

# Strategic (Dis)Integration\*

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## Abstract

Suppose a country anticipates that it may use trade as a point of leverage in future geopolitical conflicts. How should it develop domestic industries and international trading relationships today to strengthen its hand tomorrow? Domestically, we show that the country should abstain from peacetime industrial policy if it can credibly threaten trade taxes as geopolitical punishments during conflict, but not otherwise. Internationally, its peacetime trade policy should promote the accumulation of foreign capital that makes foreign prices more sensitive to trade during conflict. We apply these insights to quantitatively explore the U.S.'s optimal policies for building geopolitical power vis-à-vis China.

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# 1 Introduction

Recent years have seen countries around the world reevaluate their economic interdependence. In Europe, the European Union’s trade relationship with Russia made it possible to punish Russia’s invasion of Ukraine using sanctions. Yet, this relationship’s interruption caused economic distress in the EU, prompting “de-risking,” “onshoring,” and “friendshoring” policies to mitigate future geopolitical risks. Across the Atlantic, the United States passed sweeping legislation promoting its domestic semiconductor industry. It also banned exports of certain chips and prevented U.S. engineers from working in some Chinese industries. While some policymakers justified these actions on narrow economic and security grounds, others have offered explicitly geopolitical rationales about building strategic (in)dependence.

These events bring to the fore classic questions of economic statecraft—i.e., the use of economic tools to achieve foreign policy goals. From a positive perspective, how can we understand countries’ geopolitical incentives for economic policies beyond standard trade sanctions? From a normative perspective, how should such policies be designed to accomplish their aims without inflicting undue economic costs?

We shed new light on these questions by embedding a geopolitical game into an otherwise standard neoclassical model of international trade. In the model, countries have preferences over their own economic welfare and each other’s geopolitical behavior. For example, the U.S. may prefer that China respect Hong Kong’s autonomy, or that Russia abstain from trading arms with North Korea. The economic and geopolitical blocks of the model interact through economic threats—in the form of trade sanctions—that a country can use to influence foreign geopolitical behavior. We study how a country that anticipates making these threats in the future can adopt forward-looking policies in peacetime to increase its leverage.

Our main results characterize the optimal design of two peacetime policy instruments: industrial policy, in the form of domestic capital subsidies, and trade policy, in the form of import tariffs and export subsidies. The geopolitical block of our model is structured enough that we can deliver sharp, qualitative results about the geopolitical rationale for using each instrument. In terms of peacetime industrial policy, geopolitics rationalizes capital subsidies only for governments with limited ability to threaten trade taxes during conflicts. In terms of peacetime trade policy, geopolitics rationalizes taxes with a novel target: the *manipulability* of foreign terms of trade. The economic block of our model is rich enough that we can explore the policy implications of these insights through the lens of a state-of-the-art quantitative trade model. We quantify the U.S.’s optimal policies for building geopolitical power vis-à-vis China, finding that they build Chinese dependence by promoting U.S. exports to China as well as its main trading partners.

The starting point for our analysis is a dynamic model of trade and geopolitics. The baseline model contains two time periods—peacetime and conflict—and two countries—Home and Foreign. Each country contains a representative household, goods producer, and capital producer who exchange many goods and many types of capital. In the first period, consumption, capital formation, production, and trade occur in the standard fashion, possibly subject to capital subsidies and/or trade taxes. Capital is a state variable, determined during peacetime but still relevant during conflict.

The model’s second period combines economics and geopolitics. First, countries play a game that determines a geopolitical action taken by Foreign and second-period trade taxes imposed by Home. Home makes a trade policy threat that specifies its trade taxes as a function of Foreign’s geopolitical action. Foreign then chooses a geopolitical action by trading off its geopolitical benefits, which we take as exogenous, against its economic costs, which are endogenously determined by Home’s threat. This action and Home’s threat together determine Home’s realized trade taxes. After the conclusion of this game, households and firms consume, produce, and trade once more. Crucially, they do so using the capital accumulated during peacetime and subject to the trade taxes determined by the game described above.<sup>1</sup>

Within this setting, we study Home’s optimal peacetime industrial and trade policies.<sup>2</sup> We do so both in the case where Home can credibly threaten any trade taxes during conflict and in the case where it is limited to trade threats that are not too costly to carry out.

Our first result shows that, when all trade threats are credible, Home’s optimal peacetime industrial policy is *laissez faire* (i.e., capital subsidies are zero). This is true despite private firms’ failure to internalize that their capital investments impact Foreign’s economic incentive to avoid trade sanctions and, hence, its geopolitical actions. The reason is that Home’s trade threat already balances the geopolitical benefit of influencing Foreign’s actions against the economic cost of trade distortions. As a result, whatever marginal changes in Home’s trade under conflict are induced by additional Home investments have economic costs that, to first order, offset their geopolitical benefits. This finding calls into question the case for industrial policy as a tool to build geopolitical leverage.

If industrial policies are an inefficient way to prepare for geopolitical conflict, why are they used in practice? Our next result provides a potential answer by considering the possibility that Home cannot credibly make trade tax threats that would be too costly to carry out. For example, many have attributed the EU’s delay in sanctioning Russian natural gas after the

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<sup>1</sup>Although this baseline model is intentionally stylized, we provide generalized versions of our results in several extensions. We extend the model to include geopolitical uncertainty, Home geopolitical actions, inseparability of economic and geopolitical preferences, and many countries.

<sup>2</sup>Home’s optimal trade threats are closely related to [Becko \(2024\)](#)’s results on optimal sanctions and are not our main focus.

invasion of Ukraine to fear of economic fallout among member countries (see, e.g., [Moll et al., 2023](#)). In the presence of such a credibility constraint, industrial policy during peacetime emerges as a second-best instrument. The optimal capital subsidies take a simple form, promoting capital varieties with high rental rates under Home’s costliest threat and with low rental rates under its economically optimal trade taxes. This echoes recent industrial policies promoting energy independence and semiconductor manufacturing.

The second part of the paper turns to peacetime trade policies. While Home’s industrial policies allow it to shape domestic capital accumulation, its trade taxes offer a more direct instrument for targeting changes in Foreign capital. Such changes can incentivize Foreign to comply with Home threats by increasing Foreign’s stock of capital varieties that either (a) Foreign firms value more under compliance or (b) differentially improve Foreign’s terms of trade under compliance. Our main finding in this part of the paper is that these two channels collapse into a single statistic: whether investment in a capital variety affects the *manipulability* of Foreign’s terms of trade. This result’s most striking implication is that Home’s peacetime trade policy is unaffected by geopolitics if it cannot make Foreign prices more sensitive to traded quantities. For example, suppose Foreign is a gas exporter who can invest in pipelines that uniformly decrease its unit costs of exporting to Home. Home can subsidize trade to promote these investments and so increase Foreign’s gains from trade and hence its economic incentive to choose Home’s preferred action. Yet, Home chooses not to because such investments do not make Foreign’s export supply curve any less elastic.

When Home’s credibility is limited, its peacetime trade policies seek to influence Foreign’s capital stock for a second reason: to make its threats during conflict more credible. To do so, it pursues changes in Foreign capital that disproportionately improve Home’s terms of trade under its costliest threat. In contrast to Home’s trade policies with perfect credibility, which target only the slope of Foreign’s export supply curve, this new motive targets the level. Intuitively, since Home imports less when it punishes Foreign with sanctions, higher Foreign costs of exporting reduce Home’s welfare by less in this case, making sanctions more credible.

We illustrate these general theoretical results in a parametric economy that facilitates a sharp characterization of Home’s optimal policies. The economy features trade in many downstream sectors and a single upstream sector used as an input to capital production for each downstream sector. Home’s optimal peacetime policies in this setting evoke a number of familiar geoeconomic strategies. Its industrial policy builds the credibility of Home’s threats by subsidizing sectors’ capital in proportion to their sectoral trade deficits, a sufficient statistic for scarcity under sanctions. Meanwhile, its trade policy promotes Foreign dependence using distinct strategies on upstream and downstream goods. Upstream, Home taxes exports and subsidizes imports to starve Foreign of investment goods and thereby reduce its overall

productive capacity. Downstream, Home subsidizes exports and taxes imports in specific, strategic sectors where Foreign is the most reliant; this floods foreign markets, disincentivizing capacity building in these sectors and deepening Foreign dependence.

The final part of the paper applies our theory in a much richer, quantitative trade model to explore its practical implications. Our starting point is a static, multi-sector Armington model with trade in intermediates. We introduce dynamics by incorporating two types of capital. Production capital is sector-specific and lowers firms’ variable costs in that sector. Relationship capital is sector-by-origin-specific and lowers the trade costs associated with purchasing inputs from that origin-sector, whether foreign or domestic. These two types of capital offer two different channels through which Home’s peacetime trade taxes can make Foreign’s terms of trade more manipulable. We calibrate this model to 2017 data on global trade, tariffs, value added, and input-output networks. We also incorporate time-varying trade elasticity estimates from [Boehm et al. \(2023\)](#) and country-sector-specific estimates of the sectoral composition of investment from [Ding \(2021\)](#).

We combine our theoretical results with this calibrated model to compute the U.S.’s optimal peacetime policies for building geoeconomic power vis-à-vis China. To build Chinese dependence, the U.S. subsidizes exports of goods ultimately consumed by China—either directly, as final goods, or indirectly, as inputs embodied in other countries’ final goods. These are the same goods whose exports the U.S. subsequently threatens to tax, so Chinese investments in relationship capital for importing them increase the U.S.’s leverage during conflicts. Simultaneously, the U.S. uses both industrial and trade policies to build its own credibility. Its industrial policies promote relationship capital with domestic suppliers and discourage relationship capital with Chinese suppliers, while its trade policies lean against the “bait-and-switch” export subsidies used to build Chinese reliance. To our knowledge, these results provide the first theoretically grounded quantification of economic policies for building geopolitical leverage.

**Related literature.** In the wake of global supply disruptions triggered by COVID-19 and Western sanctions on Russia, a growing literature has emphasized countries’ exposure to global supply chain risk and considered onshoring and friendshoring policies (see, e.g., [Huang, 2017](#); [Elliott et al., 2022](#); [Baldwin et al., 2023](#)). Relevant to our work, recent theoretical contributions by [Traiberman and Rotemberg \(2023\)](#), [Grossman et al. \(2023\)](#), and [Grossman et al. \(2024\)](#) show how market failures such as learning-by-doing and imperfect competition can lead to excessive economic integration and rationalize reshoring policies. While we consider similar policy instruments, we intentionally abstract from non-geopolitical market failures by assuming markets are efficient. This isolates the geopolitical rationale for policy.

In emphasizing the geopolitical rationale for economic policies, we contribute to the literature on trade and conflict. One branch of recent work has emphasized the causal effects of economic integration on geopolitical conflict and vice versa (see [Martin et al., 2008](#); [Kleinman et al., 2024](#); [Liu and Yang, 2024](#)). Another has studied the impact and design of economic sanctions, with [Becko \(2024\)](#) and [Bianchi and Sosa-Padilla \(2024\)](#) studying optimal trade and financial punishments, and [Itskhoki and Mukhin \(2022\)](#), [Bachmann et al. \(2022\)](#), [De Souza et al. \(2024\)](#) and many others quantifying sanctions’ actual and potential impacts. Our model connects these two strands by incorporating peacetime capital investments—which shape and are shaped by the risk of geopolitical trade disruptions—and optimal sanctions that countries use to provide geopolitical incentives.

Most closely related is the literature on economic statecraft and the formation of geoeconomic power. Research in this area dates back to at least [Hirschman \(1945\)](#) and [Hirschman \(1958\)](#), and has been developed by numerous contributions in political science including recent work by [Blackwill and Harris \(2016\)](#), [Scholvin and Wigell \(2018\)](#), [Farrell and Newman \(2019\)](#), and [Drezner et al. \(2021\)](#). In economics, this theme has recently been picked up in [Mayer et al. \(2025\)](#), [Kooi \(2024\)](#), and [Clayton et al. \(2024\)](#), among others. Like us, each of these papers considers how pre-conflict economic policies influence the outcome of a during-conflict game that jointly determines geopolitical and economic outcomes.<sup>3</sup> While our frameworks differ in many ways, there are three essential differences that lead to divergent results, particularly for trade policy.<sup>4</sup> First, unlike [Mayer et al. \(2025\)](#), we assume Home’s policies during conflict are optimal rather than exogenous. This is why Home’s peacetime policies seek to increase Foreign’s gains from trade at a given quantity but not the quantity of trade itself; policies during conflict are a more direct instrument for the latter. Second, unlike [Kooi \(2024\)](#), we group Foreign capital’s direct value to firms with its impacts on Foreign terms of trade. This is what reveals that Home’s peacetime trade taxes build dependence precisely to the extent they make Foreign’s terms of trade more manipulable. Third, unlike [Clayton et al. \(2024\)](#), we assume that Home builds power in peacetime by influencing Foreign capital decisions rather than by pre-committing to some of its own future policies. While such policies can impact Foreign’s terms of trade, they—unlike capital—have no direct value to Foreign firms, so the grouping of terms that leads to our manipulability result is moot.

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<sup>3</sup>In this sense, we all follow in the footsteps of [McLaren \(1997\)](#)’s model of investments before (purely economic) trade policy bargaining. [Clayton et al. \(2023\)](#) features a related but different mechanism in which a hegemon’s simultaneous threats against many countries induce each of them to take actions that build its leverage over the others.

<sup>4</sup>In terms of industrial policy, [Kooi \(2024\)](#)’s characterization of peacetime capital subsidies when countries Nash bargain over geopolitical outcomes is similar to our characterization of the case when Home has limited credibility. Nash bargaining and credibility constraints both provide a rationale for Home to make investments that shift its welfare under the trade allocations that result from various geopolitical actions.

## 2 A Model of Trade and Geopolitics

We now present a model of trade and geopolitics. While the baseline environment is stylized along some dimensions, it can be extended significantly, as we describe in Section 2.4.

### 2.1 Baseline Environment

There are two countries, Home ( $i = H$ ) and Foreign ( $i = F$ ), and two periods, peacetime ( $t = 1$ ) and conflict ( $t = 2$ ). Home and Foreign interact both economically and geopolitically.

**Economic block.** The economic block of the model is a two-period neoclassical model of trade with long-lived capital and financial autarky.

The economy contains tradable goods  $g \in \mathcal{G}$  and non-tradable capital varieties  $v \in \mathcal{V}$ . Capital varieties can represent tangible assets, such as a semiconductor factory or a gas stockpile, or intangible assets, such as a relationship with a supplier. Each country contains three agents: a representative household, a representative goods producer, and a representative capital producer.

The representative household in country  $i$  net-consumes goods  $c_{it} = \{c_{itg}\}$  at each time  $t$  and experiences utility<sup>5</sup>

$$u_{i1}(c_{i1}) + u_{i2}(c_{i2}) + z_i(a), \quad (1)$$

where  $a$  is a geopolitical action that we introduce below.

The representative goods producer in  $i$  produces net output  $y_{it} = \{y_{itg}\}$  using capital  $k_{it}^y = \{k_{itv}^y\}$ , subject to a goods production possibilities frontier<sup>6</sup>

$$G_{it}(y_{it}, k_{it}^y) \leq 0.$$

During peacetime, the representative capital producer in  $i$  produces capital varieties  $k_i = \{k_{iv}\}$  using investment  $\iota_{i1} = \{\iota_{i1g}\}$  subject to a capital production possibilities frontier<sup>7</sup>

$$\Lambda_{i1}(k_i, \iota_{i1}) \leq 0.$$

We assume capital is perfectly durable and cannot be formed during the conflict period, so that the capital stock is the same during conflict and peacetime. Capital producers retain ownership of capital and rent it domestically in both periods.

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<sup>5</sup>Factor supply corresponds to negative consumption of some goods.

<sup>6</sup>Primary and intermediate inputs correspond to negative net output of some goods.

<sup>7</sup>We require that the model's primitives—i.e.,  $u_{it}(\cdot)$ ,  $G_{it}(\cdot, \cdot)$ , and  $\Lambda_{i1}(\cdot, \cdot)$ —satisfy basic regularity conditions stated in Appendix A.1.

In each country  $i$  and time  $t$ , households and firms face intratemporal goods prices  $P_{it} = \{P_{itg}\}$  and capital rental prices  $R_{it} = \{R_{itv}\}$ . Goods and capital producers rebate their profits to the domestic household. Intertemporally, households in each country  $i$  may save at gross interest rate  $\mathcal{R}_i$  in a domestic bond in zero net supply. To focus our analysis on trade sanctions rather than financial sanctions, we assume bonds cannot be traded internationally—i.e., countries are in financial autarky.<sup>8</sup> Since each country has a representative agent, financial autarky ensures bonds are not traded in equilibrium; however, their presence pins down intertemporal relative prices.

Finally, at each time  $t$ , the Home government levies ad valorem trade taxes  $\tau_t = \{\tau_{tg}\}$  that place a wedge between its domestic prices  $P_{Ht}$  and world prices  $P_t^w = \{P_{tg}^w\}$ .<sup>9</sup> During peacetime, it additionally offers ad valorem capital subsidies  $s_1 = \{s_{1v}\}$  that augment the rental rates paid to capital producers. The government rebates net revenues with a lump-sum transfer to the Home household. We assume the Foreign government is *laissez faire*, i.e., uses no capital subsidies or trade taxes.

**Geopolitical block.** The premise of the geopolitical block of the model is that Foreign takes a binary, non-market geopolitical action  $a \in \{\underline{a}, \bar{a}\}$  during conflict. For example, Foreign can choose whether or not to claim disputed territory, develop nuclear capabilities, or oppress minority groups. This action has a pure externality on Home utility. While there are no markets that allow Home to buy Foreign geopolitical actions, we allow Home to use trade during conflict as a carrot or stick to influence them.<sup>10</sup>

Formally, we embed a geopolitical game into the second period. First, Home commits to a time-2 trade tax threat  $\tilde{\tau}_2(\cdot)$  that specifies its trade taxes as a function of Foreign's geopolitical action. Second, Foreign chooses its geopolitical action  $a$ , balancing exogenous geopolitical preferences against the economic consequences of the resulting Home trade taxes  $\tau_2 = \tilde{\tau}_2(a)$ .

We assume that the total utility of the representative agent in each country  $i$  additively combines consumption utility—which geopolitical actions affect through Home's trade taxes—with a direct geopolitical utility  $z_i(a)$ , as in (1). Without loss of generality, we assume Home prefers action  $\bar{a}$ , i.e.,  $z_H(\bar{a}) \geq z_H(\underline{a})$ . Additive separability implies that Foreign's geopolitical action affects prices only by determining the realization of Home's trade tax threat. This

<sup>8</sup>We explain how financial autarky affects our results in Theorem 3.

<sup>9</sup>For Home imports, a positive trade tax corresponds to a positive import tariff. For Home exports, a positive trade tax corresponds to a positive export subsidy. We allow for trade taxes of  $-1$  and  $\infty$  in order to nest complete embargoes.

<sup>10</sup>In focusing on trade, we abstract from financial sanctions, except to the extent they can be understood as restrictions on the trade of financial goods and services. We do not allow, for example, Home to freeze or seize Foreign assets.

assumption, which we weaken in extensions, rules out the possibility that geopolitical actions affect prices through other channels, for example by increasing demand for weapons or by damaging factories.

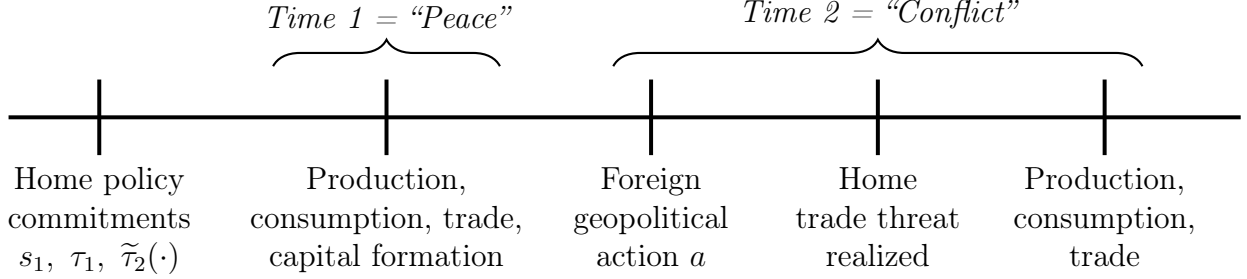


**Figure 1:** *Timing of model.*

Figure 1 summarizes the timing of the model. Note that Home chooses its policies—peacetime trade taxes and subsidies as well as trade taxes threatened under conflict—before any households or firms act. This avoids any dynamic inconsistency problems.

## 2.2 Equilibrium Conditions

We now state the model’s formal equilibrium conditions. These conditions take as given both Home’s peacetime policies  $\tau_1$  and  $s_1$  and its conflict trade threat  $\tilde{\tau}_2(\cdot)$ . We consider Home’s optimal choice of these policies in Section 2.3.

**Economic equilibrium conditions.** Households maximize consumption utility subject to a lifetime budget constraint. That is,

$$\{c_{it}\}_{t=1,2} \in \arg \max_{\{c_t\}_{t=1,2}} \sum_{t=1,2} u_{it}(c_t) \quad \text{s.t.} \quad \sum_{t=1,2} (\mathcal{R}_i)^{-(t-1)} (P_{it} \cdot c_t - I_{it}) \leq 0, \quad (2)$$

where  $I_{it}$  is income from domestic profits and lump-sum transfers in  $i$  at  $t$ , i.e.,

$$I_{it} = P_{it} \cdot (y_{it} - \mathbb{1}_{t=1} l_{i1}) + \mathbb{1}_{i=H} (P_t^w \tau_t) \cdot m_{it},$$

where  $m_{it}$  denotes the net imports of country  $i$  at time  $t$ .

Goods producers maximize profits subject to technological feasibility:

$$\{y_{it}, k_{it}^y\} \in \arg \max_{y, k^y} P_{it} \cdot y - R_{it} \cdot k^y \quad \text{s.t.} \quad G_{it}(y, k^y) \leq 0. \quad (3)$$

Capital producers maximize profits net of subsidies subject to technological feasibility:

$$\{k_i, \iota_{i1}\} \in \arg \max_{k, \iota_1} [R_{i1}(1 + \mathbb{1}_{i=H}s_1) + (\mathcal{R}_i)^{-1}R_{i2}] \cdot k - P_{i1} \cdot \iota_1 \quad \text{s.t.} \quad \Lambda_{i1}(k, \iota_1) \leq 0. \quad (4)$$

Goods markets clear globally and capital markets clear within each country:

$$c_{it} + \mathbb{1}_{t=1}\iota_{i1} = y_{it} + m_{it}, \quad m_{Ht} + m_{Ft} = 0 \quad \text{and} \quad k_i = k_{it}^y. \quad (5)$$

There is financial autarky. In other words, trade is balanced within each period:

$$P_t^w \cdot m_{it} = 0. \quad (6)$$

Domestic prices equal world prices augmented by (possibly zero) trade taxes:

$$P_{Ft} = P_t^w \quad \text{and} \quad P_{Ht} = (1 + \tau_t)P_t^w. \quad (7)$$

**Geopolitical equilibrium conditions.** Foreign's geopolitical action maximizes the sum of Foreign economic and geopolitical utility, accounting for Home's trade tax threat. To formalize this idea, we assume that, conditional on both countries' capital  $k_i$ , Home's trade taxes  $\tau_2$  during conflict uniquely determine all equilibrium variables during the conflict period, up to a choice of numeraire.<sup>11</sup> This implies that consumption in each country  $i$  is given by a function  $\tilde{c}_{i2}(\tau_2, k_H, k_F)$ . Foreign's geopolitical action must then solve

$$a \in \arg \max_{\hat{a} \in \{a, \bar{a}\}} u_{F2} \left( \tilde{c}_{F2}(\tilde{\tau}_2(\hat{a}), k_H, k_F) \right) + z_F(\hat{a}). \quad (8)$$

Home's time-2 trade taxes are determined by its trade tax threat and Foreign's geopolitical action:

$$\tau_2 = \tilde{\tau}_2(a). \quad (9)$$

**Definition 1.** Given peacetime policies  $\tau_1$  and  $s_1$  and a conflict trade threat  $\tilde{\tau}_2(\cdot)$ , an equilibrium is a profile  $\{c_{it}, y_{it}, \iota_{i1}, m_{it}, k_{it}^y, k_i, P_t^w, P_{it}, R_{it}, \mathcal{R}_i, a, \tau_2\}$  satisfying (2)–(9).

It will frequently be convenient to work with net-present-value prices rather than intratemporal prices and interest rates. To this end we define

$$p_{it} \equiv (\mathcal{R}_i)^{-(t-1)} P_{it}, \quad p_t^w \equiv (\mathcal{R}_F)^{-(t-1)} P_t^w, \quad \text{and} \quad r_{it} \equiv (\mathcal{R}_i)^{-(t-1)} R_{it}. \quad (10)$$

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<sup>11</sup>That is, given  $k_H$ ,  $k_F$ , and  $\tau_2$ , there is a unique solution to the system of equations defined by (2) taking time-1 consumption as sunk and (3), (5), (6), and (7) at time  $t = 2$ . We note that the time-2 consumption problem only depends on time-2 variables because there is no saving in equilibrium.

Note that we (arbitrarily) choose to define net-present-value world prices using the interest rate in Foreign rather than Home. This conveniently ensures  $p_{Ft} = p_t^w$ , just as  $P_{Ft} = P_t^w$ .

