Optimal Tariffs with Geopolitical Alignment*

John Sturm Becko
Princeton University

Gene M. Grossman
Princeton University

Elhanan Helpman
Harvard University

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Abstract

As geopolitical tensions intensify, great powers often turn to trade policy to influence international alignment. We examine the optimal design of tariffs in a world where large countries care not only about economic welfare but also about the political allegiance of smaller states. We consider both a unipolar setting, where a single hegemon uses preferential trade agreements to attract partners, and a bipolar world, where two great powers compete for influence. In both scenarios, we derive optimal tariffs that balance terms-of-trade considerations with strategic incentives to encourage political alignment. We find that when geopolitical concerns are active, the optimal tariff exceeds the classic Mill-Bickerdike level. In a bipolar world, optimal tariffs reflect both economic and political rivalry, and may be strategic complements or substitutes.. A calibration exercise using U.N. voting patterns, an estimate of the cost of buying votes in the U.N., and military spending suggests that geopolitical motives can significantly amplify protectionist pressures and that the emergence of a second great power can contribute to a retreat from globalization.

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1 Introduction

Statecraft involves the strategic use of the tools of national power to advance geopolitical objectives. As global tensions have intensified of late, the great powers have increasingly turned to *economic* statecraft as a means to achieve their foreign policy goals. Among its key instruments, trade policies—including the imposition of tariffs and the offer of preferential trade arrangements—serve as both sticks and carrots to foster political alignment.

The idea that trade can be wielded as a tool of state power has deep intellectual roots. Hirschman (1945) explored how asymmetrical trade relationships create dependencies that states can exploit for geopolitical leverage. Building on this foundation, Krasner (1976) examined the interplay between state power and the international trading system, challenging the prevailing notion that trade structures are determined primarily by material economic factors such as aggregate welfare and distributional effects. While acknowledging these considerations, he argued that a large country's trade policies are shaped in significant part by strategic objectives, particularly the pursuit of international influence.

Geopolitical alignments enhance a great power's international standing and security in several ways. Small allies may offer strategic geographic positions that serve as a buffer against external threats (Morrow, 1991). They may provide access to scarce natural resources or specialized technological expertise (Keohane, 1969, 1971). They may allow military bases on their soil. More abstractly, their alignment can lend political legitimacy that amplifies a larger partner's ideological influence. For example, small states can provide multilateral support for actions that might otherwise appear to be unilateral. Historically, states that lack military strength, like Singapore and Jordan, have been able to leverage their strategic positioning, diplomatic agility, and specialized capabilities to extract trade concessions from the world's most powerful countries.

Whereas large powers gain clear benefits from the geopolitical alignments they cultivate, smaller states face both opportunities and risks in aligning with a dominant economic power (Keohane, 1969, 1971). The potential rewards from alliances may include security guarantees through defense agreements and military assistance, or financial support on favorable terms for state infrastructure projects. Small countries may also gain from knowledge transfers, regulatory harmonization, and improved governance structures. Their citizens may take pride in associating with a successful regime or a country whose values and norms they admire.

However, alignment often comes at the expense of policy autonomy. Smaller states may be pressured to conform to their partner's strategic interests and ideological perspectives, even when these conflict with their own. They could face new security risks or economic retaliation from their partner's adversaries or heightened economic coercion by their more powerful ally. For some small countries, alignment with a great power yields net benefits; for others, the costs outweigh the gains. The balance depends on factors unique to each country, such as its geography, economic structure, ideological leanings, and political regime.

Extensive research supports Krasner's proposition that geopolitical alignments shape trading relationships. Several studies extend the gravity model that explains bilateral trade flows or changes in trade volumes, by incorporating alongside the usual variables like size and distance measures of geopolitical alignment. In an early example, Gowa and Mansfield (1993) included dummy variables for the existence of a bilateral military alliance, for common membership in a broader military alliance, and for countries at war. They found that alliances increase bilateral trade, especially in bipolar systems, while wars depress trade volumes. More recently, it has become common to proxy geopolitical alignment with similarity in voting behavior in international organizations, and especially in the U.N. General Assembly, using methods proposed by Voeten (2013) and Bailey et al. (2017). Recent studies (Hakobyan et al., 2023; Bonadio et al., 2024; Cevik, 2024; Gopinath et al., 2023; Qiu et al., 2024) consistently find either that geopolitical alignment boosts trade flows, after controlling for gravity variables, or conversely that increasing geopolitical distance impedes bilateral trade. Gopinath et al. (2025) focus on the decline in inter-bloc trade in the wake of the Russia-Ukraine war, whereas Bonadio et al. (2024) examine the decoupling that ensued from the U.S.-China trade war. Meanwhile, Kleinman et al. (2024) explore the causal link between economic interdependence and political alignment, leveraging China's economic rise as a natural experiment and using declines in air travel costs as an instrumental variable.[1] All of these authors conclude that similarity of political and strategic interests facilitates a closer trade relationship and, in some cases, that rising geopolitical tensions are contributing to fragmentation of the world trading system.

Trade policy plays a key role in forging a link between geopolitical alignments and trade patterns. Mansfield et al. (2002) investigated how political regime type influences the formation of international trade agreements. Analyzing the creation of preferential trade agreements (PTAs) in the latter half of the 20th century, they found that democratic countries were about twice as likely as autocratic ones to form PTAs, and that democratic dyads were roughly four times as likely to do so as autocratic dyads. Bonadio et al. (2024) measured shifts in bilateral trade costs by examining the residuals from a gravity model. They showed that between 2015 and 2023, trade costs declined for country pairs within the same geopolitical bloc (aligned with either the United States or China) but increased for those in opposing blocs. They attribute these shifts in trade costs to specific trade policy actions taken by the United States and China in response to geopolitical tensions. Finally, and most relevant for our purposes, Sokolova and DiCaprio (2018) considered the relationship between geopolitical alignment and the formation of trade agreements. Using similarity in U.N. voting as a proxy for alignment, they demonstrated that countries participating in a common PTA are 4% more likely to vote alike on General Assembly resolutions than other country pairs, with an even stronger effect for votes on divisive issues.

Perhaps the most compelling evidence of geopolitics shaping trade policy comes from recent events: escalating U.S.-China tensions have triggered multiple rounds of tariff hikes, deepening a trade war and accelerating the decoupling of their economies and those of their allies.

In this paper, we examine the relationship between trade policy and geopolitical alignment from

[1] In an earlier paper, Flores-Macías and Kreps (2013) find that increased trade with China led to greater voting alignment with China in the U.N. General Assembly, without addressing the issue of causality.

a theoretical perspective. Our starting point is the familiar analysis of optimum tariffs for a large country pioneered by Mill (1844) and Bickerdike (1906), and extended to a world with two large countries by Johnson (1953). In a simple setting where large countries enjoy market power that motivates their use of tariffs to improve their terms of trade, we introduce political alignment as an additional objective of government policy. We consider two distinct geopolitical scenarios. In the first, there is a single large country – a "hegemon" – and a continuum of small countries. The hegemon can offer a preferential trade agreement to small countries that choose to align with it (the carrot), while imposing an MFN tariff on imports from countries that retain their independence (the stick). In the second scenario, there are two "great powers" in a bipolar world. Each power can offer a free trade agreement to those that align with it while imposing an MFN tariff on those that remain non-aligned or that align with its rival. Small countries sort into three groups, those that align with H (Home), those that align with F (Foreign), and those that remain non-aligned.

