The Great Game: A Model of Geoeconomic Competition

Christopher Clayton* Matteo Maggiori† Jesse Schreger‡

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Abstract

We build a model of two hegemons that have valuable trading relationships with each other and at the same time compete in exerting geoeconomic power over countries in the rest of the world. When the hegemons trade with each other their optimal policy is shaped both by classic economic considerations - the profitability of that specific trade - and by geoeconomic competition - how the trade affects the power of each hegemon vis-a-vis the rest of the world. We show that containment, a policy mix in which an hegemon attempts to limits sales of its inputs to the rival hegemon and uses its power to demand that the rest of the world shifts away from sourcing from the rival hegemon, arises when the two hegemons offer relatively substitutable exports since a stronger rival would offer a better outside option to the targeted countries. Accommodation between the hegemons, instead, occurs when power motives are small and the two hegemons focus on purely economic profit motives. We characterize how the rest of the countries welfare depends on the contain/accommodate regime of the hegemons.

Keywords: Great Power Rivalry, World Order, Economic Statecraft, Geopolitics, Export Controls, Sanctions, Tariffs, Industrial Policy.

JEL Codes: F10, F30, F40, F50, L10, N40, P45.

*Yale School of Management and NBER; christopher.clayton@yale.edu.

†Stanford University Graduate School of Business, NBER, and CEPR; maggiori@stanford.edu.

‡Columbia Business School, NBER, and CEPR; jesse.schreger@columbia.edu.

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1 Introduction

The global economy is characterized by two large hegemonic countries, the U.S. and China, that have valuable economic relationships with each other but also compete in exerting power over the rest of the world. This form of interdependent geoeconomic competition employs many of traditional policy instruments – such as tariffs, industrial policy, and export controls – as well as economic threats, but has different underlying motivations for the use of these instruments than those in classic economic analysis. We provide a model to analyze optimal policy between two competing hegemons that attempt to accommodate or contain each other, and characterize the welfare implications for the hegemons as well as the rest of the world.

In this paper we show that when the two hegemons trade with each other, optimal policy is shaped both by economic motives – the profitability of that particular trade – and geoeconomic ones – how that trade affects the power of each hegemon vis-a-vis the rest of the world. For example, the U.S. faces two separate motives when it considers selling advanced semiconductors to Chinese industries. First, selling the semiconductors to China directly generates profits for the U.S. semiconductor industry and might also help that industry scale up and become more productive. Second, the semiconductors acquired from the U.S. are used by Chinese firms to produce other products, such as artificial intelligence, that are then sold worldwide in competition with U.S. firms. Since countries like the U.S. and China exert their geoeconomic power by threatening countries in the rest of the world with the withdrawal of access to their respective technologies, this competition has two components. First, even in the absence of geoeconomic threats, the downstream industries of each country compete for economic profits worldwide. Second, from the perspective of each country being targeted, the other hegemon is the outside option if the country gets shut off by one hegemon. For example, a country might not fear losing access to U.S. technology if Chinese technology is a viable substitute.

We show that hegemons choose to either accommodate or contain each other depending on the relative substitutability and profitability of the exports that they can offer to the rest of the world. A policy of containment, in which the U.S., for example, imposes export controls on semiconductor sales to China and uses some of its power to induce countries in the rest of of the world not to purchase Chinese downstream technology, is more likely to occur when the two hegemons' downstream technologies are closer substitutes and when U.S. technology is relatively more attractive for the targeted countries. The substitutability matters because it induces a motive for each hegemon to make the rival technology less attractive to decrease the targeted country's outside option. The relative profitability of the sectors matters because it provides the initial heterogeneity that the hegemons try to exploit to build further power. Conversely, we show that these motives are small when the hegemons' downstream products are largely separable in the production function of targets, leading the hegemons to accommodate one another and focus on pure profit extraction from the rest of the world.

Our model features two hegemonic countries populated by a downstream and upstream sector as in Figure 1. The upstream sector sells inputs to the downstream sectors of both hegemonic countries. The downstream sector of each hegemon sells its output to the rest of the world countries. We assume that the downstream sector of each hegemon has an external economy of scale so that it becomes more productive the more it produces. The rest of the world consists of two types of countries. One type is countries that are naturally in the economic sphere of one of the two hegemons, which we call allies. These countries produce only using the inputs of one hegemon. The other type is countries that produce using the inputs of both hegemons, which we call boundary countries. Intuitively, we think of allied countries as those that for geographic or natural reasons have an overwhelming close relationship with only one hegemon, while most other countries (the boundaries) do business with both.

Each country has a representative consumer and a representative government that maximizes its country's welfare. The policy game takes place over two stages, the Beginning and the Middle, while all production and consumption takes place at the End. In the Middle, the two hegemons exert their power over the rest of the world countries. They do so, following the modeling framework of Clayton et al. (2026, 2024), by threatening the other countries with loss of access to the inputs (the downstream sector output) that they control. To avoid being cutoff, they demand a set of costly actions from the rest of the world countries. These costly actions take two forms: wedges and transfers. Wedges are demands that the targeted country change its sourcing choices of inputs between the two rival hegemons. Technically, they are wedges in the target country's first order conditions in production, the revenue of which is remitted lump-sum to the targeted country's consumer. These wedges help us capture a mix of taxes/subsidies or quantity restrictions that are common in practice. Transfers are paid by the targeted government to the hegemon and can represent either direct monetary transfers, or in kind transfers, or political concessions.

Countries that are being targeted in the Middle stage, decide whether to accept or reject each hegemon's contract (the set of threats and demands). We employ a Nash-in-Nash bargaining approach, whereby each government accepts or rejects the contract of each hegemon taking as given that it accepts the rival hegemon's contract and the terms of that contract. Geoeconomic competition arises in this context because in each relationship the outside option for the targeted country is the relationship with the other hegemon. The Nash-in-Nash structure allows for substantial tractability of the problem, but does not allow for the terms of a hegemon's contract to be set directly to influence the other hegemon's contract terms. Instead, we capture the economics of influencing the terms of the other hegemon's contract with the Beginning policy stage.

In the Beginning, both hegemons set in a Nash game an export wedge on sales of their upstream industry to the rival hegemon. In doing so, they take into account the equilibrium effect in the Middle and End periods not only on prices, industries' productivity and profits, but also on geoeconomic power and the terms of the contract offered by the rival hegemon.

The two hegemons are interdependent and have a potentially profitable economic relationship with each other because they each produce in the downstream sector using inputs from both the domestic and the rival hegemon's upstream sectors. This economic relationship gives rise to a standard motive for policy vis-a-vis the rest of the world: terms of trade manipulation. All else equal, each hegemon wants to apply an export wedge to make its industries internalize their monopoly power in the presence of a finitely elastic rest of the world demand curve. This is a classic motive for trade policy and the foundation for optimal tariffs or export taxes to maximize profits by increasing the relative price of exports compared to imports.

In a hegemonic setup, however, the terms of trade manipulation is not the only force. The hegemon also pays attention to how the export wedge affects the inside and outside options of the countries in its economic network (i.e., the hegemon's power). If the two hegemons' downstream sectors are relatively substitutable as inputs in the production function of boundary countries, then each hegemon aims to contain its rival. The hegemon uses export wedges to make the downstream industry of its rival less attractive to the targeted countries, thus aiming to worsen their outside option. While this imposes direct losses on the profits of the hegemon's upstream industry that can no longer do as much (profitable) business with the rival hegemon, it raises overall welfare (profits plus transfers) for the hegemon by increasing its power over the targeted countries by more than the profits lost in its economic relationship with the rival hegemon.

The tendency to contain the rival hegemon is also strong if the relative profitability of using the hegemon's inputs is higher for the boundary countries. Intuitively, if the boundary country did not find it profitable to have a relationship with the hegemon, the hegemon has low power and on the margin there is little that it can do to increase it substantially, thus leading the hegemon to focus purely on extracting economic profits. Similarly, if the two hegemons' downstream industries are largely separable from the perspective of boundary countries' production, the optimal policy of the hegemons is to accommodate each other. In fact, each hegemon might even want to use its power to induce the boundary country to step up the purchases of its rival hegemons' goods, since this in turn means the rival hegemon's downstream industry demands more of the hegemon's upstream good.

We characterize how the welfare of the boundary country is affected by geoeconomic competition. The presence of a rival hegemon can help the boundary country by providing it with a better outside option, especially when the rival hegemons are using their power to contain each other. Each hegemon is using some of its power to contain the other hegemon, but since their demands pull in opposite directions, from the perspective of the boundary country they partly offset each other. Similarly, each hegemon might use its policies to make its industries attractive to the boundary country in an attempt to build up its own power. Yet, since each hegemon is doing this, each hegemon is also providing the boundary country with an attractive outside option vis-a-vis the rival hegemon, and hence improving the bargaining position of the boundary country. Instead, when the two hegemons accommodate each other this might lead to a worsening of the boundary country's welfare since the efforts by each hegemon to build power and the way they exert it via costly actions complement one another.

Related Literature. There is a deep literature in political science and in history on great power competition, including in economic statecraft. Among many contributions, there are notable ones by Hirschman (1945), Baldwin (1985), Kindleberger (1973), Krasner (1976), Keohane and Nye (1977), Gilpin (1981), Keohane (1984), Kennedy (1987), Ikenberry (2001), Mearsheimer (2003), Blackwill and Harris (2016), Walt (2018), and Farrell and Newman (2019). Waltz (1979) emphases how economic interdependence interacts with anarchic and hierarchical international orders.

This paper is related to an emerging literature in economics studying how multiple hegemons compete in the economic and geopolitical sphere. Broner et al. (2024) considers a model of spheres of influence in which two hegemons use trade relationships to align a continuum of countries with their preferred geopolitical actions. Meyer and Wesseler (2025) build a model of carrots and sticks being used by multiple hegemons and confronts it with data from the Cold War. Becko et al. (2025) consider multiple hegemons using tariffs trade agreements or discrimination as a way to induce geopolitical alignment. Madsen and Prat (2026) build a formal contracting model with multiple principals and a single agent and apply it to geoeconomic competition. We build on our work in Clayton et al. (2026, 2024). The appendix of Clayton et al. (2026) introduces a model with multiple hegemons but only considers cases of full separability or perfect overlap between the two hegemons.

More generally there is a fast growing literature on geoeconomics including work by Kleinman et al. (2024), Thoenig (2023), Antràs and Miquel (2023), Fernández-Villaverde et al. (2024), Becko and O'Connor (2024), Konrad (2024), Liu and Yang (2024), Kooi (2024), Mattoo et al. (2024), Alekseev and Lin (2024), Ndiaye (2024), Pflueger and Yared (2024), Egorov et al. (2025), Fernández-Villaverde et al. (2025), Mayer et al. (2025), Abadi et al. (2026), and Fernández-Villaverde et al. (2026).[1] We also relate to the literature on whether closer trade relationships promote peace (Martin, Mayer and Thoenig (2008, 2012)).

The Nash-on-Nash protocol that we use is related to the theory of Horn and Wolinsky (1988), and has been used to study trade agreements by Bagwell et al. (2020, 2021). Many of the optimal policy tools that we study also relate to their classic analysis in the macroeconomics and trade literature that analyzed optimal industrial, trade, and capital control policies: Ottonello, Perez and Witheridge (2023), Liu (2019), Bartelme, Costinot, Donaldson and Rodriguez-Clare (2019), Juhász et al. (2022), Juhász et al. (2023), Eaton and Engers (1992), Bagwell and Staiger (1999), Bagwell and Staiger (2001), Bagwell and Staiger (2004), Grossman and Helpman (1995), Ossa (2014), Farhi and Werning (2016), Costinot et al. (2014), Costinot and Werning (2019), Sturm (2022).

2 Model Setup

The global economy consists of five (types of) countries. There are two hegemonic countries, which are large and indexed by $h \in \mathcal{H} = \{US, CH\}$. There are three sets (unit continuum) of small open economies, which are indexed by their type $n \in \mathcal{N} = \{A_{US}, A_{CH}, B\}$. We call countries A_h the

[1] See Mohr and Trebesch (2024) and Clayton et al. (2025b) for overviews of the literature.

"allies" of hegemon h, and call countries B the "boundary" countries that are un-allied.

Hegemon h has an endowment of an upstream good u_h and a downstream sector d_h. We denote their prices p_{u_h} and p_{d_h}, respectively. Each country $n \in \mathcal{N}$ has a final good producing sector that produces a numeraire final good. The numeraire is common across countries. Each sector consists of a unit continuum of identical firms, and hence we refer to a representative firm. Each country has a representative consumer and a government. Figure 1 provides a visualization of the global economy in this model.

Hegemon h. Hegemon h's country has a fixed endowment $e_{u_h} > 0$ of its upstream good. The downstream sector d_h of hegemon h uses the upstream goods of both hegemons in its production process. In particular, we assume that the cost function of an individual firm in sector d_h is[2]

$$C_{d_h}(y_{d_h}) = \left(\theta_{d_h}^{-1} \sum_{k \in \mathcal{H}} \alpha_{d_h u_k} p_{u_k} - \xi y_{d_h}^*\right) y_{d_h}. \tag{1}$$

Each downstream firm's cost function is linear in its own output y_{d_h}, but features an external economy of scale at the sectoral level: the unit cost of production is declining in aggregate sectoral production $y_{d_h}^*$. The parameter $\xi \geq 0$ captures the strength of the economy of scale, with a value of zero corresponding to no economies of scale.[3] The term $\theta_{d_h}^{-1} \sum_{k \in \mathcal{H}} \alpha_{d_h u_k} p_{u_k}$ is the (per unit) cost of upstream goods purchased for the optimal bundle of inputs in production, with θ_{d_h} capturing total factor productivity. The cost function embeds that the demand by d_h for upstream good u_k is $x_{d_h u_k} = \theta_{d_h}^{-1} \alpha_{d_h u_k} y_{d_h}$. Given the cost function, and the fact that each individual firm is a price taker in the continuum of firms in its sector, the profit function of a firm in sector d_h is

$$\Pi_{d_h}(y_{d_h}) = \left(p_{d_h} - \theta_{d_h}^{-1} \sum_{k \in \mathcal{H}} \alpha_{d_h u_k} p_{u_k} + \xi y_{d_h}^*\right) y_{d_h}. \tag{2}$$

Hegemon h's representative consumer owns the domestic upstream good endowment and the domestic upstream sector, with profits Π_{d_h}. The consumer h has linear preferences, $U_h(C_{hu_h}, C_{hf}) = c_{u_h} C_{hu_h} + C_{hf}$ over its own upstream good and the numeraire final good. Therefore, the parameter c_{u_h} pins down the domestic cost of opportunity of utilizing the upstream good u_h in downstream production rather than consumption. The consumer's budget constraint is

$$p_{u_h} C_{hu_h} + C_{hf} \leq p_{u_h} e_{u_h} + \Pi_{d_h}.$$

Boundary Country B. The boundary country's final goods producing sector, denoted b, produces the numeraire final good out of the downstream goods of each of the two hegemons. Its

[2] Appendix A.1.5 provides a production function that generates this cost function and expenditure shares.
[3] We simplify the exposition by assuming that the scale parameter ξ is the same across each hegemon.

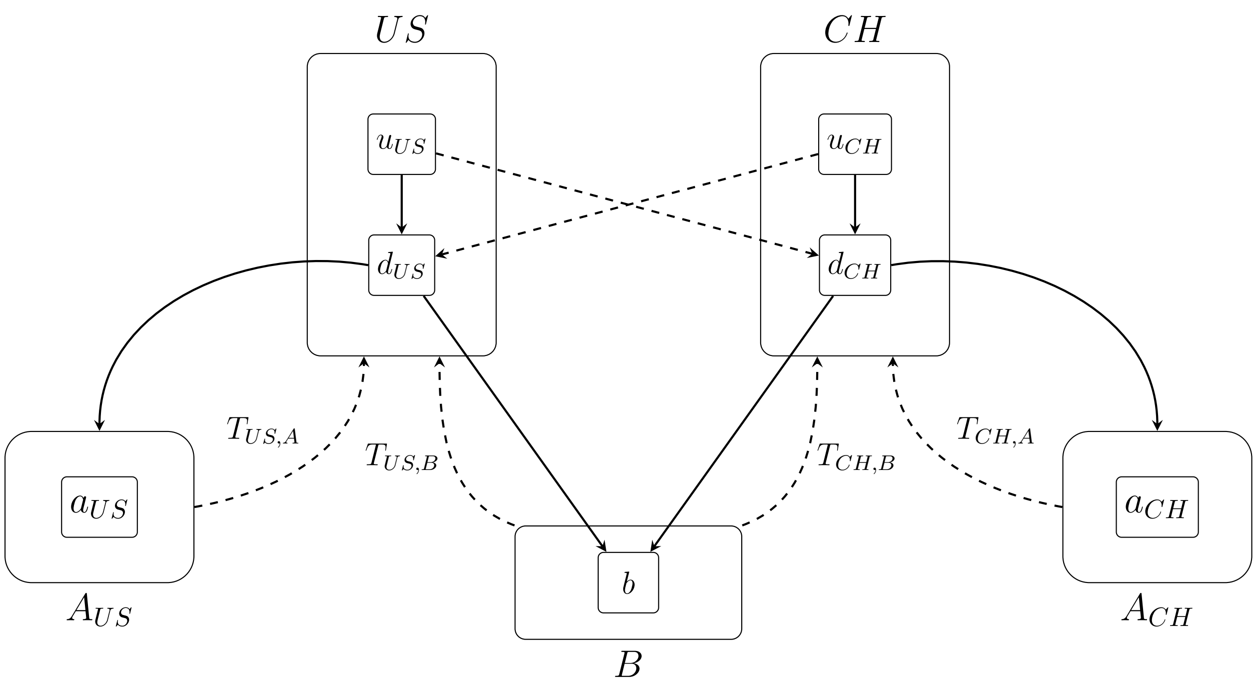


Figure 1: This figure displays the global economic structure of the model.

production function is

$$f_b(x_b) = \sum_{h \in \mathcal{H}} \left[\theta_{bd_h} x_{bd_h} - \frac{1}{2} \kappa_b x_{bd_h}^2 \right] - K_b \prod_{h \in \mathcal{H}} x_{bd_h}, \tag{3}$$

where $x_b = \{x_{bd_h}\}_{h \in \mathcal{H}}$.[4] The final term on the right hand side captures nonseparability: downstream goods are separable if $K_b = 0$, substitutes if $K_b > 0$, and complements if $K_b < 0$. The profits of a firm in sector b are

$$\Pi_b(x_b) = \sum_{h \in \mathcal{H}} \left[(\theta_{bd_h} - p_{d_h}) x_{bd_h} - \frac{1}{2} \kappa_b x_{bd_h}^2 \right] - K_b \prod_{h \in \mathcal{H}} x_{bd_h}. \tag{4}$$

Country b's representative consumer owns the final goods producers in her country and consumes the numeraire consumption good only. The consumer's budget constraint is $C_{bf} \leq \Pi_b$, and her utility is $U_b(C_{bf}) = C_{bf}$.