## 2.3 Planner's Problem

We study the problem of a Home planner who sets Home's peacetime trade taxes  $\tau_1$ , peacetime capital subsidies  $s_1$ , and conflict trade threat  $\tilde{\tau}_2(\cdot)$ . While we assume Home's peacetime policies are unconstrained, we allow for the possibility that some trade threats are unavailable. For example, some threats may not be credible. We let the set of feasible threats depend on both countries' capital  $k_i$ , as we have assumed capital and time-2 trade taxes determine all real quantities during conflict. Formally, we denote the set of feasible threats by  $\mathcal{T}_2(k_H, k_F)$ .<sup>12</sup> The planner's problem is thus

$$\begin{aligned} \max_{s_1, \tau_1, \tilde{\tau}_2(\cdot)} \quad & \max_{\{c_{it}, k_i, a\}} u_{H1}(c_{H1}) + u_{H2}(c_{H2}) + z_H(a) \\ \text{s.t.} \quad & \{c_{it}, k_i, a\} \in \mathcal{E}(s_1, \tau_1, \tilde{\tau}_2(\cdot)) \quad \text{and} \quad \tilde{\tau}_2(\cdot) \in \mathcal{T}_2(k_H, k_F), \end{aligned} \tag{11}$$

where  $\mathcal{E}(s_1, \tau_1, \tilde{\tau}_2(\cdot))$  is the set of consumption, capital, and geopolitical actions consistent with the equilibrium conditions given policies  $s_1$ ,  $\tau_1$ , and  $\tilde{\tau}_2(\cdot)$ .

Throughout the paper and without further statement, we study policies that are optimal in the sense that they solve (11).

## 2.4 Extensions

Our main results extend, in some cases with minor modifications, to significantly more general settings. We summarize these extensions below; Section 5 discusses each in detail.

First, we allow for geopolitical uncertainty by assuming that Foreign geopolitical preferences are random and revealed after Home makes its trade threat. This allows punitive trade sanctions to be used along the equilibrium path. Second, we allow both countries to take geopolitical actions, so that Home can punish Foreign geopolitically (e.g., militarily) as well as economically. Third, we remove the separability between economic and geopolitical preferences by allowing geopolitical actions to affect marginal utilities and production frontiers in both countries. This implies that geopolitical actions can raise demand for certain goods, such as weapons, or damage productive capacity. Fourth, we allow for many countries. This enables us to consider the role of bystander countries and connect our model to data.

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<sup>12</sup>Section 3.2.2 discusses how the reduced-form restriction to feasibility we study—limited credibility—can be microfounded in a repeated-game setting.

### 3 Optimal Industrial and Trade Policy

This section theoretically characterizes Home’s optimal peacetime policies—i.e., its industrial policy in the form of domestic capital subsidies and its trade policy in the form of trade taxes. Later sections apply these theoretical results in order to quantify the U.S.’s optimal peacetime policies for building geopolitical power vis-à-vis China.

#### 3.1 Primal Representation of Planning Problem

We employ a primal formulation of the planning problem in which Home chooses trade, capital, and geopolitical quantities subject to implementability constraints. Our characterization of optimal policies describes how Home implements these quantities. We begin in the case where all Home threats are credible, an assumption we relax in Section 3.2.2.

**Assumption 1.** *Home’s trade threats are unconstrained, i.e.,*

$$\mathcal{T}_2(k_H, k_F) = \{\tilde{\tau}_2(\cdot) : \{\underline{a}, \bar{a}\} \rightarrow [-1, \infty]^\mathcal{G}\}.$$

Even when threats themselves are flexible, the Home planner faces three implementability constraints. First, trade must be balanced in both periods, including under Foreign’s off-path geopolitical action. This reflects the fact that Home can only threaten trade restrictions that are achievable with some tariffs. Second, Foreign’s choice of capital must be consistent with profit maximization by private firms in Foreign, where Home cannot offer direct capital subsidies. Third—and most novel to our analysis—Foreign’s choice of geopolitical action must satisfy a *geopolitical incentive compatibility* constraint: the sum of its time-2 economic utility and its geopolitical utility must be higher for the on-path action than the off-path action.

To represent the planner’s objective and these constraints in terms of a limited set of choice variables, we introduce an extended version of Home and Foreign “Meade utilities.” That is, we let  $V_{it}(m, k)$  denote the highest possible economic welfare of  $i$ ’s representative household at time  $t$  conditional on  $i$  having net imports  $m = \{m_g\}$  and capital stock  $k = \{k_v\}$ . If  $t = 2$ ,  $k$  is simply an endowment, whereas if  $t = 1$ , the household must forgo consumption to make investments such that  $k$  is produced. Formally, we define

$$V_{it}(m, k) \equiv \begin{cases} \max_{y, \iota} u_{it}(y + m - \iota) & \text{s.t. } G_{it}(y, k) \leq 0, \quad \Lambda_{i1}(k, \iota) \leq 0, & \text{if } t = 1, \\ \max_y u_{it}(y + m) & \text{s.t. } G_{it}(y, k) \leq 0, & \text{if } t = 2. \end{cases} \quad (12)$$

Several observations allow us to connect these Meade utilities to the planner’s problem.

First, since consumption and goods production decisions are undistorted within each country, the first welfare theorem—applied conditional on capital and net imports—ensures that equilibrium production, consumption, and investment decisions actually solve the maximization problems in (12). The economic component of the planner’s objective can therefore be written in terms of Home’s net imports,  $m_{Ht} = -m_{Ft}$ , and capital,  $k_H$ . Similarly, the economic incentives in the geopolitical incentive compatibility constraint can be written in terms of Foreign’s on-path net imports under conflict,  $m_{F2}$ , its net imports under Home’s off-path threat,  $m_{F2}^{OFF}$ , and its capital stock,  $k_F$ . Second, the envelope theorem implies that marginal changes in Foreign’s Meade utility with respect to net imports equal its marginal consumption utility and hence are proportional to world prices since Foreign uses no trade taxes. We can therefore express Foreign’s trade deficit as the value of its net imports when priced according to its marginal Meade utility conditional on that import level. Third, since investment is undistorted in Foreign, the first welfare theorem—applied conditional on net imports—ensures that the privately optimal Foreign capital stock must maximize the sum of Foreign Meade utilities over the peacetime and conflict periods.

Following these steps, we arrive at the primal planner’s problem:<sup>13</sup>

$$\begin{aligned}
& \max_{m_{F1}, m_{F2}, m_{F2}^{OFF}, k_H, k_F, a} & V_{H1}(-m_{F1}, k_H) + V_{H2}(-m_{F2}, k_H) + z_H(a) & (13) \\
& \text{s.t.} & V_{Ft,m}(m_{Ft}, k_F) \cdot m_{Ft} = V_{F2,m}(m_{F2}^{OFF}, k_F) \cdot m_{F2}^{OFF} = 0 \\
& & k_F \in \arg \max_k V_{F1}(m_{F1}, k) + V_{F2}(m_{F2}, k) \\
& & V_{F2}(m_{F2}, k_F) + z_F(a) \geq V_{F2}(m_{F2}^{OFF}, k_F) + z_F(\neg a).
\end{aligned}$$

The first constraint reflects Foreign’s offer curve—i.e., what net exports Home can extract from it at each time and under each geopolitical action—as a function of its capital stock. The second constraint reflects Foreign’s private capital choice given its net imports in each period. The third constraint reflects how Foreign’s trade and capital allocations determine which geopolitical outcomes Home can successfully enforce.

### 3.2 Optimal Peacetime Industrial Policy

We now use the primal formulation of the planner’s problem to study Home’s optimal industrial policy in the form of domestic capital accumulation subsidies. We first consider the benchmark case in which Home can credibly threaten any time-2 trade taxes in response to Foreign geopolitical actions. We then relax this assumption, focusing on the case where Home is limited to threats with low enough domestic cost.

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<sup>13</sup>Lemma 1 in Appendix A.2 establishes the formal equivalence between this primal problem and (11).

### 3.2.1 Industrial policy with unrestricted trade threats

Does the private market adequately incentivize Home firms' capital investments in the presence of geopolitical coercion? Home's capital stock influences what it trades with Foreign under any given trade policies, and this trade influences Foreign's geopolitical behavior. Private firms nonetheless take Foreign's geopolitical behavior as given, suggesting there may be a role for policies that encourage firms to internalize these "geopolitical externalities."

To address this question formally, we return to the primal problem from (13). Differentiating the problem's value with respect to Home capital,  $k_H$ , we find that the social return to capital, net of investment costs, is simply

$$V_{H1,k}(-m_{F1}, k_H) + V_{H2,k}(-m_{F2}, k_H). \quad (14)$$

This reflects that Home capital enters none of the planner's constraints. Simply put, this is because all of the constraints concern Foreign's economy, and trade is a sufficient statistic for how Home capital impacts Foreign's economy. This includes Foreign's offer curve; the net imports that—under some trade taxes—Home can extract from Foreign do not depend at all on Home's own economy.<sup>14</sup>

To assess whether policy is warranted, one can compare Home capital's social and private returns. Without capital subsidies, the first welfare theorem conditional on trade implies that Home investment maximizes the sum of Home's Meade utility across the two periods, i.e.,

$$k_H \in \arg \max_k V_{H1}(m_{H1}, k) + V_{H2}(m_{H2}, k).$$

Taking a first-order condition and using that Home's net imports are Foreign's net exports—i.e.,  $m_{Ht} = -m_{Ft}$ —reveals that the private return to capital is, like the social return, given by (14). We conclude that the optimal capital subsidies under perfect credibility are zero.

**Theorem 1.** *Under Assumption 1, Home capital subsidies are zero, i.e.,  $r_{H1v}s_{1v} = 0$  for all  $v$ .*

This result clarifies that the intuition offered above—that the planner should use policy to ensure private firms internalize the geopolitical impacts of capital investments—is misguided. Why? What this narrative overlooks is that although investment has uninternalized geopolitical benefits, it also has uninternalized economic costs: Since Home's time-2 trade taxes are, from a purely economic perspective, set suboptimally in order to provide geopolitical

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<sup>14</sup>This statement relies on our assumption that Home consumption utility is defined for any Home net-consumption vector. This rules out the possibility that Home may want to use capital subsidies in order to increase the maximum possible generosity of the "carrots" it can offer to Foreign through trade subsidies. This assumption could be relaxed as long as Home's maximally generous time-2 trade policy has a high enough domestic cost that Home chooses not to offer it.

incentives, capital-induced increases in trade can worsen Home’s terms of trade more than they raise tariff revenue through fiscal externalities. Crucially, Home’s time-2 trade taxes are already designed to exactly balance these net economic costs against any geopolitical benefits, so the net impact of any capital-induced changes in trade is, to first order, zero. This logic is already implicit in the primal approach, which holds fixed  $m_{F2}$  when considering the first-order condition with respect to  $k_H$ . Holding  $m_{F2}$  fixed is appropriate precisely because it is one of the planner’s choice variables, which ensures any geopolitical and economic spillovers from capital-induced changes in trade are, from a welfare perspective, balanced.

Another way to understand Theorem 1 is as a manifestation of the “targeting principle.” Home’s geopolitical goal in subsidizing capital is to correct the externality inherent in Foreign’s geopolitical action. But the only way for Home to influence that action is through trade—either actual or threatened. It is therefore more efficient for Home to use trade taxes, which influence geopolitics by distorting trade *directly*, than to use capital subsidies, which influence geopolitics by distorting trade *through changes in Home investment*.

### 3.2.2 Industrial policy with imperfect credibility

Our analysis so far has assumed Home can credibly threaten any time-2 trade policies, regardless of their domestic consequences if realized. In practice, policymakers may be unable to carry out such policies due to political economy constraints that render extreme threats not credible. For instance, the EU may have been unable to commit to a complete embargo on Russian energy imports immediately following Russia’s invasion of Ukraine in 2022.

We now incorporate such credibility constraints into our analysis, guided by a repeated-game extension of the model that we develop in Supplemental Appendix F. In this extension, Home can, after observing Foreign’s geopolitical behavior, reevaluate its choice of time-2 trade taxes; this captures Home’s temptation to renege on its threats when they are costly to carry out. However, because Home plays this stage game with a sequence of Foreign countries over many periods of peacetime and conflict, there exist equilibria in which Home carries out its threats in order to avoid a low continuation value associated with losing credibility. In such equilibria, Home incentive compatibility requires that threats are not too costly relative to whatever time-2 trade policies maximize Home’s economic welfare ex post.

Motivated by this microfoundation, we introduce into our baseline model the following reduced-form constraint on Home’s trade threats:

**Assumption 2.** *Home can threaten any time-2 trade taxes under which its time-2 economic utility is never more than some (continuation value)  $\Delta$  below the highest time-2 economic*

utility across all trade taxes. That is,

$$\mathcal{T}_2(k_H, k_F) = \left\{ \tilde{\tau}_2(\cdot) : \{\underline{a}, \bar{a}\} \rightarrow [-1, \infty]^G \mid \forall \hat{a}, u_{H2}(\tilde{c}_{H2}(\tilde{\tau}_2(\hat{a}), k_H, k_F)) + \Delta \geq u_{H2}^*(k_H, k_F) \right\},$$

where  $u_{H2}^*(k_H, k_F) \equiv \max_{\tau_2} u_{H2}(\tilde{c}_{H2}(\tau_2, k_H, k_F))$ .

Assumption 2 introduces an additional constraint to the primal planner's problem: Home's Meade utility in the second period must not, under either realization of its trade threats, be too far below its highest available time-2 welfare. That is,

$$\min_{\tilde{m}_{F2} \in \{m_{F2}, m_{F2}^{OFF}\}} V_{H2}(-\tilde{m}_{F2}, k_H) + \Delta \geq u_{H2}^*(k_H, k_F). \quad (15)$$

We note that  $u_{H2}^*(k_H, k_F)$  can also be represented in primal form. Since capital and Foreign's geopolitical action have already been sunk when Home reevaluates its trade taxes, the only relevant constraint is trade balance, implying

$$u_{H2}^*(k_H, k_F) = \max_{m_{F2}} V_{H2}(-m_{F2}, k_H) \quad \text{s.t.} \quad V_{F2,m}(m_{F2}, k_F) \cdot m_{F2} = 0.$$

When the credibility constraint binds, it augments the marginal social value of capital, since capital can loosen or tighten the constraint depending on whether it is more useful under the trade vector when Home carries out its threat or abandons it. However, the constraint has no direct impact on the private value of capital, as private investors do not internalize capital's impacts on credibility. The optimal capital subsidies realign social and private marginal values by encouraging investments in whichever capital varieties are most useful—and therefore command a high rental rate—under the threat Home finds most costly to carry out; the subsidies similarly discourage investments in varieties with a high rental rate under Home's time-2 welfare-maximizing trade policy.

Formalizing this result requires a notion of would-be rental rates conditional on any net import vector, whether or not it occurs in equilibrium. To define such counterfactual rental rates, we note that the Jacobian of a country  $i$ 's time-2 Meade utility with respect to capital is proportional to its capital rental rates in any equilibrium.<sup>15</sup> This in mind, we define<sup>16</sup>

$$\tilde{r}_{i2}(m, k) \equiv V_{i2,k}(m, k).$$

<sup>15</sup>Applying the envelope theorem to the definition of Meade utility in (12) implies  $V_{i2,k}(m_{i2}, k_i) \propto -G_{i2,k}(y_{i2}, k_i)$  since, as  $i$ 's economy is efficient conditional on trade and capital,  $y_{i2}$  solves the Meade problem. We combine this with the goods producer's time-2 first-order condition with respect to capital, i.e.,  $r_{i2} \propto -G_{i2,k}(y_{i2}, k_i)$ .

<sup>16</sup>These hypothetical rental rates implicitly hold fixed the tightness of the household budget constraint between the actual and counterfactual allocations, as would be the case if the household could trade insurance for the off-path state.

We can now state the result.

**Theorem 2.** *Under Assumption 2, Home capital subsidies are proportional to the difference in capital rental rates between (a) the event Home carries out whichever of its threatened trade taxes results in lower time-2 Home economic utility and (b) the event Home abandons its threat and chooses whatever time-2 trade taxes maximize its economic utility. That is, letting  $m_{H2}^\ell$  and  $m_{H2}^*$  denote Home’s net imports under (a) and (b), respectively,*

$$r_{H1v}s_{1v} \propto \tilde{r}_{H2v}(m_{H2}^\ell, k_H) - \tilde{r}_{H2v}(m_{H2}^*, k_H).$$

In the typical case where Home is worse off when its trade taxes punish Foreign than when they reward it, Theorem 2 suggests Home should subsidize the capital varieties that help it to produce substitutes to Foreign imports, which are scarcer under sanctions. For example, had the EU promoted gas reserves with subsidies before Russia’s invasion of Ukraine, its threats to embargo Russian gas following the invasion might have been more credible.

### 3.3 Optimal Peacetime Trade Policy

Having characterized Home’s domestic industrial policies during peacetime, we now turn to its international trade policies. We begin by returning to the benchmark case where Home’s trade threats are unconstrained and then consider credibility constraints.

#### 3.3.1 Trade policy with unrestricted trade threats

The goal of this part of the paper is to show whether and, if so, how the presence of geopolitics affects Home’s peacetime trade policy. This is more involved than our analysis of Home’s peacetime industrial policy for two reasons. First, even in the absence of geopolitics, Home will generally engage in trade policy because of conventional terms-of-trade manipulation motives (see, e.g., [Dixit and Norman, 1980](#)).<sup>17</sup> It is therefore essential that we identify and separate out the terms-of-trade component of Home’s peacetime trade taxes. Second, we cannot simply isolate the terms-of-trade motive by identifying it with the trade balance constraints. While intuitive, this approach would be incorrect because the presence of the geopolitical IC constraint can impact how binding these trade balance constraints are—making them looser on the equilibrium path, where Home seeks to reward Foreign, and tighter off the equilibrium path, where Home seeks to punish Foreign.

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<sup>17</sup>In our model, this motive exists both statically—with Home distorting time-1 trade to lower the world prices of its net imports at time 1—and dynamically—with Home distorting time-1 trade to move Foreign’s capital stock in whichever direction lowers the world prices of its net imports at time 2.

Given these challenges, it is useful to begin our analysis in a stylized environment that facilitates a simpler presentation of the main ideas behind our approach. To this end, we temporarily suppose that each country's Meade utility has a quasilinear structure: For some numeraire good  $g = 0$ , we have

$$V_{it}(m, k) = \hat{V}_{it}(\hat{m}, k) + m_0 \quad (16)$$

for some non-numeraire component of Meade utility  $\hat{V}_{it}(\cdot, \cdot)$ , where we let  $\hat{m}$  denote  $m_{-0}$ . Under this assumption, the trade balance constraint at each time  $t$  can be written as

$$\hat{V}_{Ft, \hat{m}}(\hat{m}_{Ft}, k_F) \cdot \hat{m}_{Ft} = -m_{Ft, 0}. \quad (17)$$

Our assumption of quasilinearity also implies Foreign's capital choice does not depend on its net imports of the numeraire, so we can express the Foreign capital constraint as

$$k_F = \hat{k}_F(\hat{m}_{F1}, \hat{m}_{F2})$$

for some function  $\hat{k}_F(\cdot, \cdot)$ .

We use these observations to rewrite the primal problem. Starting with the planner's objective (i.e., Home welfare), (17) allows us to express Home's net imports of the numeraire in terms of Foreign's net imports of non-numeraire goods, so that the objective is

$$\hat{V}_{H1}(-\hat{m}_{F1}, k_H) + \hat{V}_{F1, \hat{m}}(\hat{m}_{F1}, k_F) \cdot \hat{m}_{F1} + \hat{V}_{H2}(-\hat{m}_{F2}, k_H) + \hat{V}_{F2, \hat{m}}(\hat{m}_{F2}, k_F) \cdot \hat{m}_{F2} + z_H(a),$$

where  $k_F = \hat{k}_F(\hat{m}_{F1}, \hat{m}_{F2})$ . The dependence of Home's consumption of the numeraire on  $\hat{m}_{F1}$  through Foreign's marginal utility—both directly, and indirectly via  $\hat{m}_{F1}$ 's impact on  $k_F$ —reflects Home's static and dynamic incentives to manipulate the terms of trade.<sup>18</sup>

We can similarly rewrite the geopolitical incentive compatibility constraint by expressing Foreign's net imports of the numeraire in terms of its net imports of non-numeraire goods:

$$\begin{aligned} & \left[ \hat{V}_{F2}(\hat{m}_{F2}, k_F) - \hat{V}_{F2, \hat{m}}(\hat{m}_{F2}, k_F) \cdot \hat{m}_{F2} \right] \\ & - \left[ \hat{V}_{F2}(\hat{m}_{F2}^{OFF}, k_F) - \hat{V}_{F2, \hat{m}}(\hat{m}_{F2}^{OFF}, k_F) \cdot \hat{m}_{F2}^{OFF} \right] \geq z_F(\neg a) - z_F(a), \end{aligned} \quad (18)$$

where again  $k_F = \hat{k}_F(\hat{m}_{F1}, \hat{m}_{F2})$ . Since this constraint concerns Foreign's incentives at time 2, its time-1 net imports  $\hat{m}_{F1}$  only enter it indirectly, through their impact on Foreign's capital

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<sup>18</sup>Recall from Section 3.1 that world prices are proportional to Foreign's marginal Meade utility with respect to net imports.

stock. These changes in  $k_F$  affect the IC constraint both because capital affects the utility Foreign derives from its non-numeraire net imports and because it affects its terms of trade and hence Foreign's imports of the numeraire. In both cases, it may do so differentially at Foreign's on- and off-path net imports, thereby shifting Foreign's geopolitical incentives.

The advantage of having substituted in for net imports of the numeraire is that the trade balance constraints can now be dropped from the planner's problem, which can hence be recast as one of choosing—in addition to capital and geopolitical actions—trade in *non-numeraire* goods.<sup>19</sup> This reformulated planner's problem, after substituting in for  $k_F = \hat{k}_F(\hat{m}_{F1}, \hat{m}_{F2})$ , has a single constraint that can be identified uniquely with geopolitics: If either Home or Foreign has no geopolitical preferences, then the constraint does not bind and the objective fully captures Home's problem; if both have sufficiently strong and misaligned geopolitical preferences, then the constraint does bind. The impact of geopolitics on the planner's first-order condition is therefore exactly captured by the contribution of terms proportional to the Lagrange multiplier on this constraint. And since there is only a single constraint, we need not worry that the values of other constraints' Lagrange multipliers in the planner's first-order condition might be endogenous to geopolitics.

Having isolated where geopolitics enters the planner's problem, we can now focus on how it affects peacetime trade policy. The key “trick” for this part of our analysis is to rewrite (18) using the fundamental theorem of calculus as

$$\int_{\hat{m}_{F2}^{OFF}}^{\hat{m}_{F2}} (-\hat{m}) \cdot \hat{V}_{F2, \hat{m}\hat{m}}(\hat{m}, k_F) \cdot d\hat{m} \geq z_F(-a) - z_F(a), \quad \text{where } k_F = \hat{k}_F(\hat{m}_{F1}, \hat{m}_{F2}).$$

Recalling that world prices are proportional to the derivative of Foreign Meade utility with respect to net imports, we define a “world price function”  $\hat{p}_2^w(\hat{m}, k) \equiv \hat{V}_{F2, \hat{m}}(\hat{m}, k)$  and use it to rewrite the integrand above as the terms-of-trade effect from a change in imports  $d\hat{m}$ , i.e.,

$$\int_{\hat{m}_{F2}^{OFF}}^{\hat{m}_{F2}} (-\hat{m}) \cdot \frac{\partial \hat{p}_2^w(\hat{m}, k_F)}{\partial \hat{m}} \cdot d\hat{m} \geq z_F(-a) - z_F(a), \quad \text{where } k_F = \hat{k}_F(\hat{m}_{F1}, \hat{m}_{F2}). \quad (19)$$

In words, (19) says that time-1 trade relaxes the geopolitical IC constraint to the extent it shifts Foreign capital in a direction that makes Foreign's time-2 terms of trade more sensitive to trade. In particular, it matters whether Foreign's terms of trade become more sensitive along the path between Home's stick ( $\hat{m}_{F2}^{OFF}$ ) and its carrot ( $\hat{m}_{F2}$ ).

To build intuition for which trade-induced changes in Foreign capital relax the geopolitical

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<sup>19</sup>After we have made the above substitutions, Foreign's net imports of the numeraire appear in neither the objective nor any of the constraints other than trade balance. So the planner can always simply set net imports of the numeraire to the levels that satisfy the trade balance constraints.

IC constraint, we turn to an even simpler example. Concretely, we suppose there is a single non-numeraire good and that Foreign exports that good to Home in exchange for Home's exports of the numeraire. For example, Foreign could represent Russia exporting gas to the EU or China exporting rare earth minerals to the U.S.

