based on China's continued reliance on the U.S. dollar for its trade and financial operations internationally [...] Financial sanctions are among the most oft-used and powerful ways that the United States has to exert macroeconomic pressure. [...] Most of the financial sanctions leverage the privileged position of the United States in the global financial infrastructure." (Kilcrease (2023)).

a stark and illustrative result: each country finds it optimal to fully fragment from the hegemon, providing an efficient subsidy to the home alternative while also imposing maximal restrictions on the use of the hegemon's system. This leads to full international fragmentation, with each country relying exclusively on its home alternative to shield itself from foreign influence. We show that this fragmentation is Pareto inefficient: every country would have been better off in a non-cooperative equilibrium without hegemonic influence and without anti-coercion. We then show that the hegemon committing to limit its own ex-post coercion, e.g. via an international organization, increases in equilibrium both the hegemon's power and the welfare for the rest of the world. For the hegemon, the commitment helps attract participation of the rest of the world in its economic network. Countries do not fully keep the gains from trade that their participation generates, but retain some, thus increasing their welfare over the full fragmentation case. These mechanism provide a view of current events. In the first few months of 2025, the Trump administration has changed the perception of US commitments against the coercion of other countries, including traditional allies such as Canada and the Euro Area. The expectation of severe coercion has in turn pushed many countries to attempt to distance their economies from that of the United States. Through the lens of our model, such excessive coercion leaves all countries, including the United States, worse off.

We use our model to measure the sources of geoeconomic power around the world. We demonstrate that, when production takes the form of a nested constant elasticity of substitution (CES) function, the power of the hegemon over a country can be measured with a simple ex-ante sufficient statistic. This statistic requires estimating in the data the sectoral expenditure shares on domestic and foreign inputs, which can be readily done with input-output tables and bilateral trade data at the sectoral level, and the elasticity of substitution among various inputs. We estimate this power measure at the country level for the United States and China and for broader coalitions of countries led by these two hegemons. For plausible ranges of the elasticity of substitution, we find that financial services are an important source of American geoeconomic power. This contrasts sharply with China, for which almost all geoeconomic power arises from manufacturing.

We highlight a nonlinearity in power generation that is both theoretically interesting and of practical policy relevance. All else equal, power increases disproportionally as the hegemon approaches controlling the entire supply of a sectoral input. In this sense, the difference between controlling 95 percent and 85 percent of an input is enormous, because for a medium sized target economy that extra 10 percent offers a viable alternative to withstand coercion by the hegemon. We show that, in practice, the coalition of countries aligned with the U.S. controls extremely high shares of global financial services, often in excess of 80 or 90 percent for many target countries. This almost complete control of the world financial architecture accounts for the frequent use of finance as a mean of coercion by the U.S.-led coalition.

From the perspective of the hegemon, the nonlinear nature of power cautions against overusing it and triggering anti-coercion policies and fragmentation in response. From the perspective of other countries, the nonlinearity can be used to identify inputs, often called "chokepoints" or critical dependencies, for which even a minor amount of diversification can generate a large decrease in the hegemon's coercive ability. For example, while it is easy to dismiss short-run scenarios in which China and other BRICS countries can provide an alternative financial architecture that rivals the U.S. coalition one, it is far from obvious that this alternative architecture could not account for 10-15 percent of world expenditures on international financial services.[4] Our analysis reveals that most of the losses to U.S. power would come from this alternative going from 1 to 10 percent, not from the next 40 percentage point increases. To illustrate this point in the data, we focus on the economic security policies Russia instituted after its invasion of Crimea in 2014. Anticipating the possibility of future U.S.-led sanctions, Russia actively reduced its financial dependence on the U.S.-led coalition. As a consequence, we estimate that the U.S.-led coalition's financial power over Russia was approximately halved by 2021 compared to 2014. This large loss in power is in part responsible for the muted effect of the financial sanctions that the American Coalition imposed after 2022 since Russia, via its ex-ante policies, had already prepared some alternatives.

Literature Review. Our paper is related to the literature on geoeconomics in both economics and political science. The notion of economic statecraft and coercion was put forward by Hirschman (1945) in a landmark contribution and discussed in detail by Baldwin (1985). Hirschman (1945) emphasized the dependencies that arise when trade is concentrated with a few large partners and put forward an index, later known as the Herfindahl-Hirschman index, to measure the concentration. Kindleberger (1973), Krasner (1976), Gilpin (1981), and Keohane (1984) introduced the idea of Hegemonic Stability Theory and debated whether hegemons, by providing public goods globally, can improve world outcomes. Keohane and Nye (1977) analyze the relationship between power and economic interdependence. Kirshner (1997), Gavin (2004), and Cohen (2015, 2018) focus specifically on the interplay between the monetary system and geopolitics. Blackwill and Harris (2016), Farrell and Newman (2019), and Drezner et al. (2021) explore economic coercion and "weaponized interdependence" whereby governments can use the increasingly complex global economic network to influence and coerce other entities.

This paper is part of a rapidly growing literature in economics aiming to understand geoeconomics including Clayton, Maggiori and Schreger (2023), Thoenig (2023), Becko and O'Connor (2024), Broner, Martin, Meyer and Trebesch (2024), Konrad (2024), Kleinman et al. (2024), Liu and Yang (2024), Kooi (2024), Alekseev and Lin (2024), and Pflueger and Yared (2024). In particular, we build on the geoeconomic framework developed by Clayton, Maggiori and Schreger (2023). The earlier paper develops a theory of "offense": how the hegemon builds power to coerce other countries. Here we develop a theory of "defense": how countries optimally defend themselves when expecting economic coercion. Liu and Yang (2024) develop a trade model with the potential for international disputes, construct a model-consistent measure of international power, and demonstrate that increases in power lead to more bilateral negotiations. Becko and O'Connor (2024) study ex-ante

[4] See the 2024 Kazan Declaration by BRICS countries and related Russian report.

policies focusing on the hegemon building offensive power.

We also relate to the macroeconomics and trade literature that analyzed optimal industrial, trade, and capital control policies. From industrial policy and the size of production externalities see Ottonello, Perez and Witheridge (2023), Liu (2019), Bartelme, Costinot, Donaldson and Rodriguez-Clare (2019), Juhász et al. (2022), Juhász et al. (2023), and Farhi and Tirole (2024). In particular, Farhi and Tirole (2024) develop a model of industrial financial policy. From network resilience Acemoglu, Carvalho, Ozdaglar and Tahbaz-Salehi (2012), Bigio and La'O (2020), Baqaee and Farhi (2020, 2022), Elliott et al. (2022), Acemoglu and Tahbaz-Salehi (2023), Bai, Fernández-Villaverde, Li and Zanetti (2024). From trade and commercial policy Eaton and Engers (1992); Bagwell and Staiger (1999, 2001, 2004); Grossman and Helpman (1995); Ossa (2014), as well as the recent literature on optimal policy along value chains as in Grossman et al. (2023). McLaren (1997) models how countries make ex-ante investments to improve their position in negotiations to prevent a trade conflict. Berger, Easterly, Nunn and Satyanath (2013) demonstrate that countries where the CIA intervened during the Cold War imported more from the United States. Antràs and Miquel (2023) explore how foreign influence affects tariff and capital taxation policy. We also relate to the literate on whether closer trade relationships promote peace (Martin, Mayer and Thoenig (2008, 2012)). We related to the literature on capital controls and terms of trade manipulation (Farhi and Werning (2016), Costinot et al. (2014), Costinot and Werning (2019), Sturm (2022)).

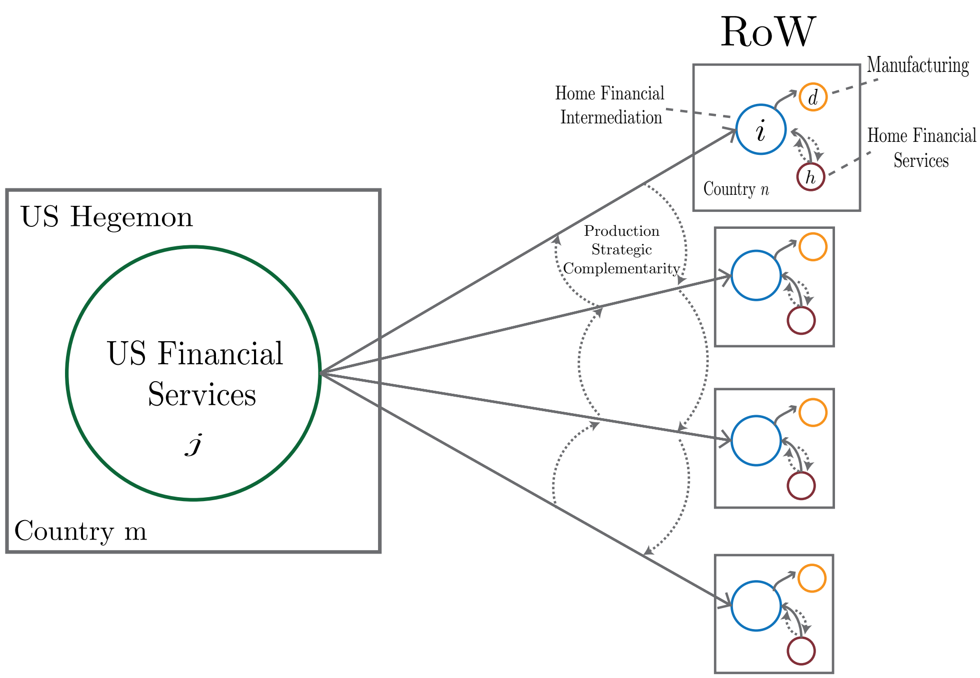
Our paper also contributes to a growing empirical literature exploring the relationship between geopolitics and fragmentation of global trade and investment by providing a framework for structural gravity analysis (Thoenig (2023), Fernández-Villaverde et al. (2024), Gopinath et al. (2024), Aiyar et al. (2024), Alfaro and Chor (2023), Hakobyan et al. (2023), Aiyar et al. (2023), Bonadio et al. (2024), and Crosignani et al. (2024)).

Finally, our application on the role of the international provision of financial services relates to a large literature on the changing nature of the international financial system. Bahaj and Reis (2020) and Clayton et al. (2022) study China's attempt to internationalize its currency and bond market. Scott and Zachariadis (2014), and Cipriani et al. (2023) survey the role of SWIFT and the global payments systems in international sanctions. Bianchi and Sosa-Padilla (2024), Nigmatulina (2021), Keerati (2022), and Hausmann et al. (2024) study trade and financial sanctions on Russia in the wake of the 2014 and 2022 invasions of Ukraine.

2 Financial Power and Fragmentation

We start by introducing a minimalist model to illustrate the main insights of our theory. We motivate and focus this basic model with an application to financial services as a tool of coercion. Yet, the insights apply more generally to sectors with economies of scale and strategic complementarities (see the general theory of Section 3).

Figure 1: **U.S. Financial Networks, Coercion, and Fragmentation**



Notes: Figure depicts the basic model set-up for the application on U.S.-centric global financial services.

2.1 Setup

The global economy consists of $N + 1$ countries. One country, denoted by m, is the U.S. hegemon. The other foreign countries are ex-ante identical and are denoted by $n = 1, \ldots, N$. Each country has a representative consumer, a set of productive sectors, and a local factor. Local factors are internationally immobile and inelastically supplied in quantities $\bar{\ell}_m, \bar{\ell}_n$ at prices p_m^ℓ, p_n^ℓ.

The structure of the production network is illustrated in Figure 1. Each productive sector consists of a unit continuum of identical firms. The U.S. has only one sector, a financial services sector, denoted j. Each foreign country n has a financial services sector, h_n, a financial intermediation sector, i_n, and a manufacturing sector, d_n. Since all foreign countries are symmetric, we denote their sectors with the same letters h, i, d and use the subscript n to denote the country. We let p_k denote the price of output of sector k.

Firms. The financial intermediation sector i drives the key economics of the model, and we streamline all other sectors and the consumers as much as possible. Financial services are produced in each country, including the hegemon, with a linear production technology using the local factor. Therefore, $f_h(\ell_{hn}) = \ell_{hn}$, and in the case of the hegemon $f_j(\ell_{jm}) = \ell_{jm}$. We refer to the local financial services produced in each foreign country as the "home alternative".

In each foreign country, sector i_n, the financial intermediation sector, aggregates financial services provided by the domestic sector h and those imported from the U.S. sector j. It performs this aggregation using a CES production function,

$$f_i(x_{i_nj}, x_{i_nh}) = \Big(A_j \; x_{i_nj}^{\sigma} + A_{i_nh} \; x_{i_nh}^{\sigma}\Big)^{\beta/\sigma}.$$

The parameter $\beta \in (0,1)$ governs the extent of decreasing returns to scale (for given A's). The parameter σ governs the elasticity of substitution across the two inputs in the production basket. We assume that $0 < \beta < \sigma$, so that the hegemon's financial services and the home alternative are substitutes in production.[5]

The crucial economics is embedded in the productivities A_j and A_{i_nh}, which individual intermediaries take as given. We postulate that the US hegemon financial services have a global strategic complementarity: their use is more productive the more countries around the world use them. The home alternative financial services have a local external economy of scale: their use is more productive the bigger the scale of the domestic financial services sector. Formally, productivity $A_j(x^*_{i_1j}, \ldots, x^*_{i_Nj}) = \frac{1}{N}\sum_{n=1}^{N} \overline{A}_j x^{*\xi_j\sigma}_{i_nj}$ of the hegemon's financial services increases in the equilibrium usage $x^*_{i_nj}$ of each country's intermediation sector. The strength of this strategic complementarity is governed by the parameter ξ_j. Productivity $A_{i_nh}(x^*_{i_nh}) = \overline{A}_h x^{*\xi_h\sigma}_{i_nh}$ of the home alternative also increases with the extent of usage of this input at the sector level, a typical external economy of scale. The strength of the economies of scale is governed by the parameter ξ_h. The chosen functional forms are standard ways to capture externalities in CES production functions (Bartelme et al. (2019), Ottonello et al. (2023)). We restrict $(1+\xi_j)\beta < 1$ and $(1+\xi_h)\beta < 1$ for concavity in the aggregate production function. We restrict $(1+\xi_j)\Big(1-\frac{\beta}{\sigma}\Big) \leq 1$ so that cross-country uses of j are complements in production.[6]

Finally, the manufacturing sector d_n produces using the local factor.[7] We assume that, in order to operate, the manufacturer has to purchase a value of financial intermediary services that is a constant fraction of its total expenditure on the local factor. That is, if the manufacturer wants to operate at a scale $p^{\ell}_n \ell_{d_nn}$ (the cost of its factor input), it has to also purchase financial intermediary services $p_i x_{d_ni_n} = \gamma p^{\ell}_n \ell_{d_nn}$ for an exogenous $\gamma \in (0,1)$. Therefore the profit function

[5]This set-up abstracts from a number of realistic but inessential elements. First, it collapses many distinct financial services into a broad sector. Messaging systems, settlement systems, clearing, correspondent banks, custodians, working capital loans and lending are of course meaningfully distinct. Each of them could be separately modeled with full foundations. Instead, we capture two essential and common features: these services are an important input into production (payments to acquire inputs and collect revenues, transfers to allocate production capital), and they feature strategic complementarities across firms and sectors. Second, we abstract from multiple layers in the network and assume the services are directly provided by the U.S. entities. Our framework can clearly handle indirect threats via foreign entities that themselves are connected to the U.S. (e.g. SWIFT).

[6]For technical reasons, we need to impose a small lower bound $\underline{x} > 0$ on use of input h, that is $x_{i_nh} \geq \underline{x}$. This constraint rules out a hegemon optimum with $x_{i_nh} = 0$, but does not bind.

[7]Given that the local factor is used both in manufacturing and in the financial services sector, we assume that its supply is sufficiently abundant that these sectors are never constrained in sourcing the factor.

of the manufacturing sector is $p_d \ell_{d_n n}^{\beta} - (1+\gamma) p_n^{\ell} \ell_{d_n n}$. This simple formulation, adapted from Bigio and La'O (2020), has two advantages. First, it captures a typical role of finance as an input in other sectors that is necessary for firms to operate (payments, working capital loans, commercial credit). Second, it is tractable and can easily be embedded in a more general theory (see Appendix A.4.5 for more discussion of the foundations and an analogy with Cobb Douglas production).

Representative Consumer. The representative consumer in each country n owns all domestic firms and the local factor endowment, and so faces a budget constraint given by

$$\sum_{k \in \mathcal{I}} p_k C_{nk} \leq \sum_{k \in \mathcal{I}_n} \Pi_k + p_n^{\ell} \bar{\ell}_n,$$

where Π_k are the profits of sector k and $p_n^{\ell} \bar{\ell}_n$ is the compensation earned by the country n local factor of production. We let $\mathcal{I}_n = \{i_n, d_n, h_n\}$ denote the productive sectors in country n. The hegemon's consumer's budget constraint is analogous but $\mathcal{I}_m = \{j\}$, since the hegemon's economy has a single sector. We let $\mathcal{I}$ denote the set of all productive sectors.

In this basic model, we substantially simplify analysis by assuming that all consumers (including the hegemon's) have identical linear preferences: $U(C_n) = \sum_{k \in \mathcal{I}} \tilde{p}_k C_{nk}$, where $\tilde{p}_k$ are exogenous positive constants. This assumption has two key advantages:[8] (i) it turns off price manipulation motives (e.g., terms of trade) by making prices effectively exogenous in equilibrium, $p_k = \tilde{p}_k$; (ii) it makes the indirect utility of consumer n equal to her wealth level, $w_n = \sum_{k \in \mathcal{I}_n} \Pi_k + p_n^{\ell} \bar{\ell}_n$.

Market Clearing. Market clearing for any good r and the local factor of country n are given by

$$C_{mr} + \sum_{n=1}^{N} C_{nr} + \sum_{k \in \mathcal{I}} x_{kr} = y_r, \qquad \sum_{k \in \mathcal{I}_n} \ell_{kn} = \bar{\ell}_n$$

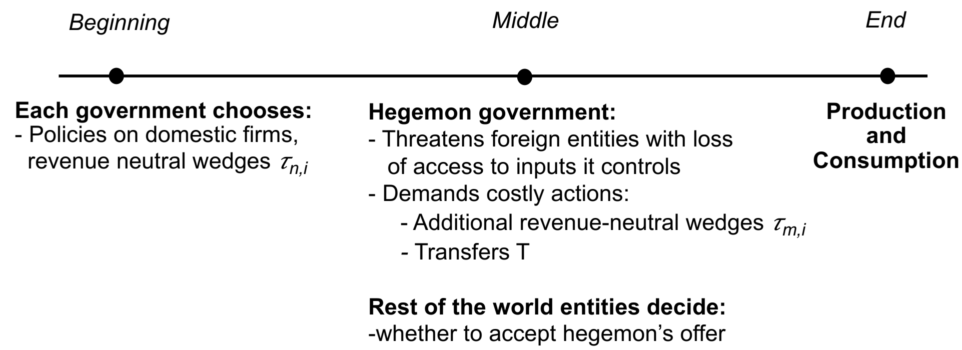
where y_r denotes the output of sector r, and where we implicitly denote $x_{kr} = 0$ if sector k does not use input r (and similarly for the local factor).

2.2 Hegemon, Target Countries, and Geoeconomic Policies

Each country n has a government that sets policy on its domestic sectors. The U.S., country m, is exogenously assumed to be a world hegemon that can also seek to impose policies on foreign entities. The model has a Stackelberg timing with the timeline presented in Figure 2, which we describe briefly here, and then in detail below as we solve by backward induction. At the "End" production and consumption take place as described in the previous subsection. In the "Middle", the hegemon makes take-it-or-leave-it offers to foreign entities. The hegemon is special in being the only country that imposes policies in the second part of the Stackelberg game. At the "Beginning" all

[8] We focused the basic model entirely on production externalities. See Appendix A.5 for a simple model that focuses instead on price based propagation as well as the general theory of Section 3.

Figure 2: **Timeline**



Notes: Model timeline.

governments impose policies on their domestic firms, and these policies once set cannot be changed in the Middle or End. As we make clear below, the policies we consider are a set of wedges in the firms' first order conditions that capture core elements of industrial, trade, and financial policy.

Hegemon's Problem in the Middle. After domestic policies are set by all governments, the hegemon country's government m makes take-it-or-leave-it offers to entities in other countries that require them to take costly actions. Since the hegemon lacks legal jurisdiction over foreign entities, the hegemon enforces compliance with its demands for costly actions by threatening to exclude a foreign entity from buying its financial services if that entity does not comply.[9]

We focus in the main text on the hegemon pressuring foreign intermediaries directly. For tractability, the hegemon's offer is made to each individual intermediary within a sector, meaning an individual intermediary could reject the offer while all other intermediaries in the same sector accept it (Appendix A.4.1 extends our analysis to allow the hegemon to pressure other governments). In particular, we assume that the hegemon can contract with every foreign intermediary, but cannot pressure manufacturing and home financial services sectors since these sectors do not purchase inputs directly from the hegemon. On the "offensive" policy of the hegemon in the Middle,

[9] Bartlett and Ophel (2021) emphasize the crucial role of the U.S. dominance in financial services in exerting influence over foreign entities and activities that involve no direct U.S. role. Traditionally, sanctions involve legal actions over activities that include at least one U.S. entity or over which the U.S. has legal jurisdiction. They write:"In contrast, secondary sanctions target normal arms-length commercial activity that does not involve a U.S. nexus and may be legal in the jurisdictions of the transacting parties. [...] Secondary sanctions present non-U.S. targets with a choice: do business with the United States or with the sanctioned target, but not both. Given the size of the U.S. market and the role of the U.S. dollar in global trade, secondary sanctions provide Washington with tremendous leverage over foreign entities as the threat of isolation from the U.S. financial market almost always outweighs the value of commerce with sanctioned states.".

we follow Clayton et al. (2023) and assume that the hegemon m's offer to intermediary i_n includes two types of demands for costly actions: (i) a transfer T_{i_n} from intermediary i_n to the hegemon's representative consumer; (ii) revenue-neutral wedges $\tau_{m,i_n} = (\tau_{m,i_nj}, \tau_{m,i_nh})$ on purchases of financial services, with equilibrium revenues $\tau_{m,i_nj}\ x^*_{i_nj} + \tau_{m,i_nh}\ x^*_{i_nh}$ raised from intermediary sector i_n rebated lump sum to intermediaries in sector i_n that accept the contract. The notation for wedges has 3 subscripts: the country imposing the wedge, the entity on which the wedge is imposed, and the specific relationship the wedge is imposed on. For example, τ_{m,i_nh} is a wedge imposed by country m, on an entity in sector i in country n, for the buying of inputs from sector h. To keep the notation compact, when we omit the third subscript and write τ_{m,i_n}, we mean the vector of wedges government m imposes on entity i_n in all its buying relationships.

The literal interpretation of the transfers is the hegemon extracting compensation from the target. However, the model can easily extend to cover expenditures on lobbying for political concessions or making the transfers distortionary.

The revenue-neutral wedges can capture Pigouvian taxes and quantity restrictions (e.g., Clayton and Schaab (2022)) and are common in the macroprudential policy literature (Farhi and Werning (2016)). Such instruments capture many government policies such as industrial policy and trade policy (e.g., export or import controls and tariffs). In this paper we refer to them as wedges, since their function is to impose a wedge in the first order condition of the targeted entity in order to induce a change in its economic behavior. Given our rebate rule they function most closely as quantity restrictions. Indeed, in the proof of Proposition 3 (and Proposition 7 in the general theory) we are able to solve the hegemon's problem by having the hegemon directly pick the economic activities of the entities it contracts with, and then backing out the choices of wedges that implement those allocations. Even though the game is played in wedges, the hegemon is de facto able to choose quantities directly.

Participation Constraint. We study the decision of an individual intermediary in sector i_n. Since we focus on symmetric equilibria, we abuse the notation and refer to an individual intermediary i_n as representative of the sector. Intermediary i_n chooses whether or not to accept the take-it-or-leave-it offer made by the hegemon. Intermediary i_n, being small, does not internalize the effect of its decision to accept or reject the contract on the prevailing aggregate usage of financial services, and therefore productivity.[10]

If intermediary i_n accepts the hegemon's contract, it complies with the hegemon's demands and maintains access to the hegemon's financial services, achieving a value $V_{i_n}(\tau_{m,i_n}) - T_{i_n}$ where

$$V_{i_n}(\tau_{m,i_n}) = \max_{x_{i_nj}, x_{i_nh}} \Pi_i(x_{i_nj}, x_{i_nh}) - (\tau_{m,i_nj} + \tau_{n,i_nj})(x_{i_nj} - x^*_{i_nj}) - (\tau_{m,i_nh} + \tau_{n,i_nh})(x_{i_nh} - x^*_{i_nh}), \quad (1)$$

[10]The hegemon is willing to punish an individual atomistic firm that deviates off-path since exclusion of an infinitesimal intermediary does not change the equilibrium, meaning the hegemon loses no value by doing so. As we discuss in Appendix A.4.3, credibility can also arise because punishing one deviator can help to maintain credibility for carrying out punishments of other potential deviators (in a repeated game).

which implicitly defines the optimal allocations $(x^*_{i_n j}, x^*_{i_n h})$ as a function of the contract offered. In equilibrium $x_{i_n j} = x^*_{i_n j}$ so that the wedges raise no revenue for the hegemon. The wedges $\tau_{n,i_n j}$ and $\tau_{n,i_n h}$ are those imposed in the Beginning by country n government on its own intermediary sector and here they are taken as given by the hegemon.

If intermediary i rejects the hegemon's contract, it does not have to comply with the hegemon's demands but is punished by losing access to inputs controlled by the hegemon, achieving value:

$$V^o_{i_n} = \max_{x^o_{i_n h}} p_i \left(\overline{A}_h^{1/\sigma} x^{*\xi_h}_{i_n h} x^o_{i_n h} \right)^\beta - p_h x^o_{i_n h} - \tau_{n,i_n h}(x^o_{i_n h} - x^{o*}_{i_n h}) \tag{2}$$

where $x^o_{i_n h}$ denotes usage of home financial services of an intermediary i_n conditional on it rejecting the hegemon's contract.[11]

An individual intermediary i_n accepts the contract if it is better off by doing so, giving rise to the participation constraint:[12]

$$V_{i_n}(\tau_{m,i_n}) - T_{i_n} \geq V^o_{i_n}. \tag{3}$$

The participation constraint is crucial to understanding the economics of hegemonic power over foreign entities. For given productivities (the A's), the hegemon's power over the intermediary is given by the slackness in this constraint when the hegemon demands no costly actions out of the target (no wedges or transfers). The participation constraint, therefore, traces the limits of hegemonic power by determining the total private cost to the intermediary of the actions that the hegemon can demand. Since the threat is to cut off the target from the hegemon's controlled inputs, its efficacy is driven by how attractive this input is to the target. As we show in Section 4, this depends on expenditure shares on the hegemon's input as well as the elasticity of substitution, since off path intermediaries can rebalance toward the home alternative.

Hegemon Maximization Problem. The hegemon government's objective function is the utility of its representative consumer to whom domestic firm profits and transfers accrue. Wedges are revenue neutral and so net out, but transfers from foreign sectors do not net out because the hegemon's consumer has no claim to foreign sectors' profits. The hegemon's objective function is:

$$w_m = \Pi_j + p^\ell_m \overline{\ell}_m + \sum_{n=1}^{N} T_{i_n}. \tag{4}$$

[11] To maintain revenue neutrality of wedges off-path, we assume that an intermediary that rejects the contract receives a lump-sum rebate from its home government based on the equilibrium usage of inputs by intermediaries that (hypothetically) rejected the hegemon's contract.

[12] Bartlett and Ophel (2021) remark that many of (financial) threats are effective but not carried out in equilibrium: "Very few secondary sanctions have been enforced on European companies due to the high level of compliance by European firms. This is because access to the U.S. correspondent banking and dollar clearing systems is critical for their operations. [...] These factors lead European financial institutions to comply with U.S. sanctions, regardless of their governments' policies. The high level of compliance by European financial institutions means it would be difficult for non-financial European firms interested in doing business with Iran to find a bank to process their transactions, and if subjected to U.S. sanctions, would be swiftly cut off from banking services in their own countries."

The hegemon chooses its demands τ_{m,i_n} and T_{i_n} of all intermediaries to maximize its utility, subject to intermediaries' participation constraints (equation 3). Given constant prices, hegemon's financial service sector profits Π_j and factor income $p^\ell_m \bar{\ell}_m$ are constants. Accordingly, in this basic model, the hegemon's objective is effectively to maximize transfers collected, $\sum_{n=1}^N T_{i_n}$.

Country n's Problem in the Beginning. In the Beginning, each country's government sets revenue neutral wedges on its own domestic firms in all sectors. In contrast to the hegemon's problem above vis a vis foreign firms, we assume that each government can impose domestic wedges by legislative power: i.e. there is no domestic participation constraint.

Formally, the country n government chooses wedges τ_{n,i_n} to maximize its consumer's utility (i.e., wealth level),

$$w_n = V_{i_n}(\tau_{m,i_n}) - T_{i_n} + \Pi_{d_n} + \Pi_{h_n} + p^\ell_n \bar{\ell}_n. \tag{5}$$

In setting the wedges, the government of country n internalizes how the hegemon's optimal demands will respond in the Middle, taking as given the ex-ante policies adopted by all other countries. Again, our assumption of constant prices considerably simplifies the objective function since profits Π_{d_n}, Π_{h_n} and factor income $p^\ell_n \bar{\ell}_n$ are constant. This reduces the country n government's objective to maximizing the profits of its intermediaries, $V_{i_n}(\tau_{m,i_n}) - T_{i_n}$.[13]

We think of the policies imposed by each country at the Beginning, as ex-ante policies that each country employs to shape its economy in anticipation of ex-post coercion by the hegemon. These policies are ex-ante and irreversible in the sense that we do not allow these wedges to vary depending on whether the hegemon contract is accepted.[14] Our paper aims to capture medium run effects: we allow entities to fully re-optimize their input choices if cut off, but at the same time do not allow for major structural shifts in the economy and policies to take place. For example, we want to capture that building a financial system after being cut-off is not possible in the medium run, and such policies would have to be implemented ex-ante.

2.3 Benchmarks: Planner and Non-Cooperative Outcomes

Before solving the hegemon's problem and optimal anti-coercion, we set the stage with two classic benchmarks: the global planner's solution, which provides an efficiency benchmark; and, the non-cooperative outcome that would arise if all countries were able to set domestic policies, but no

[13] In general, we also allow the hegemon to apply ex-ante wedges to its sectors, here its financial service firm. Since prices are constant and there are no direct externalities from its financial service production, the hegemon would not use these wedges in the basic model. Our general model of Section 3 studies the optimal use of ex-ante wedges by the hegemon.

[14] Conceptually, our two-stage problem can be thought of as the hegemon ex-post directly demanding what allocations the intermediaries choose, subject to their participation constraints. Ex-ante, each foreign country sets wedges on its own intermediaries that affect the intermediaries' perceived costs of using the hegemon's financial services and home financial services, thus affecting the intermediaries' willingness to comply with the hegemon's demands. The ex-ante wedges affect how much the hegemon tightens the participation constraint as it demands allocations that differ from the intermediaries private optimum.

country was a hegemon.

Global Planner's Efficient Allocation. We assume that the global planner has the same instruments as individual governments and the hegemon, but maximizes global welfare with a utilitarian objective function[15]

$$\mathcal{U}^{GP} = \sum_{n=1}^{N} w_n + w_m. \tag{6}$$

For the planner, the hegemon's ex-post wedges are redundant given the availability of all governments' ex-ante wedges, and transfers are purely redistributive. We can, therefore, consolidate the planner's problem into a single stage in which it sets all wedges to maximize global welfare (equation 6), yielding the following proposition.[16]

Proposition 1 *The global planner's optimal wedges are*

$$\tau_{GP,i_n j} = -\frac{\xi_j}{1+\xi_j} p_j, \qquad \tau_{GP,i_n h} = -\frac{\xi_h}{1+\xi_h} p_h. \tag{7}$$

The global planner subsidizes use of both home and U.S. financial services to induce intermediaries to internalize the positive spillover to other intermediaries within (and across) countries of greater use of financial services. The magnitude of the global planner's subsidy on j is the cost of the input, p_j, times the magnitude of the strategic complementarity, ξ_j. Intuitively, a larger strategic complementarity, a higher ξ_j, induces the planner to increase adoption by all intermediaries in order to generate productivity gains. The same logic underlies the planner's subsidy of the home alternative. Subsidies are bigger the stronger the economies of scale (the higher ξ_h). These are standard results for planning problems in the presence of production externalities. For comparison, we collect them in the first row of Table 1.

Non-Cooperative No-Hegemon Outcome. Our second benchmark is the non-cooperative outcome that arises when all countries set wedges on domestic intermediaries, but the US is not a hegemon. In our model this amounts to all countries setting wedges in the Beginning, skipping entirely the Middle part since there is no hegemon, and proceeding directly to the End. This is the classic benchmark in international economics of countries setting policies in a Nash game, i.e. best responding to all other countries' policies which are taken as given. For simplicity, we take the large number of countries limit $N \to \infty$, which provides the sharp result below.

[15] We can write the global planner's objective for given Pareto weights $\Omega_n > 0$ as $\sum_{n=1}^{N} \Omega_n w_n + \Omega_m w_m$. As is common in the literature, we select Pareto weights to eliminate the motivation for cross-country wealth redistribution, which here sets $\Omega_n = \Omega_m = 1$.

[16] The propositions for optimal policy in both this basic model and the general model of Section 3 provide necessary conditions for optimality, and we assume that an equilibrium exists.

Proposition 2 *Let $N \to \infty$. Absent a hegemon, the optimal wedges of country n are*

$$\tau_{n,i_n j} = 0, \qquad \tau_{n,i_n h} = -\frac{\xi_h}{1+\xi_h} p_h.$$

Country n's government places the same subsidy on the home alternative as did the global planner: the government internalizes the economy of scale in the use of the home alternative since the effects occur entirely within the domestic economy. On the other hand, country n's government does not internalize the global strategic complementarity in the adoption of the hegemon's financial services and places no tax or subsidy on their use, that is $\tau_{n,i_n j} = 0$. The non-cooperative outcome, therefore, features efficient subsidies of the home alternative, but no subsidies of the hegemon's financial services.[17] We collect the result in the second row of Table 1.

Compared to the global planner solution, the global economy is too financially fragmented with not enough use of the US global financial services compared to home alternatives, which is inefficient. The inefficiency arises from the classic lack of coordination of individual policies set in a Nash game.

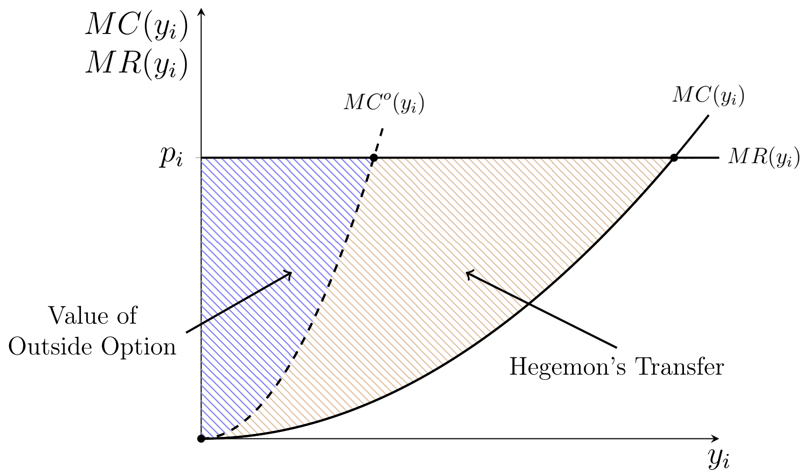
2.4 Hegemonic Financial Hyper-globalization

We solve the problem of optimal coercion and anti-coercion by backward induction. First, we solve the hegemon's problem in the Middle, taking as given the policies adopted by all countries at the Beginning. Then, we solve for the optimal policies at the Beginning.

We solve the hegemon's problem in the Middle in two steps. First, for a given choice of its own wedges, the hegemon optimally sets the transfer so that the participation constraint binds: $T_{i_n} = V_{i_n}(\tau_{m,i_n}) - V^o_{i_n}$. Intuitively, at any lower level of transfer, the constraint would have slack and hence the hegemon could increase its own surplus. This intuition is formalized in the proof of Proposition 3. The hegemon then chooses wedges to shift equilibrium productivities of utilizing financial services to maximize the total transfers it collects. Figure 3 provides a visual representation of this incentive. For an individual intermediary i_n, it plots the marginal cost (MC) and marginal revenue (MR) curves of producing output y_i. The marginal revenue curve is constant at p_i given our assumption of perfectly elastic demand at that price, and the marginal cost curve is increasing in y_i given decreasing returns to scale. Intermediary profits Π_i at the inside option are the area between the $MR(y_i)$ and $MC(y_i)$ curves. At the outside option, the intermediary marginal cost curve shifts to the left to $MC^o(y_i)$, reflecting the higher marginal cost of production arising from losing access to the hegemon financial services. Since the hegemon extracts the difference between the inside option and the outside option (the red shaded area) as a side payment, the hegemon cares about increasing this *gap* by either increasing the intermediary's inside option or by decreasing its outside option. In contrast, the intermediary retains only the portion of its profits arising from its

[17] The no subsidy result is driven by the large number of countries limit, so that each country is small and perceives no impact of its decisions on the global productivity of US financial services. In general, the economics of the problem would lead each country to under-internalize their effect on the strategic complementarity, but not necessarily to zero.

Figure 3: Hegemon's Power Building Motives



outside option (the blue shaded area) and cares about the *level* of profits at the outside option.[18] Proposition 3 formalizes how the hegemon uses optimal wedge demands to maximize this gap.[19]

Proposition 3 *When foreign countries' domestic wedges are symmetric, the hegemon's optimal wedges are*

$$\tau_{m,i_nj} = -\frac{\xi_j}{1+\xi_j}\left(p_j + \tau_{n,i_nj}\right), \qquad \tau_{m,i_nh} = \frac{\xi_h}{1+\xi_h}\left(\frac{x^o_{i_nh}}{x^*_{i_nh}} - 1\right)\left(p_h + \tau_{n,i_nh}\right). \tag{8}$$

Comparing the hegemon's optimal wedges to those of the global planner, two key properties emerge. First, the hegemon sets the wedge on the use of its financial services j according to the same formula as the global planner, up to accounting for the effects of wedges imposed by other governments on the use of j in the Beginning. If other countries did not impose wedges, that is $\tau_{n,i_nj} = 0$, then the hegemon's wedge coincides with that of the global planner. Intuitively, the hegemon, like the global planner, internalizes the positive spillover generated by increasing intermediaries' use of j. Whereas the global planner values this increase in profits directly, the hegemon instead values it indirectly because higher profits allow it to extract larger transfers. This aligns the hegemon's incentives with

[18]In Appendix A.4.2, we extend our analysis to allow a split of surplus between the hegemon and the targeted entity, rather than all surplus going to the hegemon. The participation constraint in the basic model becomes $V_i(\tau_m) - T_i \geq V_i^o + (1-\mu)(V_i(0) - V_i^o)$, where $1-\mu$ reflects the bargaining position. Another interpretation of $1-\mu$ is as the probability that the firm is able to evade the punishment, for example by routing goods through third party countries. Although the firm now values a combination of its inside and outside options, the core insight remains that the hegemon and the firm have conflicting objectives (level of profits at outside option vs difference between inside and outside option profits).

[19]Because we focus on symmetric equilibria, we focus the presentation of the result in text on the case where foreign countries have adopted symmetric wedges.

the global planner's in terms of choice of the wedge on input j. On the other hand, if governments were imposing wedges on the hegemon's financial services, the hegemon would perceive a higher cost to these foreign intermediaries using more of its services, analogous to a higher price p_j, resulting in lower global usage and a higher marginal productivity benefit of increasing usage. This motivates larger subsidies from the hegemon to increase usage. On net, however, the hegemon's subsidy rises at less than a one-for-one rate with increases in anti-coercion wedges on j.

In contrast, compared with the global planner, the hegemon shifts towards discouraging the use of home financial services h. Because the hegemon maximizes the gap between the inside and outside option, the hegemon aims to reduce the productivity A_h of home financial services to lower the outside option of an intermediary that rejected the hegemon's contract. The hegemon imposes a smaller subsidy or even a tax on home financial service usage by intermediary i_n. There is no similar incentive to manipulate the outside option by changing A_j, precisely because the threatened punishment is to cut off access to services j entirely.

In Appendix A.3.1, we show that the hegemon's optimum (absent anti-coercion) accordingly features more use of its financial services and less use of home financial services than the global planner's solution. In this sense the hegemon hyper-globalizes the financial system that loads too heavily on global use of its financial services. The hegemon is increasing the dependency of the rest of the world on its financial services to increase the power it can achieve by threatening withdrawals.

2.5 Financial Anti-Coercion Policy: Fragmentation Doom Loop

Having solved for the hegemon's optimal policies in the Middle, we now turn to solving each country optimal policy at the Beginning. We start by characterizing the positive effects of country n wedges on the global equilibrium, accounting for the endogenous response of the hegemon in the Middle. We assume all countries apart from a single country n have adopted symmetric policies, and show how country n increasing its wedges results in global fragmentation.

Proposition 4 *Suppose that all countries except for country n have adopted symmetric wedges. Then, accounting for the hegemon's endogenous response:*

1. *An increase in the country n wedge on the hegemon's financial services j lowers every country's use of hegemon financial services j and raises every country's use of their home alternative h:*

$$\frac{dx^*_{i_r j}}{d\tau_{n,i_n j}} \leq 0, \quad \frac{dx^*_{i_r h}}{d\tau_{n,i_n j}} \geq 0 \quad \forall\ r = 1, \ldots, N$$

2. *For $0 \leq \xi_h \leq \overline{\xi}_h$ (an upper bound defined in the proof), a decrease in the country n wedge on the home alternative h lowers every country's use of hegemon financial services j and raises every country's use of their home alternative h, that is:*

$$\frac{dx^*_{i_r j}}{d\tau_{n,i_n h}} \geq 0, \quad \frac{dx^*_{i_r h}}{d\tau_{n,i_n h}} \leq 0 \quad \forall\ r = 1, \ldots, N$$

Intuitively, as country n increases the wedge on its intermediaries' use of the hegemon financial services, the hegemon on the margin finds it too expensive in the Middle to fully offset country n's policy. As a result, country n's intermediaries use less of the hegemons' financial services at the End. Due to the strategic complementarity, the hegemon's financial services become less productive globally, and so also become less attractive to intermediaries in other countries. This increases the cost to the hegemon of asking intermediaries in other countries to use its services as opposed to their home alternative, leading to a re-balancing of other countries away from the hegemon's services and towards their home alternatives. A pursuit of anti-coercion by a single country results in a "fragmentation doom loop" that increases global fragmentation of all countries.