We employ a standard economic model to analyze these dynamics. Each small country has an endowment of a homogenous good that is perfectly substitutable with respect to source. Each such country also has an endowment of a unique differentiated product à la Armington (1969). The large country (or countries) also has an endowment of the homogeneous good, plus endowments of a range of differentiated products. The number of differentiated products exported by a large country is proportional to its mass. All countries import the unique goods produced elsewhere, export their own differentiated varieties, and import or export the homogeneous good to balance their trade. Product markets are perfectly competitive.

We assume that preferences are quasi-linear and that utilities derived from consumption of the differentiated products are additively separable. Small countries can impose tariffs on imports from non-FTA partners, but they have no incentive to do so. The large country may offer an FTA to allies or not. If it does, the countries that align with it face zero tariffs, whereas the non-aligned (or those that align with the second large country, if there is one) face an MFN tariff of the large country's choosing. We rule out export subsidies based on prevailing WTO rules and disregard export taxes with reference to the U.S. Constitution and to the WTO accession agreements by China. So the optimal policy problem facing a large country becomes one of choosing the MFN tariff rate on imported differentiated products for countries that opt not to align.

We treat the geopolitics in reduced form. A hegemon derives a non-economic benefit in proportion to the number of small countries that choose to align with it. Each great power in a bipolar world derives non-economic benefits from the number of small countries that align with it and incurs non-economic costs from those that align with its rival. Small countries realize "valence shocks" that reflect their net utility gains or losses from aligning with the hegemon or with one of the two great powers. The shocks vary by country and can be positive or negative, in keeping with the discussion in Keohane (1969, 1971).

In Section 3, we examine the optimal trade policies of a single large hegemon, balancing incentives for exploitation of market power and geopolitical influence. Conditional on offering an FTA to allies, the hegemon sets an MFN tariff that balances economic and geopolitical considerations.

The economic component of the optimal tariff formula exhibits the usual trade-off between the terms-of-trade improvement generated by a marginally larger tariff and the reduction in trade volume. The geopolitical component captures the direct political benefit from additional allies, but also a cost that arises from sacrificing available terms-of-trade gains in the service of state power. We show that the hegemon opts to offer an FTA to encourage alignment whenever the direct marginal benefit of allies exceeds a critical threshold. When this condition is met, the direct benefit of securing an additional ally outweighs the indirect cost of lost tariff revenues. It follows that a hegemon's optimal MFN tariff in a world with endogenous alignment exceeds the Mill-Bickerdike tariff for a country that takes the number of its allies as given.

We also analyze the determinants of the size of the optimal MFN tariff. When the hegemon offers an FTA to induce alignment, its tariff on non-aligned countries rises with the weight that it places on geopolitical allies and increases with any factor that increases the hazard rate of the alignment cost distribution for small countries. The effect of an increase in the hegemon's size is ambiguous, as it involves countervailing economic and geopolitical forces. As a result, a receding hegemon may pursue a more open trade regime or a more fragmented one, depending on the balance of these effects. We revisit this issue in Section 5, where we develop a calibrated version of our model.

In Section 4, we study the economic and geopolitical rivalry between two great powers. Here, we study Nash equilibria in which each large country sets its MFN tariff taking the other large country's tariff as given, but accounting for its own tariff's effects on the alignment decisions of small countries. In addition to the usual economic gains from trade, the large countries benefit from having allies and pay a cost when countries align with their rival. Despite several additional complexities, we derive a formula for each large country's tariff that captures generalized versions of the same forces that appear in the case of a single hegemon. The optimal tariff's economic component reflects standard terms-of-trade considerations, but now accounts for the effects of a large country's imports on two different world prices: those of non-aligned countries and those of countries aligned with the competing power. The tariff's geopolitical component reflects alignment considerations, but now accounts for small countries' alignment transitions between each of the large countries and non-alignment, as well as between the two large countries.

We examine whether the tariff choices of the rival powers are strategic substitutes or strategic complements. Several forces push in each direction. On the one hand, a higher rival's tariff increases the dependence of non-aligned countries on the remaining power's market. With a constant elasticity of demand greater than one, this increases the incentive of that power to use its tariff for standard, terms-of-trade reasons. On the other hand, a higher foreign tariff changes the number of countries that are on the margin of aligning with the remaining power relative to the number to which its MFN tariffs apply. These changes in the hazard rates of alignment can increase or decrease the marginal geopolitical return to tariff-induced realignments. We describe several additional channels and conclude that the cases of strategic substitutes and strategic complements both are possible.

Section 5 conducts a quantification of the model geared toward geopolitical competition between the United States and China. Following an extensive literature in international relations, we identify geopolitical alignment with voting patterns in the United Nations General Assembly and use data on voting histories to infer countries' costs of aligning with either great power. We combine this geopolitical approach with a more conventional economic calibration as well as inferences about the U.S. and China's preferences for alignment based on their military spending.

We then revisit our theoretical results on trade policy through the lens of the calibrated model. We draw two main conclusions. First, the geopolitical rationale for tariffs is strong, particularly for the United States. The U.S.'s optimal tariff as a hegemon is more than twice as large as the tariff it would choose if it were unconcerned with alignments and roughly 31% higher than its Nash equilibrium tariff would be in a world without geopolitical concerns. Second, average tariffs rise and global openness shrinks as a second power grows at the expense of the smaller countries in the world, suggesting that China's continuing rise as a second great power may be contributing to a retreat from globalization.

Before proceeding, we acknowledge a nascent but burgeoning literature in geoeconomics. Clayton et al. (2024) study geoeconomic power that derives from a hegemon's ability to coordinate threats across disparate relationships. Clayton et al. (2025) introduce anticipatory actions by small countries that protect them against the coercive powers of the hegemon. This paper shares some themes with Becko and O'Connor (2025), who are interested in the use of industrial and trade policies in anticipation of, and to ward off, subsequent geopolitical conflict. Like us, Broner et al. (2024) are interested in how a geopolitical world with a single hegemon differs from a world with two great powers. However, they do not model trade policy *per se*, but rather an abstract policy action that directly affects utility according to its distance from a country's ideal policy, while also influencing the gains from trade. Thoenig (2023) asks how the risk of war influences trade policy decisions and develops a quantitative toolkit for measuring the gains from trade in a conflict-prone world. Meanwhile, Alekseev and Lin (2025) examine whether recent U.S. trade policies toward China reflect strategic motives by assessing whether tariffs and export restrictions disproportionately target "dual-use" goods—civilian items with potential military applications. All of these papers (and others) share our broad concern for understanding how geopolitical consideration shape economic interactions. But none, so far as we know, studies the optimal use of trade policies as sticks and carrots, explicitly accounting for the costs and benefits of political alignment.[2]