Because of the two-good quasilinear structure, we can represent Home's "carrots" and "sticks" in a conventional supply-and-demand diagram shown in Figure 2. We begin with the "S" and "D" curves, which are the same in the left and right panels. These represent time 2 before any changes in capital. The x-axis shows two different trade quantities: Home's off-path threat of autarky and its on-path offer to import some amount  $-\hat{m}_{F2}$ . The y-axis shows the prices that Home and Foreign face on the equilibrium path; these differ due to Home's tariff, which is positive but below the terms-of-trade-optimal level. The shaded region represents Foreign's producer surplus, which is the same as the left-hand side of (19).<sup>20</sup>

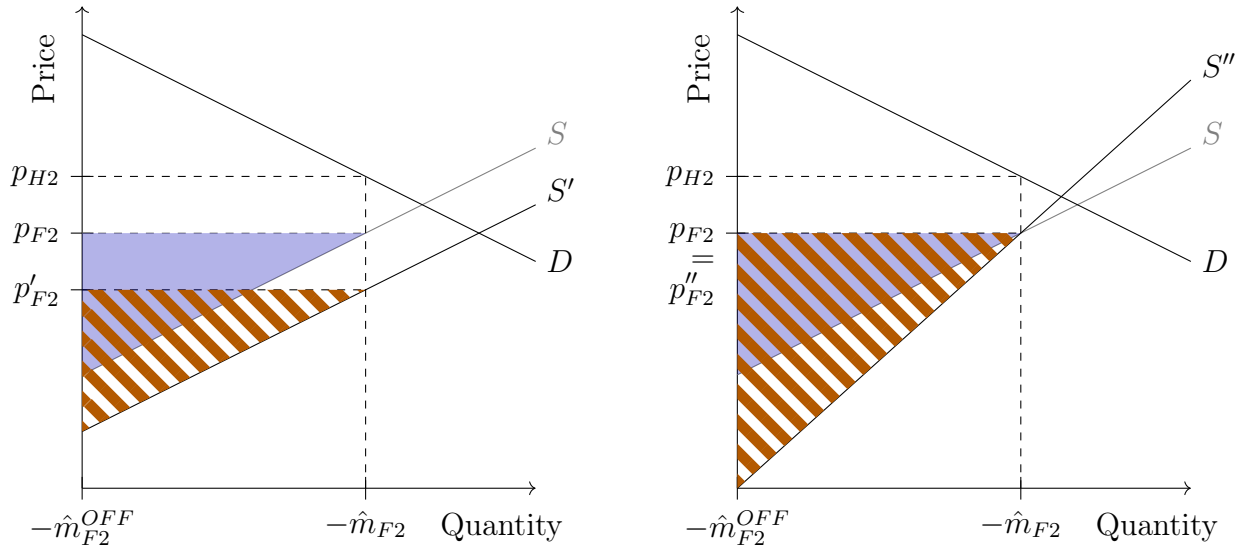


**Figure 2:** *Changes in Foreign's geopolitical incentives at fixed trade quantities. Left panel: Uniform supply shift. Right panel: Supply rotation.*

The left and the right panels of the figure consider two different shifts of Foreign's export supply curve, which one may think of as reflecting trade-induced changes in capital. Which changes in capital serve a geopolitical purpose in the sense of loosening (19)? The left panel considers a uniform downward shift in Foreign's supply curve. This could reflect, for example, a decrease in Russia's per-unit cost of shipping gas to the EU brought on by the construction of a new pipeline. The hatched orange region shows Foreign's new producer surplus after this shift. Importantly, the figure holds  $\hat{m}_{F2}$  fixed when computing this new producer surplus, in line with (19). This reflects that, before the supply shift, Home had already optimized its

<sup>20</sup>The integral writes producer surplus as a sum of rectangles with width  $-\hat{m}$  and height  $d\hat{p}_2^w/d(-\hat{m}) \times d(-\hat{m})$ .

on-path tariff so that it was indifferent between the economic costs of higher imports—i.e., a tariff further below its economically optimal level—and their geopolitical benefits—i.e., greater Foreign producer surplus and hence geopolitical incentives. One may therefore evaluate a small supply shift by supposing it is accompanied by a small increase in Home’s on-path tariff engineered to keep the quantity of imports constant. When computed in this way, Foreign’s producer surplus does not change. In other words, to the extent that time-1 trade policies move Foreign’s capital stock in directions that uniformly shift Foreign’s net import demand system, they provide no geopolitical benefit.

By contrast, the right panel of the figure shows a rotation in Foreign’s supply curve that makes Foreign’s supply less price-elastic. This could reflect, for example, a decline in Russia’s outside options for selling gas if it disinvests from pipelines to third countries only willing to pay below-equilibrium prices. The same analysis reveals that this rotation—by increasing the sensitivity of Foreign’s export price to quantity along the path between off- and on-path quantities—raises its producer surplus at fixed quantities. It therefore loosens the geopolitical incentive compatibility constraint in (19) and can potentially rationalize time-1 trade distortions.

Synthesizing the lessons from the left and right panels of Figure 2, we conclude that *geopolitical considerations rationalize distortions to time-1 trade if and only if they rotate Foreign’s net import demand system rather than merely shifting it*. In doing so, Home seeks to raise the *manipulability* of Foreign’s terms of trade. Put differently, we offer a refinement of the idea, dating back to at least Montesquieu (1748), that “peace is the natural effect of trade.” In our setting it is not changes in trade that promote peace, but rather changes in trade (semi-)elasticities.

Our next result generalizes the lessons of the quasilinear setting to the general model of Section 2 and shows how they interact with the conventional terms-of-trade motive for distorting peacetime trade. Doing so requires a notion of world prices under counterfactual trade quantities, analogous to the counterfactual rental rates used in Theorem 2. Recall from Section 3.1 that the Jacobian of Foreign’s Meade utility with respect to net imports is proportional to world prices in net-present-value terms. This in mind, we define

$$\tilde{p}_t^w(m_{Ft}, k_F) \equiv V_{Ft,m}(m_{Ft}, k_F).$$

Our particular choice of proportionality constant (unity) plays no role in our results.

**Theorem 3.** *Under Assumption 1, Home's peacetime trade taxes satisfy*

$$\tau_{1g} = \tau_{1g}^{ToT} + \kappa \left( \int_{m_{F2}^{OFF}}^{m_{F2}} (-m) \cdot \frac{\partial^2 \tilde{p}_2^w(m, k_F)}{\partial k_F \partial m} \cdot dm \right) \cdot \frac{\partial \tilde{k}_F}{\partial m_{F1g}} \bigg/ \tilde{p}_{1g}^w \quad (20)$$

where  $\tau_{1g}^{ToT} = \frac{m_{F1}}{\tilde{p}_{1g}^w} \cdot \frac{\partial \tilde{p}_1^w}{\partial m_{F1g}} + \left( \frac{m_{F1}}{\tilde{p}_{1g}^w} \cdot \frac{\partial \tilde{p}_1^w}{\partial k_F} + \Phi \frac{m_{F2}}{\tilde{p}_{1g}^w} \cdot \frac{\partial \tilde{p}_2^w}{\partial k_F} \right) \cdot \frac{\partial \tilde{k}_F}{\partial m_{F1g}},$

up to Lerner symmetry, for some  $\kappa \geq 0$ , where  $\Phi > 0$  is a scalar whose deviations from unity represent the extent of inefficiency from financial autarky,<sup>21</sup> and where  $\tilde{k}_F(m_{F1}, m_{F2})$  is given by the second constraint of (13). Above, all functions are evaluated at on-path quantities unless otherwise specified.

This result characterizes Home's optimal peacetime trade taxes in the presence of geopolitical concerns. The term  $\tau_{1g}^{ToT}$  represents Home's conventional terms-of-trade motive for trade taxes at time 1. This formula would fully describe Home's optimal tariffs in the absence of geopolitical concerns.<sup>22</sup> The geopolitical rationale for peacetime trade policy enters as a separate, additively separable term proportional to a Lagrange multiplier  $\kappa$  on the geopolitical incentive compatibility constraint. This term reflects the same economics as emphasized above in the quasilinear case: Geopolitics provides a rationale for distorting time-1 trade if and only if doing so moves Foreign's capital stock in a way that makes its prices more sensitive to trade at time 2.

### 3.3.2 Trade policy with imperfect credibility

So far, we have characterized Home's optimal peacetime trade taxes under the assumption that Home's time-2 trade threats are unconstrained and, in particular, fully credible. We now reconsider peacetime trade policy away from this benchmark.

As a starting point, we return to the quasilinear environment from Section 3.3.1 but now add a credibility constraint. We focus on the case where Home's economic utility is lower off the equilibrium path. In this case, after using trade balance to substitute in for Home's net

<sup>21</sup>With perfect commitment,  $\Phi$  is equal to the ratio of the planner's Lagrange multipliers on the on-path time-2 and time-1 trade balance constraints. This equals one in the case of integrated international financial markets, since then there is a single lifetime trade balance constraint. Appendix A.6 provides an expression for  $\Phi$  in terms of observable quantities.

<sup>22</sup>This is subtly different from the claim that Home's tariffs would equal  $\tau_{1g}^{ToT}$  in the absence of geopolitical concerns. The difference is that the various elasticities comprising  $\tau_{1g}^{ToT}$  must be evaluated at the allocation that results from Home's full optimal policy—including the geopolitical component of trade taxes. To the extent these elasticities are non-constant,  $\tau_{1g}^{ToT}$  will differ from Home's tariffs in the absence of geopolitical concerns. This is a standard feature of policy decomposition formulas; see, for example, Adão et al. (2023) and Adão et al. (2024).

imports of the numeraire, the credibility constraint in Assumption 2 takes the form

$$\begin{aligned} \hat{V}_{H2}(-\hat{m}_{F2}^{OFF}, k_H) + \hat{V}_{F2, \hat{m}}(\hat{m}_{F2}^{OFF}, k_F) \cdot \hat{m}_{F2}^{OFF} + \Delta \\ \geq \max_{\hat{m}_{F2}^*} \hat{V}_{H2}(-\hat{m}_{F2}^*, k_H) + \hat{V}_{F2, \hat{m}}(\hat{m}_{F2}^*, k_F) \cdot \hat{m}_{F2}^*. \end{aligned} \quad (21)$$

Importantly, Home's credibility constraint in (21) depends on Foreign capital to the extent it affects world prices for non-numeraire goods. Changes in Foreign capital relax Home's credibility constraint if they disproportionately improve Home's terms of trade at the off-path trade vector  $\hat{m}_{F2}^{OFF}$  relative to Home's economically optimal trade vector  $\hat{m}_{F2}^*$ .

Figure 3 displays this effect in the supply-and-demand economy where Home imports a single, non-numeraire good from Foreign. In the figure, we consider the impact on Home's time-2 economic welfare of an upward shift in Foreign's supply curve. The left panel considers its impact at Home's economically optimal quantity while the right considers its impact at Home's off-path quantity used to punish Foreign. Since Home punishes Foreign precisely by withdrawing from trade, its imports are lower off-path and hence its economic surplus is less affected by the increase in world prices than at its economically optimal level of imports, which is higher. This disproportionate welfare effect relaxes the credibility constraint: Now that Home benefits less from trade, it can credibly threaten more substantial reductions in it. As a result, Home benefits from whatever peacetime trade policies cause such gains-from-trade-reducing changes in supply. These include policies that, through movements in Foreign's capital stock, *shift* its net export supply system—not just those that rotate it, as was the case with perfect commitment.

Our next theoretical result extends this logic to the general case.

**Theorem 4.** *Under Assumption 2, Home's peacetime trade taxes satisfy*

$$\tau_{1g} = \tau_{1g}^{cred} + \left( \xi^\ell m_{F2}^\ell \cdot \frac{\partial \tilde{p}_2^w(m_{F2}^\ell, k_F)}{\partial k_F} - \xi^* m_{F2}^* \cdot \frac{\partial \tilde{p}_2^w(m_{F2}^*, k_F)}{\partial k_F} \right) \cdot \frac{\partial \tilde{k}_F}{\partial m_{F1g}} \bigg/ \tilde{p}_{1g}^w,$$

up to Lerner symmetry, where  $\tau_{1g}^{cred}$  is the expression on the right-hand side of (20),  $m_{F2}^\ell$  and  $m_{F2}^*$  are Foreign's net imports under whichever threat delivers Home lower time-2 economic utility and under Home's economically optimal time-2 trade policy, respectively, and  $\xi^\ell, \xi^* \geq 0$  are multipliers defined in the proof.

Taken together with Theorems 2 and 3, Theorem 4 offers a new take on the conundrum of how Home can foster Foreign's dependence without itself becoming dependent on Foreign. On one hand, Home's international trade policies target Foreign's dependence on Home by promoting capital that *rotates* Foreign's net export supply system to make its terms of trade

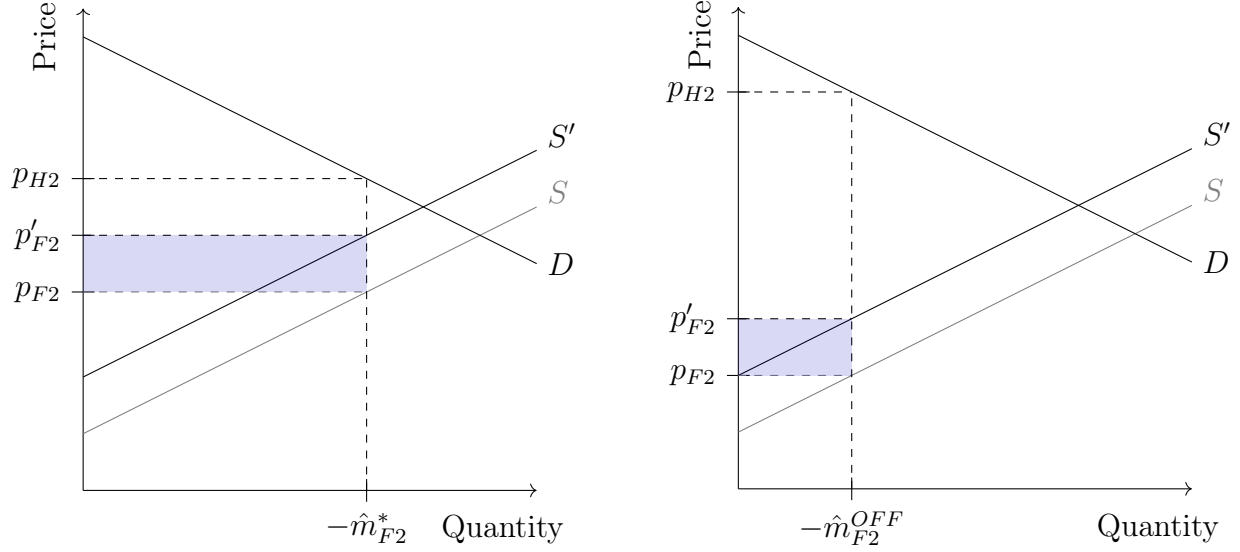


**Figure 3:** *Loss of Home surplus due to upward shift in Foreign supply. Left panel: Evaluated at Home's economically optimal imports. Right panel: Evaluated at Home's off-path threat.*

more sensitive. On the other hand, they also seek to *shift* Foreign's net export supply system so that trade is more expensive for Home and therefore its withdrawal as a punishment is more credible. Home's domestic industrial policies simultaneously shift its own net import demand system to the same effect.

## 4 Optimal Policies in an Example Economy

So far, we have characterized Home's optimal capital subsidies and trade policy in an abstract model. While this isolates the key mechanisms through which geopolitics affects optimal policy, it provides little guidance about what kinds of goods and capital varieties a government should actually target. To shed light on what our results imply for policy in practice, we now specialize our optimal policy formulas to a parametric economy similar to familiar trade models. Although we consider a fairly rich model, we can still characterize Home's optimal policies in the limit where trade is a small share of GDP and the conflict period is short.

### 4.1 Environment

There are  $N + 1$  sectors: one investment sector, which we index by  $n = 0$ , and  $N$  consumption sectors, which we index by  $n \in \{1, \dots, N\}$ . Within each consumption sector, Home and Foreign produce differentiated products using specialized capital. Within the investment sector, each country is endowed with differentiated products it can use to produce capital. In

the language of Section 2, this economy has  $2 \times (N + 1)$  goods, one for each sector- $n$  and country- $j$  pair,  $g = nj$ . There are  $N$  dimensions of capital in each country, one for each consumption sector  $n$ ,  $v = n$ .

In each country  $i$  at time  $t$ , consumption utility is log Cobb-Douglas over sectors and CES over origins, i.e.,

$$u_{it}(c) = \beta^{t-1} \sum_{n \geq 1} \theta_{in} \log(C_n), \quad \text{where} \quad C_n = \left( \sum_{j \in \{H, F\}} (\phi_{inj})^{1/\sigma_n} (c_{nj})^{(\sigma_n-1)/\sigma_n} \right)^{\sigma_n/(\sigma_n-1)},$$

and where  $\sigma_n > 1$ ,  $\sum_n \theta_{in} = 1$ ,  $\sum_j \phi_{inj} = 1$ ,  $\theta_{in} > 0$ , and  $\phi_{inj} \geq 0$ . Geopolitical utility is similarly discounted, so that

$$z_i(\hat{a}) = \beta(\mathbb{1}_{\hat{a}=\underline{a}} \bar{z}_i + \mathbb{1}_{\hat{a}=\bar{a}} \bar{\bar{z}}_i).$$

Each consumption product  $ni$  in country  $i$  is produced one-for-one in sector-specific capital, while the country simply has an endowment  $\bar{y}_{0i}$  of investment products at time 1. That is,

$$G_{it}(y, k^y) = \max \left[ y_{0i} - \mathbb{1}_{t=1} \bar{y}_{0i}, \max_{n \geq 1} (y_{ni} - k_n^y), \max_{n \geq 0, j \neq i} y_{nj} \right].$$

Capital is produced using a single CES aggregator over the investment products from both Foreign and Home. It is then allocated across different consumption sectors  $n \geq 1$  where it remains stuck for time 2. That is,

$$\Lambda_{i1}(k, \iota) = \sum_{n \geq 1} k_n - \left( \sum_{j \in \{H, F\}} (\phi_{i0j})^{1/\sigma_0} (\iota_{0j})^{(\sigma_0-1)/\sigma_0} \right)^{\sigma_0/(\sigma_0-1)}.$$

## 4.2 Industrial Policy

Recall we have shown in Theorem 1 that Home's optimal industrial policy is laissez faire when Home has perfect commitment. We therefore focus on Home's optimal industrial policy when Home has imperfect commitment. According to Theorem 2, Home should, in this case, subsidize capital varieties according to the difference between their rental rates under Home's costliest threat and its economically optimal trade taxes. In our specialized model of intra- and inter-industry trade, this implies Home should subsidize capital investment in sectors where Home has a larger trade deficit under its economically optimal trade policy than under its most costly threat.

**Proposition 1.** *Home's time-1 capital subsidies satisfy*

$$r_{H1n}s_{1n} \propto \frac{TD_{H2n}^* - TD_{H2n}^\ell}{k_{Hn}},$$

where  $TD_{H2n} \equiv p_{H2nF}C_{H2nF} - p_{H2nH}C_{F2nH}$  is Home's own-price sector- $n$  trade deficit at time 2, which we evaluate under its costliest threat (“ $\ell$ ”) and its economically optimal policy (“ $*$ ”).

This result follows from the fact that Home has concave utility in sectoral aggregates  $C_n$ . Under concavity, if Home's most costly threat cuts off more imports from Foreign in a given sector than exports to Foreign in that sector—so that Home's total consumption in the sector will be lower—then the sectoral aggregate will be more expensive. The higher are prices in a sector, the higher is the capital rental rate, which Home targets to raise Home welfare in its worse-off state to build credibility.

### 4.3 Trade Policy

Next we characterize Home's optimal trade policy in this specialized setting. We focus on the case of perfect commitment since Home's trade policies are already non-trivial in this case.<sup>23</sup> Theorem 3 implies that Home uses time-1 trade policy to move Foreign capital in whatever direction makes Foreign's terms of trade more manipulable at time 2. We now break this logic into two steps: We first discuss how Home would like to influence Foreign capital and then demonstrate how to use time-1 trade policy to effect that change.

In the limit of low time-2 trade,<sup>24</sup> the marginal value to Home of sector- $n$  Foreign capital is proportional to

$$\int_{m_{F2}^{OFF}}^{m_{F2}} (-m) \cdot \frac{\partial^2 \tilde{p}_2^w(m, k_F)}{\partial k_{Fn} \partial m} \cdot dm \rightarrow \gamma_n \equiv -\frac{1}{\sigma_n} \frac{p_{2nH}^w m_{F2nH}}{y_{F2nF}}.$$

In particular, Home would like to reduce Foreign capital investment in every sector ( $\gamma_n < 0$ ), whether Foreign is a net importer or net exporter. This is because Foreign utility is prudent over sectoral aggregates, so it is more concave at lower levels of consumption.<sup>25</sup> This makes Foreign's marginal utility of consumption more sensitive to changes in quantities at lower consumption levels. This, in turn, makes the prices of Home's and Foreign's products in that sector more sensitive to changes in trade quantity, as Home intends.

<sup>23</sup>Appendix B.4 characterizes Home's trade policy in this economy under limited credibility.

<sup>24</sup>Formally, the remainder of the results in this section hold to first order in the value of trade, or up to  $o(\{p_{2nj}^w m_{i2nj}\}_{i \in \{H,F\}, j \neq i})$ , holding nominal GDP fixed. One way to achieve this limit is by taking the foreign share parameters  $\phi_{inj \neq i} \rightarrow 0$ .

<sup>25</sup> $f(x)$  is prudent if  $f'''(x) > 0$ .

Although Foreign capital in each sector affects the price sensitivity of both its imports and exports, the import effect turns out to dominate in the low-trade limit. This is because, in the limit, the Foreign price of Foreign exports converges to a finite number. Meanwhile, the Foreign price of Home exports converges to infinity. As a result, how much Home values a decrease in Foreign's capital depends only on Home's market power over its own product. This is decreasing in its substitutability with the Foreign product,  $\sigma_n$ , and increasing in the value of Foreign's imports relative to its own production, or  $(p_{2nH}^w m_{F2nH})/y_{F2nF}$ ; these are precisely the two terms that appear in the above expression for  $\gamma_n$ .

Having characterized Home's desire to influence Foreign capital investments, we now turn to how Home can use trade policy to this effect. To simplify this analysis, we focus on the limit where time 2 becomes short ( $\beta \rightarrow 0$ ), which ensures Foreign capital investment only depends on time-1 trade.<sup>26</sup> At time 1, Home has access to two types of policies. First, Home can discourage Foreign capital investment in each sector by decreasing Foreign's ability to produce aggregate capital. Home does this by subsidizing its imports of the Foreign investment product and taxing exports of its own investment product.

**Proposition 2.** *In the limit of small time-2 trade volumes and as  $\beta \rightarrow 0$ ,*

$$\tau_{10H} - \tau_{10H}^{ToT} = \tau_{10F} - \tau_{10F}^{ToT} = \kappa \frac{\Gamma}{r_{F1}} \leq 0,$$

where  $\Gamma$  is a weighted average of  $\gamma_n$  across sectors,<sup>27</sup>  $r_{F1}$  is the (common) rental rate of all capital varieties, and  $\kappa$  is the multiplier on the geopolitical IC constraint, as in Theorem 3.<sup>28</sup>

The import subsidy and export tax in Proposition 2 imply that Home uses policy to raise the price of all investment products in Foreign relative to Home. This is evocative of recent policies such as the U.S.'s 2022 restrictions on U.S. engineers' ability to work on the development of integrated circuits in China. The services of these engineers can be seen as a capital input that the U.S. sought to make scarce to reduce Chinese chipmaking capacity.

In addition to trade taxes on investment products, which limit Foreign's aggregate capital production, Home can also use trade taxes on consumption products to influence which sectors Foreign invests that capital in. For sectors  $n$  where  $\gamma_n < \Gamma$ , Home would like to decrease Foreign capital in sector  $n$  more than in the average sector. Home can accomplish this by importing less of Foreign's output and exporting more of its own output. This floods

<sup>26</sup>Of course, as time 2 becomes short, Home also places less weight on geopolitics relative to time-1 economic welfare. This manifests as trade taxes proportional to the Lagrange multiplier  $\kappa$  on the geopolitical IC constraint, which grows small in the  $\beta \rightarrow 0$  limit.

<sup>27</sup>Let  $\mu_{F1nF} \equiv p_{F1nF} c_{F1nF} / (p_{F1nF} c_{F1nF} + p_{F1nH} c_{F1nH})$  denote the share of Foreign's sector- $n$  spending on its own product at time 1. We define  $\Gamma \equiv (\sum_n w_n \gamma_n) / (\sum_n w_n)$  for  $w_n \equiv \sigma_n c_{F1nF} / [(\sigma_n - 1) \mu_{F1nF} + 1]$ .

<sup>28</sup>Propositions 2 and 3 both use the same Lerner normalization of taxes as Theorem 3.

Foreign's market with its own product and a close substitute, driving down the price of its product and discouraging investment. For sectors  $n$  where  $\gamma_n > \Gamma$ , Home does not want to decrease capital as much and so encourages Foreign's limited investment in those sectors by importing more of Foreign's product and exporting less of its own output.<sup>29</sup>

**Proposition 3.** *In the limit of small time-2 trade volumes and as  $\beta \rightarrow 0$ ,*

$$\tau_{1nF} - \tau_{1nF}^{ToT} = -\kappa \frac{\gamma_n - \Gamma}{p_{F1nF}}$$

$$\text{and } \tau_{1nH} - \tau_{1nH}^{ToT} = \frac{(\sigma_n - 1) \mu_{F1nF}}{(\sigma_n - 1) \mu_{F1nF} + 1} (\tau_{1nF} - \tau_{1nF}^{ToT}),$$

where  $\mu_{F1nF} \equiv p_{F1nF} C_{F1nF} / (p_{F1nF} C_{F1nF} + p_{F1nH} C_{F1nH})$  is the share of Foreign's sector- $n$  spending on its own product at time 1.

Proposition 3 summarizes the above intuition and quantifies what this means for trade taxes. The result also reveals a subtlety about Home's incentive to encourage exports of its own products. For this discussion, we focus on a sector  $n$  in which Home wants to discourage Foreign investment by more than the average, i.e.,  $\gamma_n < \Gamma$ . To discourage investment, Home wants to decrease the price of Foreign's product in the sector. Clearly, Home can do this by buying less of Foreign's output and thereby making it more abundant within Foreign. Home can also do this by exporting more of its own product, since this will further decrease the price of Foreign's product as demand substitutes toward Home's. This second mechanism is especially effective if the Home and Foreign products are very substitutable ( $\sigma_n \gg 1$ ) or if Foreign spends a lot on itself ( $\mu_{F1nF} \approx 1$ ) so that Foreign's substitution has a large impact on the market for its own product.

## 5 Extensions

The baseline model is stylized along several dimensions. It features no geopolitical uncertainty, assumes Home's threats are purely economic, abstracts from any direct impact of geopolitical choices on economic activity, and features only two countries. We now outline extensions that enrich the model along each of these dimensions and discuss how they affect our results.

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<sup>29</sup>One may ask why Home does not simply flood the market in all Foreign consumption sectors. The reason is that although Home would like to decrease Foreign's capital in all consumption sectors, it has a more direct instrument for reducing Foreign's aggregate investment—its trade taxes on investment products. It uses these taxes to discourage investment overall and uses its trade taxes on consumption products to shift relative investment across sectors.

## 5.1 Geopolitical Uncertainty

The baseline model is deterministic. This implies that Home never applies trade sanctions (i.e., a “stick”) along the equilibrium path, which is at odds with reality.<sup>30</sup> In Appendix C.1, we consider a variant of the model in which Foreign’s geopolitical preferences are random and revealed after Home makes its trade threat. If Foreign has a sufficiently strong preference for an action Home dislikes, it will take the action leading to trade conflict on-path.