We next characterize optimal wedges adopted by country n, taking as given the symmetric domestic policies of other foreign countries. The proposition below shows that optimal wedges result in global fragmentation.

Proposition 5 *If all other foreign countries have adopted symmetric policies, then an optimal anti-coercion policy of country n is to set $\tau_{n,i_nj} \to \infty$ and $\tau_{n,i_nh} = -\frac{\xi_h}{1+\xi_h} p_h$. Therefore, country n subsidizes its home alternative and prevents its intermediaries from using the hegemon's financial services.*

Country n's optimal wedges result in complete international fragmentation through a prohibition on use of the hegemon's system ($\tau_{n,i_nj} \to \infty$) and fostering of reliance on the home alternative. Intuitively, the hegemon would extract all gains from international integration ex-post, leaving country n in the same position as if it relied exclusively on the home alternative. This means that any use $x_{i_nj} > 0$ of the hegemon's services crowds out use of the home alternative, lowering its productivity and lowering the outside option. As a result, country n optimally prohibits use of the hegemon's services entirely, at which point its subsidy to the home alternative $\tau_{n,i_nh} = -\frac{\xi_h}{1+\xi_h} p_h$ is of course set efficiently. We collect this result in the third row of Table 1. The results in Proposition 5 are both sharp and stark. As the general theory in Section 3 will make clear, the full fragmentation is an extreme outcome, but anti-coercion policy in general would have a tendency toward fragmentation in the sense of moving away from what the hegemon controls in order to increase the outside option.

Comparing the policies summarized in Table 1 it becomes clear that the full fragmentation is entirely the result of each country, at the Beginning, anticipating coercion by the hegemon in the Middle. Absent the coercion, countries would have no reason to either subsidize or tax the usage of the hegemon financial services (in the large N limit). In this sense, we think of the wedge τ_{n,i_nj} as purely an economic security or anti-coercion policy. Instead, the wedge τ_{n,i_nh} features a more standard motivation of the government correcting a domestic externality. In this basic model, the attempt of the hegemon to coerce induces such as strong ex-ante response that the hegemon completely loses its power in equilibrium since no country allows any dependency on the hegemon to build up.

Table 1: Summary of Optimal Policies Under Different Configurations

	Hegemon Finance $\tau_{i_n j}$	**Home Alternative** $\tau_{i_n h}$
Global Planner	$-\frac{\xi_j}{1+\xi_j} p_j$	$-\frac{\xi_h}{1+\xi_h} p_h$
Nash No-Hegemon	0	$-\frac{\xi_h}{1+\xi_h} p_h$
Anti-Coercion	∞	$-\frac{\xi_h}{1+\xi_h} p_h$

Table collects the wedges applied in the Beginning from each government of country n on its domestic intermediaries for purchases of hegemon and home-alternative financial services. First row: wedges chosen by a global planner as in Proposition 1. Second row: wedges chosen by each country in a non-cooperative Nash setting with no hegemon as in Proposition 2. Third row: wedges chosen by each country in a non-cooperative Nash setting with a hegemon Proposition 5.

It is obvious that the global planner solution Pareto-dominates both the non-cooperative outcome without an hegemon and the one with a hegemon and anti-coercion policy. However, it is interesting that in this basic model the non-cooperative outcome without a hegemon Pareto-dominates the outcome under optimal anti-coercion with a hegemon (see Appendix A.3.2). Intuitively, even though the non-cooperative outcome features lower-than-optimal use of the US financial services due to the absence of subsidies, it at least allows for some usage rather than full fragmentation. Our results offer a stark warning for the current policy impetus of countries pursuing economic security agendas in uncoordinated fashion. As each country tries to insulate itself from hegemonic coercion, it kicks into motion a fragmentation doom loop that makes other countries want to insulate themselves even more. The global outcome can be inefficient fragmentation that destroys the gains from trade.

2.6 A Hegemonic View of International Organizations

In this subsection, we explore how the hegemon could potentially improve its welfare through commitments that limit its ability to coerce foreign entities. A commitment to tie its own hands affects how other countries set anti-coercion policies, potentially reducing fragmentation away from the hegemon's economy. One interpretation of such commitments is the establishment of international organizations, like the IMF or WTO, that place constraints on the policies countries can adopt.

We focus on a simple commitment rule. Recall that the participation constraint takes the form $V_{i_n}(\tau_{m,i_n}) - T_{i_n} \geq V^o_{i_n}$, we postulate that the hegemon commits to extracting a fraction $\mu \in [0,1]$ of the inside option, i.e. to set $T_i = \mu V_{i_n}(\tau_{m,i_n})$ if the contract is accepted. Substituting this transfer rule into the participation constraint,

$$(1-\mu)V_{i_n}(\tau_{m,i_n}) \geq V^o_{i_n}.$$

While in the previous section the hegemon set transfers to extract the entire difference between the inside and outside option, this commitment rule shares the gap between the two options and potentially leaves surplus to the targeted entity (i.e., the participation constraint may not bind). This rule also induces more alignment between the hegemon and its target by vesting both with an interest in the inside option value (akin to an equity stake). Intuitively, too strong of a commitment, that is $\mu = 0$, extracts no revenue for the hegemon by construction; too weak of a commitment, that is too high of a μ, and the hegemon might lose its power and extract no transfers since countries fully fragment. An intermediate value of commitment might work to improve outcomes. The proposition below proves this result.

Proposition 6 *Let $N \to \infty$. A commitment by the hegemon to set $T_{i_n} = \mu V_{i_n}$ for μ sufficiently small is welfare improving for the hegemon relative to no commitment. The resulting equilibrium allocations $x^*_{i_n h}$ and $x^*_{i_n j}$ are the same as in the non-cooperative equilibrium without a hegemon.*

This commitment improves welfare for the hegemon by inducing foreign countries to allow at least some usage of the hegemon's financial services. Intuitively, the limited transfers that the hegemon demands induce the foreign countries to allow some usage of the hegemon's financial services to increase the inside option value of their intermediaries.

Interestingly, the combination of countries' ex-ante wedges and the hegemon's ex-post wedges, ends up implementing the same allocation as the non-cooperative equilibrium without a hegemon. Thus, a commitment to a sufficiently low μ also improves the welfare of all foreign countries. Each foreign country's welfare is now in between the non-cooperative outcome without a hegemon (same allocations, but countries are making transfers), and the anti-coercion outcome in the absence of hegemon's commitments.

In this equilibrium countries still fight the hegemon ex-ante by imposing a tax on usage of hegemon system $\tau^{\mu}_{n,i_n j} = \xi_j p_j$, but much less so than without commitment $\tau_{n,i_n j} = \infty$. We use the subscript μ to denote the wedges imposed under this commitment rule. The hegemon ex-post asks the countries to increase their usage of its services, but facing the ex-ante anti-coercion, the best policy for the hegemon is to simply unwind the ex-ante wedge imposed by the countries, $\tau^{\mu}_{n,i_n j} = -\xi_j p_j$. The net result is a zero wedge on the use of hegemon financial services, just like in the non-cooperative case without a hegemon (middle row of Table 1). On the usage of the home alternative, the commitment rule aligns the incentives of the hegemon and the targeted country, so that the hegemon implements the global planner's wedge ($\tau^{\mu}_{m,i_n h} = -\frac{\xi_h}{1+\xi_h} p_h$) and the domestic government does nothing ($\tau^{\mu}_{n,i_n h} = 0$).

If the μ is too high, i.e. the commitment is too low, under some mild regularity conditions the equilibrium goes back to the optimal anti-coercion one studied in the previous subsection (see

Appendix A.3.3). Each foreign country bans usage of the hegemon's financial services and subsidizes the home alternative to the efficient scale.

Although our formal characterization has focused on a simple rule for transfers (μ), the insights are more general. Parallel trade offs would emerge for restrictions on instruments τ_m: the hegemon trades off the direct loss from restrictions on use of the instrument, against the indirect benefits from favorably shaping the global equilibrium by reducing anti-coercion policies. While we have focused on the hegemon imposing restrictions on itself, it could potentially do even better by enlisting other countries to agree to a set of rules that directly limit the ex-ante policies that are allowed. For example, the hegemon could induce agreement to its rules by offering favorable terms (μ sufficiently low) to countries that forego anti-coercion instruments. The hegemon could potentially benefit from doing so because each country would only internalize its own surplus from agreeing to the terms, while neglecting the effects of its doing so on the power the hegemon had over other countries.

Our theory highlights that the hegemon can benefit from a rules-based international order – even rules that only apply to itself – because those rules provide commitment power that limit motives of other countries to engage in economic security policies that reduce their dependency on the hegemon. This echoes a view from political science that international organizations are the expression of Great Powers and serve to improve the welfare of these dominant countries (Baldwin (1985)). Indeed, the topic of a US-centric "liberal hegemony" has attracted an intense debate (Ikenberry (2001); Mearsheimer (1994, 2018); Walt (2018)). It also echoes the analysis of Bagwell and Staiger (2004) of the incentives of large countries to sponsor trade agreements even if they limit their ability to manipulate the terms of trade.

Our theory also offers a view of what has caused the surge in threats and hegemonic power exertion in recent years. First, the global economy has undergone structural transformation that have arguably made sectors with strategic complementarities and economies of scale more relevant (e.g. finance and information technology). Second, governments of powerful countries might have experienced a drop in their commitment to the rules of the previous international order. Both China under President Xi and the US under President Trump have used economic threats and pressure to extract either economic or political concession on a much grander scale than previous administrations. As a result, many countries are upping their economic security policies and re-thinking how dependent they want to be on these powerful countries.

3 General Model

The model in the previous section was intentionally minimalist to illustrate the main intuition. In this section, we generalize the basic model both to show the robustness of the main insights and to provide additional results that require introducing more complex forces. We focus specifically on illustrating the following points: endogenous prices and terms of trade manipulation, endogenous transmission of costly actions across sectors (generalized Leontief inverse) and the hegemon's macro power, hegemon building power with ex-ante policies, and more general objective functions for the hegemon (economic and political goals).

3.1 General Model Setup

There are N countries in the world. Each country n is populated by a representative consumer and a set of productive sectors $\mathcal{I}_n$, and is endowed with a set of local factors $\mathcal{F}_n$. We define $\mathcal{I}$ to be the union of all productive sectors across all countries, $\mathcal{I} = \bigcup_{n=1}^{N} \mathcal{I}_n$, and define $\mathcal{F}$ analogously. Each sector produces a differentiated good indexed by $i \in \mathcal{I}$ out of local factors and intermediate inputs produced by other sectors. Each sector is populated by a continuum of identical firms. The good produced by sector i is sold on world markets at price p_i. Local factor f has price p_f^ℓ. Local factors are internationally immobile. We take the good produced by sector 1 as the numeraire, so that $p_1 = 1$. We define the vector of all intermediate goods' prices (excluding the numeraire) as p, the vector of all local factor prices as p^ℓ, and the vector of all prices (excluding the numeraire) as $P = (p, p^\ell)$.

Representative Consumer. The representative consumer in country n has preferences $U(C_n) + u_n(z)$, where $C_n = \{C_{ni}\}_{i \in \mathcal{I}}$ and where z is a vector of aggregate variables which we use to capture externalities à la Greenwald and Stiglitz (1986) and/or direct political objectives. We simplify the analysis by assuming that the consumption utility function U is homothetic and identical across countries.[20] We also assume U is increasing, concave, and continuously differentiable. Consumers take z and P as given. The representative consumer in each country n owns all domestic firms and local factor endowments, and so faces a budget constraint given by $\sum_{i \in \mathcal{I}} p_i \, C_{ni} \leq w_n$, where $w_n = \sum_{i \in \mathcal{I}_n} \Pi_i + \sum_{f \in \mathcal{F}_n} p_f^\ell \bar{\ell}_f$ is consumer wealth, Π_i are the profits of sector i, and $p_f^\ell \bar{\ell}_f$ is the compensation earned by the local factor of production f. We denote the consumer's Marshallian demand function $C(p, w_n)$ and her indirect utility function from consumption as $W(p, w_n) = U(C(p, w_n))$. The consumer's total indirect utility is $W(p, w_n) + u_n(z)$.

Firms. A firm in sector i located in country n produces output y_i using a subset $\mathcal{J}_i$ of intermediate inputs and a subset $\mathcal{F}_{in}$ of the local factors of country n. Firm i's production function is $y_i = f_i(x_i, \ell_i, z)$, where $x_i = \{x_{ij}\}_{j \in \mathcal{J}_i}$ is the vector of intermediate inputs used by firm i, x_{ij} is the use of intermediate input j, $\ell_i = \{\ell_{if}\}_{f \in \mathcal{F}_{in}}$ is the vector of factors used by firm i, and ℓ_{if} is the use of local factor f. Firms take the aggregate vector z and prices P as given. We assume that f_i is increasing, strictly concave, satisfies the Inada conditions in (x_i, ℓ_i), and is continuously differentiable in (x_i, ℓ_i, z).[21] The sector-specific production function f_i allows us to capture technology, but also transport costs, and relationship-specific knowledge. The dependency of f_i on the vector of

[20] This implies that the optimal composition of consumption out of one unit of wealth is identical across countries' consumers, and so wealth transfers among consumers do not induce relative price changes in goods.

[21] We also allow for the existence of sectors that repackage factors but use no intermediate inputs, that do not necessarily satisfy Inada conditions on factors.

aggregates z captures production externalities (see below) such as the strategic complementarities in Section 2. Firms in this model are best thought of as entities that perform an economic activity, for example manufacturers, wholesalers, and financial intermediaries. They can be private entities or can be owned and operated by governments (e.g., a state-owned enterprise).

Central to our analysis is the possibility that a firm is cut off from being able to use some inputs. We define the firm's profit function if it were restricted to produce using only a subset $\mathcal{J}_i' \subset \mathcal{J}_i$ of intermediate goods as

$$\Pi_i(x_i, \ell_i, \mathcal{J}_i') = p_i f_i(x_i, \ell_i, z) - \sum_{j \in \mathcal{J}_i'} p_j x_{ij} - \sum_{f \in \mathcal{F}_{in}} p_f^\ell \ell_{if}$$

which leaves implicit that $x_{ij} = 0$ for $j \notin \mathcal{J}_i'$. The firm's decision problem, given inputs $\mathcal{J}_i'$ available, is to choose its inputs and factors (x_i, ℓ_i) to maximize its profits $\Pi_i(x_i, \ell_i, \mathcal{J}_i')$.

Market Clearing and Aggregates. Market clearing for good j and factor f in country n are given by $\sum_{n=1}^N C_{nj} + \sum_{i \in \mathcal{I}} x_{ij} = y_j$ and $\sum_{i \in \mathcal{I}_n} \ell_{if} = \bar{\ell}_f$. We assume that the vector of aggregates takes the form $z = \{z_{ij}\}$. In equilibrium $z_{ij}^* = x_{ij}^*$, where we use the $*$ notation to stress it is an equilibrium value. That is, externalities from the aggregate vector z are based on the quantities of inputs in bilateral sectors i and j relationships. This general formulation can capture, for example, the external economies of scale and strategic complementarities in the basic model of Section 2.

Leading Simplified Environments. To build intuition for our model it is at times useful to simplify the modeling environment by shutting off several channels. We consider two classes of simplifications: (i) a "constant prices" environment in which we switch off terms-of-trade manipulation incentives, and (ii) a "no z-externalities" environment in which we switch off the dependency of utility functions and production functions on the aggregates vector z. We briefly define each environment below. Indeed, the basic model in Section 2 already made use of the "constant prices" environment. Our main results do not use these simplified environments.

Definition 1 *The **constant prices** environment assumes that consumers have linear preferences over goods, $U = \sum_{i \in \mathcal{I}} \tilde{p}_i C_{ni}$, and that each country has a local-factor-only firm with linear production $f_i(\ell_i) = \sum_{f \in \mathcal{F}_n} \frac{1}{\tilde{p}_i} \tilde{p}_f^\ell \ell_{if}$. We assume consumers are marginal in every good and factor-only firms are marginal in every local factor so that $p_i = \tilde{p}_i$ and $p_f^\ell = \tilde{p}_f^\ell$.*[22]

Definition 2 *The **no z-externalities** environment assumes that $u_n(z)$ and $f_i(x_i, \ell_i, z)$ are constant in z.*

[22] We can guarantee this by assuming consumers and the factor-only firms can short goods and factors.

3.2 Hegemon, Target Countries, and Geoeconomic Policies

Country m is exogenously taken to be a world hegemon.[23] As discussed in Section 2 and Figure 2, the model has a Stackelberg timing. At the Beginning all countries (including the hegemon) simultaneously choose policies for their domestic sectors. In the Middle, the hegemon makes take-it-or-leave-it offers to foreign entities (which we describe formally below as a contract). At the End all production and consumption takes place.

In the Beginning, the instruments available to all governments, including the hegemon, consist of a complete set of revenue-neutral wedges $\tau_{n,i} = \{\{\tau_{n,ij}\}_{j\in\mathcal{J}_i}, \{\tau^{\ell}_{n,if}\}_{f\in\mathcal{F}_{in}}\}$ for each domestic firm $i \in \mathcal{I}_n$, where $\tau_{n,ij}$ is the bilateral wedge (tax) on purchases by firm i of good j and $\tau^{\ell}_{n,if}$ is the bilateral factor wedge. The first subscript n identifies the country imposing the tax, the second subscript i the firm subject to the tax, and the third subscript j the sourcing relationship that is being taxed. The equilibrium revenues of the tax are remitted lump-sum to the sector they are collected from, and are adapted to whether or not the firm accepts the hegemon's contract. Country n takes both the taxes and revenue remissions of other countries as given.[24]

Hegemon's Problem in the Middle. We assume that the hegemon can contract with every foreign firm that is able to source at least one input from the hegemon's domestic firms. Formally, this set of firms is $\mathcal{C}_m = \{i \in \mathcal{I}\backslash\mathcal{I}_m \mid \mathcal{J}_i \cap \mathcal{I}_m \neq \emptyset\}$. Hegemon m's offer to firm $i \in \mathcal{C}_m$ has three components: (i) a non-negative transfer T_i from firm i to the hegemon's representative consumer; (ii) revenue-neutral wedges $\tau_{m,i} = \{\{\tau_{m,ij}\}_{j\in\mathcal{J}_i}, \{\tau^{\ell}_{m,if}\}_{f\in\mathcal{F}_{in}}\}$ on purchases of inputs and factors, with equilibrium revenues $\tau_{m,ij}x^*_{ij}$ and $\tau^{\ell}_{m,if}\ell^*_{if}$ raised from sector i rebated lump sum to firms in sector i that accept the contract; (iii) a *punishment* $\mathcal{J}^o_i$, that is a restriction to only use inputs $j \in \mathcal{J}^o_i$ if firm i rejects the hegemon's contract. We denote $\Gamma_i = \{T_i, \tau_{m,i}, \mathcal{J}^o_i\}$ the contract terms offered to firm $i \in \mathcal{C}_m$. The hegemon's offer is made to each individual firm within a sector, meaning one atomistic firm could reject the offer while all other firms in the same sector accept it.

We restrict the punishments that the hegemon can make to involve sectors that are at most one step removed from the hegemon, that is involving either the hegemon's sectors or the foreign firms that the hegemon contracts with. This avoids unrealistic situations in which the punishment of the hegemon occurs over arbitrarily long supply chains of foreign entities. Formally, a punishment $\mathcal{J}^o_i$ is *feasible* if $\mathcal{J}_i\backslash(\mathcal{I}_m \cup \mathcal{C}_m) \subset \mathcal{J}^o_i$. We define $\underline{\mathcal{J}}^o_i = \mathcal{J}_i\backslash(\mathcal{I}_m \cup \mathcal{C}_m)$ to be the maximal punishment that the hegemon can threaten: i.e. suspending access to all inputs that it controls either directly, via its own firms, or indirectly, via the immediate downstream firms of its own firms. The inclusion of

[23]One could consider multiple hegemons competing in this second part of the game and/or the endogenous emergence of hegemons. Both are beyond the scope of this paper that takes the existence of one hegemon as given and studies the equilibrium implications.

[24]In this setup, we have not allowed countries (or the hegemon) to impose bilateral export tariffs on sales, with infinite tariffs imitating severing a relationship. It is straightforward to extend the model to allow for such instruments. Since revenue remissions are taken as given, an off-path country n policy change can lead to nonzero net revenues collected by another government from its domestic sectors. We assume these revenues are remitted to that country's consumer.

foreign entities in the set of firms enacting the punishment is of practical relevance since the U.S., for example, often uses foreign banks or technology companies with strong economic ties to the U.S. economy in enacting its punishments.

Participation Constraint. Firm $i \in \mathcal{C}_m$ chooses whether or not to accept the take-it-or-leave-it offer made by the hegemon. Firm i, being small, does not internalize the effect of its decision to accept or reject the contract on the prevailing aggregate vector z and prices P .

If firm i rejects the hegemon's contract Γ_i, it does not have to comply with the hegemon's demands but is punished by losing access to inputs controlled by the hegemon, achieving value:

$$V_i^o(\mathcal{J}_i^o) = \max_{x_i, \ell_i} \; \Pi_i(x_i, \ell_i, \mathcal{J}_i^o) - \sum_{j \in \mathcal{J}_i} \tau_{n,ij}(x_{ij} - x_{ij}^o) - \sum_{f \in \mathcal{F}_{in}} \tau_{n,if}^{\ell}(\ell_{if} - \ell_{if}^o). \tag{9}$$

We use the superscript o to denote values of objects at the outside option. For example, (x_i^o, ℓ_i^o) are the equilibrium optimal allocations of a firm in sector i conditional on it rejecting the hegemon's contract. If instead firm i accepts the contract Γ_i, it achieves value $V_i(\Gamma_i) = V_i(\tau_{m,i}, \mathcal{J}_i) - T_i$, where

$$V_i(\tau_{m,i}, \mathcal{J}_i) = \max_{x_i, \ell_i} \; \Pi_i(x_i, \ell_i, \mathcal{J}_i) - \sum_{j \in \mathcal{J}_i} (\tau_{m,ij} + \tau_{n,ij})(x_{ij} - x_{ij}^*) - \sum_{f \in \mathcal{F}_{in}} (\tau_{m,ij}^{\ell} + \tau_{n,ij}^{\ell})(\ell_{if} - \ell_{if}^*), \tag{10}$$

which implicitly defines the optimal allocations (x_i^*, ℓ_i^*) as a function of the contract offered.[25]

Firm i accepts the contract if it is better off by doing so, giving rise to the participation constraint

$$V_i(\tau_m, \mathcal{J}_i) - T_i \geq V_i^o(\mathcal{J}_i^o). \tag{11}$$

Hegemon Maximization Problem in the Middle. The hegemon's government objective function is the utility of its representative consumer to whom domestic firm profits and transfers accrue. Wedges are revenue neutral and so net out, but transfers from foreign sectors do not net out because the hegemon's consumer has no claim to foreign sectors' profits. The hegemon's objective function is:

$$\mathcal{U}_m = W(p, w_m) + u_m(z), \quad w_m = \sum_{i \in \mathcal{I}_m} \Pi_i + \sum_{f \in \mathcal{F}_m} p_f^{\ell} \bar{\ell}_f + \sum_{i \in \mathcal{C}_m} T_i. \tag{12}$$

The hegemon chooses contract terms Γ to maximize its utility, subject to firms' participation constraints (equation 11), feasibility of punishments, and non-negativity of transfers $T \geq 0$.

Hegemon's Power Building and Wielding in the Middle. We solve the hegemon's problem in the Middle in three steps (see the proof of Proposition 7). First, we show the hegemon builds as much power as possible by threatening maximal punishments for contract rejection, $\mathcal{J}_i^o = \underline{\mathcal{J}}_i^o$. Second, we show that the hegemon holds each firm to its participation constraint, $T_i =$

[25] Noting that $V_i(\Gamma_i) = V_i(T_i, \tau_{m,i}, \mathcal{J}_i) = V_i(0, \tau_{m,i}, \mathcal{J}_i) - T_i$, we slightly abuse notation by writing $V_i(0, \tau_{m,i}, \mathcal{J}_i) = V_i(\tau_{m,i}, \mathcal{J}_i)$. Recall also that the hegemon takes the revenue remissions of country n's government as given. In equation 10, these remissions are given by $\sum_{j \in \mathcal{J}_i} \tau_{n,ij} x_{ij}^* + \sum_{f \in \mathcal{F}_{in}} \tau_{n,ij}^{\ell} \ell_{if}^*$.

$V_i(\tau_m, \mathcal{J}_i) - V_i^o(\underline{\mathcal{J}}_i^o)$, resulting in a trade-off between demands for transfers and wedges as in Section 2. Finally, we use these results to characterize in the proposition below the optimal wedges $\tau_{m,ij}$ that the hegemon demands of foreign firms $i \in \mathcal{C}_m$ (with factor wedges characterized in the proof). Since the participation constraints bind, we substitute them into the hegemon's problem and keep track of the Lagrange multiplier η_i on the transfers non-negativity constraint: $T_i = V_i(\tau_m, \mathcal{J}_i) - V_i^o(\underline{\mathcal{J}}_i^o) \geq 0 \quad \Rightarrow \quad V_i(\tau_m, \mathcal{J}_i) \geq V_i^o(\underline{\mathcal{J}}_i^o)$. Proposition 7 is the counterpart of Proposition 3 in Clayton et al. (2023) in characterizing the hegemon's optimal "offense": how it wields its power in the Middle.[26]

Proposition 7 *Under an optimal contract, the hegemon imposes on a foreign firm $i \in \mathcal{C}_m$, a wedge on input j given by*

$$\tau_{m,ij} = -\frac{1}{1+\frac{\partial W_m}{\partial w_m}\eta_i} \overbrace{\sum_{k\in\mathcal{C}_m}\left(1+\frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_k\right)\left[\left(\frac{\partial \Pi_k}{\partial z} - \frac{\partial \Pi_k^o}{\partial z}\right)\frac{dz}{dx_{ij}} + \left(\frac{\partial \Pi_k}{\partial P} - \frac{\partial \Pi_k^o}{\partial P}\right)\frac{dP}{dx_{ij}}\right]}^{\text{Building Power}} + \\ - \frac{1}{1+\frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_i}\Bigg[\underbrace{X_m \frac{dP}{dx_{ij}}}_{\text{Terms-of-Trade}} + \underbrace{\left[\sum_{k\in\mathcal{I}_m}\frac{\partial \Pi_k}{\partial z} + \frac{1}{\frac{\partial W_m}{\partial w_m}}\frac{\partial u_m}{\partial z}\right]\frac{dz}{dx_{ij}}}_{\text{Domestic } z\text{-Externalities}} + \underbrace{\sum_{k\in\mathcal{I}_m}\tau_{m,k}\frac{d\boldsymbol{x}_k}{dx_{ij}}}_{\text{Private Distortion}}\Bigg] \quad (13)$$

where $\boldsymbol{x}_i = (x_i, \ell_i)$, $\frac{d\boldsymbol{x}_k}{dx_{ij}} = \frac{\partial \boldsymbol{x}_k}{\partial z}\frac{dz}{dx_{ij}} + \frac{\partial \boldsymbol{x}_k}{\partial P}\frac{dP}{dx_{ij}}$, and where X_m is the vector of exports by the hegemon's country.

The optimal wedge trades off the marginal benefit and cost of reducing activity in the i, j economic link. The (wealth-equivalent) marginal cost is $1 + \frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_i$, capturing both the direct cost of losing transfers from tightening the participation constraint, valued at 1 on the margin, and the wealth-equivalent shadow cost of tightening the transfer non-negativity constraint, $\frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_i$. The Lagrange multiplier η_i tracks the marginal value to the hegemon of increasing its power over sector i in excess of simply being able to extract an extra transfer.

The marginal benefit grouped under the label "Building Power" tracks how changes in equilibrium quantities ($\frac{dz}{dx_{ij}}$) and equilibrium prices ($\frac{dP}{dx_{ij}}$) affect how much power the hegemon has over foreign entities. The hegemon has more power if the induced equilibrium changes *raise* a firm's inside option ($\partial \Pi_k > 0$) or *lower* its outside option ($-\partial \Pi_k^o > 0$). Intuitively, as in Figure 3, the hegemon is using the wedges to manipulate the equilibrium to maximize the gap between the inside and outside options of foreign entities. The hegemon is seeking to increase how dependent

[26] We focus on threats by the hegemon that lower the targeted entity's outside option. Clayton et al. (2023) focused instead on joint threats that increase the targeted entity inside option. Such threats generate value for the target, for example, by increasing commitment and enforceability. The hegemon then extracts the surplus via costly actions. Moving the inside option, in general, alleviates the concern of fragmentation because it does not threaten the target with losing all access to the hegemon's goods at the outside option. Rather it entices the target with even closer integration (at the expense of dependency) on the inside option expanding the set of feasible allocations. For modeling sketches of many other types of threats see Clayton et al. (2025).

foreign entities are on the inputs it controls. In the basic model of Section 2 this manipulation was happening entirely through the productivity of the intermediary sector. In this general result, the transmission is via a full Leontief inverse of the global production network. Each firm is reacting to what other firms are producing either because of changes in productivity via the z-externalities or changes in prices of the intermediate inputs. In this context a sector, like financial intermediation, is important for the hegemon to build power not only directly because of the effect of externalities on the sector itself (as in our basic model), but also and perhaps more importantly indirectly because via Leontief amplification it affects the inside and outside option of many other sectors. This indirect effect is what Clayton et al. (2023) call the Macro Power of the hegemon, as opposed to the Micro Power (the slack in the target participation constraint for given equilibrium aggregates).

The rest of the marginal benefits in equation 13 reflect the more general objective function and production structure compared to the basic model in Section 2. The term, "Domestic z-externalities," reflects spillovers to the hegemon's domestic firms and consumers from changes in aggregate quantities. For example, the hegemon wants to lower the competitiveness of foreign industries that compete with its domestic ones (the term $\partial \Pi_k$). This is an economic objective. Further, the hegemon might have geopolitical considerations (the term ∂u_m originating from the utility function), that lead it to want to shrink a foreign activity, such as military expenditures on research, that directly threatens its utility. The third term, "private distortion," reflects the interaction between the induced equilibrium changes and domestic wedges that the hegemon placed on its own firms in the ex-ante stage, and so accounts for the loss of profits to its domestic firms whose production decisions are distorted away from their private optimum. Both these terms were absent in the basic model.

The term $(\frac{dP}{dx_{ij}})$ traces the effects due to changes in prices. These price changes affect both the building power motive and also have a standard "Terms-of-Trade" manipulation motive to boost prices of goods the hegemon exports ($X_{m,k} > 0$) and lower prices of goods it imports ($X_{m,k} < 0$). These effects are absent in the basic model of Section 2, but terms of trade manipulation has a long intellectual tradition in international economics. Here, the hegemon is directly manipulating foreign firm actions and, as in Clayton et al. (2023), might face a conflict between building power and manipulating the terms of trade.

3.3 Anti-Coercion Policy and Fragmentation

Moving backward in the timeline of Figure 2, at the Beginning the government of each country n chooses policies (sets wedges) applied to its own domestic firms, internalizing how the hegemon's offered contract will change in response, but taking as given the policies adopted by all other countries. While each country $n \neq m$ has several incentives for imposing wedges (e.g., domestic externality correction), we think of anti-coercion policy as the component targeted at influencing the hegemon's contract. At the end of this section, we also characterize the optimal wedges set by the hegemon on its own firms in this ex-ante stage, again isolating the component aimed at build up its hegemonic power.

The government of country n chooses wedges τ_n in order to maximize its representative consumer's utility. Given the binding participation constraint, the objective of country n is

$$\mathcal{U}_n = W(p, w_n) + u_n(z), \qquad w_n = \sum_{i \in \mathcal{I}_n} V_i^o(\underline{\mathcal{J}}_i^o) + \sum_{f \in \mathcal{F}_n} p_f^\ell \bar{\ell}_f. \tag{14}$$

For sectors in country n that contract with the hegemon, the country n's government internalizes that they will be kept at their outside option ex-post (as in Figure 3) and, therefore maximizes the outside option value V_i^o. For all other sectors, instead, country n's government maximizes the inside option value V_i. For notational simplicity, we leave implicit the dependency of the hegemon's contract and equilibrium objects on anti-coercion policies, and for sectors that the hegemon does not contract with we define all outside option values to equal the inside option values (i.e., as if these firms were offered a trivial contract with no threats, no transfers, and no wedges). For these sectors, therefore, $V_i(\mathcal{J}_i) = V_i^o(\underline{\mathcal{J}}_i^o)$, leading to simpler notation in the equation above.

We are now ready to characterize the optimal policy of country n – the wedges its government imposes on its domestic sectors – in the ex-ante stage in seeking to shield the economy from undue influence by the hegemon ex-post.[27]

Proposition 8 *The optimal wedges imposed by (non-hegemonic) country n's government on its domestic sectors satisfy:*

$$\tau_n \frac{d\boldsymbol{x}_n^o}{d\tau_n} = -\left[\sum_{i \in \mathcal{I}_n} \frac{\partial \Pi_i^o}{\partial z} + \frac{1}{\frac{\partial W_n}{\partial w_n}} \frac{\partial u_n}{\partial z}\right] \frac{dz}{d\tau_n} - X_n^o \frac{dP}{d\tau_n} \tag{15}$$

where X_n^o is the vector of country n exports of goods $i \in \mathcal{I}$ and factors $f \in \mathcal{F}_n$ if firms were to operate at their outside options.

Proposition 8 presents the optimal wedge formula of country n, which balances the marginal cost on the left hand side with the marginal benefit on the right hand side. The marginal cost of a change in wedges is given by the private cost of distorting production from its private optimum, τ_n, times the amount that production is further distorted at the outside option from a perturbation in the wedge, $\frac{d\mathbf{x}_n^o}{d\tau_n}$. The right-hand side of the formula is the social benefit to country n of the changes in equilibrium quantities z and prices P induced by the change in taxes. These social benefits depend on the network amplification on both prices and quantities, $\frac{dP}{d\tau_n}$ and $\frac{dz}{d\tau_n}$, induced by the change in policies. These effects are derived in full in the proof, and we also expand upon them below. To illustrate the economics of each term, we turn to our simplified environments.

To illustrate the effect on quantities, we specialize the theory by assuming constant prices as in the environment of Definition 1. Then equation (8) reduces to

[27] We assume that the the hegemon's equilibrium (P, z, τ_m) is differentiable in τ_n in a neighborhood of the optimum.

$$\tau_n \frac{d\mathbf{x}_n^o}{d\tau_n} = -\Bigg[\underbrace{\sum_{i\in\mathcal{I}_n} \frac{\partial \Pi_i^o}{\partial z} + \frac{\partial u_n}{\partial z}}_{\text{Marginal Value of Change in Quantities}} \Bigg] \overbrace{\Bigg[\underbrace{\Psi^z \frac{\partial x}{\partial \tau_n}}_{\text{Standard Intervention}} + \underbrace{\Psi^z \frac{\partial x}{\partial \tau_m}\frac{d\tau_m}{d\tau_n}}_{\text{Anti-Coercion}} \Bigg]}^{=\frac{\partial z}{\partial \tau_n}}. \tag{16}$$

The first term reflects the social benefit of inducing changes in firm activities that result in equilibrium changes in the vector of aggregate quantities z. Country n wants to manipulate z-externalities to bolster its firms' outside options (Π_i^o) or benefit its consumers (u_n). For example, country n might push its own firms to scale up domestic production in industries with economies of scale. This force featured prominently in the basic model of Section 2.

The shift in equilibrium quantities in equation 16 has two components: the firm term, labeled "Standard Intervention", reflects endogenous input-output amplification from the propagation of externalities. $\Psi^z = (\mathbb{I} - \frac{\partial x}{\partial z^*})^{-1}$ is the matrix capturing how a production externality generated by one sector filters through the equilibrium network. The partial equilibrium effect of firms changing their demand in response to the policy change is augmented in general equilibrium as production externalities cause other firms to change their demand for inputs as well. This further shifts the equilibrium aggregate z^*, eliciting further demand changes, and so forth. The matrix Ψ^z is the fixed point of this feedback loop, with $\Psi^z \frac{\partial x}{\partial \tau_n}$ being the total change in all aggregates in equilibrium induced by the initial direct response to changes in τ_n. Ψ^z is akin to a Leontief inverse, but operating through externalities rather than prices. This term would be there even in the absence of a hegemon since it reflects country n's government's motive to use wedges to correct externalities within its domestic economy. In models with economies of scale, for example, this standard intervention leads to production subsidies. However, in the absence of a hegemon, country n's government would impose the wedges to maximize the inside option value. In the presence of a hegemon, instead, it maximizes the outside option value to limit the transfers that the hegemon can extract.

The second term reflects a pure anti-coercion motive: country n's government imposes ex-ante wedges to shape its economy in a way that will shield it from ex-post influence by the hegemon. Formally, country n's government internalizes how its ex-ante wedges will limit the ability of the hegemon to ex-post impose wedges on the domestic firm that decrease country n's welfare. This term is absent in models à la Krugman without a coercive hegemon that maximize the gains from trade arising from economies of scale and strategic complementarities even if in equilibrium these induce economic dependency on other countries.

To illustrate the effect via equilibrium prices, we specialize the general theory by assuming no z-externalities as in the environment of Definition 2. Then equation (8) reduces to:

$$\tau_n \frac{d\mathbf{x}_n^o}{d\tau_n} = -X_n^o \Bigg[\overbrace{\underbrace{\Psi^P \frac{\partial ED}{\partial \tau_n}}_{\text{Standard Intervention}} + \underbrace{\Psi^P \frac{\partial ED}{\partial \tau_m}\frac{d\tau_m}{d\tau_n}}_{\text{Anti-Coercion}}}^{=\frac{dP}{d\tau_n}} \Bigg] \tag{17}$$

where $\Psi^P = -\left(\frac{\partial ED}{\partial P}\right)^{-1}$ and where ED is the vector of excess demand in every good and factor market (except the numeraire). The government of country n is now imposing wedges on its firms to manipulate the terms of trade. Parallel to equation (16), the term $\frac{dP}{d\tau_n}$ includes both standard price-based amplification and anti-coercion motives. The standard motive to manipulate the terms of trade are still present. In a class of models, for example external economies of scale in production and nested CES preferences as in Bartelme et al. (2019), this standard intervention on domestic sectors features a production subsidy (to exploit the economies of scale) and an export tax (to manipulate the terms of trade). The anti-coercion motive arises instead from the desire to limit the ability of the hegemon to ex-post manipulate the production externalities or the terms of trade against country n.

Our results reveal the importance of network amplification for anti-coercion policy. In the absence of amplification, e.g. if there are constant prices (Definition 1) and no z-externalities (Definition 2), then country n's optimal policy is to impose no wedges, $\tau_n = 0$. Intuitively, even though the hegemon is extracting the difference between the inside and outside options as a transfer payment, country n can no longer shift the equilibrium to improve its outside option. As a result, anti-coercion policies could lower the transfer extracted by the hegemon, but in the process would also lower the outside option of firms in country n, making both worse off.

The optimal policy characterized in this paper gives theoretical foundations for the economic security policies that many countries and blocks, such as the European Union, are introducing. It clarifies the rationale for government intervention, defines the scope and tool to be used, and warns about the danger that (globally) such policies might be counter productive. We turn to each of these elements next.

The rationale for country n's government intervention is that economic coercion is exerted, as often is in practice, by a hegemonic government on entities that do not internalize the entire equilibrium. A European firm accepting a technology sale to China, or a European bank acquiescing to U.S. demands to stop dealing with a specific entity, do not internalize that these requests are being made at a system level and might change the entire macro dynamic. These firms simply comply because the private cost of not doing so would exceed their private benefit.

The scope of the policy is narrow on sectors that have a high influence on the equilibrium. As we discussed above, in the absence of network amplification the best policy is to do nothing. More generally, the theory shows that sectors are strategic for the government of country n the more they can be used to shield the economy from undue ex-post influence. For example, the government of country n wants to bolster ex-ante a sector with large economies of scale that can offer an alternative to hegemon inputs in order to become less dependent on the hegemon. Securing a supply of critical minerals or energy, or making sure there is enough domestic production of inputs that are essential to the military are typical policies of this type. Many of these anti-coercion policies seek to bolster home alternatives to hegemonic inputs. In doing so they fragment the global economy as countries put more weight on having high outside options. Our theory, see Section 3.5, warns about the dangers of these policies when carried out in an uncoordinated fashion.[28]

Krugman Meets Geoeconomics. Our simple model focuses on external economies of scale while the general theory allows also for price based amplification in addition to these external economies. In landmark contributions, Krugman (1979, 1980) put forward a theory of trade based on increasing returns to scale (internal economies of scale) and specialization patterns. Our theory highlights that in the presence of geoeconomic threats, these same mechanisms can induce dependency by leaving the target with poor outside options (the technology they did not scale up is a poor substitute). Economic security policy aims to induce ex-ante incentives to scale up the alternatives, specialize less (diversify), and give up some of the gains from trade to achieve greater security. In Appendix A.5 we provide a specialization of the general theory to illustrate this argument in a price-amplification based model with ex-ante irreversible decisions à la Krugman. Our paper offers a unified analysis of this core insight: the presence of a trade off between economic security and gains from trade in the presence of externalities. External or internal economies of scale, ex-ante (or off path vs on path) irreversible decisions, or price based amplification are incarnations of this more general insight.

3.4 Hegemon's Industrial and Trade Policies to Build Power

Just like governments in other countries, the hegemon's government also sets wedges on its domestic firms in the ex-ante stage of the Stackleberg game. Yet, the hegemon's objectives are quite different: it uses these ex-ante policies to shape its domestic economy to build up its coercive power. These policies include industrial, financial, and trade policies that boost those strategic sectors of the hegemons' economy that generate high dependence in foreign countries. The proposition below characterizes the optimal policies.