2 The Setting

In this section, we describe the economic and political environments for which we will derive optimal trade policies. The following two sections consider distinct geopolitical scenarios. In the first, a

[2] In Becko and O'Connor (2025), a hegemon uses trade threats as a carrot and stick to influence a single partner's geopolitical behavior. However, the optimal politices in their baseline model are corner solutions. The optimal stick is autarky, whereas the optimal carrot is the minimal level of trade subsidies needed to incentivize a desired geopolitical action. We study a hegemon who applies the same trade policies to many partners and therefore faces more meaningful trade-offs.

single large country—labeled H—interacts with a continuum of small countries. The large country (or "hegemon" in this scenario) can offer a free trade agreement (FTA) to those that align with it, leaving those that do not align to face its chosen MFN tariff, τ_H.[3] In the second scenario, two "great powers" compete to attract allies among the continuum of small countries in a bipolar world. Each large country, H (for Home) or F (for Foreign), can offer preferential market access to small countries that align exclusively with it. Meanwhile, each imposes an MFN tariff τ_J, $J \in \{H, F\}$, on imports from the rival power, from countries that align with the rival, and from non-aligned countries. The small countries sort into three groups, those that align with H, those that align with F, and those that remain geopolitically independent.

In both geopolitical settings, there is a continuum of measure m_S of symmetric small countries indexed by $i \in [1 - m_S, 1]$, with a combined population of m_S. We endow each small country with x units per capita of a freely-traded homogeneous good, which serves as numeraire, and y units of a unique differentiated product, also indexed by i. In the unipolar world of Section 3, a single hegemon has population $m_H = 1 - m_S$, an aggregate endowment of $m_H x$ units of the homogeneous good, and an aggregate endowment of y units of each of a measure m_H of differentiated products indexed by $i \in [0, m_H]$. In the bipolar world of Section 4, large country J, $J \in \{H, F\}$, has population m_J, an aggregate endowment of $m_J x$ units of the homogeneous good, and an aggregate endowment of y units of each of a measure m_J of differentiated products. The differentiated products originating in H are indexed by $i \in [0, m_H]$, while those from F are indexed by $i \in [m_H, m_H + m_F]$. In this scenario, $m_H + m_F = 1 - m_S$. All markets are perfectly competitive.

Consumers worldwide derive their demands from a quasi-linear utility function that has additively separable sub-utility components, namely

$$U = c^x + \int_0^1 u\left[c\left(i\right)\right] di,$$

where c^x denotes consumption of the homogeneous good, $c\left(i\right)$ denotes consumption of differentiated product i, and $u\left(\cdot\right)$ is twice differentiable, with $u'\left(c\right) > 0$, $u''\left(c\right) < 0$, and $\lim_{c \to 0} u'\left(c\right) = \infty$. All consumers have sufficient income to purchase their desired quantities of the differentiated products and allocate their strictly-positive residual spending to the homogeneous good. Let $p_j\left(i\right)$ represent the consumer price of a differentiated product i when purchased in country j (where j might index a large country or one of the small countries) and let $c_j\left(i\right)$ be the per-capita consumption in j of a good i. Then consumer optimization implies

$$u'\left[c_j\left(i\right)\right] = p_j\left(i\right), \quad \text{for all } i \text{ and } j, \tag{1}$$

and $c_j^x = I_j - \int_0^1 p_j\left(i\right) c_j\left(i\right) di$, where I_j is per-capita income in country j and c_j^x is per-capita consumption of the homogeneous good.

In competitive markets, the relationship between the prices of a given variety in different coun-

[3] We use τ to refer to one plus the *ad valorem* tariff rate.

tries reflects their respective trade policies. In this paper, we exclude export subsidies, in line with Article XVI of the GATT, which prohibits their use. We also rule out export taxes in powerful countries, inasmuch as the U.S. Constitution and China's WTO Accession Agreement prohibit such levies.[4] Later, we will argue that, in our setting, small countries have no unilateral incentive to impose tariffs on their imports of differentiated products or to tax exports of their unique varieties. Anticipating this result, we do not introduce notation for trade policies in the small countries. We also rule out taxes or subsidies on imports of the homogeneous product.[5] This leaves only the MFN tariffs imposed by the large countries that create price wedges between origin and destination markets. Accordingly, we will distinguish the domestic prices of imported varieties in large-country markets from the prices paid for those goods in the rest of the world.

An additive political component of utility captures geopolitical motivations in reduced form. We assume that a small country can align with at most one large country and that country i bears a cost $\eta_{J,i}$ from aligning with large country J, where $J = H$ in the unipolar scenario and $J \in \{H, F\}$ in the bipolar world. This cost reflects domestic policy concessions required to secure alignment, compromises in international positions, and psychological costs associated with aligning with a country that has different values, culture, or religious composition or a different political regime. However, $\eta_{J,i}$ need not be positive, if country i actually benefits, on net, from an alignment with J. A small country might benefit geopolitically if J provides military protection from external threats or if i derives status or satisfaction from associating itself with an admired large country or one with similar values or political regime.

In the unipolar scenario, we take $\eta_{H,i}$ to be an independent draw from a continuous cumulative distribution function $G(\eta)$, with a range that includes positive and negative values and $G' > 0$ on either a large finite or infinite support. In the bipolar scenario, the pair $(\eta_{H,i}, \eta_{F,i})$ is an independent draw from the joint cumulative distribution function $\Gamma(\eta_H, \eta_F)$ with similar regularity conditions. We allow for correlation, either positive or negative, between $\eta_{H,i}$ and $\eta_{F,i}$. In all cases, the geopolitical utility from non-alignment is normalized to zero.

A large country enjoys strictly positive geopolitical benefits when small countries align with it. These benefits may arise from aggregating military power against a common adversary, gaining policy concessions, or enhancing support in international organizations. We introduce the parameter $\beta_J > 0$ to capture the intensity of a large country's preference for each ally. The per-capita utility benefit from having a fraction α_J of the measure m_S of small countries align with it is $\beta_J \alpha_J m_S$, where $J = H$ in the hegemonic scenario and $J \in \{H, F\}$ in the bipolar scenario. In the latter case, we also assume that a large country incurs a welfare loss of $\delta_J \alpha_{-J} m_S$ when a fraction α_{-J} of the measure m_S of small countries align with its rival.

The political dynamics unfold as follows. First, the large countries decide whether to offer

[4] In the European Union (EU), member states are generally not prohibited from imposing export taxes, though such policies are rarely used in practice. While we could incorporate export taxes into our analysis, we choose to focus on a case without them.