Allied Country A_h. The allied country A_h also has a final goods producing sector, denoted a_h, but is only able to utilize the downstream good of hegemon h in production. This difference in the production function of allied versus boundary countries is precisely what distinguishes these types of countries in this paper. We think of allied countries as those that due to geography or other

[4]We simplify the exposition by assuming the quadratic parameter κ_b is the same for both hegemons' goods.

invariable constraints are naturally in the economic sphere of one of the hegemons. The production function of firms in sector a_h is $f_{a_h}(x_{a_h d_h}) = \theta_{a_h d_h} x_{a_h d_h} - \frac{1}{2}\kappa_a x_{a_h d_h}^2$ and their profit function is[5]

$$\Pi_{a_h}(x_{a_h d_h}) = (\theta_{a_h d_h} - p_{d_h}) x_{a_h d_h} - \frac{1}{2}\kappa_a x_{a_h d_h}^2. \tag{5}$$

Country A_h's representative consumer owns the final goods producers in her country and consumes the numeraire consumption good only. The consumer's budget constraint is $C_{a_h f} \leq \Pi_{a_h}$, and her utility is $U_{a_h}(C_{a_h f}) = C_{a_h f}$.

Market Clearing. The market clearing conditions for the upstream and downstream goods of the hegemons are:

$$\sum_{k \in \mathcal{H}} x_{d_k u_h} + C_{h u_h} = e_{u_h},$$

$$x_{a_h d_h} + x_{b d_h} = y_{d_h},$$

for each $h \in \mathcal{H}$. Market clearing for the numeraire final good follows from Walras' law.[6]

2.1 Geoeconomic Game

The geoeconomic game unfolds in a Stackelberg timing structure, summarized in Figure 2. In the End, production and consumption occur. In the Middle, each hegemon h offers a contract to the government of each small open economy $n \in \mathcal{N}_h = \{A_h, B\}$ in a Nash-in-Nash game, and countries choose which contract(s) to accept. In the Beginning, each hegemon h can set bilateral export wedges on the sales of its upstream and downstream goods in a Nash game.[7] These wedges can be interpreted as export taxes or subsidies.

2.1.1 Hegemonic Contracting in the Middle.

In the Middle, each hegemon h offers a contract to the governments of countries $n \in \mathcal{N}_h$ specifying: (i) a required transfer $T_{h,n} \geq 0$ from country n's government to country h's government; (ii) revenue-neutral wedges $\tau_{h,n} = \{\tau_{h,nd_k}\}_{k \in \mathcal{H}}$, with equilibrium revenues $r_{h,n} = \sum_{k \in \mathcal{H}} \tau_{h,nd_k} x_{nd_k}^*$ remitted lump sum to countries n that accept hegemon h's contract.[8] The transfers capture revenue extraction by the hegemon and in practice might be monetary, in kind, or a political concession. The revenue neutral wedges aim to influence the sourcing decisions of the targeted countries and can include both (dis)incentives to purchase inputs from one hegemon or the other. For example, the U.S. might ask

[5] We simplify the exposition by assuming the quadratic parameter κ_a is the same across the two hegemons' allies.

[6] We assume that the upstream good endowments e_{u_h} are sufficiently large that the consumer in country h is marginal in purchases of u_h.

[7] Given the cost function and expenditure shares, it is without loss of generality to restrict attention to wedges on sales, since wedges on purchases will change the price without changing expenditure shares.

[8] This leaves implicit that $x_{a_h d_{-h}}^* = 0$.

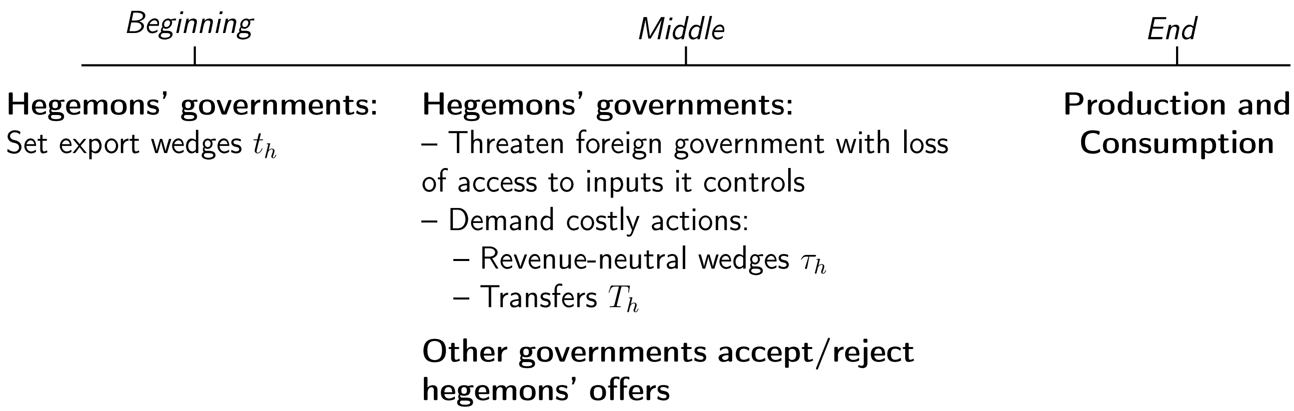


Figure 2: Model Timeline

of a boundary country to increase the purchases of its own goods and decrease the purchases from China.

To enforce its demands, hegemon h threatens to stop exports of sector d_h to country n in the event that n rejects h's contract.[9] Because hegemon h does not export to the rival hegemon's allies A_{-h}, we assume hegemon h cannot contract with A_{-h}.

We assume that the two hegemons offer contracts in a Nash-in-Nash game in the Middle period. That is, hegemon h offers its contracts taking as given both the terms of hegemon $-h$'s offered contracts and that each country $n \in \mathcal{N}_{-h}$ will accept hegemon $-h$'s offer. The Nash-in-Nash contracting structure (à la Horn and Wolinsky (1988)) is a common simplifying bargaining protocol also used in international economics by Bagwell, Staiger and Yurukoglu (2020, 2021) to study tariff negotiations. It allows each hegemon to internalize the effect of its offer on the equilibrium, but not on the offer of the rival hegemon. This simplifies the analysis by smoothing out the best response of h, which otherwise might involve offers that induced the target to reject $-h$'s contract. This set-up does not allow for the possibility that one hegemon offers a contract with terms that are contingent on the targeted government accepting/rejecting the rival hegemon's contract, or with specific terms that are contingent on the terms offered by the rival hegemon. On the other hand, we employ the Stackelberg timing structure to instead allow each hegemon in the Beginning period to set policies that, while invariant to whether targeted countries accept or reject contracts in the Middle period, take into account the effects on the terms of the contract offered by the rival hegemon in the Middle period. This set-up balances analytical tractability with capturing the strategic interactions between the hegemons that are important for the economics of the model.

[9]Because the target of threats (a government of a small open economy) is infinitesimal in global markets, exclusion of that country from purchasing hegemon h's inputs does not change the equilibrium. Hegemon h is willing to punish the individual infinitesimal government because it loses no value by doing so.

Participation Constraints of Boundary Country B. The boundary country B receives contracts that are offered by both hegemons. Given the Nash-in-Nash structure, B separately decides whether or not to accept the offer of each hegemon h, taking as given that it accepts the offer from hegemon $-h$. This results in two participation constraints, one for each hegemon.

If B accepts both offers, it achieves value $V_B(\overline{\tau}_b) + \sum_{h\in\mathcal{H}}[r_{h,B} - T_{h,B}]$, where

$$V_B(\overline{\tau}_b) = \max_{x_b} \ \Pi_b(x_b) - \sum_{h\in\mathcal{H}} \overline{\tau}_{bd_h} x_{bd_h}. \tag{6}$$

and where $\overline{\tau}_{bd_h} = \sum_{k\in\mathcal{H}} \tau_{k,bd_h}$ is the total wedge imposed by the two hegemons on use of d_h. If instead country B rejects h's contract (while accepting $-h$'s contract), then it achieves value $V_B^{-h}(\tau_{-h,b}) + r_{-h,B} - T_{-h,B}$, where

$$V_B^{-h}(\tau_{-h,b}) = \max_{x_b^{-h}} \ \Pi_b(x_b^{-h}) - \tau_{-h,bd_{-h}} x_{bd_{-h}}^{-h} \quad s.t. \quad x_{bd_h}^{-h} = 0. \tag{7}$$

The participation constraint of country B in its contracting relationship with hegemon h is $V_B(\overline{\tau}_b) + \sum_{h\in\mathcal{H}}[r_{h,B} - T_{h,B}] \geq V_B^{-h}(\tau_{-h,b}) + r_{-h,B} - T_{-h,B}$, which simplifies to

$$V_B(\overline{\tau}_b) + r_{Bh} - T_{Bh} \geq V_B^{-h}(\tau_{-h,b}). \tag{8}$$

Equation 8 defines two participation constraints, one with respect to each hegemon h, for each boundary country B.

Participation Constraint of Allied Country A_h. The allied countries A_h only receive a contract offered by hegemon h. This is the sense in which these countries are in the exclusive sphere of influence of one hegemon. If allied country A_h rejects h's offer, it cannot produce the final good since its production function relies on the hegemon's inputs, and therefore the country has an outside option of 0. If allied country A_h accepts the offer, it achieves value $V_{A_h}(\tau_{h,a_hd_h}) + r_{h,A_h} - T_{h,A_h}$, where

$$V_{A_h}(\tau_{h,a_hd_h}) = \max_{x_{a_hd_h}} \Pi_{a_h}(x_{a_hd_h}) - \tau_{h,a_hd_h} x_{a_hd_h}. \tag{9}$$

The participation constraint of A_h is thefore:

$$V_{A_h}(\tau_{h,a_hd_h}) + r_{h,A_h} - T_{h,A_h} \geq 0. \tag{10}$$

Hegemon h Maximization Problem in the Middle. Hegemon h takes as given the contracts offered by hegemon $-h$, and chooses its contracts to maximize its final payoff, $U(C_{hu_h}, C_{hf}) + T_{h,A_h} + T_{h,B}$, subject to the participation constraints (equations 8 and 10) and to the determination of the equilibrium in the End.[10]

Single Hegemon Benchmark. It is at times be helpful to benchmark our results against the case in which there is a single hegemon h, that is $-h$ is a large country but is not a hegemon (i.e., $-h$ cannot offer contracts in the Middle). We formally represent this case by assuming that $-h$ must offer a trivial contract with no costly actions: $\tau_{-h} = 0$ and $T_{-h} = 0$.

Definition 1 *In the single hegemon environment, we assume that $-h$ can only offer a trivial contract with no costly actions in the Middle: $\tau_{-h} = 0$ and $T_{-h} = 0$.*

2.1.2 Hegemon h's Problem in the Beginning.

In the Beginning, hegemon h can impose a bilateral wedge $t^y_{h,d_{-h}u_h}$ on sales of its upstream good to the rival hegemon's downstream sector.[11] Given the linear structure of producers, these bilateral wedges affect the sales price of the upstream good to the rival hegemon. That is, we can write the price that d_{-h} faces for purchasing u_h as

$$p_{d_{-h}u_h} = c_{u_h} + t^y_{h,d_{-h}u_h}. \tag{11}$$

In the rest of the paper, it is helpful to define $t_{h,d_{-h}} = \theta^{-1}_{d_{-h}} \alpha_{d_{-h}u_h} t^y_{h,d_{-h}u_h}$, which is the implied wedge that hegemon h is placing in the sales price of sector d_{-h} to all other countries. We derive results below directly in terms of $t_{h,d_{-h}}$.

3 Geoeconomic Competition: Economic Threats

We solve our model by backward induction, and begin by characterizing the outcome of the geoeconomic game in the Middle, taking as given the wedges that each hegemon has already set in the Beginning.

[10] So that the hegemon's contracting problem is convex, we assume that $\xi < \frac{1}{2}\frac{\kappa_a\kappa_b}{\kappa_a+\kappa_b}$ and that $K_b^2 < \frac{\kappa_a\kappa_b - 2\xi(\kappa_a+\kappa_b)}{\kappa_a - 2\xi}\frac{1}{\kappa_b}\left(\frac{(\kappa_a+\kappa_b)\xi - \kappa_a\kappa_b}{\kappa_a - \xi}\right)^2$. Since each hegemon takes the other hegemon's revenue remissions as given in the best response problem, an off-equilibrium deviation by one hegemon to offering an alternative contract can generate nonzero net revenues for the other hegemon. We assume that such revenues are remitted lump sum to that hegemon's representative consumer.

[11] It is without loss of generality to abstract from bilateral wedges on sales of u_h to d_h. Provided that the transfer non-negativity constraints do not bind, it is also be without loss of generality to abstract from bilateral wedges on sales of d_h to a_h and b. Intuitively, this is because the hegemon h is indifferent whether it uses its power in the Middle or the wedges in the Beginning to induce changes in n's behavior. We will focus the exposition of the paper on cases in which the transfer non-negativity constraints do not bind.

3.1 Best Response of Hegemon h

We start by characterizing hegemon h's best response to the contracts offered by the rival hegemon $-h$. The three wedges in h's contracts are the wedge on purchases of h's downstream good d_h by h's allies, $\tau_{h,a_h d_h}$, the wedge on purchases of h's downstream good d_h by the boundary country, τ_{h,bd_h}, and the wedge on purchases of the rival hegemon's downstream good d_{-h} by the boundary country, $\tau_{h,bd_{-h}}$.

We start by building intuition. Intuitively, given the wedges it demands, hegemon h always set the transfer $T_{h,n}$ so that n's participation constraint vis-a-vis h binds, since if h left slack in the constraint it could always improve its own welfare by increasing the demanded transfer. We then analyze the hegemon's optimal choice of wedges. The first order conditions of hegemon h's best response problem yields wedges on good d_h that satisfy:[12]

$$\tau_{h,a_h d_h} = \tau_{h,bd_h} = \underbrace{-\xi y_{d_h}}_{\text{Economy of Scale for } d_h}. \tag{12}$$

Hegemon h demands the same wedge on purchases of its own downstream good d_h by both its allies and the boundary country. This wedge takes the form of a subsidy targeting the economy of scale within the hegemon's own country, ξ, and scales with aggregate output of the sector, y_{d_h}. This is a standard policy motive to subsidize a sector with an external economy of scale. Because both the allies' and boundary country's demand contribute to increase the sector's output and hence affect the economy of scale similarly on the margin, and because both are unable to use hegemon h's good at their outside option, the hegemon demands the same wedge of both. Equation 12 does not include terms related to changes in the hegemon's downstream good's price or building power over the target. In fact, these effects offset each other: a lower price reduces d_h's direct profits, but also increases power over the targets by the same amount. As in Clayton et al. (2026, 2024), the power building motive can dull the incentive for terms-of-trade manipulation, and in this model the two exactly offset.

The first order condition of hegemon h's best response also yields a wedge on the boundary country's purchases of (the rival hegemon's downstream) good d_{-h} given by

$$\tau_{h,bd_{-h}} = \Bigg(\underbrace{-t_{h,d_{-h}}}_{\text{Terms of Trade}} + \underbrace{\left(x^{-h}_{bd_{-h}} - x_{bd_{-h}}\right)\xi}_{\text{Building Power over } B} \Bigg) \Bigg(1 + \underbrace{\frac{\xi}{\kappa_a - \xi}}_{\text{Amplification through } A_{-h}} \Bigg). \tag{13}$$

Hegemon h's demanded wedge on the boundary country's purchases of the rival hegemon's downstream good is a mixture of two motives. First, when hegemon h is imposing a positive export wedge on its upstream good, $t_{h,d_{-h}} > 0$, then h has an incentive to *boost* downstream demand from the boundary country for d_{-h}. This reflects an indirect terms-of-trade manipulation: by boosting

[12] See the proof of Lemma 1.

B's demand for d_{-h}, the hegemon also boosts d_{-h}'s demand for h's own upstream good u_h. This allows the hegemon's own upstream sector to earn higher economic profits. Intuitively, this use of power is welfare-improving for the hegemon because the boundary country experiences only a second order loss from purchasing the first additional marginal unit of d_{-h} beyond its private optimum, but hegemon h perceives a first order gain through its increased profits. This force pushes hegemon h to accommodate its rival by promoting more experts of its rival's downstream good to the boundary country.

The second force captures building power over the boundary country, here operating through the economy of scale of the rival hegemon's downstream sector d_{-h}. By restricting the boundary country's demand for d_{-h}, hegemon h is able to make the alternative to its own downstream good less attractive by raising the rival hegemon's downstream good price. This boosts h's power over B whenever B would substitute towards using more of the rival hegemon's good at the outside option when it rejects h's contract, that is whenever $x^{-h}_{bd_{-h}} > x_{bd_{-h}}$. In this case, the building power motive incentivizes hegemon h towards containment of its rival, in the form of a positive demanded wedge on the boundary country's use of the rival hegemon's upstream good. However, if the boundary country uses more of the rival hegemon's good at the inside option (for example, this can arise if downstream goods are complements in production), then h builds power by boosting demand in order to accommodate the economy of scale.

Network amplification through the rival hegemon's allies, A_{-h}, due to the economy of scale amplifies both the terms of trade and building power incentives. As the output of d_{-h} rises, its price falls and demand from A_{-h} rises. This increases economic profits that h's downstream sector earns by selling its upstream good to its rival's downstream sector, and also affects power since higher demand from A_{-h} bolsters the economy of scale of d_{-h}. The multiplicative term $\frac{\xi}{\kappa_a - \xi}$ reflects the fixed point of the network amplification process, as further purchases by A_{-h} increase the productivity of d_{-h}, bolstering demand even further and so on.