Our results concerning peacetime capital subsidies remain unchanged. Uncertainty does not affect the targeting logic behind either result, and firms internalize the probability of a trade war. Home’s trade policy is unaltered except that the terms-of-trade component of trade taxes now accounts for world price changes under both geopolitical actions, since they both can occur in equilibrium. For the same reason, expressions must replace  $m_{F2}$  and  $m_{F2}^{OFF}$  with Foreign’s time-2 net imports under the two geopolitical actions.

## 5.2 Home Geopolitical Actions

In the baseline model, Home does not have access to military or diplomatic action. Instead, it is limited to economic policies. In Appendix C.2, we extend the model to allow Home to threaten its own geopolitical action alongside its tax threats.

In this case, Home generally uses both geopolitical and economic policies to coerce Foreign. However, Home’s peacetime capital subsidies and peacetime trade taxes are given by the same expressions as in our baseline model.

## 5.3 Inseparability of Economics and Geopolitics

In the baseline model, geopolitical actions affect economic outcomes only through Home’s time-2 trade taxes. This rules out geopolitical actions with direct economic impacts, such as demand for weapons or destruction of factories. In Appendix C.3, we relax the assumption that countries’ economic and geopolitical preferences are additively separable, allowing geopolitical actions to directly change production frontiers or consumption utilities.

We focus on extending our results with perfect credibility, since inseparability already affects Home policy in this case. Namely, Home’s peacetime trade taxes now feature an additional term on top of Foreign’s terms-of-trade manipulability. The new term accounts

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<sup>30</sup>When Foreign’s geopolitical preferences are weak, Home can control its geopolitical behavior using only *off-path* threats that are never realized in equilibrium. When Foreign’s geopolitical preferences are of intermediate strength, Home lowers its trade taxes below the terms-of-trade-manipulating level (a “carrot”) on the equilibrium path and only raises them above it (a “stick”) off-path. When Foreign’s geopolitical preferences are strong, Home’s cost of influencing its behavior exceeds the benefit, so Home’s trade taxes ignore geopolitics altogether.

for how the market value of trade-induced changes in Foreign capital depends on Foreign’s geopolitical action. It implies that Home should promote Foreign capital that, all else equal, is more valuable when Foreign takes Home’s preferred geopolitical action, and vice versa. For example, Home may—as in [Alekseev and Lin \(2024\)](#)—restrict its exports of arms to Foreign to discourage Foreign from building military stockpiles, which are more useful if Foreign goes to war. Home’s peacetime capital subsidies are unaffected.

## 5.4 Many Countries

The baseline model features only two countries. It therefore does not speak to the ability of sanctioning and sanctioned countries to substitute toward trade with third parties. In [Appendix C.4](#), we extend the model to allow for many countries. Countries other than Home and Foreign are passive in the sense that they do not take geopolitical actions or use capital subsidies or trade taxes, while Home now taxes its trade with all other countries.

Our results on industrial policy are unchanged. However, the presence of bystander countries affects our results on peacetime trade taxes in two ways. First, it broadens the “manipulability” mechanism we emphasized in the two-country case. Home can now threaten to punish Foreign indirectly by using its trade taxes with bystanders to discourage *their* trade with Foreign. Therefore, Home seeks to raise Foreign’s terms-of-trade manipulability with respect to those third-party trade changes in addition to the bilateral changes. Moreover, Home must account for the more complex impact of its net imports on Foreign capital, which with bystanders differs from the impact of Foreign’s net exports on Foreign capital.

Second, bystander countries introduce a new qualitative mechanism: Home seeks to move Foreign and bystander capital in ways that—holding fixed Home’s own time-2 net imports—affect Foreign’s time-2 net imports. With two countries, this mechanism is not present because Foreign’s net imports are simply Home’s net exports, but with more than two countries, capital can affect trade between Foreign and bystanders. Therefore, Home promotes capital that, under its preferred geopolitical action, induces trade changes that improve Foreign’s terms of trade and that, under Home’s less preferred geopolitical action, induces trade changes that worsen Foreign’s terms of trade.

## 6 A Quantitative Model of Global Interdependence

Having characterized optimal geopolitical policies theoretically, we now set out to quantify them in the context of the U.S. (which we treat as Home) and China (Foreign). This section formulates and calibrates a quantitative trade model nested by our general framework. [Section 7](#) then uses the model to quantify the U.S.’s optimal peacetime policies.

## 6.1 Quantitative Model

The idea behind our choice of parametric model is to embed capital investment into an otherwise standard trade model. We start from a many-country, many-sector static model with trade in intermediates, similar to [Caliendo and Parro \(2015\)](#). We augment this model by assuming firms use two types of capital—one that reduces the cost of producing their own varieties and another that reduces the cost of importing varieties from each origin. Firms' capital investment decisions endogenize their productivity shifters from the static model.

For ease of reading, we present this parametric model using conventional notation rather than describing utility and production functions  $u_{it}(\cdot)$ ,  $G_{it}(\cdot, \cdot)$ , and  $\Lambda_{i1}(\cdot, \cdot)$  in the language of Section 2.1. As a result, we—where there is no risk of confusion—slightly abuse notation by indexing some variables differently than in earlier sections of the paper. Supplemental Appendix H.4.1 explicitly maps the parametric model into our general framework.

**Environment.** There are many countries  $i \in \mathcal{I}$  and sectors  $n \in \mathcal{N}$ . For each sector  $n$ , there are two types of firms in country  $i$ : a variety producer that sells a differentiated variety and a composite producer that sells a domestically usable sector- $n$  composite composed of varieties from all origins. Households supply labor and consume domestic composites.

**Variety producers.** At each time  $t$ , country  $i$ 's sector- $n$  variety producer produces output  $q_{int}$  using labor  $\ell_{int}$ , production capital  $k_{in}$ , and intermediate inputs of domestic composites  $\{Q_{in'nt}\}_{n' \in \mathcal{N}}$ . It produces according to the Cobb-Douglas production function

$$q_{int} = \phi_{in}^q (\ell_{int}/\theta_{in}^\ell)^{\theta_{in}^\ell} (k_{in}/\theta_{in}^k)^{\theta_{in}^k} \prod_{n' \in \mathcal{N}} (Q_{in'nt}/\theta_{in'n}^Q)^{\theta_{in'n}^Q}, \quad (22)$$

where  $\theta_{in}^\ell + \theta_{in}^k + \sum_{n' \in \mathcal{N}} \theta_{in'n}^Q = 1$ .

Each such firm chooses its time-invariant capital stock  $k_{in}$  at time 1 to maximize discounted profits. Production capital is formed using time-1 investment of domestic composites  $\{\iota_{in'n1}\}_{n' \in \mathcal{N}}$  according to the Cobb-Douglas production function

$$k_{in} = \phi_{in}^k \prod_{n' \in \mathcal{N}} (\iota_{in'n1}/\theta_{in'n}^\iota)^{\theta_{in'n}^\iota}, \quad (23)$$

where  $\sum_{n' \in \mathcal{N}} \theta_{in'n}^\iota < 1$ .

**Composite producers.** At each time  $t$ , country  $j$ 's sector- $n$  composite producer produces output  $Q_{jnt}$  using relationship capital  $\{K_{ijn}\}_{i \in \mathcal{I}}$  and intermediate inputs of foreign and

domestic varieties  $\{q_{ijnt}\}_{i \in \mathcal{I}}$ . It produces according to the CES production function

$$Q_{jnt} = \left[ \sum_{i \in \mathcal{I}: \theta_{ijn}^K > 0} (K_{ijn})^{1/\sigma} (q_{ijnt})^{(\sigma-1)/\sigma} \right]^{\sigma/(\sigma-1)}. \quad (24)$$

Each such firm chooses its capital stock  $\{K_{ijn}\}_{i \in \mathcal{I}}$  at time 1 to maximize discounted profits. Relationship capital formation requires no investment but must satisfy the constraint

$$\sum_{i \in \mathcal{I}: \theta_{ijn}^K > 0} (\theta_{ijn}^K)^{(1-\sigma)/(\bar{\sigma}-\sigma)} (K_{ijn})^{(\bar{\sigma}-1)/(\bar{\sigma}-\sigma)} = 1, \quad (25)$$

where  $\bar{\sigma} > \sigma$  and  $\sum_{i \in \mathcal{I}} \theta_{ijn}^K = 1$ . This functional form ensures the firm's demand for intermediates in the long run—i.e., when the firm can adjust relationship capital—is exactly CES with elasticity  $\bar{\sigma}$  (see Supplemental Appendix H.4.2).

**Households.** Each country  $i$  contains a representative household that, at each time  $t$ , inelastically supplies  $\ell_i$  units of labor and consumes  $C_{int}$  units of the domestic composite in each sector  $n$ . As in the general model, we assume households are in financial autarky.

At time 1, the household experiences consumption utility

$$\frac{\rho}{\rho-1} \left( \prod_{n \in \mathcal{N}} (C_{in1}/\theta_{in}^C)^{\theta_{in}^C} \right)^{(\rho-1)/\rho},$$

where  $\sum_{n \in \mathcal{N}} \theta_{in}^C = 1$  and where  $\rho$  is the elasticity of intertemporal substitution.

At time 2, we give households an additional consumption motive to compensate for the fact that investment demand vanishes in the second period. This allows us to square our two-period model with the data. Concretely, we assume that the household in each country  $i$  splits its time-2 consumption  $\{C_{in2}\}_{n \in \mathcal{N}}$  into two components: consumption for consumption's sake,  $\{C_{in2}^C\}_{n \in \mathcal{N}}$ , and “investment-as-consumption,”  $\{C_{in2}^I\}_{n \in \mathcal{N}}$ . For the first component, the household experiences utility equal to

$$\beta \frac{\rho}{\rho-1} \left( \prod_{n \in \mathcal{N}} (C_{in2}^C/\theta_{in}^C)^{\theta_{in}^C} \right)^{(\rho-1)/\rho},$$

where  $\beta$  is a discount factor. For the second component, the household experiences utility based on the production capital one could produce using the goods it consumes. Motivated by the case where the conflict period is short, we assume there is an exogenous marginal

value  $\nu_{in}$  of each unit of country- $i$ , sector- $n$  production capital “formed within the utility.” The household therefore experiences investment-as-consumption utility equal to

$$\max_{\{\iota_{in'2}\}} \beta \sum_{n \in \mathcal{N}} \nu_{in} \phi_{in}^k \prod_{n' \in \mathcal{N}} (\iota_{in'2} / \theta_{in'n}^t)^{\theta_{in'n}^t} \quad \text{s.t.} \quad \sum_{n \in \mathcal{N}} \iota_{in'2} \leq C_{in'2}^n \quad \text{for all } n'.$$

Total consumption utility at time 2 is the sum of these components.

**Market clearing.** For each country  $i$  and time  $t$ , variety and composite markets clear in each sector  $n$  and the labor market clears:

$$q_{int} = \sum_j q_{ijnt}, \quad Q_{int} = C_{int} + \sum_{n'} Q_{inn't} + \mathbb{1}_{t=1} \sum_{n'} \iota_{inn't}, \quad \text{and} \quad \ell_i = \sum_n \ell_{int}.$$

## 6.2 Calibration

We calibrate our model to match the world economy in 2017, before the U.S.-China trade war. We summarize our procedure below; see Supplemental Appendices [G](#) and [H.5](#) for details.

**Data.** We take  $\mathcal{I}$  to be a set of 39 countries involved in over 96% of world trade in 2017, plus one rest-of-the-world aggregate. We take  $\mathcal{N}$  to be a set of 26 sectors given by the finest common coarsening of those used by [Ding \(2021\)](#) and [Adão et al. \(2024\)](#).

We obtain data on bilateral, FOB trade flows by sector from the OECD’s Inter-Country Input-Output tables for 2017 (ICIO). The ICIO tables also provide country-level data on aggregate consumption as well as the sectoral composition of consumption, investment, and sector-specific intermediate expenditures.

We compute bilateral, statutory, ad-valorem-equivalent tariffs at the sectoral level using product-level 2017 tariffs imputed by [Adão et al. \(2024\)](#). We average these tariffs across products within each sector, weighting by product-level trade flows from CEPII’s BACI data.

We obtain data on labor shares of value added at the country-sector level from the World Input-Output Database. We use values from the most recent year available, 2014.

Finally, we borrow from [Ding \(2021\)](#) an imputed measure of the sectoral composition of investment spending by firms in each country and sector. We also use his estimates of sector-specific capital depreciation rates and the global risk-free rate of return.

**Calibration strategy: economic block.** We set  $\sigma$  and  $\bar{\sigma}$  to match evidence on short- and long-run trade elasticities. Following [Boehm et al. \(2024\)](#), we set the short-run elasticity to  $\sigma = 1.25$  and the long-run elasticity to  $\bar{\sigma} = 2$ . We set  $\rho = 0.53$  based on estimates of China’s elasticity of intertemporal substitution in the meta-analysis of [Havranek et al. \(2015\)](#).

We set the preference and production share parameters to match shares in the observed data. Namely, we set  $\theta_{in'n}^Q$  to match intermediate expenditure shares,  $\theta_{in}^\ell$  to match labor shares of value added given the ratio of value added to revenues implied by  $\{\theta_{in'n}^Q\}_{n' \in \mathcal{N}}$ , and  $\theta_{in}^k$  to account for the remainder of revenues. We set  $\theta_{ijn}^K$  to match sectoral trade shares. We set  $\theta_{in'n}^\ell$  so that (a) the profit share of capital income is consistent with the sectoral rates of capital depreciation and risk-free return, and (b) we match the sectoral composition of investment. We set  $\theta_{in}^C$  to match the sectoral composition of consumption.

To calibrate productivity and preference shifters, we normalize units of account so that, in the observed equilibrium, wages, marginal private values of capital, and the prices of all sectoral varieties are equal to one. This normalization pins down the values of  $\phi_{in}^q$  and  $\phi_{in}^k$ . We set the investment-as-consumption preference shifters  $\nu_{in}$  so that, under free trade, investment in the first period is equal to investment-as-consumption in the second. We choose to study Home's optimal peacetime policies when the conflict period is short and so consider the limit  $\beta \rightarrow 0$ . This choice is consistent with our interpretation of  $\sigma$  as the short-run trade elasticity and our assumption that there are no decreasing returns in the value of capital formed inside household preferences at time 2. It also simplifies computation by ensuring that time-2 prices do not affect firms' time-1 investments.

Finally, we calibrate the labor endowments  $\ell_i$  so that labor markets clear, given observed consumption levels and the consumption and production shares set above.

**Calibration strategy: geopolitical block.** Home's optimal policies depend on not only economic fundamentals but also geopolitical parameters, namely U.S. and Chinese geopolitical preferences,  $z_i(\cdot)$ , and the credibility of U.S. threats,  $\Delta$ . In light of the considerable uncertainty around these parameters, we opt for an approach that illustrates their roles while taking a limited stance on their values.

First, we set the U.S.'s continuation value  $\Delta$  so that the consumption-for-consumption's-sake component of its time-2 consumption experiences a 0.2% drop between its on- and off-path trade threats. That is, the U.S. can credibly threaten to endure modest economic costs but not at the level of a small recession.

Second, rather than assigning explicit values to U.S. and Chinese geopolitical preferences, we study Home's policies in the limit where the Lagrange multiplier on the geopolitical IC constraint,  $\kappa$ , is small but non-zero.<sup>31</sup> In other words, we compute the geopolitical component of Home's peacetime policies to first order in the extent of geopolitical considerations.

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<sup>31</sup>This occurs when the U.S. and China disagree about geopolitics just enough that, given the U.S.'s limited credibility, its off-path threat alone is not enough to control China's behavior.

## 7 Quantifying Optimal Economic Statecraft

This section quantifies the U.S.’s optimal peacetime policies for building geopolitical power vis-à-vis China. We do so by applying our characterization of Home’s peacetime policies in the many-country extension of our framework to the calibrated model of Section 6.

### 7.1 U.S. Economic Sanctions on China

Our main interest is the U.S.’s optimal *peacetime* policies, as a separate literature has already studied optimal sanctions (see, e.g., Becko, 2024; De Souza et al., 2024). Understanding the optimal time-2 trade threats is nonetheless a useful starting point; the role of the U.S.’s peacetime policies is, after all, to alter the cost of these threats to China and the U.S. Since our calibration assumes geopolitical conflict is limited, the U.S.’s on-path trade taxes are simply the terms-of-trade optimum, so we restrict our attention to its off-path sanction threat.

Figure 4 shows the U.S.’s optimal off-path export subsidies and import tariffs.<sup>32</sup> On the export side, the U.S. bans all sales to China and bans sales to key Chinese trading partners, including Taiwan and Korea, in select sectors. Appendix Figure D.1 shows that both these bans and the U.S.’s other, non-prohibitive export taxes are well explained by the share of an export’s value consumed directly or indirectly by China. On the import side, the U.S. uses high but not prohibitive tariffs on purchases from China and moderate tariffs on purchases from bystanders. These bystander tariffs worsen China’s terms of trade indirectly by taxing U.S. imports more in sectors, like textiles, where China is a net exporter and from countries, like Mexico, with which China runs a bilateral trade surplus (see Appendix Figure D.2).

### 7.2 Peacetime Policies for Building Chinese Dependence

We now turn to the U.S.’s peacetime policies. As discussed in Section 3, these policies have two distinct roles beyond terms-of-trade manipulation: to build Chinese dependence (loosen the geopolitical IC constraint) and to build U.S. credibility (loosen the credibility constraint). We begin by studying the dependence motive. Since the U.S.’s only rationale for industrial policy is to build credibility (see Theorems 1 and 2), this section focuses on trade policy. The dependence-building component of U.S. trade taxes comprises the manipulability term from Theorem 3 (the second line of (C.6)) and the bystander terms-of-trade effect discussed in Section 5.4 (the third line of (C.6)). Since these terms are proportional to the extent of geopolitical conflict,  $\kappa$ , which we do not calibrate, we display the dependence-building component of trade taxes normalized so that the magnitude of the largest trade tax is 100%.

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<sup>32</sup>By Lerner symmetry, the U.S.’s off-path trade taxes are determined only up to a degree of freedom. We normalize them by setting the median trade tax (import tariff or export subsidy) to zero.

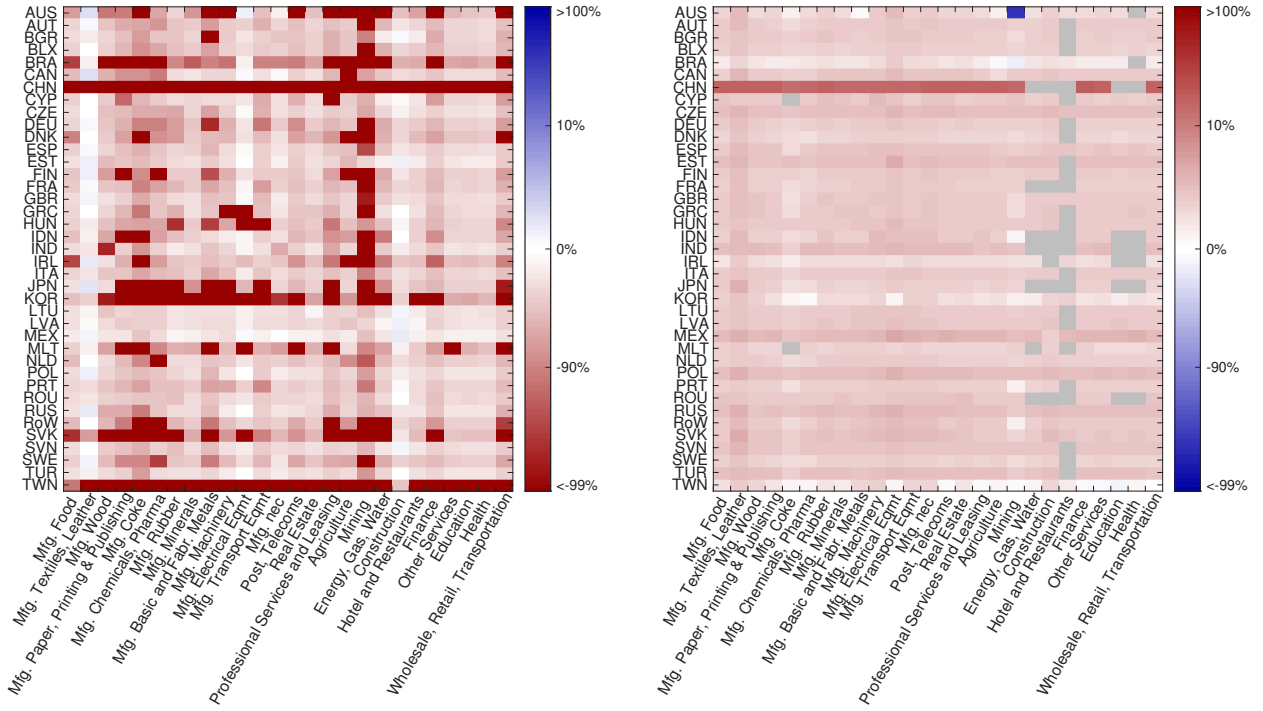


**Figure 4:** Optimal off-path trade taxes for the U.S. Left panel: Export subsidies. Right panel: Import tariffs. Red shading corresponds to trade-restricting policies; blue corresponds to trade-promoting policies. Gray cells represent origin-sectors that do not trade with the U.S.

What peacetime trade taxes optimally build Chinese dependence? The left panel of Figure 5 shows the U.S.’s peacetime export subsidies, plotted against the share of exported value that ultimately flows to China—either directly or indirectly, embodied as an input to another final product. The U.S. disproportionately *subsidizes* exports of goods that flow to China during peacetime—the same goods whose exports it threatens to disproportionately *tax* during conflict. Understanding the U.S.’s optimal dependence-building policies boils down to understanding this export subsidy reversal, since its dependence-building import tariffs are more than an order of magnitude smaller than these export subsidies.

The U.S.’s “export bait and switch” tactic works through two distinct mechanisms: First, peacetime U.S. exports directly to China encourage it to invest in relationship capital for importing from the U.S.<sup>33</sup> The stronger are these bilateral ties, the weaker is China’s ability to substitute away from U.S. goods to domestic or third-party alternatives. This makes its prices more sensitive to trade quantities, in line with the manipulability mechanism. Second, U.S. exports of intermediates to bystanders encourage them to invest in relationship capital

<sup>33</sup>The left panel of Appendix Figure D.3 shows that the U.S.’s dependence-building trade taxes are almost entirely explained by relationship capital rather than production capital.

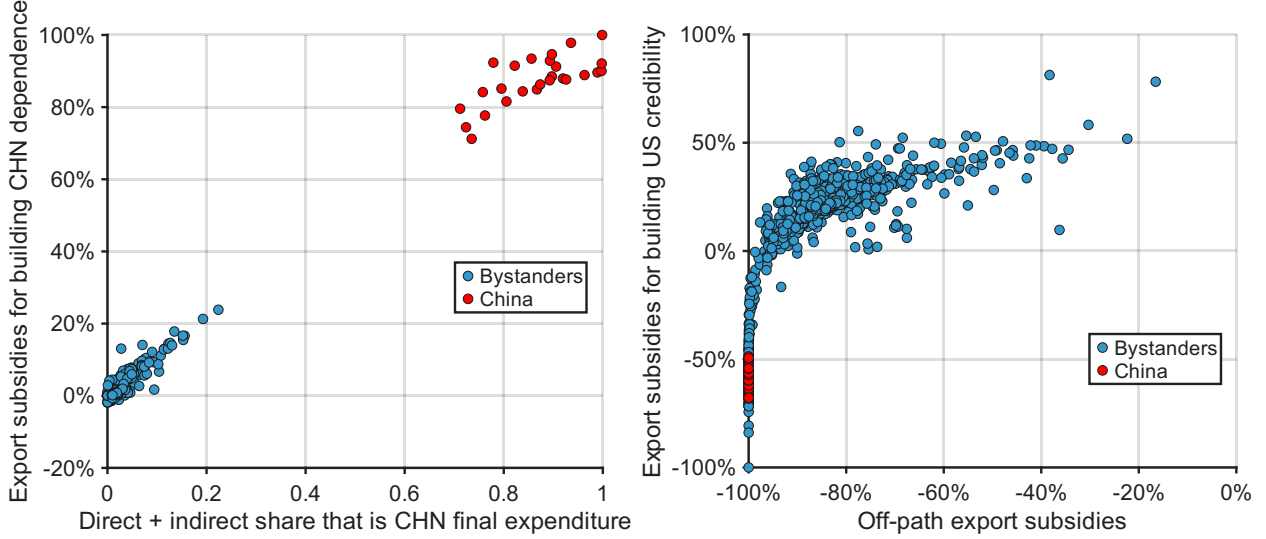


**Figure 5:** *Left panel: To build Chinese dependence, the U.S. subsidizes peacetime exports that flow directly or indirectly to Chinese consumption. Right panel: To build U.S. credibility, the U.S. taxes peacetime exports on which it threatens high export taxes during conflict.*

for importing from the U.S. This allows these bystanders to supply final goods to China at a lower price, pushing China down its demand curve and improving its terms of trade. Since this beneficial effect is muted off-path—where the U.S.’s indirect sanctions cut off input trade with bystanders—it strengthens China’s incentives to comply with U.S. threats.<sup>34</sup>

### 7.3 Peacetime Policies for Building U.S. Credibility

Finally, we turn to the credibility-building motive for U.S. peacetime policies. Recall that the U.S. optimally builds credibility using both industrial policy, as in Theorem 2, and trade policy, as in Theorem 4. We consider each in turn, again normalizing the absolute value of each type of policy to 100%.