[5] If the large countries were to tax imports of the homogeneous goods from countries that do not align, then consumers in that country would source their imports duty-free from aligned countries, and consumers in the aligned countries would import instead from the non-aligned countries, with no effect on equilibrium quantities or prices.

duty-free access to imports from geopolitical allies, while simultaneously setting an MFN tariff that applies to imports from countries that are not aligned with them, including any rival power. In the bipolar scenario, each large country simultaneously chooses whether to offer FTAs and what MFN tariff to set, while taking its rival's policy choices as given. Once the large countries have announced their trade policies, the small countries decide whether to align. In the hegemonic scenario, if an FTA is on offer, a small country compares its combined economic and geopolitical utility under free trade with the utility it would achieve facing the MFN tariff τ_H in H's market and no alignment. In the bipolar scenario, a small country compares combined economic and geopolitical welfare under three options: alignment with H (implying that its firms face a tariff of τ_F when exporting to F); alignment with F (implying that its firms face a tariff of τ_H when exporting to H); and non-alignment (implying that it faces MFN tariffs in both large markets).

3 Optimal Tariffs for a Single Hegemon

In this section, we analyze the optimal stick-and-carrot trade policies for a single large hegemon. To simplify notation, we omit the subscript H on variables relating to the hegemon except when needed for clarity.

Anticipating that small countries impose no import tariffs or export taxes, consider the case in which the hegemon offers an FTA to encourage alignment. Countries that accept the proposal realize a uniform price q_h for their exports of differentiated products to all markets. By symmetry, $q_h = q$, the price that firms in the hegemon obtain for their differentiated outputs, both domestically and abroad. In contrast, countries that choose to remain geopolitically independent face the hegemon's tariff when exporting there. Letting q_n denote the f.o.b. price of a differentiated product exported by a non-aligned country, the c.i.f. price in H for a good imported from a non-aligned country becomes $p_n = \tau q_n$.

These pricing relationships imply the following market-clearing conditions for goods produced by non-aligned and aligned small countries, respectively, when allies can join an FTA:

$$mc\left(\tau q_n\right) + m_S c\left(q_n\right) = y \tag{2}$$

and

$$mc\left(q\right) + m_S c\left(q\right) = y, \tag{3}$$

where $c\left(\cdot\right)$ represents the per-capita demand function derived by inverting (1). In (2), the first term captures demand for a non-aligned country's exports by the measure m of consumers in the hegemon, who face the tariff-augmented price τq_n. The second term represents demand by the measure $m_S = 1 - m$ of consumers in small countries, who purchase the good at the world price q_n. Together, these demands exhaust the supply y. In (3), the terms capture the demand by consumers in the hegemon and in the measure m_S of small countries for goods produced in aligned countries, considering that all these sales take place at price q. Again, these demands sum to the inelastic supply y of each good. This equation also applies to goods produced in the hegemon itself, which face no tariffs domestically or in any export market.

These market-clearing conditions clarify why small countries gain nothing from imposing import tariffs or export taxes. A small country that levies a tariff on an imported differentiated product would slightly reduce aggregate world demand for that good, but the resulting loss in consumer-surplus would outweigh the negligible terms-of-trade gain. An export tax would increase the cost of a country's goods in foreign markets, but with a perfectly inelastic export supply, producers in the exporting country would bear the entire burden of the tax. The price q_n paid to these firms would fall in proportion to one plus the export levy, leaving the country's total revenue—combining both private and government proceeds—unchanged.[6]

The hegemon selects its tariff τ and decides whether to offer an FTA to allies to maximize per-capita welfare, including both economic and geopolitical components. To formalize the policy calculus, we define $S(q,\tau)$ as the sum of per-capita consumer surplus and tariff revenue when local consumers buy $c(p)$ units of a differentiated product and pay $p = \tau q$ per unit, with q going to the seller and $(\tau - 1) q$ accruing as tariff revenue. Specifically,

$$\begin{aligned} S(q,\tau) &= u[c(\tau q)] - \tau q c(\tau q) + (\tau - 1) q c(\tau q) \\ &= u[c(\tau q)] - q c(\tau q). \end{aligned}$$

Using this notation, a good imported by the hegemon from a non-aligned country generates consumer surplus plus revenue of $S(q_n,\tau) = u[c(\tau q_n)] - q_n c(\tau q_n)$, while an import from an ally under an FTA yields $S(q_h, 1)$, which matches the per-capita consumer surplus enjoyed by the hegemon for consumption of domestically-produced goods, $S(q, 1)$.[7]

In equilibrium, the economic component of the hegemon's utility v amounts to the sum of per-capita income from sales of local goods, per-capita consumer surplus from all differentiated products, and per-capita tariff revenue. A tariff of τ with an exception for allies generates economic utility of

$$v = x + qy + (1-\alpha) m_S S(q_n,\tau) + [m + \alpha m_S] S(q,1), \tag{4}$$

considering that $(1-\alpha) m_S$ goods are imported subject to the tariff and $m + \alpha m_S$ goods are either produced locally or imported duty-free.

Adding the geopolitical benefits from alignment gives total per capita welfare W under an FTA,

$$W = x + qy + (1-\alpha) m_S S(q_n,\tau) + [m + \alpha m_S] S(q,1) + \beta \alpha m_S. \tag{5}$$

The hegemon chooses a tariff τ to maximize W, accounting for its effect on the equilibrium prices

[6] If the demand function $c(\cdot)$ were inelastic, a small country could benefit from an export quota that limits export sales to the monopoly level. However, such quotas are prohibited under WTO rules.

[7] If the hegemon does not offer any FTAs, all imports are subject to a common tariff, and the choice of tariff has no influence on the number of countries that align with it. In this case, the price q_n° of all goods exported by small countries is determined by (13).

(q and q_n) and the fraction of countries that align (α). It then compares the maximal welfare level achievable under an FTA with the welfare it could obtain without one, where a (potentially different) uniform tariff would apply to all small countries but would not influence their alignment decisions.

An individual residing in a small country derives utility as a consumer from the sum of per-capita income and consumer surplus on differentiated products. Since $q_h = q$ under an FTA, the indirect utility of a resident of a small country is

$$v_z = x + q_z y + [m + \alpha m_S] S(q, 1) + (1 - \alpha) m_S S(q_n, 1), \text{ for } z \in \{h, n\},$$

where v_h and v_n represent economic utility with and without preferential market access. The economic incentive to align with the hegemon—assuming that an FTA is on offer and the MFN tariff is positive—is given by

$$v_h - v_n = y(q - q_n) > 0.$$

This expression captures the income gain from the higher export prices realized by aligned countries.

Beyond economic considerations, individuals in small country i experience a cost of alignment, denoted by $\eta_{H,i}$. This captures the disutility associated with alignment with the hegemon. This "cost" may be negative if, for example, the small country benefits from a military alliance with the hegemon.[8]

Country i aligns with the hegemon if and only if the benefit from alignment exceeds the cost, i.e.,

$$\eta_{H,i} < v_h - v_n = y(q - q_n) \ .$$

Since $\eta_{H,i}$ follows the cumulative distribution function $G(\cdot)$, the fraction of small countries that choose to align with the hegemon is

$$\alpha = G[y(q - q_n)]. \tag{6}$$

This fraction increases with $q - q_n$, the price premium that an aligned country receives for its exports relative to a non-aligned country.