Having intuitively discussed the incentives underlying hegemon h's best response, we formally characterize it in the Lemma below.[13]

Lemma 1 *The best response of hegemon h to the contracts offered by hegemon $-h$ is*

$$\begin{aligned}\tau_{h,bd_h} = &- \delta^{own}_b\Big(\pi_{bd_h} - t_{-h,d_h} - \tau_{-h,bd_h}\Big) - \delta^{own}_a\Big(\pi_{a_h d_h} - t_{-h,d_h}\Big)\\ &+ K_b\delta^{rival}_b\Big(\pi_{bd_{-h}} - t_{h,d_{-h}} - \tau_{-h,bd_{-h}}\Big)\\ &+ K_b\delta^{rival}_a\Big(\pi_{a_{-h}d_{-h}} - t_{h,d_{-h}} - \tau_{-h,a_{-h}d_{-h}}\Big)\\ &+ K_b\delta^{own}_t t_{h,d_{-h}} \end{aligned} \tag{14}$$

[13] Lemma 1 is the counterpart to the optimal offensive policy studied by Clayton et al. (2026) (Proposition 3). The key difference is that Lemma 1 includes the rival hegemon's wedges. For expositional simplicity, all our results focus attention on parameterizations for which allocations are interior, $x^*_{a_h d_h}, x^*_{bd_h} > 0$ for $h \in \mathcal{H}$.

$$\tau_{h,bd_{-h}} = -K_b \epsilon_\tau \tau_{h,bd_h} - \epsilon_t^{own} t_{h,d_{-h}} - K_b \epsilon_a^{own} \left(\pi_{a_h d_h} - t_{-h,d_h} \right) \tag{15}$$

and $\tau_{h,a_h d_h} = \tau_{h,bd_h}$*, where the coefficients are defined in the proof.*

Lemma 1 shows that hegemon h's best response treats the rival hegemon's demanded wedges as if they were direct increases in the costs countries face from utilizing the corresponding good. This provides sharp and intuitive characterizations of whether hegemon h shifts towards containment or accommodation in response to changes in its rival's demanded wedges.

First, when the two hegemons' downstream goods are substitutes in production for the boundary country ($K_b > 0$), demands by the rival hegemon $-h$ that either the boundary country or $-h$'s allies use more of the rival hegemon's downstream good d_{-h} ($\downarrow \tau_{-h,a_{-h}d_{-h}}$ or $\downarrow \tau_{-h,bd_{-h}}$), induce hegemon h to lower its demanded subsidy of its own downstream good h for both its own allies ($\uparrow \tau_{h,a_h d_h}$) and the boundary country ($\uparrow \tau_{h,bd_h}$). Intuitively, the larger demanded subsidy by $-h$ lowers the effective cost to the boundary country and allies of purchasing the rival hegemon's downstream good d_{-h}, which in turn leads hegemon h to perceive a higher cost of the boundary country substituting its purchases towards h's own downstream good d_h. This leads hegemon h to shift its strategy towards earning markups on sales of its upstream good u_h to the rival hegemon's downstream sector d_{-h}, which it does by lowering its demanded subsidy of its own downstream good for both the boundary country and h's allies. By the same token, a higher demanded wedge by the rival hegemon on the boundary country's use of good d_h ($\uparrow \tau_{-h,bd_h}$) also induces hegemon h to reduce its own demanded subsidy of d_h. In these cases, the rival hegemon's attempt to promote its own downstream good or contain usage of h's by the boundary country, is met by a response in the same direction as hegemon h lowers the demanded subsidy on its own downstream good.

Lemma 1 also shows that when the two hegemons' downstream goods are substitutes in production for the boundary country ($K_b > 0$), hegemon h tends to pair demanded subsidies of its own downstream good with demanded taxes on the boundary country's usage of the rival hegemon's downstream good. That is, h's demanded wedge on the boundary country's use of good d_{-h} is increasing in h's demanded subsidy on use of good d_h by both its allies and the boundary country. In other words, as hegemon h promotes usage of its own downstream good due to changes in its rival's wedges, it also correspondingly contains usage of its rival's downstream good more through its demanded wedge on the boundary country's use of its rival's good.

3.2 Equilibrium Contracts

Having characterized the best response of hegemon h to the contracts offered by the rival hegemon $-h$, we are now ready to characterize the equilibrium contracts offered by the two hegemons in the Middle. The following Proposition characterizes the equilibrium wedges, with equilibrium transfers defined by the binding participation constraints of each hegemon.

Proposition 1 *In equilibrium, the optimal demanded wedges of hegemon h are*

$$\tau_{h,bd_h} = -\beta_a^{own}\pi_{a_h d_h} - \beta_b^{own}\pi_{bd_h} + K_b\beta_a^{rival}\pi_{a_{-h}d_{-h}} + K_b\beta_b^{rival}\pi_{bd_{-h}} + K_b(\kappa_a - \kappa_b)\beta_t^{own}t_{h,d_{-h}} + \beta_t^{rival}t_{-h,d_h} \tag{16}$$

$$\tau_{h,bd_{-h}} = K_b\gamma_a^{own}\pi_{a_h d_h} + K_b\gamma_b^{own}\pi_{bd_h} + \gamma_a^{rival}\pi_{a_{-h}d_{-h}} + \gamma_b^{rival}\pi_{bd_{-h}} - \gamma_t^{own}t_{h,d_{-h}} + K_b(\kappa_a - \kappa_b)\gamma_t^{rival}t_{-h,d_h} \tag{17}$$

where the loadings $\beta_a, \beta_b, \beta_t^{own}, \gamma_a, \gamma_b, \gamma_t > 0$ and β_t^{rival} are defined in the proof.

As the proof of Proposition 1 makes clear, the loadings do not depend on profitabilities (the π's) or the hegemons' export wedges (the t's).[14] This allows for concrete comparative statics on the equilibrium wedges demanded by each hegemon. Following equation 12, hegemon h's demanded wedge on use by its allies and the boundary country of h's own downstream good takes the form of a subsidy (i.e., a demand for more use of d_h). This demanded subsidy is larger when the profitability of either its allies ($\uparrow \pi_{a_h d_h}$) or the boundary country ($\uparrow \pi_{bd_h}$) is higher. On the other hand, the effect of increases in profitability of the rival hegemon's downstream good d_{-h} for the boundary country (or $-h$'s allies) is ambiguous and depends on whether the downstream goods of the two hegemons are substitutes or complements in the production function of the boundary country. In the case of substitutes (complements), increases in profitability from using the rival hegemon's downstream good results in lower (higher) demanded subsidies by hegemon h for its own downstream good d_h.

The impact of the bilateral export wedges between the two hegemons set in the Beginning is ambiguous. An increase in hegemon h's export wedge $t_{h,d_{-h}}$ set in the Beginning leads h to increase its demanded subsidy in the Middle when $K_b(\kappa_a - \kappa_b) > 0$. That is, the demanded subsidy rises when the downstream goods are substitutes (complement) in the production of the boundary country and allies face larger (smaller) convex costs compared to the boundary country from employing downstream goods in production. Intuitively, this corresponds to the tradeoff that hegemon h faces between its incentive to earn economic rents from sales of its upstream good to d_{-h}, and its incentive to build power over the boundary country.

Equation 17 reveals that when the hegemons' downstream goods are substitutes in production of the boundary country, there is a strong tendency for hegemon h to contain use of its rival's downstream good, that is to demand a positive wedge on the use of the rival hegemon's good by the boundary country. In particular, an increase in the profitability of any relationship leads to an increase in the demanded wedge on the boundary country's use of the rival hegemon's downstream good. The counterveiling force to this containment incentive manifesting from the power building motive comes from the terms of trade channel, and can be seen in the negative loading on hegemon h's own export wedge $t_{h,d_{-h}}$. Intuitively when the export wedge is larger, the per-unit profits

[14] The simplifying assumptions that ξ, κ_a, κ_b did not depend on h simplified Proposition 1 by ensuring that the loadings are the same for both hegemons.

from sales of h's upstream good to the rival hegemon's downstream sector are larger, motivating hegemon h to use its power to accommodate its rival's good in order to increase the boundary country's demand for d_{-h} and so increase sales of h's own upstream to d_{-h}.

3.3 Welfare of Boundary Countries

The welfare of the boundary country is affected by competition between the two hegemons. We characterize how changes in exogenous parameters and in the hegemons' export wedges affect the welfare of the boundary country.

Using the participation constraint of hegemon h, we can write that the welfare of the boundary country is given by its outside option in its contracting relationship with h, that is $W_B = V_B^{-h}(\tau_{-h,b}) + r_{-h,B} - T_{-h,B}$. Importantly, this outside option depends on the contract being offered by hegemon $-h$, including the transfer extracted. Using the participation constraint of the boundary country in its contracting relationship with hegemon $-h$ to substitute out $r_{-h,B} - T_{-h,B} = V_B^{-(-h)}(\tau_{h,b}) - V_B(\overline{\tau}_b)$, we can finally write the boundary country's welfare as

$$W_B = \sum_{h \in \mathcal{H}} V_B^{-h}(\tau_{-h,b}) - V_B(\overline{\tau}_b). \tag{18}$$

Equation 18 shows that the boundary country's welfare is the sum of its two outside options (one with respect to each hegemon), net of its inside option. Intuitively, this means that its welfare depends on the power building of each of the two hegemons: to the extent each builds power by raising the inside option relative to their respective outside option, B's welfare falls. We formalize this intuition in the following Proposition.

Proposition 2 *The welfare effect on the boundary country B of a perturbation in an exogenous (in the Middle) parameter e is*

$$\begin{aligned} \frac{dW_B}{de} = & \sum_{h \in \mathcal{H}} \frac{\partial V_B^{-h}(\tau_{-h,B})}{\partial e} - \frac{\partial V_B(\overline{\tau}_b)}{\partial e} \\ & \underbrace{- \sum_{h \in \mathcal{H}} \frac{d[p_{d_{-h}} + \tau_{-h,bd_{-h}}]}{de} t^{tot}_{h,-h} + \sum_{h \in \mathcal{H}} \frac{d\tau_{h,bd_{-h}}}{de} x_{bd_{-h}}}_{\text{Reduction in Hegemonic Power (Prices and Wedges)}} . \end{aligned} \tag{19}$$

where $t^{tot}_{h,-h} = x^{-h}_{bd_{-h}} - x_{bd_{-h}} = \frac{\kappa_a - \xi}{\kappa_a \xi} \tau_{h,bd_{-h}} + \frac{1}{\xi} t_{h,d_{-h}}$ measures the total containment by hegemon h of the rival hegemon's downstream good.

The second line of equation 19 shows that the indirect welfare effects for the boundary country B of the change in variable e occur via the reduction in the power that each of the two hegemons has over country B, here arising from changes in each hegemon's price and wedges. The first term on the second line captures how the attractiveness of the rival hegemon $-h$'s downstream good affects the welfare of the boundary country via the power that hegemon h has over it, as is the product between two sufficient statistics. The first sufficient statistic is how the change in e affects the effective price $p_{d_{-h}} + \tau_{-h,bd_{-h}}$ at which the boundary country purchases the rival hegemon's good d_{-h}, accounting for hegemon $-h$'s demanded subsidy on its own downstream good. These price changes affect B's welfare to the extent they affect B's inside and outside options differently in its contracting relationship with hegemon h. The second sufficient statistic, capturing this difference, is the difference between the boundary country's use of d_{-h} at its inside and outside options, and captures a measure of the total containment or accommodation by hegemon h of its rival's downstream good. When hegemon h is containing use of its rival's good through the combination of an export wedge in the Beginning ($t_{h,d_{-h}}$) and a demanded tax in the Middle ($\tau_{h,bd_{-h}}$), a boundary country that rejected hegemon h's contract would shift to greater use of the rival hegemon's downstream good d_{-h}. In such a case, the containment policies of hegemon h mean the boundary country benefits from a more attractive alternative from the rival hegemon $-h$, either through a lower direct price or a higher demanded subsidy by the rival. In contrast when hegemon h is accommodating its rival on net, a more attractive alternative actually further builds hegemon h's power, leaving the boundary country worse off.

The second term on the second line captures changes in each hegemon h's power over the boundary country coming from changes in the attractiveness of its own downstream good d_h, and is tied to changes in how the rival hegemon $-h$ contains or accommodates d_h. When the variation in e leads the rival hegemon $-h$ to shift towards containment of d_h, that is $\frac{d\tau_{-h,bd_h}}{de} > 0$, the power of hegemon h is reduced and the welfare of the boundary country increases. In contrast if the rival hegemon shifts towards accommodation, hegemon h's power increases from its own downstream good, and the boundary country is made worse off.

Proposition 2 reveals that both the level of containment policies and also the marginal effect on containment are key sufficient statistics to determine the welfare impacts on the boundary country. The boundary country benefits from changes that enhance the attractiveness of a rival's downstream good that a hegemon h is trying to contain, and also benefit from shifts that induce a hegemon to shift towards containment of its rival.

We next use Proposition 2 to examine how changes in key parameters (in the Middle) affect the welfare of the boundary country.

Welfare Effects of Changes in Export Wedges. First, we ask how an increase in one hegemon's export wedge $t_{h,d_{-h}}$ set in the Beginning affects the boundary country's welfare. Applying equation 18, the welfare effect of an increase in h's export wedge is

$$\frac{dW_B}{dt_{h,d_{-h}}} = \underbrace{-(1+2\beta_t^{rival})t_{h,-h}^{tot} + K_b(\kappa_a - \kappa_b)\gamma_t^{rival} x_{bd_h}}_{\text{Change in } h\text{'s Power}} - \underbrace{\gamma_t^{own} x_{bd_{-h}} - K_b(\kappa_a - \kappa_b) 2\beta_t^{own} t_{-h,h}^{tot}}_{\text{Change in } -h\text{'s Power}}$$

When hegemon h is in total containing use of the rival hegemon's downstream good, increases in h's export wedge reduce the boundary country's welfare by increasing h's power. Intuitively, hegemon

h's containment of its rival derives from its power building motive. The negative welfare effect is amplified by geoeconomic competition when $\beta_t^{rival} > 0$, and hence the higher export wedge imposed by h in the Beginning also leads the rival hegemon to lower its own demanded subsidy of its own downstream good d_{-h}. This further reduces the boundary country's welfare as the power of hegemon h increases even more. The power consequence vis-a-vis hegemon h's own good is ambiguous and depends on the relative curvature of allies and the boundary country, corresponding to whether the rival hegemon's wedge on d_h rises or falls in the export wedge (the second term on the first line).

The second set of terms captures the welfare effects of the higher export wedge on the rival hegemon's own power over the boundary country, and manifests through the equilibrium effects on production both directly and through the endogenous response of the rival hegemon. First, the higher export wedge increases h's incentives to earn economic profits from sales of its upstream good to its rival, which motivates hegemon h towards accommodating its rival's good in the Middle. This reduces hegemonic rivalry and lowers the welfare of the boundary country by increasing $-h$'s power. On the other side, the welfare effect operating through d_h's own good is ambiguous and again depends on the relative curvature of allies and the boundary country.

Welfare Effects of Changes in Profitability. We next examine how the welfare of the boundary country is affected by changes in the profitability of hegemon's allies or its own profitability of using a hegemon's good. Would the boundary country be better off if one hegemon became more attractive relative to the other (through a factor external to the boundary country, such as the upstream cost), either through an increase in the profitability π_{bd_h} relative to $\pi_{bd_{-h}}$ or through an increase in the relative profitability of h's allies relative to $-h$'s allies? Formally, we define $\Delta_a^h = \frac{\partial W_B}{\partial \pi_{a_h d_h}} - \frac{\partial W_B}{\partial \pi_{a_{-h} d_{-h}}}$ as the relative benefit to B of an increase in h's allies' profitability, and define Δ_b^h analogously. Applying Proposition 2, we have

$$\Delta_a^h = 2(\beta_a^{own} + K_b \beta_a^{rival})(t_{-h,h}^{tot} - t_{h,-h}^{tot}) + (\gamma_a^{rival} - K_b \gamma_a^{own})(x_{bd_h} - x_{bd_{-h}}). \tag{20}$$

$$\Delta_b^h = 2(\beta_b^{own} + K_b \beta_b^{rival})(t_{-h,h}^{tot} - t_{h,-h}^{tot}) + (\gamma_b^{rival} - K_b \gamma_b^{own})(x_{bd_h} - x_{bd_{-h}}) \tag{21}$$

Equations 20 and 21 reveal that the two key determinants of the welfare impact on the boundary country are the relative containment policies of each hegemon and the relative use by the boundary country of each downstream good. First, the boundary country benefits from a shift in profitability away from the hegemon that is doing more to contain its rival. Intuitively, this reflects the greater power reduction from improving the alternative to the hegemon trying to contain its rival, and suggests one source of benefit from the rise of a competitor. On the other hand, for K_b not too large, the boundary country also benefits from increases in profitability of the hegemon from which it purchases more inputs. This latter effect derives from changes in how each hegemon tries to contain its rival, and orients around how the boundary country benefits from containment policies by the rival of the hegemon on which the boundary country is more reliant in terms of total imports.

Benchmark: Case of a Single Hegemon. We benchmark our results against the case of a single hegemon (Definition 1). When h is the sole hegemon, the outside option of the boundary country when it rejects h's contract is $W_B^{SH} = V_B^{-h}(0)$ (where SH stands for single hegemon), that is the value from operating with no costly actions but also without access to h's downstream good. This differentiates the outside option in the single hegemon world from that in the world of multiple hegemons, in which the outside option was to accept $-h$'s contract, the value of which was influenced by the equilibrium wedges offered by the rival hegemon. Applying the Envelope Theorem, we have for a perturbation in an ex-post constant e

$$\frac{\partial W_B^{SH}}{\partial e} = \frac{\partial W_B^{SH}}{\partial e} - \frac{\partial p_{d_{-h}}}{\partial e} x_{bd_{-h}}^{-h}.$$

Importantly, whereas in the multiple hegemon case the welfare of the boundary country depends on reducing the power of each hegemon (i.e., shrinking the gap between the inside and outside options), in the single hegemon case the welfare of the boundary country depends only on raising the outside option (Clayton et al. (2024)). This centers the focus on the attractiveness (price) of the alternative. Moreover, the boundary country loses the benefits that arise from the rival hegemon economic containment of h (or conversely, the boundary country avoids the costs arising from economic accommodation between the two hegemons).