The U.S.’s credibility-building capital subsidies target both relationship capital and production capital. The former is straightforward: Since relationship capital reduces the costs of buying from an origin-sector, it is more valuable whenever the U.S. buys more from that origin-sector. So peacetime policy can build the credibility of the U.S.’s off-path threat by disincentivizing relationship capital with China—from which the U.S. imports much less off-path—and instead incentivizing domestic relationships—toward which the U.S. substitutes. The left panel of Figure 6 illustrates this pattern. The U.S.’s production capital subsidies similarly target sectors where capital is more valuable under U.S. sanctions. Interestingly,

<sup>34</sup>The right panel of Appendix Figure D.3 shows that this mechanism explains U.S. subsidies on exports to bystanders, while the manipulability mechanism explains U.S. subsidies on exports to China.

sanctions reduce the value of capital in most sectors, since they lower profits by limiting export opportunities.<sup>35</sup> The U.S. therefore taxes production capital in most sectors, particularly those used intensively as an input to investment. U.S. demand has a higher income elasticity in such sectors, so they see even larger losses during a sanction-induced downturn.

Meanwhile, the U.S.'s trade taxes promote investments abroad that build U.S. credibility by improving its terms of trade disproportionately under sanctions. As with its trade taxes for building Chinese dependence, the U.S.'s trade taxes for building credibility are an order of magnitude smaller on the import side than the export side, where we therefore focus our attention. The right panel of Figure 5 compares these export taxes and subsidies to the export taxes the U.S. threatens off-path. Intuitively, the U.S. discourages foreign firms from building up capital useful for importing goods the U.S. will later threaten to cut off, since such investments raise the U.S.'s opportunity cost of carrying out its sanctions.

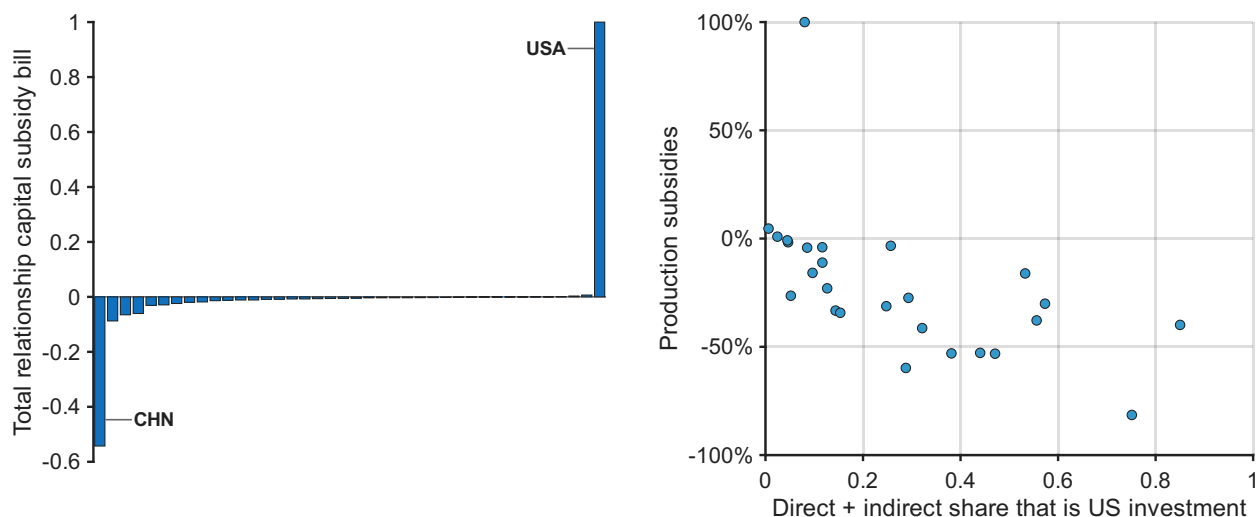


**Figure 6:** *Left panel: To build U.S. credibility, the U.S. taxes relationship capital with China and subsidizes relationship capital domestically. Right panel: To build U.S. credibility, the U.S. taxes production capital in most sectors, especially those used as an input to investment.*

## 8 Conclusion

Policymakers are increasingly wielding economic tools as instruments of power and statecraft. Yet, rigorous theory about the design of such policies still lags behind practice. Our paper attempts to narrow this gap by studying optimal industrial and trade policies in a model that brings together countries' economic and geopolitical decisions. This framework allows

<sup>35</sup>A notable exception is the textiles sector (the outlier in the right panel of Figure 6), in which the U.S. has a large trade deficit with China.

us to deliver both qualitative insights about the role of economic policies in addressing geopolitical frictions and quantitative statements about appropriate policies for particular bilateral relationships.

Our analysis leaves many questions unanswered. What policies are appropriate for countries that expect to face sanctions rather than apply them? How do countries' policy motives change in dynamic settings with repeated conflicts over time? And what does our understanding of countries' unilateral policies imply for the design of bilateral trade agreements and multilateral organizations? We leave these questions to future work.

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# A Proofs of Main Results

## A.1 Technical Assumptions

Our results rely on a few weak technical assumptions. We state these assumptions below and henceforth assume they hold without explicitly referring to them.

First, we impose smoothness, concavity/convexity, and local nonsatiation conditions on primitives.

**Assumption 3.** *The functions  $u_{it}(\cdot)$  are three times differentiable, strictly concave, and locally nonsatiated. The functions  $G_{it}(\cdot, \cdot)$  and  $\Lambda_{i1}(\cdot, \cdot)$  are three times differentiable and weakly convex, and their negatives are locally nonsatiated.*

Second, we assume that at least some good contributes to production to first order. This ensures there is a strictly positive price.

**Assumption 4.** *There exists a good  $g^* \in \mathcal{G}$  for which  $G_{it,y_{g^*}}(y, k) > 0$  for all  $i, t, y$ , and  $k$ .*

Third, we assume that Meade utility functions exist, are sufficiently smooth, and are increasing to first order in imports. These functions are key objects that allow us to combine household and firm optimization in our analysis.

**Assumption 5.** *The Meade utility functions  $V_{it}(\cdot, \cdot)$  exist (i.e., the associated maxima are achieved), are three times differentiable, and satisfy  $V_{it,m}(m, k) \gg 0$  for all  $m, k$ .*

Fourth, we assume that Foreign's choice of capital conditional on trade is well-defined and sufficiently smooth in trade.

**Assumption 6.** *For any  $m_{F1}$  and  $m_{F2}$ , the problem*

$$k_F \in \arg \max_k V_{F1}(m_{F1}, k) + V_{F2}(m_{F2}, k)$$

*admits a solution  $\tilde{k}_F(m_{F1}, m_{F2})$  (our convexity assumptions ensure this solution is unique). Moreover,  $\tilde{k}_F(m_{F1}, m_{F2})$  is differentiable.*

## A.2 Primal Representation of Planning Problem

Under the assumptions in Appendix A.1, the planner's problem admits a more tractable primal representation. We state this representation result below and relegate its proof (which is fairly standard but tedious) to Supplemental Appendix E.2.

To begin, consider the full planner's problem, which we formulate in terms of net-present-value prices rather than intratemporal prices and interest rates (see (10)). This is to choose a profile of policies and equilibrium variables

$$\{c_{it}, y_{it}, \iota_{i1}, m_{it}, k_{it}^y, k_i, p_t^w, p_{it}, r_{it}, \mathcal{R}_i, a, s_1, \tau_1, \tau_2, \tilde{\tau}_2(\cdot)\}$$

that solves

$$\begin{aligned} \max \quad & u_{H1}(c_{H1}) + u_{H2}(c_{H2}) + z_H(a) \\ \text{s.t.} \quad & \{c_{it}\}_{t=1,2} \in \arg \max_{\{c_t\}_{t=1,2}} \sum_{t=1,2} u_{it}(c_t) \\ \text{s.t.} \quad & \sum_{t=1,2} (p_{it} \cdot c_t - p_{it} \cdot (y_{it} - \mathbb{1}_{t=1} \iota_{i1}) - \mathbb{1}_{i=H} [(\mathcal{R}_F/\mathcal{R}_H)^{t-1} p_t^w \tau_t] \cdot m_{Ht}) \leq 0 \\ & \{y_{it}, k_{it}^y\} \in \arg \max_{y, k^y} p_{it} \cdot y - r_{it} \cdot k^y \quad \text{s.t.} \quad G_{it}(y, k^y) \leq 0 \\ & \{k_i, \iota_{i1}\} \in \arg \max_{k, \iota_1} (r_{i1}(1 + \mathbb{1}_{i=H} s_1) + r_{i2}) \cdot k - p_{i1} \cdot \iota_1 \quad \text{s.t.} \quad \Lambda_{i1}(k, \iota_1) \leq 0 \quad (\text{A.1}) \\ & c_{it} + \mathbb{1}_{t=1} \iota_{i1} = y_{it} + m_{it}, \quad m_{Ht} + m_{Ft} = 0, \quad \text{and} \quad k_i = k_{it}^y \\ & p_t^w \cdot m_{it} = 0 \\ & p_{Ft} = p_t^w \quad \text{and} \quad p_{Ht} = (\mathcal{R}_F/\mathcal{R}_H)^{t-1} p_t^w (1 + \tau_t) \\ & u_{F2}(\tilde{c}_{F2}(\tilde{\tau}_2(a), k_H, k_F)) + z_F(a) \geq u_{F2}(\tilde{c}_{F2}(\tilde{\tau}_2(\neg a), k_H, k_F)) + z_F(\neg a) \\ & \tau_2 = \tilde{\tau}_2(a) \\ & \tilde{\tau}_2(\cdot) \in \mathcal{T}_2(k_H, k_F). \end{aligned}$$

**Lemma 1.** *A profile  $\{c_{it}, y_{it}, \iota_{i1}, m_{it}, k_{it}^y, k_i, p_t^w, p_{it}, r_{it}, \mathcal{R}_i, a, s_1, \tau_1, \tau_2, \tilde{\tau}_2(\cdot)\}$  solves the planner's problem in (A.1) if and only if some extended profile*

$$\left\{ c_{it}, y_{it}, \iota_{i1}, m_{it}, k_{it}^y, k_i, p_t^w, p_{it}, r_{it}, \mathcal{R}_i, a, s_1, \tau_1, \tau_2, \tilde{\tau}_2(\cdot), \eta_i, \chi, \right. \\ \left. \tilde{c}_{i2}(\cdot), \tilde{y}_{i2}(\cdot), \tilde{m}_{i2}(\cdot), \tilde{k}_{i2}^y(\cdot), \tilde{p}_{i2}(\cdot), \tilde{r}_{i2}(\cdot), \tilde{p}_2^w(\cdot) \right\}$$

maximizes

$$V_{H1}(-m_{F1}, k_H) + V_{H2}(-\tilde{m}_{F2}(a), k_H) + z_H(a)$$

subject to

$$\begin{aligned}
k_F &= \tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a)) \\
V_{F1,m}(m_{F1}, k_F) \cdot m_{F1} &= 0 \\
V_{F2,m}(\tilde{m}_{F2}(\hat{a}), k_F) \cdot \tilde{m}_{F2}(\hat{a}) &= 0 \\
V_{F2}(\tilde{m}_{F2}(a), k_F) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F) &\geq z_F(\neg a) - z_F(a) \\
\chi \frac{V_{H2,m}(-\tilde{m}_{F2}(\cdot), k_H)}{V_{F2,m}(\tilde{m}_{F2}(\cdot), k_F)} - 1 &\in \mathcal{T}_2(k_H, k_F)
\end{aligned}$$

and subject to

$$\begin{aligned}
\{y_{i1}, \iota_{i1}\} &\in \arg \max_{y, \iota} u_{i1}(y + m_{i1} - \iota) \quad s.t. \quad G_{i1}(y, k_i) \leq 0, \quad \Lambda_{i1}(k_i, \iota) \leq 0 \\
\tilde{y}_{i2}(\hat{a}) &\in \arg \max_y u_{i2}(y + \tilde{m}_{i2}(\hat{a})) \quad s.t. \quad G_{i2}(y, k_i) \leq 0 \\
p_{i1} &= \eta_i V_{i1,m}(m_{i1}, k_i) \quad and \quad \tilde{p}_{i2}(\hat{a}) = \eta_i V_{i2,m}(\tilde{m}_{i2}(\hat{a}), k_i) \\
r_{i1} &= -G_{i1,k}(y_{i1}, k_i) / G_{i1,y_{g^*}}(y_{i1}, k_i) \times p_{i1g^*} \\
\tilde{r}_{i2}(\hat{a}) &= -G_{i2,k}(\tilde{y}_{i2}(\hat{a}), k_i) / G_{i2,y_{g^*}}(\tilde{y}_{i2}(\hat{a}), k_i) \times \tilde{p}_{i2g^*}(\hat{a}) \\
r_{H1}s_1 &= -\eta_H [V_{H1,k}(m_{H1}, k_H) + V_{H2,k}(\tilde{m}_{H2}(a), k_H)] \\
c_{i1} &= y_{i1} + m_{i1} - \iota_{i1} \quad and \quad \tilde{c}_{i2}(\hat{a}) = \tilde{y}_{i2}(\hat{a}) + \tilde{m}_{i2}(\hat{a}) \\
m_{H1} &= -m_{F1} \quad and \quad \tilde{m}_{H2}(\hat{a}) = -\tilde{m}_{F2}(\hat{a}) \\
k_{i1}^y &= k_i \quad and \quad \tilde{k}_{i2}^y(\hat{a}) = k_i \\
p_1^w &= p_{F1} \quad and \quad \tau_1 = p_{H1} / p_1^w - 1 \\
\tilde{p}_2^w(\hat{a}) &= \tilde{p}_{F2}(\hat{a}) \quad and \quad \tilde{\tau}_2(\hat{a}) = [\mathcal{R}_H \tilde{p}_{H2}(\hat{a})] / [\mathcal{R}_F \tilde{p}_2^w(\hat{a})] - 1 \\
\chi &= (\eta_H \mathcal{R}_H) / (\eta_F \mathcal{R}_F) \\
c_{i2} &= \tilde{c}_{i2}(a), \quad y_{i2} = \tilde{y}_{i2}(a), \quad m_{i2} = \tilde{m}_{i2}(a), \quad k_{i2}^y = \tilde{k}_{i2}^y(a) \\
p_{i2} &= \tilde{p}_{i2}(a), \quad r_{i2} = \tilde{r}_{i2}(a), \quad p_2^w = \tilde{p}_2^w(a), \quad \tau_2 = \tilde{\tau}_2(a)
\end{aligned}$$

for  $g^*$  as in Assumption 4.

The advantage of the formulation in Lemma 1 is that the objective and the first set of constraints depend only on a reduced set of variables—i.e.,  $m_{F1}$ ,  $\tilde{m}_{F2}(\cdot)$ ,  $k_H$ ,  $k_F$ ,  $a$ , and  $\chi$ —while the second set of constraints is automatically satisfied for some values of the remaining variables. The second set of constraints therefore does not affect the planner's problem of choosing the variables that appear in the first set of constraints, but allows us to infer the values of other equilibrium variables, including policies, that are consistent with them.

We similarly provide a primal representation of Home's highest possible time-2 economic

utility given capital. This utility enters Home's credibility constraint in Assumption 2 because it is the time-2 economic welfare Home could achieve if it did not carry out its trade tax threats.

**Lemma 2.** *Home's highest possible economic utility given capital,  $u_{H2}^*(k_H, k_F)$ , satisfies*

$$u_{H2}^*(k_H, k_F) = \max_{m_{F2}} V_{H2}(-m_{F2}, k_H) \quad \text{s.t.} \quad V_{F2,m}(m_{F2}, k_F) \cdot m_{F2} = 0. \quad (\text{A.2})$$

### A.3 Proof of Theorem 1

Consider the planner's problem as formulated in Lemma 1. Note that the objective and first set of constraints depend only on a reduced set of variables—i.e.,  $m_{F1}$ ,  $\tilde{m}_{F2}(\cdot)$ ,  $k_H$ ,  $k_F$ ,  $a$ , and  $\chi$ —while the second set of conditions is automatically satisfied for some values of the remaining variables. It follows that, in any profile that solves the planner's problem, this reduced set of variables must maximize the objective subject to only the first set of constraints. That is, it must solve

$$\begin{aligned} \max_{m_{F1}, \tilde{m}_{F2}(\cdot), k_H, k_F, a, \chi} & V_{H1}(-m_{F1}, k_H) + V_{H2}(-\tilde{m}_{F2}(a), k_H) + z_H(a) \\ \text{s.t.} & k_F = \tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a)) \\ & V_{F1,m}(m_{F1}, k_F) \cdot m_{F1} = 0 \\ & V_{F2,m}(\tilde{m}_{F2}(\hat{a}), k_F) \cdot \tilde{m}_{F2}(\hat{a}) = 0 \\ & V_{F2}(\tilde{m}_{F2}(a), k_F) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F) \geq z_F(\neg a) - z_F(a) \\ & \chi \frac{V_{H2,m}(-\tilde{m}_{F2}(\cdot), k_H)}{V_{F2,m}(\tilde{m}_{F2}(\cdot), k_F)} - 1 \in \mathcal{T}_2(k_H, k_F). \end{aligned} \quad (\text{A.3})$$

Under Assumption 1, the final constraint may be dropped. The planner's first-order condition with respect to  $k_H$  then implies

$$V_{H1,k}(-m_{F1}, k_H) + V_{H2,k}(-\tilde{m}_{F2}(a), k_H) = 0.$$

The second set of conditions in Lemma 1 then implies that

$$r_{H1}s_1 = 0.$$

### A.4 Proof of Theorem 2

We begin from the planner's problem as expressed in (A.3). Under Assumption 2, a trade threat  $\tilde{\tau}_2(\cdot)$  is credible if and only if it results in a small enough Home utility gap between

Home's costliest threat and its economically optimal policy; by Lemma 4 this condition can be expressed as

$$\min_{\hat{a}=\underline{a}, \bar{a}} V_{H2}[-\tilde{m}_{F2}(\tilde{\tau}_2(\hat{a}), \{k_i\}), k_H] + \Delta \geq u_{H2}^*(k_H, k_F),$$

where  $\tilde{m}_{F2}(\tau_2, \{k_i\})$  is the unique vector of Foreign net imports compatible with the time-2 equilibrium conditions given trade taxes  $\tau_2$  and capital stocks  $\{k_i\}$ . As established in Lemma 1, the fact that  $\tilde{m}_{F2}(\hat{a})$  satisfies the constraints of (A.3) implies it is exactly  $\tilde{m}_{F2}(\tilde{\tau}_2(\hat{a}), \{k_i\})$ . So the planner's problem is to solve

$$\begin{aligned} \max_{m_{F1}, \tilde{m}_{F2}(\cdot), k_H, k_F, a} \quad & V_{H1}(-m_{F1}, k_H) + V_{H2}(-\tilde{m}_{F2}(a), k_H) + z_H(a) \\ \text{s.t.} \quad & k_F = \tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a)) \\ & V_{F1, m}(m_{F1}, k_F) \cdot m_{F1} = 0 \\ & V_{F2, m}(\tilde{m}_{F2}(\hat{a}), k_F) \cdot \tilde{m}_{F2}(\hat{a}) = 0 \\ & V_{F2}(\tilde{m}_{F2}(a), k_F) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F) \geq z_F(\neg a) - z_F(a) \\ & \min_{\hat{a}=\underline{a}, \bar{a}} V_{H2}(-\tilde{m}_{F2}(\hat{a}), k_H) + \Delta \geq u_{H2}^*(k_H, k_F). \end{aligned}$$

The planner's first-order condition with respect to  $k_H$  implies

$$V_{H1, k}(-m_{F1}, k_H) + V_{H2, k}(-\tilde{m}_{F2}(a), k_H) \propto -V_{H2, k}(-m_{F2}^\ell, k_H) + V_{H2, k}(-m_{F2}^*, k_H),$$

where  $m_{F2}^\ell = -m_{H2}^\ell$  is Foreign's net imports under whichever action results in lower time-2 Home economic welfare,  $m_{F2}^* = -m_{H2}^*$  is Foreign's net imports under whatever trade taxes maximize Home's time-2 economic welfare given capital, and where the final term follows from the envelope theorem applied to Lemma 2's representation of  $u_{H2, k_H}^*(k_H, k_F)$ . The second set of constraints in the planner's problem formulation of Lemma 1 then implies that the right-hand side is proportional to  $-r_{H1}s_1$ , completing the proof.

## A.5 Proof of Theorem 3

We begin by following the same steps as the proof of Theorem 1 to show that the variables  $m_{F1}$ ,  $\tilde{m}_{F2}(\cdot)$ ,  $k_H$ ,  $k_F$ , and  $a$  must solve

$$\begin{aligned}
& \max_{m_{F1}, \tilde{m}_{F2}(\cdot), k_H, k_F, a} V_{H1}(-m_{F1}, k_H) + V_{H2}(-\tilde{m}_{F2}(a), k_H) + z_H(a) \\
& \text{s.t.} \quad k_F = \tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a)) \\
& \quad V_{F1,m}(m_{F1}, k_F) \cdot m_{F1} = 0 \\
& \quad V_{F2,m}(\tilde{m}_{F2}(\hat{a}), k_F) \cdot \tilde{m}_{F2}(\hat{a}) = 0 \\
& \quad V_{F2}(\tilde{m}_{F2}(a), k_F) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F) \geq z_F(\neg a) - z_F(a).
\end{aligned}$$

The remaining equilibrium variables must satisfy the second set of conditions in Lemma 1.

Note that the optimization problem above is equivalent to the problem where we subtract and add the trade balance constraint under actions  $a$  and  $\neg a$ , respectively, to the final constraint, resulting in

$$\begin{aligned}
& V_{F2}(\tilde{m}_{F2}(a), k_F) - V_{F2,m}(\tilde{m}_{F2}(a), k_F) \cdot \tilde{m}_{F2}(a) \\
& - V_{F2}(\tilde{m}_{F2}(\neg a), k_F) + V_{F2,m}(\tilde{m}_{F2}(\neg a), k_F) \cdot \tilde{m}_{F2}(\neg a) \geq z_F(\neg a) - z_F(a).
\end{aligned} \tag{A.4}$$

Note that

$$\frac{d}{dm} [V_{F2}(m, k_F) - m \cdot V_{F2,m}(m, k_F)] = -V_{F2,mm}(m, k_F) \cdot m.$$

So by the fundamental theorem of calculus, (A.4) is the same as

$$- \int_{\tilde{m}_{F2}(\neg a)}^{\tilde{m}_{F2}(a)} m \cdot V_{F2,mm}(m, k_F) \cdot dm \geq z_F(\neg a) - z_F(a).$$

Using this equivalent version of the final constraint and substituting for  $k_F = \tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a))$ , we arrive at the following version of the planner's problem:

$$\begin{aligned}
& \max_{m_{F1}, \tilde{m}_{F2}(\cdot), k_H, a} V_{H1}(-m_{F1}, k_H) + V_{H2}(-\tilde{m}_{F2}(a), k_H) + z_H(a) \\
& \text{s.t.} \quad V_{F1,m} \left( m_{F1}, \tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a)) \right) \cdot m_{F1} = 0 \\
& \quad V_{F2,m} \left( \tilde{m}_{F2}(\hat{a}), \tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a)) \right) \cdot \tilde{m}_{F2}(\hat{a}) = 0 \\
& \quad - \int_{\tilde{m}_{F2}(\neg a)}^{\tilde{m}_{F2}(a)} m \cdot V_{F2,mm} \left( m, \tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a)) \right) \cdot dm \geq z_F(\neg a) - z_F(a).
\end{aligned}$$

The first-order condition with respect to  $m_{F1g}$  is

$$\begin{aligned}
V_{H1,m_g} = & \kappa_1 \left[ V_{F1,m_g} + m_{F1} \cdot V_{F1,m m_g} + m_{F1} \cdot V_{F1,m k} \cdot \tilde{k}_{F,m_{F1g}} \right] \\
& + \sum_{\hat{a}=\underline{a}, \bar{a}} \tilde{\kappa}_2(\hat{a}) \tilde{m}_{F2}(\hat{a}) \cdot V_{F2,m k}(\hat{a}) \cdot \tilde{k}_{F,m_{F1g}} \\
& - \hat{\kappa} \left( \int_{\tilde{m}_{F2}(-a)}^{\tilde{m}_{F2}(a)} m \cdot V_{F2,m m k}(m, k_F) \cdot dm \right) \cdot \tilde{k}_{F,m_{F1g}},
\end{aligned} \tag{A.5}$$

where we have omitted and/or simplified the arguments of functions where there is no risk of confusion.

We simplify this expression with two observations. First, we consider the planner's first-order condition with respect to  $\tilde{m}_{F2}(-a)$  local to  $\tilde{m}_{F2}(-a) = 0$ , which always solves the planner's choice of off-path net imports since gains from trade are positive. This is simply

$$\tilde{\kappa}_2(-a) V_{F2,m}(-a) = 0,$$

implying  $\tilde{\kappa}_2(-a) = 0$ . Second, we define

$$\Phi \equiv \tilde{\kappa}_2(a) / \kappa_1.$$

The interpretation of  $\Phi$  is that it is the ratio of the value the planner places on transfers to Home at time 2 relative to time 1. When  $\Phi = 1$ , it is as if the planner faced an intertemporal trade balance constraint, i.e., for each action  $\hat{a}$ ,

$$V_{F1,m}(m_{F1}, k_F) \cdot m_{F1} + V_{F2,m}(\tilde{m}_{F2}(\hat{a}), k_F) \cdot \tilde{m}_{F2}(\hat{a}) = 0.$$

This is precisely the constraint that would have appeared in the planner's problem (in lieu of intratemporal trade balance) if we had allowed for international borrowing. The constant  $\Phi$  is therefore a measure of the extent of departure from international financial markets.