3.1 Optimal MFN Tariff Conditional on Offering an FTA to Allies

We now examine the optimal tariff problem facing the hegemon. To begin, we assume that the hegemon offers an FTA to countries that align and characterize the tariff it would then impose on non-aligned countries. Later, we consider whether offering an FTA is optimal in the first place.

The hegemon's objective is to maximize its total welfare, W, as given in (5), subject to market-clearing conditions (2) and (3), which jointly determine equilibrium prices and hence alignment via

[8] If military alliance provides a motivation for alliance, the cost or benefit of joining may depend on the size of the hegemon, m. We could easily incorporate a geopolitical valence shock that varies with m; this will only matter when considering comparative statics with respect to m.

(6).

Notice first that the market-clearing condition (3) for goods produced in an aligned country or in the hegemon fully determines the price q, independently of the tariff τ. In contrast, the price of non-aligned exports, q_n, is determined by (2), which reveals an inverse relationship between q_n and τ. As in standard trade theory, the prospect of a terms-of-trade improvement incentivizes the hegemon to set $\tau > 1$. However, unlike in a pure terms-of-trade context, the hegemon must also consider the impact of a tariff on alignment. A higher tariff τ increases the price gap $q - q_n$, enhancing the attractiveness of FTA membership to small countries. The optimal tariff balances the marginal economic and geopolitical effects of the tariff.

The first-order condition for the optimal MFN tariff can be written as[9]

$$\frac{W'(\tau)}{m_S} = (1-\alpha)\left[-c(p_n)\frac{dq_n}{d\tau} + (\tau - 1)\, q_n c'(p_n)\frac{dp_n}{d\tau}\right] + [\beta + S(q,1)) - S(q_n,\tau)]\frac{d\alpha}{d\tau} = 0, \quad (7)$$

where we recall that $p_n = \tau q_n$ is the domestic price in the hegemon for a good imported from a non-aligned country.

The first term in (7) is familiar from the standard, optimal-tariff analysis. In the square brackets, the first term represents the *terms-of-trade effect*: since $dq_n/d\tau < 0$, an MFN tariff generates a welfare benefit by depressing the price of imports from non-aligned countries. The second term captures a *volume-of-trade effect*: since $c'(p_n) < 0$, a higher MFN tariff, which dampens demand for imports from non-aligned countries, reduces welfare due to the gap between marginal utility from consumption and the opportunity cost of imports whenever $\tau > 1$. The two effects can be combined to yield

$$-c(p_n)\frac{dq_n}{d\tau} + (\tau - 1)\, q_n c'(p_n)\frac{dp_n}{d\tau} = c(p_n)\frac{dq_n}{d\tau}\left[(\tau - 1)\,\varepsilon_{e(q_n)} - 1\right],$$

where $e(q_n) = y - (1-m)\,c(q_n)$ is the net supply of exports by a non-aligned country to the hegemon after allowing for exports to the other small markets, and $\varepsilon_{e(q_n)} > 0$ is the elasticity of net exports with respect to their price. If geopolitical considerations were absent (e.g., if $d\alpha/d\tau = 0$), then the first-order condition would reduce to[10]

$$\tau^\circ - 1 = \frac{1}{\varepsilon_{e(q_n^\circ)}}\ , \quad (8)$$

[9] We assume that $W(\tau)$ is strictly concave in the relevant range, in which case the value of τ that satisfies (7) provides a unique solution for the optimal MFN tariff rate when the hegemon offers an FTA to allies.

[10] In equilibrium,

$$e(q_n) = mc(\tau q_n).$$

Differentiating with respect to τ implies

$$\varepsilon_{c(\tau q_n)}(1 + \varepsilon_{q_n}) = \varepsilon_{e(q_n)}\varepsilon_{q_n},$$

from which it follows that

$$\tau^\circ - 1 = \frac{1}{\varepsilon_{e(q_n)}}.$$

where the superscripts on τ and q_n indicate values of these variables in an equilibrium with exogenous alignment. We recognize (8) as the familiar Mill-Bickerdike formula (derived, for example, by Johnson, 1951) equating the *ad valorem* tariff rate to the inverse of the export supply elasticity.

The second term in (7) represents the marginal welfare effect of induced changes in alignment. From (6), $d\alpha/d\tau > 0$; a higher tariff reduces the export price q_n (see (2)) and so expands the gap between a small country's income with and without alignment. The direct effect on welfare is positive, as reflected by the preference parameter β. But there is a second, more subtle effect, captured by $S(q,1) - S(q_n,\tau)$, which is negative at $\tau = \tau^\circ$. When a small country switches its status from being non-aligned to aligned, the hegemon realizes consumer surplus on imports from that country of $S(q,1)$ instead of consumer surplus plus tariff revenue of $S(q_n,\tau)$. Inasmuch as the Mill-Bickerdike tariff τ° maximizes the sum of consumer surplus and tariff revenue, the marginal welfare effect of this swap must be negative at τ°. In other words, the induced change in alignment provides a direct geopolitical benefit to the hegemon, but also imposes a cost, because it sacrifices surplus attainable via strategic manipulation of the terms of trade.

Letting τ^* be the solution to (7), it is easy to see that $\tau^* > 1$, because $W'(1) = -m_S(1-\alpha)\,c(p_n)(dq_n/d\tau) + \beta m_S(d\alpha/d\tau) > 0$. At $\tau = 1$, the volume-of-trade effect and the cost of inducing alliance vanish. What remains are the terms-of-trade effect and the direct geopolitical effect, both of which point to a positive tariff.

3.2 To Offer FTAs to Allies or Not?

The hegemon is under no obligation to offer preferential market access to aligned countries; it may instead apply MFN tariffs uniformly to all imports. If the hegemon chooses to design an optimal regime of sticks and carrots, it achieves welfare $W^{FTA}(\beta)$, where, using (5),

$$W^{FTA}(\beta) = \max_{\tau}\ [x + qy + (1-\alpha)\,m_S S(q_n,\tau) + (m + \alpha m_S)\,S(q,1) + \beta\alpha m_S]$$
$$\text{subject to equations (2) and (6).}$$

If it offers no FTAs, it obtains

$$W^{no-FTA}(\beta) = x + qy + m_S S(q_n^\circ,\tau^\circ) + mS(q,1) + \beta\alpha^\circ m_S,$$

where $\alpha^\circ = G(0)$ is the fixed fraction of small countries that align with the hegemon based solely on their political affinities, τ° is given by (8), and q_n° is determined by τ° and (2). The hegemon exercises a strategic component of trade policy if and only if $W^{FTA}(\beta) > W^{no-FTA}(\beta)$.