For comparison, we revisit the welfare implication of changes in the export wedge $t_{h,d_{-h}}$ and profitabilities for the boundary country. For the export wedge, we have

$$\frac{\partial W_B^{SH}}{\partial t_{h,d_{-h}}} = -\left(1 + \xi \left| \frac{\partial y_{d_{-h}}}{\partial t_{h,d_{-h}}} \right| \right) x_{bd_{-h}}^{-h} < 0.$$

With a single hegemon, a higher export wedge imposed by h is unambiguously welfare-reducing for the boundary country. Intuitively, the higher export wedge depresses production of d_{-h}, reducing its economy of scale and raising its price. Since the alternative good d_{-h} serves as the outside option for the boundary country, this deteriorates its outside option and lowers its welfare. Next revisiting the implications of profitability, we have for a profitability parameter π that

$$\frac{\partial W_B}{\partial \pi} = \xi \frac{\partial y_{d_{-h}}}{\partial \pi} x_{bd_{-h}}^{-h},$$

so that the comparative static on boundary country welfare is the same as the comparative static on output of d_{-h}. In this case, we have that $y_{d_{-h}}$ is increasing in $\pi_{bd_{-h}}$ and decreasing in π_{bd_h}. This is a manifestation of the idea that the boundary country benefits from a bolstering of its outside option and fragmentation away from the coercive hegemon and towards alternatives.

3.4 Impact of Rivalry on Hegemon's Allies

Competition over the boundary country has implications for the power and treatment of each hegemon's allies. We define hegemon h's power over its allies as the slack in A_h's participation constraint when no costly actions are demanded. Therefore, we have:

$$\text{Power}_{h,A_h} = V_{A_h}(0).$$

By Envelope Theorem, for an exogenous variable e we have

$$\frac{d\text{Power}_{h,A_h}}{de} = \frac{\partial \Pi_{a_h}}{\partial e} - \frac{\partial p_{d_h}}{\partial e} x_{a_h d_h}. \tag{22}$$

As there are changes even external to the hegemon's allies, network amplification through the economy of scale affects the price at which the hegemon sells d_h to its allies, which in turn affects h's power over them. Changes that increase the demand of the boundary country for d_h result in an increase in h's power over its allies. We consider two perturbations of interest.

Effects of Export Wedge on the Rival Hegemon. First, we consider the effect of an exogenous increase in the export wedge $t_{h,d_{-h}}$ that h imposes on sales of its upstream good to the rival hegemon in the Beginning. Applying equation 22, we have

$$\frac{d\text{Power}_{h,A_h}}{dt_{h,d_{-h}}} = K_b(\kappa_b - \kappa_a)\beta_t^{own} x_{a_h d_h}.$$

The impact of the higher export wedge on h's power over its allies is ambiguous and depends on the strength of the terms of trade and building power channels. First, when goods are separable in B and $K_b = 0$, there is no effect of the rivalry on the hegemon's own allies. When $K_b > 0$, then power over h's allies rises when demand responses are strong for the rival hegemon's allies ($\kappa_a < \kappa_b$) and falls when demand responses are strong for the boundary country ($\kappa_b < \kappa_a$).

Effect of Boundary Country Profitability We next consider the effect of changes in the profitability to the boundary country of using each hegemon's downstream goods, that is π_{bd_k}. The impact on the power of hegemon h over its allies is given by

$$\frac{d\text{Power}_{h,A_h}}{d\pi_{bd_h}} = \beta_b^{own} x_{a_h d_h},$$

$$\frac{d\text{Power}_{h,A_h}}{d\pi_{bd_{-h}}} = K_b \beta_b^{rival} x_{a_h d_h}.$$

Hegemon h's power rises over its allies when the boundary country becomes more economically profitable in its purchases of d_h, a result of the economy of scale. Intuitively as the boundary country's greater profitability increases from using d_h increases, in equilibrium it purchases more of that good, making h more productive and increasing its attractiveness to its allies. Conversely, when downstream goods are substitutes in boundary country production, an increase in profitability for the boundary country of using the rival hegemon's good lowers h's power over its allies. This once again arises as a consequence of the economy of scale, as B's diversion of expenditures towards d_{-h} and away from d_h raises the cost of d_h's production and so increases the price faced by h's allies, lowering h's power over them.

Effect on Costly Actions Demanded from Allies. Since the impact of the hegemon's power over its allies manifests through the economy of scale, the change in the hegemon's power also informs how the hegemon changes its demands (costly actions) for use of its own good, that is $\tau_{h,a_h d_h}$. When the hegemon's power grows due to an increase in output y_{d_h} with a corresponding fall in its downstream good price, the hegemon also starts demanding that its allies use even more of d_h. Equilibrium changes that result in an increase in the power of the hegemon h (either the export wedge or profitability) are therefore reinforced by greater demands of h's allies to use d_h, translating the power increase into a rise in costly actions that further cement its power.

4 Geoeconomic Competition: Hegemonic Export Wedges

Having characterized hegemonic competition over contracts, we now characterize geoeconomic competition in the hegemons' policies set in the Beginning in anticipation of competition in the contracting stage (the Middle). Formally, we study the Nash game of each hegemon setting its export wedge $t_{h,d_{-h}}$ on sales of its upstream good to the rival hegemon's downstream firm. In setting its export wedge, each hegemon internalizes its effect on the terms offered by the rival hegemon in the contracting game in the Middle, and the resulting equilibrium. We label these subset of motives that focus on influencing the offer of the rival hegemon as geoeconomic competition in the Beginning.

Before presenting the optimal export wedge of each hegemon, we start by building intuition for the underlying economic forces, focusing in particular on how anticipation of geoeconomic competition between the two hegemons affects the desired export wedge. The change in hegemon h's welfare from a change in its export wedge $t_{h,d_{-h}}$ can be decomposed as[15]

$$\begin{aligned}\frac{\partial U_h}{\partial t_{h,d_{-h}}} =& \overbrace{y_{d_{-h}} - \frac{1}{\kappa_a - \xi} t_{h,d_{-h}}}^{\text{Terms of Trade}} + \overbrace{\frac{\kappa_a}{\kappa_a - \xi} t^{tot}_{h,-h}}^{\text{Building Power}} \\ & \underbrace{\overbrace{-t_{h,d_{-h}} \frac{1}{\kappa_a - \xi} \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}}^{\text{Terms of Trade}} + \overbrace{\frac{\kappa_a}{\kappa_a - \xi} \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}} t^{tot}_{h,-h} - \frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}} x_{bd_h}}^{\text{Building Power}}}_{\text{Geoeconomic Competition}}. \qquad (23)\end{aligned}$$

The first line contains two standard effects of optimal trade policy and the geoeconomic offensive problem. First, there is the standard terms of trade (monopolist) incentive from trade policy: as the hegemon increases its export wedge, the sales price of its upstream good to d_{-h} rises. This increases

[15] See the proof of Proposition 3.

the per unit rents its upstream sector earns on sales to the rival hegemon, net of how much demand is reduced by the higher price. This terms of trade manipulation via an export tax is reminiscent, via Lerner (1936) symmetry, of the motive for an optimal tariff, a tax on imports (Johnson (1953)).[16] In both cases the aim of the optimal tax is to increase the relative price of exports compared to imports. Second, there is a motivation arising from offensive geoeconomic policy, to build power over the boundary country (Clayton et al. (2026)). Hegemon h builds its power by increasing the price of the alternative d_{-h} whenever the boundary country would substitute to d_{-h} after being cut off by h; that is whenever $t^{tot}_{h,-h} = x^{h}_{bd_{-h}} - x_{bd_{-h}} > 0$. In this model, this building power motive of increasing the gap between B's inside and outside options is summarized by hegemon h's total containment of its rival through both its export wedge in the Beginning and its demanded wedge on the boundary country's use of the rival hegemon's downstream good in the Middle.

The second line captures forces specifically arising from geoeconomic competition. Geoeconomic competition in the Beginning arises because hegemon h's export wedge affects the costly actions that the rival hegemon demands of the boundary country and $-h$'s allies in the Middle. The second line reveals how geoeconomic competition interacts with the terms-of-trade and building power motivations.

The first term on the second line captures the interaction between geoeconomic competition and terms-of-trade manipulation. As h raises its export wedge $t_{h,d_{-h}}$, the rival hegemon alters its demanded subsidy of its own good, $\frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}} = \beta^{rival}_t$, which in turn affects the demand of the boundary country and the rival hegemon's allies for d_{-h}. When a higher export wedge lowers the rival hegemon's demanded subsidy, that is $\beta^{rival}_t > 0$, then the increase in the export wedge depresses demand for d_{-h} even further because not only does the price of d_{-h} increase directly, but also the rival hegemon's demanded subsidies for its purchases falls as well. This additional dampening of demand for the rival hegemon's downstream good from the boundary country, also dampens demand by the rival hegemon's downstream sector for h's upstream good. This motivates hegemon h to shade its export wedge in order to preserve demand for its upstream good and so preserve its economic profits. On the other hand, when $\beta^{rival}_t < 0$ and a higher export wedge promotes larger demanded subsidies by the rival hegemon for d_{-h}, the rival hegemon's attempts to promote its good serve to cushion the drop in demand for its downstream good, in turn cushioning the drop in demand for h's upstream good. This motivates hegemon h to raise its export wedge further, since the rival hegemon's response partially offsets the resulting fall in demand.

The second term on the second line captures the interaction between geoeconomic competition interacts and the power building motive. It comprises two effects. First, there is the effect on building power operating through the rival hegemon's downstream good. Whenever hegemon h is in total containing its rival, that is $t^{tot}_{h,-h} > 0$, then hegemon h builds power even further when the rival hegemon responds by lowering its demanded subsidy of d_{-h}, that is when $\beta^{rival}_t > 0$. Conversely when $\beta_t rival < 0$, the rival hegemon's responds to the higher export wedge by attempting

[16]See Ossa and Redding (2026) for a modern review.

to preserve demand for its downstream good through a higher demanded subsidy, which mutes h's power building motive. In this case, geoeconomic competition via power building vis-a-vis the rival hegemon's downstream good actually pushes against higher export wedges. The second effect captures the effect operating through hegemon h's own downstream good. In particular, hegemon h builds power even further if its higher export wedge induces the rival hegemon to shift towards accommodation in the contracting game, that is to lower τ_{-h,bd_h}. This effect, given by $\frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}} = K_b(\kappa_a - \kappa_b)\gamma_t^{rival}$, is ambiguous and depends both on whether downstream goods are complements or substitutes, and on the relative demand curvature of allies and the boundary country.

Having characterized the underlying forces that motivate hegemon h's choice of the export wedge in the Beginning, we now characterize h's optimal choice of export wedge in the best response problem in the Beginning (taking as given its rival's wedge). As a preliminary to the proposition below, we define $y_{d_{-h}}(t)$ to be equilibrium output of sector d_{-h} when wedges are $t = \{t_{h,d_{-h}}\}_{h \in \mathcal{H}}$, and similarly define $\tau_{h,bd_{-h}}(t)$ and $x_{bd_h}(t)$. The following proposition characterizes the best response of hegemon h in the Beginning.[17]

Proposition 3 *The optimal export wedge of hegemon h, given the export wedge of hegemon $-h$, is*

$$t_{h,d_{-h}} = \frac{1}{\psi} y_{d_{-h}}(0) + \frac{1}{\psi}\frac{1}{\xi}\left(1 + \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}\right)\tau_{h,bd_{-h}}(0) - \frac{1}{\psi}\frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}} x_{bd_h}(0) + \frac{1}{\psi}\phi t_{-h,d_h} \qquad (24)$$

where ϕ and ψ are defined in the proof.

The optimal export wedge is a weighted sum of four terms. The first term corresponds to the terms-of-trade incentive, and scales with the output of the rival hegemon's downstream sector d_{-h}, since that output determines the rival's demand for h's upstream good. This force pushes for a positive wedge in order to earn profits from sales of the upstream good.

The second term captures the building power motive operating through the attractiveness of the rival hegemon's downstream good d_{-h} to the boundary country. Its sign depends on whether the hegemon h is containing or accommodating the rival hegemon's downstream good in the Middle. Whenever hegemon h is containing the rival hegemon's downstream good, that is demanding the boundary country use less of it in the form of a positive wedge $\tau_{h,bd_{-h}}(0)$, the hegemon is also incentivized towards containment in the Beginning, which is achieved through a higher export wedge that further reduces the attractiveness of d_{-h}. This motivation to build power interacts with geoeconomic competition because of changes in the rival hegemon's demanded wedges, $\frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}} = \beta_t^{rival}$, which amplifies (dampens) the building power motive when the rival hegemon reduces (increases) its demanded subsidy of d_{-h} in the Middle in response.

The third term captures the interaction between geoeconomic competition and the building power motive operating through hegemon h's own downstream good. Its effect depends on whether

[17] To ensure that the hegemon's optimization problem is convex, we assume that the model parameters satisfy $\psi > 0$, where ψ is defined in the proof of Proposition 3.

increases in the export wedge lead the rival hegemon to shift towards accommodation or containment in the Middle. When the rival hegemon shifts towards accommodation (containment), hegemon h has an incentive for higher (lower) export wedges in order to enhance (preserve) its power.

The final term reflects how the hegemon adjusts its export wedge in response to the export wedge set by the rival hegemon. The proof of Proposition 3 shows that the loading ϕ can take either sign. For a sufficiently small economy of scale parameter ξ, the sign of the loading ϕ is determined by $K_b(\kappa_b - \kappa_a)$. As a result, the hegemons' export wedges in the Beginning can be strategic complements or strategic substitutes, and are strategic complements (substitutes) when downstream goods are substitutes in the boundary country's production and allies have steep demand curves.

To build intuition, we provide numerical examples in Figure 3 and 4. These figures plot how hegemon h's utility varies with the export wedge it sets in the Beginning, holding fixed the export wedge set by the rival hegemon. The figures decompose the changes in the hegemon's utility into the contributions coming from the components related to terms of trade, building power, and geoeconomic competition channels (equation 23). The figures use the same model parameters, except for the parameter specifically being varied in each comparative static.

Figure 3 focuses on variation in the parameter K_b governing the substitutability of the hegemons' downstream goods in the boundary country's production function. A higher K_b implies the two hegemons' downstream goods are more substitutable from the perspective of the boundary country's production. Each panel plots in the solid black line how the hegemon's utility varies in its export wedge (relative to the baseline of an export wedge equal to zero). The optimal export wedge is pinned down by the maximum of this curve (recall the optimization problem is convex) and denoted by a black dot. The figure also decomposes how the four subcomponents of equation 23 contribute to changes in the hegemon's utility. These areas are the integrals over each of the terms in equation 23.

The blue area labeled "Terms of Trade" focuses on the effect of the hegemon's export wedge on the export price of its upstream good to the rival hegemon. A higher export wedge raises the price at which the upstream good is sold to d_{-h}, increasing per unit revenues on sales of the upstream good. While this reduces the total amount exported to the rival hegemon, it raises more export revenue, and leads to the classic argument for an optimal tariff or export tax.

The red area labeled "Building Power" focuses on the effect of the hegemon's export wedge of the price of the rival hegemon's downstream good for the boundary country. A higher export wedge leads to an increase in the rival hegemon's downstream sector good price, since the sector passes through the higher input cost to preserve its profitability (zero profit). Recall that from the perspective of hegemon h the outside option of the boundary country depends on how attractive the rival hegemon $-h$'s inputs are. A higher price of exports by hegemon $-h$ to the boundary country makes this outside option less attractive. On the other hand, hegemon h might have incentives to use its power over the boundary country to induce it to buy more of the rival hegemon's good in order to boost demand by the rival hegemon of its upstream good. Hence whether the red area is positive or negative in terms of its contribution to the optimal export wedge is ambiguous and depends on wether the hegemon is accommodating or containing the rival hegemon.

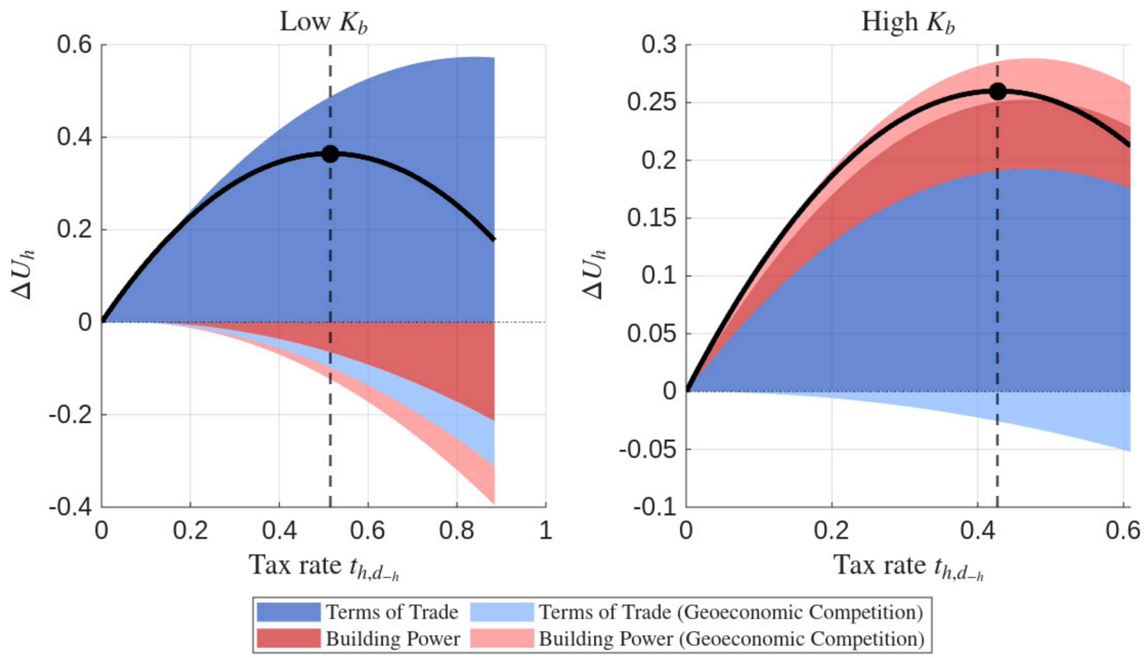
The two areas above focused on the effects of an export wedge taking as given the costly actions demanded by the rival hegemon in the Middle part of the game. These effects would be present even if the rival hegemon was simply another country that could not exert any power. Equation 23, however, clarifies that in the case of two hegemons competing there are additional effects. The light blue area labeled "Terms of Trade (Geoeconomic Competition)" arises from the effect of the export wedge on how the rival hegemon uses its power and the resulting terms of trade effect. The effect of the higher export wedge is ambiguous and depends on whether it induces the rival hegemon $-h$ to shade or increase its demands to the boundary country that it buys more of hegemon $-h$ goods. Whenever it leads to a shading of the demands, this in turn reduces the demand of the rival hegemon's downstream sector for the upstream exports of hegemon h. Facing lower demand for its upstream exports reduces the hegemon h profits in its upstream sector.