We now rewrite (A.5) using the above observations and using the second set of conditions from Lemma 1 to relate derivatives of the Meade utility to prices and therefore trade taxes:

$$\begin{aligned}
\frac{1}{\kappa_1} \frac{\eta_F}{\eta_H} (1 + \tau_{1g}) = & 1 + \frac{m_{F1}}{\tilde{p}_{1g}^w} \cdot \frac{\partial \tilde{p}_1^w}{\partial m_{F1g}} + \frac{m_{F1}}{\tilde{p}_{1g}^w} \cdot \frac{\partial \tilde{p}_1^w}{\partial k_F} \cdot \frac{\partial \tilde{k}_F}{\partial m_{F1g}} + \Phi \frac{\tilde{m}_{F2}(a)}{\tilde{p}_{1g}^w} \cdot \frac{\partial \tilde{p}_2^w(a)}{\partial k_F} \cdot \frac{\partial \tilde{k}_F}{\partial m_{F1g}} \\
& - \kappa \left( \int_{\tilde{m}_{F2}(-a)}^{\tilde{m}_{F2}(a)} m \cdot \frac{\partial^2 \tilde{p}_2^w(m, k_F)}{\partial m \partial k_F} \cdot dm \right) \cdot \frac{\partial \tilde{k}_F}{\partial m_{F1g}} / \tilde{p}_{1g}^w,
\end{aligned}$$

where  $\kappa \equiv \hat{\kappa} / \kappa_1$ . That is, trade taxes are as described in Theorem 3, up to Lerner symmetry.

## A.6 Proof of Theorem 4

We begin by following the same steps as the proof of Theorem 2 to show that the variables  $m_{F1}$ ,  $\tilde{m}_{F2}(\cdot)$ ,  $k_H$ ,  $k_F$ , and  $a$  must solve

$$\begin{aligned}
& \max_{m_{F1}, \tilde{m}_{F2}(\cdot), k_H, k_F, a} V_{H1}(-m_{F1}, k_H) + V_{H2}(-\tilde{m}_{F2}(a), k_H) + z_H(a) \\
& \text{s.t. } k_F = \tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a)) \\
& V_{F1,m}(m_{F1}, k_F) \cdot m_{F1} = 0 \\
& V_{F2,m}(\tilde{m}_{F2}(\hat{a}), k_F) \cdot \tilde{m}_{F2}(\hat{a}) = 0 \\
& V_{F2}(\tilde{m}_{F2}(a), k_F) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F) \geq z_F(\neg a) - z_F(a) \\
& \min_{\hat{a}=\underline{a}, \bar{a}} V_{H2}(-\tilde{m}_{F2}(\hat{a}), k_H) + \Delta \geq u_{H2}^*(k_H, k_F).
\end{aligned}$$

We now proceed as in the proof of Theorem 3, but with two modifications. First, since  $k_F$  appears directly in the final constraint, the planner's first-order condition with respect to  $m_{F1}$  is as in (A.5) but with an additional term on the right-hand side equal to

$$-\hat{\xi} u_{H2, k_F}^* \tilde{k}_{F, m_{F1}},$$

where  $\hat{\xi} \geq 0$  is the Lagrange multiplier on the credibility constraint. Second, we must revisit the treatment of  $\tilde{\kappa}_2(a)$  and  $\tilde{\kappa}_2(\neg a)$  since (i)  $\tilde{m}_{F2}(\neg a)$  may no longer equal zero (autarky) when the credibility constraint binds and (ii) both  $\tilde{m}_{F2}(a)$  and  $\tilde{m}_{F2}(\neg a)$  enter the credibility constraint directly.

For our analysis of both of these alterations, we assume there exist goods bundles  $m_1^\perp$ ,  $m_2^\perp(a)$ ,  $m_2^\perp(\neg a)$ , and  $m_2^{*\perp}$  with the following properties.<sup>36</sup> First, changes in trade in the direction of the bundles have no impact on terms of trade local to their respective allocations, i.e.,

$$m_{F1} \cdot V_{F1,mm} \cdot m_1^\perp = \tilde{m}_{F2}(\hat{a}) \cdot V_{F2,mm}(\hat{a}) \cdot m_2^\perp(\hat{a}) = m_{F2}^* \cdot V_{F2,mm}^* \cdot m_2^{*\perp} = 0,$$

where  $m_{F1}$  and  $\tilde{m}_{F2}(\hat{a})$  are the solutions to the planner's problem above and  $m_{F2}^*$  is the solution to the time-2 problem as formulated in Lemma 2. Second, on-path changes in trade in the direction of the bundles have no impact on Foreign capital, i.e.,

$$\tilde{k}_{F, m_{F1}} \cdot m_1^\perp = \tilde{k}_{F, m_{F2}} \cdot m_2^\perp(a) = 0.$$

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<sup>36</sup>We view the existence of these bundles as a weak regularity condition typically satisfied when the number of goods exceeds the number of capital varieties. In economies with an outside good, each bundle is simply the unit vector corresponding to the outside good.

Third, the bundles have positive market value in both Home and Foreign, i.e.,

$$V_{i1,m} \cdot m_1^\perp, V_{i2,m}(\hat{a}) \cdot m_2^\perp(\hat{a}), V_{i2,m}^* \cdot m_2^{*\perp} > 0.$$

We now take the first-order conditions with respect to  $m_{F1}$ ,  $\tilde{m}_{F2}(a)$ ,  $\tilde{m}_{F2}(-a)$ , and  $m_{F2}$  in the direction of the respective bundles. In the case of  $m_2^{*\perp}$ , we take the first-order condition with respect to  $m_{F2}$  in the time-2 problem, as formulated in Lemma 2, and we let  $\kappa_2^*$  denote the Lagrange multiplier on this problem's constraint. The first-order conditions are

$$\begin{aligned} V_{H1,m} \cdot m_1^\perp &= \kappa_1 V_{F1,m} \cdot m_1^\perp \\ V_{H2,m}(a) \cdot m_2^\perp(a) &= \tilde{\kappa}_2(a) V_{F2,m}(a) \cdot m_2^\perp(a) - \hat{\xi} \mathbb{1}_{a=a^\ell} V_{H2,m}(a) \cdot m_2^\perp(a) \\ 0 &= \tilde{\kappa}_2(-a) V_{F2,m}(-a) \cdot m_2^\perp(-a) - \hat{\xi} \mathbb{1}_{-a=a^\ell} V_{H2,m}(-a) \cdot m_2^\perp(-a) \\ V_{H2,m}^* \cdot m_2^{*\perp} &= \kappa_2^* V_{F2,m}^* \cdot m_2^{*\perp}, \end{aligned} \tag{A.6}$$

where  $a^\ell$  is whichever action results in lower Home time-2 economic utility when it carries out its threat. We note that the quantity  $\Phi$ , defined in the proof of Theorem 3 as the ratio of  $\tilde{\kappa}_2(a)$  to  $\kappa_1$  when  $\hat{\xi} = 0$ , was implicitly defined as

$$\Phi \equiv \frac{V_{H2,m}(a) \cdot m_2^\perp(a)}{V_{F2,m}(a) \cdot m_2^\perp(a)} \bigg/ \frac{V_{H1,m} \cdot m_1^\perp}{V_{F1,m} \cdot m_1^\perp}.$$

Maintaining this definition of  $\Phi$ , we solve (A.6) for  $\tilde{\kappa}_2(a)$ ,  $\tilde{\kappa}_2(-a)$ , and  $\kappa_2^*$ :

$$\tilde{\kappa}_2(\hat{a}) = \mathbb{1}_{\hat{a}=a} \Phi \kappa_1 + \mathbb{1}_{\hat{a}=a^\ell} \hat{\xi} \frac{V_{H2,m}(\hat{a}) \cdot m_2^\perp(\hat{a})}{V_{F2,m}(\hat{a}) \cdot m_2^\perp(\hat{a})}, \quad \kappa_2^* = \frac{V_{H2,m}^* \cdot m_2^{*\perp}}{V_{F2,m}^* \cdot m_2^{*\perp}}.$$

Returning to the first-order condition with respect to  $m_{F1}$ , (A.5) can be written as

$$\begin{aligned} V_{H1,m_g} &= \kappa_1 \left[ V_{F1,m_g} + m_{F1} \cdot V_{F1,m_g} + m_{F1} \cdot V_{F1,m_k} \cdot \tilde{k}_{F,m_{F1g}} + \Phi \tilde{m}_{F2}(a) \cdot V_{F2,m_k}(a) \cdot \tilde{k}_{F,m_{F1g}} \right] \\ &+ \hat{\xi} \left[ \frac{V_{H2,m}(a^\ell) \cdot m_2^\perp(a^\ell)}{V_{F2,m}(a^\ell) \cdot m_2^\perp(a^\ell)} \tilde{m}_{F2}(a^\ell) \cdot V_{F2,m_k}(a^\ell) - \frac{V_{H2,m}^* \cdot m_2^{*\perp}}{V_{F2,m}^* \cdot m_2^{*\perp}} m_{F2}^* \cdot V_{F2,m_k} \right] \cdot \tilde{k}_{F,m_{F1g}} \\ &- \hat{\kappa} \left( \int_{\tilde{m}_{F2}(-a)}^{\tilde{m}_{F2}(a)} m \cdot V_{F2,m_k}(m, k_F) \cdot dm \right) \cdot \tilde{k}_{F,m_{F1g}}, \end{aligned}$$

where the term  $m_{F2}^* \cdot V_{F2,m_k}^*$  follows from applying the envelope theorem to (A.2). Rearranging terms in the same manner as the proof of Theorem 3 and defining  $\kappa \equiv \hat{\kappa}/\kappa_1$ ,  $\xi^\ell \equiv \hat{\xi}[V_{H2,m}(a^\ell) \cdot m_2^\perp(a^\ell)]/[V_{F2,m}(a^\ell) \cdot m_2^\perp(a^\ell)]/\kappa_1$ , and  $\xi^* \equiv \hat{\xi}[V_{H2,m}^* \cdot m_2^{*\perp}]/[V_{F2,m}^* \cdot m_2^{*\perp}]/\kappa_1$  completes the

argument.

## B Proofs of Results in Example Economy

This appendix proves the propositions stated in Section 4's application of our main theoretical results to a stylized example economy.

We begin with several preliminary observations we will use in subsequent steps.

First, each country's time-2 Meade utility function can be expressed as

$$V_{i2}(m_{i2}, k_i) = \beta \sum_{n \geq 1} \theta_{in} \log(C_{i2n})$$

$$\text{where } C_{i2n} = \left( \sum_{j \in \{H, F\}} (\phi_{inj})^{1/\sigma_n} (c_{i2nj})^{(\sigma_n-1)/\sigma_n} \right)^{\sigma_n/(\sigma_n-1)}$$

$$c_{i2ni} = k_{in} + m_{i2ni} \quad \text{and} \quad c_{i2nj \neq i} = m_{i2nj}.$$

Useful derivatives of  $V_{i2}$  include

$$V_{i2, m_{i2nj}}(m_{i2}, k_i) = \frac{x_{i2nj}^i}{c_{i2nj}}$$

$$V_{i2, k_{in}}(m_{i2}, k_i) = V_{i2, m_{i2ni}}(m_{i2}, k_i)$$

$$V_{i2, m_{i2ni} m_{i2nj}}(m_{i2}, k_i) = V_{i2, m_{i2ni} k_{in}}(m_{i2}, k_i) = -\frac{1}{\sigma_n} \frac{x_{i2ni}^i}{(c_{i2ni})^2} - \frac{\sigma_n - 1}{\sigma_n} \frac{(x_{i2ni}^i)^2}{\beta \theta_{in} (c_{i2ni})^2}$$

$$V_{i2, m_{i2ni} m_{i2nj \neq i}}(m_{i2}, k_i) = -\frac{\sigma_n - 1}{\sigma_n} \frac{x_{i2ni}^i x_{i2nj}^i}{\beta \theta_{in} c_{i2ni} c_{i2nj}},$$

where  $x_{i2nj}^k = p_{k2nj} c_{i2nj}$  denotes  $i$ 's expenditure on sector  $n$  goods from  $j$ , valued at prices in  $k$ , and where we normalize prices by setting

$$p_{i2} = V_{i2, m}(m_{i2}, k_i).$$

Note that this implies  $i$ 's spending on each sector  $n$  is  $\beta \theta_{in}$ , so nominal GDP is  $\beta$ .

Second, it is useful to re-express each country's consumption of its own varieties in terms of its own spending on imports from other countries, other countries' spending on its exports,

and its endowment. Using the observation that  $i$  spends  $\beta\theta_{in}$  on each sector  $n$ , we have

$$\begin{aligned}\beta\theta_{in} - x_{i2nj}^i &= x_{i2ni}^i = x_{j2ni}^i \frac{c_{i2ni}}{c_{j2ni}} = x_{j2ni}^i \frac{c_{i2ni}}{k_{in} - c_{i2ni}} \\ \implies c_{i2ni} &= \frac{\beta\theta_{in} - x_{i2nj}^i}{\beta\theta_{in} - x_{i2nj}^i + x_{j2ni}^i} k_{in}.\end{aligned}$$

## B.1 Proof of Proposition 1

By Theorem 2,

$$r_{H1n}s_{1n} \propto \tilde{r}_{H2n}(m_{H2}^\ell, k_H) - \tilde{r}_{H2n}(m_{H2}^*, k_H),$$

where  $m_{H2}^\ell$  and  $m_{H2}^*$  denote Home's net imports under its most painful threat and its economically optimal policies, respectively. From the observations above, we have

$$\tilde{r}_{H2n}(m_{H2}, k_H) \equiv \frac{\partial V_{H2}(m_{H2}, k_H)}{\partial k_{Hn}} = \frac{x_{H2nH}^H}{c_{H2nH}} = \frac{\beta\theta_{Hn} - x_{H2nF}^H + x_{F2nH}^H}{k_{Hn}}.$$

So, recalling that  $y_{H2nH} = k_{Hn}$  and letting  $TD_{H2n} = x_{H2nF}^H - x_{F2nH}^H$  denote Home's sector- $n$  trade deficit valued in Home prices, we have

$$r_{H1n}s_{1n} \propto \frac{TD_{H2n}^* - TD_{H2n}^\ell}{k_{Hn}}.$$

## B.2 Characterization of Home's Desire to Move Foreign Capital

We claim in Section 4.3 that, as time-2 trade volume converges to 0, the value Home places on an increase in sector- $n$  Foreign capital is given by

$$\int_{m_{F2}^{OFF}=0}^{m_{F2}} (-m) \cdot \frac{\partial^2 \tilde{p}_2^w(m, k_F)}{\partial k_{Fn} \partial m} \cdot dm \rightarrow \gamma_n \equiv -\frac{1}{\sigma_n} \frac{p_{2nH}^w m_{F2nH}}{y_{F2nF}}.$$

This result is proved as follows:

First, integrating by parts gives

$$\gamma_n = \int_0^{m_{F2}} (-m) \cdot V_{F2,mmk_n}(m, k_F) \cdot dm = R_n(0, k_F) - R_n(m_{F2}, k_F),$$

where  $R_n(m, k) = V_{F2,mk_n}(m, k) \cdot m - V_{F2,k_n}(m, k)$ .

Next, we use the expressions computed at the beginning of this appendix to write  $R_n(m_{F2}, k_F)$

as

$$\begin{aligned}
& -m_{F2nF} \left[ \frac{1}{\sigma_n} \frac{x_{F2nF}^F}{(c_{F2nF})^2} + \frac{\sigma_n - 1}{\sigma_n} \frac{(x_{F2nF}^F)^2}{\beta\theta_{Fn}(c_{F2nF})^2} \right] - m_{F2nH} \frac{\sigma_n - 1}{\sigma_n} \frac{x_{F2nF}^F x_{F2nH}^F}{\beta\theta_{Fn} c_{F2nF} c_{F2nH}} - \frac{x_{F2nF}^F}{c_{F2nF}} \\
& = \frac{1}{c_{F2nF}} \left[ \frac{1}{\sigma_n} x_{H2nF}^F + \frac{\sigma_n - 1}{\sigma_n} \frac{x_{F2nF}^F x_{H2nF}^F}{\beta\theta_{Fn}} - \frac{\sigma_n - 1}{\sigma_n} \frac{x_{F2nF}^F x_{F2nH}^F}{\beta\theta_{Fn}} - x_{F2nF}^F \right] \\
& = \frac{\beta\theta_{Fn} - x_{F2nH}^F + x_{H2nF}^F}{\beta\theta_{Fn} - x_{F2nH}^F} \frac{1}{k_{Fn}} \left[ \frac{1}{\sigma_n} x_{H2nF}^F + \frac{\sigma_n - 1}{\sigma_n} \frac{\beta\theta_{Fn} - x_{F2nH}^F}{\beta\theta_{Fn}} (x_{H2nF}^F - x_{F2nH}^F) - \beta\theta_{Fn} + x_{F2nH}^F \right],
\end{aligned}$$

where the second equality uses  $x_{F2nF}^F/c_{F2nF} \times m_{F2nF} = -x_{H2nF}^F$  and where the third equality uses the expression above for  $c_{F2nF}$  and  $x_{F2nF}^F = \beta\theta_{Fn} - x_{F2nH}^F$ . Differentiating to express  $R_n(\cdot)$  to first order in trade,  $x_{H2nF}^F$  and  $x_{F2nH}^F$  implies

$$R_n(m_{F2}, k_F) = -\frac{\beta\theta_{Fn}}{k_{Fn}} + \frac{x_{F2nH}^F}{\sigma_n k_{Fn}} + o(x_{H2nF}^F, x_{F2nH}^F) \implies \gamma_n = -\frac{x_{F2nH}^F}{\sigma_n k_{Fn}} + o(x_{H2nF}^F, x_{F2nH}^F).$$

### B.3 Proof of Propositions 2 and 3

Recall from Theorem 3 that trade taxes are given by

$$\tau_{1g} - \tau_{1g}^{ToT} = \kappa\gamma \cdot \frac{\partial \tilde{k}_F}{\partial m_{F1g}} \bigg/ \tilde{p}_{1g}^w. \quad (\text{B.1})$$

We have already characterized  $\gamma = \{\gamma_n\}$  and so now turn to  $\partial \tilde{k}_F / \partial m_{F1g}$ .

We study the  $\beta \rightarrow 0$  limit in which capital is fully determined by time-1 prices. Concretely, Foreign capital is fully determined by the system of equations comprising (a) firms' capital rental first-order conditions and (b) capital market clearing. That is,

$$\begin{aligned}
r_{F1} &= \theta_{Fn} \frac{(\phi_{FnF})^{1/\sigma_n} (k_{Fn} + m_{F1nF})^{-1/\sigma_n}}{(C_{F1n})^{(\sigma_n-1)/\sigma_n}} \\
C_{F1n} &= [(\phi_{FnF})^{1/\sigma_n} (k_{Fn} + m_{F1nF})^{(\sigma_n-1)/\sigma_n} + (\phi_{FnH})^{1/\sigma_n} (m_{F1nH})^{(\sigma_n-1)/\sigma_n}]^{\sigma_n/(\sigma_n-1)} \\
\sum_n k_{Fn} &= [(\phi_{F0F})^{1/\sigma_0} (\bar{y}_{0F} + m_{F10F})^{(\sigma_0-1)/\sigma_0} + (\phi_{F0H})^{1/\sigma_0} (m_{F10H})^{(\sigma_0-1)/\sigma_0}]^{\sigma_0/(\sigma_0-1)},
\end{aligned}$$

where  $r_{F1}$  is the common capital rental rate across all sectors. Totally differentiating the

system implies

$$\begin{aligned}
d \log r_{F1} &= -\frac{1}{\sigma_n} \frac{dk_{Fn} + dm_{F1nF}}{C_{F1nF}} - \frac{\sigma_n - 1}{\sigma_n} d \log C_{F1n} \\
d \log C_{F1n} &= \mu_{F1nF} \frac{dk_{Fn} + dm_{F1nF}}{C_{F1nF}} + \mu_{F1nH} \frac{dm_{F1nH}}{m_{F1nH}} \\
\sum_n \frac{dk_{Fn}}{k_F} &= \mu_{F10F} \frac{dm_{F10F}}{\iota_{F10F}} + \mu_{F10H} \frac{dm_{F10H}}{\iota_{F10H}},
\end{aligned}$$

where  $k_F \equiv \sum_n k_{Fn}$  and where  $\mu_{F1nj}$  is the share of  $F$ 's sector- $n$  expenditure on goods from country  $j$ . We solve this system of linear equations by substituting the second equation into the first, solving it for  $dk_{Fn}$  and then substituting  $dk_{Fn}$  into the third equation to solve for  $d \log r_{F1}$ . We then plug  $d \log r_{F1}$  back into the equation for  $dk_{Fn}$  to characterize the change in capital with respect to imports of each good. This implies the following derivatives

$$\begin{aligned}
\frac{\partial \tilde{k}_{Fn}}{\partial m_{F10F}} &= \frac{\frac{\sigma_n}{1+(\sigma_n-1)\mu_{F1nF}} C_{F1nF}}{\sum_{n'} \frac{\sigma_{n'}}{1+(\sigma_{n'}-1)\mu_{F1n'F}} C_{F1n'F}} \frac{k_F \mu_{F10F}}{\iota_{F10F}} \\
\frac{\partial \tilde{k}_{Fn}}{\partial m_{F10H}} &= \frac{\frac{\sigma_n}{1+(\sigma_n-1)\mu_{F1nF}} C_{F1nF}}{\sum_{n'} \frac{\sigma_{n'}}{1+(\sigma_{n'}-1)\mu_{F1n'F}} C_{F1n'F}} \frac{k_F \mu_{F10H}}{\iota_{F10H}} \\
\frac{\partial \tilde{k}_{Fn}}{\partial m_{F1n'F}} &= -\mathbb{1}_{n=n'} + \frac{\frac{\sigma_n}{1+(\sigma_n-1)\mu_{F1nF}} C_{F1nF}}{\sum_{n''} \frac{\sigma_{n''}}{1+(\sigma_{n''}-1)\mu_{F1n''F}} C_{F1n''F}} \\
\frac{\partial \tilde{k}_{Fn}}{\partial m_{F1n'H}} &= \frac{(\sigma_{n'} - 1)\mu_{F1n'H}}{1 + (\sigma_{n'} - 1)\mu_{F1n'F}} \frac{C_{F1n'F}}{m_{F1n'H}} \left[ -\mathbb{1}_{n=n'} + \frac{\frac{\sigma_n}{1+(\sigma_n-1)\mu_{F1nF}} C_{F1nF}}{\sum_{n''} \frac{\sigma_{n''}}{1+(\sigma_{n''}-1)\mu_{F1n''F}} C_{F1n''F}} \right].
\end{aligned}$$

To compute peacetime trade taxes in the limit as trade values  $p_{2nj}^w m_{i2nj} \rightarrow 0$  for  $i \in \{H, F\}, j \neq i$ , we substitute our characterization of  $\partial \tilde{k}_F / \partial m_{F1g}$  into (B.1). To do so, we make use of the observations that  $p_{10j}^w \iota_{F10j} = \mu_{F10j} r_{F1} k_F$  and  $\mu_{F1nH} / (p_{F1nH} m_{F1nH}) = \mu_{F1nF} / (p_{F1nF} C_{F1nF})$  and the definition

$$\Gamma \equiv \left( \sum_n \frac{\sigma_n}{1 + (\sigma_n - 1)\mu_{F1nF}} C_{F1nF} \times \gamma_n \right) / \left( \sum_n \frac{\sigma_n}{1 + (\sigma_n - 1)\mu_{F1nF}} C_{F1nF} \right).$$

In these terms, we obtain

$$\begin{aligned}\tau_{10F} - \tau_{10F}^{ToT} &= \tau_{10H} - \tau_{10H}^{ToT} = \kappa \frac{\Gamma}{r_{F1}} \\ \tau_{1nF} - \tau_{1nF}^{ToT} &= -\kappa \frac{\gamma_n - \Gamma}{p_{F1nF}} \\ \tau_{1nH} - \tau_{1nH}^{ToT} &= \frac{(\sigma_n - 1)\mu_{F1nF}}{1 + (\sigma_n - 1)\mu_{F1nF}} (\tau_{1nF} - \tau_{1nF}^{ToT}).\end{aligned}$$

## B.4 Trade Taxes with Limited Credibility in the Example Economy

In Section 4, we focused our analysis of trade policy in the example economy on the case with perfect credibility. This appendix covers the case with imperfect credibility.

**Proposition 4.** *In the limit of small time-2 trade volumes and as  $\beta \rightarrow 0$ ,*

$$\begin{aligned}\tau_{10H} - \tau_{10H}^{ToT} &= \tau_{10F} - \tau_{10F}^{ToT} = \frac{\kappa\Gamma + \xi^\ell \mathcal{Z}^\ell - \xi^* \mathcal{Z}^*}{r_{F1}}, \\ \tau_{1nF} - \tau_{1nF}^{ToT} &= \frac{-\kappa(\gamma_n - \Gamma) - \xi^\ell(\zeta_n^\ell - \mathcal{Z}^\ell) + \xi^*(\zeta_n^* - \mathcal{Z}^*)}{p_{F1nF}}, \\ \tau_{1nH} - \tau_{1nH}^{ToT} &= \frac{(\sigma_n - 1)\mu_{F1nF}}{(\sigma_n - 1)\mu_{F1nF} + 1} (\tau_{1nF} - \tau_{1nF}^{ToT}),\end{aligned}$$

where

$$\gamma_n = \frac{x_{F2nH}^{F,OFF} - x_{F2nH}^F}{\sigma_n k_{Fn}} \quad \text{and} \quad \zeta_n = \frac{1}{\sigma_n} \frac{p_{2nH}^w m_{F2nH}}{y_{F2nF}} - \frac{TD_{F2n}}{y_{F2nF}},$$

where  $\zeta_n^\ell$  and  $\zeta_n^*$  evaluate the above expression for  $\zeta_n$  under Home's most costly threat (" $\ell$ ") and its economically optimal trade taxes ("\*"); where  $\Gamma$ ,  $\mathcal{Z}^\ell$ , and  $\mathcal{Z}^*$  are weighted averages of  $\gamma_n$ ,  $\zeta_n^\ell$ , and  $\zeta_n^*$  across sectors,<sup>37</sup> and where  $\kappa$ ,  $\xi^\ell$ , and  $\xi^*$  are the Lagrange multipliers in Theorem 4.<sup>38</sup>

*Proof.* Recall from Theorem 4 that Home's trade taxes with limited credibility satisfy

$$\begin{aligned}\tau_{1g} - \tau_{1g}^{ToT} &= \kappa \left( \int_{m_{F2}^{OFF}}^{m_{F2}} (-m) \cdot V_{F2,mmk}(m, k_F) \cdot dm \right) \cdot \tilde{k}_{F,m_{F1g}} / \tilde{p}_{1g}^w \\ &\quad + (\xi^\ell \tilde{m}_{F2}(a^\ell) \cdot V_{F2,mk}(a^\ell) - \xi^* m_{F2}^* \cdot V_{F2,mk}^*) \cdot \tilde{k}_{F,m_{F1g}} / \tilde{p}_{1g}^w.\end{aligned}\tag{B.2}$$

<sup>37</sup>We define  $\Gamma \equiv (\sum_n w_n \gamma_n) / (\sum_n w_n)$ ,  $\mathcal{Z}^\ell \equiv (\sum_n w_n \zeta_n^\ell) / (\sum_n w_n)$ , and  $\mathcal{Z}^* \equiv (\sum_n w_n \zeta_n^*) / (\sum_n w_n)$  for  $w_n \equiv \sigma_n c_{F1nF} / [(\sigma_n - 1)\mu_{F1nF} + 1]$ .