Proposition 9 *The hegemon's optimal wedges on domestic firms satisfy*

$$\tau_{m,ij} = -\overbrace{\sum_{k\in\mathcal{C}_m}\left(1+\frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_k\right)\left[\left(\frac{\partial \Pi_k}{\partial z}-\frac{\partial \Pi_k^o}{\partial z}\right)\frac{dz}{dx_{ij}}+\left(\frac{\partial \Pi_k}{\partial P}-\frac{\partial \Pi_k^o}{\partial P}\right)\frac{dP}{dx_{ij}}\right]}^{\text{Building Power}}$$
$$\underbrace{-\left[\sum_{k\in\mathcal{I}_m}\frac{\partial \Pi_k}{\partial z}+\frac{1}{\frac{\partial W_m}{\partial w_m}}\frac{\partial u_m}{\partial z}\right]\frac{dz}{dx_{ij}}}_{\text{Domestic } z\text{-Externalities}}-\underbrace{X_m\frac{dP}{dx_{ij}}}_{\text{Terms-of-Trade}} \tag{18}$$

The hegemon has an incentive to manipulate prices and aggregate quantities to build its power over foreign firms. This motivation parallels its incentive to use (ex-post) its optimal contract with foreign

[28]Creating defensive coalitions of governments to pursue coordinated anti-coercion would clearly be beneficial to improve the block's bargaining position by allowing the members to internalize more of the externalities that economic security policy should target and lifting their outside options.

firms to ask them to take costly actions that build its power by manipulating the global equilibrium (Proposition 7). However, the effect in the first line of equation (18) is ex-ante and operating through the activities of the hegemons' domestic firms.[29] The rest of the hegemon's motivations for setting taxes on domestic firms parallel those of non-hegemonic countries in correcting domestic z-externalities and manipulating the terms of trade (the second line of equation 18).

The building power motive can act in contrast with traditional objectives such as terms of trade manipulation. For example, a classic textbook result is to impose a tariff on imports in inverse proportion to the elasticity of foreign export supply (Feenstra (2015) page 223), or by Lerner symmetry a tax on exports. As Clayton et al. (2023) highlight, the power building can be a countervailing force: the hegemon might be better off lowering prices of its exports (an export subsidy rather than tax) in order to build more power. A hegemon like China can find it optimal to subsidize its export-oriented manufacturing sectors and push down the price of its exports. Lowering the price of the exports is the opposite of what the terms of trade manipulation would imply. The rationale here is different from the standard motives for manipulating prices: cheap exports will have a high penetration in foreign markets and discourage production of alternatives in foreign countries. In the presence of external economies of scale, in both China and foreign manufacturing sectors, this creates a foreign dependency on Chinese inputs that China can exploit ex-post to exert geoeconomic power. The threat of being cut off from Chinese manufacturing inputs is effective once other countries have too small of a scale of their domestic manufacturing sectors. This logic is similar to that of Section 2 on the U.S. hegemon and its provision of financial services to the rest of the world.

3.5 Efficient Allocation and Noncooperative Outcome

As in the basic model of Section 2, it is useful to benchmark our results against the global planner's solution and the non-cooperative outcome without an hegemon.

Global Planner's Efficient Allocation. We assume that the global planner has the same instruments as individual governments and the hegemon, but maximizes global welfare, $\mathcal{U}^{GP} = \sum_{n=1}^{N} \Omega_n \left[W_n(p, w_n) + u_n(z) \right]$, where $\Omega_n > 0$ is the Pareto weight attached to country n. As is common in the literature, we eliminate the motivation for cross-country wealth redistribution by choosing Pareto weights that equalize the marginal value of wealth across countries, that is $\Omega_n \frac{\partial W_n}{\partial w_n} = 1$. Since the hegemon's ex-post wedges are redundant given the availability of all governments' ex-ante wedges and transfers are purely redistributive, we can consolidate the planner's problem into a single stage in which it sets wedges τ on all sectors globally to maximize global welfare. The

[29] In contrast with the anti-coercion motivation of foreign countries, equation 18 does not contain terms related to the reoptimization of the hegemon's contract, a consequence of Envelope Theorem. Rather, the hegemon internalizes how its domestic policies affect its contracting problem through the effects on its power over foreign firms.

following proposition characterizes the global planner's optimum.

Proposition 10 *The global planner's optimal wedges are*

$$\tau_{ij} = -\sum_{k\in\mathcal{I}} \frac{\partial \Pi_k}{\partial z_{ij}} - \sum_{n=1}^{N} \frac{1}{\frac{\partial W_n}{\partial w_n}} \frac{\partial u_n}{\partial z_{ij}} \tag{19}$$

The global planner uses wedges τ_{ij} to correct externalities arising from the vector of aggregate quantities z, differing from individual countries' optimal ex-ante policies in three ways. First, since the global planner lacks a redistributive motive, the global planner does not engage in terms-of-trade manipulation (at best zero-sum redistribution). Second, whereas individual country governments only target externalities borne by domestic firms and consumers, the global planner accounts for externalities on firms and consumers in all countries. Third, individual country governments care about the externalities on their firms' outside options, due to anticipated coercion by the hegemon, whereas the global planner cares about the externalities on firms' inside options.[30]

Proposition 10 illustrates the points of commonality and difference between the hegemon and the global planner. Compared to the planner, the hegemon manipulates the global equilibrium to increase the dependency of foreign firms on inputs it controls, thus increasing what it can extract from them (the building power term in Proposition 7). Much like the global planner, the hegemon shifts production externalities to increase firms' inside options, but unlike the global planner the hegemon also tries to lower firms' outside options. In this sense, the hegemon generates hyper-globalization by over-integrating foreign economies with its own economic network. Anti-coercion policy tries to limit this process. Each country pursues anti-coercion to push the outside option up. Since these policies are uncoordinated among the foreign governments, they risk globally destroying welfare as each country over-fragments the global economy to improve its own economic security.

Non-Cooperative No-Hegemon Outcome. Our second benchmark is the noncooperative outcome that arises when all countries set their own policies on domestic firms, but no country is a hegemon.

Proposition 11 *Absent a hegemon, the optimal wedges of country n satisfy*

$$\tau_{n,ij} = -\left[\sum_{k\in\mathcal{I}_n} \frac{\partial \Pi_k}{\partial z} + \frac{1}{\frac{\partial W_n}{\partial w_n}} \frac{\partial u_n}{\partial z}\right] \frac{dz}{dx_{ij}} - X_n \frac{dP}{dx_{ij}}$$

[30] Whereas individual countries' wedge formulas account for network amplification, the global planner's wedges do not. Intuitively, the global planner has a complete set of instruments on all firms and can directly manage externalities associated with each activity separately. In contrast, individual countries and the hegemon have limited instruments, and can only control a subset of firms in the global economy. Although the global planner accounts for amplification through price changes, the resulting pecuniary externalities are purely redistributive and so do not generate a net welfare impact.

In the absence of a hegemon, each country corrects z-externalities that fall on its domestic economy and manipulates its terms-of-trade. However, unlike anti-coercion against a hegemon that focused on the outside option, the government of country n now maximizes the inside option of all of its firms. The country n government deviates from the global planner's efficient wedges both in ignoring externalities that fall outside of its country and in manipulating the terms-of-trade. In general, this noncooperative equilibrium could be better or worse for the (non-hegemonic) countries than the equilibrium with a hegemon and anti-coercion. As discussed above, the hegemon shares features of the global planner, thus adding value to foreign countries, but also distorts the equilibrium in its favor. Similarly, uncoordinated anti-coercion policy can end up making all countries worse off by destroying the gains from global integration. Indeed, Section 2 proved a case in which the noncooperative equilibrium without a hegemon would have been welfare improving for all non-hegemonic countries.

3.6 A Hegemonic View of International Organizations

Finally, we show how our insights on hegemonic commitment and international organizations generalize. As in our basic model of Section 2, we study a commitment to restrict transfers to a fraction of the inside option, $T_i = \mu V_i(\tau_m, \mathcal{J}_i)$. The proposition below characterizes the hegemon's optimal choice of μ.[31]

Proposition 12 *The hegemon's optimal choice of commitment μ satisfies*

$$\sum_{i \in \mathcal{C}_m} \Pi_i(\boldsymbol{x}_i^*) = -\sum_{i \in \mathcal{C}_m} \mu \left[\left(\tau_{m,i} + \tau_{n,i} \right) \frac{d\boldsymbol{x}_i^*}{d\mu} + \frac{d\Pi_i}{dP} \frac{dP}{d\mu} + \frac{\partial \Pi_i}{\partial z} \frac{dz}{d\mu} \right] \\ - \sum_{i \in \mathcal{I}_m} \left[\tau_{m,i} \frac{d\boldsymbol{x}_i^*}{d\mu} + \frac{\partial \Pi_i}{\partial z} \frac{dz}{d\mu} \right] - X_m \frac{dP}{d\mu} - \frac{1}{\frac{\partial W}{\partial w_m}} \frac{\partial u_m}{\partial z} \frac{dz}{d\mu} \tag{20}$$

When deciding the fraction μ to extract from foreign firms to firm, the hegemon trades off the direct benefit from higher transfers (LHS) against the indirect costs of countries' changes in anti-coercion policies (RHS). In our basic model, a commitment to a low μ was welfare-improving because even though the hegemon's transfer fell directly (the LHS), the size of the transfer increased as the hegemon's commitment reshaped the equilibrium by reducing incentives for anti-coercion (the RHS). The first line on the RHS reflects how the reshaping of the equilibrium changes the profits that the hegemon extracts from foreign firms, both by directly changing their distorted activities (dx_i^*), by changes equilibrium prices (dP), and by changing equilibrium externalities (dz). In our basic model, the reshaping of the equilibrium operated through the first and third channel, while prices were constant. The second line in equation 20 reflects how the reshaping of the equilibrium affects the

[31] For simplicity, the proposition is written for an interior solution. Appendix A.4.4 studies an alternative specification of the commitment over transfers in which the hegemon commits to extract at most a fraction of the gap between the inside and outside option.

hegemon's economy through z-externalities, terms-of-trade manipulation, and altering the private activities of firms. These channels were absent in the basic model. Indeed, the general theory highlights not only additional price-based channels by which reshaping the equilibrium affects what the hegemon can extract from foreign firms, but also that the hegemon is willing to limit extraction if doing so has positive spillovers to the hegemon's own economy, for example through production externalities.

It is both noteworthy and intuitive that it is only valuable to the hegemon to be restricted to a transfer of this form if it produces a beneficial endogenous equilibrium response. This suggests that the hegemon is willing to leave more surplus to countries the more these countries would otherwise employ economic security policies to mitigate hegemonic coercion. Interestingly, if μ were made sector- or country-specific (μ_i or μ_n), this channel could endogenously produce differentiation in the surplus the hegemon is willing to leave to different firms and countries in the world that is distinct from a more direct geopolitical classification of the allied and non-allied countries of the hegemon (e.g., UN voting similarities). For example, the hegemon may be willing to leave more surplus to a country for which deterring anti-coercion policies has particularly strong network propagation that increases the hegemon's power over other countries.

4 Quantifying Geoeconomic Power and Vulnerabilities

In this section, we use our model as a guide for examining the sources of geoeconomic power around the world and identifying key vulnerabilities for the target countries. We show that a parameterized version of our model with a nested-CES structure provides a simple sufficient statistics approach to measuring power and demonstrating the importance of finance in generating U.S. power. Our estimates also measure, at the sector level, the relative impact of anti-coercion policies that can be adopted by the target countries.

We consider a nested-CES production function in each country that uses domestic and foreign intermediate inputs to produce a final composite good.[32] We abuse notation by identifying a representative final-goods producer with its country of residence n (i.e., by denoting $i = n$). In keeping with the finance application of the previous subsection, we set the top CES layer to be an aggregator between financial services and a bundle of all other inputs (manufacturing, non-finance services, agriculture, etc...),

$$f_n\left(x_n\right) = A_n \left(\sum_{G \in \{M,F\}} \alpha_{nG}\ x_{nG}^{\frac{\varrho-1}{\varrho}} \right)^{\frac{\beta\varrho}{\varrho-1}},$$

where ϱ is the elasticity of substitution across sectors, β governs the returns to scale, and $\mathcal{G} = \{F, M\}$

[32]Formally, there are a continuum of identical firms each with a nested-CES production function, so that we think of the collection as a representative final-good producer.

is the set of sectors: F for finance, and M for all other goods and services. Each sector composite good x_{nG} is itself produced out of the output of sub-sectors $J \in \mathcal{J}_G$ with a CES aggregator of sub-sectors given by[33]

$$x_{nG} = \left(\sum_{J \in \mathcal{J}_G} \alpha_{nJ} \; x_{nJ}^{\frac{\rho_G - 1}{\rho_G}} \right)^{\frac{\rho_G}{\rho_G - 1}},$$

where ρ_G is the elasticity of substitution across sub-sectors J in sector G. Each sub-sector composite good is itself an aggregator of home and foreign varieties in that sub-sector,

$$x_{nJ} = \left(\alpha_{nJn} \; x_{nJn}^{\frac{\varsigma_J - 1}{\varsigma_J}} + \alpha_{nJR} \; x_{nJR}^{\frac{\varsigma_J - 1}{\varsigma_J}} \right)^{\frac{\varsigma_J}{\varsigma_J - 1}}, \quad x_{nJR} = \left(\sum_{k \neq n} \alpha_{nJk} \; x_{nJk}^{\frac{\sigma_J - 1}{\sigma_J}} \right)^{\frac{\sigma_J}{\sigma_J - 1}},$$

where ς_J is the elasticity of substitution between home and foreign inputs in sub-sector J, and σ_J is the elasticity of substitution across different foreign countries' varieties of sub-sector J. Each country n has an intermediate goods producer that produces the country n variety of industry J linearly out of local factors of production. As a result, intermediate producer profits are constant at zero.[34]

We take the perspective that target economies are "small," in the small open economy sense, and therefore assume constant prices (Definition 1). This means that the hegemon's power over country n – that is, the loss to country n of losing access to the hegemon-controlled inputs – is equal to the loss of profits to the final goods producer. Importantly, our model allows the producer to fully reoptimize its input choices as it tries to find substitutes for the inputs it has lost access to. In this sense, our calculation is not about very short run effects that assume relationships in place are hard to substitute away from. We focus, instead, on the medium run horizon, but abstract from more general equilibrium effects that could be incorporated in more quantitative extensions. We show that the power of hegemon m over country n can be computed from the following sufficient statistic.[35]

Proposition 13 *The hegemon's power over country n is given by*

$$\text{Power}_{mn} = \frac{\beta}{1-\beta} \frac{1}{1-\varrho} \log \left(\sum_{G \in \{M,F\}} \Omega_{nG} \left(\sum_{J \in \mathcal{J}_G} \Omega_{nGJ} \left(1 - \Omega_{nJR} + \Omega_{nJR} \left(1 - \omega_{nJR_m} \right)^{\frac{\varsigma_J - 1}{\sigma_J - 1}} \right)^{\frac{\rho_G - 1}{\varsigma_J - 1}} \right)^{\frac{\varrho - 1}{\rho_G - 1}} \right) \tag{21}$$

[33]We omit a productivity term A_{nG} because we can always fold that into the uppermost production function f_n by normalizing the weights α_{nG} and adjusting aggregate productivity A_n. Similar normalizations can be applied to productivity terms for the sub-sector composites.

[34]In this production structure, all factor payments are made by the basic intermediate goods producers that only use the local factors. GDP is the sum of the final goods producers profits and the factor payments.

[35]It is a sufficient statistic in the sense that many parameters of the production function do not have to be estimated. For example, since the economy is small and even within the economy deviations are at the atomistic firm level, the z-externalities and factor specific productivities are all subsumed in the observed expenditure shares. This notion of power corresponds more closely to "micro-power" in Clayton et al. (2023).

where Ω_{nG} is the expenditure share on sector G, Ω_{nGJ} is the share of sector G spending on sub-sector J, Ω_{nJR} is the share of sub-sector J spending on foreign inputs, and ω_{nJR_m} is the share of foreign input spending in sub-sector J controlled by the hegemon.

All else equal, this potential loss sets an upper bound on the cost to country n of actions (wedges, transfers, or political concessions) that the hegemon can ask for before the entities in that country prefer to decline the contract. This is a natural measure of the hegemon's power over a country n.

This measure of power allows the model to make concrete empirical predictions and is simple to estimate. It provides both formal treatment and empirical content to the notion of geoeconomic power put forward by Hirschman (1945). We consider not only cases in which the hegemon only cuts off supply of its own inputs, in which case ω_{nJR_m} is the expenditure share on the hegemon's inputs, but also cases in which the hegemon coordinates a punishment coalition, in which case ω_{nJR_m} is the expenditure share on the inputs sold by all members of that coalition. Our measure of power is also related to the Arkolakis et al. (2012) calculations of the benefits of international trade, in which autarky is the counterfactual so that $\omega_{nJR_m} = 1$. In our framework power comes from the losses induced on producers, so that in this application $Power_{mn} = \log V_n(\mathcal{J}_n) - \log V_n^o(\mathcal{J}_n^o)$. The effect on country n's income w_n, which here coincides with GDP and consumer welfare, is obtained by scaling down $Power_{mn}$ by the fraction of aggregate income accounted for by profits.[36]

We focus on two potential hegemons, the United States and China, and we assume that only a hegemon can cut off exports. For every country n, we measure the level of power that the hegemon (United States or China) has over that country in equation (22). Consistent with our model, we present two versions: a narrow version in which the hegemon uses only the inputs in its own country to form threats, and a coalition version in which the hegemon also uses inputs in countries that are part of its political or economic network to make threats. As an example, in the narrow version the U.S. would use only its own correspondent banks to make threats of suspension of financial services, whereas in the coalition version the U.S. would also induce SWIFT, a Belgian cooperative entity, to join its threats. Practically, we study two coalitions. The American Coalition includes: U.S., all Euro Area countries, Canada, Australia, New Zealand, Japan, Sweden, Norway, Great Britain, Denmark, Switzerland, Taiwan, and South Korea. The Chinese Coalition includes China, Russia, Belarus, Syria, and Iran.[37] Our estimates do not take into account indirect effects, outside of the coalition, arising from value chains. For example, they do not take into account the Chinese content in goods that Vietnam exports to the U.S. (Baldwin et al. (2023)).

To gather intuition, we empirically implement our measure in the main text under the following simplifications: (i) a Cobb-Douglas aggregator at the sector level ($\varrho = 1$), (ii) we aggregate all non-finance sub-sectors together, that is $|\mathcal{J}_M| = 1$, meaning the elasticity ρ_G is no longer used.

[36]In our model this fraction is $1 - \beta$ whenever the factor prices and endowments are assumed to be such that the factors are "just" used by the domestic producers. This is consistent with the final good of country n being consumed by its own consumer.

[37]The definition of China in this paper always includes Hong Kong and Macau.

Under these conditions, equation 21 simplifies to

$$\text{Power}_{mn} = -\frac{\beta}{1-\beta} \sum_{G \in \{M,F\}} \Omega_{nG} \log \left[1 - \Omega_{nGR} + \Omega_{nGR} \left(1 - \omega_{nGR_m} \right)^{\frac{\varsigma_G - 1}{\sigma_G - 1}} \right]^{\frac{1}{\varsigma_G - 1}}. \tag{22}$$

Data Sources. To implement our measure, we use goods trade data from BACI, service trade data from the OECD-WTO Balanced Trade in Services (BaTIS), and domestic gross output data for all sectors from the OECD Inter Country Input Output (ICIO) tables. We aggregate both BACI and BaTIS to the same sectors used in the ICIO in order to ensure consistency in the measurement of domestic production. These bilateral trade and domestic gross output shares at the sector level are used to measure the expenditure shares in equations 21 and 22 (i.e. the Ωs and ωs). The trade elasticity of substitution is a notoriously difficult parameter to estimate (see Costinot and Rodríguez-Clare (2014) for a review). For the benchmark calibration of equation 22, we set the composite bundle elasticity to $\sigma_M = 6$ to deliver a trade elasticity of 5 as in Costinot and Rodríguez-Clare (2014) and the financial services bundle to $\sigma_F = 1.76$ following Rouzet et al. (2017).[38] We set $\varsigma_G = \frac{\sigma_G}{2}$ to account for the domestic variety being a relatively worse substitute for the bundle of foreign varieties than each foreign variety is with respect to other foreign varieties, as discussed in Feenstra et al. (2018).[39] This effectively reduces the aggregate trade elasticity, consistent with recent evidence in Boehm et al. (2023). Appendix A.4.6 provides the results under different assumptions on the elasticities and also calibrates the more disaggregated formula in equation 21 using the sectoral elasticities provided by Fontagné et al. (2022). We set the economies of scale parameter $\beta = 0.8$, which is within the range of estimates discussed in Basu and Fernald (1997) and Burnside et al. (1995).

Empirical Measure In Figure 4, we plot our measure of the power that the U.S. and China have over countries around the world for the year 2019.[40] As expected, the United States and China have more power over countries relatively close to them, with for example the U.S. displaying a large amount of power over Mexico and China over Vietnam. The difference between the sources of U.S. and China's power is stark. The overwhelming share of Chinese power arises from goods trade, with financial power only playing a significant role in Singapore, a financial center with close ties to China. The financial sector, instead, is an important source of power for the U.S. against most countries.

[38] Rouzet et al. (2017) estimate an elasticity of substitution of 1.6 for financial services and 2.2 for insurance. Since we aggregate to the OECD sector of "finance" which combines both sub-sectors, 1.76 is the size-weighted average of the two sub-sectors in the BaTIS data.

[39] It is crucial to account for the domestic alternatives in power calculations. All else equal, the hegemon has lower power over large countries that have vast domestic production capabilities and are therefore less reliant on foreign inputs.

[40] The year was chosen to be pre-Covid since many data sources are not available yet for the years post-Covid. Appendix A.4.6 presents the results for other years.

Our estimated losses are in the range of the trade literature estimated gains from trade, see for example Table 4.1 in Costinot and Rodríguez-Clare (2014) for a summary view across papers and methods.[41] Relatedly, Hausmann et al. (2024) measures the cost that the United States and Europe can impose on Russia via export controls in the Baqaee and Farhi (2022) framework. Our estimated losses are also consistent with the special role of the basic financial sector in sustaining economic activity. Disruptions to this sector, even if it is a small part of gross expenditures, can cause large economic downturns (Kiyotaki and Moore (1997)).

The right panels of Figure 4 focus on the American and Chinese Coalitions and make these patterns even more stark. Obviously, the level of power increases particularly for the American Coalition given the economic size of the coalition and the amount of inputs it controls. More interestingly, the composition of the sources of power also changes with more of the overall power coming from finance in the American Coalition compared to the U.S. alone. The reason for this change is the nonlinearity in power that comes from controlling a sector almost entirely, as we discuss below.

Dominance and the Nonlinearity of Power. To understand the sources of geoeconomic power and its nonlinearity, we isolate the basic building block of equation 22: the basket of foreign varieties of intermediate inputs,

$$\left(\frac{1}{1-\omega_{nGR_m}}\right)^{\frac{1}{\sigma_J-1}}. \tag{23}$$

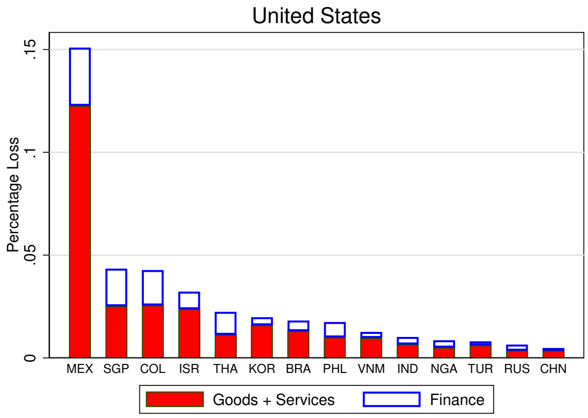
As is common in the trade literature, equation 23 represents the increase in the price index of this foreign basket of varieties that country n faces when the hegemon withholds the inputs it controls in that basket (see the proof of Proposition 13). For a given $\sigma_J > 1$, the price increase is infinite if the hegemon controls the entire basket, $\omega_{nGR_m} \uparrow 1$, since the new price index needs to induce the producer to use none of this basket. Power, therefore, is nonlinear in the share controlled by the hegemon, given by the function $\frac{1}{1-\omega_{nGR_m}}$. The difference between controlling 90% and 99% of the supply of an input is very large in terms of the power it can generate.

The importance of concentration in trade shares has a storied intellectual history. Hirschman (1945) states that "it will be an elementary defensive principle of the smaller trading countries not to have too large a share of their trade with any single great trading country [...]. The idea that dependence can be diminished by distributing the trade among many countries have been clearly enunciated by Macaulay."[42] He then designed an index, later known as the Herfindahl-Hirschman index, to measure how concentrated the bilateral trade shares are (chapter VI in Hirschman (1945)).

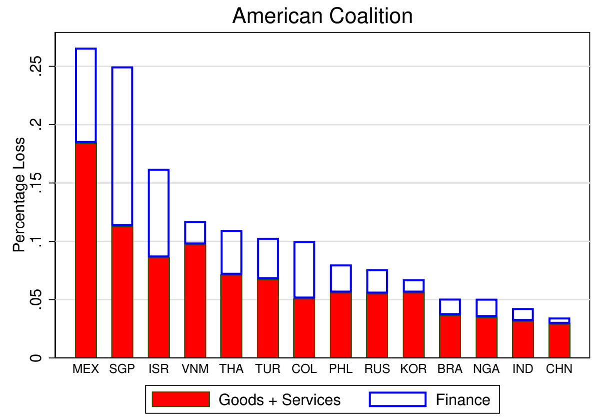
[41] Recall that our losses are expressed as percentage (log) changes in firms profits. The trade literature focuses on welfare gains to the total economy. Here the analogous metric is change in country income, which coincides with consumer welfare and GDP. Our numbers have to be scaled down by the profit share of total income, which corresponds to $1-\beta$ (see footnote 36 above).

[42] The reference to Macaulay is based on Parliamentary Debates on the Corn Laws in Britain, in which Macaulay extolled the benefits of a more diverse source of trading partners.

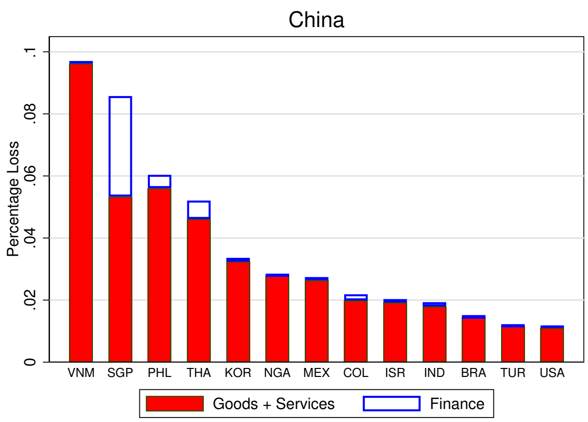
Figure 4: **USA and China Geoeconomic Power**



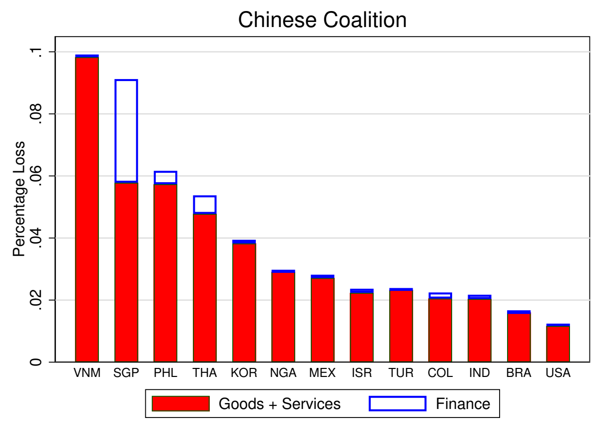
(a) United States



(b) American Coalition



(c) China



(d) Chinese Coalition

Notes: This figure plots estimates of the power as in equation (22). The vertical axis measures in percentage (log) points the economic loss to the country on the corresponding bar of the horizontal axis. The solid red bar is the loss arising from withholding all goods trade and non-finance services. The hollow blue bar is the loss arising from withholding financial services. The hegemon coalition making the threat is the (a) USA, (b) American Coalition, (c) China, (d) Chinese Coalition.

We take advantage of 80 years of trade theory advances since then, to derive a formula for power that is not a simple Herfindahl-Hirschman index of trade shares, since it accounts for trade elasticities and domestic shares. Nevertheless, our measure builds on the earlier fundamental insight that concentration generates power.

Figure 5 shows that these nonlinearities are important in the data. The figure plots the distribution (kernel smoothed) of the shares ω_{nGR_m} controlled by China and the U.S. in finance and in goods and non-finance services.[43] Comparing Panels 5a and 5c for the U.S. and China respectively

[43] The level of aggregation of the sectors considered can of course affect the shares and mask more disaggregated inputs that China controls. For example, China might have high control shares in rare earths and

shows a stark pattern. The U.S. controls higher shares of financial services in most destination countries than it does in all other sectors. The opposite is true for China. Panel 5b shows that the American Coalition controls the vast majority of the finance basket in most destinations. This is a major source of power for the American Coalition and one of the reasons why in practice this coalition has resorted to financial sanctions so often. Once the coalition as a block cuts financial services to a destination country, there are few other alternatives available. China, at present, provides very little of the world's financial services compared to its overall economic size. The other major sources of financial services that we did not include in the American Coalition are Singapore and offshore financial centers such as Bermuda. If the U.S. could induce countries like Singapore to join its coalition, its power would increase considerably due to the nonlinearity that we have highlighted.

The other source of nonlinearity arises as the elasticity of substitution approaches one, i.e. getting close to Cobb Douglas. This effect is visible in equation 23 in which the exponent $\frac{1}{\sigma_J - 1}$ goes to infinity as $\sigma_J \downarrow 1$. If the foreign variety basket is Cobb Douglas, then controlling any one variety, an arbitrary small ω_{nGR_m}, is equivalent to controlling the entire basket since no production can take place without that single variety (see also Ossa (2015)). To the extent that financial services have a low elasticity of substitution, then controlling them is a larger source of power. Indeed, estimates for the elasticity of substitution of financial services, however noisy, tend to be low, reflecting the fact that it is often difficult to find good alternatives (Pellegrino et al. (2021)).

To better understand the nonlinearity of power, we define an iso-power curve by $Power_{mn} = \overline{u}$, as in equation 22. For a given scalar $\overline{u}$, the iso-power curve describes the pairs of hegemon controlled share of the financial services and hegemon controlled share of goods and services that generate $\overline{u}$ in power over country n for the hegemon. The slope of the iso-power curve is (for simplicity setting $\varsigma_G = 1$):

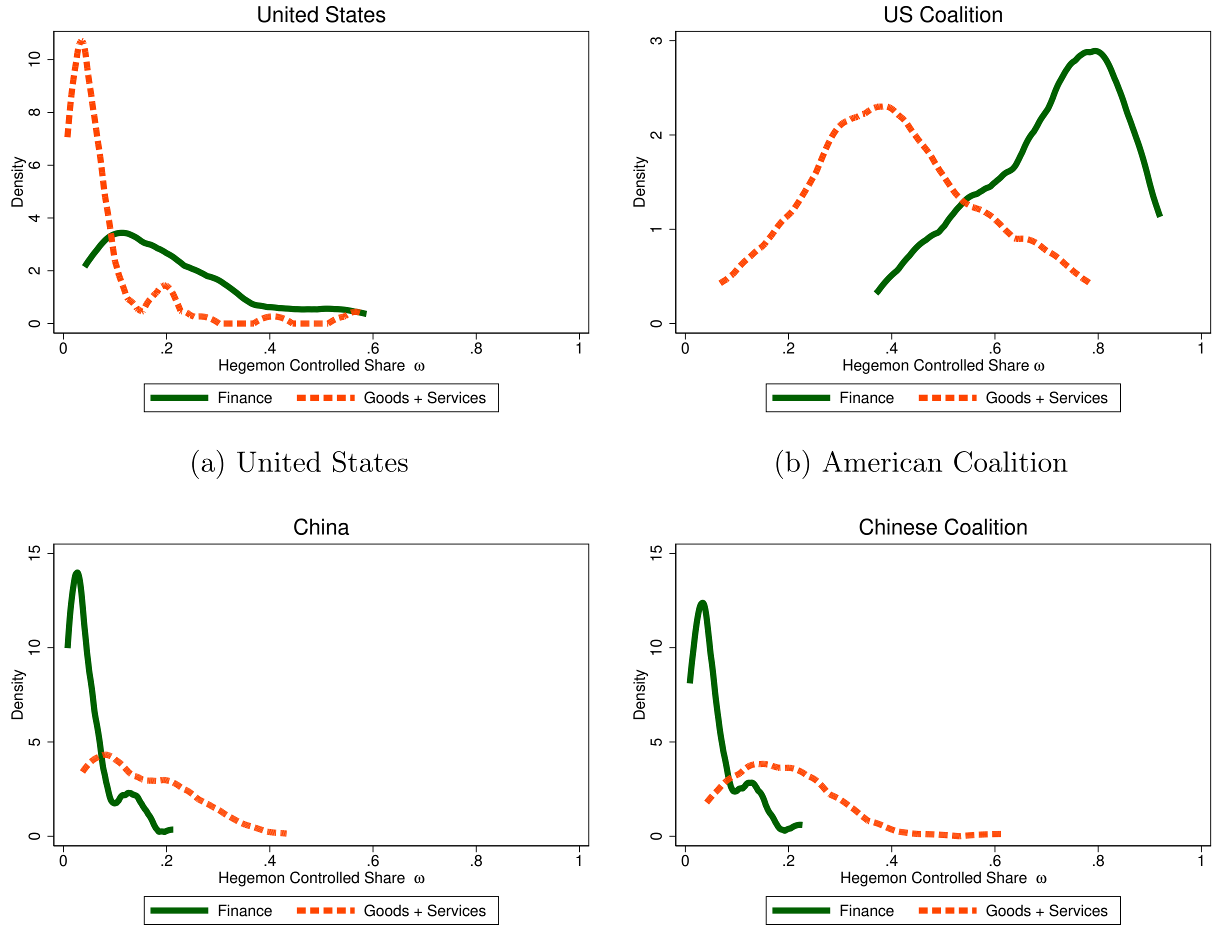
$$\frac{\partial \omega_{nMR_m}}{\partial \omega_{nFR_m}} = -\frac{\Omega_{nF}\Omega_{nFR}}{\Omega_{nM}\Omega_{nMR}} \frac{\sigma_M - 1}{\sigma_F - 1} \frac{1 - \omega_{nMR_m}}{1 - \omega_{nFR_m}}. \tag{24}$$

This slope highlights the nonlinearity: as the expenditure share on hegemon-controlled finance ω_{nFR_m} approaches 1, even very small additional increases in the hegemon's control of finance can increase power by as much as large increases in the hegemon's control over goods and other services.

Figure 6 traces out the resulting iso-power curves for our baseline calibration. Starting from the outer (blue dashed line) curve, the iso-power curve traces the combinations of shares of the two bundles that the hegemon has to control to achieve that level of power. At the extremes, the hegemon could control either 81% of the composite bundle and none of finance, or 93% of finance and none of the composite bundle. The intercepts are driven by the relative expenditure shares on the two bundles: all else equal, a lower hegemon controlled share of a bundle that is a higher expenditure share for the targeted country generates the same amount of power. Most countries have low expenditure shares on finance (low Ω_{nF}) so that, all else equal, financial services would

other minerals important in the semiconductors value chain.

Figure 5: **U.S. and China Dominance of Finance and Other Industries**



(a) United States

(b) American Coalition

(c) China

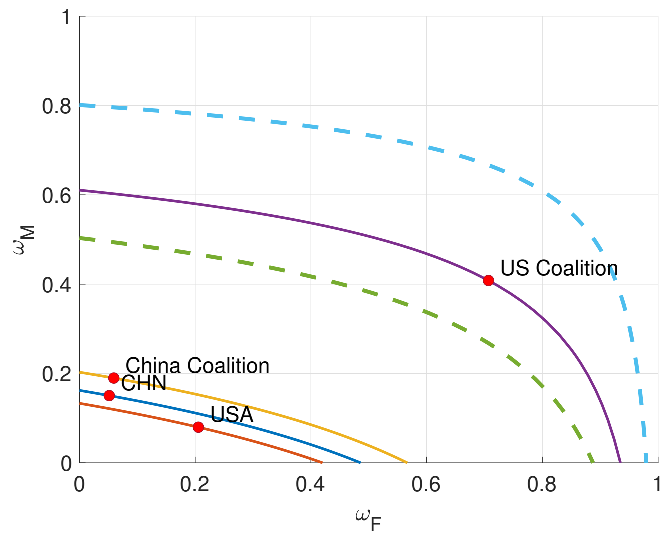
(d) Chinese Coalition

Notes: The figure plots kernel densities of the shares of imports controlled by the hegemon across destination countries in either finance or the composite of goods and non-finance services (ω_{nGR_m}). The dashed red line is the kernel density of the shares for goods trade and non-finance services. The solid green line is the kernel density for finance. The hegemon coalition making the threat is the (a) USA, (b) American Coalition, (c) China, (d) Chinese Coalition.

not be a natural sector to generate geoeconomic power. But all else is *not* equal in practice: it is the high share controlled by the U.S. and by the American Coalition and the low elasticity of substitution that makes this sector important. This nonlinearity is visible in the graph since, as in equation 24, the iso-power curves highlight that power is convex: once the share of finance controlled by the hegemon gets above 85%, even small further increases in this share can compensate for large decreases of the share that the hegemon controls of all other sectors.

Chokepoints and Economic Security Polices. Focusing on the targeted countries, the nonlinearity of power can be used to quantify those sectors in which the dependency on the hegemon inputs exposes the entire economy to the hegemon's coercion. These inputs are generally referred to as "chokepoints," pressure points, or critical dependencies.

Figure 6: **Iso-Power Curves**



Notes: Figure depicts iso-power curves. The points labeled CHN, USA, China Coalition and U.S. Coalition correspond to the unweighted cross-country mean share of foreign finance and composite goods and services controlled by China, the U.S. and their respective coalitions.

Suppose that an anti-coercion policy could shift a dollar towards the target country's expenditures on hegemon-controlled goods and away from hegemon-controlled finance, while holding fixed the country's total expenditures on each sector. The resulting decrease in the hegemon's power is a normalization of the slope of the iso-power curve:[44]

$$\frac{\sigma_M - 1}{\sigma_F - 1}\frac{1 - \omega_{nMR_m}}{1 - \omega_{nFR_m}} \tag{25}$$

When the hegemon controls a very high share of finance (ω_{nFR_m} is large), the hegemon's loss of power is disproportionately large from the shift of expenditure away from hegemon-controlled finance. This shift away from the hegemon's power does not necessarily come with a commensurate new dependency on other countries since, given the nonlinearity, power is not additive.

The nonlinearity in U.S. and American Coalition power arising from financial services brings up an important policy concern. A common view articulated in U.S. policy circles and media is that the dominance of the dollar makes U.S. power resilient to the presence of small alternatives. For example, China under many metrics only currently accounts for a small fraction of global financial services. The argument goes that even if China became a provider of 10 percent of world financial services, that would pale in comparison to the U.S. and American Coalition share. Although this argument is true in shares of expenditure, the nonlinearity of power means it is not true in terms

[44]We keep considering the special case of $\varsigma_G = 1$ to build intuition. See Appendix A.2.13 for a full derivation. The normalization is due to the shares $\Omega_{nG}\Omega_{nGR}$ being over bundles that overall attract a different amount of spending by the target country.

of consequences for power. For the American Coalition, moving from controlling 90% of finance to controlling 80% of finance generates an enormous loss of power. However, this power does not accrue one-for-one to China since power is not additive. Intuitively, for a small to medium sized economy, the existence of an alternative provider with a 10 percent market share is enough to withstand much of the coercion exerted by the American Coalition without leaving it vulnerable to Chinese pressure.

The nonlinearity of power means that anti-coercion policy targeted at chokepoints can substantially increase a country's economic security even for a modest reallocation of its expenditures. Our estimates quantify those dependencies on which countries should act to diversify their sources of inputs. They also rationalize an often quoted principle of supply chains known as "China + 1" that pushes western managers to have at least one alternative to a Chinese supplier in the global value chain. The same, of course, applies in reverse to Chinese managers.

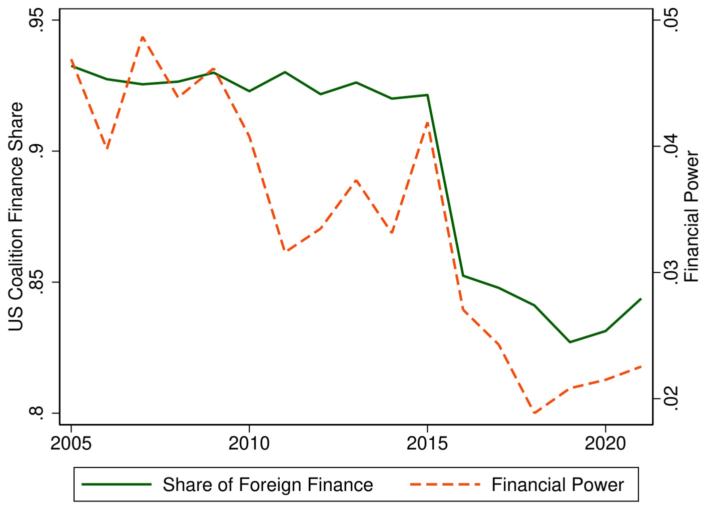
Indeed, China, Russia and the other BRICS countries are actively working on economic security policies that aim to create an alternative financial system architecture outside of the dollar-centric Western controlled system.[45] It is easy to dismiss plans for this architecture to meaningfully rival the Western one in terms of usage shares and expenditure shares since these countries have rule of law and credibility issues. It is much less obvious that this alternative architecture could not sustain expenditure shares of 10 percent for many small and medium size countries around the world. Our analysis reveals that disproportionally more of the losses to U.S. power will come from this alternative going from 1 percent to 10, not from the next 40 percentage point increases.

To illustrate this point in the data, we focus on the economic security policies Russia instituted after its invasion of Crimea in 2014. Russian leaders anticipated the possibility of future financial coercion by the American Coalition as they further invaded Ukraine in 2022. Anticipating the possibility of future sanctions, Russia actively reduced its financial dependence on the American Coalition. Figure 7 shows that the share of Russian financial imports controlled by the American Coalition was a stable 94% before 2014 and subsequently dropped to 84% as Russia started to fragment from the global financial architecture.[46] As a consequence, the American Coalition's

[45]See the 2024 Kazan Declaration by BRICS countries and related Russian report. Following an earlier sanctions package applied to Russia in 2014, Russia developed a domestic messaging system called SPFS (System for Transfer of Financial Messages) that potentially helped Russia cushion the blow of having some of its banks disconnected from SWIFT in 2023. China has been developing and growing its own messaging and settlement system CIPS (Chinese Cross-Border Interbank Payment System) in an attempt to isolate itself from potential U.S. coercion, but also as a mean to offer an alternative to other countries that might fear U.S. pressure. Clayton et al. (2022) point out that one of the reasons China is liberalizing access to its domestic bond market and also letting some domestic capital go abroad is to create two-way liquidity in RMB bonds that can serve as a store of value to complement the payment system (means of payment). India also launched its own system SFMS (Structured Financial Messaging System). For now, these alternatives are inefficient substitutes, but highlight a fragmentation response to diverging political and economic interests with the U.S. hegemon.