Now define the normalized welfare difference:

$$\Delta(\beta) := \frac{W^{FTA}(\beta) - W^{no-FTA}(\beta)}{m_S} = [1-\alpha(\beta)]\,\mathcal{S}(\beta) + \alpha(\beta)\,S(q,1) - S(q_n^\circ,\tau^\circ) + \beta\,[\alpha(\beta) - \alpha^\circ]$$

where $\mathcal{S}(\beta)$ denotes the surplus $S(q_n,\tau)$ from trade with non-aligned countries after accounting for the dependence of q_n and τ on β in the maximization of W^{FTA}, and $\alpha(\beta)$ is the fraction of countries that align when the MFN tariff is optimally chosen. Since $S\left(q_n^{\circ}, \tau^{\circ}\right) > \max\left\{\mathcal{S}\left(\beta\right), S\left(q, 1\right)\right\}$ and $\alpha\left(\beta\right)$ is bounded below by a number greater than α° (see appendix), it follows that $\Delta\left(0\right) < 0$ and $\lim_{\beta \to \infty} \Delta\left(\beta\right) > 0$. Moreover, applying the envelope theorem, $\Delta'\left(\beta\right) = \left[\alpha\left(\beta\right) - \alpha^{\circ}\right] > 0$.[11] Therefore, there exists a threshold β^* such that $W^{FTA}\left(\beta^*\right) = W^{no-FTA}\left(\beta^*\right)$ and the hegemon offers FTAs to encourage alignment if and only if $\beta > \beta^*$. Clearly, the decision to offer an FTA hinges on the value the hegemon attaches to geopolitical allies.

3.3 Characterizing the Optimal Tariffs

We now characterize the hegemon's optimal trade policy and examine how it varies with geopolitical circumstances. If the benefit from attracting allies are limited ($\beta < \beta^*$), the hegemon imposes a uniform tariff $\tau = \tau^{\circ}$ on imports from all sources. Conversely, if the gains from alignment are sufficiently large ($\beta > \beta^*$), the hegemon offers duty-free market access to aligned countries while imposing a tariff of $\tau = \tau^*$ on imports from non-aligned countries.

Do geopolitical considerations—when active—lead to higher tariffs? To address this question, we consider the objective function of a hegemon that strictly prefers to offer an FTA than not; that is, $\beta > \beta^*$. We use (7) to evaluate the marginal benefit to such a hegemon of a small increase in the tariff rate at $\tau = \tau^{\circ}$:

$$\left.\frac{dW}{d\tau}\right|_{\tau=\tau^{\circ}} = \left[1 - \alpha\left(\tau^{\circ}\right)\right] \frac{dS\left(q_n^{\circ}, \tau^{\circ}\right)}{d\tau} + \frac{d\alpha\left(\tau^{\circ}\right)}{d\tau}\left[\beta + S\left(q, 1\right) - S\left(q_n^{\circ}, \tau^{\circ}\right)\right]. \tag{9}$$

The first term in (9) is zero, by the first-order condition that defines τ°. And $d\alpha\left(\tau^{\circ}\right)/d\tau > 0$. So it pays for the government to raise the tariff above τ° if and only if $\beta > S\left(q_n^{\circ}, \tau^{\circ}\right) - S\left(q, 1\right)$; that is, if and only if the marginal ally creates a direct benefit for the hegemon that exceeds the indirect cost.

We now argue that this condition must be satisfied when the hegemon prefers to offer an FTA. In such circumstances, $\Delta\left(\beta\right) > 0$, where

$$\begin{aligned} \Delta\left(\beta\right) &= \left[\left(1 - \alpha^*\right) S\left(q_n^*, \tau^*\right) + \alpha^* S\left(q, 1\right) + \alpha^* \beta\right] - \left[S\left(q_n^{\circ}, \tau^{\circ}\right) + \alpha^{\circ}\beta\right] \\ &= \left[\left(1 - \alpha^*\right) S\left(q_n^*, \tau^*\right) + \alpha^{\circ} S\left(q, 1\right) - \left(1 - \alpha^* + \alpha^{\circ}\right) S\left(q_n^{\circ}, \tau^{\circ}\right)\right] \\ &\quad + \left(\alpha^* - \alpha^{\circ}\right)\left[\beta + S\left(q, 1\right) - S\left(q_n^{\circ}, \tau^{\circ}\right)\right] \ , \end{aligned}$$

and α^* and q_n^* denote the share of aligned countries and the export price received by non-aligners under the optimal stick-and-carrot tariff, τ^*. The first term after the second equality is weakly negative, since $S\left(q_n^{\circ}, \tau^{\circ}\right) \geq \max\left\{S\left(q_n^*, \tau^*\right), S\left(q, 1\right)\right\}$. Therefore, the condition $\Delta\left(\beta\right) > 0$, together with $\alpha^* > \alpha^{\circ}$, implies that $\beta > S\left(q_n^{\circ}, \tau^{\circ}\right) - S\left(q, 1\right)$. This, in turn, implies that $\tau > \tau^*$: whenever geopolitical considerations motivate the hegemon to offer preferential access to aligned countries, it sets a higher tariff on non-aligned imports than the Mill–Bickerdike benchmark.

[11] In the appendix, we prove formally that the inequalities reported in this paragraph are *strict inequalities.* The proof makes use of an assumption that $G'\left(0\right) > 0$.

We summarize this result formally:

Proposition 1 *If $\beta < \beta^*$, the hegemon does not offer any FTAs and imposes a uniform tariff of $\tau^\circ > 1$ on all imports. If $\beta > \beta^*$, the hegemon offers FTAs to induce alignment and sets a tariff on non-aligned imports of $\tau^* > \tau^\circ$.*

Assuming now that $\beta > \beta^*$, we examine three key aspects of the geopolitical environment: the hegemon's preference intensity for allies β, the hazard rate $\lambda(\eta^*) \equiv G'(\eta^*) / [1 - G(\eta^*)]$ of the distribution of alignment costs among small countries, and the hegemon's share m of world population.

Using (7), we can express the optimal tariff as[12]

$$\tau^* - 1 = \frac{1}{\varepsilon_{e(q_n^*)}} \left\{ 1 + [\beta + S(q,1) - S(q_n^*, \tau^*)] \frac{y}{c^n(\tau^* q_n^*)} \lambda(\eta^*) \right\} := T(\tau^*) . \quad (10)$$

Now we can ascertain how any parameter ζ affects the optimal tariff by considering how it affects $T(\tau^*)$ at constant τ^*.[13]

Consider first the preference parameter β. We have

$$\frac{\partial T^*(\tau^*)}{\partial \beta} = \frac{1}{\varepsilon_{e(q_n^*)}} \frac{y}{c^n(\tau^* q_n^*)} \lambda(\eta^*) > 0.$$

Therefore, a hegemon that values allies more highly will set a larger MFN tariff. The reasoning is straightforward: when $\beta > \beta^*$, each additional ally brings a net benefit to the hegemon. A higher β strengthens the incentive to attract allies, prompting the hegemon to impose harsher penalties on non-alignment through increased tariffs.

Now suppose we introduce a parameter θ in the distribution function, $G(\eta;\theta)$, such that $\partial \lambda(\eta^*;\theta) / \partial \theta > 0$; i.e., an increase in θ raises the hazard rate of $G(\cdot)$ at the initial η^*. Taking the partial derivative of $T(\tau^*)$ at constant τ^*, we find

$$\frac{\partial T^*(\tau^*)}{\partial \theta} = \frac{1}{\varepsilon_{e(q_n^*)}} [\beta + S(q,1) - S(q_n^*, \tau^*)] \frac{y}{c^n(\tau^* q_n^*)} \frac{\partial \lambda(\eta^*;\theta)}{\partial \theta}.$$

For all $\beta > \beta^*$, the term in square brackets is positive. So a change in the parameter θ raises the tariff if and only if it raises the hazard rate $\lambda(\eta^*)$ at the initial value of η^*.