The light red area labeled "Building Power (Geoeconomic Competition)" arises from the effect of the export wedge on whether the rival hegemon $-h$ uses its power on the margin to accommodate or contain hegemon h. The positive (negative) effect arises when the rival hegemon reacts to the export wedge by decreasing (increasing) the containment effort, that is decreasing the asks it makes to the boundary country not to buy hegemon h good. Therefore the area is ambiguous. A second force is whether the rival hegemon shades or increases the demands to the boundary country that it buys its own goods interacted with hegemon h policy of containment or accommodation. All else equal, the effect is positive whenever the rival hegemon reaction lines up with the objective of hegemon h. For example, when hegemon h aims to contain the rival, and the rival reacts by shading the demand to the boundary country that it buys more of its own good.

The left panel of Figure 3 presents the decomposition for a low (positive) value of K_b, that is for the case in which the two hegemon's downstream goods are close to separable in the production function of the boundary country. The optimal export wedge is positive, with the positive loading coming from the terms-of-trade channel. All other components are negative. Intuitively, when the two hegemons sell goods that are almost separable in the production function of the targeted boundary country, hegemon h has incentives to accommodate the rival hegemon in order to maximize the revenue from terms of trade manipulation. Once the two hegemons are accommodating each other, a higher export wedge destroys some of the implicit coordination and the rival hegemon reaction destroy some of the revenue extraction.

The right panel of Figure 3 shows how hegemon h's incentives shift from accommodation towards containment when the two hegemons are economic competitors downstream, that is when $K_b > 0$ is larger and the downstream goods are closer substitutes in the boundary country's production. The terms of trade channel still pushes for positive export wedges as before, but now the Building Power motives both add to the incentives to impose higher export wedges. The reason is that hegemon h now wants to restrict its exports to hurt the rival hegemon by both making it less attractive as a

Figure 3: Export Wedges When the Two Hegemons Compete: Variation in Substitutability



competitor (outside option) and in order to induce it to lower its containment policies.

Figure 4 repeats the exercise of Figure 3, but instead considers in the top Panel the variation in the profitability of the boundary country in its utilization of h's downstream good, π_{bd_h}; the bottom panel considers the variation in the profitability of the boundary country in its utilization of the rival hegemon $-h$'s downstream good, $\pi_{bd_{-h}}$. The top left panel shows that when profitability is low, the positive export wedge comes largely from a positive loading on the terms-of-trade channel. Interestingly, the Building Power channels starts positive for low export wedges, and then turn negative at higher export wedges. Intuitively, when the boundary country has low profitability from using d_h, the value to hegemon h is dominated by terms of trade manipulation, since the low profitability limits exports of hegemon h's downstream good to the boundary country and therefore limits its ability to build power and compete geoeconomically in the Middle period. The right top panel shows that at higher profitability (and given the parametrization has a relatively high substitutability K_b), Building Power becomes an increasing contributor to the value to the hegemon from its export wedge. The higher profitability of hegemon h's good for the boundary country incentivizes hegemon h to pursue containment policies toward the other hegemon to build power.

The bottom panels of Figure 4 instead illustrate the variation in the profitability of the boundary country in its usage of the rival hegemon $-h$'s downstream good, $\pi_{bd_{-h}}$. Here the decomposition reflects the opposite pattern as for π_{bd_h}. The left panel shows that the forces at low profitability of d_{-h} mirror those for high profitability of d_h, with positive loadings the Building Power component representing an incentive towards containment. By contrast the right panel shows that at high

Figure 4: Export Wedges When the Two Hegemons Compete: Variation in Profitability

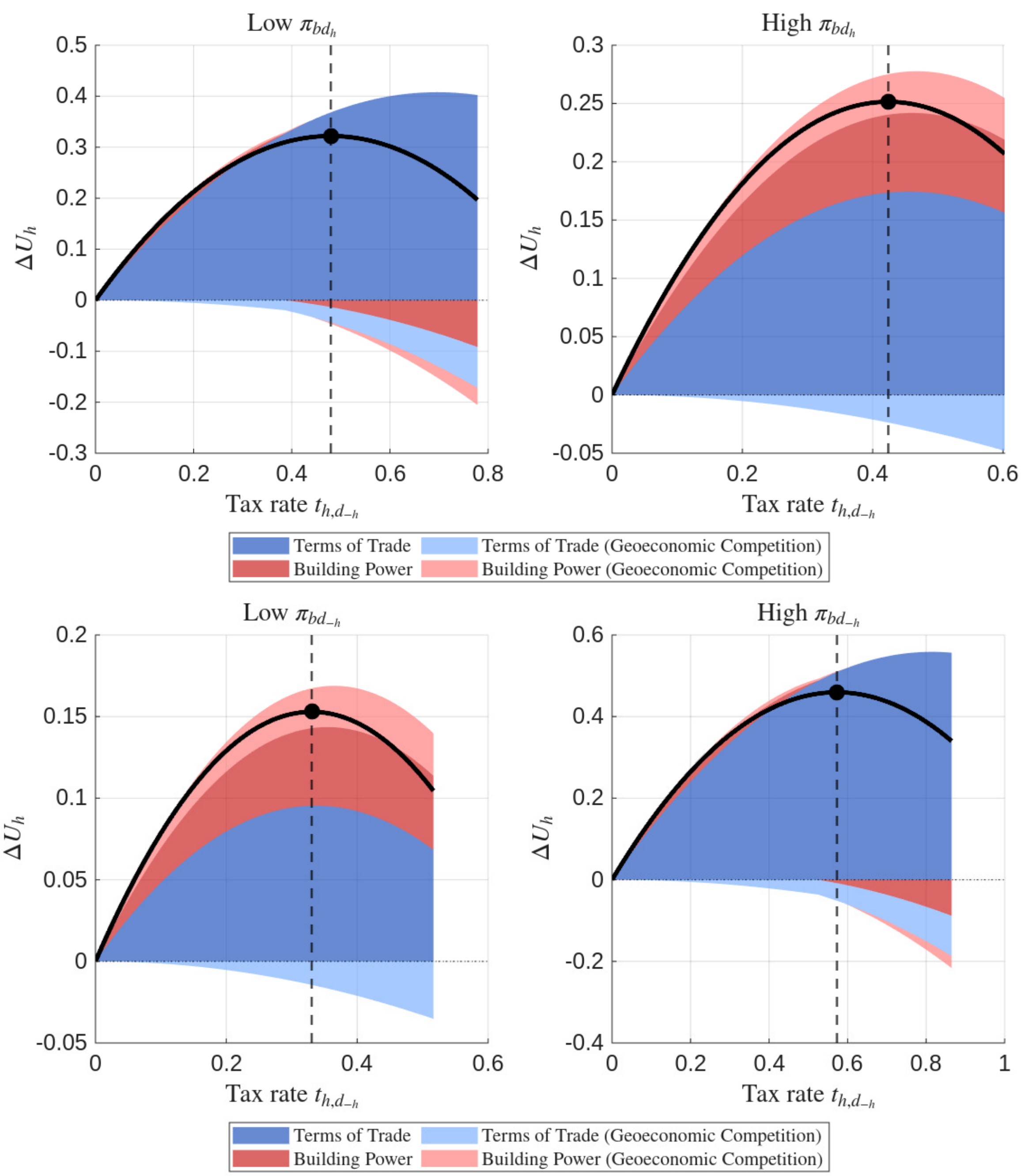
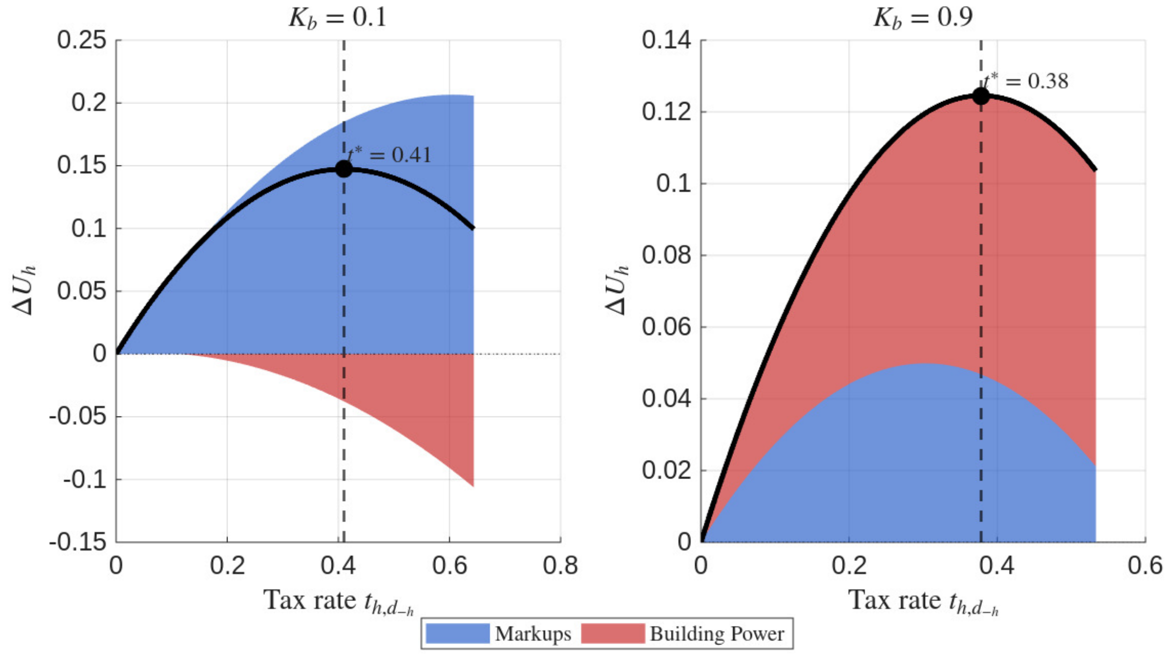


Figure 5: Export Wedges with a Single Hegemon



profitability of the rival hegemon's good for the boundary country, much as in the case of low profitability of h's own good, incentives tilt towards the terms of trade manipulation.

It is instructive to benchmark the results above against the case in which hegemon h is the sole hegemon (Definition 1). Figure 5 replicates the exercise of Figure 3 under the same parametrization, but where hegemon h is the sole hegemon. It shows that the terms of trade and building power forces go in the same directions as in the case of multiple hegemons. That is, even when the country $-h$ is only an economic competitor, h's incentives orient around positive loadings on the terms of trade channel when goods are close to separable, and positive loadings also on Building Power when downstream goods are substitutes. Relative to Figure 5, Figure 3 shows how geoeconomic competition interacts with the terms of trade and power building motives that underlie the tradeoff the hegemon faces between earning economic rents from its rival versus containing its rival in order to build h's geoeconomic power. The presence of a competing hegemon that can offer a close substitute increases the incentives to apply export wedges to contain the rival hegemon.

5 Extensions

Bargaining and Threats Between Hegemons. One interesting extension of our model is to allow for bargaining and threats between the two hegemons. We sketch here an illustrative extension. We assume that in the Beginning before setting export wedges, the two hegemons can bargain over three terms: (i) the export wedges set in the Beginning; (ii) the contracts offered in the Middle; and, (iii) a side payment $T_{US,CH}$ from CH to US, with $T_{US,CH} < 0$ capturing a side payment from US to CH. We assume that bargaining takes the form of Nash bargaining and that the two hegemons have equal bargaining power, so that the bargaining solution solves

$$\max_{\{t_{h,d_{-h}},\tau_h,T_h\}_h,T_{US,CH}} (U_{US} + T_{US,CH} - U^O_{US}(t^O)) \cdot (U_{CH} - T_{US,CH} - U^O_{CH}(t^O))$$

subject to the participation constraints of boundary countries and allies, and where we have defined $U^O_h(t^O)$ as the outside option of each hegemon when bargaining breaks down. We think of the outside option U^O_h as being a function of the *threats* $t^O = \{t^O_{h,d_{-h}}\}_{h\in\mathcal{H}}$ made by each hegemon, where $t^O_{h,d_{-h}}$ is the export wedge that h will set if bargaining breaks down.

Given this bargaining structure, fixing the threats t^O, bargaining between the two hegemons results in a "grand coalition" in which the two hegemons effectively collude to become a single hegemon that maximizes their total surplus. That is, the two hegemons implicitly solve

$$\max_{\{t_h,\tau_h,T_h\}} \sum_{h\in\mathcal{H}} U_h.$$

subject to the participation constraints. There are a few interesting consequences of the grand coalition structure. First, the incentive to manipulate the terms of trade with respect to the rival hegemon's downstream sector is eliminated, since that manipulation is at best zero sum and can be replaced with shifts in transfers and domestic wedges. Second, the hegemons' motivations to build power become more nuanced. The two hegemons still have incentives to build power in each of their relationships with the boundary country, maximizing the gap between the inside and outside options of the target in each relationship so that they can extract transfers in relationships with both the boundary country and allies. As a consequence, the hegemons still have to balance the desire to make each good more attractive to increase power in one relationship, against the fact that that good serves as the outside option in the other relationship.[18] However, the motives to contain each other are muted given the ability to make transfers as part of the grand bargain.

Finally, we sketch the hegemons' motivations in their choice of threats $t^O_{h,d_{-h}}$. Given Nash bargaining, the transfer from the US to China is given by

$$T_{US,CH} = \frac{U_{CH} - U^O_{CH}(t^O)}{2} - \frac{U_{US} - U^O_{US}(t^O)}{2}.$$

The US benefits from economic threats that are asymmetrically costly to China, that is that lower China's outside option relative to the US's outside option. It is also interesting to note that the threats employed shift the surplus between the two hegemons, but do not alter the resulting allocation. That is, hegemonic threats are a mechanism to improve the bargaining position, but in the end each hegemon backs down on its threats once the bargain is resolved. These types of asymmetric

[18] If the two hegemons as a bargaining unit can also consolidate their threats, that is offer the target the choice to accept both hegemons' contracts or lose access to both hegemons' goods, then the outside option would be zero and incentives would orient around lifting the boundary country's inside option.

treats are consistent with the observe patters of the U.S. using threats in semiconductors toward China, while China uses threats in rare-earths towards the U.S. to bargain (Clayton et al. (2025a)).

Anticoercion and Economic Security. A second important extension is to allow for different countries to pursue economic security policies. We sketch how to extend the model first to incorporate economic security by the targets of coercion. We then sketch an extension in which the hegemons pursue economic security vis-a-vis each other.

To capture economic security policies by the allies and the boundary country, we could extend the setup by assuming that each of these countries can in the Beginning choose investment between hegemon-reliant technologies or home alternatives. We could assume that there is a fixed factor that can be allocated between a nontradeable production sector and the country's tradeable sector, with a greater factor allocation increasing the productivity of that sector. Building from the welfare results of Proposition 2, the boundary country would be motivated to allocate its factor in ways that reduce each hegemon's power over it. Allies, being held to their outside option, would have an incentive to fragment away from their hegemon and invest more in home production, which can motivate each hegemon to set commitments to limit their coercion.

To capture economic security policies between the two hegemons, we could extend the model by assuming that each hegemon can allocate a local factor between producing its own upstream good and producing an alternative to the upstream good of its rival. Assuming each hegemon is relatively less efficient at producing the alternative, each hegemon has an incentive to rely on purchases of its rival's good for economic reasons, but would also have an incentive to invest in its home alternative to circumvent its rival's export wedge or to influence its rival's offered contracts in the Middle. Even if the two hegemons are bargaining as sketched above, each hegemon might have an incentive to invest in its home alternative in order to increase its bargaining power vis-a-vis its rival by blunting its rival's economic threat. For example, this might capture Chinese incentives to develop its own advanced semiconductor industry if the U.S. imposes a high export wedge to China in that industry for geoeconomic competition reasons.

Commitment. In models with a single hegemon, the hegemon can benefit from commitments to limit its own behavior in order to deter economic security policies by its targets (Clayton et al. (2024)). It would be interesting to extend our setup to allow for economic security policies and commitments by the hegemons' over their coercion. We conjecture that the prospect of a rising competitor might mute the incentives of an incumbent hegemon to commit itself to more limited coercion. Intuitively, if a rising competitor will erode the rents that the incumbent can earn from its geoeconomic power, the incumbent's motivation to preserve these rents by adhering to rules will be lowered, and the incumbent might start turning more extractive even towards its allies. It is also interesting to consider the relative incentives of the two hegemons to structure rules, as well as when rules are adopted globally (e.g., commitment to limit coercion of all countries) versus within a more contained area (e.g., commitment only over allies, over whom the rival hegemon cannot easily compete).

6 Conclusion

In this paper we introduce a model of geoeconomic competition in which two hegemons both have a profitable trading relationship with each other and compete with each other in exerting power over the rest of the world. We characterize regimes of the model in which the two hegemons accommodate or contain each other and show how these regimes affect the welfare of the rest of the world. We relate the model to both the current U.S. and China rivalry and to previous episodes of great power competition.