[46]Data on Russia's usage of foreign inputs, especially services, is notoriously noisy during a period of escalating Western sanctions. We used estimates of Russian imports of financial services provided by the WTO (BaTIS dataset with Balanced Values). According to these estimates Russia switched to China and Singapore as providers of financial services, with those countries shares moving from 0.55% and 1.0%, respectively, in 2013 to 6.2% and 2.3% in 2021. Interestingly, within the American Coalition there is a

Figure 7: **American Coalition Financial Power over Russia**



Notes: Figure plots the share of Russian imports of financial services controlled by the American Coalition ω_{iFRm} (solid green line) and the American Coalition financial power over Russia.

financial power over Russia was approximately halved. This large loss in power is in part responsible for the muted effect of the financial sanctions that the American Coalition imposed after 2022 since Russia, via its ex-ante policies, had already prepared some alternatives.

5 Conclusion

Geoeconomic tensions have the potential to fragment the world trade and financial system, unwinding gains from international integration. Governments around the world are introducing mixes of industrial, trade, and financial policies to protect their economies from unwanted foreign influence. Collectively, these policies fall under the umbrella of Economic Security policy. We provide a model for jointly analyzing economic coercion by a hegemon and economic security policies by the rest of the world. We show that precisely those forces, like economies of scale, that are classic rationales for global integration and specialization can be used by a hegemon to increase its coercive power. Countries around the world react by implementing economic security policies that shift their domestic firms away from the hegemon's global inputs into an inefficient home alternative. We show these uncoordinated policies results in inefficient global fragmentation as each country over-insulates its economy. We focus on financial services as an industry with strong strategic complementarities at

corresponding large increase in Cyprus which corresponds to the EU concerns of Russian control of Cypriot financial institutions. The BaTIS dataset relies on extrapolation, model estimates, and mirroring in case of missing data. Appendix A.4.6 discusses alternative estimates and the reported raw data showing that indeed over this sanction period the data is noisy and it is hard to get a precise estimate of Russian financial imports.

the global level. We derive simple statistics to measure geoeconomic power and estimate that the United States and its allies derive an outsized share of their power from their dominance of global finance. We show that power is nonlinear in the share of inputs controlled by the hegemon and demonstrate how only small reductions in American control of the international financial system come with significant reductions in American power.

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Online Appendix for
"A Theory of Economic Coercion and Fragmentation"

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A.1 Economic Security and Anti-Coercion Policy

Several governments have recently put forward Economic Security Strategy initiatives aimed at derisking their economies from foreign dependencies. We briefly review here some of the most high profile policy initiatives.

The G7 governments statement in 2023 on Economic Resilience and Economic Security provided an overview of shared concerns about economic coercion. It remarked: "The world has encountered a disturbing rise in incidents of economic coercion that seek to exploit economic vulnerabilities and dependencies and undermine the foreign and domestic policies and positions of G7 members as well as partners around the world. We will work together to ensure that attempts to weaponize economic dependencies by forcing G7 members and our partners including small economies to comply and conform will fail and face consequences." Several countries have subsequently followed up with their own policy initiatives.

Japan. Japan was one of the first advanced economies to adopt formal economic security policies. Its Economic Security Protection Act (ESPA) aims to: (1) "Ensure stable supplies of critical products" through diversification and stockpiling; (2) "Ensure stable provision of essential infrastructure services" and prevent disruptions by foreign entities; (3) "Support for development of critical technologies"; and (4) Establish a non-disclosure system for patents related to sensitive technologies.[1]

European Union. The EU introduced its economic security framework in June 2023. This framework focuses on evaluating threats to economic security such as identifying critical materials and technologies,[2] and institutions to address those risks, including Single Intelligence Analysis Capacity (SIAC) for detecting threats, Strategic Technologies for Europe Platform (STEP) for supporting R&D in critical technology, Common Foreign and Security Policy (CFSP) for enhancing cyber and digital security, and Coordination Platform on Economic Coercion (CPEC) for addressing non-market or coercive practices. Based on the framework, the European Commission adopted five initiatives in January 2024 (see press release), aiming at strengthening FDI screening, monitoring outbound investments, controlling export of dual-use goods, supporting R&D in dual-use technologies, and enhancing research security.

United Kingdom. The UK has also implemented measures to support strategic sectors and ensure economic security. Through energy support packages and plans to increase annual R&D budget, the UK is investing in strategic sectors such as energy, artificial intelligence, and cybersecurity (See the Integrated Review Refresh of 2023). Legislation is also in place to maintain the country's control over strategic sectors, for example the National Security and Investment Act that

[1] See also a summary of the Japanese policies provided by the European Parliament.

[2] In October 2023, the European Commission recommended to consider advanced semiconductors, artificial intelligence, quantum technologies and biotechnologies as critical technologies. See press release.

"gives the government powers to scrutinise and intervene in business transactions, such as takeovers, to protect national security".[3]

Australia Australia is also advancing policies to support sectors in which "some level of domestic capability is a necessary or efficient way to protect the economic resilience and security of Australia, and the private sector will not deliver the necessary investment in the absence of government support" (see Future Made in Australia initiative). The Australian government highlights the country's advantage in minerals and energy resources, and propose to develop these industries into strategic sectors that contributes to global economic security by serving as a reliable supplier of natural resources.

South Korea. In October 2022, South Korea announced the National Strategic Technology Nurture Plan "to foster strategic technologies that will contribute to future society and national security in the global tech competition era where new and core technologies determine the fate of national economy, security, and diplomacy." The plan identifies twelve key sectors, including semiconductor, energy, cybersecurity, AI, communication, and quantum computing, as national strategic technologies. These sectors "will be regularly evaluated and improved in consideration of technology development trends, technology security circumstances, and policy demands."

A.2 Proofs

A.2.1 Proof of Proposition 1

Given the global planner has a complete set of wedges on intermediaries, we solve the global planner's problem via a primal approach of choosing intermediaries' allocations and then back out the wedges that implement those (see the proof of Proposition 7 for further discussion of the primal approach). To make the notation more compact, we write the production function f_i as $g_i\left(A_j(x_{i_1 j}, \ldots, x_{i_N j})x_{i_n j}^{\sigma},\ A_{i_n h}(x_{i_n h})x_{i_n h}^{\sigma}\right)$ where we have defined the function $g_i(a, b) = (a+b)^{\beta/\sigma}$. Then, the global planner's maximization problem is

$$\max_{\{x_{i_n j}, x_{i_n h}\}} \sum_{n=1}^{N} \left[p_i g_i\left(A_j(x_{i_1 j}, \ldots, x_{i_N j})x_{i_n j}^{\sigma},\ A_{i_n h}(x_{i_n h})x_{i_n h}^{\sigma}\right) - p_j x_{i_n j} - p_h x_{i_n h}\right]$$

Using symmetry of the global planner's objective across countries, $x_{i_n j}$ and $x_{i_n h}$ are invariant to n, and we can write

$$\max_{x_{ij}, x_{ih}} p_i g_i\left(A_j(x_{ij})x_i^{\sigma}, A_{ih}(x_{ih})x_{ih}^{\sigma}\right) - p_j x_{ij} - p_h x_{ih}$$

where we abuse notation by writing $A_j(x_{ij}) = \overline{A}_j x_{ij}^{\xi_j \sigma}$.

The global planner's FOC in x_{ij} is

$$p_i \frac{\partial g_i}{\partial [A_j x_{ij}^{\sigma}]} A_j x_{ij}^{\sigma-1} \sigma \left(1 + \frac{1}{\sigma} \frac{x_{ij}}{A_j} \frac{\partial A_j}{\partial x_{ij}}\right) = p_j$$

[3]See also additional strategies like the Critical Minerals Strategy, the National Semiconductor Strategy, and the UK Critical Imports and Supply Chains Strategy.

The FOC for x_{ij} of an infinitesimal intermediary that takes productivity as given but faces wedges in purchases is

$$p_i \frac{\partial g_i}{\partial [A_j x_{ij}^\sigma]} A_j x_{ij}^{\sigma-1} \sigma = p_j + \tau_{GP,ij}$$

Thus dividing through,

$$1 + \frac{1}{\sigma} \frac{x_{ij}}{A_j} \frac{\partial A_j}{\partial x_{ij}} = \frac{p_j}{p_j + \tau_{GP,ij}}$$

and using that $\frac{x_{ij}}{A_j} \frac{\partial A_j}{\partial x_{ij}} = \sigma \xi_j$, we obtain

$$\tau_{GP,ij} = -\frac{\xi_j}{1+\xi_j} p_j.$$

Precisely the same steps then show that $\tau_{GP,ih} = -\frac{\xi_h}{1+\xi_h} p_h$.

A.2.2 Proof of Proposition 2

Taking $N \to \infty$, each country n takes A_j as given. Given there is no hegemon, then we can solve country n's government problem by the primal approach,

$$\max_{x_{i_n j}, x_{i_n h}} p_i g_i \left(A_j x_{i_n j}^\sigma, A_{i_n h}(x_{i_n h}) x_{i_n h}^\sigma \right) - p_j x_{i_n j} - p_h x_{i_n h}$$

where the function g_i is defined in the previous proof. The same steps as for the proof of Proposition 1 show that $\tau_{n,i_n h} = -\frac{\xi_h}{1+\xi_h} p_h$. On the other hand, country n's government FOC for $x_{i_n j}$ is now

$$p_i \frac{\partial g_i}{\partial [A_j x_{i_n j}^\sigma]} A_j x_{i_n j}^{\sigma-1} \sigma = p_j$$

which aligns with the intermediary's FOC, that is $\tau_{n,i_n j} = 0$.

A.2.3 Proof of Proposition 3

Because the hegemon has complete instruments over intermediaries, we can adopt a primal approach of solving the hegemon's problem. In particular, the hegemon chooses $\{x_{i_n j}, x_{i_n h}, T_{i_n}\}$ in order to maximize utility,

$$\sum_{n=1}^N T_{i_n}$$

subject to all intermediaries' participation constraints,

$$\begin{aligned} &p_i g_i \left(A_j(x_{i_1 j}, \ldots, x_{i_N j}) x_{i_n j}^\sigma,\ A_{i_n h}(x_{i_n h}) x_{i_n h}^\sigma \right) - (p_j + \tau_{n,i_n j}) x_{i_n j} - (p_h + \tau_{n,i_n h}) x_{i_n h} + r_{i_n}^* - T_{i_n} \\ &\geq \max_{x_{i_n h}^o} \left\{ p_i g_i \left(0, A_{i_n h}(x_{i_n h}) x_{i_n h}^o \right) - (p_j + \tau_{n,i_n h}) x_{i_n h}^o + r_{i_n}^{o*} \right\} \end{aligned}$$

where g_i is a function defined in the proof of Proposition 1 and $r_{i_n}^* = \tau_{n,i_n j} x_{i_n j}^* + \tau_{n,i_n h} x_{i_n h}^*$ and $r_{i_n}^{o*} = \tau_{n,i_n h} x_{i_n h}^{o*}$ are revenue remissions by country n, which the hegemon takes as given in this problem since the target intermediaries perceive this lump-sum rebates not to depend on their production choices.

If hypothetically the participation constraint of intermediary i_n were slack, the hegemon could increase T_{i_n} and increase its objective, therefore all participation constraints bind. Thus we can substitute out for transfers and drop the optimization-irrelevant constants $r^*_{i_n}, r^{o*}_{i_n}$ to obtain

$$\max_{\{x_{i_nj},x_{i_nh}\}} \sum_{n=1}^{N} \Bigg\{ p_i g_i\bigg(A_j(x_{i_1j},\ldots,x_{i_Nj})x^{\sigma}_{i_nj},\ A_{i_nh}(x_{i_nh})x^{\sigma}_{i_nh}\bigg) - (p_j+\tau_{n,i_nj})x_{i_nj} - (p_h+\tau_{n,i_nh})x_{i_nh}$$
$$- \max_{x^o_{i_nh}} \Big\{ p_i g_i\Big(0, A_{i_nh}(x_{i_nh})x^o_{i_nh}\Big) - (p_h+\tau_{n,i_nh})x^o_{i_nh}\Big\}\Bigg\}$$

The hegemon's FOC in x_{i_nj} is

$$p_i \frac{\partial g_{i_n}}{\partial A_j x^{\sigma}_{i_nj}} A_j x^{\sigma-1}_{i_nj}\sigma + \sum_{o=1}^{N} p_i \frac{\partial g_{i_o}}{\partial A_j x^{\sigma}_{i_oj}} \frac{\partial A_j}{\partial x_{i_nj}} x^{\sigma}_{i_oj} = p_j + \tau_{n,i_nj}.$$

Given the intermediary's FOC is $p_i \frac{\partial g_{i_n}}{\partial A_j x^{\sigma}_{i_nj}} A_j x^{\sigma-1}_{i_nj}\sigma = p_j + \tau_{n,i_nj} + \tau_{m,i_nj}$, then we obtain the hegemon's wedge formula for j as

$$\tau_{m,i_nj} = -\frac{\partial A_j}{\partial x_{i_nj}} \sum_{o=1}^{N} p_i \frac{\partial g_{i_o}}{\partial A_j x^{\sigma}_{i_oj}} x^{\sigma}_{i_oj}$$

Focusing presentation on the case of symmetric ex-ante wedges and a resulting symmetric allocations of the hegemon,

$$\tau_{m,i_nj} = -\frac{1}{N}\xi_j \frac{1}{x_{i_nj}} \sum_{o=1}^{N} x_{i_oj} p_i \frac{\partial g_{i_o}}{\partial A_j x^{\sigma}_{i_oj}} A_j \sigma x^{\sigma-1}_{i_oj}$$

and using the intermediary's FOC,

$$\tau_{m,i_nj} = -\frac{1}{N}\xi_j \sum_{o=1}^{N} \frac{x_{i_oj}}{x_{i_nj}} \bigg(p_j + \tau_{n,i_oj} + \tau_{m,i_oj}\bigg).$$

Again using symmetry, we have

$$\tau_{m,i_nj} = -\frac{\xi_j}{1+\xi_j}\bigg(p_j + \tau_{n,i_nj}\bigg).$$

Next taking the hegemon's FOC in x_{i_nh}, by Envelope Theorem we have

$$p_i \frac{\partial g_{i_n}}{\partial A_{i_nh} x^{\sigma}_{i_nh}} A_{i_nh} x^{\sigma-1}_{i_nh}\sigma + p_i \frac{\partial g_{i_n}}{\partial A_{i_nh} x^{\sigma}_{i_nh}} \frac{\partial A_{i_nh}}{\partial x_{i_nh}} x^{\sigma}_{i_nh} + p_i \frac{\partial g^o_{i_n}}{\partial A_{i_nh} x^{o}_{i_nh}} \frac{\partial A_{i_nh}}{\partial x_{i_nh}} x^{o}_{i_nh} = p_h + \tau_{n,i_nh}$$

And using the intermediary's FOC at the inside option

$$\tau_{m,i_nh} = -\bigg(p_h + \tau_{n,i_nh} + \tau_{m,i_nh}\bigg)\xi_h + p_i \frac{\partial g^o_{i_n}}{\partial A_{i_nh} x^{o\sigma}_{i_nh}} A_{i_nh} x^{o\sigma-1}_{i_nh}\sigma \xi_h \frac{x^o_{i_nh}}{x_{i_nh}}$$

And next using the intermediary's FOC at the outside option, $p_i \frac{\partial g^o_{i_n}}{\partial A_{i_nh} x^{o\sigma}_{i_nh}} A_{i_nh} x^{o\sigma-1}_{i_nh}\sigma = p_h + \tau_{n,i_nh}$, we obtain

$$\tau_{m,i_nh} = \left(p_h + \tau_{n,i_nh}\right)\frac{\xi_h}{1+\xi_h}\left(\frac{x^o_{i_nh}}{x_{i_nh}} - 1\right)$$

which completes the proof.

A.2.4 Proof of Proposition 4

Suppose that all countries $-n$ (i.e. all other foreign countries, except n) adopt symmetric policies, so that the hegemon adopts symmetric allocations for all countries $-n$. We can therefore write the hegemon's objective as

$$\mathcal{U}_m = \Pi_{i_n} - \Pi^o_{i_n} + (N-1)(\Pi_{i_{-n}} - \Pi^o_{i_{-n}})$$

with choice variables $(x_{i_nj}, x_{i_nh}, x_{i_{-n}j}, x_{i_{-n}h})$. To simplify notation for the proof, we will denote these by $(x_{ij}, x_{ih}, X_{ij}, X_{ih})$.

The proof proceeds in two steps. First, we show that the hegemon's objective is supermodular in $(x_{ij}, s_{ih}, X_{ij}, S_{ih})$ where $s_{ih} = -x_{ih}$ and $S_{ih} = -X_{ih}$. Then, we show increasing differences in the relevant comparative statics.

Supermodularity. We first show that the objective is supermodular in $(x_{ij}, s_{ih}, X_{ij}, S_{ih})$. We do so by separately showing that both components of the objective are supermodular. Note that cross partials in Π^o_i are all zero, so it suffices to show that Π_i is supermodular, which entails only showing the production function itself is supermodular. The production function has the generic form

$$f = \left((ax_{ij}^{\xi_j\sigma} + bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma} + c(-s_{ih})^{(\xi_h+1)\sigma}\right)^{\beta/\sigma}$$

where we note that given this generic form, it is arbitrary whether this is the production function of n or of $-n$, thus showing supermodularity of this function suffices. First, all cross partials in S_{ih} are zero.

Next, we have

$$\frac{\partial f}{\partial s_{ih}} = -\beta\left((ax_{ij}^{\xi_j\sigma} + bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma} + c(-s_{ih})^{(\xi_h+1)\sigma}\right)^{\frac{\beta}{\sigma}-1} c(\xi_h+1)(-s_{ih})^{(\xi_h+1)\sigma-1}$$

so that since $\beta \leq \sigma$ we have

$$\frac{\partial^2 f}{\partial s_{ih}\partial X_{ij}} = \left(1-\frac{\beta}{\sigma}\right)\beta\left((ax_{ij}^{\xi_j\sigma} + bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma} + c(-s_{ih})^{(\xi_h+1)\sigma}\right)^{\frac{\beta}{\sigma}-2} c(\xi_h+1)(-s_{ih})^{(\xi_h+1)\sigma-1}\frac{\partial\left[(ax_{ij}^{\xi_j\sigma} + bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma}\right]}{\partial X_{ij}} \geq 0.$$

Finally, we have

$$\frac{\partial f}{\partial X_{ij}} = \beta\left((ax_{ij}^{\xi_j\sigma} + bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma} + c(-s_{ih})^{(\xi_h+1)\sigma}\right)^{\frac{\beta}{\sigma}-1} \xi_j bX_{ij}^{\xi_j\sigma-1}x_{ij}^{\sigma}$$

so that

$$\frac{\partial^2 f}{\partial X_{ij}\partial x_{ij}} = \left(\frac{\beta}{\sigma}-1\right)\beta\left((ax_{ij}^{\xi_j\sigma}+bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma}+c(-s_{ih})^{(\xi_h+1)\sigma}\right)^{\frac{\beta}{\sigma}-2}\xi_j bX_{ij}^{\xi_j\sigma-1}x_{ij}^{\sigma}\frac{\partial\left[(ax_{ij}^{\xi_j\sigma}+bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma}\right]}{\partial x_{ij}}$$
$$+\beta\left((ax_{ij}^{\xi_j\sigma}+bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma}+c(-s_{ih})^{(\xi_h+1)\sigma}\right)^{\frac{\beta}{\sigma}-1}\xi_j bX_{ij}^{\xi_j\sigma-1}x_{ij}^{\sigma-1}\sigma$$

This is positive if

$$\left((ax_{ij}^{\xi_j\sigma}+bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma}+c(-s_{ih})^{(\xi_h+1)\sigma}\right)\sigma \geq \left(1-\frac{\beta}{\sigma}\right)x_{ij}\frac{\partial\left[(ax_{ij}^{\xi_j\sigma}+bX_{ij}^{\xi_j\sigma})x_{ij}^{\sigma}\right]}{\partial x_{ij}}$$

which simplifies to

$$1 \geq \left(1-\frac{\beta}{\sigma}\right)\left[\frac{(1+\xi_j)ax_{ij}^{(1+\xi_j)\sigma}+bX_{ij}^{\xi_j\sigma}x_{ij}^{\sigma}}{ax_{ij}^{(1+\xi_j)\sigma}+bX_{ij}^{\xi_j\sigma}x_{ij}^{\sigma}+c(-s_{ih})^{(\xi_h+1)\sigma}}\right]$$

Finally, we can bound

$$\frac{(1+\xi_j)ax_{ij}^{(1+\xi_j)\sigma}+bX_{ij}^{\xi_j\sigma}x_{ij}^{\sigma}}{ax_{ij}^{(1+\xi_j)\sigma}+bX_{ij}^{\xi_j\sigma}x_{ij}^{\sigma}+c(-s_{ih})^{(\xi_h+1)\sigma}} \leq (1+\xi_j)\frac{ax_{ij}^{(1+\xi_j)\sigma}+bX_{ij}^{\xi_j\sigma}x_{ij}^{\sigma}}{ax_{ij}^{(1+\xi_j)\sigma}+bX_{ij}^{\xi_j\sigma}x_{ij}^{\sigma}} = (1+\xi_j)$$

so that the sufficient condition is

$$\left(1-\frac{\beta}{\sigma}\right)(1+\xi_j) \leq 1,$$

which was assumed. Therefore, the hegemon's objective is supermodular in $(x_{ij}, s_{ih}, X_{ij}, S_{ih})$.

Monotone Comparative Statics. Given supermodularity, we next invoke monotone comparative statics. First we take τ_{n,i_nj}. Since the outside option does not depend on τ_{n,i_nj} and since countries $-n$ objectives do not depend on τ_{n,i_nj}, we have

$$\frac{\partial\mathcal{U}_m}{\partial(-\tau_{n,i_nj})} = x_{i_nj}$$

Therefore, $\mathcal{U}_m$ has increasing differences in $((x_{ij}, X_{ij}, s_{ih}, S_{ih}), -\tau_{n,i_nj})$. Therefore, (x_{ij}, X_{ij}) decrease in τ_{n,i_nj} while (x_{ih}, X_{ih}) increase in τ_{n,i_nj}, yielding the first result.

Next, we take τ_{n,i_nh}. By Envelope Theorem, we have

$$\frac{\partial\mathcal{U}_m}{\partial\tau_{n,i_nh}} = s_{i_nh} + x_{i_nh}^o$$

All cross partials apart from s_{i_nh} are thus zero. On the other hand for x_{i_nh}, we have

$$\frac{\partial^2\mathcal{U}_m}{\partial\tau_{n,i_nh}\partial s_{i_nh}} = 1 + \frac{\partial x_{i_nh}^o}{\partial s_{i_nh}}$$

Recall that demand $x^o_{i_nh}$ is given by

$$x^o_{i_nh} = \left[\frac{p_i\beta}{p_h + \tau_{n,i_nh}}\left(\overline{A}_h^{1/\sigma}\right)^{\beta}\right]^{\frac{1}{1-\beta}} x_{i_nh}^{\frac{\xi_h\beta}{1-\beta}}$$

so that we have

$$\frac{\partial x^o_{i_nh}}{\partial s_{i_nh}} = -\left[\frac{p_i\beta}{p_h + \tau_{n,i_nh}}\left(\overline{A}_h^{1/\sigma}\right)^{\beta}\right]^{\frac{1}{1-\beta}} (-s_{i_nh})^{\frac{\xi_h\beta}{1-\beta}-1}\frac{\xi_h\beta}{1-\beta}.$$

Given a lower bound $x_{i_nh} \geq \underline{x}$, then we can bound

$$\frac{\partial x^o_{i_nh}}{\partial s_{i_nh}} \geq -c\xi_h$$

where $c = \left[\frac{p_i\beta}{p_h+\tau_{n,i_nh}}\left(\overline{A}_h^{1/\sigma}\right)^{\beta}\right]^{\frac{1}{1-\beta}} \underline{x}^{-1}\frac{\beta}{1-\beta} > 0$. Thus for any $\xi_h < \frac{1}{c}$, we have

$$\frac{\partial^2 \mathcal{U}_m}{\partial \tau_{n,i_nj}\partial s_{i_nh}} > 1 - c\frac{1}{c} = 0$$

and so we have increasing differences in $((x_{ij}, X_{ij}, s_{ih}, S_{ih}), \tau_{n,i_nh})$. Therefore, (x_{ij}, X_{ij}) increase in τ_{n,i_nh} while (x_{ih}, X_{ih}) decrease in τ_{n,i_nh}, yielding the second result. This completes the proof.

A.2.5 Proof of Proposition 5

Consider the objective of the country n government, which solves

$$\max_{\tau_n} \Pi^o_i$$

where we have

$$\Pi^o_i = \max_{x^o_{i_nh}} p_i\overline{A}_h^{\beta/\sigma} x_{i_nh}^{*\xi_h\beta} x_{i_nh}^{o\beta} - p_h x^o_{i_nh} - \tau_{i_nh}(x^o_{i_nh} - x^{o*}_{i_nh}),$$

where the optimal policy is

$$x^{o*}_{i_nh} = \left[\frac{p_i\beta}{p_h + \tau_{n,i_nh}}\left(\overline{A}_h^{1/\sigma}\right)^{\beta}\right]^{\frac{1}{1-\beta}} x_{i_nh}^{*\frac{\xi_h\beta}{1-\beta}}.$$

Substituting in the optimal policy, we have

$$\Pi^o_i = \left[p_i\overline{A}_h^{\beta/\sigma}\left[\frac{p_i\beta}{p_h + \tau_{n,i_nh}}\left(\overline{A}_h^{1/\sigma}\right)^{\beta}\right]^{\frac{\beta}{1-\beta}} - p_h\left[\frac{p_i\beta}{p_h + \tau_{n,i_nh}}\left(\overline{A}_h^{1/\sigma}\right)^{\beta}\right]^{\frac{1}{1-\beta}}\right] x_{i_nh}^{*\frac{\xi_h\beta}{1-\beta}}.$$

Given that optimal policy necessarily lies in the region where $p_i\overline{A}_h^{\beta/\sigma}\left[\frac{p_i\beta}{p_h+\tau_{n,i_nh}}\left(\overline{A}_h^{1/\sigma}\right)^{\beta}\right]^{\frac{\beta}{1-\beta}} - p_h\left[\frac{p_i\beta}{p_h+\tau_{n,i_nh}}\left(\overline{A}_h^{1/\sigma}\right)^{\beta}\right]^{\frac{1}{1-\beta}} > 0$, we have

$$\frac{\partial \Pi^o_i}{\partial x^*_{i_nh}} > 0$$

$$\frac{\partial \Pi_i^o}{\partial x_{i_n j}^*} = 0$$

$$\frac{\partial \Pi_i^o}{\partial x_{i_r j}^*}, \frac{\partial \Pi_i^o}{\partial x_{i_r h}^*} = 0 \quad \forall r \neq n$$

that is, the welfare of country n is increasing in home use $x_{i_n h}^*$ and constant in all other other elements of x^*. From Proposition 4, we therefore have

$$\frac{d\Pi_i^o}{d\tau_{n,i_n j}} = \frac{\partial \Pi_i^o}{\partial x_{i_n h}^*} \frac{dx_{i_n h}^*}{d\tau_{n,i_n j}} \geq 0$$

and therefore, welfare is maximized by $\tau_{n,i_n j} \to \infty$.

Given $\tau_{n,i_n j} \to \infty$ (i.e., a ban on j), the hegemon optimally sets $x_{i_n j}^* = 0$. Setting $\tau_{m,i_n h} \neq 0$ would then require setting $T_{i_n} < 0$, which is not optimal, hence $\tau_{m,i_n h} = T_{i_n} = 0$. As a result, policies applied to the firm at the inside and outside option are identical, and therefore $x_{i_n h}^* = x_{i_n h}^{o*}$. Thus, the problem of country n reduces to a primal optimization problem of

$$\max_{x_{i_n h}} p_i \overline{A}_h^{\beta/\sigma} x_{i_n h}^{\xi_h \beta} x_{i_n h}^{\beta} - p_h x_{i_n h},$$

whose solution is implemented by $\tau_{n,i_n h} = -\frac{\xi_h}{1+\xi_h} p_h$. This concludes the proof.

A.2.6 Proof of Proposition 6

The hegemon's objective, omitting the optimization irrelevant constant $r_{i_n}^*$, is

$$\max_{\{x_{i_n j}, x_{i_n h}\}} (1-\mu) \sum_n \left\{ p_i g_i \left(A_j(x_{i_1 j}, \ldots, x_{i_N j}) x_{i_n j}^{\sigma}, A_{i_n h}(x_{i_n h}) x_{i_n h}^{\sigma} \right) - (p_j + \tau_{n,i_n j}) x_{i_n j} - (p_h + \tau_{n,i_n h}) x_{i_n h} \right\}$$

The FOC in $x_{i_n j}$ is

$$p_i \frac{\partial g_{i_n}}{\partial A_j x_{i_n j}^{\sigma}} A_j x_{i_n j}^{\sigma-1} \sigma - (p_j + \tau_{n,i_n j}) + \sum_{o=1}^{N} p_i \frac{\partial g_{i_o}}{\partial A_j x_{i_o j}^{\sigma}} \frac{\partial A_j}{\partial x_{i_n j}} x_{i_o j}^{\sigma} = 0$$

The firm's FOC in $x_{i_n j}$ is

$$p_i \frac{\partial g_{i_n}}{\partial A_j x_{i_n j}^{\sigma}} x_{i_n j}^{\sigma} = \left(p_j + \tau_{m,i_n j} + \tau_{n,i_n j} \right) \frac{x_{i_n j}}{A_j} \frac{1}{\sigma}$$

Take the large $N \to \infty$ limit in which all firms have adopted symmetric policies. Substituting in yields

$$\sum_{o=1}^{N} p_i \frac{\partial g_{i_o}}{\partial A_j x_{i_o j}^{\sigma}} \frac{\partial A_j}{\partial x_{i_n j}} x_{i_o}^{\sigma} = \sum_{o=1}^{N} \left(p_j + \tau_{m,i_o j} + \tau_{o,i_o j} \right) \frac{1}{\sigma} \frac{x_{i_o j}}{A_j} \frac{\partial A_j}{\partial x_{i_n j}}$$

We have $\frac{\partial A_j}{\partial x_{i_n j}} = \frac{1}{N} \overline{A}_j x_{i_n j}^{\sigma \xi_j - 1} \sigma \xi_j$, and so

$$\sum_{o=1}^{N} p_i \frac{\partial g_{i_o}}{\partial A_j x_{i_o j}^{\sigma}} \frac{\partial A_j}{\partial x_{i_n j}} x_{i_o}^{\sigma} = \frac{1}{N} \sum_{o=1}^{N} \left(p_j + \tau_{m,i_o j} + \tau_{o,i_o j} \right) \frac{x_{i_o j} \overline{A}_j x_{i_n j}^{\sigma \xi_j - 1}}{A_j} \xi_j = \left(p_j + \tau_{m,i_n j}^* + \tau_{n,i_n j}^* \right) \frac{x_{i_n j}^{\sigma \xi_j - 1}}{x_{i_n j}^{* \sigma \xi_j - 1}} \xi_j,$$

where we have used the $*$ notation to indicate the symmetric policies and outcomes of all other countries, which in a symmetric equilibrium will be the same as the policies and outcomes of country n. Note that we have employed the large N limit (i.e., country n's contribution to the sum is vanishingly small). Finally, substituting in the firm's FOCs, we obtain (where we use the $*$ notation to indicate that the tax is based on the equilibrium symmetric policy adopted by all countries)

$$\tau_{m,i_nj} = -\left(p_j + \tau^*_{m,i_nj} + \tau^*_{n,i_nj}\right)\frac{x_{i_nj}^{\sigma\xi_j-1}}{x_{i_nj}^{*\sigma\xi_j-1}}\xi_j.$$

In a symmetric equilibrium in all countries apart from n have adopted the same taxes, we therefore have

$$\tau^*_{m,i_nj} = -\frac{\xi_j}{1+\xi_j}\left(p_j + \tau^*_{n,i_nj}\right).$$

This yields for country n

$$\tau_{m,i_nj} = -\frac{\xi_j}{1+\xi_j}(p_j + \tau^*_{n,i_nj})\frac{x_{i_nj}^{\sigma\xi_j-1}}{x_{i_nj}^{*\sigma\xi_j-1}}.$$

Parallel derivations then yield

$$\tau_{m,ih} = -\frac{\xi_h}{1+\xi_h}(p_h + \tau_{n,i_nh})$$

where we note that the hegemon's wedge is based on the specific wedge of country n. Now, consider the decision problem of country n that maximizes μV_i, internalizing the hegemon's choice of wedges. Since country n's objective is the same as in the noncooperative outcome (up to the inclusion of the hegemon's wedges), country n's optimum is obtained at $\tau_{n,i_nj} + \tau_{m,i_nj} = 0$ and $\tau_{n,i_nh} + \tau_{m,i_nh} = -\frac{\xi_h}{1+\xi_h}p_h$, if that is implementable. To implement this, country n sets a wedge on j given by

$$\tau_{n,i_nj} = -\tau_{m,i_nj} = \frac{\xi_j}{1+\xi_j}\left(p_j + \tau^*_{n,i_nj}\right)\frac{x_{i_nj}^{\sigma\xi_j-1}}{x_{i_nj}^{*\sigma\xi_j-1}}.$$

Finally employing equilibrium symmetry $\tau_{n,i_nj} = \tau^*_{n,i_nj}$ and $x^*_{i_nj} = x_{i_nj}$ we have

$$\tau_{n,i_nj} = \xi_j p_j.$$

Next, country n sets a wedge on h given by

$$\tau_{n,i_nh} = -\frac{\xi_h}{1+\xi_h}p_h - \tau_{m,i_nh} = -\frac{\xi_h}{1+\xi_h}p_h + \frac{\xi_h}{1+\xi_h}(p_h + \tau_{n,i_nh})$$

which yields $\tau_{n,i_nh} = 0$.

Since the noncooperative outcome dominates the anti-coercion outcome, the participation constraint is satisfied for sufficiently small μ. The hegemon is better off because $\mu V_i > 0$, concluding the proof.

A.2.7 Proof of Proposition 7

We start by showing the hegemon threatens maximal punishments.

Lemma 1 *It is weakly optimal for the hegemon to offer a contract with maximal punishments to every firm it contracts with, that is* $\mathcal{J}_i^o = \underline{\mathcal{J}}_i^o$ *for all* $i \in \mathcal{C}_m$.

Proof of Lemma 1. Consider a hypothetical optimal contract Γ that is feasible and satisfies firms' participation constraints, and suppose that $\mathcal{J}_i^o \neq \underline{\mathcal{J}_i}^o$. Let (x^*, ℓ^*, z^*, P) denote optimal firm allocations, externalities, and prices under this contract. The proof strategy is to show that the hegemon can achieve the same allocations x^*, ℓ^* and the same transfers T_i using a feasible contract featuring maximal punishments threats, without changes in equilibrium prices or the vector of aggregates. Hence the hegemon can obtain at least as high value using maximal punishments. The proof involves constructing appropriate wedges to achieve this outcome.

We first construct a vector of taxes $\tau_{m,i}^*$ that implements the allocation x_i^*, ℓ_i^* under maximal punishments for each $i \in \mathcal{C}_m$. In particular, let $\tau_{m,ij}^* = \frac{\partial \Pi_i(x_i^*, \ell_i^*)}{\partial x_{ij}} - \tau_{n,ij}$ and $\tau_{if}^{\ell *} = \frac{\partial \Pi_i(x_i^*, \ell_i^*)}{\partial \ell_{if}} - \tau_{n,ij}^{\ell}$, then because firm i's optimization problem is convex, this implements the allocation (x_i^*, ℓ_i^*). Finally, every firm $i \notin \mathcal{C}_m$ and every consumer n faces the same decision problem as under the original contract, since both prices and the vector of aggregates are unchanged. Hence, every firm $i \notin \mathcal{C}_m$ and every consumer n has the same optimal policy. Hence $x^* = z^*$ and aggregates are consistent with their conjectured value. Finally, market clearing remains satisfied since all allocations are unchanged.

Finally, given firm i's participation constraint was satisfied under the original contract, it is also satisfied under the new contract since firm value is the same given the same allocations, transfers, prices, and aggregates. Finally since firm value is unchanged for $i \in \mathcal{I}_m$, since prices P and aggregates z^* are unchanged, and since transfers T_i are unchanged for all $i \in \mathcal{C}_m$, the hegemon's objective (equation 12) is also unchanged relative to the original contract. Thus the hegemon is indifferent between the implementable contracts $\{\mathcal{J}_i^o, T_i, \tau_i\}_{i \in \mathcal{C}_m}$ and $\{\underline{\mathcal{J}}_i^o, T_i, \tau_i^*\}_{i \in \mathcal{C}_m}$. Hence, it is weakly optimal for the hegemon to offer a contract involving maximal punishments. □

Next, we show that the hegemon holds each firm to its participation constraint.

Lemma 2 *Under the hegemon's optimal contract, the participation constraint binds for each firm $i \in \mathcal{C}_m$, that is $T_i = V_i(\tau_m, \mathcal{J}_i) - V_i^o(\underline{\mathcal{J}}_i^o)$.*

Proof of Lemma 2. Suppose by way of contradiction that the participation constraint of firm $i \in \mathcal{C}_m$ did not bind. We conjecture and verify that the same equilibrium prices P and aggregate quantities z^* can be sustained while increasing T_i. Under the conjecture that prices and aggregates do not change, firm and consumer optimization do not change, and therefore all factor markets clear. It remains only to verify that goods markets still clear. Market clearing for good i is given by

$$\sum_{n=1}^{N} C_{nj} + \sum_{i \in \mathcal{I}} x_{ij} = y_j$$

Given homothetic preferences, we can define the expenditures of consumer n as

$$C_{nj}(p) = c_j(p) w_n$$

and, therefore, aggregate consumption is given by

$$\sum_{n=1}^{N} C_{nj}(p, w_n) = \sum_{n=1}^{N} c_j(p) w_n = c_j(p) \sum_{n=1}^{N} w_n$$

An increase in T_i holds fixed aggregate wealth, and therefore markets still clear. Thus we have found a feasible perturbation that is welfare improving for the hegemon, contradicting that the participation constraint did not bind. □

The hegemon's problem is to choose τ_m to maximize

$$\mathcal{U}_m = W_m\left(p, \sum_{i\in\mathcal{I}_m} V_i(\mathcal{J}_i) + \sum_{f\in\mathcal{F}_m} p_f^\ell \bar{\ell}_f + \sum_{i\in C_m}\left(V_i(\tau_m, \mathcal{J}_i) - V_i^o(\underline{\mathcal{J}}_i)\right)\right) + u_m(z)$$

subject to the non-negativity constraint on transfers,

$$V_i(\tau_m, \mathcal{J}_i) - V_i^o(\underline{\mathcal{J}}_i) \geq 0.$$

For a given choice of wedges $\tau_{m,i}$ on firm i, the FOCs of firm i on the equilibrium path are given by

$$\tau_{m,ij} = \frac{\partial \Pi_i}{\partial x_{ij}} - \tau_{n,ij}, \quad \tau_{m,if}^\ell = \frac{\partial \Pi_i}{\partial \ell_{if}} - \tau_{n,if}^\ell.$$

Given the firm's optimization problem is convex, a choice by the hegemon of wedges $\tau_{m,i}$ for firm i is equivalent to a choice of allocations (x_i, ℓ_i), holding fixed equilibrium prices and aggregates (P, z). Since the hegemon takes the wedges $\tau_{n,ij}$ as given (i.e., they were set in the Beginning), we will be able to adopt a primal approach whereby the hegemon directly mandates allocations (x_i, ℓ_i) for $i \in \mathcal{C}_m$. The participation constraint then specifies a constraint on allocations,

$$\Pi_i(x_i, \ell_i, \mathcal{J}_i) - \tau_{n,i}x_i - \tau_{n,i}^\ell \ell_i + r_{n,i}^* \geq V_i^o(\underline{\mathcal{J}}_i)$$

where $r_{n,i}^* = \tau_{n,i}x_i^* + \tau_{n,i}^\ell \ell_i^*$ is revenue remissions from the country n government, which are taken as given by the hegemon.[4] It is important to note that although the hegemon can in principal try to unwind the wedge $\tau_{n,ij}$ set in the Beginning, it is potentially costly to do so, as that wedge still appears in the firm's participation constraint.[5] As such, the hegemon's problem becomes akin to a familiar primal approach problem in which the ex-ante wedges serve to change the effective prices faced by firms. Moreover, because changes in mandated allocations (x_i, ℓ_i) also result in changes in the equilibrium (P, z), we will include these equilibrium objects in the hegemon's decision problem, subject to the constraints imposed by market clearing and the determination of aggregates ($z^* = x^*$).

Formally, we proceed as follows.[6] We adopt a primal representation to the problem: the hegemon chooses allocations $\{x_i, \ell_i\}_{i\in\mathcal{C}_m}, P, z$, subject to equilibrium determination, and then chooses wedges

[4] Since revenue remissions are taken as given, an off-path deviation of the hegemon from $x_{ij} = x_{ij}^*$ generates net (positive or negative) revenues for the country n government, which we assume are remitted to (or taken from) the country n consumer. As a result, these off-path revenues are a wash in the country n consumer's budget constraint.

[5] This reflects the irreversability of the wedges set by other countries in the Beginning. It is therefore crucial that $r_{n,i}^*$ is taken as given by the hegemon. If the hegemon internalized how revenue remissions changed with its own wedges, and so $r_{n,i}^* = \tau_{n,i}x_{n,i} + \tau_{n,i}^\ell \ell_i$, then the ex-ante wedges would drop out of the participation constraint. This would allow the hegemon to costlessly unwind the wedges of country n.