To illustrate, suppose that θ represents a uniform downward shift in the distribution of alignment costs, so that we can express $G(\eta;\theta)$ as $G(\eta + \theta)$, with an (arbitrary) initial value of $\theta = 0$. In this case, the hazard rate rises with θ if and only if $\lambda'(\eta^*) > 0$. To understand the forces at play, consider again the two terms on the right-hand side of (7). The first term captures

[12] See the online appendix for a derivation of this expression, along with proofs of the qualitative statements in the paragraphs that follow.

[13] For any parameter ζ and any τ^* that satisfies the second-order condition for maximizing W, $d\tau^*/d\zeta > 0$ if and only if $\partial W'(\tau^*) / \partial \zeta > 0$. But, as we show in the appendix, $sign [\partial T(\tau^*) / \partial \zeta] = sign [\partial W'(\tau^*) / \partial \zeta]$.

the marginal economic disincentive to raise the tariff, which stems from τ^* exceeding the Mill-Bickerdike level. A larger shift reduces the number of non-aligned countries, thereby lowering the marginal cost of increasing the tariff. This effect is proportional to the density of countries initially on the margin of indifference relative to the initial number of non-aligned countries, i.e., $g(\eta^*)/[1-G(\eta^*)]$. The second term captures the marginal geopolitical incentive to raise the tariff in order to attract more allies, which depends on the responsiveness of alignment to a tariff change. From (6), $d\alpha/d\tau$ grows with θ at $\theta=0$ if and only if $g'(\eta^*)>0$. If the density is rising at η^*, the geopolitical incentive to raise the tariff strengthens, reinforcing the reduced marginal cost and leading to a higher optimal tariff. However, if the density if falling at the initial η^*, the economic and geopolitical forces work against one another. The decline in alignment responsiveness is proportional to $g'(\eta^*)/g(\eta^*)$. Since the two terms in (7) balance at the initial τ^*, the positive force dominates whenever $g(\eta^*)/[1-G(\eta^*)] > -g'(\eta^*)/g(\eta^*)$, a condition that holds if and only if the hazard rate is rising at η^*.[14]

Finally, we examine how the optimal tariff varies with the hegemon's population share, m. The right-hand side of (10) includes four key components: (i) the inverse of the foreign supply elasticity, $1/\varepsilon_{e(q_n^*)}$; (ii) the marginal value of an additional ally, $\beta+S(q,1)-S(q_n^*,\tau^*)$; (iii) the ratio of a non-aligned country's endowment of its differentiated product to the per capita demand for that good in the hegemon; and (iv) the hazard rate of the valence shock, $\lambda(\eta^*)$. We now discuss how each of these components responds to a change in the m, holding τ^* constant.

The inverse supply elasticity may rise or fall as the population share of the hegemon grows, although an increase seems more likely based on standard trade-theoretic considerations. For example, Syropoulos (2002) provides sufficient conditions under which an increase in country size implies a higher inverse supply elasticity in a fairly general, two-country, two-sector neoclassical trade model. In our setting, a sufficient condition for the inverse supply elasticity to rise with m is that demand for a differentiated product exhibits a constant elasticity or one that rises with price (i.e., satisfies Marshall's second law of demand).

In the term expressing the marginal net benefit from an additional ally, only $S(q_n^*,\tau^*)$ varies with m. As the hegemon's population share increases, its terms of trade improve for a given tariff, allowing it to extract more surplus from non-aligned suppliers. This raises the opportunity cost of attracting allies, contributing to a lower tariff.

At a constant tariff, the per capita demand for non-aligned imports grows as the hegemon's terms of trade improve, while the supply of any given differentiated product remains fixed. Consequently, the inverse demand share declines with m, further contributing to a smaller optimal tariff.

A larger m also implies a greater number of allies, as the relative benefit of alignment increases when q_n falls. This has two effects on the last term in (10). First, the greater alignment may increase or decrease the density of countries on the margin of indifference, depending on whether

[14] Note that

$$\frac{d\log\lambda(\eta)}{d\eta}=\frac{g(\eta)}{1-G(\eta)}+\frac{g'(\eta)}{g(\eta)},$$

so $\lambda'(\eta^*)>0 \Leftrightarrow \frac{g(\eta)}{1-G(\eta)} > -\frac{g'(\eta)}{g(\eta)}$.

$g(\eta)$ is increasing or decreasing at $\eta = \eta^*$. As the density on the margin changes, so does the responsiveness of alignment to the MFN tariff. Second, greater alignment means that the MFN tariff applies to fewer countries, and so the marginal cost of raising the tariff further beyond the Mill-Bickerdike level is reduced. No matter whether the density is rising or falling at η^*, the second effect dominates when the valence shock has a rising hazard rate. In this case, a larger relative size of the hegemon contributes to a higher optimal tariff rate.

The comparative statics with respect to m reflect the combined influence of these four effects. Unlike a purely economic analysis, these geopolitical considerations mean that theory does not guarantee that larger hegemons impose higher tariffs. To explore the relationship between country size and optimal tariffs further, we turn to model calibration in Section 5.

We can summarize the comparative statics for the hegemon's optimal tariff in the following proposition:

Proposition 2 *If $\beta > \beta^*$, the optimal MFN tariff (i) increases with the weight β that the hegemon places on geopolitical allies; (ii) increases with any parameter that raises the hazard rate of the alignment cost distribution for small countries at the initial value of η^*; (iii) may increase or decrease with the hegemon's population share m, depending on the balance of economic and geopolitical forces.*[15]

4 Nash Tariffs in a Bipolar World

The emergence of China as an economic power has challenged the hegemonic dominance of the United States. Meanwhile, after decades of steady global integration, the "decoupling" of trading blocs now appears to be the prevailing trend in international relations. Might these two observations be related?

In this section, we re-examine the determinants of the unilaterally optimal trade policies, but this time in a world with competing powers. The two large countries—labeled H and F, but perhaps representing the United States and China—can offer preferential trade agreements to small countries to entice them to align. If either one does so, it sets an MFN tariff τ_J, $J \in \{H, F\}$, that applies to imports from the other large country and from small countries that choose not to align with it—either because they align with the rival or because they opt to remain non-aligned. Imports from allies enter the large countries duty free.

As before, each small country produces y units of a unique variety of a differentiated product, while large country $J \in \{H, F\}$ produces y units of a measure m_J of varieties, $m_H + m_F = 1 - m_S$. We use α_J to denote the fraction of small countries that align with country J, and attach a subscript h to indicate a variable associated with a small country that aligns with H and a subscript f to indicate a variable associated with a country that aligns with F.