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Online Appendix for
"The Great Game: A Model of Geoeconomic Competition"

Christopher Clayton   Matteo Maggiori   Jesse Schreger

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A.1 Proofs

A.1.1 Proof of Lemma 1

The utility of hegemon h can be written as

$$U_h = c_{u_h} e_{u_h} + (p_{d_{-h}u_h} - c_{u_h}) y_{d_{-h}} + \Pi_{d_h} + T_{h,A_h} + T_{h,B}$$

We begin by simplifying. We have that

$$\Pi_{d_h} = \left(p_{d_h} - c_{d_h} - t_{-h,d_h} + \xi y^*_{d_h} \right) y_{d_h}$$

where we have defined $c_{d_h} = \theta^{-1}_{d_h} \sum_{k \in \mathcal{H}} \alpha_{d_h u_k} c_{u_k}$ and $t_{-h,d_h} \equiv \theta^{-1}_{d_h} \alpha_{d_h u_{-h}} t_{-h,d_h u_{-h}}$.

Because the optimization problem of A_h is convex and h has a complete set of wedges on A_h, we re-represent h's problem under the primal approach of choosing $x_{a_h d_h}$ directly, with the implementing wedge given from the FOC,

$$x_{a_h d_h} = \frac{\theta_{a_h d_h} - p_{d_h} - \tau_{h,a_h d_h}}{\kappa_a}$$

Under the primal approach, the participation constraint of A_h is given by

$$\Pi_a(x_{a_h d_h}) - T_{h,A_h} \geq 0$$

Analogously, the optimization problem of B is convex and h has a complete set of wedges, so we again employ the primal approach, with h's wedges satisfying

$$\tau_{h,bd_k} = \theta_{bd_k} - p_{d_k} - \tau_{-h,bd_k} - \kappa_b x_{bd_k} - K_b x_{bd_{-k}}, \quad k \in \mathcal{H}$$

while the primal representation of the participation constraint is

$$\Pi_b(x_b) - \tau_{-h,b} x_b - T_{h,B} \geq V_B^{-h}(\tau_{-h,b})$$

Note that if either participation constraint is slack, the hegemon can strictly increase its objective by increasing its demanded transfer. Therefore, both participation constraints bind, and we have

$$T_{h,A_h} = \Pi_a(x_{a_h d_h})$$

$$T_{h,B} = \Pi_b(x_b) - \tau_{-h,b} x_b - V_B^{-h}(\tau_{-h,b})$$

so that internalizing and using that $p_{d_{-h}u_h} - c_{u_h} = t_{h,d_{-h}}$,

$$U_h = c_{u_h} e_{u_h} + t_{h,d_{-h}} y_{d_{-h}} + \Pi_{d_h} + \Pi_a(x_{a_h d_h}) + \Pi_b(x_b) - \tau_{-h,b} x_b - V_B^{-h}(\tau_{-h,b})$$

where equilibrium prices satisfy

$$p_{d_k} = c_{d_k} + t_{-k,d_k} - \xi y_{d_k}$$

and market clearing implies

$$y_{d_{-h}} = x_{a_{-h}d_{-h}} + x_{bd_{-h}}$$
$$y_{d_h} = x_{a_h d_h} + x_{bd_h}$$

and finally demand of $-h$'s allies is

$$x_{a_{-h}d_{-h}} = \frac{\theta_{a_{-h}d_{-h}} - p_{d_{-h}} - \tau_{-h,a_{-h}d_{-h}}}{\kappa_a}$$

We can now take FOCs. First, the FOC in $x_{a_h d_h}$ is

$$0 = \left(\frac{\partial p_{d_h}}{\partial x_{a_h d_h}} + \xi\right) y_{d_h} + \frac{\partial \Pi_a(x_{a_h d_h})}{\partial x_{a_h d_h}} + \left(\frac{\partial \Pi_a}{\partial p_{d_h}} + \frac{\partial \Pi_b}{\partial p_{d_h}}\right)\frac{\partial p_{d_h}}{\partial x_{a_h d_h}}$$

By Envelope Theorem, $\frac{\partial \Pi_a}{\partial p_{d_h}} + \frac{\partial \Pi_b}{\partial p_{d_h}} = -x_{a_h d_h} - x_{bd_h} = -y_{d_h}$. By construction, $\frac{\partial \Pi_a(x_{a_h d_h})}{\partial x_{a_h d_h}} = \tau_{h,a_h d_h}$. Therefore, we have

$$\tau_{h,a_h d_h} = -\xi y_{d_h}$$

Second, the FOC in x_{bd_h} is

$$0 = \left(\frac{\partial p_{d_h}}{\partial x_{bd_h}} + \xi\right) y_{d_h} + \frac{\partial \Pi_b}{\partial x_{bd_h}} - \tau_{-h,bd_h} + \left(\frac{\partial \Pi_a}{\partial p_{d_h}} + \frac{\partial \Pi_b}{\partial p_{d_h}}\right)\frac{\partial p_{d_h}}{\partial x_{a_h d_h}}$$

Applying Envelope Theorem and market clearing as before and using that $\tau_{h,bd_h} = \frac{\partial \Pi_b}{\partial x_{bd_h}} - \tau_{-h,bd_h}$, we obtain

$$\tau_{h,bd_h} = -\xi y_{d_h}$$

Finally, we take the FOC in $x_{bd_{-h}}$, given by

$$0 = t_{h,d_{-h}}\left(1 + \frac{\partial x_{a_{-h}d_{-h}}}{\partial p_{d_{-h}}}\frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}\right) + \frac{\partial \Pi_b}{\partial x_{bd_{-h}}} - \tau_{-h,bd_{-h}} + \frac{\partial \Pi_b(x_b)}{\partial p_{d_{-h}}}\frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}} - \frac{\partial V_B^{-h}(\tau_{-h,b})}{\partial p_{d_{-h}}}\frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}$$

Using $\frac{\partial x_{a_{-h}d_{-h}}}{\partial p_{d_{-h}}} = -\frac{1}{\kappa_a}$, $\frac{\partial \Pi_b}{\partial x_{bd_{-h}}} - \tau_{-h,bd_{-h}} = \tau_{h,bd_{-h}}$, $\frac{\partial \Pi_b(x_b)}{\partial p_{d_{-h}}} = -x_{bd_{-h}}$, and (by Envelope Theorem) $\frac{\partial V_B^{-h}(\tau_{-h,b})}{\partial p_{d_{-h}}} = -x^{-h}_{bd_{-h}}$, we have

$$\tau_{h,bd_{-h}} = -t_{h,d_{-h}}\left(1 - \frac{1}{\kappa_a}\frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}\right) + (x_{bd_{-h}} - x^{-h}_{bd_{-h}})\frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}$$

Now to evaluate $\frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}$, we have

$$p_{d_{-h}} = c_{d_{-h}} + t_{h,d_{-h}} - \xi(x_{a_{-h}d_{-h}} + x_{bd_{-h}})$$

and so substituting in demand $x_{a_{-h}d_{-h}} = \frac{\theta_{a_{-h}d_{-h}} - p_{d_{-h}} - \tau_{-h,a_{-h}d_{-h}}}{\kappa_a}$ and rearranging, we obtain

$$p_{d_{-h}} = \frac{\kappa_a}{\kappa_a - \xi} c_{d_{-h}} + \frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} - \frac{\xi}{\kappa_a - \xi}(\theta_{a_{-h}d_{-h}} - \tau_{-h,a_{-h}d_{-h}}) - \frac{\kappa_a \xi}{\kappa_a - \xi} x_{bd_{-h}}$$

$$\frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}} = -\frac{\kappa_a \xi}{\kappa_a - \xi}$$

and so then we obtain

$$\tau_{h,bd_{-h}} = -\frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} - \frac{\kappa_a \xi}{\kappa_a - \xi}(x_{bd_{-h}} - x^{-h}_{bd_{-h}})$$

We can therefore consolidate our three key FOCs of hegemon h,

$$\tau_{h,a_h d_h} = -\xi y_{d_h}$$

$$\tau_{h,bd_h} = -\xi y_{d_h}$$

$$\tau_{h,bd_{-h}} = -\frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} - \frac{\kappa_a \xi}{\kappa_a - \xi}(x_{bd_{-h}} - x^{-h}_{bd_{-h}})$$

and proceed from here to solve the system, in conjunction with the three key implementability conditions (FOCs of A_h and B),

$$\tau_{h,a_h d_h} = \theta_{a_h d_h} - p_{d_h} - \kappa_a x_{a_h d_h}$$

$$\tau_{h,bd_k} = \theta_{bd_k} - p_{d_k} - \tau_{-h,bd_k} - \kappa_b x_{bd_k} - K_b x_{bd_{-k}}, \quad k \in \mathcal{H}$$

To solve for the equilibrium, we start by reducing the system of equations. We first substitute out $\tau_{h,a_h d_h} = \tau_{h,bd_h}$ to obtain

$$\tau_{h,bd_h} = -\xi y_{d_h}$$

$$\tau_{h,bd_{-h}} = -\frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} - \frac{\kappa_a \xi}{\kappa_a - \xi}(x_{bd_{-h}} - x^{-h}_{bd_{-h}})$$

$$\tau_{h,bd_h} = \theta_{a_h d_h} - p_{d_h} - \kappa_a x_{a_h d_h}$$

$$\tau_{h,bd_k} = \theta_{bd_k} - p_{d_k} - \tau_{-h,bd_k} - \kappa_b x_{bd_k} - K_b x_{bd_{-k}}, \quad k \in \mathcal{H}$$

We then use $x_{a_h d_h} = \frac{\theta_{a_h d_h} - p_{d_h} - \tau_{h,bd_h}}{\kappa_a}$ (the third equation), $x^{-h}_{bd_{-h}} = \frac{\theta_{bd_{-h}} - p_{d_{-h}} - \tau_{-h,bd_{-h}}}{\kappa_b}$, and market clearing $y_{d_h} = x_{a_h d_h} + x_{bd_h}$ to obtain

$$\tau_{h,bd_h} = -\xi \frac{\theta_{a_h d_h} - p_{d_h} - \tau_{h,bd_h}}{\kappa_a} - \xi x_{bd_h}$$

$$\tau_{h,bd_{-h}} + \frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} = -\frac{\kappa_a \xi}{\kappa_a - \xi} x_{bd_{-h}} + \frac{\kappa_a \xi}{\kappa_a - \xi} \frac{\theta_{bd_{-h}} - p_{d_{-h}} - \tau_{-h,bd_{-h}}}{\kappa_b}$$

$$\tau_{h,bd_k} = \theta_{bd_k} - p_{d_k} - \tau_{-h,bd_k} - \kappa_b x_{bd_k} - K_b x_{bd_{-k}}, \quad k \in \mathcal{H}$$

Substituting in for p_{d_h} and $p_{d_{-h}}$,

$$\tau_{h,bd_h} \frac{\kappa_a - 2\xi}{\kappa_a \xi} = -x_{bd_h} - \frac{1}{\kappa_a}(\pi_{a_h d_h} - \theta^{-1}_{d_h} \alpha_{d_h u_{-h}} t^y_{-h,d_h u_{-h}})$$

$$\tau_{h,bd_{-h}}\frac{\kappa_a-\xi}{\kappa_a\xi} = -\frac{1}{\xi}t^y_{h,d_{-h}u_h}\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h} + \frac{\left(\pi_{bd_{-h}}-\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}t^y_{h,d_{-h}u_h}-\tau_{-h,bd_{-h}}\right)+\frac{\xi}{\kappa_a-\xi}(\pi_{a_{-h}d_{-h}}-\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}t^y_{h,d_{-h}u_h}-\tau_{-h,a_{-h}d_{-h}})}{\kappa_b} - \frac{1}{\kappa_b}\frac{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}{\kappa_a-\xi}x_{bd_{-h}}$$

$$2\tau_{h,bd_h} = \left(\pi_{bd_h}-\theta^{-1}_{d_h}\alpha_{d_hu_{-h}}t^y_{-h,d_hu_{-h}}-\tau_{-h,bd_h}\right)-\kappa_bx_{bd_h}-K_bx_{bd_{-h}}$$

$$\tau_{h,bd_{-h}} = \left(\pi_{bd_{-h}}-\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}t^y_{h,d_{-h}u_h}-\tau_{-h,bd_{-h}}\right)+\frac{\xi}{\kappa_a-\xi}(\pi_{a_{-h}d_{-h}}-\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}t^y_{h,d_{-h}u_h}-\tau_{-h,a_{-h}d_{-h}}) - \frac{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}{\kappa_a-\xi}x_{bd_{-h}}-K_bx_{bd_h}$$

We can rewrite the first two equations as

$$x_{bd_h} = -\frac{\kappa_a-2\xi}{\kappa_a\xi}\tau_{h,bd_h}-\frac{1}{\kappa_a}(\pi_{a_hd_h}-\theta^{-1}_{d_h}\alpha_{d_hu_{-h}}t^y_{-h,d_hu_{-h}})$$

$$\frac{1}{\kappa_b}\frac{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}{\kappa_a-\xi}x_{bd_{-h}} = -\frac{\kappa_a-\xi}{\kappa_a\xi}\tau_{h,bd_{-h}}-\frac{1}{\xi}t^y_{h,d_{-h}u_h}\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h} + \frac{1}{\kappa_b}\left(\pi_{bd_{-h}}-\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}t^y_{h,d_{-h}u_h}-\tau_{-h,bd_{-h}}\right) + \frac{1}{\kappa_b}\frac{\xi}{\kappa_a-\xi}(\pi_{a_{-h}d_{-h}}-\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}t^y_{h,d_{-h}u_h}-\tau_{-h,a_{-h}d_{-h}})$$

We can then substitute into the latter two equations,

$$\frac{2(\kappa_a+\kappa_b)\xi-\kappa_a\kappa_b}{\kappa_a\xi}\tau_{h,bd_h} = \left(\pi_{bd_h}-\theta^{-1}_{d_h}\alpha_{d_hu_{-h}}t^y_{-h,d_hu_{-h}}-\tau_{-h,bd_h}\right)+\frac{\kappa_b}{\kappa_a}(\pi_{a_hd_h}-\theta^{-1}_{d_h}\alpha_{d_hu_{-h}}t^y_{-h,d_hu_{-h}}) - K_b\frac{\kappa_b(\kappa_a-\xi)}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\frac{1}{\kappa_b}\left(\pi_{bd_{-h}}-\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}t^y_{h,d_{-h}u_h}-\tau_{-h,bd_{-h}}\right) - K_b\frac{\kappa_b(\kappa_a-\xi)}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\frac{1}{\kappa_b}\frac{\xi}{\kappa_a-\xi}(\pi_{a_{-h}d_{-h}}-\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}t^y_{h,d_{-h}u_h}-\tau_{-h,a_{-h}d_{-h}}) + K_b\frac{\kappa_b(\kappa_a-\xi)}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\frac{\kappa_a-\xi}{\kappa_a\xi}\tau_{h,bd_{-h}} + K_b\frac{\kappa_b(\kappa_a-\xi)}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\frac{1}{\xi}t^y_{h,d_{-h}u_h}\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}$$

$$\tau_{h,bd_{-h}} = -K_b\frac{\kappa_a-2\xi}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\tau_{h,bd_h}-K_b\frac{\xi}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}(\pi_{a_hd_h}-\theta^{-1}_{d_h}\alpha_{d_hu_{-h}}t^y_{-h,d_hu_{-h}}) - \frac{\kappa_a\kappa_b}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}t^y_{h,d_{-h}u_h}\theta^{-1}_{d_{-h}}\alpha_{d_{-h}u_h}$$

From here, we define

$$\epsilon_\tau = \frac{\kappa_a-2\xi}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}$$

$$\epsilon_t^{own} = \frac{\kappa_a\kappa_b}{\kappa_a\kappa_b - (\kappa_a+\kappa_b)\xi}$$
$$\epsilon_a^{own} = \frac{\xi}{\kappa_a\kappa_b - (\kappa_a+\kappa_b)\xi}$$

from which obtains equation 15.

Finally, we can then substitute in $\tau_{h,bd_{-h}}$ above to obtain

$$\begin{aligned}
\zeta\tau_{h,bd_h} = &-\kappa_a\xi\left(\pi_{bd_h} - \theta_{d_h}^{-1}\alpha_{d_h u_{-h}} t^y_{-h,d_h u_{-h}} - \tau_{-h,bd_h}\right)\\
&-\kappa_b\xi\left[1 - K_b^2\left(\frac{(\kappa_a-\xi)}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\right)^2\right](\pi_{a_h d_h} - \theta_{d_h}^{-1}\alpha_{d_h u_{-h}} t^y_{-h,d_h u_{-h}})\\
&+K_b\frac{\kappa_a\xi(\kappa_a-\xi)}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\left(\pi_{bd_{-h}} - \theta_{d_{-h}}^{-1}\alpha_{d_{-h}u_h} t^y_{h,d_{-h}u_h} - \tau_{-h,bd_{-h}}\right)\\
&+K_b\frac{\kappa_a\xi^2}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\left(\pi_{a_{-h}d_{-h}} - \theta_{d_{-h}}^{-1}\alpha_{d_{-h}u_h} t^y_{h,d_{-h}u_h} - \tau_{-h,a_{-h}d_{-h}}\right)\\
&+K_b\frac{\kappa_a\xi\kappa_a\kappa_b(\kappa_a-\xi)}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)^2} t^y_{h,d_{-h}u_h}\theta_{d_{-h}}^{-1}\alpha_{d_{-h}u_h}
\end{aligned}$$

where we have defined[1]

$$\zeta = \kappa_a\kappa_b - 2(\kappa_a+\kappa_b)\xi - K_b^2\left(\frac{(\kappa_a-\xi)}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\right)^2\kappa_b(\kappa_a-2\xi)$$

From here we obtain equation 14, where

$$\delta_b^{own} = \zeta^{-1}\kappa_a\xi$$
$$\delta_a^{own} = \zeta^{-1}\kappa_b\xi\left[1 - K_b^2\left(\frac{(\kappa_a-\xi)}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\right)^2\right]$$
$$\delta_b^{rival} = \zeta^{-1}\frac{\kappa_a\xi(\kappa_a-\xi)}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}$$
$$\delta_a^{rival} = \zeta^{-1}\frac{\kappa_a\xi^2}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}$$
$$\delta_t^{own} = \zeta^{-1}\frac{\kappa_a\xi\kappa_a\kappa_b(\kappa_a-\xi)}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)^2}$$

A.1.2 Proof of Proposition 1

The utility of hegemon h can be written as

$$U_h = c_{u_h}e_{u_h} + (p_{d_{-h}u_h} - c_{u_h})y_{d_{-h}} + \Pi_{d_h} + T_{h,A_h} + T_{h,B}$$

[1]Recall that concavity requires $K_b^2 < \frac{\kappa_a\kappa_b - 2\xi(\kappa_a+\kappa_b)}{\kappa_a - 2\xi}\frac{1}{\kappa_b}\left(\frac{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}{\kappa_a-\xi}\right)^2$, which implies that $\zeta > 0$.