[6] The proof follows closely that of Proposition 3 in Clayton et al. (2023)

to implement the resulting optimal allocation.[7] The hegemon's Lagrangian is

$$\begin{aligned}\mathcal{L}_m =& W_m\Bigg(p, \sum_{i\in\mathcal{I}_m} V_i(\mathcal{J}_i) + \sum_{f\in\mathcal{F}_m} p^\ell_f \bar{\ell}_f + \sum_{i\in C_m}\Big(\Pi_i(x_i,\ell_i,\mathcal{J}_i) - \tau_{n,i}x_i - \tau^\ell_{n,i}\ell_i + r^*_{n,i} - V^o_i(\underline{\mathcal{J}}_i)\Big)\Bigg) + u_m(z)\\ &+ \sum_{i\in\mathcal{C}_m}\eta_i\Big[\Pi_i(x_i,\ell_i,\mathcal{J}_i) - \tau_{n,i}x_i - \tau^\ell_{n,i}\ell_i + r^*_{n,i} - V^o_i(\underline{\mathcal{J}}_i)\Big]\\ &+ ED\phi + \sum_{i\in\mathcal{C}_m}\psi_{ij}[z_{ij} - x_{ij}] + [z^{NC} - x^{NC}(P,z)]\psi^{NC}.\end{aligned}$$

We have defined

$$ED_i = \begin{cases} \sum_{n=1}^N C_{ni}(P,w_n) + \sum_{j\in\mathcal{C}_m} x_{ji} + \sum_{j\notin\mathcal{C}_m} x_{ji}(P,z) - f_i(x_i,\ell_i,z), & i\in\mathcal{C}_m\\ \sum_{n=1}^N C_{ni}(P,w_n) + \sum_{j\in\mathcal{C}_m} x_{ji} + \sum_{j\notin\mathcal{C}_m} x_{ji}(P,z) - y_i(P,z), & i\notin\mathcal{C}_m\end{cases}$$

is the excess demand in the market for good i and $ED^\ell_f = \bar{\ell}_f - \sum_{i\in\mathcal{I}_n\cap\mathcal{C}_m}\ell_{if} - \sum_{i\in\mathcal{I}_n\setminus\mathcal{C}_m}\ell_{if}(P,z)$. We defined $ED = \{ED_i, ED^\ell_f\}_{i\neq 1}$ and defined ϕ (Lagrange multipliers on market clearing) analogously. We defined $\psi^{NC} = \{\psi_{ij}\}_{i\notin\mathcal{C}_m}$ and z^{NC}, x^{NC} analogously.

Following the proof of Proposition 3 in Clayton et al. (2023), taking any contract allocation $e\in\{x_i,\ell_i\}_{i\in\mathcal{C}_m}$ we have

$$\frac{\partial}{\partial e}\left[ED\phi + \sum_{i\in\mathcal{C}_m}\sum_{j\in\mathcal{J}_i}\psi_{ij}\Big[z_{ij} - x_{ij}\Big] + \Big[z^{NC} - x^{NC}\Big]\psi^{NC}\right] = \frac{dz}{de}\varepsilon^z + \frac{dP}{de}\varepsilon^P$$

where $\frac{dz}{de} = (\frac{\partial x^C}{\partial e}, \frac{dz^{NC}}{de})$, where $x^C = \{x_{ij}\}_{i\in\mathcal{C}_m}$, where

$$\frac{dz^{NC}}{de} = \Psi^{z,NC}\left(\frac{\partial x^{NC}}{\partial e} + \frac{\partial x^{NC}}{\partial P}\frac{dP}{de}\right)$$

$$\frac{dP}{de} = -\left(\frac{\partial ED}{\partial P} + \frac{\partial ED}{\partial z^{NC}}\Psi^z\frac{\partial x^{NC}}{\partial P}\right)^{-1}\left(\frac{\partial ED}{\partial e} + \frac{\partial ED}{\partial z^{NC}}\Psi^z\frac{\partial x^{NC}}{\partial e}\right),$$

where $\Psi^z = \left(\mathbb{I} - \frac{\partial x^{NC}}{\partial z^{NC}}\right)^{-1}$.

The vector ε^z is defined by

$$\begin{aligned}\varepsilon^z =& \frac{\partial}{\partial z}\Bigg\{W_m\Bigg(p, \sum_{i\in\mathcal{I}_m} V_i(\mathcal{J}_i) + \sum_{f\in\mathcal{F}_m} p^\ell_f\bar{\ell}_f + \sum_{i\in C_m}\Big(\Pi_i(x_i,\ell_i,\mathcal{J}_i) - \tau_{n,i}x_i - \tau^\ell_{n,i}\ell_i + r^*_{n,i} - V^o_i(\underline{\mathcal{J}}_i)\Big)\Bigg) + u_m(z)\\ &+ \sum_{i\in\mathcal{C}_m}\eta_i\Big[\Pi_i(x_i,\ell_i,\mathcal{J}_i) - \tau_{n,i}x_i - \tau^\ell_{n,i}\ell_i + r^*_{n,i} - V^o_i(\underline{\mathcal{J}}_i)\Big]\Bigg\}\\ =& \frac{\partial W_m}{\partial w_m}\sum_{i\in\mathcal{I}_m}\frac{\partial V_i(\mathcal{J}_i)}{\partial z} + \sum_{i\in C_m}\left(\frac{\partial W_m}{\partial w_m} + \eta_i\right)\left(\frac{\partial \Pi_i}{\partial z} - \frac{\partial V^o_i(\underline{\mathcal{J}}_i)}{\partial z}\right) + \frac{\partial u_m}{\partial z}\end{aligned}$$

[7] The inclusion of aggregates (P,z) is a common technical assumption in optimal policy problems (e.g., Farhi and Werning (2016)), and implies that the hegemon is allowed to select its preferred equilibrium in the case that there would be multiple equilibria associated with its offered contract.

From here, we can write out for any domestic firm $i \in \mathcal{I}_m$

$$\frac{\partial V_i(\mathcal{J}_i)}{\partial z} = \frac{\partial \Pi_i}{\partial z} + \frac{\partial \Pi_i}{\partial \mathbf{x}_i}\frac{\partial \mathbf{x}_i}{\partial z} = \frac{\partial \Pi_i}{\partial z} + \tau_{m,i}\frac{\partial \mathbf{x}_i}{\partial z}$$

and for any foreign firm $i \in \mathcal{C}_m$,

$$\frac{\partial V_i^o(\underline{\mathcal{J}}_i)}{\partial z} = \frac{\partial \Pi_i^o}{\partial z} + \left(\frac{\partial \Pi_i^o}{\partial \mathbf{x}_i} - \tau_{n,i}\right)\frac{\partial \mathbf{x}_i}{\partial z} = \frac{\partial \Pi_i^o}{\partial z},$$

which follows by Envelope Theorem and since revenue remissions are taken as given. Therefore,

$$\varepsilon^z = \frac{\partial W_m}{\partial w_m}\sum_{i\in\mathcal{I}_m}\left(\frac{\partial \Pi_i}{\partial z} + \tau_{m,i}\frac{\partial \mathbf{x}_i}{\partial z}\right) + \sum_{i\in\mathcal{C}_m}\left(\frac{\partial W_m}{\partial w_m} + \eta_i\right)\left(\frac{\partial \Pi_i}{\partial z} - \frac{\partial \Pi_i^o}{\partial z}\right) + \frac{\partial u_m}{\partial z}.$$

The vector ε^P is given by

$$\begin{aligned}\varepsilon^P =& \frac{\partial}{\partial P}\Bigg\{W_m\Bigg(p, \sum_{i\in\mathcal{I}_m} V_i(\mathcal{J}_i) + \sum_{f\in\mathcal{F}_m} p_f^\ell \bar{\ell}_f + \sum_{i\in C_m}\Big(\Pi_i(x_i,\ell_i,\mathcal{J}_i) - \tau_{n,i}x_i - \tau_{n,i}^\ell \ell_i + r_{n,i}^* - V_i^o(\underline{\mathcal{J}}_i)\Big)\Bigg) + u_m(z) \\ &+ \sum_{i\in\mathcal{C}_m}\eta_i\Big[\Pi_i(x_i,\ell_i,\mathcal{J}_i) - \tau_{n,i}x_i - \tau_{n,i}^\ell \ell_i + r_{n,i}^* - V_i^o(\underline{\mathcal{J}}_i)\Big]\Bigg\} \\ =& \frac{\partial W_m}{\partial P} + \frac{\partial W_m}{\partial w_m}\left(\sum_{i\in\mathcal{I}_m}\frac{\partial V_i(\mathcal{J}_i)}{\partial P} + \sum_{f\in\mathcal{F}_m}\frac{\partial p_f^\ell}{\partial P}\bar{\ell}_f\right) + \sum_{i\in\mathcal{C}_m}\left(\frac{\partial W_m}{\partial w_m} + \eta_i\right)\left(\frac{\partial \Pi_i}{\partial P} - \frac{\partial V_i^o(\underline{\mathcal{J}}_i)}{\partial P}\right)\end{aligned}$$

As above, we have

$$\frac{\partial V_i^o(\underline{\mathcal{J}}_i)}{\partial P} = \frac{\partial \Pi_i^o}{\partial P} + \left(\frac{\partial \Pi_i^o}{\partial \mathbf{x}_i} - \tau_{n,i}\right)\frac{\partial \mathbf{x}_i}{\partial P} = \frac{\partial \Pi_i^o}{\partial P}$$

Next, we can write

$$\frac{\partial W_m}{\partial P} = -\frac{\partial W_m}{\partial w_m}\sum_{i\in\mathcal{I}}\frac{\partial p_i}{\partial P}C_{mi}$$

and similarly

$$\frac{\partial V_i(\mathcal{J}_i)}{\partial P} = \tau_{m,i}\frac{\partial \mathbf{x}_i}{\partial P} + \frac{\partial p_i}{\partial P}y_i - \sum_{j\in\mathcal{J}_i}\frac{\partial p_j}{\partial P}x_{ij} - \sum_{f\in\mathcal{F}_{in}}\frac{\partial p_f^\ell}{\partial P}\ell_{if}$$

Putting together and using market clearing for domestic factors, we obtain

$$\varepsilon^P = \frac{\partial W_m}{\partial w_m}\sum_{i\in\mathcal{I}_m}\tau_{m,i}\frac{\partial \mathbf{x}_i}{\partial P} + \frac{\partial W_m}{\partial w_m}\sum_{i\in\mathcal{I}}\frac{\partial p_i}{\partial P}X_{m,i} + \sum_{i\in\mathcal{C}_m}\left(\frac{\partial W_m}{\partial w_m} + \eta_i\right)\left(\frac{\partial \Pi_i}{\partial P} - \frac{\partial \Pi_i^o}{\partial P}\right)$$

where $X_{m,i} = y_i - \sum_{i\in\mathcal{I}_m} x_{ij} - C_{mi}$. Note the second term is terms of trade manipulation.

We are now ready to take the hegemon's FOCs in contract terms. The hegemon's FOC for x_{ij}, $i \in \mathcal{C}_m$, is

$$0 = 0 = \left(\frac{\partial W_m}{\partial w_m} + \eta_i\right)\left(\frac{\partial \Pi_i}{\partial x_{ij}} - \tau_{n,ij}\right) + \frac{dz}{dx_{ij}}\varepsilon^z + \frac{dP}{dx_{ij}}\varepsilon^P.$$

The firm's FOC is $\frac{\partial \Pi_i}{\partial x_{ij}} = \tau_{n,ij} + \tau_{m,ij}$, and so we obtain

$$\tau_{m,ij} = -\frac{1}{\frac{\partial W_m}{\partial w_m} + \eta_i} \frac{dz}{dx_{ij}} \varepsilon^z - \frac{1}{\frac{\partial W_m}{\partial w_m} + \eta_i} \frac{dP}{dx_{ij}} \varepsilon^P.$$

From here the result obtains after transposition.

Factor Wedges. Parallel derivations yield

$$\begin{aligned}
\tau^{\ell}_{m,if} = &- \frac{1}{1 + \frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_i} \sum_{i \in \mathcal{I}_m} \tau_{m,i} \frac{d\mathbf{x}_i}{d\ell_{if}} \\
&- \frac{1}{1 + \frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_i} \left[\sum_{i \in \mathcal{I}_m} \frac{\partial \Pi_i}{\partial z} + \frac{1}{\frac{\partial W_m}{\partial w_m}} \frac{\partial u_m}{\partial z} \right] \frac{dz}{d\ell_{if}} \\
&- \frac{1}{1 + \frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_i} \sum_{i \in \mathcal{I}} X_{m,i} \frac{\partial p_i}{\partial P} \frac{dP}{d\ell_{if}} \\
&- \frac{1}{1 + \frac{\partial W_m}{\partial w_m}\eta_i} \sum_{i \in \mathcal{C}_m} \left(1 + \frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_i\right) \left[\left(\frac{\partial \Pi_i}{\partial z} - \frac{\partial \Pi^o_i}{\partial z} \right) \frac{dz}{d\ell_{if}} + \left(\frac{\partial \Pi_i}{\partial P} - \frac{\partial \Pi^o_i}{\partial P} \right) \frac{dP}{d\ell_{if}} \right]
\end{aligned}$$

The network amplification for factors is identical to that of goods except noting that $\frac{dx^C}{d\ell_{if}} = 0$.

A.2.8 Proof of Proposition 8

Country n solves

$$\max_{\tau_n} \mathcal{U}_n = W_n \left(p, \sum_{i \in \mathcal{I}_n \cap \mathcal{C}_m} V^o_i(\underline{\mathcal{J}}_i) + \sum_{i \in \mathcal{I}_n \setminus \mathcal{C}_m} V_i(\mathcal{J}_i) + \sum_{f \in \mathcal{F}_n} p^{\ell}_f \bar{\ell}_f \right) + u_n(z).$$

To reduce cumbersome notation, observe that without loss of generality we can define $V_i(\mathcal{J}_i) = V^o_i(\underline{\mathcal{J}}_i)$ for $i \in \mathcal{I}_n \setminus \mathcal{C}_m$, since in this case $\underline{\mathcal{J}}_i = \mathcal{J}_i$ and $x^o_{ij} = x^*_{ij}$. Therefore, we can rewrite the country n optimization problem as

$$\max_{\tau_n} \mathcal{U}_n = W_n \left(p, \sum_{i \in \mathcal{I}_n} V^o_i(\underline{\mathcal{J}}_i) + \sum_{f \in \mathcal{F}_n} p^{\ell}_f \bar{\ell}_f \right) + u_n(z).$$

Key to derivations to come is how a change in the wedges τ_n affect the equilibrium of the second stage of the Stackelberg game. We characterize below the effect of an exogenous perturbation in an arbitrary constant e (e.g., a tax $\tau_{n,ij}$) on these aggregates in the ex-post period of the Stackelberg game.[8]

Lemma 3 *The aggregate response of z^* and P to a perturbation in an arbitrary constant e is*

$$\frac{dz^*}{de} = \Psi^z \left(\frac{\partial x}{\partial e} + \frac{\partial x}{\partial P} \frac{dP}{de} \right) + \Psi^z \frac{\partial x}{\partial \tau_m} \frac{d\tau_m}{de} \tag{A.1}$$

[8]Lemma 3 is similar to Proposition 2 in Clayton et al. (2023), but accounts for the endogenous reponse of the hegemon's optimal contract.

$$\frac{dP}{de} = \Psi^P\left(\frac{\partial ED}{\partial e} + \frac{\partial ED}{\partial z^*}\Psi^z\frac{\partial x}{\partial e}\right) + \Psi^P\left(\frac{\partial ED}{\partial \tau_m} + \frac{\partial ED}{\partial z^*}\Psi^z\frac{\partial x}{\partial \tau_m}\right)\frac{d\tau_m}{de} \tag{A.2}$$

where $\Psi^z = \left(\mathbb{I} - \frac{\partial x}{\partial z^*}\right)^{-1}$, *where* $\Psi^P = -\left(\frac{\partial ED}{\partial P} + \frac{\partial ED}{\partial z^*}\Psi^z\frac{\partial x}{\partial P}\right)^{-1}$, *and where* ED *is the vector of excess demand in goods and factor markets.*

Proof of Lemma 3. Consider first the demand of firm i, given by $x_{ij}(\tau_m, P, z^*) = z^*_{ij}$ Totally differentiating in a generic variable e, we have

$$\frac{\partial x_{ij}}{\partial e} + \frac{\partial x_{ij}}{\partial \tau_m}\frac{d\tau_m}{de} + \frac{\partial x_{ij}}{\partial P}\frac{dP}{de} + \frac{\partial x_{ij}}{\partial z^*}\frac{dz^*}{de} = \frac{dz^*_{ij}}{de}.$$

Stacking the system vertically across goods j and firms i and rerranging,

$$\left(\mathbb{I} - \frac{\partial x}{\partial z^*}\right)\frac{dz^*}{de} = \frac{\partial x}{\partial e} + \frac{\partial x}{\partial \tau_m}\frac{d\tau_m}{de} + \frac{\partial x}{\partial P}\frac{dP}{de}$$

which yields our first equation with $\Psi^z = (\mathbb{I} - \frac{\partial x}{\partial z^*})^{-1}$.

Next, we define the vector of excess demand ED as the stacked system of excess demand in goods and factor markets (excluding the numeraire), where excess demand for good i is $ED_i = \sum_{n=1}^N C_{ni} + \sum_{j\in\mathcal{I}} x_{ji} - y_i$, and excess demand for factor f is $ED^\ell_f = \sum_{i\in\mathcal{I}_n} \ell_{if} - \bar{\ell}_f$. Market clearing requires excess demand to be zero, $ED = 0$. Totally differentiating this system with regards to an exogenous variable e, we obtain

$$\frac{\partial ED}{\partial e} + \frac{\partial ED}{\partial z^*}\frac{dz^*}{de} + \frac{\partial ED}{\partial P}\frac{dP}{de} + \frac{\partial ED}{\partial \tau_m}\frac{d\tau_m}{de} = 0.$$

Substituting in the equation for $\frac{dz^*}{de}$ and rearranging, we have

$$\frac{dP}{de} = \Psi^P\left(\frac{\partial ED}{\partial e} + \frac{\partial ED}{\partial z^*}\Psi^z\frac{\partial x}{\partial e}\right) + \Psi^P\left(\frac{\partial ED}{\partial \tau_m} + \frac{\partial ED}{\partial z^*}\Psi^z\frac{\partial x}{\partial \tau_m}\right)\frac{d\tau_m}{de}$$

where $\Psi^P = -(\frac{\partial ED}{\partial P} + \frac{\partial ED}{\partial z^*}\Psi^z\frac{\partial x}{\partial P})^{-1}$. □

First, we consider the effect on utility of a perturbation in ex-post aggregates. Note that there is *no* direct impact of a perturbation in the hegemon's wedges, that is $\frac{\partial \mathcal{U}_n}{\partial \tau_m} = 0$ which follows because $V^o_i(\underline{\mathcal{J}_i})$ is evaluated at the outside option. Next, for a perturbation to an aggregate z, by Envelope Theorem

$$\frac{\partial \mathcal{U}_n}{\partial z} = \frac{\partial W_n}{\partial w_n}\sum_{i\in\mathcal{I}_n}\left[\frac{\partial \Pi^o_i}{\partial z} + \tau_{n,i}\frac{\partial x^o_i}{\partial z} + \tau^\ell_{n,i}\frac{\partial \ell^o_i}{\partial z}\right] + \frac{\partial u_n}{\partial z}$$

Finally, for a price perturbation we have

$$\frac{\partial \mathcal{U}_n}{\partial P} = \frac{\partial W_n}{\partial P} + \frac{\partial W_n}{\partial w_n}\sum_{i\in\mathcal{I}_n}\left[\frac{\partial \Pi^o_i}{\partial P} + \frac{\partial x^o_i}{\partial P}\tau_{n,i} + \frac{\partial \ell^o_i}{\partial P}\tau^\ell_{n,i}\right] + \frac{\partial W_n}{\partial w_n}\sum_{f\in\mathcal{F}_n}\frac{\partial p^\ell_f}{\partial P}\bar{\ell}_f.$$

Finally, the direct impact of a tax perturbation in τ_n is, by Envelope Theorem,

$$\frac{\partial \mathcal{U}_n}{\partial \tau_n} = \frac{\partial W_n}{\partial w_n}\sum_{i\in\mathcal{I}_n}\left[\frac{\partial x^o_i}{\partial \tau_n}\tau_{n,i} + \frac{\partial \ell^o_i}{\partial \tau_n}\tau^\ell_{n,i}\right].$$

Re-stacking,

$$\tau_n \frac{\partial \mathbf{x}_i^o}{\partial \tau_n} = \sum_{i\in\mathcal{I}_n} \left[\frac{\partial x_i^o}{\partial \tau_n}\tau_{n,i} + \frac{\partial \ell_i^o}{\partial \tau_n}\tau_{n,i}^\ell \right]$$

Similarly, we have

$$\frac{\partial \mathcal{U}_n}{\partial z} = \frac{\partial W_n}{\partial w_n}\tau_n \frac{\partial \mathbf{x}_i^o}{\partial z} + \frac{\partial W_n}{\partial w_n}\sum_{i\in\mathcal{I}_n}\frac{\partial \Pi_i^o}{\partial z} + \frac{\partial u_n}{\partial z}$$

$$\frac{\partial \mathcal{U}_n}{\partial P} = \frac{\partial W_n}{\partial w_n}\tau_n \frac{\partial \mathbf{x}_i^o}{\partial P} + \frac{\partial W_n}{\partial P} + \frac{\partial W_n}{\partial w_n}\left[\sum_{i\in\mathcal{I}_n}\frac{\partial \Pi_i^o}{\partial P} + \sum_{f\in\mathcal{F}_n}\frac{\partial p_f^\ell}{\partial P}\bar{\ell}_f\right]$$

$$\frac{\partial \mathcal{U}_n}{\partial \tau_n} = \frac{\partial W_n}{\partial w_n}\tau_n \frac{\partial \mathbf{x}_i^o}{\partial \tau_n}$$

Now, we can put it all together. The first order conditions of country n are represented by the system

$$0 = \frac{\partial \mathcal{U}_n}{\partial \tau_n} + \frac{\partial \mathcal{U}_n}{\partial z}\frac{dz}{d\tau_n} + \frac{\partial \mathcal{U}_n}{\partial P}\frac{dP}{d\tau_n} + \frac{\partial \mathcal{U}_n}{\partial \tau_m}\frac{d\tau_m}{d\tau_n}.$$

Since the last term is equal to zero, substituting in we have

$$\begin{aligned} 0 =& \frac{\partial W_n}{\partial w_n}\tau_n \frac{\partial \mathbf{x}_i^o}{\partial \tau_n} \\ &+ \left[\frac{\partial W_n}{\partial w_n}\tau_n \frac{\partial \mathbf{x}_i^o}{\partial z} + \frac{\partial W_n}{\partial w_n}\sum_{i\in\mathcal{I}_n}\frac{\partial \Pi_i^o}{\partial z} + \frac{\partial u_n}{\partial z}\right]\frac{dz}{d\tau_n} \\ &+ \left[\frac{\partial W_n}{\partial w_n}\tau_n \frac{\partial \mathbf{x}_i^o}{\partial P} + \frac{\partial W_n}{\partial P} + \frac{\partial W_n}{\partial w_n}\left[\sum_{i\in\mathcal{I}_n}\frac{\partial \Pi_i^o}{\partial P} + \sum_{f\in\mathcal{F}_n}\frac{\partial p_f^\ell}{\partial P}\bar{\ell}_f\right]\right]\frac{dP}{d\tau_n}. \end{aligned}$$

Rearranging, we obtain

$$\tau_n \frac{d\mathbf{x}_n^o}{d\tau_n} = -\left[\sum_{i\in\mathcal{I}_n}\frac{\partial \Pi_i^o}{\partial z} + \frac{1}{\frac{\partial W_n}{\partial w_n}}\frac{\partial u_n}{\partial z}\right]\frac{dz}{d\tau_n} - \left[\sum_{i\in\mathcal{I}_n}\frac{\partial \Pi_i^o}{\partial P} + \sum_{f\in\mathcal{F}_n}\frac{\partial p_f^\ell}{\partial P}\bar{\ell}_f + \frac{1}{\frac{\partial W_n}{\partial w_n}}\frac{\partial W_n}{\partial P}\right]\frac{dP}{d\tau_n}$$

where $\frac{d\mathbf{x}_n^o}{d\tau_n} = \frac{\partial \mathbf{x}_n^o}{\partial \tau_n} + \frac{\partial \mathbf{x}_n^o}{\partial z}\frac{dz}{d\tau_n} + \frac{\partial \mathbf{x}_n^o}{\partial P}\frac{dP}{d\tau_n}$.

Finally, it is helpful to rewrite the price effect. We have

$$\frac{\partial \Pi_i^o}{\partial P} = \frac{\partial p_i}{\partial P}y_i^o - \sum_{j\in\underline{\mathcal{J}}_i^o}\frac{\partial p_j}{\partial P}x_{ij}^o - \sum_{f\in\mathcal{F}_{in}}\frac{\partial p_j}{\partial P}x_{ij}^o$$

and similarly, we have

$$\frac{\partial W_n}{\partial P} = -\frac{\partial W_n}{\partial w_n}\sum_{i\in\mathcal{I}}\frac{\partial p_i}{\partial P}C_{ni}$$

Therefore, we can write

$$\sum_{i\in\mathcal{I}_n}\frac{\partial \Pi_i^o}{\partial P} + \sum_{f\in\mathcal{F}_n}\frac{\partial p_f^\ell}{\partial P}\bar{\ell}_f + \frac{1}{\frac{\partial W_n}{\partial w_n}}\frac{\partial W_n}{\partial P} = \sum_{i\in\mathcal{I}_n}\frac{\partial p_i}{\partial P}\left[y_i^o - \overline{x}_i^o - C_{ni}\right] - \sum_{i\in\mathcal{I}\setminus\mathcal{I}_n}\frac{\partial p_i}{\partial P}\left[C_{ni} + \overline{x}_i^o\right] + \sum_{f\in\mathcal{F}_n}\frac{\partial p_f^\ell}{\partial P}\left[\bar{\ell}_f - \ell_f^o\right]$$

where we define $\overline{x}_i^o = \sum_{i' \in \mathcal{I}_n} x_{i'i}^o$ (and similarly $\overline{\ell}_f^o$). More generally, therefore, we can write

$$X_{n,i}^o = \mathbf{1}_{i \in \mathcal{I}_n} y_i^o - \sum_{i' \in \mathcal{I}_n} x_{i'i}^o - C_{n_i}^o$$

$$X_{n,f}^o = \overline{\ell}_f - \sum_{i \in \mathcal{I}_n} \ell_{if}^o$$

and so write

$$\sum_{i \in \mathcal{I}_n} \frac{\partial \Pi_i^o}{\partial P} + \sum_{f \in \mathcal{F}_n} \frac{\partial p_f^\ell}{\partial P} \overline{\ell}_f + \frac{1}{\frac{\partial W_n}{\partial w_n}} \frac{\partial W_n}{\partial P} = X_n^o$$

Thus substituting into the tax formula,

$$\tau_n \frac{d\mathbf{x}_n^o}{d\tau_n} = -\left[\sum_{i \in \mathcal{I}_n} \frac{\partial \Pi_i^o}{\partial z} + \frac{1}{\frac{\partial W_n}{\partial w_n}} \frac{\partial u_n}{\partial z} \right] \frac{dz}{d\tau_n} - X_n^o \frac{dP}{d\tau_n}$$

A.2.9 Proof of Proposition 9

The hegemon's ex-ante policy is to maximize the ex-post utility, $\max_{\{\tau_{m,i}\}_{i \in \mathcal{I}_m}} \max_{\{\Gamma_i\}_{i \in C_m}} \mathcal{U}_m$, which can equivalently be represented as a single decision problem of simultaneously choosing domestic policies and the contract, taking as given the wedges and revenue remissions of other countries in the ex-ante Nash game. As in the proof of Proposition 7, we adopt a primal representation to the problem: the hegemon chooses allocations $\{x_i, \ell_i\}_{i \in \mathcal{C}_m \cup \mathcal{I}_m}, P, z$ and then chooses wedges to implement the resulting optimal allocation (where note that the chosen allocations now include those of domestic firms). The hegemon's Lagrangian is

$$\begin{aligned}
\mathcal{L}_m = & W_m\Bigg(p, \sum_{i \in \mathcal{I}_m} \Pi_i(x_i, \ell_i, \mathcal{J}_i) + \sum_{f \in \mathcal{F}_m} p_f^\ell \overline{\ell}_f + \sum_{i \in C_m} \Big(\Pi_i(x_i, \ell_i, \mathcal{J}_i) - \tau_{n,i} x_i - \tau_{n,i}^\ell \ell_i + r_{n,i}^* - V_i^o(\underline{\mathcal{J}}_i)\Big)\Bigg) + u_m(z) \\
& + \sum_{i \in \mathcal{C}_m} \eta_i \Big[\Pi_i(x_i, \ell_i, \mathcal{J}_i) - \tau_{n,i} x_i - \tau_{n,i}^\ell \ell_i + r_{n,i}^* - V_i^o(\underline{\mathcal{J}}_i)\Big] \\
& + ED\phi + \sum_{i \in \mathcal{C}_m \cup \mathcal{I}_m} \psi_{ij}[z_{ij} - x_{ij}] + [z^{NC} - x^{NC}(P, z)]\psi^{NC}.
\end{aligned}$$

where we now denote $x^{NC} = \{x_{ij}\}_{i \notin \mathcal{C}_m \cup \mathcal{I}_m}$ to be all firms apart from either those the hegemon contracts with or the hegemon's domestic firms.

Following the proof of Proposition 7, we have the FOC in x_{ij} for $i \in \mathcal{I}_m$ given by

$$0 = \frac{\partial W_m}{\partial w_m} \frac{\partial \Pi_i}{\partial x_{ij}} + \frac{dz}{dx_{ij}} \varepsilon^z + \frac{dP}{dx_{ij}} \varepsilon^P.$$

Using $\frac{\partial \Pi_i}{\partial x_{ij}} = \tau_{m,ij}$ and the new definitions of ε's, we have

$$\begin{aligned}
\tau_{m,ij} = & -\left[\sum_{i \in \mathcal{I}_m} \frac{\partial \Pi_i}{\partial z} + \frac{1}{\frac{\partial W_m}{\partial w_m}} \frac{\partial u_m}{\partial z} \right] \frac{dz}{dx_{ij}} - \sum_{i \in \mathcal{I}} X_{m,i} \frac{\partial p_i}{\partial P} \frac{dP}{dx_{ij}} \\
& - \sum_{i \in \mathcal{C}_m} \left(1 + \frac{1}{\frac{\partial W_m}{\partial w_m}} \eta_i\right) \left[\left(\frac{\partial \Pi_i}{\partial z} - \frac{\partial \Pi_i^o}{\partial z} \right) \frac{dz}{dx_{ij}} + \left(\frac{\partial \Pi_i}{\partial P} - \frac{\partial \Pi_i^o}{\partial P} \right) \frac{dP}{dx_{ij}} \right]
\end{aligned}$$

Factor wedges are derived analogously,

$$\tau^{\ell}_{m,if} = -\Bigg[\sum_{k\in\mathcal{I}_m}\frac{\partial\Pi_k}{\partial z} + \frac{1}{\frac{\partial W_m}{\partial w_m}}\frac{\partial u_m}{\partial z}\Bigg]\frac{dz}{d\ell_{if}} - \sum_{k\in\mathcal{I}} X_{m,k}\frac{\partial p_k}{\partial P}\frac{dP}{d\ell_{if}} \tag{A.3}$$

$$-\sum_{k\in\mathcal{C}_m}\left(1+\frac{1}{\frac{\partial W_m}{\partial w_m}}\eta_k\right)\Bigg[\left(\frac{\partial\Pi_k}{\partial z}-\frac{\partial\Pi^o_k}{\partial z}\right)\frac{dz}{d\ell_{if}} + \left(\frac{\partial\Pi_k}{\partial P}-\frac{\partial\Pi^o_k}{\partial P}\right)\frac{dP}{d\ell_{if}}\Bigg] \tag{A.4}$$

A.2.10 Proof of Proposition 10

We first show that the global planner can, without loss, offer a trivial contract from the hegemon. Note that the first order conditions for firms are

$$\frac{\partial\Pi_i}{\partial x_{ij}} = \tau_{m,ij} + \tau_{n,ij}$$

$$\frac{\partial\Pi_i}{\partial\ell_{if}} = \tau^{\ell}_{m,if} + \tau^{\ell}_{n,if}$$

Therefore, if the allocation (x_i, ℓ_i) is implemented with wedges $(\tilde{\tau}_{m,i}, \tilde{\tau}_{n,i})$, it is also implemented with wedges $\tau_{m,i} = 0$ and $\tau_{n,i} = \tilde{\tau}_{m,i} + \tilde{\tau}_{n,i}$. Lastly side payments are ruled out since $\Omega_n\frac{\partial W_n}{\partial w_n} = 1$ by construction, and therefore the global planner can offer a trivial contract of the hegemon.

We can therefore instead characterize optimal wedges τ_n. Because the global planner has complete instruments on firms, we can adopt the primal approach. Noting that pecuniary externalities are zero sum (pure redistribution), then since the global planner's objective is

$$\mathcal{U}^G = \sum_{n=1}^{N}\Omega_n\Big[W_n(p, w_n) + u_n(z)\Big].$$

then the global planner's FOC for x_{ij} is

$$0 = \Omega_n\frac{\partial W_n}{\partial w_{n_n}}\frac{\partial\Pi_i}{\partial x_{ij}} + \sum_{k=1}^{N}\Omega_k\Bigg[\frac{\partial W_k}{\partial w_k}\sum_{i\in\mathcal{I}_k}\frac{\partial\Pi_i}{\partial z_{ij}} + \frac{\partial u_k}{\partial z_{ij}}\Bigg]$$

Using that $\Omega_n\frac{\partial W_n}{\partial w_n} = 1$ for all n, we have

$$\tau_{n,ij} = -\sum_{i'\in\mathcal{I}}\frac{\partial\Pi_{i'}}{\partial z_{ij}} - \sum_{n}\frac{1}{\frac{\partial W_n}{\partial w_n}}\frac{\partial u_n}{\partial z_{ij}}.$$

Optimal wedges on factors are therefore zero since ℓ_{if} does not appear in the vector of aggregates.

A.2.11 Proof of Proposition 11

Absent a hegemon, the objective of country n is

$$\mathcal{U}_n = W_n\left(p, \sum_{i\in\mathcal{I}_n}V_i(\mathcal{J}_i) + \sum_{f\in\mathcal{F}_n}p^{\ell}_f\bar{\ell}_f\right) + u_n(z).$$

Since country n has complete controls over its domestic firms, we can employ the primal approach of directly selecting allocations of domestic firms.[9] The optimality condition for x_{ij} is therefore

$$0 = \frac{\partial W_n}{\partial w_n}\frac{\partial \Pi_i}{\partial x_{ij}} + \left[\frac{\partial W_n}{\partial w_n}\sum_{i'\in\mathcal{I}_n}\frac{\partial \Pi_{i'}}{\partial z} + \frac{\partial u_n}{\partial z}\right]\frac{dz}{dx_{ij}} + \frac{\partial W_n}{\partial P}\frac{dP}{dx_{ij}}.$$

From the first order condition of firm i, we have $\tau_{n,ij} = \frac{\partial \Pi_i}{\partial x_{ij}}$, and therefore

$$\tau_{n,ij} = -\left[\sum_{i'\in\mathcal{I}_n}\frac{\partial \Pi_{i'}}{\partial z} + \frac{1}{\frac{\partial W_n}{\partial w_n}}\frac{\partial u_n}{\partial z}\right]\frac{dz}{dx_{ij}} - \frac{1}{\frac{\partial W_n}{\partial w_n}}\frac{\partial W_n}{\partial P}\frac{dP}{dx_{ij}}.$$

Lastly, we need to decompose out the term $\frac{\partial W_n}{\partial P}$. We have

$$\frac{\partial W_n}{\partial P} = \frac{\partial W_n}{\partial p} + \frac{\partial W_n}{\partial w_n}\frac{\partial w_n}{\partial P}$$

Following the proofs of Propositions 7 and 8, we have

$$\frac{\partial W_n}{\partial p} = -\frac{\partial W_n}{\partial w_n}\sum_{i\in\mathcal{I}}\frac{\partial p_i}{\partial P}C_{ni}$$

and

$$\frac{\partial w_n}{\partial P} = \sum_{i\in\mathcal{I}_n}\frac{\partial \Pi_i}{\partial P} + \sum_{f\in\mathcal{F}_n} p_f^{\ell}\bar{\ell}_f = \frac{\partial p_i}{\partial P}y_i - \sum_{i\in\mathcal{I}_n}\sum_{j\in\mathcal{J}_i}\frac{\partial p_j}{\partial P}x_{ij}$$

where factor payments drop out by market clearing. Therefore, we have

$$\frac{\partial W_n}{\partial P} = \frac{\partial W_n}{\partial w_n}\sum_{i'\in\mathcal{I}}X_{n,i}\frac{\partial p_i}{\partial P}$$

where $X_{n,i} = \mathbf{1}_{i\in\mathcal{I}_n}y_i - \sum_{i\in\mathcal{I}_n}x_{ij} - C_{ni}$. Thus substituting back into the optimal tax formula, we have

$$\tau_{n,ij} = -\left[\sum_{i'\in\mathcal{I}_n}\frac{\partial \Pi_{i'}}{\partial z} + \frac{1}{\frac{\partial W_n}{\partial w_n}}\frac{\partial u_n}{\partial z}\right]\frac{dz}{dx_{ij}} - \sum_{i'\in\mathcal{I}}X_{n,i'}\frac{\partial p_{i'}}{\partial P}\frac{dP}{dx_{ij}}.$$

Factor wedges are derived analogously,

$$\tau^{\ell}_{n,if} = -\left[\sum_{i'\in\mathcal{I}_n}\frac{\partial \Pi_{i'}}{\partial z} + \frac{1}{\frac{\partial W_n}{\partial w_n}}\frac{\partial u_n}{\partial z}\right]\frac{dz}{d\ell_{if}} - \sum_{i'\in\mathcal{I}}X_{n,i'}\frac{\partial p_{i'}}{\partial P}\frac{dP}{d\ell_{if}}$$

[9] For brevity, we omit the full specification of each country choosing the equilibrium. Formally, the primal approach involves each country specifying $\{x_i, \ell_i\}_{i\in\mathcal{I}_n}, P, z$, taking as given the wedges and revenue remissions of other countries. A Nash equilibrium at $\{\tau_n\}$ therefore entails that if there are multiple equilibria (P, z), each country n selects the same (P, z) as its preferred equilibria.