<sup>38</sup>As in Propositions 2 and 3, we maintain the same Lerner normalization of taxes as Theorem 4.

We have already characterized the first term in the low-trade limit except that, with limited credibility,  $m_{F2}^{OFF}$  need not be zero. Our characterization of  $R_n(\cdot)$  in Appendix B.2 implies that Propositions 2 and 3 continue to describe the first term as long as (a)  $\gamma_n$  is replaced with the value

$$\gamma_n = \frac{x_{F2nH}^{F,OFF} - x_{F2nH}^F}{\sigma_n k_{Fn}},$$

where  $x_{F2nH}^{F,OFF} = \tilde{p}_{2nH}^w(m_{F2}^{OFF}, k_F)m_{F2nH}^{OFF}$  is Foreign's spending on the sector- $n$  good from Home under the off-path threat and (b) the term's entry corresponding to trade taxes on good  $nH$  is written without reference to  $\tau_{1nF} - \tau_{1nF}^{ToT}$ , as simply

$$-\kappa \frac{(\sigma_n - 1)\mu_{F1nF}}{1 + (\sigma_n - 1)\mu_{F1nF}} \frac{\gamma_n - \Gamma}{p_{F1nF}}.$$

We now turn to the terms on the second line of (B.2). We let

$$\hat{R}_n(m, k) \equiv m \cdot V_{F2, mk_n}(m, k) = R_n(m, k) + V_{F2, k_n}(m, k).$$

Using our characterization of  $R_n(\cdot)$  in Appendix B.2 and characterizing  $V_{F2, k_n}(m_{F2}, k_F)$  by the same steps as in Appendix B.1—except for Foreign rather than Home—we have

$$\hat{R}_n(m_{F2}, k_F) = \zeta_n + o(x_{H2nF}^F, x_{F2nH}^F) \quad \text{where} \quad \zeta_n = \frac{1}{\sigma_n} \frac{p_{F2nH} c_{F2nH}}{y_{F2nF}} - \frac{TD_{F2n}}{y_{F2nF}}$$

and where  $TD_{F2n} = x_{F2nH}^F - x_{H2nF}^F$  denotes Foreign's sector- $n$  trade deficit valued in Foreign or equivalently world prices.

To construct the term on the second line of (B.2), we now follow the same steps as in the proofs of Propositions 2 and 3. However, we use  $\zeta_n^\ell$  and  $\zeta_n^*$ —representing  $\zeta_n$  when evaluated under Home's most costly threat and its economically optimal policy, respectively—instead of  $\gamma_n$  and the analogously defined  $\mathcal{Z}^\ell$  and  $\mathcal{Z}^*$  instead of  $\Gamma$ . Letting  $\Xi_{1g}$  denote this term for good  $g$ , we have, in the limit as  $p_{2nj}^w m_{i2nj} \rightarrow 0$  for  $i \in \{H, F\}, j \neq i$ ,

$$\begin{aligned} \Xi_{10F} &= \Xi_{10H} = \frac{\xi^\ell \mathcal{Z}^\ell - \xi^* \mathcal{Z}^*}{r_{F1}} \\ \Xi_{1nF} &= -\frac{\xi^\ell (\zeta_n^\ell - \mathcal{Z}^\ell) - \xi^* (\zeta_n^* - \mathcal{Z}^*)}{p_{F1nF}} \\ \Xi_{1nH} &= \frac{(\sigma_n - 1)\mu_{F1nF}}{1 + (\sigma_n - 1)\mu_{F1nF}} \Xi_{1nF}. \end{aligned}$$

□

## C Model Extensions

### C.1 Geopolitical Uncertainty

#### C.1.1 Extended model

We assume that Foreign's geopolitical preferences are randomly determined by a state of the world  $\omega \in \Omega$  that is revealed to all actors at time 2, after Home's trade threat has been set, but before Foreign takes its geopolitical action. Formally, we model uncertainty by representing all time-2 equilibrium variables as functions of  $\omega$ . For example, we denote the vector of consumption in  $i$  at time 2 by  $c_{i2}(\omega)$ . As in the baseline model, we assume complete markets within each country but maintain international financial autarky. With risk, this implies the rate of return on bonds  $\mathcal{R}_i(\omega)$  within each country  $i$  is now state-contingent, but trade balance still must hold at each time and each state of the world.

The equilibrium conditions in this augmented model are as follows.

**Economic equilibrium conditions.** Households maximize expected consumption utility subject to a lifetime budget constraint:

$$\begin{aligned} c_{i1}, \{c_{i2}(\omega)\}_{\omega \in \Omega} \in \arg \max_{c_1, \{c_2(\omega)\}} & u_{i1}(c_1) + \mathbb{E}[u_{i2}(c_2(\omega))] \\ \text{s.t.} & P_{i1} \cdot c_1 - I_{i1} + \mathbb{E}[\mathcal{R}_i(\omega)^{-1}(P_{i2}(\omega) \cdot c_2(\omega) - I_{i2}(\omega))] \leq 0, \end{aligned}$$

where  $I_{i1}$  and  $I_{i2}(\omega)$  are income from domestic profits and lump-sum transfers, i.e.,

$$\begin{aligned} I_{i1} &= P_{i1} \cdot (y_{i1} - \iota_{i1}) + \mathbb{1}_{i=H}(P_1^w \tau_1) \cdot m_{i1}, \\ I_{i2}(\omega) &= P_{i2}(\omega) \cdot y_{i2}(\omega) + \mathbb{1}_{i=H}(P_2^w(\omega) \tau_2(\omega)) \cdot m_{i2}(\omega), \end{aligned}$$

where  $m_{i1}$  and  $m_{i2}(\omega)$  denote the net imports of country  $i$ .

Goods producers maximize profits subject to technological feasibility:

$$\begin{aligned} \{y_{i1}, k_{i1}^y\} &\in \arg \max_{y, k^y} P_{i1} \cdot y - R_{i1} \cdot k^y \quad \text{s.t.} \quad G_{i1}(y, k^y) \leq 0, \\ \{y_{i2}(\omega), k_{i2}^y(\omega)\} &\in \arg \max_{y, k^y} P_{i2}(\omega) \cdot y - R_{i2}(\omega) \cdot k^y \quad \text{s.t.} \quad G_{i2}(y, k^y) \leq 0. \end{aligned}$$

Capital producers maximize expected profits subject to technological feasibility and facing subsidies:

$$\{k_i, \iota_{i1}\} \in \arg \max_{k, \iota_1} (R_{i1}(1 + \mathbb{1}_{i=H}s_1) + \mathbb{E}[\mathcal{R}_i(\omega)^{-1}R_{i2}(\omega)]) \cdot k - P_{i1} \cdot \iota_1 \quad \text{s.t.} \quad \Lambda_{i1}(k, \iota_1) \leq 0.$$

Goods markets clear globally and capital markets clear within each country:

$$\begin{aligned} c_{i1} + \iota_{i1} &= y_{i1} + m_{i1}, & m_{H1} + m_{F1} &= 0, & k_i &= k_{i1}^y, \\ c_{i2}(\omega) &= y_{i2}(\omega) + m_{i2}(\omega), & m_{H2}(\omega) + m_{F2}(\omega) &= 0, & k_i &= k_{i2}^y(\omega). \end{aligned}$$

There is financial autarky. In other words, trade is balanced within each period and state of the world:

$$P_1^w \cdot m_{i1} = 0 \quad \text{and} \quad P_2^w(\omega) \cdot m_{i2}(\omega) = 0.$$

Domestic prices equal world prices augmented by (possibly zero) trade taxes:

$$\begin{aligned} P_{F1} &= P_1^w \quad \text{and} \quad P_{H1} = (1 + \tau_1)P_1^w, \\ P_{F2}(\omega) &= P_2^w(\omega) \quad \text{and} \quad P_{H2}(\omega) = (1 + \tau_2(\omega))P_2^w(\omega). \end{aligned}$$

**Geopolitical equilibrium conditions.** Foreign's geopolitical action solves

$$a(\omega) \in \arg \max_{\hat{a} \in \{\underline{a}, \bar{a}\}} u_{F2} \left( \tilde{c}_{F2}(\tilde{\tau}_2(\hat{a}), k_H, k_F) \right) + z_F(\hat{a}; \omega).$$

Home's time-2 trade taxes are determined by its trade tax threat and Foreign's geopolitical action:

$$\tau_2(\omega) = \tilde{\tau}_2(a(\omega)).$$

**Net-present-value prices.** Analogously to the main text, we define

$$\begin{aligned} p_{i1} &\equiv P_{i1}, & p_{i2}(\omega) &\equiv \mathcal{R}_i(\omega)^{-1} P_{i2}(\omega), \\ p_1^w &\equiv P_1^w, & p_2^w(\omega) &\equiv \mathcal{R}_F(\omega)^{-1} P_2^w(\omega), \\ r_{i1} &\equiv R_{i1}, & r_{i2}(\omega) &\equiv \mathcal{R}_i(\omega)^{-1} R_{i2}(\omega). \end{aligned}$$

### C.1.2 Extended results

Following the same steps as in the proof of Lemma 1—and noting that  $a(\omega)$  is a sufficient statistic for the impact of  $\omega$  on the time-2 allocation—allows us to represent the planner's

problem in its primal form. The primal problem with uncertainty is

$$\begin{aligned}
& \max_{m_{F1}, \tilde{m}_{F2}(\cdot), k_H, k_F, \{a(\omega)\}_{\omega \in \Omega, \chi}} V_{H1}(-m_{F1}, k_H) + \mathbb{E}[V_{H2}(-\tilde{m}_{F2}(a(\omega)), k_H) + z_H(a(\omega))] \\
& \text{s.t.} \quad k_F = \tilde{k}_F[m_{F1}, \tilde{m}_{F2}(a(\cdot))] \\
& \quad V_{F1, m}(m_{F1}, k_F) \cdot m_{F1} = 0 \\
& \quad V_{F2, m}(\tilde{m}_{F2}(\hat{a}), k_F) \cdot \tilde{m}_{F2}(\hat{a}) = 0 \\
& \quad V_{F2}(\tilde{m}_{F2}(a(\omega)), k_F) - V_{F2}(\tilde{m}_{F2}(\neg a(\omega)), k_F) \\
& \quad \geq z_F(\neg a(\omega); \omega) - z_F(a(\omega); \omega) \\
& \quad \chi \frac{V_{H2, m}(-\tilde{m}_{F2}(\cdot), k_H)}{V_{F2, m}(\tilde{m}_{F2}(\cdot), k_F)} - 1 \in \mathcal{T}_2(k_H, k_F),
\end{aligned}$$

where  $\tilde{k}_F(\cdot)$ , the function mapping trade at each time and state to Foreign capital, is given by the solution to

$$\max_{k_F} V_{F1}(m_{F1}, k_F) + \mathbb{E}[V_{F2}(\tilde{m}_{F2}(a(\omega)), k_F)].$$

Following the same steps as in the proofs of Theorems 1 and 2 reveals that our results on industrial policy are unchanged.

Our results on optimal peacetime trade taxes—i.e., Theorems 3 and 4—require minor modifications. Beginning in the case with perfect commitment, we note that the geopolitical incentive compatibility constraint can be replaced with a single equality constraint,

$$V_{F2}(\tilde{m}_{F2}(\bar{a}), k_F) - V_{F2}(\tilde{m}_{F2}(\underline{a}), k_F) = V_{F2}(\tilde{m}_{F2}^*(\bar{a}), k_F) - V_{F2}(\tilde{m}_{F2}^*(\underline{a}), k_F), \quad (\text{C.1})$$

where  $\tilde{m}_{F2}^*(\cdot)$  is Home's optimal threat. We then proceed using the same steps as in the proof of Theorem 3 except for the following alterations: First, the function  $\tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a))$  used in the baseline versions of those results must now be replaced with the version  $\tilde{k}_F(m_{F1}, \tilde{m}_{F2}(a(\cdot)))$  that accounts for the distribution of Foreign geopolitical actions in the second period. Second, the Home planner may no longer threaten autarky, even when it has perfect commitment, so the Lagrange multiplier on the time-2 off-path trade balance constraint,  $\tilde{\kappa}_2(\neg a)$ , need not equal zero. As a result, the terms-of-trade component of trade taxes,  $\tau_{1g}^{ToT}$ , takes the form

$$\tau_{1g}^{ToT} = \frac{m_{F1}}{\tilde{p}_{1g}^w} \cdot \frac{\partial \tilde{p}_1^w}{\partial m_{F1g}} + \frac{m_{F1}}{\tilde{p}_{1g}^w} \cdot \frac{\partial \tilde{p}_1^w}{\partial k_F} \cdot \frac{\partial \tilde{k}_F}{\partial m_{F1g}} + \sum_{\hat{a}} \Phi(\hat{a}) \frac{\tilde{m}_{F2}(\hat{a})}{\tilde{p}_{1g}^w} \cdot \frac{\partial \tilde{p}_2^w(\hat{a})}{\partial k_F} \cdot \frac{\partial \tilde{k}_F}{\partial m_{F1g}},$$

where  $\Phi(\hat{a}) \equiv \tilde{\kappa}_2(\hat{a})/\kappa_1$ . Deviations of  $\Phi(\hat{a})$  from  $\mathbb{P}[a(\omega) = \hat{a}]$  now capture binding restrictions on international financial trade both across time and across states of the world. Third, our modified geopolitical incentive compatibility constraint, (C.1), implies that the integral term in

Theorem 3 is now between  $\underline{m}_{F2} \equiv \tilde{m}_{F2}(\underline{a})$  and  $\bar{m}_{F2} \equiv \tilde{m}_{F2}(\bar{a})$  rather than  $m_{F2}^{OFF} = \tilde{m}_{F2}(\neg a)$  and  $m_{F2} = \tilde{m}_{F2}(a)$ , and its multiplier is not signed in general.

The case with limited commitment inherits these same modifications but no others.

## C.2 Home Geopolitical Actions

### C.2.1 Extended model

We assume that both Home and Foreign take geopolitical actions  $a_H \in \{\underline{a}_H, \bar{a}_H\}$  and  $a_F \in \{\underline{a}_F, \bar{a}_F\}$ . Each country  $i$ 's geopolitical utility depends on the geopolitical actions of both countries, i.e., it is given by  $z_i(a_H, a_F)$ . We assume that Home's geopolitical actions and trade taxes are determined by Foreign's geopolitical action and a joint Home policy threat—encompassing both Home's geopolitical actions and its trade taxes—that we represent with functions  $\tilde{a}_H(\cdot)$  and  $\tilde{\tau}_2(\cdot)$  from  $\{\underline{a}_F, \bar{a}_F\}$  to  $\{\underline{a}_H, \bar{a}_H\}$  and  $[-1, \infty]^\mathcal{G}$ , respectively.

The economic equilibrium conditions of this extended model are the same as in the baseline model. The geopolitical equilibrium conditions are modified to accommodate Home geopolitical actions.

**Geopolitical equilibrium conditions.** Foreign's geopolitical action solves

$$a_F \in \arg \max_{\hat{a}_F \in \{\underline{a}_F, \bar{a}_F\}} u_{F2} \left( \tilde{c}_{F2}(\tilde{\tau}_2(\hat{a}_F), k_H, k_F) \right) + z_F(\tilde{a}_H(\hat{a}_F), \hat{a}_F).$$

Home's geopolitical action and its time-2 trade taxes are determined by its geopolitics-and-trade-tax threat and Foreign's geopolitical action:

$$a_H = \tilde{a}_H(a_F) \quad \text{and} \quad \tau_2 = \tilde{\tau}_2(a_F).$$

### C.2.2 Extended results

Following the same steps as in the proof of Lemma 1 allows us to represent the planner's problem in its primal form. The primal problem with Home geopolitical actions is

$$\begin{aligned}
& \max_{m_{F1}, \tilde{m}_{F2}(\cdot), k_H, k_F, \tilde{a}_H(\cdot), a_F, \chi} V_{H1}(-m_{F1}, k_H) + V_{H2}(-\tilde{m}_{F2}(a_F), k_H) + z_H(\tilde{a}_H(a_F), a_F) \\
& \text{s.t. } k_F = \tilde{k}_F[m_{F1}, \tilde{m}_{F2}(a_F)] \\
& V_{F1,m}(m_{F1}, k_F) \cdot m_{F1} = 0 \\
& V_{F2,m}(\tilde{m}_{F2}(\hat{a}_F), k_F) \cdot \tilde{m}_{F2}(\hat{a}_F) = 0 \\
& V_{F2}(\tilde{m}_{F2}(a_F), k_F) - V_{F2}(\tilde{m}_{F2}(\neg a_F), k_F) \\
& \quad \geq z_F(\tilde{a}_H(\neg a_F), \neg a_F) - z_F(\tilde{a}_H(a_F), a_F) \\
& \chi \frac{V_{H2,m}(-\tilde{m}_{F2}(\cdot), k_H)}{V_{F2,m}(\tilde{m}_{F2}(\cdot), k_F)} - 1 \in \mathcal{T}_2(k_H, k_F).
\end{aligned}$$

Following the same steps as in the proofs of Theorems 1, 2, 3, and 4 reveals that all of our results carry over without modification to the case of Home geopolitical actions. Intuitively, this is because one way to solve Home's problem is to first select a geopolitical threat and then choose capital and trade taxes conditional on this threat. Given Home's optimal geopolitical threat  $\tilde{a}_H^*(\cdot)$ , both countries can be thought of as having preferences over only Foreign's action given by

$$z_i^*(\hat{a}_F) \equiv z_i(\tilde{a}_H^*(\hat{a}_F), \hat{a}_F).$$

All of our previous analysis concerning Home's capital and trade policies therefore applies verbatim to the "inner problem" that conditions on  $\tilde{a}_H^*(\cdot)$ .

## C.3 Inseparability of Economics and Geopolitics

### C.3.1 Extended model

We assume that time-2 utilities depend on consumption and Foreign's geopolitical action without imposing additive separability, i.e., we assume they are given by some functions  $u_{i2}(c_{i2}, a)$ . We moreover allow for Foreign's geopolitical action to affect countries' time-2 production possibilities frontiers, which we represent with functions  $G_{i2}(y_{i2}, k_{i2}^y, a)$ .

The equilibrium conditions of this extended model are as follows.

**Economic equilibrium conditions.** Households maximize consumption utility subject to a lifetime budget constraint:

$$\{c_{it}\}_{t=1,2} \in \arg \max_{\{c_t\}_{t=1,2}} u_{i1}(c_1) + u_{i2}(c_2, a) \quad \text{s.t.} \quad \sum_{t=1,2} (\mathcal{R}_i)^{-(t-1)} (P_{it} \cdot c_t - I_{it}) \leq 0,$$

where  $I_{it}$  is income from domestic profits and lump-sum transfers in  $i$  at  $t$ , i.e.,

$$I_{it} = P_{it} \cdot (y_{it} - \mathbb{1}_{t=1} \iota_{i1}) + \mathbb{1}_{i=H} (P_t^w \tau_t) \cdot m_{it},$$

where  $m_{it}$  denotes the net imports of country  $i$  at time  $t$ .

Goods producers maximize profits subject to technological feasibility:

$$\begin{aligned} \{y_{i1}, k_{i1}^y\} &\in \arg \max_{y, k^y} P_{i1} \cdot y - R_{i1} \cdot k^y \quad \text{s.t.} \quad G_{i1}(y, k^y) \leq 0, \\ \{y_{i2}, k_{i2}^y\} &\in \arg \max_{y, k^y} P_{i2} \cdot y - R_{i2} \cdot k^y \quad \text{s.t.} \quad G_{i2}(y, k^y, a) \leq 0. \end{aligned}$$

Capital producer optimization, market clearing, trade balance, and non-arbitrage are as in the baseline model, i.e., (4), (5), (6), and (7) hold.

**Geopolitical equilibrium conditions.** Foreign's geopolitical action solves

$$a \in \arg \max_{\hat{a} \in \{\underline{a}, \bar{a}\}} u_{F2} \left( \tilde{c}_{F2}(\tilde{\tau}_2(\hat{a}), k_H, k_F, \hat{a}), \hat{a} \right),$$

where  $\tilde{c}_{F2}(\cdot)$ 's direct dependence on  $\hat{a}$  reflects  $\hat{a}$ 's presence in time-2 economic preferences and technology.

Home's time-2 trade taxes are determined by its trade tax threat and Foreign's geopolitical action, i.e., (9) holds.

### C.3.2 Extended results

In the presence of inseparability between economics and geopolitics, we must define countries' time-2 Meade utilities in a more general way. We define

$$V_{i2}(m, k, a) \equiv \max_y u_{i2}(y + m, a) \quad \text{s.t.} \quad G_{i2}(y, k, a) \leq 0.$$

Using this definition and following the same steps as in the proof of Lemma 1 allows us to represent the planner's problem in its primal form. The planner's primal problem with

inseparability is

$$\begin{aligned}
& \max_{m_{F1}, \tilde{m}_{F2}(\cdot), k_H, k_F, a, \chi} V_{H1}(-m_{F1}, k_H) + V_{H2}(-\tilde{m}_{F2}(a), k_H, a) \\
& \text{s.t. } k_F = \tilde{k}_F[m_{F1}, \tilde{m}_{F2}(a), a] \\
& V_{F1,m}(m_{F1}, k_F) \cdot m_{F1} = 0 \\
& V_{F2,m}(\tilde{m}_{F2}(\hat{a}), k_F, \hat{a}) \cdot \tilde{m}_{F2}(\hat{a}) = 0 \\
& V_{F2}(\tilde{m}_{F2}(a), k_F, a) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F, \neg a) \geq 0 \\
& \chi \frac{V_{H2,m}(-\tilde{m}_{F2}(\cdot), k_H, \cdot)}{V_{F2,m}(\tilde{m}_{F2}(\cdot), k_F, \cdot)} - 1 \in \mathcal{T}_2(k_H, k_F),
\end{aligned}$$

where  $\tilde{k}_F(\cdot)$  is given by the solution to

$$\max_{k_F} V_{F1}(m_{F1}, k_F) + V_{F2}(\tilde{m}_{F2}(a), k_F, a).$$

We focus on the results with perfect credibility. Following the same steps as in the proof of Theorem 1 reveals that our results on industrial policy are unchanged in this case. Our results on trade policy, however, must be augmented. The modification to our results reflects that the incentive compatibility constraint corresponding to Foreign's geopolitical action is no longer separable between Foreign's economic and geopolitical utilities. To isolate this interaction, we note that the IC constraint may nonetheless be written as

$$\begin{aligned}
V_{F2}(\tilde{m}_{F2}(a), k_F, a) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F, \neg a) &= V_{F2}(\tilde{m}_{F2}(a), k_F, a) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F, a) \\
&\quad + V_{F2}(\tilde{m}_{F2}(\neg a), k_F, a) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F, \neg a) \geq 0 \\
&\iff \\
&\quad - \int_{\tilde{m}_{F2}(\neg a)}^{\tilde{m}_{F2}(a)} m \cdot V_{F2,mm}(m, k_F, a) \cdot dm + V_{F2}(\tilde{m}_{F2}(\neg a), k_F, a) - V_{F2}(\tilde{m}_{F2}(\neg a), k_F, \neg a) \geq 0
\end{aligned}$$

using analogous steps to those used in the proof of Theorem 3, plus the observation that trade balance trivially holds at  $\tilde{m}_{F2}(\neg a)$  under any prices since  $\tilde{m}_{F2}(\neg a) = 0$ . Using this version of the IC constraint, following analogous steps to those used in the proof of Theorem 3 implies that Home's time-1 trade taxes satisfy

$$\begin{aligned}
\tau_{1g} = \tau_{1g}^{ToT} + \kappa \left( - \int_{m_{F2}^{OFF}}^{m_{F2}} m \cdot \frac{\partial^2 \tilde{p}_2^w(m, k_F, a)}{\partial k_F \partial m} \cdot dm \right. \\
\left. + \tilde{r}_{F2}(m_{F2}^{OFF}, k_F, a) - \tilde{r}_{F2}(m_{F2}^{OFF}, k_F, \neg a) \right) \cdot \frac{\partial \tilde{k}_F(m_{F1}, m_{F2}, a)}{\partial m_{F1g}} \Big/ \tilde{p}_{1g}^w,
\end{aligned}$$

where  $\tilde{p}_2^w(m, k, \hat{a}) \equiv V_{F2,m}(m, k, \hat{a})$  denotes Foreign prices as a function of imports, capital, and Foreign geopolitical actions, and where  $\tilde{r}_{F2}(m, k, a)$  denotes Foreign rental rates as a function of imports, capital, and Foreign geopolitical actions. Intuitively, this result states that there are now two geopolitical motives for time-1 trade taxes: They should promote Foreign capital varieties that (a) make Foreign's terms of trade more sensitive, assuming Foreign takes its on-path geopolitical action, and (b) are disproportionately less valuable when Foreign chooses its off-path geopolitical action, assuming Foreign imports its off-path quantities. The latter is a direct channel that, for example, discourages Home exports of weapons that Foreign can stockpile and investment goods it can use to build weapons factories.