We begin by simplifying. We have that

$$\Pi_{d_h} = \left(p_{d_h} - c_{d_h} - t_{-h,d_h} + \xi y^*_{d_h}\right) y_{d_h}$$

where we have defined $c_{d_h} = \theta^{-1}_{d_h} \sum_{k \in \mathcal{H}} \alpha_{d_h u_k} c_{u_k}$ and $t_{-h,d_h} \equiv \theta^{-1}_{d_h} \alpha_{d_h u_{-h}} t_{-h,d_h u_{-h}}$.

Because the optimization problem of A_h is convex and h has a complete set of wedges on A_h, we re-represent h's problem under the primal approach of choosing $x_{a_h d_h}$ directly, with the implementing wedge given from the FOC,

$$x_{a_h d_h} = \frac{\theta_{a_h d_h} - p_{d_h} - \tau_{h,a_h d_h}}{\kappa_a}$$

Under the primal approach, the participation constraint of A_h is given by

$$\Pi_a(x_{a_h d_h}) - T_{h,A_h} \geq 0$$

Analogously, the optimization problem of B is convex and h has a complete set of wedges, so we again employ the primal approach, with h's wedges satisfying

$$\tau_{h,bd_k} = \theta_{bd_k} - p_{d_k} - \tau_{-h,bd_k} - \kappa_b x_{bd_k} - K_b x_{bd_{-k}}, \quad k \in \mathcal{H}$$

while the primal representation of the participation constraint is

$$\Pi_b(x_b) - \tau_{-h,b} x_b - T_{h,B} \geq V_B^{-h}(\tau_{-h,b})$$

Note that if either participation constraint is slack, the hegemon can strictly increase its objective by increasing its demanded transfer. Therefore, both participation constraints bind, and we have

$$T_{h,A_h} = \Pi_a(x_{a_h d_h})$$

$$T_{h,B} = \Pi_b(x_b) - \tau_{-h,b} x_b - V_B^{-h}(\tau_{-h,b})$$

so that internalizing and using that $p_{d_{-h} u_h} - c_{u_h} = t_{h,d_{-h}}$,

$$U_h = c_{u_h} e_{u_h} + t_{h,d_{-h}} y_{d_{-h}} + \Pi_{d_h} + \Pi_a(x_{a_h d_h}) + \Pi_b(x_b) - \tau_{-h,b} x_b - V_B^{-h}(\tau_{-h,b})$$

where equilibrium prices satisfy

$$p_{d_k} = c_{d_k} + t_{-k,d_k} - \xi y_{d_k}$$

and market clearing implies

$$y_{d_{-h}} = x_{a_{-h} d_{-h}} + x_{bd_{-h}}$$

$$y_{d_h} = x_{a_h d_h} + x_{bd_h}$$

and finally demand of $-h$'s allies is

$$x_{a_{-h} d_{-h}} = \frac{\theta_{a_{-h} d_{-h}} - p_{d_{-h}} - \tau_{-h,a_{-h} d_{-h}}}{\kappa_a}$$

We can now take FOCs. First, the FOC in $x_{a_h d_h}$ is

$$0 = \left(\frac{\partial p_{d_h}}{\partial x_{a_h d_h}} + \xi\right) y_{d_h} + \frac{\partial \Pi_a(x_{a_h d_h})}{\partial x_{a_h d_h}} + \left(\frac{\partial \Pi_a}{\partial p_{d_h}} + \frac{\partial \Pi_b}{\partial p_{d_h}}\right) \frac{\partial p_{d_h}}{\partial x_{a_h d_h}}$$

By Envelope Theorem, $\frac{\partial \Pi_a}{\partial p_{d_h}} + \frac{\partial \Pi_b}{\partial p_{d_h}} = -x_{a_h d_h} - x_{bd_h} = -y_{d_h}$. By construction, $\frac{\partial \Pi_a(x_{a_h d_h})}{\partial x_{a_h d_h}} = \tau_{h,a_h d_h}$. Therefore, we have

$$\tau_{h,a_h d_h} = -\xi y_{d_h}$$

Second, the FOC in x_{bd_h} is

$$0 = \left(\frac{\partial p_{d_h}}{\partial x_{bd_h}} + \xi\right) y_{d_h} + \frac{\partial \Pi_b}{\partial x_{bd_h}} - \tau_{-h,bd_h} + \left(\frac{\partial \Pi_a}{\partial p_{d_h}} + \frac{\partial \Pi_b}{\partial p_{d_h}}\right) \frac{\partial p_{d_h}}{\partial x_{a_h d_h}}$$

Applying Envelope Theorem and market clearing as before and using that $\tau_{h,bd_h} = \frac{\partial \Pi_b}{\partial x_{bd_h}} - \tau_{-h,bd_h}$, we obtain

$$\tau_{h,bd_h} = -\xi y_{d_h}$$

Finally, we take the FOC in $x_{bd_{-h}}$, given by

$$0 = t_{h,d_{-h}} \left(1 + \frac{\partial x_{a_{-h} d_{-h}}}{\partial p_{d_{-h}}} \frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}\right) + \frac{\partial \Pi_b}{\partial x_{bd_{-h}}} - \tau_{-h,bd_{-h}} + \frac{\partial \Pi_b(x_b)}{\partial p_{d_{-h}}} \frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}} - \frac{\partial V_B^{-h}(\tau_{-h,b})}{\partial p_{d_{-h}}} \frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}$$

Using $\frac{\partial x_{a_{-h} d_{-h}}}{\partial p_{d_{-h}}} = -\frac{1}{\kappa_a}$, $\frac{\partial \Pi_b}{\partial x_{bd_{-h}}} - \tau_{-h,bd_{-h}} = \tau_{h,bd_{-h}}$, $\frac{\partial \Pi_b(x_b)}{\partial p_{d_{-h}}} = -x_{bd_{-h}}$, and (by Envelope Theorem) $\frac{\partial V_B^{-h}(\tau_{-h,b})}{\partial p_{d_{-h}}} = -x_{bd_{-h}}^{-h}$, we have

$$\tau_{h,bd_{-h}} = -t_{h,d_{-h}} \left(1 - \frac{1}{\kappa_a} \frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}\right) + (x_{bd_{-h}} - x_{bd_{-h}}^{-h}) \frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}$$

Now to evaluate $\frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}}$, we have

$$p_{d_{-h}} = c_{d_{-h}} + t_{h,d_{-h}} - \xi(x_{a_{-h} d_{-h}} + x_{bd_{-h}})$$

and so substituting in demand $x_{a_{-h} d_{-h}} = \frac{\theta_{a_{-h} d_{-h}} - p_{d_{-h}} - \tau_{-h,a_{-h} d_{-h}}}{\kappa_a}$ and rearranging, we obtain

$$p_{d_{-h}} = \frac{\kappa_a}{\kappa_a - \xi} c_{d_{-h}} + \frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} - \frac{\xi}{\kappa_a - \xi} (\theta_{a_{-h} d_{-h}} - \tau_{-h,a_{-h} d_{-h}}) - \frac{\kappa_a \xi}{\kappa_a - \xi} x_{bd_{-h}}$$

$$\frac{\partial p_{d_{-h}}}{\partial x_{bd_{-h}}} = -\frac{\kappa_a \xi}{\kappa_a - \xi}$$

and so then we obtain

$$\tau_{h,bd_{-h}} = -\frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} - \frac{\kappa_a \xi}{\kappa_a - \xi} (x_{bd_{-h}} - x_{bd_{-h}}^{-h})$$

We can therefore consolidate our three key FOCs of hegemon h,

$$\tau_{h,a_h d_h} = -\xi y_{d_h}$$

$$\tau_{h,bd_h} = -\xi y_{d_h}$$

$$\tau_{h,bd_{-h}} = -\frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} - \frac{\kappa_a \xi}{\kappa_a - \xi}(x_{bd_{-h}} - x^{-h}_{bd_{-h}})$$

and proceed from here to solve the system, in conjunction with the three key implementability conditions (FOCs of A_h and B),

$$\tau_{h,a_h d_h} = \theta_{a_h d_h} - p_{d_h} - \kappa_a x_{a_h d_h}$$

$$\tau_{h,bd_k} = \theta_{bd_k} - p_{d_k} - \tau_{-h,bd_k} - \kappa_b x_{bd_k} - K_b x_{bd_{-k}}, \quad k \in \mathcal{H}$$

To solve for the equilibrium, we start by reducing the system of equations. We first substitute out $\tau_{h,a_h d_h} = \tau_{h,bd_h}$ to obtain

$$\tau_{h,bd_h} = -\xi y_{d_h}$$

$$\tau_{h,bd_{-h}} = -\frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} - \frac{\kappa_a \xi}{\kappa_a - \xi}(x_{bd_{-h}} - x^{-h}_{bd_{-h}})$$

$$\tau_{h,bd_h} = \theta_{a_h d_h} - p_{d_h} - \kappa_a x_{a_h d_h}$$

$$\tau_{h,bd_k} = \theta_{bd_k} - p_{d_k} - \tau_{-h,bd_k} - \kappa_b x_{bd_k} - K_b x_{bd_{-k}}, \quad k \in \mathcal{H}$$

We then use $x_{a_h d_h} = \frac{\theta_{a_h d_h} - p_{d_h} - \tau_{h,bd_h}}{\kappa_a}$ (the third equation), $x^{-h}_{bd_{-h}} = \frac{\theta_{bd_{-h}} - p_{d_{-h}} - \tau_{-h,bd_{-h}}}{\kappa_b}$, and market clearing $y_{d_h} = x_{a_h d_h} + x_{bd_h}$ to obtain

$$\tau_{h,bd_h} = -\xi \frac{\theta_{a_h d_h} - p_{d_h} - \tau_{h,bd_h}}{\kappa_a} - \xi x_{bd_h}$$

$$\tau_{h,bd_{-h}} + \frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} = -\frac{\kappa_a \xi}{\kappa_a - \xi} x_{bd_{-h}} + \frac{\kappa_a \xi}{\kappa_a - \xi} \frac{\theta_{bd_{-h}} - p_{d_{-h}} - \tau_{-h,bd_{-h}}}{\kappa_b}$$

$$\tau_{h,bd_k} = \theta_{bd_k} - p_{d_k} - \tau_{-h,bd_k} - \kappa_b x_{bd_k} - K_b x_{bd_{-k}}, \quad k \in \mathcal{H}$$

We next use the equilibrium relationship $\tau_{h,bd_h} = -\xi y_{d_h}$ and the pricing equation $p_{d_h} = c_{d_h} + t_{-h,d_h} - \xi y_{d_h} = c_{d_h} + t_{-h,d_h} + \tau_{h,bd_h}$ to obtain for each $h \in \mathcal{H}$

$$\frac{\kappa_a - 2\xi}{\kappa_a} \tau_{h,bd_h} = -\xi \frac{(\pi_{a_h d_h} - t_{-h,d_h})}{\kappa_a} - \xi x_{bd_h}$$

$$\tau_{h,bd_{-h}} + \frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} = -\frac{\kappa_a \xi}{\kappa_a - \xi} x_{bd_{-h}} + \frac{1}{\kappa_b} \frac{\kappa_a \xi}{\kappa_a - \xi}(\pi_{bd_{-h}} - t_{h,d_{-h}}) - \frac{1}{\kappa_b} \frac{\kappa_a \xi}{\kappa_a - \xi} 2\tau_{-h,bd_{-h}}$$

$$2\tau_{h,bd_h} = (\pi_{bd_h} - t_{-h,d_h}) - \tau_{-h,bd_h} - \kappa_b x_{bd_h} - K_b x_{bd_{-h}}$$

where we have defined $\pi_{a_h d_h} = \theta_{a_h d_h} - c_{d_h}$ and $\pi_{bd_h} = \theta_{bd_h} - c_{d_h}$. Next, we use the two versions of the first equation for each $h \in \mathcal{H}$ to substitute out for x_b,

$$x_{bd_h} = -\frac{1}{\kappa_a}(\pi_{a_h d_h} - t_{-h,d_h}) - \frac{\kappa_a - 2\xi}{\kappa_a \xi} \tau_{h,bd_h}$$

$$x_{bd_{-h}} = -\frac{1}{\kappa_a}(\pi_{a_{-h} d_{-h}} - t_{h,d_{-h}}) - \frac{\kappa_a - 2\xi}{\kappa_a \xi} \tau_{-h,bd_{-h}}$$

and obtain the system for $h \in \mathcal{H}$

$$\tau_{h,bd_{-h}} = -\frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} + \frac{\xi}{\kappa_a - \xi}(\pi_{a_{-h}d_{-h}} - t_{h,d_{-h}}) + \frac{1}{\kappa_b}\frac{\kappa_a \xi}{\kappa_a - \xi}(\pi_{bd_{-h}} - t_{h,d_{-h}}) + \frac{\kappa_a\kappa_b - 2(\kappa_a+\kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\tau_{-h,bd_{-h}}$$

$$\Big(\kappa_a\kappa_b - 2(\kappa_a+\kappa_b)\xi\Big)\tau_{h,bd_h} = -\kappa_b\xi(\pi_{a_h d_h} - t_{-h,d_h}) - \kappa_a\xi(\pi_{bd_h} - t_{-h,d_h}) - K_b\xi(\pi_{a_{-h}d_{-h}} - t_{h,d_{-h}}) - K_b(\kappa_a - 2\xi)\tau_{-h,bd_{-h}} + \kappa$$

We can then use the pair of the first two equations to substitute out for $\tau_{h,bd_{-h}}$ and τ_{-h,bd_h}, obtaining for $h \in \mathcal{H}$

$$\begin{aligned}
\Big(\kappa_a\kappa_b - 2(\kappa_a+\kappa_b)\xi\Big)\tau_{h,bd_h} = &- \kappa_b\xi(\pi_{a_h d_h} - t_{-h,d_h}) - \kappa_a\xi(\pi_{bd_h} - t_{-h,d_h}) \\
&- K_b\frac{\kappa_b\xi(\kappa_a - \xi)}{\Big(\kappa_a\kappa_b - (\kappa_a+\kappa_b)\xi\Big)}(\pi_{a_{-h}d_{-h}} - t_{h,d_{-h}}) - \frac{\kappa_b\kappa_a^2\xi}{\Big(\kappa_a\kappa_b - (\kappa_a+\kappa_b)\xi\Big)}t_{-h,d_h} \\
&- K_b\frac{\kappa_b(\kappa_a - \xi)(\kappa_a - 2\xi)}{\Big(\kappa_a\kappa_b - (\kappa_a+\kappa_b)\xi\Big)}\tau_{-h,bd_{-h}}
\end{aligned}$$

Finally, we use the version of this equation for $-h$,

$$\begin{aligned}
\Big(\kappa_a\kappa_b - 2(\kappa_a+\kappa_b)\xi\Big)\tau_{-h,bd_{-h}} = &- \kappa_b\xi(\pi_{a_{-h}d_{-h}} - t_{h,d_{-h}}) - \kappa_a\xi(\pi_{bd_{-h}} - t_{h,d_{-h}}) \\
&- K_b\frac{\kappa_b\xi(\kappa_a - \xi)}{\Big(\kappa_a\kappa_b - (\kappa_a+\kappa_b)\xi\Big)}(\pi_{a_h d_h} - t_{-h,d_h}) - \frac{\kappa_b\kappa_a^2\xi}{\Big(\kappa_a\kappa_b - (\kappa_a+\kappa_b)\xi\Big)}t_{h,d_{-h}} \\
&- K_b\frac{\kappa_b(\kappa_a - \xi)(\kappa_a - 2\xi)}{\Big(\kappa_a\kappa_b - (\kappa_a+\kappa_b)\xi\Big)}\tau_{h,bd_h}
\end{aligned}$$

to substitute into the equation for h to obtain the solution,

$$\begin{aligned}
\tau_{h,bd_h} =& -\vartheta^{-1}\kappa_b\xi\left[1 - K_b^2\kappa_b\left(\frac{\kappa_a-\xi}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\right)^2\frac{\kappa_a-2\xi}{\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi}\right](\pi_{a_hd_h}-t_{-h,d_h}) \\
&-\vartheta^{-1}\kappa_a\xi(\pi_{bd_h}-t_{-h,d_h}) \\
&+\vartheta^{-1}K_b\frac{\kappa_b(\kappa_a-\xi)\xi}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)}\frac{2\kappa_a\xi}{\left(\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi\right)}(\pi_{a_{-h}d_{-h}}-t_{h,d_{-h}}) \\
&+\vartheta^{-1}K_b\frac{\kappa_b(\kappa_a-\xi)(\kappa_a-2\xi)}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)\left(\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi\right)}\kappa_a\xi(\pi_{bd_{-h}}-t_{h,d_{-h}}) \\
&-\vartheta^{-1}\frac{\kappa_b\kappa_a^2\xi}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)}t_{-h,d_h} \\
&+\vartheta^{-1}K_b\frac{\kappa_b(\kappa_a-\xi)(\kappa_a-2\xi)}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)\left(\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi\right)}\frac{\kappa_b\kappa_a^2\xi}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)}t_{h,d_{-h}}
\end{aligned}$$

where we have defined

$$\vartheta = \kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi - K_b^2\frac{\kappa_b(\kappa_a-\xi)(\kappa_a-2\xi)}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)\left(\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi\right)}\frac{\kappa_b(\kappa_a-\xi)(\kappa_a-2\xi)}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)}$$

We can therefore represent this system as

$$\tau_{h,bd_h} = -\beta_a^{own}\pi_{a_hd_h}-\beta_b^{own}\pi_{bd_h}+K_b\beta_a^{rival}\pi_{a_{-h}d_{-h}}+K_b\beta_b^{rival}\pi_{bd_{-h}}+K_b(\kappa_a-\kappa_b)\beta_t^{own}t_{h,d_{-h}}+\beta_t^{rival}t_{-h,d_h}$$

where we have defined

$$\beta_a^{own} = \vartheta^{-1}\kappa_b\xi\left[1-K_b^2\kappa_b\left(\frac{\kappa_a-\xi}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\right)^2\frac{\kappa_a-2\xi}{\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi}\right]$$

$$\beta_b^{own} = \vartheta^{-1}\kappa_a\xi$$

$$\beta_a^{rival} = \vartheta^{-1}\frac{\kappa_b(\kappa_a-\xi)\xi}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\frac{\kappa_a}{\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi}2\xi$$

$$\beta_b^{rival} = \vartheta^{-1}\frac{\kappa_b(\kappa_a-\xi)\xi}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\frac{\kappa_a}{\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi}(\kappa_a-2\xi)$$

$$\beta_t^{own} = \vartheta^{-1}\frac{\kappa_b(\kappa_a-\xi)\xi}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)}\frac{1}{\left(\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi\right)}\kappa_a^2\frac{\xi}{\left(\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi\right)}$$

$$\beta_t^{rival} = \vartheta^{-1}\xi\left[\frac{\kappa_a\kappa_b^2-(\kappa_a+\kappa_b)^2\xi}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}-K_b^2\kappa_b^2\left(\frac{\kappa_a-\xi}{\kappa_a\kappa_b-(\kappa_a+\kappa_b)\xi}\right)^2\frac{\kappa_a-2\xi}{\kappa_a\kappa_b-2(\kappa_a+\kappa_b)\xi}\right]$$

Note that we have $\beta_b^{own}, \beta_a^{rival}, \beta_b^{rival}, \beta_t^{own} > 0$ since concavity requires $\kappa_a > \xi$ and $\kappa_a\kappa_b - 2(\kappa_a+\kappa_b)\xi > 0$. We also have $\beta_a^{own} > 0$ from concavity.