A.2.12 Proof of Proposition 12

From an ex-ante perspective, since wedges are revenue neutral we have $V_i(\tau_m, \mathcal{J}_i) = \Pi_i(\mathbf{x}_i^*)$. Therefore, hegemon welfare is given by

$$\mathcal{U}_m = W(p, w_m) + u_m(z), \quad w_m = \sum_{i\in\mathcal{I}_m} \Pi_i + \sum_{f\in\mathcal{F}_m} p_f^\ell \bar{\ell}_f + \sum_{i\in\mathcal{C}_m} \mu_i \Pi_i(\mathbf{x}_i^*).$$

Therefore, we have

$$\begin{aligned}
\frac{\partial \mathcal{U}_m}{\partial \mu} \quad = \quad & \frac{\partial W}{\partial w_m} \textstyle\sum_{i\in\mathcal{C}_m} \Pi_i(\mathbf{x}_i^*) \\
& + \frac{\partial W}{\partial w_m}\left[\textstyle\sum_{k\in\mathcal{I}_m} \frac{\partial \Pi_k}{\partial \mathbf{x}_k^*}\frac{d\mathbf{x}_k^*}{d\mu} + \textstyle\sum_{i\in\mathcal{C}_m} \mu \frac{\partial \Pi_i}{\partial \mathbf{x}_i^*}\frac{d\mathbf{x}_i^*}{d\mu}\right] \\
& + \frac{\partial W}{\partial w_m}\left[\textstyle\sum_{k\in\mathcal{I}_m} \frac{\partial \Pi_k}{\partial z} + \textstyle\sum_{i\in\mathcal{C}_m} \mu \frac{\partial \Pi_i}{\partial z}\right]\frac{dz}{d\mu_i} + \frac{\partial u_m}{\partial z}\frac{dz}{d\mu} \\
& + \frac{\partial W}{\partial P}\frac{dP}{d\mu} + \frac{\partial W}{\partial w_m}\left[\textstyle\sum_{i\in\mathcal{I}_m} \frac{d\Pi_i}{dP} + \textstyle\sum_{f\in\mathcal{F}_m} \frac{dp_f^\ell}{dP}\bar{\ell}_f + \textstyle\sum_{i\in\mathcal{C}_m} \mu \frac{d\Pi_i}{dP}\right]\frac{dP}{d\mu}
\end{aligned}$$

Using the firm FOCs $\frac{\partial \Pi_i}{\partial \mathbf{x}_i^*} = \tau_{m,i} \quad \forall i \in \mathcal{I}_m$, $\frac{\partial \Pi_i}{\partial \mathbf{x}_i^*} = \tau_{m,i} + \tau_{n,i} \quad \forall i \in \mathcal{C}_m$, and $\frac{\partial \Pi_i^o}{\partial \mathbf{x}_i^*} = \tau_{n,i} \quad \forall i \in \mathcal{C}_m$, and as usual using $\frac{\partial W}{\partial P} + \frac{\partial W}{\partial w_m}\sum_{i\in\mathcal{I}_m}\frac{d\Pi_i}{dP} + \sum_{f\in\mathcal{F}_m}\frac{dp_f^\ell}{dP}\bar{\ell}_f = \frac{\partial W}{\partial w_m}X_m$, we obtain the first order condition at an interior solution,

$$\begin{aligned}
\sum_{i\in\mathcal{C}_m} \Pi_i(\mathbf{x}_i^*) = & -\sum_{i\in\mathcal{C}_m} \mu\left[\left(\tau_{m,i} + \tau_{n,i}\right)\frac{d\mathbf{x}_i^*}{d\mu} + \frac{d\Pi_i}{dP}\frac{dP}{d\mu} + \frac{\partial \Pi_i}{\partial z}\frac{dz}{d\mu_i}\right] \\
& - \sum_{i\in\mathcal{I}_m}\left[\tau_{m,i}\frac{d\mathbf{x}_i^*}{d\mu} + \frac{\partial \Pi_i}{\partial z}\frac{dz}{d\mu}\right] - X_m\frac{dP}{d\mu} - \frac{1}{\frac{\partial W}{\partial w_m}}\frac{\partial u_m}{\partial z}\frac{dz}{d\mu}
\end{aligned}$$

A.2.13 Proof of Proposition 13

Consider first the outermost layer of nesting over sectors, and denote P_{nG} to be the price index of the sector G composite (which remains to be derived). The standard CES price index for final production is given by $P_n = \left(\sum_{G\in\mathcal{G}} \alpha_{ng}^\varrho P_{nG}^{1-\varrho}\right)^{\frac{1}{1-\varrho}}$. Given this final price index, the final goods producer solves

$$\max_{X_n} A_n X_n^\beta - P_n X_n,$$

which yields optimal production $X_n = \left(\beta\frac{A_n}{P_n}\right)^{\frac{1}{1-\beta}}$ and a value function as a function of the price index given by

$$v_n(P_n) = \left[A_n\left(\beta A_n\right)^{\frac{\beta}{1-\beta}} - \left(\beta A_n\right)^{\frac{1}{1-\beta}}\right]P_n^{-\frac{\beta}{1-\beta}}.$$

The log loss from losing access to a subset of goods, $V_n(\mathcal{J}_n) - V_n(\mathcal{J}_n^o)$, is therefore given by the corresponding change in the price index,

$$\log V_n(\mathcal{J}_n) - \log V_n(\mathcal{J}_n^o) = -\frac{\beta}{1-\beta}\log\frac{P_n}{P_n^o}.$$

Substituting in the definition of the price index, we have

$$
\begin{aligned}
\log V_n(\mathcal{J}_n) - \log V_n(\mathcal{J}_n^o) &= \frac{\beta}{1-\beta}\frac{1}{1-\varrho}\log\frac{\sum_{G\in\mathcal{G}}\alpha_{nG}^{\varrho}(P_{nG}^o)^{1-\varrho}}{\sum_{G\in\mathcal{G}}\alpha_{nG}^{\varrho}(P_{nG})^{1-\varrho}} \\
&= \frac{\beta}{1-\beta}\frac{1}{1-\varrho}\log\sum_{G\in\mathcal{G}}\frac{\alpha_{nG}^{\varrho}P_{nG}^{1-\varrho}}{\sum_{G\in\mathcal{G}}\alpha_{nG}^{\varrho}(P_{nG})^{1-\varrho}}\frac{(P_{nG}^o)^{1-\varrho}}{(P_{nG})^{1-\varrho}} \\
&= \frac{\beta}{1-\beta}\frac{1}{1-\varrho}\log\left\{\sum_{G\in\mathcal{G}}\Omega_{nG}\left[\frac{P_{nG}^o}{P_{nG}}\right]^{1-\varrho}\right\}
\end{aligned}
$$

where $\Omega_{nG} = \frac{\alpha_{nG}^{\varrho}P_{nG}^{1-\varrho}}{\sum_{G\in\mathcal{G}}\alpha_{nG}^{\varrho}(P_{nG})^{1-\varrho}}$ is the expenditure share on G and where P_{nG}^o is the price index after losing access to hegemon-controlled inputs. Next, the price index for G is given by $P_{nG} = \left(\sum_{J\in\mathcal{J}_G}\alpha_{nJ}^{\rho_G}P_{nJ}^{1-\rho_G}\right)^{\frac{1}{1-\rho_G}}$, which by the same calculations as above yields

$$
\frac{P_{nG}^o}{P_{nG}} = \left(\sum_{J\in\mathcal{J}_G}\frac{\alpha_{nJ}^{\rho_G}P_{nJ}^{1-\rho_G}}{\sum_{J\in\mathcal{J}_G}\alpha_{nJ}^{\rho_G}P_{nJ}^{1-\rho_G}}\left(\frac{P_{nJ}^o}{P_{nJ}}\right)^{1-\rho_G}\right)^{\frac{1}{1-\rho_G}} = \left(\sum_{J\in\mathcal{J}_G}\Omega_{nGJ}\left(\frac{P_{nJ}^o}{P_{nJ}}\right)^{1-\rho_G}\right)^{\frac{1}{1-\rho_G}}.
$$

Substituting back in yields

$$
\log V_n(\mathcal{J}_n) - \log V_n(\mathcal{J}_n^o) = \frac{\beta}{1-\beta}\frac{1}{1-\varrho}\log\left\{\sum_{G\in\mathcal{G}}\Omega_{nG}\left[\sum_{J\in\mathcal{J}_G}\Omega_{nGJ}\left(\frac{P_{nJ}^o}{P_{nJ}}\right)^{1-\rho_G}\right]^{\frac{1-\varrho}{1-\rho_G}}\right\}.
$$

Going the next layer down (to home and foreign), we have by the same calculations and using that home goods are never cut off,

$$
\frac{P_{nJ}^o}{P_{nJ}} = \left[1-\Omega_{nGJR}+\Omega_{nGJR}\left(\frac{P_{nJR}^o}{P_{nJR}}\right)^{1-\varsigma_J}\right]^{\frac{1}{1-\varsigma_J}}.
$$

Finally, going the last step down, we have $\frac{P_{nJR}^o}{P_{nJR}} = \left(1-\omega_{nJR_m}\right)^{\frac{1}{1-\sigma_J}}$. Thus substituting back in, we obtain

$$
\log V_n(\mathcal{J}_n)-\log V_n(\mathcal{J}_n^o) = \frac{\beta}{1-\beta}\frac{1}{1-\varrho}\log\left\{\sum_{G\in\mathcal{G}}\Omega_{nG}\left[\sum_{J\in\mathcal{J}_G}\Omega_{nGJ}\left[1-\Omega_{nGJR}+\Omega_{nGJR}\left(1-\omega_{nJR_m}\right)^{\frac{1-\varsigma_J}{1-\sigma_J}}\right]^{\frac{1-\rho_G}{1-\varsigma_J}}\right]^{\frac{1-\varrho}{1-\rho_G}}\right\}
$$

which is equation 21.

Specializing the formula with $\varrho = 1$ and $|\mathcal{J}_G| = 1$, we have

$$
\begin{aligned}
\log V_n(\mathcal{J}_n) - \log V_n(\mathcal{J}_n^o) &= \frac{\beta}{1-\beta}\lim_{\varrho\to 1}\frac{1}{1-\varrho}\log\left\{\sum_{G\in\mathcal{G}}\Omega_{nG}\left[1-\Omega_{nGR}+\Omega_{nGR}\left(1-\omega_{nGR_m}\right)^{\frac{1-\varsigma_G}{1-\sigma_G}}\right]^{\frac{1-\varrho}{1-\varsigma_G}}\right\} \\
&= -\frac{\beta}{1-\beta}\sum_{G\in\mathcal{G}}\Omega_{nG}\log\left[1-\Omega_{nGR}+\Omega_{nGR}\left(1-\omega_{nGR_m}\right)^{\frac{\varsigma_G-1}{\sigma_G-1}}\right]^{\frac{1}{\varsigma_G-1}}
\end{aligned}
$$

which is equation 22.

Iso-Power Curve. The iso-power curve is defined by $Power_{mn} = \overline{u}$, that is

$$-\frac{\beta}{1-\beta}\sum_{G\in\mathcal{G}}\Omega_{nG}\log\left[1-\Omega_{nGR}+\Omega_{nGR}\left(1-\omega_{nGR_m}\right)^{\frac{\varsigma_G-1}{\sigma_G-1}}\right]^{\frac{1}{\varsigma_G-1}} = \overline{u}.$$

Taking the special case $\varsigma_J = 1$, we have

$$\text{Power}_{mn} = -\frac{\beta}{1-\beta}\sum_{G\in\{F,M\}}\Omega_{nG}\Omega_{nGR}\frac{1}{\sigma_G-1}\log(1-\omega_{nGR_m}).$$

Therefore, the slope of the iso-power curve in this case is given by

$$\frac{\partial\omega_{nMR_m}}{\partial\omega_{nFR_m}} = -\frac{\Omega_{nF}\Omega_{nFR}}{\Omega_{nM}\Omega_{nMR}}\frac{\sigma_M-1}{\sigma_F-1}\frac{1-\omega_{nMR_m}}{1-\omega_{nFR_m}}$$

Marginal Increase in Power. Again taking the special case of $\varsigma_J = 1$, we let $\omega_{nGR_m} = \frac{E_{nGR_m}}{E_{nGR}}$, where E_{nGR_m} is expenditures on hegemon-controlled inputs G and E_{nGR} is expenditures on all foreign inputs G. Then, we have

$$\frac{\partial\text{Power}_{mn}}{\partial E_{nGR_m}} = \frac{\beta}{1-\beta}\Omega_{nG}\Omega_{nGR}\frac{1}{\sigma_G-1}\frac{1}{1-\frac{E_{nGR_m}}{E_{nGR}}}\frac{1}{E_{nGR}} = \frac{\beta}{1-\beta}\frac{1}{\sigma_G-1}\frac{1}{1-\omega_{nGR_m}}\frac{1}{E_n}$$

where the last equality follows from $\Omega_{nG}\Omega_{nGR}E_n = E_{nGR}$. Therefore, we have

$$\frac{\partial\text{Power}_{mn}/\partial E_{nFR_m}}{\partial\text{Power}_{mn}/\partial E_{nMR_m}} = \frac{\sigma_M-1}{\sigma_F-1}\frac{1-\omega_{nMR_m}}{1-\omega_{nFR_m}}$$

which reflects the efficiency of finance relative to goods and services in generating power, and is a rescaling of the slope of the iso-power curve.

A.3 Application Further Results

A.3.1 Financial Hyper-Globalization

We compare the allocations under the hegemon's optimum in the absence of anti-coercion policies to the allocations of the global planner. In particular, we show that the hegemon increases use of its financial services and decreases use of home financial services relative to the global planner's optimum.

Proposition 14 *In the absence of anti-coercion policies ($\tau_n = 0$), the hegemon's optimum has higher use of its financial services $x_{i_n j}$ and lower use of home alternatives $x_{i_n h}$ than the global planner's optimum.*

This proposition maps the difference in the hegemon's optimal wedges compared to the planner into the difference in terms of allocations. Intuitively, because home and hegemon's financial services are substitutes in production ($0 < \sigma < \beta$), reducing the subsidy on home financial services has the effect of pushing intermediaries towards greater use of hegemon's financial services. The hegemon, therefore, generically promotes "financial hyper-globalization" that loads too heavily on global use of its financial services. The hegemon is increasing the dependency of the rest of the world on its financial services to increase the power it can achieve by threatening withdrawals.

A.3.1.1 Proof of Proposition 14

In absence of anticoercion policies, the hegemon's optimization problem can be given by the primal approach as

$$\max \sum_{n=1}^{N} [\Pi_{i_n} - \Pi^o_{i_n}]$$

Given symmetry, the hegemon optimally selects the same allocations $(x_{i_n j}, x_{i_n h}) = (x_{ij}, x_{ih})$ for every country. Thus we can equivalently represent the problem,

$$\max \Pi_i(x_{ij}, x_{ih}) - \Pi^o_i$$

where $A_j = \overline{A}_j x_{ij}^{\xi_j \sigma}$. As compared to the global planner's problem, the only difference is the hegemon subtracts off the term Π^o_i in the objective. We thus proceed by writing the objective

$$\max \Pi_i(x_{ij}, x_{ih}) - \theta \Pi^o_i$$

for $\theta \geq 0$ and apply monotone comparative statics regarding θ. First, since $\sigma > 0$ and $\beta < \sigma$, then $\frac{\partial^2 f_i}{\partial x_{ij} \partial x_{ih}} < 0$ and so the objective is supermodular in $(x_{ij}, -x_{ih})$. Second, since $\frac{\Pi^o_i}{\partial x^*_{ih}} > 0$ and $\frac{\partial \Pi^o_i}{\partial x^*_{ij}} = 0$, then the objective has increasing differences in $((x_{ij}, -x_{ih}), \theta)$. Therefore, $(x^*_{ij}, -x^*_{ih})$ is increasing in θ. Hence, the hegemon's solution features higher x^*_{ij} and lower x^*_{ih} than the global planner's solution.

A.3.2 Fragmentation and Welfare

We characterize how the presence of hegemonic power and anti-coercion policies affect welfare, both at the global level and from the perspective of individual countries. We compare the welfare outcomes under the noncooperative outcome and the equilibrium with a hegemon and anti-coercion policies. The following result summarizes the welfare consequences as $N \to \infty$.

Proposition 15 *Let $N \to \infty$. The noncooperative outcome without a hegemon* Pareto *dominates the outcome with optimal anti-cercion and a hegemon.*

The international fragmentation induced by each country attempting to shield its economy from hegemonic power is inefficient. In the noncooperative outcome without a hegemon, country n efficiently subsidizes its home alternative, $\tau_{n,i_n h} = -\frac{\xi_h}{1+\xi_h}$, but puts neither a tax nor a subsidy on the hegemon's financial services. Thus although the noncooperative outcome features under-utilization of the hegemon's system relative to the global planner's solution, it still features higher use compared with the fragmentation outcome.

Our results offer a stark warning for the current policy impetus of countries pursuing economic security agendas in uncoordinated fashion. As each country tries to insulate itself from hegemonic coercion, it kicks into motion a fragmentation doom loop that makes other countries want to insulate themselves even more. The global outcome is inefficient fragmentation that destroys the gains from trade.

A.3.2.1 Proof of Proposition 15

The result follows since in the fragmentation equilibrium (as compared to the cooperative equilibrium),

$$\Pi_i^o = \max_{x_{i_n h}} p_i \overline{A}_h^{\beta/\sigma} x_{i_n h}^{\xi_h \beta} x_{i_n h}^{\beta} - p_h x_{i_n h} < \max_{x_{i_n j}, x_{i_n h}} p_i \left(A_j x_{i_n j}^{\sigma} + \overline{A}_h x_{i_n h}^{\xi_h \sigma} x_{i_n h}^{\sigma} \right)^{\beta/\sigma} - p_j x_{ij} - p_h x_{ih}$$

which follows from the Inada condition.

A.3.3 International Organization with High μ

We show that if μ is high, the equilibrium reverts to fragmentation.

Corollary 1 *Let $\overline{A}_j$ be sufficiently large. Then, there are thresholds $\underline{\mu}, \overline{\mu}$ such that:*

1. *For $\mu \le \underline{\mu}$, country n's optimal policy is as in Proposition 6.*
2. *For $\mu \in (\underline{\mu}, \overline{\mu})$, country n's optimal policy is as in Proposition 5.*

A.3.3.1 Proof of Corollary 1

Define $\underline{\mu}$ as the threshold value from Proposition 6. The proof strategy is as follows. First, define $\Pi^{\text{Prop } 6}$ to be intermediary profits (excluding transfers) at the inside option under Proposition 6 and also define

$$\Pi^{o\text{Prop } 6} = \max_{x_{i_n h}^o} p_i A_h^{\beta/\sigma} x_{i_n h}^{o\beta} - p_h x_{i_n h}^o$$

to be profits at the outside option, where $A_h^{\beta/\sigma}$ is productivity in the noncooperative equilibrium.[10] Note that there are no wedges at this outside option because $\tau_{n,i_n h} = 0$ under Proposition 6. Finally, define

$$\Pi^{\text{Prop } 5} = \max_{x_{i_n h}} p_i A_h (x_{i_n h})^{\beta/\sigma} x_{i_n h}^{\beta} - p_h x_{i_n h}$$

to be profits under the fragmentation equilibrium (we have used the primal representation of this profit function to express it directly over quantities). Now, define $\underline{\mu}$ by

$$(1 - \underline{\mu}) \Pi^{\text{Prop } 6} = \Pi^{\text{Prop } 5}$$

which is the value of μ that leaves country n indifferent between the two outcomes. The proof strategy is to show that

$$\Pi^{\text{Prop } 5} > \Pi^{o\text{Prop } 6}$$

and therefore that the participation constraint of intermediaries is slack at $\mu = \underline{\mu}$, that is

$$(1 - \underline{\mu}) \Pi^{\text{Prop } 6} > \Pi^{o\text{Prop } 6}.$$

Given a slack participation constraint, then considering $\mu = \underline{\mu} + \epsilon$, if country n did not implement full fragmentation then its optimal policy would be as in Proposition 6. Hence, country n prefers full fragmentation for at least a range $\mu \in (\underline{\mu}, \overline{\mu})$.

[10] Recall that this is the outside option of an infinitessimal intermediary that rejects the hegemon's contract.

First taking the fragmentation case, optimal use of h under fragmentation is

$$x_{i_n h} = \left(\frac{p_i \overline{A}_h^{\beta/\sigma}(1+\xi_h)\beta}{p_h}\right)^{\frac{1}{1-(1+\xi_h)\beta}}$$

which yields

$$\Pi^{\text{Prop 5}} = \frac{\left(p_i \overline{A}_h^{\beta/\sigma}\right)^{\frac{1}{1-(1+\xi_h)\beta}}}{p_h^{\frac{(1+\xi_h)\beta}{1-(1+\xi_h)\beta}}}\left[\left((1+\xi_h)\beta\right)^{\frac{(1+\xi_h)\beta}{1-(1+\xi_h)\beta}} - \left((1+\xi_h)\beta\right)^{\frac{1}{1-(1+\xi_h)\beta}}\right]$$

Next, at the outside option for intermediaries, we have

$$x^o_{i_n h} = \left(\frac{p_i A_h^{\beta/\sigma}\beta}{p_h}\right)^{\frac{1}{1-\beta}}$$

and therefore

$$\Pi^{o\text{Prop 6}} = \frac{\left(p_i A_h^{\beta/\sigma}\right)^{\frac{1}{1-\beta}}}{p_h^{\frac{\beta}{1-\beta}}}\left[\left(\beta\right)^{\frac{\beta}{1-\beta}} - \left(\beta\right)^{\frac{1}{1-\beta}}\right]$$

Therefore, we have $\Pi^{\text{Prop 5}} > \Pi^{o\text{Prop 6}}$ if

$$A_h^{\frac{\beta}{\sigma(1-\beta)}} < \frac{p_h^{\frac{\beta}{1-\beta}}}{p_i^{\frac{1}{1-\beta}}} \frac{\left(p_i \overline{A}_h^{\beta/\sigma}\right)^{\frac{1}{1-(1+\xi_h)\beta}}}{p_h^{\frac{(1+\xi_h)\beta}{1-(1+\xi_h)\beta}}} \frac{\left[\left((1+\xi_h)\beta\right)^{\frac{(1+\xi_h)\beta}{1-(1+\xi_h)\beta}} - \left((1+\xi_h)\beta\right)^{\frac{1}{1-(1+\xi_h)\beta}}\right]}{\left[\left(\beta\right)^{\frac{\beta}{1-\beta}} - \left(\beta\right)^{\frac{1}{1-\beta}}\right]}$$

$$x_{i_n h}^{\xi_h \frac{\beta}{1-\beta}} \leq \frac{1}{\overline{A}_h^{\frac{\beta}{\sigma(1-\beta)}}} \frac{p_h^{\frac{\beta}{1-\beta}}}{p_i^{\frac{1}{1-\beta}}} \frac{\left(p_i \overline{A}_h^{\beta/\sigma}\right)^{\frac{1}{1-(1+\xi_h)\beta}}}{p_h^{\frac{(1+\xi_h)\beta}{1-(1+\xi_h)\beta}}} \frac{\left[\left((1+\xi_h)\beta\right)^{\frac{(1+\xi_h)\beta}{1-(1+\xi_h)\beta}} - \left((1+\xi_h)\beta\right)^{\frac{1}{1-(1+\xi_h)\beta}}\right]}{\left[\left(\beta\right)^{\frac{\beta}{1-\beta}} - \left(\beta\right)^{\frac{1}{1-\beta}}\right]}$$

which is an upper bound on use of h in the noncooperative equilibrium (note the RHS is a constant). Thus we aim to show that $x_{i_n h}$ is monotonically declining in $\overline{A}_j$ and approaches 0 as $\overline{A}_j \to \infty$.

At the noncooperative outcome, intermediary FOCs are

$$p_i\left(A_j x_{i_n j}^{\sigma} + A_h x_{i_n h}^{\sigma}\right)^{\frac{\beta}{\sigma}-1} A_j x_{i_n j}^{\sigma-1}\beta = p_j$$

$$p_i\left(A_j x_{i_n j}^{\sigma} + A_h x_{i_n h}^{\sigma}\right)^{\frac{\beta}{\sigma}-1} A_h x_{i_n h}^{\sigma-1}\beta = p_h - \frac{\xi_h}{1+\xi_h}p_h$$

which substitute in the total wedges imposed at the noncooperative outcome. As a result,

$$x_{i_n h} = x_{i_n j}\left(\frac{A_h p_h^{-1}(1+\xi_h)}{A_j p_j^{-1}}\right)^{\frac{1}{1-\sigma}}$$

Since allocations are symmetric, substituting out for productivity gives

$$x_{i_nh}^{1-\frac{\sigma}{1-\sigma}\xi_h}\left(\frac{\overline{A}_j p_j^{-1}}{\overline{A}_h p_h^{-1}(1+\xi_h)}\right)^{\frac{1}{1-\sigma}} = x_{i_nj}^{1-\frac{\sigma}{1-\sigma}\xi_j}$$

$$x_{i_nj} = x_{i_nh}^{\frac{1-\frac{\sigma}{1-\sigma}\xi_h}{1-\frac{\sigma}{1-\sigma}\xi_j}}\left(\frac{\overline{A}_j p_j^{-1}}{\overline{A}_h p_h^{-1}(1+\xi_h)}\right)^{\frac{1}{1-\sigma}\frac{1}{1-\frac{\sigma}{1-\sigma}\xi_j}}$$

Substituting back into the FOC for h,

$$\begin{aligned}\frac{1}{1+\xi_h}p_h = p_i\Bigg(&\overline{A}_j^{1+\frac{(1+\xi_j)\sigma}{1-\sigma(1+\xi_j)}}\left(x_{i_nh}^{\frac{1-\frac{\sigma}{1-\sigma}\xi_h}{1-\frac{\sigma}{1-\sigma}\xi_j}}\left(\frac{p_j^{-1}}{\overline{A}_h p_h^{-1}(1+\xi_h)}\right)^{\frac{1}{1-\sigma}\frac{1}{1-\frac{\sigma}{1-\sigma}\xi_j}}\right)^{(1+\xi_j)\sigma} x_{i_nh}^{\frac{(1+\xi_h)\sigma-1}{\beta-\sigma}\sigma}\\ &+\overline{A}_h x_{i_nh}^{(1+\xi_h)\sigma} x_{i_nh}^{\frac{(1+\xi_h)\sigma-1}{\beta-\sigma}\sigma}\Bigg)^{\frac{\beta-\sigma}{\sigma}}\overline{A}_h\beta\end{aligned}$$

which reduces to

$$\begin{aligned}\left(\frac{1}{\overline{A}_h\beta p_i}\frac{1}{1+\xi_h}p_h\right)^{\frac{\sigma}{\beta-\sigma}} =&\overline{A}_j^{\frac{1}{1-\sigma(1+\xi_j)}} x_{i_nh}^{\frac{1-\sigma(1+\xi_h)}{1-\sigma(1+\xi_j)}(1+\xi_j)\sigma+\frac{1-(1+\xi_h)\sigma}{\sigma-\beta}\sigma}\left(\left(\frac{p_j^{-1}}{\overline{A}_h p_h^{-1}(1+\xi_h)}\right)^{\frac{1}{1-\sigma}\frac{1}{1-\frac{\sigma}{1-\sigma}\xi_j}}\right)^{(1+\xi_j)\sigma}\\ &+\overline{A}_h x_{i_nh}^{(1+\xi_h)\sigma+\frac{1-(1+\xi_h)\sigma}{\sigma-\beta}\sigma}\end{aligned}$$

Note that the RHS is increasing in both $\overline{A}_j$ and x_{i_nh} (positive exponents on each). Note also that the LHS is a constant. Therefore, x_{i_nh} is decreasing in $\overline{A}_j$ and, moreover, $x_{i_nh} \to 0$ as $\overline{A}_j \to \infty$. Therefore, there is a threshold value of $\overline{A}_j$ such that $\Pi^{\text{Prop } 5} > \Pi^{o\text{Prop } 6}$, concluding the proof.

A.4 Extensions

A.4.1 Coercing Governments

We extend our framework to allow the hegemon to coerce both firms (as in the baseline model) and also governments. We assume that in the Middle, each government n can choose a diplomatic action $a_n \in \mathbb{R}$.[11] Examples of diplomatic actions include votes at the UN, diplomatic recognition of another country, positions on international issues such as human rights, and conflict. The representative consumer of country n receives separable utility $\psi_n(a)$ from the vector of diplomatic actions chosen by all countries (i.e., country n's utility can depend on other countries' diplomatic actions). The total utility of the country n representative consumer is $W(p, w_n) + u_n(z) + \psi_n(a)$.

The hegemon can attempt to influence the diplomatic action undertaken by foreign governments. In particular, simultaneously with offering contracts to foreign firms, the hegemon also offers a contract to each foreign government n. The contract the hegemon offers specifies: (i) a diplomatic action a_n^* that country n will undertake; (ii) a punishment $\mathcal{P}_n^g$ for rejecting the contract, which is a restriction that firms $i \in \mathcal{I}_n$ can only use a subset of inputs $\mathcal{J}_i^g$. We use the notation $\mathcal{J}_i^g$ to differentiate punishments associated with the government rejecting the contract, from punishments associated with an individual firm rejecting the contract. Punishments must be feasible as before.[12] Each firm and government simultaneously chooses whether to accept or reject the contract, taking

[11] It is straightforward to extend results to $a_n \in \mathcal{A}_n \subset \mathbb{R}^M$ for $M \geq 1$

[12] We could extend analysis to also allow the hegemon to cut off sales to the country n consumer, which

as given the acceptance decisions of other entities. For example, if firm $i \in \mathcal{I}_n$ accepts the contract but government n rejects the contract, the firm i avoids punishment $\mathcal{J}_i^o$ but incurs punishment $\mathcal{J}_i^g$ associated with the government's contract rejection.

Government Participation Constraint. Each government voluntarily chooses to accept or reject the hegemon's contract. If government n accepts the hegemon's contract, it receives utility $\mathcal{U}_n^* + \psi_n(a^*)$. It is important to note that the government's inside option $\mathcal{U}_n^*$ involves all of its firms accepting the hegemon's contract and, hence, being held to their outside options. If instead it rejects the contract, it instead receives utility

$$\mathcal{U}_n^o(\mathcal{P}_n^g) + \sup_{a_n} \psi_n(a_n, a_{-n}^*)$$

where $\mathcal{U}_n^o$ is the consumption and z-externality utility of its representative consumer in the equilibrium in which it incurs punishment $\mathcal{P}_n^g$. This gives rise to the government's participation constraint

$$\mathcal{U}_n^* + \psi_n(a^*) \geq \mathcal{U}_n^o(\mathcal{P}_n^g) + \sup_{a_n} \psi_n(a_n, a_{-n}^*). \tag{A.5}$$

The participation constraint compares the benefit of its firms retaining access to the hegemon's goods against the cost of having to comply with the hegemon's preferred diplomatic action. As with individual firms, the hegemon's power over government n limits the extent to which it can distort the government's diplomatic action away from that country's preferred level.

Hegemon's Optimal Wedges and Actions. Lemma 1, which proves the optimality of maximal punishments for firms that reject the hegemon's contract, follows by the same argument as before. Unlike with firms, however, the optimality of maximal punishments is not immediate for governments, since the equilibrium changes off-path in response to a punishment of a government. Instead, the optimal punishment of government n is the one that minimizes its outside option, that is

$$\mathcal{P}_n^{g*} = \arg\inf_{P_n^g} \mathcal{U}_n^o(\mathcal{P}_n^g). \tag{A.6}$$

Lemma 2, which proved the optimality of binding firm participation constraints, is not immediate in this setting. This is because transfers can affect the government participation constraint (equation A.5) if the marginal value of wealth is different across the government's inside and outside options. To simplify analysis as in the baseline model, we adopt an assumption of quasilinear utility to guarantee that the marginal value of wealth is the same across the inside and outside options. This assumption below replaces the assumption of homothetic preferences.

Assumption 1 *Each government n has quasilinear utility $U(C_n) = C_{n1} + \tilde{U}(C_{n,-1})$, where good 1 is a good not controlled by the hegemon.*

Quasilinear preferences also imply that transfers of wealth between consumers only shift consumption of good 1 across consumers, without changing other consumer expenditure patterns. This serves the same role as homothetic preferences did in the baseline model. As a consequence, Lemma 2 follows, and all firm participation constraints bind.

We are now ready to characterize the hegemon's optimal contract offered to firms and governments. As a preliminary, we denote ϕ_n to be the Lagrange multiplier on the participation constraint of government n.

increases the potential scope for punishments.

Proposition 16 *Under an optimal contract:*

1. *The hegemon imposes on a foreign firm $i \in \mathcal{C}_m$, a wedge on input j given by*

$$\tau_{m,ij} = -\frac{1}{1+\eta_i}\Bigg[\overbrace{\sum_{k\neq m}\phi_k\left(\frac{d\mathcal{U}_k^*}{dx_{ij}} - \frac{d\mathcal{U}_k^o}{dx_{ij}}\right)}^{\text{Building Power (Governments)}} + \overbrace{\sum_{k\in\mathcal{C}_m}\left(1+\eta_k\right)\left[\left(\frac{\partial\Pi_k}{\partial z} - \frac{\partial\Pi_k^o}{\partial z}\right)\frac{dz}{dx_{ij}} + \left(\frac{\partial\Pi_k}{\partial P} - \frac{\partial\Pi_k^o}{\partial P}\right)\frac{dP}{dx_{ij}}\right]}^{\text{Building Power (Firms)}}\Bigg]$$
$$-\frac{1}{1+\eta_i}\Bigg[\underbrace{X_m\frac{dP}{dx_{ij}}}_{\text{Terms-of-Trade}} + \underbrace{\left[\sum_{k\in\mathcal{I}_m}\frac{\partial\Pi_k}{\partial z} + \frac{\partial u_m}{\partial z}\right]\frac{dz}{dx_{ij}}}_{\text{Domestic } z\text{-Externalities}} + \underbrace{\sum_{k\in\mathcal{I}_m}\tau_{m,k}\frac{d\boldsymbol{x}_k}{dx_{ij}}}_{\text{Private Distortion}}\Bigg] \tag{A.7}$$

2. *The hegemon demands a diplomatic action a_n of government n given by*

$$0 = \frac{\partial\psi_m(a^*)}{\partial a_n^*} + \phi_n\frac{\partial\psi_n(a^*)}{\partial a_n^*} + \sum_{k\notin\{n,m\}}\phi_k\left(\frac{\partial\psi_k(a^*)}{\partial a_n^*} - \frac{\partial\psi_k(a_k^o, a_{-k}^*)}{\partial a_n^*}\right) \tag{A.8}$$

where a_k^o is government k's optimal action when rejecting the hegemon's contract.

The first part of Proposition 16 characterizes optimal input wedges demanded of firms by the hegemon. As in the baseline analysis, the hegemon uses wedges to build power over firms, to manipulate terms-of-trade, to correct domestic z-externalities, and to account for private distortions in the hegemon's economy. The new term in the tax formula relates to building power over foreign governments. In particular, the government internalizes how a shift in action shifts the equilibrium inside and outside options of each foreign government k. Similar to with firms, the hegemon seeks to manipulate the equilibrium in order to build its power over governments, by increasing their inside options and decreasing their outside options. The extent to which the government cares about expanding its power over government n is weighted by the Lagrange multiplier ϕ_n on that government's participation constraint, which represents the marginal value of power over that government.

The second part of Proposition 16 characterizes the optimal diplomatic action demanded of country n. The hegemon balances its own interests, the first term, against the power expended or built by asking a foreign government to change its action. As a consequence, the hegemon directly internalizes the inside option preferences of country n over the diplomatic action, weighted by the multiplier ϕ_n. Note that the absence of an effect on country n's outside option is precisely because country n is free to choose its diplomatic action at its outside option. The hegemon also internalizes the power consequences over all third party countries, and demands actions of country n that increase the inside options of other countries and decrease their outside options. In particular, the hegemon can have a stronger ability to coordinate countries onto its preferred diplomatic action if there are strategic complementarities in that action, since once a large fraction of countries are coordinated onto the action it becomes easier to ask each country to coordinate onto it.

Optimal Anti-Coercion. The following proposition characterizes optimal anti-coercion policies adopted by governments that anticipate the hegemon attempting to influence both firms and governments.

Proposition 17 *The optimal domestic policy of country n satisfies*

$$\tau_n \frac{d\boldsymbol{x}_n^o}{d\tau_n} = -\left[\sum_{i\in\mathcal{I}_n} \frac{\partial \Pi_i^o}{\partial z} + \frac{\partial u_n}{\partial z}\right]\frac{dz}{d\tau_n} - X_n^o \frac{dP}{d\tau_n} - \frac{\partial \psi_n(a^*)}{\partial a^*}\frac{da^*}{d\tau_n} \tag{A.9}$$

Paralleling Proposition 8, the government engages in anti-coercion policies to improve the outside options of its firms that contract with the hegemon and to shift the equilibrium by manipulating the wedges that the hegemon sets ex-post. In addition, the government accounts for how its anti-coercion policies shape how the hegemon influences the diplomatic actions demanded of both its own countries and also of other countries, which is the new final term in equation A.9.

Global Planner and Noncooperative. Finally, we revisit the two key benchmarks of the global planner and the noncooperative outcome.

Global Planner: For the global planner to lack a redistributive motive, given quasilinear utility the welfare weights are $\Omega_n = 1$ (utilitarian). The global planner's optimal input wedges are given by Proposition 10, while the global planner's optimal actions satisfy

$$\sum_{k=1}^{N} \frac{\partial \psi_k(a^*)}{\partial a_n} = 0.$$

The hegemon's optimal actions resemble the global planner's in the sense that the hegemon internalizes the effects of changes in actions on the inside options of governments due to their participation constraints, weighted by the multiplier ϕ_k. Unlike the hegemon, however, the global planner places no weight on reducing the outside options of governments that reject the hegemon's contract.

Noncooperative Equilibrium. In absence of hegemonic influence, each country sets its wedges according to Proposition 11. In addition, each government chooses its diplomatic action to maximize its own consumer's utility, that is

$$\frac{\partial \psi_n}{\partial a_n} = 0.$$

In comparison to the global planner, each individual country neglects the welfare consequences to other countries of its diplomatic action.

A.4.1.1 Proof of Proposition 16

Parallel to the proof of Proposition 7, the hegemon's Lagrangian is

$$\begin{aligned}
\mathcal{L}_m =& W_m\Bigg(p, \sum_{i\in\mathcal{I}_m} V_i(\mathcal{J}_i) + \sum_{f\in\mathcal{F}_m} p_f^\ell \bar{\ell}_f + \sum_{i\in C_m}\Big(\Pi_i(x_i,\ell_i,\mathcal{J}_i) - \tau_{n,i}x_i - \tau_{n,i}^\ell \ell_i + r_{n,i}^* - V_i^o(\underline{\mathcal{J}}_i)\Big)\Bigg) + u_m(z) \\
&+ \sum_{i\in\mathcal{C}_m} \eta_i \Big[\Pi_i(x_i,\ell_i,\mathcal{J}_i) - \tau_{n,i}x_i - \tau_{n,i}^\ell \ell_i + r_{n,i}^* - V_i^o(\underline{\mathcal{J}}_i)\Big] \\
&+ \sum_{n\neq m} \phi_n \Big[\mathcal{U}_n^* + \psi_n(a^*) - \mathcal{U}_n^o - \sup_{a_n} \psi_n(a_n, a_{-n}^*)\Big]
\end{aligned}$$

First for the optimal wedge, all derivations are analogous to the proof of Proposition 7 up to the new constraint. We therefore have

$$\tau_{m,ij} = -\frac{1}{1+\eta_i}\left[\sum_{k\neq m}\phi_k\left(\frac{d\mathcal{U}_k^*}{dx_{ij}} - \frac{d\mathcal{U}_k^o}{dx_{ij}}\right) + \sum_{k\in\mathcal{C}_m}\left(1+\eta_k\right)\left[\left(\frac{\partial\Pi_k}{\partial z} - \frac{\partial\Pi_k^o}{\partial z}\right)\frac{dz}{dx_{ij}} + \left(\frac{\partial\Pi_k}{\partial P} - \frac{\partial\Pi_k^o}{\partial P}\right)\frac{dP}{dx_{ij}}\right]\right]$$
$$- \frac{1}{1+\eta_i}\left[X_m\frac{dP}{dx_{ij}} + \left[\sum_{k\in\mathcal{I}_m}\frac{\partial\Pi_k}{\partial z} + \frac{\partial u_m}{\partial z}\right]\frac{dz}{dx_{ij}} + \sum_{k\in\mathcal{I}_m}\tau_{m,k}\frac{d\mathbf{x}_k}{dx_{ij}}\right]$$

where $\frac{d\mathcal{U}_k^*}{dx_{ij}}$ and $\frac{d\mathcal{U}_k^o}{dx_{ij}}$ are the corresponding total derivatives. Note that this includes derivatives in the hegemon's wedges.

Finally, taking the first order condition for the optimal action,

$$0 = \frac{\partial\psi_m(a^*)}{\partial a_n^*} + \phi_n\frac{\partial\psi_n(a^*)}{\partial a_n^*} + \sum_{k\notin\{n,m\}}\phi_k\left(\frac{\partial\psi_k(a^*)}{\partial a_n^*} - \frac{\partial\psi_k(a_k^o, a_{-k}^*)}{\partial a_n^*}\right).$$

A.4.1.2 Proof of Proposition 17

Following the proof of Proposition 8, we can write the objective of country n as

$$W_n\left(p, \sum_{i\in\mathcal{I}_n\cap\mathcal{C}_m}V_i^o(\underline{\mathcal{J}}_i) + \sum_{i\in\mathcal{I}_n\setminus\mathcal{C}_m}V_i(\mathcal{J}_i) + \sum_{f\in\mathcal{F}_m}p_f^\ell\bar{\ell}_f\right) + u_n(z) + \psi_n(a_n^*).$$

This objective is the same except for the separable term ψ_n. Therefore using the same steps as in the proof of Proposition 8, we have

$$\tau_n\frac{d\mathbf{x}_n^o}{d\tau_n} = -\left[\sum_{i\in\mathcal{I}_n}\frac{\partial\Pi_i^o}{\partial z} + \frac{\partial u_n}{\partial z}\right]\frac{dz}{d\tau_n} - X_n^o\frac{dP}{d\tau_n} - \frac{\partial\psi_n(a^*)}{\partial a^*}\frac{da^*}{d\tau_n}$$

A.4.2 Bargaining Weights and Punishment Leakage

We provide a simple extension to the general theory in which the hegemon does not have full bargaining power ex-post. We introduce a reduced-form bargaining weight $\mu\in[0,1]$ and modify the participation constraint of firm i to be

$$V_i(\Gamma_i) \geq \mu V_i^o(\mathcal{J}_i^o) + (1-\mu)V_i(\mathcal{J}_i). \tag{A.10}$$

That is, if $\mu = 1$ the hegemon has full bargaining power and can hold the firm to its outside option, while if $\mu = 0$ the firm has full bargaining power and the hegemon cannot extract any costly actions. One interpretation of equation A.10 is that $1-\mu$ is the probability of leakage of punishments, that is the possibility that the firm will be able to evade the punishment and retain access to the hegemon-controlled inputs.

From here, we can define the modified outside option as $\mathcal{V}_i^o(\mathcal{J}_i^o) = \mu V_i^o(\mathcal{J}_i^o) + (1-\mu)V_i(\mathcal{J}_i)$. Formal analysis then proceeds as before, with $\mathcal{V}_i^o$ replacing V_i^o. Given Lemmas 1 and 2, the transfer extracted is

$$T_i = V_i(\tau_m, \mathcal{J}_i) - \mathcal{V}_i^o(\underline{\mathcal{J}}_i^o).$$

As before, the hegemon has an incentive to maximize the gap between the inside option from accepting the contract and the outside option $\mathcal{V}_i^o$ that arises under the (probabilistic) punishment. The key difference from before is that the outside option $\mathcal{V}_i^o$ is a weighted average between the scenarios of punishment $V_i^o(\underline{\mathcal{J}}_i^o)$ and no punishment $V_i(\mathcal{J}_i)$. In the context of Proposition 7 (hegemon's optimal contract wedges), this means its building power motivation again orients around maximizing the inside option of firms and minimizing their outside option $\mathcal{V}_i^o$. Analogously, anti-coercion of countries revolves around maximizing their firms' outside options $\mathcal{V}_i^o$. The key difference from before is that in maximizing their outside option, country n weights both the case in which it is punished and cannot rely on the hegemon's inputs, but also (with probability $1-\mu$) the probability it retains access to the hegemon's inputs.

A.4.3 Punishments, Credibility, and Manipulating the Inside Option

We have modeled the hegemon as committing to carry out punishments against entities that reject its contract. If, in particular, an atomistic firm were to reject the contract, the hegemon would be able to carry out the punishment without incurring a loss of value because the equilibrium would not change. If we were to extend the model to a repeated game, with our baseline model being the stage game and punishments being for permanent exclusion from using hegemon-controlled inputs at all future dates, the hegemon could potentially gain credibility from the fact that it contracts with a cross-section of firms. In particular, if the hegemon were to fail to carry out a punishment against an individual entity that rejected its contract, other entities would also doubt its commitment to carry out punishments against them, limiting the hegemon's ability to extract costly actions from other entities. The hegemon would trade off the one-shot gain in value from not carrying out the punishment in the current stage game, against the loss in continuation value of its reduced power in the future. This would add an "incentive compatibility of punishments" (IC) constraint for the hegemon that would limit the costly actions it could demand. The limits to power this would imply would depend on, among other things, the number of players the hegemon contracts with. If as in the baseline model the hegemon contracts with continuums of atomistic agents, the one-shot gain would be infinitesimal while the continuation value loss would be potentially large, leading the punishment IC constraint to impose almost no limit. If instead the hegemon were to contract with a small number of large entities, the hegemon's stage game loss could potentially be large, leading to a more binding constraint.

Our baseline model has focused on the hegemon gaining power by threatening punishments that lower the outside option of entities that reject its contract. Another source of power is through increasing the inside option. The inside option can be increased, for example, if the hegemon serves as a global enforcer, coordinating joint threats for retaliation against entities that deviate on their promised economic relationships (Clayton et al. (2023)). This increases the scope for international economic activity by enhancing commitment, increasing the inside option. Following Clayton et al. (2023), we could extend our framework to accommodate joint threats as a source of power either by introducing a second period or through a repeated game, and by introducing the ability of firms to "cheat" or "steal" in their economic relationship. The key economic trade-off in our model would still revolve around the hegemon wanting to increase the inside option – of retaining access to the hegemon's commitment power – and also decreasing the outside option – of losing access to the hegemon's commitment power and, potentially, also to its inputs. Given the presence of side payments T_i as in the baseline model, the hegemon would hold firms to their participation constraints, leading countries to again maximize their outside option in which they have lost access to the hegemon's enforcement (and inputs).