## C.4 Many Countries

### C.4.1 Extended model

We assume the economy contains any finite number of countries  $i \in \mathcal{I}$ , including Home and Foreign. Countries  $i$  other than Home and Foreign are analogous to Home and Foreign except that they are both passive in their economic policies and geopolitical behavior.

The equilibrium conditions of this extended model are as follows.

**Economic equilibrium conditions.** The following equilibrium conditions from Section 2.2 now apply to all countries  $i$ : household optimization, i.e., (2); profit maximization by goods and capital producers, i.e., (3) and (4); market clearing, i.e., (5), except that we now write international goods market clearing as

$$\sum_i m_{it} = 0;$$

financial autarky, i.e., (6); non-arbitrage, i.e., (7), except that we now have

$$P_{it} = P_t^w$$

for all  $i \neq H$ . Additionally, the geopolitical equilibrium conditions (8) and (9) continue to apply, except that Foreign consumption is now determined by Home trade taxes  $\tau_2$  as a function  $\tilde{c}_{F2}(\tau_2, \{k_i\})$  of capital around the world. This function is defined as the consumption level consistent with all time-2 economic equilibrium conditions, which we continue to assume have a unique solution up to a price constant. Finally, we continue to represent prices in net-present-value terms using (10).

### C.4.2 Extended results

We begin by defining functions that specify the net imports of each country as a function of Home's net imports.<sup>39</sup> To this end, we assume that given any profile of Home net imports  $\{m_{H1}, m_{H2}\}$ , there exists a unique solution (up to a price constant) to the following set of reduced-form equilibrium conditions:

$$0 = m_{H1} + \sum_{i \neq H} m_{i1} = m_{H2} + \sum_{i \neq H} m_{i2} \quad \text{and, for } i \neq H,$$

$$p_t^w \propto V_{it,m}(m_{it}, k_i), \quad 0 = \sum_{t=1,2} V_{it,k}(m_{it}, k_i), \quad \text{and} \quad p_t^w \cdot m_{it} = -\frac{p_t^w \cdot m_{Ht}}{|\mathcal{I}| - 1}.$$

When  $m_{H1}$  and  $m_{H2}$  satisfy Home's trade balance constraint, these conditions are implied by the equilibrium conditions; otherwise, they assume Home's deficit or surplus at time  $t$  is financed with a uniform transfer to each foreign country, also at time  $t$ . We denote by  $\check{k}_i(m_{H1}, m_{H2})$  each country  $i$ 's capital and by  $\check{p}_1^w(m_{H1}, m_{H2})$  time-1 world prices, both as functions of Home's time-1 and time-2 trade.

Similarly, we assume that given any profile of Home's time-2 net imports  $m_{H2}$  and capital for all other countries  $k_{-H}$ , there exists a unique solution to the following set of reduced-form equilibrium conditions:

$$0 = m_{H2} + \sum_{i \neq H} m_{i2} \quad \text{and, for } i \neq H,$$

$$p_2^w \propto V_{i2,m}(m_{i2}, k_i), \quad \text{and} \quad p_2^w \cdot m_{i2} + \frac{p_2^w \cdot m_{H2}}{|\mathcal{I}| - 1} = 0.$$

We denote by  $\check{m}_{i2}(m_{H2}, k_{-H})$  each country's time-2 trade and by  $\check{p}_2^w(m_{H2}, k_{-H})$  world prices (up to a constant), both as functions of Home's time-2 trade and all other countries' capital.

With these tools in hand, we now revisit the planner's problem with many countries. Similar steps to those in the proof of Lemma 1 imply that the planner's primal problem can

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<sup>39</sup>With two countries, this was unnecessary, as Foreign net imports were the negative of Home's by market clearing.

be written as<sup>40</sup>

$$\begin{aligned}
& \max_{a, m_{H1}, \tilde{m}_{H2}(\cdot), k_H, \chi} V_{H1}(m_{H1}, k_H) + V_{H2}(\tilde{m}_{H2}(a), k_H) + z_H(a) \\
& \text{s.t.} \quad -m_{H1} \cdot \check{p}_1^w[m_{H1}, \tilde{m}_{H2}(a)] = 0 \\
& \quad -\tilde{m}_{H2}(\hat{a}) \cdot \check{p}_2^w[\tilde{m}_{H2}(\hat{a}), k_{-H}] = 0 \\
& \quad - \int_{\check{m}_{F2}(\tilde{m}_{H2}(\neg a), k_{-H})}^{\check{m}_{F2}(\tilde{m}_{H2}(a), k_{-H})} m \cdot V_{F2,mm}(m, k_F) \cdot dm \geq z_F(\neg a) - z_F(a) \quad (\text{C.2}) \\
& \quad k_{-H} = \check{k}_{-H}(m_{H1}, \tilde{m}_{H2}(a)) \\
& \quad \left\{ \chi \frac{V_{H2,m}(\tilde{m}_{H2}(\cdot), k_H)}{V_{i2,m}(\check{m}_{i2}(\tilde{m}_{H2}(\cdot), k_{-H}), k_i)} - 1 \right\}_{i \neq H} \in \mathcal{T}_2(k_H, k_{-H}).
\end{aligned}$$

Following the same steps as in the proofs of Theorems 1 and 2 reveals that our results on industrial policy are unchanged.

Our results on trade policy must be modified somewhat. Starting in the case without credibility constraints, we consider the planner's first-order condition with respect to  $m_{H1}$ :

$$\begin{aligned}
V_{H1,m} &= \kappa_1 [\check{p}_1^w + m_{H1} \cdot \check{p}_{1,m_{H1}}^w] + \sum_{\hat{a}} \tilde{\kappa}_2(\hat{a}) \tilde{m}_{H2}(\hat{a}) \cdot \check{p}_{2,k_{-H}}^w(\hat{a}) \cdot \check{k}_{-H,m_{H1}} \\
&+ \hat{\kappa} \int_{\check{m}_{F2}(\neg a)}^{\check{m}_{F2}(a)} m \cdot V_{F2,mm}(m, k_F) \cdot dm \cdot \check{k}_{F,m_{H1}} \quad (\text{C.3}) \\
&+ \hat{\kappa} [\check{m}_{F2}(a) \cdot V_{F2,mm}(a) \cdot \check{m}_{F2,k_{-H}}(a) - \check{m}_{F2}(\neg a) \cdot V_{F2,mm}(\neg a) \cdot \check{m}_{F2,k_{-H}}(\neg a)] \cdot \check{k}_{-H,m_{H1}},
\end{aligned}$$

where, for ease of notation, we suppress functions' arguments, displaying only the state of the world to which they correspond. We now simplify this expression in several steps.

First, we argue that  $\tilde{\kappa}_2(\neg a) = 0$ . To see why, consider the first-order condition with respect to  $\tilde{m}_{H2}(\neg a)$ :

$$0 = \tilde{\kappa}_2(\neg a) [\check{p}_2^w(\neg a) + \tilde{m}_{H2}(\neg a) \cdot \check{p}_{2,m_{H2}}^w(\neg a)] - \hat{\kappa} \check{m}_{F2}(\neg a) \cdot V_{F2,mm}(\neg a) \cdot \check{m}_{F2,m_{H2}}(\neg a).$$

We assume the existence of a direction  $m_2^\perp$  such that, local to the solution to the planner's problem, deviations in this direction change the world price of Home's net imports but not

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<sup>40</sup>Note that the construction of  $\check{p}_1^w(\cdot)$ ,  $\check{p}_2^w(\cdot)$ , and  $\check{k}_{-H}(\cdot)$  ensures that the first and second constraints—i.e., Foreign trade balance—also imply trade balance for all countries.

its terms of trade or that of Foreign.<sup>41</sup> That is,

$$\tilde{m}_{H2}(\neg a) \cdot \check{p}_{2,m_{H2}}^w(\neg a) \cdot m_2^\perp = \check{m}_{F2}(\neg a) \cdot \check{p}_{2,m_{H2}}^w(\neg a) \cdot m_2^\perp = 0 \quad \text{and} \quad \check{p}_2^w(\neg a) \cdot m_2^\perp \neq 0.$$

The first-order condition in this direction can only hold if  $\tilde{\kappa}_2(\neg a) = 0$ .

Next, we define  $\Phi \equiv \tilde{\kappa}_2(a)/\kappa_1$ , as in Theorem 3.  $\Phi$ 's deviations from unity continue to measure how binding financial autarky is; if  $\Phi = 1$ , then it is as if the planner faces a lifetime trade balance constraint. We represent Home's terms-of-trade motive for trade taxes by

$$\tau_{1g}^{ToT} \equiv \frac{m_{H1}}{\check{p}_{1g}^w} \cdot \frac{\partial \check{p}_1^w}{\partial m_{H1g}} + \Phi \frac{\tilde{m}_{H2}(a)}{\check{p}_{1g}^w} \cdot \frac{\partial \check{p}_2^w(a)}{\partial k_{-H}} \cdot \frac{\partial \check{k}_{-H}}{\partial m_{H1g}}.$$

Finally, we combine these simplifications using that  $p_{i1} \propto V_{i1,m}(m_{i1}, k_i)$  and the definition  $\tilde{p}_{F2}(m_F, k_F) \equiv V_{F2,m}(m_F, k_F)$ , as in the main text. We conclude that Home's first-order condition can be rewritten, up to Lerner symmetry, as

$$\begin{aligned} \tau_{1g} = \tau_{1g}^{ToT} + \kappa \left[ \left( \int_{\tilde{m}_{F2}(\neg a)}^{\tilde{m}_{F2}(a)} m \cdot \frac{\partial^2 \tilde{p}_{F2}(m, k_F)}{\partial m \partial k_F} \cdot dm \right) \cdot \frac{\partial \check{k}_F}{\partial m_{H1g}} \Big/ \check{p}_{1g}^w \right. \\ \left. + \left( \tilde{m}_{F2}(a) \cdot \frac{\partial \tilde{p}_{F2}(a)}{\partial m} \cdot \frac{\partial \tilde{m}_{F2}(a)}{\partial k_{-H}} - \tilde{m}_{F2}(\neg a) \cdot \frac{\partial \tilde{p}_{F2}(\neg a)}{\partial m} \cdot \frac{\partial \tilde{m}_{F2}(\neg a)}{\partial k_{-H}} \right) \cdot \frac{\partial \check{k}_{-H}}{\partial m_{H1g}} \Big/ \check{p}_{1g}^w \right], \end{aligned}$$

for  $\kappa \equiv \hat{\kappa}/\kappa_1 \geq 0$ , and where  $\tilde{p}_{Ft}(\cdot) \equiv V_{Ft,m}(\cdot)$ .

In the case where Home's credibility is constrained, the final line of the primal problem in (C.2) takes the form

$$\min_{\hat{a}=a, \neg a} V_{H2}(\tilde{m}_{H2}(\hat{a}), k_H) + \Delta \geq u_{H2}^*(k_H, k_{-H}),$$

and  $u_{H2}^*(k_H, k_{-H})$  admits the primal representation

$$u_{H2}^*(k_H, k_{-H}) = \max_{m_{H2}} V_{H2}(m_{H2}, k_H) \quad \text{s.t.} \quad \check{p}_2^w(m_{H2}, k_{-H}) \cdot m_{H2} = 0 \quad (\text{C.4})$$

whose solution we denote by  $m_{H2}^*$ . This contributes an additional term equal to

$$-\hat{\xi} \kappa_2^* m_{H2}^* \cdot \check{p}_{2,k_{-H}}^{w*} \cdot \check{k}_{-H, m_{H1}}$$

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<sup>41</sup>Note that we do not require the deviation in the direction of  $m_2^\perp$  to maintain trade balance. Such vectors exist generically when there are many goods. As a simple example, suppose there is an outside good over which each country's Meade utility is quasilinear. Then one can take  $m_2^\perp$  to be the unit vector corresponding to an increase in only Home's trade in the outside good.

to the planner's first-order condition with respect to  $m_{H1}$ , where  $\hat{\xi} \geq 0$  is the Lagrange multiplier on the credibility constraint and  $\kappa_2^*$  is the Lagrange multiplier on the constraint in (C.4). Analogously to the proof of Theorem 4, we assume the existence of goods bundles  $m_1^\perp$ ,  $m_2^\perp(a)$ ,  $m_2^\perp(\neg a)$ , and  $m_2^{*\perp}$  with the following properties, which we state without description for brevity:

$$\begin{aligned}
0 &= m_{H1} \cdot \check{p}_{1,m_{H1}}^w \cdot m_1^\perp = m_{H1} \cdot \check{p}_{1,m_{H2}}^w \cdot m_2^\perp(a) \\
0 &= \tilde{m}_{H2}(\hat{a}) \cdot \check{p}_{2,m_{H2}}^w(\hat{a}) \cdot m_2^\perp(\hat{a}) = \tilde{m}_{H2}(\hat{a}) \cdot \check{p}_{2,k_{-H}}^w(\hat{a}) \cdot \check{k}_{-H,m_{H1}} \cdot m_1^\perp \\
&= \tilde{m}_{H2}(\hat{a}) \cdot \check{p}_{2,k_{-H}}^w(\hat{a}) \cdot \check{k}_{-H,m_{H2}} \cdot m_2^\perp(a) \\
0 &= \tilde{m}_{F2}(\hat{a}) \cdot V_{F2,mm}(\hat{a}) \cdot \check{m}_{F2,m_{H2}}(\hat{a}) \cdot m_2^\perp(\hat{a}) = \tilde{m}_{F2}(\hat{a}) \cdot V_{F2,mm}(\hat{a}) \cdot \check{m}_{F2,k_{-H}}(\hat{a}) \cdot \check{k}_{-H,m_{H1}} \cdot m_1^\perp \\
&= \tilde{m}_{F2}(\hat{a}) \cdot V_{F2,mm}(\hat{a}) \cdot \check{m}_{F2,k_{-H}}(\hat{a}) \cdot \check{k}_{-H,m_{H2}} \cdot m_2^\perp(a) \\
0 &= \check{k}_{F,m_{H1}} \cdot m_1^\perp = \check{k}_{F,m_{H2}} \cdot m_2^\perp(a) \\
0 &= m_{H2}^* \cdot \check{p}_{2,m_{H2}}^{w*} \cdot m_2^{*\perp} \\
0 &< V_{H1,m} \cdot m_1^\perp, V_{H2,m}(\hat{a}) \cdot m_2^\perp(\hat{a}), \check{p}_1^w \cdot m_1^\perp, \check{p}_2^w(\hat{a}) \cdot m_2^\perp(\hat{a}).
\end{aligned}$$

We now take the first-order conditions with respect to  $m_{H1}$ ,  $\tilde{m}_{H2}(a)$ ,  $\tilde{m}_{H2}(\neg a)$ , and  $m_{H2}$  in the direction of the respective bundles. In the case of  $m_2^{*\perp}$ , we take the first-order condition with respect to  $m_{H2}$  in the time-2 problem, as formulated in (C.4). The first-order conditions are

$$\begin{aligned}
V_{H1,m} \cdot m_1^\perp &= \kappa_1 \check{p}_1^w \cdot m_1^\perp \\
V_{H2,m}(a) \cdot m_2^\perp(a) &= \tilde{\kappa}_2(a) \check{p}_2^w(a) \cdot m_2^\perp(a) - \hat{\xi} \mathbf{1}_{a=a^\ell} V_{H2,m}(a) \cdot m_2^\perp(a) \\
0 &= \tilde{\kappa}_2(\neg a) \check{p}_2^w(\neg a) \cdot m_2^\perp(\neg a) - \hat{\xi} \mathbf{1}_{\neg a=a^\ell} V_{H2,m}(\neg a) \cdot m_2^\perp(\neg a), \\
V_{H2,m}^* \cdot m_2^{*\perp} &= \kappa_2^* \check{p}_2^{w*} \cdot m_2^{*\perp},
\end{aligned} \tag{C.5}$$

where  $a^\ell$  is whichever action results in lower Home time-2 economic utility when it carries out its threat. We note that the quantity  $\Phi$ , defined in the case with perfect credibility as the ratio of  $\tilde{\kappa}_2(a)$  to  $\kappa_1$  when  $\hat{\xi} = 0$ , was implicitly defined as

$$\Phi \equiv \frac{V_{H2,m}(a) \cdot m_2^\perp(a)}{\check{p}_2^w(a) \cdot m_2^\perp(a)} \bigg/ \frac{V_{H1,m} \cdot m_1^\perp}{\check{p}_1^w \cdot m_1^\perp}.$$

Maintaining this definition of  $\Phi$ , we solve (C.5) for  $\tilde{\kappa}_2(a)$ ,  $\tilde{\kappa}_2(\neg a)$ , and  $\kappa_2^*$ :

$$\tilde{\kappa}_2(\hat{a}) = \mathbf{1}_{\hat{a}=a} \Phi \kappa_1 + \mathbf{1}_{\hat{a}=a^\ell} \hat{\xi} \frac{V_{H2,m}(\hat{a}) \cdot m_2^\perp(\hat{a})}{\check{p}_2^w(\hat{a}) \cdot m_2^\perp(\hat{a})}, \quad \kappa_2^* = \frac{V_{H2,m}^* \cdot m_2^{*\perp}}{\check{p}_2^{w*} \cdot m_2^{*\perp}}.$$

Returning to the first-order condition with respect to  $m_{H1}$ , the term  $\sum_{\hat{a}} \tilde{\kappa}_2(\hat{a}) \dots$  in (C.3) can be expressed as

$$\Phi \kappa_1 \tilde{m}_{H2}(a) \cdot \check{p}_{2,k-H}^w(a) \cdot \check{k}_{-H,m_{H1}} + \hat{\xi} \frac{V_{H2,m}(a^\ell) \cdot m_2^\perp(a^\ell)}{\check{p}_2^w(a^\ell) \cdot m_2^\perp(a^\ell)} \tilde{m}_{H2}(a^\ell) \cdot \check{p}_{2,k-H}^w(a^\ell) \cdot \check{k}_{-H,m_{H1}}.$$

Finally, we rearrange terms in the same manner as with perfect commitment, arriving at the following expression for trade taxes, up to Lerner symmetry:

$$\begin{aligned} \tau_{1g} = & \tau_{1g}^{ToT} \\ & + \kappa \left[ \left( \int_{\check{m}_{F2}(\neg a)}^{\check{m}_{F2}(a)} m \cdot \frac{\partial^2 \check{p}_{F2}(m, k_F)}{\partial m \partial k_F} \cdot dm \right) \cdot \frac{\partial \check{k}_F}{\partial m_{H1g}} \Big/ \check{p}_{1g}^w \right. \\ & + \left( \check{m}_{F2}(a) \cdot \frac{\partial \check{p}_{F2}(a)}{\partial m} \cdot \frac{\partial \check{m}_{F2}(a)}{\partial k_{-H}} - \check{m}_{F2}(\neg a) \cdot \frac{\partial \check{p}_{F2}(\neg a)}{\partial m} \cdot \frac{\partial \check{m}_{F2}(\neg a)}{\partial k_{-H}} \right) \cdot \frac{\partial \check{k}_{-H}}{\partial m_{H1g}} \Big/ \check{p}_{1g}^w \left. \right] \\ & + \left[ \xi^\ell \tilde{m}_{H2}(a^\ell) \cdot \frac{\partial \check{p}_2^w(a^\ell)}{\partial k_{-H}} - \xi^* m_{H2}^* \cdot \frac{\partial \check{p}_2^{w*}}{\partial k_{-H}} \right] \cdot \frac{\partial \check{k}_{-H}}{\partial m_{H1g}} \Big/ \check{p}_{1g}^w, \end{aligned} \quad (C.6)$$

for  $\kappa \equiv \hat{\kappa}/\kappa_1$ ,  $\xi^\ell \equiv \hat{\xi}/\kappa_1 \times [V_{H2,m}(a^\ell) \cdot m_2^\perp(a^\ell)]/[\check{p}_2^w(a^\ell) \cdot m_2^\perp(a^\ell)]$ , and  $\xi^* \equiv \hat{\xi}/\kappa_1 \times (V_{H2,m}^* \cdot m_2^{*\perp})/(\check{p}_2^{w*} \cdot m_2^{*\perp})$ . We note that  $\kappa, \xi^\ell, \xi^* \geq 0$ .

## D Additional Figures

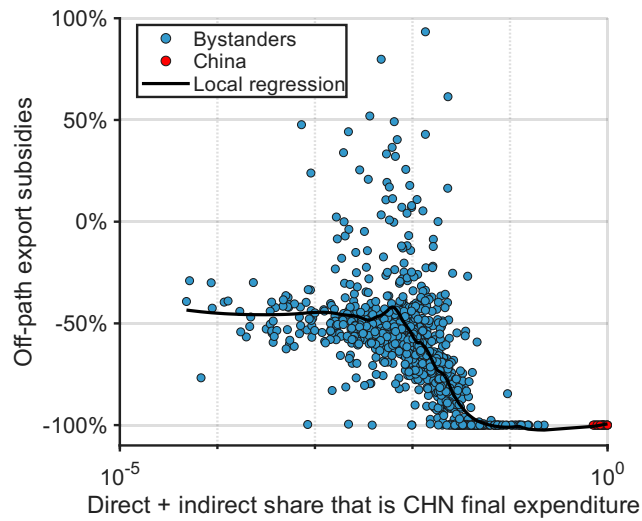


**Figure D.1:** *U.S. off-path export subsidies target exports a larger share of whose value directly or indirectly enters Chinese final expenditure.*

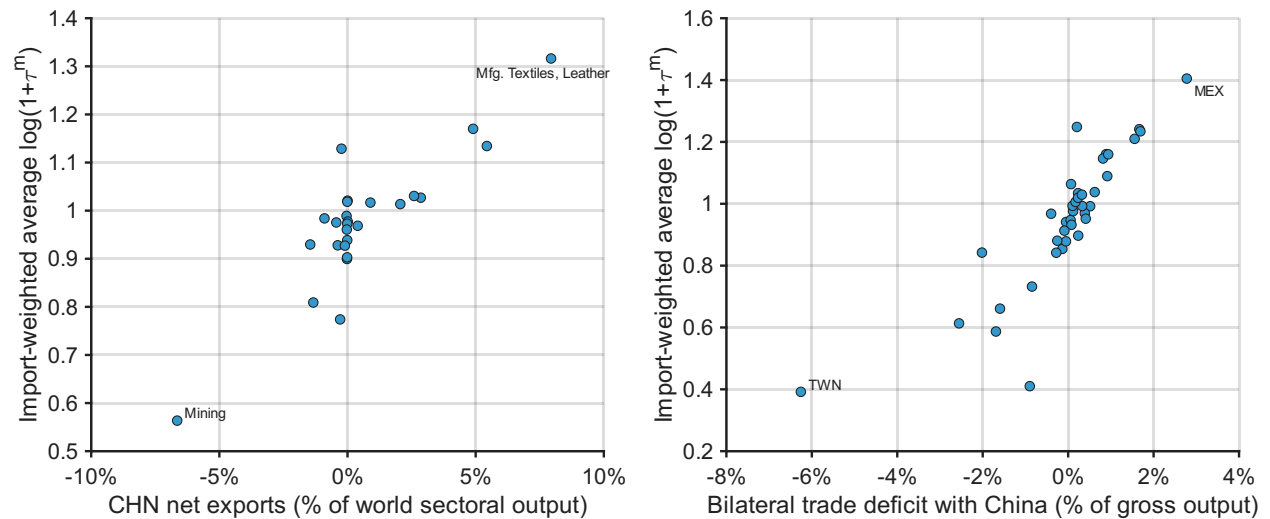


**Figure D.2:** *Left panel: U.S. off-path import tariffs are higher in sectors China net exports. Right panel: U.S. off-path import tariffs are higher on goods from countries with which China runs a trade surplus.*

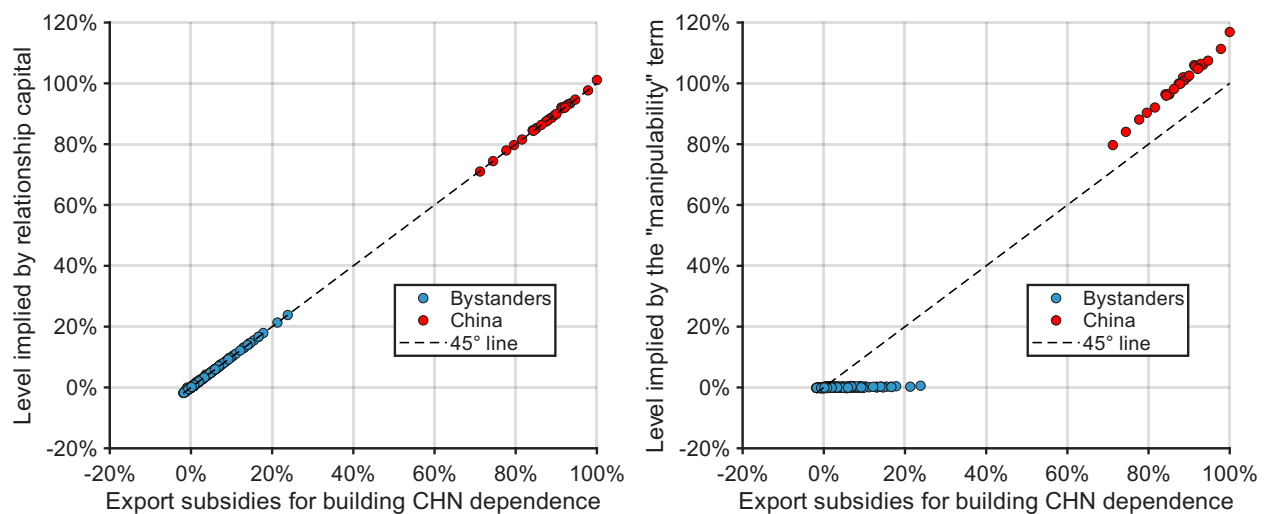


**Figure D.3:** *Left panel: U.S. export subsidies for building dependence are determined by relationship capital, not production capital. Right panel: U.S. export subsidies for building dependence are mostly determined by “manipulability” for bilateral trade and terms-of-trade effects at fixed Home net imports for bystander trade.*