Finally, we can use the equation

$$\tau_{h,bd_{-h}} = -\frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} + \frac{\xi}{\kappa_a - \xi}(\pi_{a_{-h}d_{-h}} - t_{h,d_{-h}}) + \frac{1}{\kappa_b}\frac{\kappa_a \xi}{\kappa_a - \xi}(\pi_{bd_{-h}} - t_{h,d_{-h}}) + \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\tau_{-h,bd_{-h}}$$

and the solution for $\tau_{-h,bd_{-h}}$ to write

$$\tau_{h,bd_{-h}} = K_b\gamma_a^{own}\pi_{a_h d_h} + K_b\gamma_b^{own}\pi_{bd_h} + \gamma_a^{rival}\pi_{a_{-h}d_{-h}} + \gamma_b^{rival}\pi_{bd_{-h}} - \gamma_t^{own} t_{h,d_{-h}} + K_b(\kappa_a - \kappa_b)\gamma_t^{rival} t_{-h,d_h}$$

$$\gamma_a^{own} = \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\beta_a^{rival}$$

$$\gamma_b^{own} = \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\beta_b^{rival}$$

$$\gamma_a^{rival} = \frac{\xi}{\kappa_a - \xi} - \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\beta_a^{own}$$

$$\gamma_b^{rival} = \frac{1}{\kappa_b}\frac{\kappa_a\xi}{\kappa_a - \xi} - \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\beta_b^{own}$$

$$\gamma_t^{own} = \frac{\kappa_a\kappa_b + (\kappa_a + \kappa_b)\xi}{\kappa_a - \xi}\frac{1}{\kappa_b} - \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\beta_t^{rival}$$

$$\gamma_t^{rival} = \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\beta_t^{own}$$

We have $\gamma_a^{own}, \gamma_b^{own}, \gamma_t^{rival} > 0$ from concavity and since $\beta_a^{rival}, \beta_b^{rival}, \beta_t^{own} > 0$. We also have

$$\begin{aligned}
\gamma_a^{rival} &= \frac{\xi}{\kappa_a - \xi} - \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\vartheta^{-1}\kappa_b\xi\left[1 - K_b^2\kappa_b\left(\frac{\kappa_a - \xi}{\kappa_a\kappa_b - (\kappa_a + \kappa_b)\xi}\right)^2\frac{\kappa_a - 2\xi}{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}\right] \\
&\geq \frac{\xi}{\kappa_a - \xi} - \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\vartheta^{-1}\kappa_b\xi \\
&\geq \frac{\xi}{\kappa_a - \xi} - \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\frac{1}{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}\kappa_b\xi \\
&= 0
\end{aligned}$$

since $\vartheta \leq \kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi$. We have

$$\gamma_b^{rival} = \frac{1}{\kappa_b}\frac{\kappa_a\xi}{\kappa_a - \xi} - \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\vartheta^{-1}\kappa_a\xi \geq 0$$

by the same logic. Finally, we have

$$\begin{aligned}
\gamma_t^{own} &\geq \frac{\kappa_a\kappa_b + (\kappa_a + \kappa_b)\xi}{\kappa_a - \xi}\frac{1}{\kappa_b} - \frac{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\vartheta^{-1}\xi\frac{\kappa_a\kappa_b^2 - (\kappa_a + \kappa_b)^2\xi}{\kappa_a\kappa_b - (\kappa_a + \kappa_b)\xi} \\
&\geq \frac{\kappa_a\kappa_b}{\kappa_a\kappa_b - (\kappa_a + \kappa_b)\xi} \\
&> 0
\end{aligned}$$

A.1.3 Proof of Proposition 2

Starting from the boundary country's welfare,

$$W_B = \sum_{h \in \mathcal{H}} V_B^{-h}(\tau_{-h,b}) - V_B(\overline{\tau}_b),$$

and using Envelope Theorem, we have

$$\frac{dV_B^{-h}(\tau_{-h,b})}{de} = \frac{\partial V_B^{-h}(\tau_{-h,b})}{\partial e} - \frac{\partial[p_{d_{-h}} + \tau_{-h,bd_{-h}}]}{\partial e} x_{bd_{-h}}^{-h}$$

$$\frac{dV_B(\overline{\tau}_b)}{de} = \frac{\partial V_B(\overline{\tau}_b)}{de} - \sum_{h \in \mathcal{H}} \frac{\partial[p_{d_{-h}} + \overline{\tau}_{bd_{-h}}]}{\partial e} x_{bd_{-h}}$$

and so we obtain

$$\frac{dW_B}{de} = \sum_{h \in \mathcal{H}} \frac{\partial V_B^{-h}(\tau_{-h,b})}{\partial e} - \frac{\partial V_B(\overline{\tau}_b)}{de} - \sum_{h \in \mathcal{H}} \frac{\partial[p_{d_{-h}} + \tau_{-h,bd_{-h}}]}{\partial e} x_{bd_{-h}}^{-h} + \sum_{h \in \mathcal{H}} \frac{\partial[p_{d_h} + \overline{\tau}_{bd_h}]}{\partial e} x_{bd_h}$$

and so rearranging,

$$\frac{dW_B}{de} = \sum_{h \in \mathcal{H}} \frac{\partial V_B^{-h}(\tau_{-h,b})}{\partial e} - \frac{\partial V_B(\overline{\tau}_b)}{de} - \sum_{h \in \mathcal{H}} \frac{\partial[p_{d_{-h}} + \tau_{-h,bd_{-h}}]}{\partial e} (x_{bd_{-h}}^{-h} - x_{bd_{-h}}) + \sum_{h \in \mathcal{H}} \frac{\partial \tau_{-h,bd_h}}{\partial e} x_{bd_h}$$

A.1.4 Proof of Proposition 3

Following the proof of Proposition h, hegemon h's ex-post optimization problem is

$$U_h = \max c_{u_h} e_{u_h} + t_{h,d_{-h}} y_{d_{-h}} + \Pi_{d_h} + \Pi_a(x_{a_h d_h}) + \Pi_b(x_b) - \tau_{-h,b} x_b - V_B^{-h}(\tau_{-h,b})$$

internalizing the equilibrium relationships

$$p_{d_h} = c_{d_h} + t_{-h,d_h} - \xi y_{d_h}$$

$$y_{d_h} = x_{a_h d_h} + x_{bd_h}$$

$$y_{d_{-h}} = \frac{\theta_{a_{-h} d_{-h}} - p_{d_{-h}} - \tau_{-h,a_{-h} d_{-h}}}{\kappa_a} + x_{bd_{-h}}$$

$$p_{d_{-h}} = \frac{\kappa_a}{\kappa_a - \xi} c_{d_{-h}} + \frac{\kappa_a}{\kappa_a - \xi} t_{h,d_{-h}} - \frac{\xi}{\kappa_a - \xi}(\theta_{a_{-h} d_{-h}} - \tau_{-h,a_{-h} d_{-h}}) - \frac{\kappa_a \xi}{\kappa_a - \xi} x_{bd_{-h}}$$

By Envelope Theorem, we have

$$\frac{\partial U_h}{\partial t_{h,d_{-h}}} = y_{d_{-h}} + t_{h,d_{-h}} \frac{\partial y_{d_{-h}}}{\partial t_{h,d_{-h}}} + \frac{\partial \Pi_b}{\partial p_{d_{-h}}} \frac{\partial p_{d_{-h}}}{\partial t_{h,d_{-h}}} - \frac{\partial \tau_{-h,b}}{\partial t_{h,d_{-h}}} x_b + \frac{\partial[p_{d_{-h}} + \tau_{-h,bd_{-h}}]}{\partial t_{h,d_{-h}}} x_{bd_{-h}}^{-h}$$

using that $\frac{\partial \Pi_b}{\partial p_{d_{-h}}} = -x_{bd_{-h}}$, we have

$$\frac{\partial U_h}{\partial t_{h,d_{-h}}} = y_{d_{-h}} - t_{h,d_{-h}} \frac{1}{\kappa_a} \frac{\partial[p_{d_{-h}} + \tau_{-h,a_{-h} d_{-h}}]}{\partial t_{h,d_{-h}}} - \frac{\partial[p_{d_{-h}} + \tau_{-h,bd_{-h}}]}{\partial t_{h,d_{-h}}} (x_{bd_{-h}} - x_{bd_{-h}}^{-h}) - \frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}} x_{bd_h}$$

Finally, we have

$$\frac{\partial[p_{d_{-h}} + \tau_{-h,a_{-h}d_{-h}}]}{\partial t_{h,d_{-h}}} = \frac{\kappa_a}{\kappa_a - \xi} + \left(\frac{\xi}{\kappa_a - \xi} + 1\right)\frac{\partial \tau_{-h,a_{-h}d_{-h}}}{\partial t_{h,d_{-h}}} = \frac{\kappa_a}{\kappa_a - \xi}\left(1 + \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}\right)$$

and so we obtain

$$\frac{\partial U_h}{\partial t_{h,d_{-h}}} = \overbrace{y_{d_{-h}} - \frac{1}{\kappa_a - \xi} t_{h,d_{-h}}}^{\text{Markups}} + \overbrace{\frac{\kappa_a}{\kappa_a - \xi}(x^{-h}_{bd_{-h}} - x_{bd_{-h}})}^{\text{Building Power}}$$

$$\underbrace{\overbrace{-t_{h,d_{-h}} \frac{1}{\kappa_a - \xi} \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}}^{\text{Markups}} + \overbrace{\frac{\kappa_a}{\kappa_a - \xi} \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}(x^{-h}_{bd_{-h}} - x_{bd_{-h}}) - \frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}} x_{bd_h}}^{\text{Building Power}}}_{\text{Geoeconomic Competition}}$$

To now solve for the optimal tax, the FOC is

$$0 = y_{d_{-h}} - \frac{1}{\kappa_a - \xi} t_{h,d_{-h}} + \frac{\kappa_a}{\kappa_a - \xi}(x^{-h}_{bd_{-h}} - x_{bd_{-h}}) - t_{h,d_{-h}} \frac{1}{\kappa_a - \xi} \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}$$

$$0 = y_{d_{-h}} + \frac{\kappa_a}{\kappa_a - \xi}\left(1 + \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}\right)(x^{-h}_{bd_{-h}} - x_{bd_{-h}}) - \frac{1}{\kappa_a - \xi} t_{h,d_{-h}} \left(1 + \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}\right) - \frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}} x_{bd_h}$$

First, we use that

$$x^{-h}_{bd_{-h}} - x_{bd_{-h}} = \frac{\kappa_a - \xi}{\kappa_a \xi} \tau_{h,bd_{-h}} + \frac{1}{\xi} t_{h,d_{-h}}$$

in order to write

$$0 = y_{d_{-h}} + \frac{1}{\xi}\left(1 + \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}\right)\left(\tau_{h,bd_{-h}} + t_{h,d_{-h}}\right) - \frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}} x_{bd_h}$$

We now write out

$$y_{d_{-h}}(t_{h,d_{-h}}, t_{-h,d_h}) = -\frac{1}{\xi} \tau_{-h,bd_{-h}}(\tau_{h,d_{-h}}, t_{-h,d_h}) = y_{d_{-h}}(0,0) - \frac{1}{\xi}\left[K_b(\kappa_a - \kappa_b)\beta^{own}_t t_{-h,d_h} + \beta^{rival}_t t_{h,d_{-h}}\right]$$

$$\tau_{h,bd_{-h}}(t_{h,d_{-h}}, t_{-h,d_h}) = \tau_{h,bd_{-h}}(0,0) - \gamma^{own}_t t_{h,d_{-h}} + K_b(\kappa_a - \kappa_b)\gamma^{rival}_t t_{-h,d_h}$$

Moreover, from the proof of Proposition 1 we have $x_{bd_h} = -\frac{1}{\kappa_a}(\pi_{a_h d_h} - t_{-h,d_h}) - \frac{\kappa_a - 2\xi}{\kappa_a \xi} \tau_{h,bd_h}$, so that

$$x_{bd_h}(t_{h,d_{-h}}, t_{-h,d_h}) = x_{bd_h}(0,0) + \frac{1}{\kappa_a} t_{-h,d_h} - \frac{\kappa_a - 2\xi}{\kappa_a \xi}\left(K_b(\kappa_a - \kappa_b)\beta^{own}_t t_{h,d_{-h}} + \beta^{rival}_t t_{-h,d_h}\right)$$

Thus substituting in, we have

$$t_{h,d_{-h}} = \frac{1}{\psi} y_{d_{-h}}(0,0) + \frac{1}{\psi}\frac{1}{\xi}\left(1 + \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}\right)\tau_{h,bd_{-h}}(0,0) - \frac{1}{\psi}\frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}} x_{bd_h}(0,0) + \frac{1}{\psi}\phi t_{-h,d_h}$$

where

$$\psi = \frac{1}{\xi}\beta_t^{rival} + \frac{1}{\xi}\left(1 + \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}\right)(\gamma_t^{own} - 1) - \frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}}\frac{\kappa_a - 2\xi}{\kappa_a \xi}K_b(\kappa_a - \kappa_b)\beta_t^{own}$$

$$\phi = \frac{1}{\xi}K_b(\kappa_a - \kappa_b)\left[\left(1 + \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}\right)\gamma_t^{rival} - \beta_t^{own}\right] - \frac{1}{\kappa_a}\frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}}\left(1 + \frac{\kappa_a - 2\xi}{\xi}\beta_t^{rival}\right)$$

We proceed to simplify ϕ. We have

$$\frac{\partial \tau_{-h,bd_h}}{\partial t_{h,d_{-h}}} = K_b(\kappa_a - \kappa_b)\gamma_t^{rival}$$

$$\gamma_t^{rival} = \frac{\kappa_a \kappa_b - 2(\kappa_a + \kappa_b)\xi}{\kappa_b(\kappa_a - \xi)}\beta_t^{own}$$

and so we obtain

$$\phi = K_b(\kappa_a - \kappa_b)\gamma_t^{rival}\left\{\frac{1}{\xi}\left[\left(1 + \frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}}\right) - \frac{\kappa_b(\kappa_a - \xi)}{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi}\right] - \frac{1}{\kappa_a}\left(1 + \frac{\kappa_a - 2\xi}{\xi}\beta_t^{rival}\right)\right\}$$

We have $\frac{\partial \tau_{-h,bd_{-h}}}{\partial t_{h,d_{-h}}} = \beta_t^{rival}$, so

$$\phi = K_b(\kappa_a - \kappa_b)\gamma_t^{rival}\frac{1}{\xi}\left\{\frac{\kappa_a - \xi}{\kappa_a} - \frac{\kappa_b(\kappa_a - \xi)}{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi} + \beta_t^{rival}\frac{2\xi}{\kappa_a}\right\}$$

$$\phi = K_b(\kappa_b - \kappa_a)\gamma_t^{rival}\frac{2}{\kappa_a}\left(\frac{(\kappa_a - \xi)(\kappa_a + \kappa_b)}{\kappa_a\kappa_b - 2(\kappa_a + \kappa_b)\xi} - \beta_t^{rival}\right)$$

A.1.5 Cost and Production Functions of d_h.

In this appendix, we provide a production function that gives rise to the downstream producer's cost function (equation 1). Production by firm d_h occurs by the following process. Firm d_h's production set is

$$y_{d_h} = \theta_{d_h}\min\{\alpha_{d_h u_h}^{-1} x_{d_h u_h}, \alpha_{d_h u_{-h}}^{-1} x_{d_h u_{-h}}, \Xi(y_{d_h}^*)^{-1}\ell_{d_h h}\}$$

where $\ell_{d_h h}$ is d_h's use of a local factor with unit cost 1. This is a simple way to capture the economy of scale. As a result, d_h's production requires that require that

$$x_{d_h u_k} = \theta_{d_h}^{-1}\alpha_{d_h u_k} y_{d_h},$$

$$\ell_{d_h h} = \Xi(y_{d_h}^*) y_{d_h}.$$

This gives rise to h's cost function for y_{d_h} given by

$$C_{d_h}(y_{d_h}) = \sum_{k \in \mathcal{H}} p_{u_k} x_{d_h u_k} - \Xi(y_{d_h}^*) y_{d_h} = \left(\theta_{d_h}^{-1}\sum_{k \in \mathcal{H}} \alpha_{d_h u_k} p_{u_k} - \Xi(y_{d_h}^*)\right) y_{d_h}.$$

We let $\Xi(y_{d_h}^*) = \Xi_0 - \xi y_{d_h}^*$. We simplified the exposition in main text by letting $\Xi_0 = 0$, which has the interpretation that d_h is a supplier of the local factor (e.g., bought by the consumer or used by a factor-utilizing final goods producer).