A.4.4 International Organizations Transfer Rule

We study an alternative specification of the transfer rule commitment. In particular, we assume the hegemon commits to a restriction to extract only a fraction $1-\mu_i \in [0,1]$ of the gap between the inside and outside option, that is to set $T_i = (1-\mu_i)(V_i(\tau_m, \mathcal{J}_i) - V_i^o(\mathcal{J}_i))$. Economically, this restriction is similar to vesting some of the bargaining power with entities (see Appendix A.4.2), as it leaves firms with some value deriving from their inside option. The following result parallels Proposition 12 and, for simplicity, is written for interior solutions.

Proposition 18 *The hegemon's optimal choice of commitments μ_i satisfies*

$$\overbrace{\Pi_i - \Pi_i^o}^{\text{Lost Transfers}} = \overbrace{\sum_{k\in\mathcal{C}_m}(1-\mu_k)\left[\left(\frac{\partial \Pi_k}{\partial z} - \frac{\partial \Pi_k^o}{\partial z}\right)\frac{dz}{d\mu_i} + \left(\frac{d\Pi_k}{dP} - \frac{d\Pi_k^o}{dP}\right)\frac{dP}{d\mu_i} + (\tau_{m,k}+\tau_{n,k})\frac{d\boldsymbol{x}_k^*}{d\mu_i} - \tau_{n,k}\frac{d\boldsymbol{x}_k^o}{d\mu_i}\right]}^{\text{Increase in Power}}$$
$$+ \underbrace{X_m \frac{dP}{d\mu_i}}_{\text{Terms-of-Trade}} + \underbrace{\left[\sum_{k\in\mathcal{I}_m}\frac{\partial \Pi_k}{\partial z} + \frac{1}{\frac{\partial W_m}{\partial w_m}}\frac{\partial u_m}{\partial z}\right]\frac{dz}{d\mu_i}}_{\text{Domestic z-Externalities}} + \underbrace{\sum_{k\in\mathcal{I}_m}\tau_{m,k}\frac{d\boldsymbol{x}_k^*}{d\mu_i}}_{\text{Private Distortion}} \tag{A.11}$$

A.4.4.1 Proof of Proposition 18

From an ex-ante perspective, since wedges are revenue neutral we have $V_i(\tau_m, \mathcal{J}_i) = \Pi_i(\mathbf{x}_i^*)$ and $V_i^o(\underline{\mathcal{J}}_i) = \Pi_i(\mathbf{x}_i^o)$. Therefore, hegemon welfare is given by

$$\mathcal{U}_m = W(p, w_m) + u_m(z), \quad w_m = \sum_{i\in\mathcal{I}_m}\Pi_i + \sum_{f\in\mathcal{F}_m} p_f^\ell \bar{\ell}_f + \sum_{i\in\mathcal{C}_m}(1-\mu_i)\Big[\Pi_i(\mathbf{x}_i^*) - \Pi_i(\mathbf{x}_i^o)\Big].$$

Totally differentiating in μ_i, we have

$$\begin{aligned}
\frac{\partial \mathcal{U}_m}{\partial \mu_i} = \; & -\frac{\partial W}{\partial w_m}\Big[\Pi_i(\mathbf{x}_i^*) - \Pi_i(\mathbf{x}_i^o)\Big] \\
& + \frac{\partial W}{\partial w_m}\Big[\textstyle\sum_{k\in\mathcal{I}_m}\frac{\partial \Pi_k}{\partial \mathbf{x}_k^*}\frac{d\mathbf{x}_k^*}{d\mu_i} + \sum_{k\in\mathcal{C}_m}(1-\mu_k)\Big[\frac{\partial \Pi_k}{\partial \mathbf{x}_k^*}\frac{d\mathbf{x}_k^*}{d\mu_i} - \frac{\partial \Pi_k^o}{\partial \mathbf{x}_k^o}\frac{d\mathbf{x}_k^o}{d\mu_i}\Big]\Big] \\
& + \frac{\partial W}{\partial w_m}\Big[\textstyle\sum_{k\in\mathcal{I}_m}\frac{\partial \Pi_k}{\partial z} + \sum_{k\in\mathcal{C}_m}(1-\mu_k)\Big[\frac{\partial \Pi_k}{\partial z} - \frac{\partial \Pi_i^o}{\partial z}\Big]\Big]\frac{dz}{d\mu_i} + \frac{\partial u_m}{\partial z}\frac{dz}{d\mu_i} \\
& + \frac{\partial W}{\partial P}\frac{dP}{d\mu_i} + \frac{\partial W}{\partial w_m}\Big[\textstyle\sum_{k\in\mathcal{I}_m}\frac{d\Pi_k}{dP} + \sum_{f\in\mathcal{F}_m}\frac{dp_f^\ell}{dP}\bar{\ell}_f + \sum_{k\in\mathcal{C}_m}(1-\mu_k)\Big[\frac{d\Pi_k}{dP} - \frac{d\Pi_k^o}{dP}\Big]\Big]\frac{dP}{d\mu_i}
\end{aligned}$$

Using the firm FOCs $\frac{\partial \Pi_i}{\partial \mathbf{x}_i^*} = \tau_{m,i} \quad \forall i \in \mathcal{I}_m$, $\frac{\partial \Pi_i}{\partial \mathbf{x}_i^*} = \tau_{m,i} + \tau_{n,i} \quad \forall i \in \mathcal{C}_m$, and $\frac{\partial \Pi_i^o}{\partial \mathbf{x}_i^*} = \tau_{n,i} \quad \forall i \in \mathcal{C}_m$, and as usual using $\frac{\partial W}{\partial P} + \frac{\partial W}{\partial w_m}\sum_{i\in\mathcal{I}_m}\frac{d\Pi_i}{dP} + \sum_{f\in\mathcal{F}_m}\frac{dp_f^\ell}{dP}\bar{\ell}_f = \frac{\partial W}{\partial w_m}X_m$, we obtain the first order condition,

$$\begin{aligned}
\Pi_i - \Pi_i^o = & \sum_{k\in\mathcal{C}_m}(1-\mu_k)\left[\left(\frac{\partial \Pi_k}{\partial z} - \frac{\partial \Pi_k^o}{\partial z}\right)\frac{dz}{d\mu_i} + \left(\frac{d\Pi_k}{dP} - \frac{d\Pi_k^o}{dP}\right)\frac{dP}{d\mu_i} + (\tau_{m,k}+\tau_{n,k})\frac{d\mathbf{x}_k^*}{d\mu_i} - \tau_{n,k}\frac{d\mathbf{x}_k^o}{d\mu_i}\right] \\
& + X_m\frac{dP}{d\mu_i} + \left[\sum_{k\in\mathcal{I}_m}\frac{\partial \Pi_k}{\partial z} + \frac{1}{\frac{\partial W_m}{\partial w_m}}\frac{\partial u_m}{\partial z}\right]\frac{dz}{d\mu_i} + \sum_{k\in\mathcal{I}_m}\tau_{m,k}\frac{d\mathbf{x}_k^*}{d\mu_i}
\end{aligned}$$

which is the result.

A.4.5 Financial Services Application: CES Isomorphism

One interpretation of the constant expenditure of the manufacturer on financial services in Section 2.1 is that the manufacturing firm faces a working capital financing constraint that requires it to pay its workers' wages before output is produced. To make this interpretation concrete, suppose that before production occurs, the firm hires its workers and has to immediately pay their wages $p_n^\ell \ell_{d_n n}$. To pay for these wages, the firm has to take out a loan from the intermediary at an interest rate of γ. Its final payment to the intermediary is therefore $(1+\gamma)p_n^\ell \ell_{d_n n}$. The net cost to the firm of the loan is the interest payment $\gamma p_n^\ell \ell_{d_n n}$ while this interest payment is also the net revenue for the intermediary. Under this interpretation, $p_i x_{i_n d_n}$ is the interest payment made. Another interpretation, akin to a payment system, is that γ is the per-dollar fee for making a payment for inputs. Under this interpretation, to cover payments of $p_n^\ell \ell_{d_n n}$, the firm has to spend $(1+\gamma)p_n^\ell \ell_{d_n n}$, with payment $\gamma p_n^\ell \ell_{d_n n}$ going to the financial service provider. That is, $p_i x_{i_n d_n}$ is the total payment received by the intermediary for its payment services. Livdan et al. (2024) build a network model in which the payment system is used by firms to access inputs and, using Russian data, find large negative economic effects of disruptions to the system.

The constant expenditure share of our financial services application can be instead represented by a Cobb Douglas production function. In particular, suppose that the manufacturing sector instead had a production technology $f(x,\ell) = A(x_{di}^\alpha \ell_{dn}^{1-\alpha})^\beta$. Its profit function is therefore $p_d A(x_{di}^\alpha \ell_{dn}^{1-\alpha})^\beta - p_h \ell_{dn} - p_i x_{di}$. The firm's first order conditions imply $p_i x_{di} = \frac{1-\alpha}{\alpha} p_h \ell_{dn}$, meaning that expenditures on financial services are a constant fraction $\gamma = \frac{1-\alpha}{\alpha}$ of expenditures on the local factor. Given constant prices, we can substitute this solution into the profit function to obtain

$$p_d \hat{A} \ell_{dn}^\beta - (1+\gamma) p_h \ell_{dn},$$

where $\hat{A} = A\left(\frac{1-\alpha}{\alpha}\frac{p_h}{p_i}\right)^\alpha$ is the modified productivity (set equal to one for simplicity in the application).

A.4.6 Alternate Calibrations, Disaggregated Sectors, Details of Trade and Service Data

Bilateral trade data and input-output tables are routinely used in economic research but also well-known to have measurement issues. The issues revolve around the quality of the raw data (particularly for services) and the way missing information is imputed. Rather than provide a full overview of the issues since many are known in the literature, we focus here on a summary and emphasize those issues that are more likely to affect our results.

To compute our estimates of geoeconomic power in Section 4, we use several datasets. We use goods trade data from BACI, service trade data from the OECD-WTO Balanced Trade in Services (BaTIS), and domestic gross output data for all sectors from the OECD Inter Country Input Output (ICIO) tables. We investigated some of the underlying data sources that these datasets use, such as the UN Commodity Trade Statistics Database (COMTRADE), the WTO-UNCTAD-ITC Annual Trade in Services Database, as well as national sources such as the BEA for the U.S..

BACI, BaTIS, and the OECD ICIO tables have many procedures in common. For example, starting from the raw data, they fill in many of the trade observations by mirroring imports and exports. If country X does not report exporting to country Y, but country Y reports importing from country X, then this latter value is filled in (mirrored) for the export of country X.[13] This

[13]The details differ across datasets on the exact calculation and adjustments to the data performed while

mirroring procedure is common and mostly improves the coverage of the data. Beyond this and simple corrections of mistakes in the raw data, the datasets differ in how much more information they fill in and how. BACI and BaTIS perform more interpolations and checks of disaggregated versus aggregated data. BaTIS in particular reports three versions of its data: Reported Value, Balanced Value, and Final Value. The Reported Value closely follows the raw data from the underlying data sources, the Balanced Value include mirroring and other basic interpolations, the Final Value includes estimates generated by gravity models.[14] The input output tables, like ICIO, manipulate the data much further since they aim to estimate a balanced system in which every good or service produced has a corresponding use either domestically or internationally. Since the raw data are far from balanced, the production of input output tables involves multiple layers of estimation.

Given this imperfect but useful landscape of international trade data, we decided to base our benchmark estimates on datasets that include the most obvious corrections of the raw data (like mirroring, and basic error correction) but exclude model-based estimates (like those coming from a gravity model). The distinction is not always clear cut, but this is the general aim. For example, the BaTIS Balanced may use some information from BaTIS final. This led us to use BACI for goods, BaTIS Balanced Value for services, and the ICIO for the domestic absorption share. In this appendix, we show how our results change if we use different (combinations of) datasets or different data concepts within the same dataset. We considered the following combinations:

1. Benchmark estimates as in the main body of the paper, but use BaTIS Reported Value rather than Balanced Value for services (Figure A.1)

2. Use ICIO for both exports/imports and domestic data (Figure A.5)

Using BaTIS Reported Values for services in Figure A.1 leads to a substantial increase in U.S. and American Coalition power, with the increase coming from finance power. This is to be expected since in BaTIS Reported Value the U.S. accounts for a substantially higher share of foreign financial services purchased by most target countries, as it tends to be among the most frequent reporters. Indeed, Figure A.2 shows that the fraction of expenditures on foreign financial services accounted for by the U.S. is much higher in the Reported Value than in the Balanced Value version of the BaTIS data. The actual dollar value of expenditures on U.S. financial services is not much different between Balanced Value and Reported value since both essentially use the data published by the U.S. BEA. The major difference arises from the denominator in the fraction, the dollar value spent on all foreign financial services. Many countries have irregular reporting, and the BaTIS balancing procedure fills in many of these values compared to the raw reported data. Given the large increase in the U.S. controlled share of finance services in the Reported Value data, the even larger increase in estimated power is a reminder of the nonlinear nature of power. The U.S. controlled share is already high using the Balanced Value, further increases coming from using the Reported Value lead to disproportionally large increases in power.

Using ICIO for both domestic and international data in Figure A.5 leads to relatively similar results to those in the main body of the paper that use our benchmark data choices. Using only the ICIO tables has the advantage of a single dataset that is internally consistent. It has the disadvantage that the ICIO tables use many more estimation procedures to balance the data and those cannot be easily unwound or inspected since the data are provided with a single methodology, with no variations coming from different sets of assumptions.

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mirroring.

[14] See the BaTIS manual for full documentation.

Financial Services. The data on financial services and insurance are of particular interest in this paper. Conceptually, the data on financial services and insurance can be divided into two components: directly and indirectly measured. Directly measured financial services account for those services for which a fee is paid directly. For example, the fee for a payment, security transaction or custody, or the management of assets. Financial Intermediation Services Indirectly Measured (FISIM) include those services for which there is no observable fee directly associated with the service but for which a fee is nonetheless paid indirectly by adjusting other elements of the transaction. For example, opening and maintaining a bank account might have no direct fee, but a fee is nonetheless paid via a lower interest rate on deposit. To measure the value of these services indirectly, statisticians have to estimate what the interest rate would have been if no service was provided by the bank account.[15] This indirect measurement is of course fraught with difficulties, especially in the presence of risk and liquidity premia.

The statistical discussion above also brings up the economic issue of which parts of finance our paper aims to capture. Our basic focus is on financial services at the core of the international financial architecture: payment systems, security transaction and settlement, custody and management of assets, trade financing and insurance, etc. We focus on these basic services because they play a large role in geoeconomics and sanctions.[16] As explained in the paper, their basic nature means that they affect many other activities (e.g. the ability to make a payment) and have therefore large economic effects. In practice, they are also heavily controlled by the U.S.-led coalition making them a natural chokepoint for threats and sanctions. We also include insurance and pension services both because they are related to these basic services and because in some datasets only the combination of financial services and insurance and pension services is reported in an aggregate finance service category. We are not focusing on other aspects of finance, which are also interesting, like seizing assets or preventing particular investments on national security grounds (either inbound or outbound investments).

There are several basic issues with the service data. For example, they are more likely based on surveys rather than transaction data. One issue is that for many countries the data can not be disaggregated to focus on sub-components of particular interest. Second, we would ideally like to separate directly and indirectly measured services. Both because indirectly measured services are more noisily estimated and because they could capture elements of finance that are further away from the economics of this paper. While this is not possible systematically across many countries, the BEA produces detailed breakdowns for the U.S.. Table B.1 shows that for the U.S. the FISIM component is relatively small at 27bn compared to 149bn of explicitly charged financial services in 2023. The largest individual subcategories are "Financial management services," "Credit card and other credit-related services," and "Securities lending, electronic funds transfer, and other services."

We have emphasized that the U.S.-led coalition accounts for a high share of expenditures of most countries on foreign financial services. We conjecture that aggregating all financial services and insurance together understates the underlying concentration in crucial financial services like international payments. On the other hand, the presence of omitted data on financial services could skew the concentration. Two possible concerns are: (1) financial services from the China-led

[15] See the BPM6 manual and the statistical annex for a full discussion of the statistical procedures.

[16] The BPM6 manual indeed explains that: "Financial services cover financial intermediary and auxiliary services, except insurance and pension fund services. These services include those usually provided by banks and other financial corporations. They include deposit taking and lending, letters of credit, credit card services, commissions and charges related to financial leasing, factoring, underwriting, and clearing of payments. Also included are financial advisory services, custody of financial assets or bullion, financial asset management, monitoring services, liquidity provision services, risk assumption services other than insurance, merger and acquisition services, credit rating services, stock exchange services, and trust services."

coalition are systematically understated, (2) small countries do not collect the data on services.

The first concern is most pressing when looking at countries politically close to China since they could be using more financial services from China that are not currently measured. For example, there is ample anecdotal evidence of Russia relying more on China for payments since the war in Ukraine. There are good reasons to believe that these transactions are not fully accounted for in international trade datasets, in particular since both China and Russia have interest in not disclosing such sensitive data. For example, in Figure 7 we have to rely on the WTO estimates of the level and composition of financial services imports from Russia. In many cases the underlying reported data is both sparse and noisy.

The second concern was highlighted above in our discussion of BaTIS Balanced versus Reported Values and Figure A.2. In more balanced datasets (like BaTIS Balanced Values or ICIO) the expenditure shares on U.S. finance are systematically lower and many more bilateral relationships are populated with non-zero values.

Russian Financial Services Imports Data. Figure 7 plots the share of Russian financial service imports sourced from the American-led coalition over time. As discussed in the main text, the data on Russia's financial service imports are incomplete and given the war and related sanctions are particularly noisy. Figure 7 relies on interpolated and estimated data from the World Trade Organization (WTO) and Organization for Economic Cooperation and Development (OECD) Balanced Trade in Services (BaTiS) dataset.

To illustrate the issues with the data, Figure A.3 plots the time series of the American Coalition's share of Russia's financial service imports (sum of financial services and insurance) constructed from three different BaTiS methodologies, as well as the OECD Inter-Country Input-Output Tables (ICIO). The red solid line, labeled "BaTiS Balanced" replicates the figure from the main text, using the BaTiS Balanced data. This is the headline estimate of the WTO-OECD procedure, but involves both reconciling discrepancies between how much the exporting countries report selling with how much the importing country reports buying to create a balanced dataset, as well as a range of estimation procedures to fill the dataset in the event that the source country, destination country, or both do not report. The gray-dashed line labeled "BaTiS Final Exports" instead involves relying only on data from exporting countries and WTO and OECD estimations in the event of missing data. For both Balanced and Final exports, we observe a reduction in the share of Russia's imports from the American-led coalition, although each begins and ends at different levels. The green-dashed line, labeled "BaTiS Reported Imports", instead relies on data reported by Russia about what it imports, with "Reported" indicating that the WTO and OECD (mostly) do not estimate missing data. While we once again observe a drop in the American Coalition's share, the time series is far more jagged and the drop substantially larger. Finally, the the blue-solid line, labeled "ICIO", uses the input-output table form the OECD. In this case, the imports from the American coalition are only slightly declining but overall stable. Since the ICIO tables also rely on estimations and other data-filling procedures to construct a full matrix of positions, it is not clear what drives the differences between these series.

In order to better understand the differences among these data sources, we report the data underlying these time series split into subgroups. In particular, we report the value of financial service exports from the United States, European Union, other American allies (Canada, Japan, South Korea, New Zealand, Australia, United Kingdom, Switzerland, and Taiwan), global tax havens (excluding those inside the EU), China, and the Rest of the World. The American Coalition is the sum of the United States, European Union, and US Allies lines. Figure A.4 plots the decomposition of Russia's financial services imports as reported in the BaTiS Balanced, BaTiS Final Exports, BaTiS

Reported Imports, and ICIO. A few findings stand out. First, the time series country-composition for Balanced and Final are relatively similar, although the scale of the increase in tax haven provided financial services differs across the two calculations. Second, we observe that Russia's reported financial service imports lead to both very different levels and composition than do Balanced and Final. In particular, we in reported imports China is absent from the later years, and there is instead a large spike in imports coming from the Rest of the World (a category that the data source does not break down further). Finally, for ICIO, we observe a qualitatively different split than for the other sources. Putting all this evidence together, while the preferred estimates of BaTiS, as well as Final, show a change in the composition of Russia's financial service imports, even this basic finding relies on interpolation and estimation, highlighting the challenges once again in measuring cross-border financial service flows. The data suggests that it is likely that Russia has decreased its dependence for financial services on the US-led coalition, but, given the level of missing data and therefore the reliance on estimates and extrapolation, the evidence is not conclusive.

Alternative Calibration of the Elasticities. Despite being one of the most important parameters in international trade, the sector level elasticities σ_J are notoriously hard to pin down in the data and there is little consensus in the literature. Our approach is to take the estimates directly from the literature, and then show the reader how the results change with different ranges of the elasticities.

In the benchmark results of the paper, we we set the composite bundle of all goods and non-financial services elasticity to $\sigma_M = 6$ to deliver a trade elasticity of 5 as in Costinot and Rodríguez-Clare (2014) and the financial services bundle to $\sigma_F = 1.76$ following Rouzet et al. (2017). We set $\varsigma_G = \frac{\sigma_G}{2}$ for $G = M, F$ to account for the domestic variety being a relatively worse substitute for the bundle of foreign varieties than each foreign variety is with respect to other foreign varieties, as discussed in Feenstra et al. (2018).

To transparently visualize how the results change with the elasticities Figure A.6 plots the level of power and Figure A.7 the fraction of power attributable to the financial sector for the U.S., the American Coalition, China, and the Chinese Coalition. In these figures we fix the expenditure shares to be the averages of the data in 2019, and then vary the elasticities σ_M and σ_F. In particular, we calibrate the share of expenditures on financial services to be 5%, non-finance 95%, the share of spending on foreign financial services to be 15% and the share of spending on foreign non-finance to be 21%. These values corresponds to unweighted cross-country average values in 2019. For each of the four hegemonic coalitions (each panel), we calibrate the share of finance and non-finance that falls on the coalition, ω_F and ω_M to be: 5% and 15% for China, 21% and 8% for the United States, 6% and 19% for the Chinese coalition, and 71% and 41% for the American coalition. This corresponds to the unweighted cross-country average values in 2019. We vary the elasticity σ_M between 3 and 8 and the elasticity σ_F between 1.3 and 4.

Figure A.6 illustrates clearly the result that as the elasticities increase the power falls since the target country is able to substitute the inputs it has lost access to with other inputs from countries outside the hegemonic coalition that are relatively similar. Panels (a) and (b) focusing on the U.S. and American Coalition differ strikingly with Panels (c) and (d). The difference is driven by the heterogeneity in what the U.S. and China control. For the U.S., Panels (a) and (b) highlight that power increases fast as the finance elasticity lowers. The same is not true (quantitatively) for China in Panels (c) and (d) because the fraction of financial services controlled by China is so small that even a low finance elasticity does not result in much power. On the other hand, China's power increases strongly as σ_M lowers since China controls high expenditure shares in that bundle. Figure A.6 confirms these patters by displaying the fraction of overall power that arises from the finance services.

We provide two more explorations of what different elasticities would imply for the main results of the paper. Figure A.8 shows the distribution of power across target countries when the finance elasticity is lowered to 1.2. There is a substantial jump up in power, the more so for those target countries for which an hegemonic coalition has a high expenditure share. Figure A.9 shows that overall power decreases when we set ς equal to σ, that is we set the domestic variety to be as substitutable with the bundle of foreign varieties as the foreign varieties are substitutable with each other. Since in the paper we set $\varsigma = \frac{1}{2}\sigma$, setting the two elasticities to be the same disproportionally lowers the importance of sectors that have low elasticities σ, like finance, in the power calculations.

Disaggregated Sectors. In the main body of the paper we aggregated all non-finance sectors together. A more aggregated approach has the advantage of making the formulas and results easier to understand and inspect as well as rely less on noisy disaggregated data. The issues discussed above for bilateral and sector level trade and input-output data as well as the elasticity estimates are magnified by going to finer disaggregated sectors. Yet, disaggregation is important for the economics of the paper since chokepoints might occur at finer levels of disaggregation and impact the aggregates, and these chokepoints are lost to the analysis when using a coarser definition of sectors (see also Ossa (2015)).

In this appendix we begin by using the same data choices made in the paper (BACI for goods, BaTIS Balanced for services, ICIO for domestic absorption) but allow for more sectors. In particular, we used the ICIO goods sectors, and separate services into either financial services or a composite "other services." For this calculation, we used the sectoral elasticity estimates from Fontagné et al. (2022), kept the elasticity of substitution of finance to 1.76, and set the other services sector to the mean of other sectors. The results are reported in Figure A.10. While the results are broadly similar to those in the main body of the paper, the disaggregation in general increases the power coming from non-finance sectors for the U.S. and decreases it for China. The Fontagné et al. (2022) elasticities do not immediately correspond to the value of 6 set in our aggregate results, rather it turns out that China (more than the U.S.) has higher expenditure shares in sectors with relatively high elasticities.

In addition, we calculate power using the disaggregated ICIO data for both exports and domestic shares and report the results in Figure A.11. The results are again broadly similar.

A.5 Specialization meets Geoeconomics

We extend our modeling to capture specialization forces such as internal economies of scale. We focus on a simple setup that captures the core economics, in which in the Beginning each country can choose its endowment of local factors. However, the simple example highlights that its forces, such as internal economies of scale, can be flexibly represented in the general theory through expanding the elements of the vector z (Greenwald and Stiglitz (1986)).

A.5.1 A Simple Model of Specialization

We consider $N + 1$ countries, where country $m = N + 1$ is the hegemon and foreign countries $n = 1, \ldots, N$ are identical and of measure $\frac{1}{N}$. We take the large $N \to \infty$ limit. There is a homogeneous final consumption good that we take to be the numeraire.

The hegemon's country has two sectors and a single local factor. It has an intermediate goods producer j that produces out of the local factor, $f_j(\ell_{jm}) = \ell_{jm}$. It also has a final goods producer

d_m that produces the consumption good out of intermediate j, $f_{d_m}(x_{d_m j}) = x_{d_m j}$.

Each foreign country n has two local factors, which we denote respectively by ℓ_{b_n} and ℓ_{h_n}, and a final goods producer. The final goods producer in country n produces the consumption good both directly out of local factor h, but also using a Cobb-Douglas aggregator of factor b and the hegemon's intermediate good,

$$f_{d_n}(\ell_{d_n h_n}, \ell_{d_n b_n}, x_{d_n j}) = \ell_{d_n h_n} + A_d(\ell_{d_n b_n}^{\alpha} x_{d_n j}^{1-\alpha})^{\beta}.$$

We think of production using factor h as home production, and production using factor b and input j as a specialized production process.

Every country has linear utility over this final consumption good, $u(c_n) = c_n$ and $u(c_m) = c_m$. Since there is a single numeraire consumption good, each country maximizes its wealth level.

Finally, we follow Appendix A.4.1 by assuming that each country n's government has a geopolitical action $a_n \geq 0$ it can take in the Middle. We assume that country n experiences disutility over the action, $-\psi_n a_n$, while the hegemon's gets utility from country n taking the action, $\psi_m a_n$. Therefore, the total utility of the country n government is $c_n - \psi_n a_n$ while that of the hegemon is $c_m + \frac{1}{N}\sum_{n=1}^{N} \psi_m a_n$.

Pressuring Governments for Geopolitical Actions. We assume that the hegemon pressures foreign countries over the geopolitical action.[17] Given a prevailing market price p_j for the hegemon's good, the inside option of country n is therefore

$$U_n = \bar{\ell}_{h_n} + A_d(\bar{\ell}_{b_n}^{\alpha} x_{d_n j}^{*1-\alpha})^{\beta} - p_j x_{d_n j}^{*} - \psi_n a_n^{*},$$

where $x_{d_m j}^{*}$ solves the final goods producer's maximization problem. The outside option of country n is

$$U_n^o = \bar{\ell}_{h_n}$$

since its optimal geopolitical action is $a_n^o = 0$. Therefore, the participation constraint of country n specifies an upper bound on the demanded action based on its surplus from utilizing the foreign input,

$$a_n^{*} \leq \frac{1}{\psi_n}\left[A_d(\bar{\ell}_{b_n}^{\alpha} x_{d_n j}^{*1-\alpha})^{\beta} - p_j x_{d_m j}^{*}\right]. \tag{A.12}$$

Central to this setup is that the participation constraint depends on the factor endowments of country n. The endowment of the local factor h does not affect the participation constraint, since the country can engage in home production even without the hegemon's input. Conversely, a higher endowment of factor b increases the profitability of using the hegemon's input (all else equal).

Choice of Wedges and Factors in the Beginning. Country n's wedges in the Beginning are factor wedges $\tau_{n,d_n b}^{\ell}, \tau_{n,d_n h}^{\ell}$ and input wedge $\tau_{n,d_n j}$. Country m's wedges in the Beginning are a factor wedge $\tau_{m,d_m m}^{\ell}$ on its intermediate goods producer and an input wedge $\tau_{m,d_m j}$ on its final goods producer.

In addition to choosing wedges in the Beginning, we assume that the government of country n can also choose its endowment of local factors. In particular, we assume that it chooses how to

[17] For simplicity we abstract from demands for transfers and changes in economic activities or direct pressure on the final goods producer.

allocate a total endowment $\bar{\ell}$ between its two local factors,

$$\bar{\ell}_{b_n} + A_h^{-1}\bar{\ell}_{h_n} = \bar{\ell}.$$

where A_h^{-1} governs the implicit relative price of the two factors.

A.5.2 Non-Cooperative Outcome Without a Hegemon.

We begin with a standard benchmark of the noncooperative outcome in which country m is not a hegemon.

Proposition 19 *In the noncooperative equilibrium without a hegemon, country m sets its wedges so that good j commands a markup*

$$p_j = \frac{1}{(1-\alpha)\beta},$$

while all foreign countries set no wedges.

Proposition 19 yields a standard result that the large country m charges a markup $\frac{1}{(1-\alpha)\beta}$ on its good j. This standard markup results from the curvature in demand from foreign final goods producers, given the Cobb-Douglas exponent $(1-\alpha)\beta$ on use of j. In contrast to country m, all foreign countries n are small and take the global price p_j as given. As a result, they do not set any wedges. We focus on presenting the results directly in prices, for the wedges that support these outcomes see the proofs.

A.5.3 Hegemon's Optimal Coercion and Wedges

We begin by solving for both the hegemon's optimal contract and its ex-ante wedges, taking as given that other countries have adopted symmetric ex-ante wedges. The hegemon's optimal contract is trivial, since it demands the largest a_n^* so that the participation constraint binds (equation A.12 holds with equality). The following proposition characterizes how the hegemon sets wedges ex-ante as a function of the wedges that foreign countries adopted ex-ante (i.e., the hegemon's best response function).

Proposition 20 *When foreign countries' ex-ante wedges are symmetric, the hegemon's best response is to set its ex-ante wedges so that the price of good j is*

$$p_j = \frac{1}{(1-\alpha)\beta + \psi\Big(1-(1-\alpha)\beta\Big)} - \left[1 + \frac{\psi - 1}{(1-\alpha)\beta + \psi\Big(1-(1-\alpha)\beta\Big)}\right]\tau_{n,d_n j}$$

where $\psi = \frac{\psi_m}{\psi_n}$.

To build intuition, suppose that (as in the noncooperative equilibrium without a hegemon) all foreign countries set no wedges. Then, the hegemon's optimal price is

$$p_j = \frac{1}{(1-\alpha)\beta + \psi\Big(1-(1-\alpha)\beta\Big)},$$

which is lower than in the noncooperative outcome. Intuitively, the hegemon now places value on the surplus country n gets from production because it allows the hegemon to demand a larger geopolitical action from country n. This counteracts the hegemon's incentives to charge markups and results in the hegemon lowering its price. When the hegemon places more value on geopolitics than country n, that is $\psi > 1$, then $p_j < 1$ and the hegemon switches to charging markdowns. Intuitively in this case, the marginal value of power that can be used to influence the geopolitical action of country n, exceeds the marginal value of extracting economic rents, leading the hegemon to price its good below marginal cost.

If instead other countries are imposing positive wedges (i.e., taxes) on use of the hegemon's good, the hegemon alters its price depending on the value of geopolitical rents. At low values of ψ (the hegemon places relatively low value on geopolitics), the hegemon *raises* its price in response to the wedge increase, that is $\frac{\partial p_j}{\partial \tau_{n,d_n j}} > 0$. The hegemon is extracting the economic rents it can as the tax has depressed demand for its good. On the other hand, at high values of ψ the hegemon *lowers* its price in an attempt to maintain its power to extract the geopolitical action. Inded when $\psi > 1$, this effect is so strong that the total post-wedge price $p_j + \tau_{n,d_n j}$ actually *falls* with an increase in the tax (owing to the hegemon's best response).

A.5.4 Optimal Coercion and Anti-Coercion

Next, we consider the optimal policy of country n.

Proposition 21 *In a symmetric equilibrium, country n allocates all of its local factor to home production, that is $\bar{\ell}_{b_n} = 0$.*

Much like our benchmark result of full fragmentation in the basic model of Section 2, here optimal anti-coercion induces full fragmentation as country n moves away from the specialized production process that relies on the hegemon's inputs.

A.5.5 International Organizations and Hegemonic Commitment

Finally, we suppose that the hegemon commits to limit its surplus extraction to a fraction μ of the profits from using its production, so that the participation constraint becomes

$$a_n^* \leq \mu \frac{1}{\psi_n}\left[A_d(\bar{\ell}_{b_n}^{\alpha} x_{d_n j}^{*1-\alpha})^{\beta} - p_j x_{d_n j}^*\right].$$

Note that in this example because of Cobb-Douglas, this is also the gap between the profits from this mode of production between the inside and outside options. We obtain the following result.

Proposition 22 *Let $\mu < 1$. The hegemon's optimal wedges achieve a price*

$$p_j = \frac{1}{(1-\alpha)\beta + \mu\psi\Big(1-(1-\alpha)\beta\Big)}$$

Each foreign country n sets no wedges, and chooses a factor amount of b_n given by

$$\bar{\ell}_{b_n} = \Big(\alpha\beta A_d A_h^{-1}\Big)^{\frac{1-(1-\alpha)\beta}{1-\beta}} \Big(A_d(1-\alpha)\beta\Big)^{\frac{(1-\alpha)\beta}{1-\beta}} \frac{(1-\mu)^{\frac{1-(1-\alpha)\beta}{1-\beta}}}{p_j^{\frac{(1-\alpha)\beta}{1-\beta}}}$$

For $\mu < 1$, country n retains some surplus from using the hegemon's input and therefore allocates some of its factor endowment to b. As in the noncooperative outcome without a hegemon, country n sets no wedges since it cannot influence the global price p_j. On the other hand, the value of μ affects both the hegemon's markup and the factor choices of country n. First, the hegemon's markup *decreases* in its extractiveness μ. Intuitively as μ rises, the hegemon extracts more of the value of country n's specialized production in the form of geopolitical actions, which aligns the hegemon's incentives with that of country n and pushes towards a lower markup or even markdown. At the same time, there are competing effects of μ on country n's choice of $\bar{\ell}_{b_n}$. On the one hand, a higher μ directly lowers country n's willingness to allocate its factor towards specialized production, because it keeps less of the surplus from doing so. On the other hand, the falling price p_j of the hegemon's good increases the profits that country n gets from using it in production, and so motivates country n to actually increase $\bar{\ell}_{b_n}$. Which force dominates depends on the relative weight $\psi = \frac{\psi_m}{\psi_n}$ the hegemon places on geopolitical utility relative to country n (i.e., how sensitive the hegemon's price is to changes in μ).

A.5.6 Proof of Propositions 19, 20, 21, and 22

Starting in the End, market clearing for factor h requires that $p^\ell_h + \tau^\ell_{n,d_n h_n} = 1$ and market clearing for factor m requires $p^\ell_m + \tau^\ell_{m,jm} = p_j$. As a result, the hegemon's choice of wedge $\tau^\ell_{m,jm}$ implicitly determines the factor price p^ℓ_m. Finally, for $\bar{\ell}_m$ sufficiently large so that the final goods producer in country m is marginal in the market for j, market clearing for j requires that $p_j + \tau_{m,d_m j} = 1$. As a result, the hegemon's wedges determine the market price p_j, which we henceforth will take directly as the hegemon's choice variable.

Given $p^\ell_h + \tau^\ell_{n,d_n h_n} = 1$, market clearing pins down demand $\ell_{d_n h_n} = \bar{\ell}_{h_n}$. The demand of the final goods producer in country n for factor b_n and intermediate good j solves

$$\max A_d(\ell^\alpha_{d_n b_n} x^{1-\alpha}_{d_n j})^\beta - (p_j + \tau_{n,d_n j})x_{d_n j} - (p^\ell_{a_n} + \tau^\ell_{n,d_n b_n})\ell_{d_n b_n}.$$

Given Cobb-Douglas, we have FOCs

$$A_d \ell^{\alpha\beta}_{d_n b_n} x^{(1-\alpha)\beta-1}_{d_n j}(1-\alpha)\beta = p_j + \tau_{n,d_n j}$$

$$A_d \ell^{\alpha\beta-1}_{d_n b_n} x^{(1-\alpha)\beta}_{d_n j}\alpha\beta = p^\ell_{b_n} + \tau^\ell_{n,d_n b_n}$$

By market clearing, we have $\ell_{d_n b_n} = \bar{\ell}_{b_n}$. Thus the second equation becomes an implementability condition that pins down $\tau^\ell_{n,d_n b_n}$, while the first equation pins down demand for j. This allows us to adopt a familiar primal representation in the Beginning whereby country n directly selects $x^*_{d_n j}$, taking p_j as given, with the above formula decentralizing the required wedge. In particular, note that demand is given by

$$x^*_{d_n j} = \left(\frac{A_d \bar{\ell}^{\alpha\beta}_{b_n}(1-\alpha)\beta}{p_j + \tau_{n,d_n j}}\right)^{\frac{1}{1-(1-\alpha)\beta}}.$$

Equilibrium without a Hegemon. If country m is not a hegemon, then in a symmetric equilibrium it solves (using the demand from above)

$$\max_{p_j}(p_j - 1)x^*_{d_n j} \quad s.t. \quad x^*_{d_n j} = \left(\frac{A_d \bar{\ell}^{\alpha\beta}_{b_n}(1-\alpha)\beta}{p_j + \tau_{n,d_n j}}\right)^{\frac{1}{1-(1-\alpha)\beta}}$$

where it takes wedges of foreign countries as given. Therefore, we have a familiar FOC

$$p_j + \tau_{n,d_nj} - (p_j - 1)\frac{1}{1-(1-\alpha)\beta} = 0$$

which yields optimal price of

$$p_j = \frac{1}{(1-\alpha)\beta} + \frac{1-(1-\alpha)\beta}{(1-\alpha)\beta}\tau_{n,d_nj}.$$

Next, country n maximizes its inside option by setting $a_n^* = 0$ and by solving

$$\max_{x^*_{d_nj}} A_d(\bar{\ell}^{\alpha}_{b_n} x^{*1-\alpha}_{d_nj})^{\beta} - p_j x^*_{d_nj}$$

which yields FOC

$$A_d \bar{\ell}^{\alpha\beta}_{b_n} x^{*(1-\alpha)\beta-1}_{d_nj}(1-\alpha)\beta = p_j x^*_{d_nj}$$

and therefore $\tau_{n,d_nj} = 0$. Thus we recover the simple outcome where country j charges a markup on its marginal cost, $p_j = \frac{1}{(1-\alpha)\beta}$. This proves Proposition 19.

Equilibrium with a Hegemon. Next, consider the equilibrium in which country m is a hegemon. The hegemon's optimal contract in the Middle is to set

$$a_n^* = \frac{1}{\psi_n}\left[A_d(\bar{\ell}^{\alpha}_{b_n} x^{*1-\alpha}_{d_nj})^{\beta} - p_j x^*_{d_nj}\right].$$

Now, consider the hegemon's best response in the Beginning. In a symmetric equilibrium, the hegemon solves

$$\max_{p_j} (p_j - 1)x_{d_nj} + \psi_m a_n^*$$

The hegemon's FOC is

$$0 = x^*_{d_nj} + (p_j - 1)\frac{\partial x^*_{d_nj}}{\partial p_j} + \psi_m \frac{da_n^*}{dp_j}.$$

Using the firm's FOCs, we have

$$\frac{da_n^*}{dp_j} = \frac{1}{\psi_n}\tau_{n,d_nj}\frac{\partial x^*_{d_nj}}{\partial p_j} - \frac{1}{\psi_n}x^*_{d_mj}$$

and so we get

$$0 = x^*_{d_nj}\left(1 - \frac{\psi_m}{\psi_n}\right) + \left[p_j - 1 + \frac{\psi_m}{\psi_n}\tau_{n,d_nj}\right]\frac{\partial x^*_{d_nj}}{\partial p_j}$$

$$0 = \left(p_j + \tau_{n,d_nj}\right)\left(1 - \frac{\psi_m}{\psi_n}\right) - \left[p_j - 1 + \frac{\psi_m}{\psi_n}\tau_{n,d_nj}\right]\frac{1}{1-(1-\alpha)\beta}$$

which yields

$$p_j = \frac{1}{(1-\alpha)\beta + \psi\Big(1-(1-\alpha)\beta\Big)} + \frac{1-(1-\alpha)\beta - \psi\Big(2-(1-\alpha)\beta\Big)}{(1-\alpha)\beta + \psi\Big(1-(1-\alpha)\beta\Big)}\tau_{n,d_nj}$$

where $\psi \equiv \frac{\psi_m}{\psi_n}$. This proves Proposition 20.

Finally, consider country m that maximizes its outside option, $U_n^o = \bar{\ell}_{h_n}$. Clearly, the optimization of country n in the Beginning is to set $\bar{\ell}_{b_n} = 0$, that is country n allocates all of its factors towards pure home production. Thus we have full fragmentation (the equilibrium wedges are therefore indeterminate), proving Proposition 21.

Equilibrium with Limited Extraction. Finally, suppose that the hegemon commits to limit its extraction to a fraction of profits from production using j, that is to

$$a_n^* = \mu \frac{1}{\psi_n}\left[A_d(\bar{\ell}_{b_n}^{\alpha} x_{d_n j}^{*1-\alpha})^{\beta} - p_j x_{d_n j}^*\right].$$

The participation constraint ex post is always satisfied, so the key impact is on the factor allocations and wedges ex ante. The objective of country n is therefore

$$\mathcal{U}_n = \bar{\ell}_{h_n} + (1-\mu)\left(A_d(\bar{\ell}_{b_n}^{\alpha} x_{d_n j}^{*1-\alpha})^{\beta} - p_j x_{d_n j}^*\right)$$

Taking as given p_j, we have $\tau_{n,d_n j} = 0$. The hegemon's optimal p_j solves

$$\max_{p_j} \; (p_j - 1)x_{d_n j} + \psi_m a_n^*$$

but now with a_n^* downweighted by a factor μ. Since $\tau_{n,d_n j} = 0$, we therefore have

$$p_j = \frac{1}{(1-\alpha)\beta + \mu\psi\left(1-(1-\alpha)\beta\right)}.$$

By Envelope Theorem, the factor endowment therefore solves

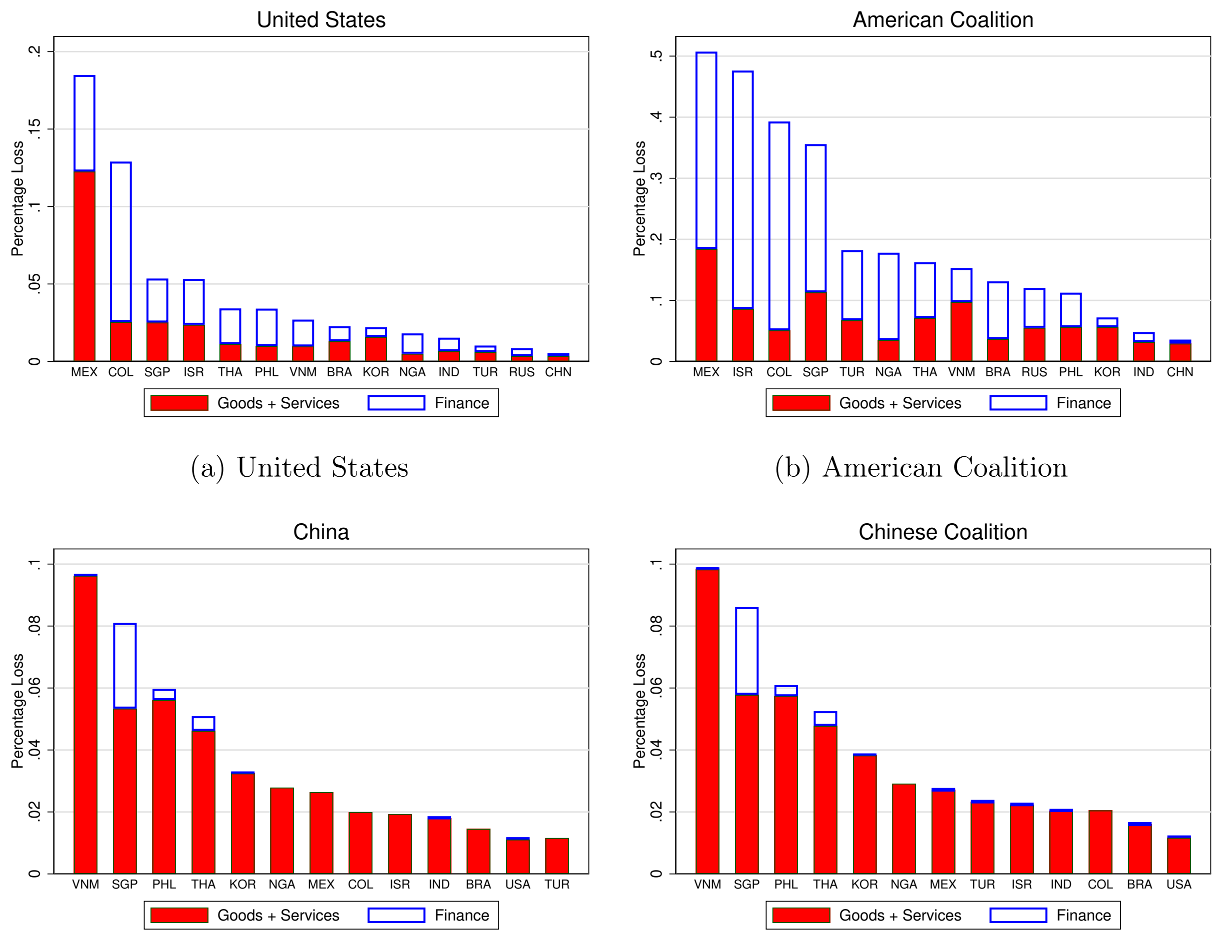
$$0 = -A_h + (1-\mu)\alpha\beta A_d \bar{\ell}_{b_n}^{\alpha\beta-1} x_{d_n j}^{*(1-\alpha)\beta}$$

which substituting in for $x_{d_n j}^*$ yields

$$\bar{\ell}_{a_n} = \left((1-\mu)\alpha\beta A_d A_h^{-1}\right)^{\frac{1-(1-\alpha)\beta}{1-\beta}} \left(\frac{A_d(1-\alpha)\beta}{p_j}\right)^{\frac{(1-\alpha)\beta}{1-\beta}}.$$

This proves Proposition 22.

Figure A.1: **USA and China Geoeconomic Power, BaTIS Reported Value Data**



(a) United States

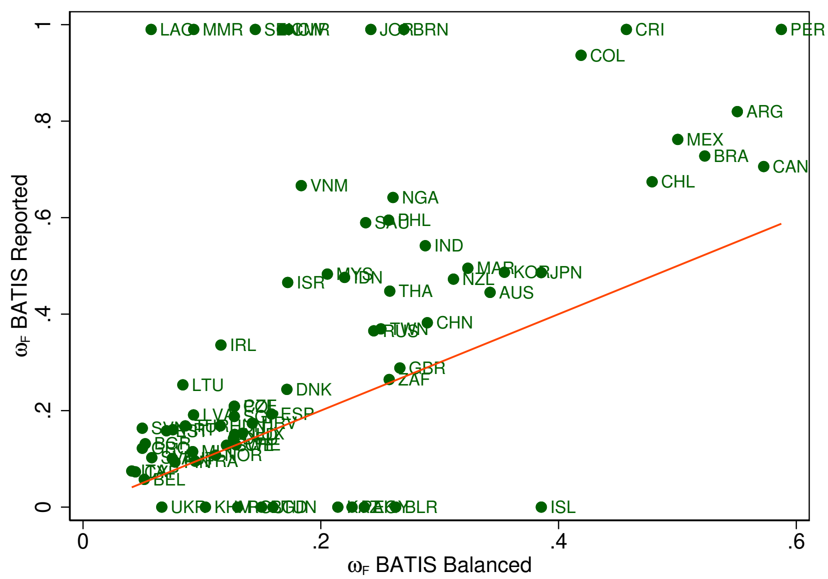
(b) American Coalition

(c) China

(d) Chinese Coalition

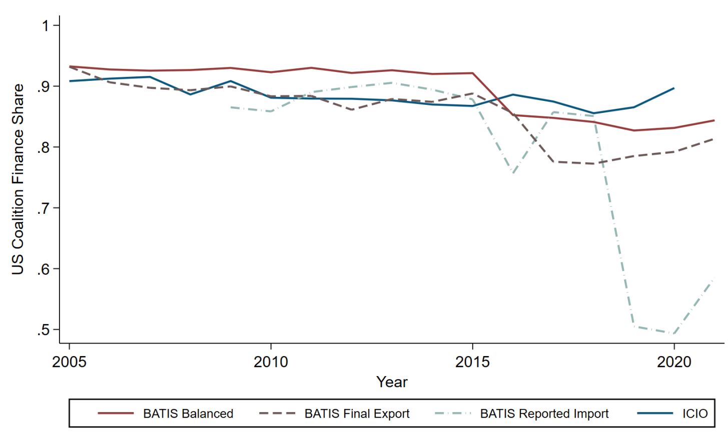
Notes: This figure plots estimates of power as in equation (22) using the BaTIS Reported Value (rather than Balanced Value) data. The vertical axis measures in percentage (log) points the economic loss to the country on the corresponding bar of the horizontal axis. The solid red bar is the loss arising from withholding all goods trade and non-finance services. The hollow blue bar is the loss arising from withholding financial services. The hegemon coalition making the threat is the (a) USA, (b) American Coalition, (c) China, (d) Chinese Coalition.

Figure A.2: U.S. Share of Foreign Expenditures on Finance Services, BaTIS Reported and Balanced Values



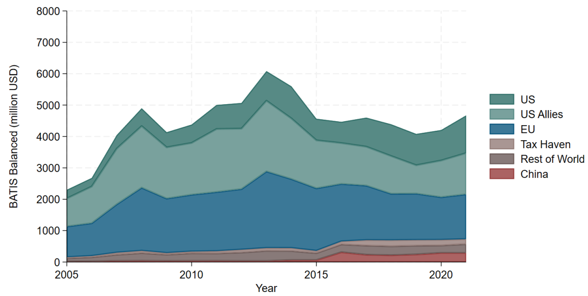
Notes: Figure plots the U.S. share of expenditure on foreign finance services for a number of countries, using the Reported and Balanced Values in the BaTIS data in 2019.

Figure A.3: US Coalition's Share of Russian Financial Services Imports

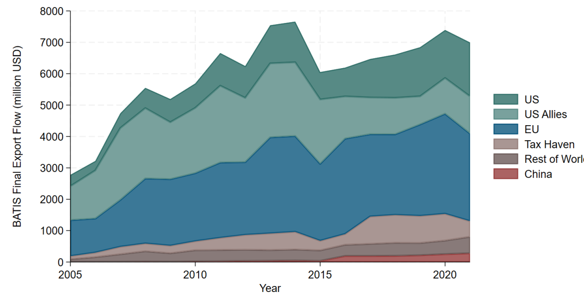


Notes: Figure plots the time series of the American Coalition's share of Russia's financial service imports constructed from three different BaTiS methodologies (Balanced, Final, Reported) and the OECD ICIO Tables. The vertical axis measures the share of Russian financial service imports sourced from the American Coalition. The solid red line is the share computed with BaTiS Balanced (Exports) of American Coalition financial services to Russia. The dashed brown line is the share computed with BaTiS Final Exports of American Coalition financial services to Russia. The dash-dotted light-blue line is the share computed with BaTiS Reported Russian Imports of financial services from the American Coalition. The solid blue line is the share computed with ICIO American Coalition financial services Exports to Russia.

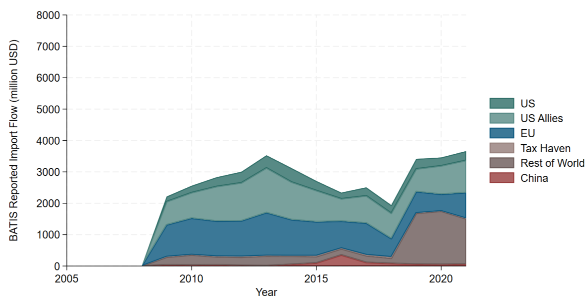
Figure A.4: Decomposition of Russia's Financial Services Imports



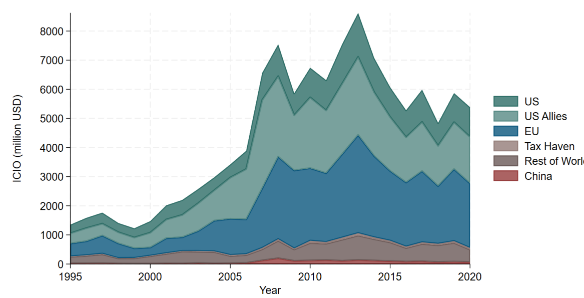
(a) BaTiS Balanced



(b) BaTiS Final Exports



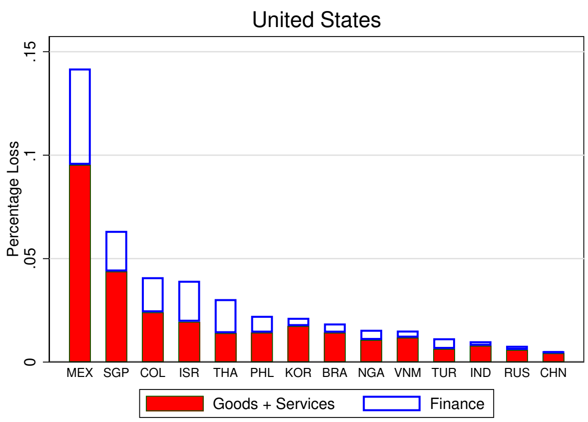
(c) BaTiS Reported Imports



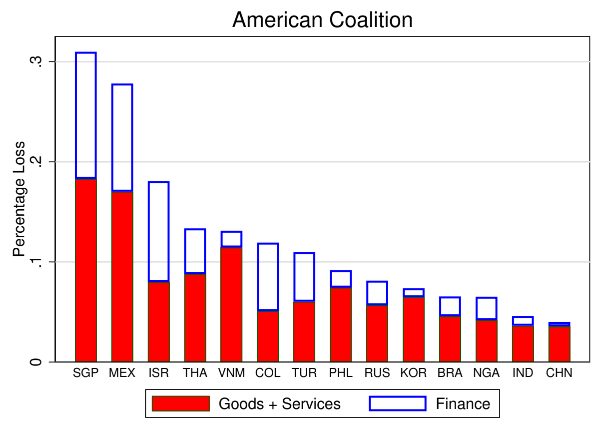
(d) ICIO

Notes: Figure plots the decomposition of Russia's financial services imports as reported in the BaTiS Balanced (Exports), BaTiS Final Exports, BaTiS Reported Imports, and ICIO. The vertical axis measures the level of either Russian imports of financial services from the American Coalition or of exports of financial services from the American Coalition to Russia. Levels are expressed in million USD. US Allies includes: Canada, Japan, South Korea, New Zealand, Australia, United Kingdom, Switzerland. Tax Haven excludes those inside the EU, and more precisely includes: Aruba, Anguilla, Andorra, Netherlands Antilles, Antigua and Barbuda, Bahrain, Bahamas, Belize, Bermuda, Barbados, Cook Islands, Costa Rica, Curaçao, Cayman Islands, Djibouti, Dominica, Federated States of Micronesia, Guernsey, Gibraltar, Grenada, Isle of Man, Jersey, Jordan, Saint Kitts and Nevis, Lebanon, Liberia, Saint Lucia, Liechtenstein, Saint Martin (French part), Monaco, Maldives, Marshall Islands, Montserrat, Mauritius, Niue, Nauru, Panama, San Marino, Seychelles, Turks and Caicos Islands, Tonga, Saint Vincent and the Grenadines, British Virgin Islands, Vanuatu, Samoa, Singapore. China includes also Hong Kong and Macau, consistently with the rest of the paper. The American Coalition is the sum of the United States, European Union, and US Allies areas.

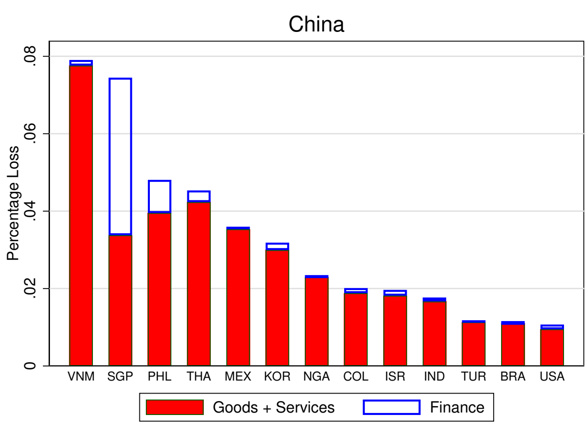
Figure A.5: **USA and China Geoeconomic Power, ICIO**



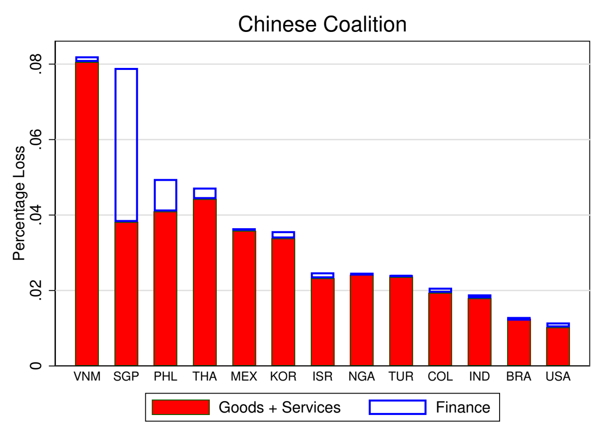
(a) United States



(b) American Coalition



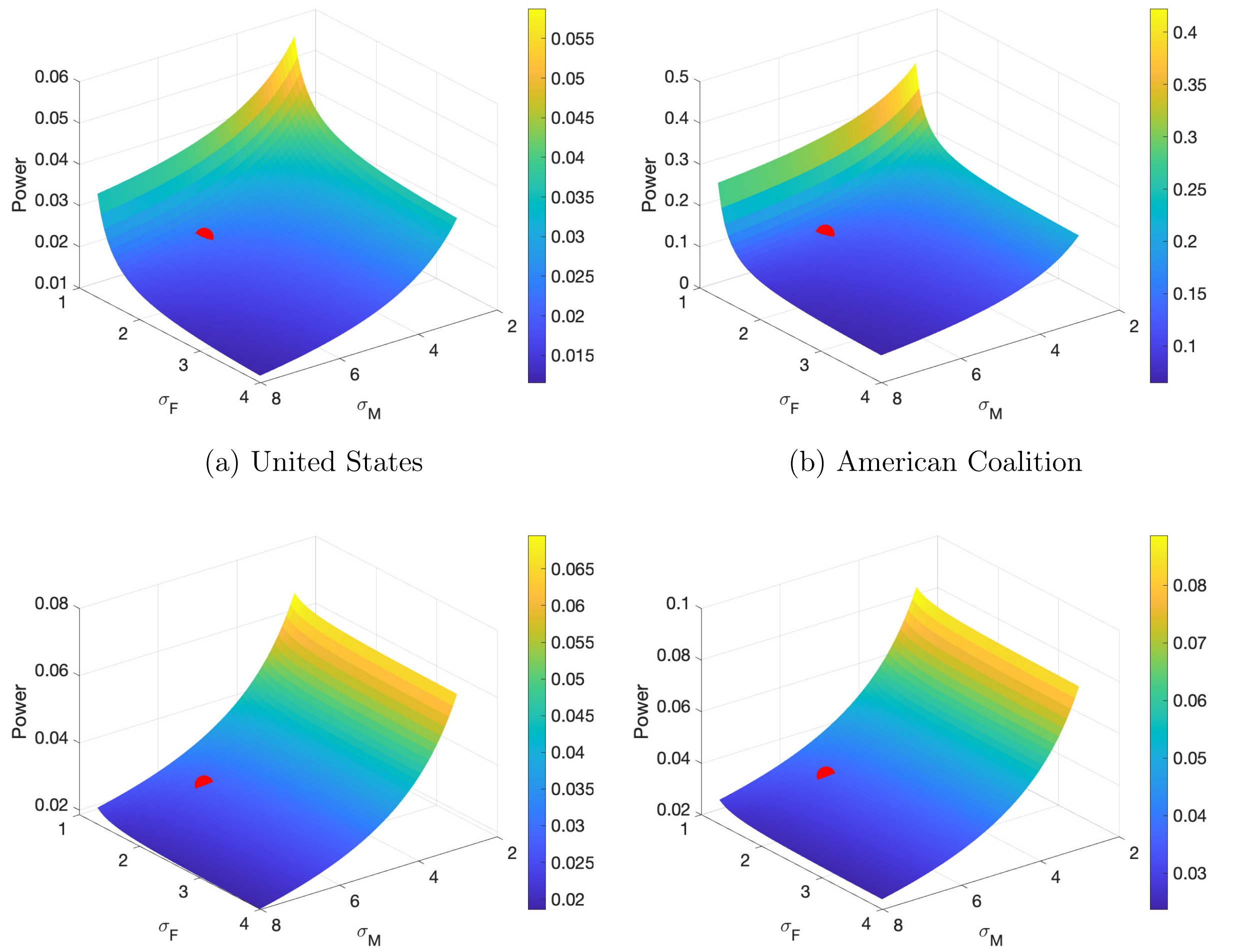
(c) China



(d) Chinese Coalition

Notes: This figure plots estimates of the power as in equation (22) using export data from ICIO instead of BaTIS. The vertical axis measures in percentage (log) points the economic loss to the country on the corresponding bar of the horizontal axis. The solid red bar is the loss arising from withholding all goods trade and non-finance services. The hollow blue bar is the loss arising from withholding financial services. The hegemon coalition making the threat is the (a) USA, (b) American Coalition, (c) China, (d) Chinese Coalition.

Figure A.6: **Power and The Elasticity of Substitution**



(a) United States

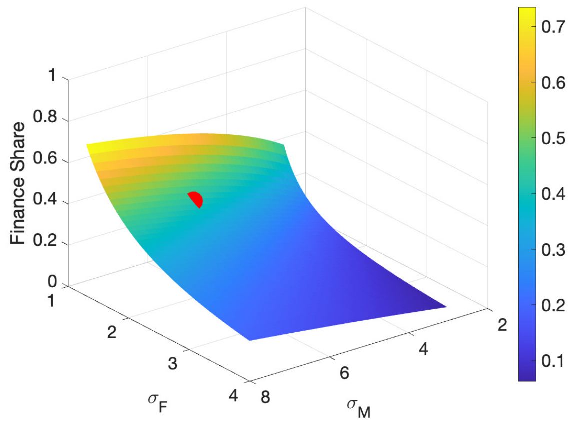
(b) American Coalition

(c) China

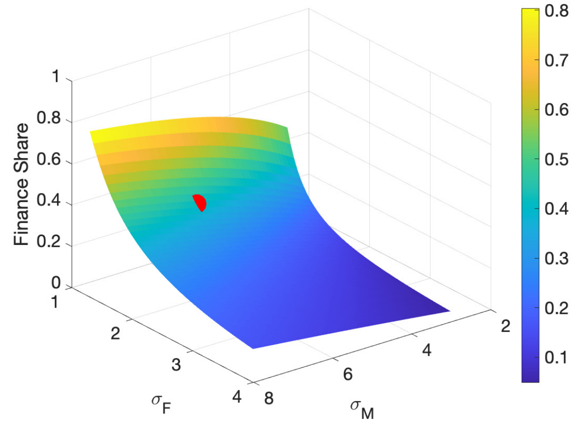
(d) Chinese Coalition

Notes: This figure plots levels of power as in equation (22) for different levels of the the elasticity of substitution of financial services (σ_F) and nonfinance (σ_M). The hegemon coalition making the threat is the (a) USA, (b) American Coalition, (c) China, (d) Chinese Coalition. The red dot corresponds to our basline calibration with $\sigma_F = 1.76$ and $\sigma_M = 6$. We calibrate the share of spending on financial servies to be 5%, nonfinance 95%, the share of foreign spending on financial services to be 15% and the share of foreign spending on nonfinance to be 21%. This corresponds to an unweighted cross-country average in 2019. For each of the four hegemon coalitions, we calibrate the share of finance and nonfinance they control, ω_F and ω_M, to the be the unweighted cross-country average in 2019.

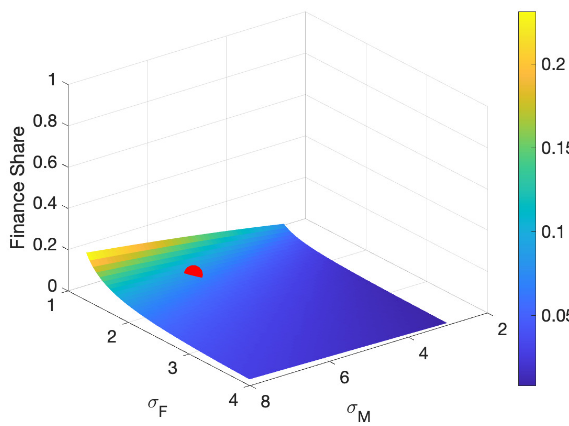
Figure A.7: **The Share of Financial Power and the Elasticities of Substitution**



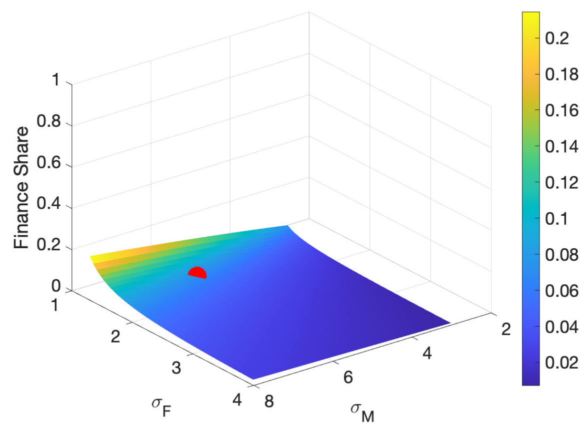
(a) United States



(b) American Coalition



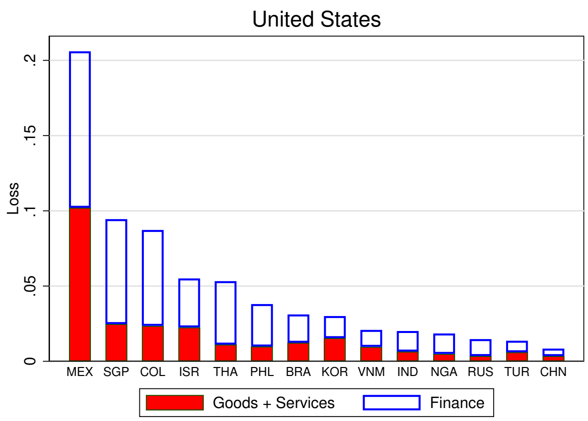
(c) China



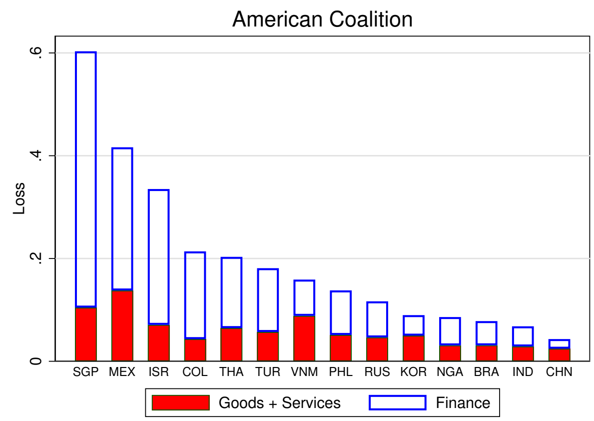
(d) Chinese Coalition

Notes: This figure plots the share of hegemonic power coming from finance. The hegemon coalition making the threat is the (a) USA, (b) American Coalition, (c) China, (d) Chinese Coalition. The red dot corresponds to our basline calibration with $\sigma_F = 1.76$ and $\sigma_M = 6$. We calibrate the share of spending on financial servies to be 5%, nonfinance 95%, the share of foreign spending on financial services to be 15% and the share of foreign spending on nonfinance to be 21%. This corresponds to an unweighted cross-country average in 2019. For each of the four hegemon coalitions, we calibrate the share of finance and nonfinance they control, ω_F and ω_M, to the be the unweighted cross-country average in 2019.

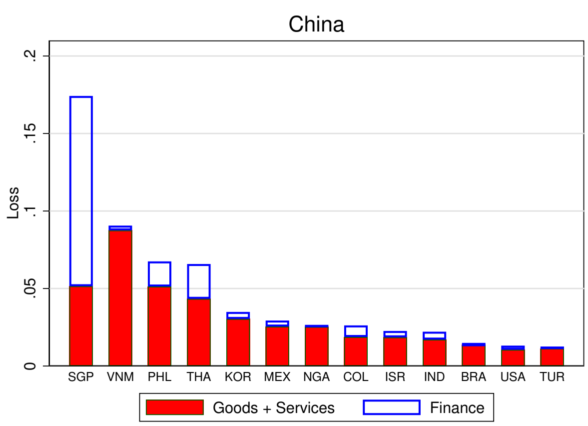
Figure A.8: **Geoeconomic Power, Alternative Finance Calibration, 2019**



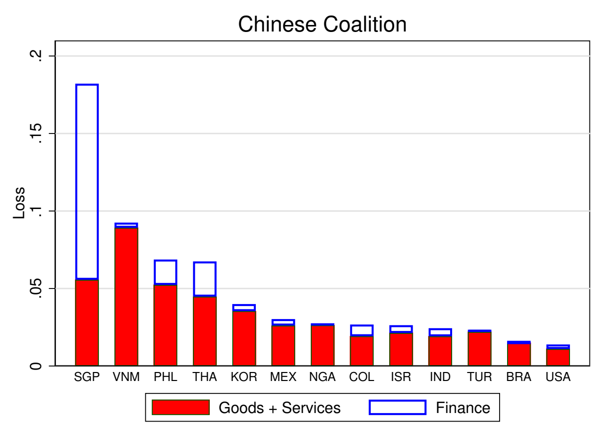
(a) United States



(b) West Coalition



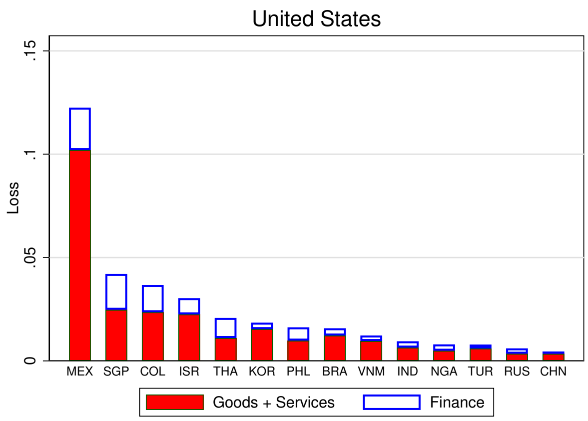
(c) China



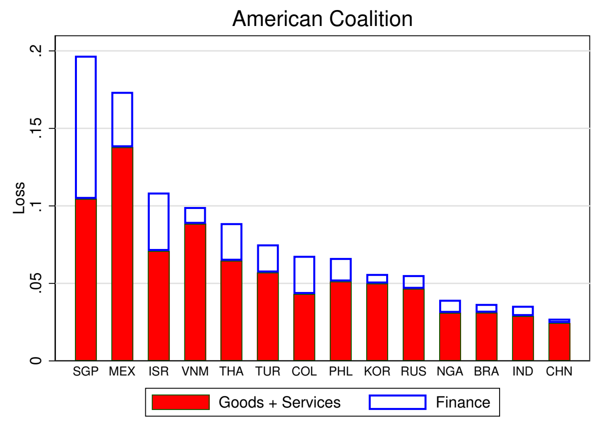
(d) East Coalition

Notes: The figure plots estimates of power as in equation (22). The vertical axis measures in percentage (log) points the economic loss to the country on the corresponding bar of the horizontal axis. The solid red bar is the loss arising from withholding all goods trade and non-finance services. The hollow blue bar is the loss arising from withholding financial services. The hegemon coalition making the threat is the (a) USA, (b) West Coalition, (c) China, (d) East Coalition. In this calibration, we follow the Koijen and Yogo (2020) of a demand elasticities of 1.2 (for equities) to calibrate the elasticity of substitution of financial services. In addition, we assume that foreign and home financial services are Cobb-Douglas with $\varsigma_F = 1$. Finally, we set $\varsigma_M = 6$.

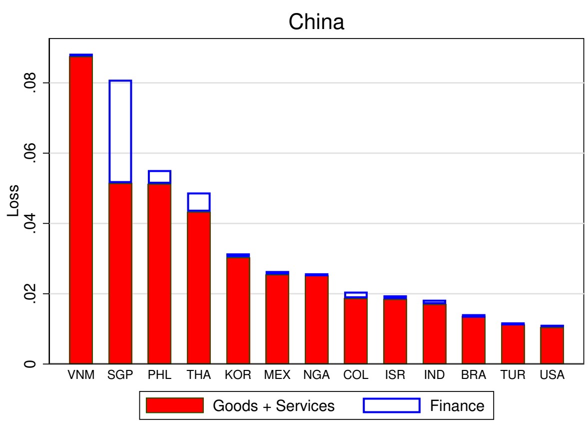
Figure A.9: **Geoeconomic Power, $\varsigma = \sigma$, 2019**



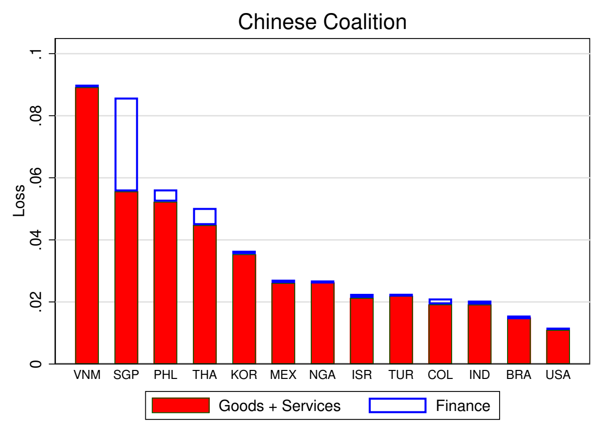
(a) United States



(b) West Coalition



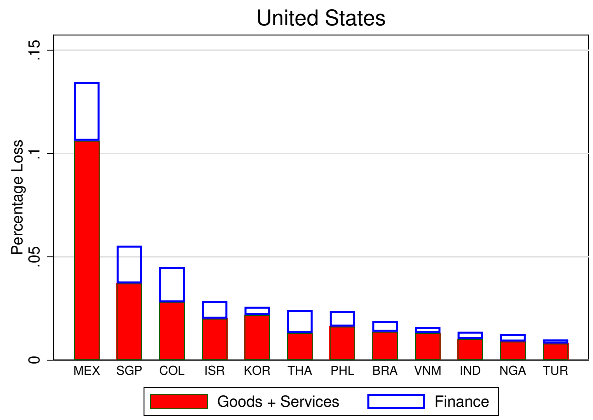
(c) China



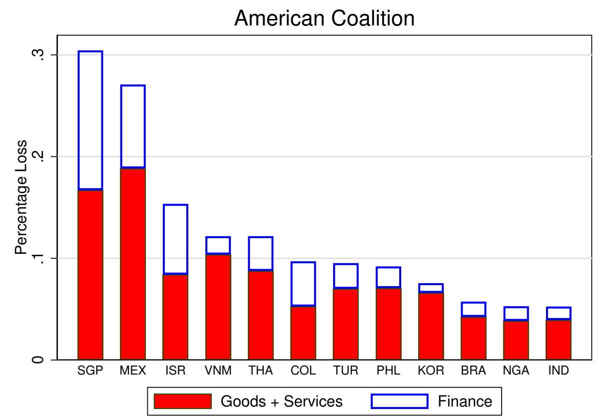
(d) East Coalition

Notes: The figure plots estimates of power as in equation (22). The vertical axis measures in percentage (log) points the economic loss to the country on the corresponding bar of the horizontal axis. The solid red bar is the loss arising from withholding all goods trade and non-finance services. The hollow blue bar is the loss arising from withholding financial services. The hegemon coalition making the threat is the (a) USA, (b) West Coalition, (c) China, (d) East Coalition. In this calibration, we set $\varsigma_f = \sigma_f = 1.76$ and $\varsigma_m = \sigma_m = 6$.

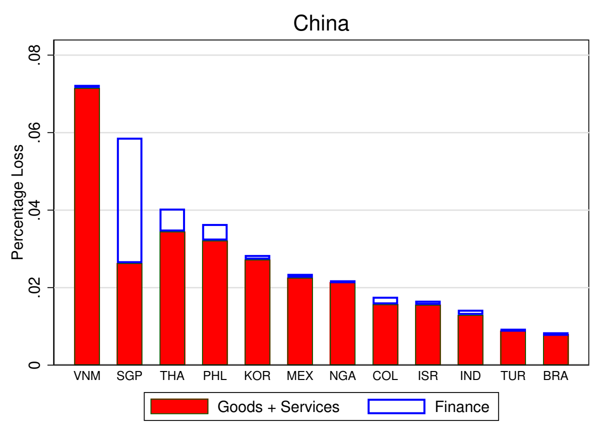
Figure A.10: **USA and China Geoeconomic Power, BACI/BATIS and ICIO Sectoral**



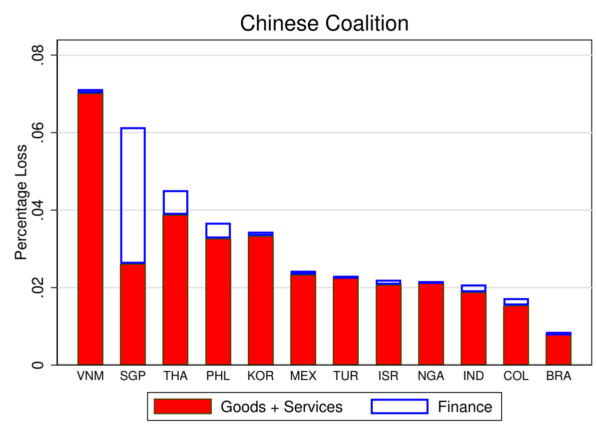
(a) United States



(b) American Coalition



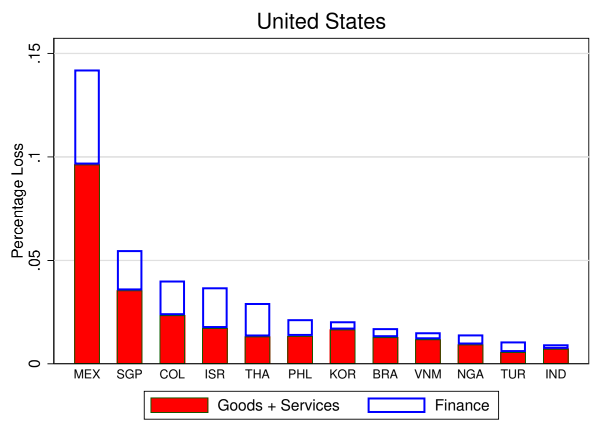
(c) China



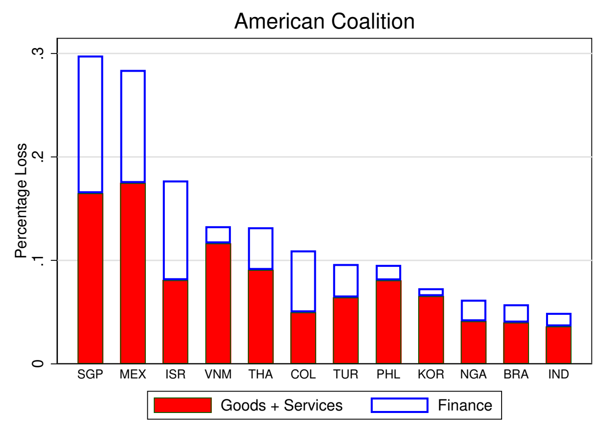
(d) Chinese Coalition

Notes: This figure plots estimates of power as in equation (21) using service trade data from BATIS and goods trade data from BACI. The vertical axis measures in percentage (log) points the economic loss to the country on the corresponding bar of the horizontal axis. The solid red bar is the loss arising from withholding all goods trade and non-finance services. The hollow blue bar is the loss arising from withholding financial services. The hegemon coalition making the threat is the (a) USA, (b) American Coalition, (c) China, (d) Chinese Coalition. This figure considers a disaggregated version Calibrated multi-sector version using BACI and BATIS data for exports and ICIO for domestic shares. Elasticities of substitution from Fontagné et al. (2022), $\rho_M = 3, \varsigma = (1/2)\sigma, \varrho = 1$.

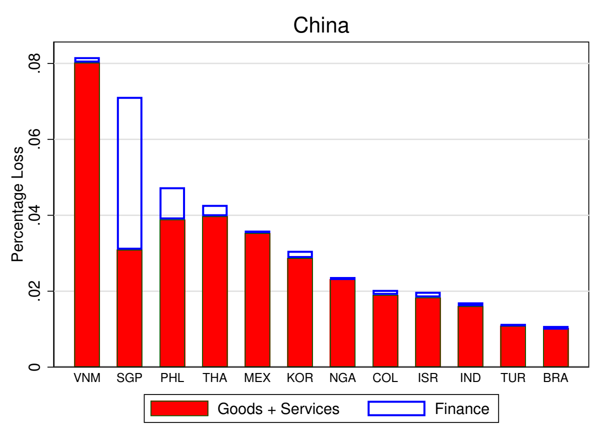
Figure A.11: **USA and China Geoeconomic Power, ICIO Sectoral**



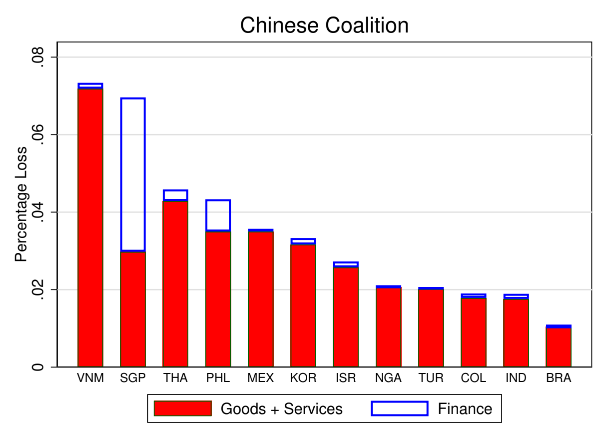
(a) United States



(b) American Coalition



(c) China



(d) Chinese Coalition

Notes: This figure plots estimates of power as in equation (21) using trade data and domestic production data from OECD ICIO. The vertical axis measures in percentage (log) points the economic loss to the country on the corresponding bar of the horizontal axis. The solid red bar is the loss arising from withholding all goods trade and non-finance services. The hollow blue bar is the loss arising from withholding financial services. The hegemon coalition making the threat is the (a) USA, (b) American Coalition, (c) China, (d) Chinese Coalition. This figure considers a disaggregated version Calibrated multi-sector version using BACI and BATIS data for exports and ICIO for domestic shares. Elasticities of substitution from Fontagné et al. (2022), $\rho_M = 3, \varsigma = (1/2)\sigma, \varrho = 1$.

Table B.1: U.S. Financial and Insurance Services Export Overview

	2020	2021	2022	2023
Insurance services	20	23	24	25
Direct insurance	2	2	2	3
Reinsurance	16	18	19	19
Auxiliary insurance services	2	3	3	3
Financial services	151	172	167	175
Explicitly charged and other financial services	132	153	145	149
Brokerage and market-making services	11	12	10	10
Underwriting and private placement services	4	5	2	2
Credit card and other credit-related services	24	29	33	38
Financial management services	61	69	65	62
Financial advisory and custody services	8	10	7	7
Securities lending, electronic funds transfer, and other services	24	28	28	29
Financial intermediation services indirectly measured	19	19	23	27

Notes: The table reports data for Insurance services and Financial Services from the BEA Table 2.1. U.S. Trade in Services, by Type of Service. Values are in billions of U.S. dollars.