We record the market-clearing conditions that determine world prices, assuming that both large

[15] In the appendix, we provide a necessary and sufficient condition for an increase in m to raise the optimal tariff.

countries offer FTAs. For small countries that align with H and F, respectively, we have

$$m_H c(q_h) + m_F c(\tau_F q_h) + m_S c(q_h) = y \tag{11}$$

and

$$m_H c(\tau_H q_f) + m_F c(q_f) + m_S c(q_f) = y, \tag{12}$$

where the MFN tariff imposed by H applies to imports from small countries labeled f and that imposed by F applies to imports from those labeled h. Goods produced in non-aligned countries, labeled n, face MFN tariffs in both large markets. Thus,

$$m_H c(\tau_H q_n) + m_F c(\tau_F q_n) + m_S c(q_n) = y. \tag{13}$$

The market-clearing conditions for the two large countries can be written as

$$m_J c(q_J) + m_{-J} c(\tau_{-J} q_J) + m_S c(q_J) = y, \;\; J \in \{H, F\}, \tag{14}$$

since exports from each great power face tariffs only in the rival's market.

A small country of type z achieves economic utility of

$$\begin{aligned} v_z &= x + q_z y + \sum_J m_J S(q_J, 1) \\ &\quad + m_S \left[\alpha_H S(q_h, 1) + \alpha_F S(q_f, 1) + (1 - \alpha_H - \alpha_F) S(q_n, 1)\right], \end{aligned}$$

for $z \in \{h, f, n\}$. A small country's income depends on its alignment decision, because this choice affects the world price of its differentiated variety. Meanwhile, it earns consumer surplus on all imported varieties, the prices of which are beyond its control. A country i that aligns with $J \in \{H, F\}$ incurs a geopolitical utility cost of $\eta_{J,i}$, while a non-aligned country bears no such cost. Consequently, country i aligns with H if and only if

$$\eta_{H,i} < \min\left\{(q_h - q_n) y, (q_h - q_f) y + \eta_{F,i}\right\}$$

and aligns with F if and only if

$$\eta_{F,i} < \min\left\{(q_f - q_n) y, (q_f - q_h) y + \eta_{H,i}\right\}.$$

Figure 1 illustrates the combinations of $\eta_{H,i}$ and $\eta_{F,i}$ that lead a small country to align with H, align with F, and remain geopolitically independent. The solid line depicts the values of $\eta_{H,i}$ and $\eta_{F,i}$ for which country i is indifferent between aligning with F and remaining non-aligned; since this comparison does not depend on $\eta_{H,i}$, the line is horizontal. The dashed line depicts values of $\eta_{H,i}$ and $\eta_{F,i}$ for which country i is indifferent between aligning with H and remaining independent; since this comparison does not depend on $\eta_{F,i}$, the line is vertical. Finally, the dotted

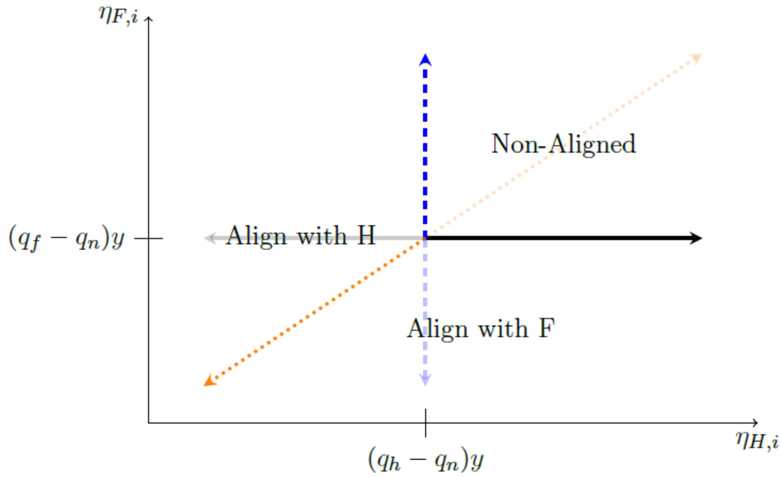


Figure 1: Geopolitical Alignments

line illustrates combinations of $\eta_{H,i}$ and $\eta_{F,i}$ such that country i is indifferent between aligning with H and aligning with F. This comparison depends on the difference between the two components of the valence shock, so the dotted line is upward sloping with a slope of 1.

Using these indifference conditions as boundaries, we can identify the regions in the figure that give rise to each different alignment decision. These regions are noted on the figure; for example, the region to the right of the dashed line and above the solid line includes combinations of $\eta_{H,i}$ and $\eta_{F,i}$ for which country i prefers non-alignment to alignment with either of the great powers, and so it is marked as "Non-Aligned". Similar arguments apply to the regions marked as "Align with H" and "Align with F".

To find the fraction of small countries that choose to align with each great power, we use the joint cumulative distribution function $\Gamma(\eta_H, \eta_F)$ to derive the joint density function $\gamma(\eta_H, \eta_F)$ and then integrate over the densities in each of the relevant regions. This gives

$$\alpha_H = \int \int^{\min\{(q_h - q_n)y, (q_h - q_f)y + \eta_{F,i}\}} \gamma(\eta_H, \eta_F)\, d\eta_H d\eta_F \tag{15}$$

and

$$\alpha_F = \int \int^{\min\{(q_f - q_n)y, (q_f - q_h)y + \eta_{H,i}\}} \gamma(\eta_H, \eta_F)\, d\eta_F d\eta_H \ . \tag{16}$$

Henceforth, we use $m_h := \alpha_H m_S$, $m_f := \alpha_F m_S$, and $m_n := (1 - \alpha_H - \alpha_F) m_S$ to denote the number of small countries that align with H, with F, and with neither large country, respectively.

When a country J offers an FTA to encourage alignment, it chooses its MFN tariff τ_J to maximize the sum of the economic and geopolitical components of utility, where the latter incorporates both the perceived benefit from having allies and the perceived cost from seeing countries align with a rival. Country H maximizes

$$W_H(\tau_H,\tau_F) = x + q_H y + m_H S(q_H,1) + m_F S(q_F,\tau_H) \\ + m_h S(q_h,1) + m_f S(q_f,\tau_H) + m_n S(q_n,\tau_H) \\ + \beta_H m_h - \delta_H m_f \ , \tag{17}$$

where the first line represents the country's factor income plus the sum of consumer surplus and tariff revenues from purchases of its own differentiated products and those imported from its rival, the second line represents the sum of consumer surplus and tariff revenues from imports from the three types of small countries, and the final line represents the geopolitical benefits and costs to country H of equilibrium alignments.[16] The expression for W_F, the combined economic and geopolitical per capita welfare in country F, is analogous.[17]

Equations (11) and (14) imply $q_f = q_F$, with both prices inversely related to τ_H but independent of τ_F. Likewise, (12) and (14) imply $q_h = q_H$, with both prices inversely related to τ_F but independent of τ_H. Moreover, (13) shows that an increase in either tariff lowers the price of goods exported by non-aligned countries, ensuring that $q_n < \min\{q_h, q_f\}$ if $\tau_H > 1$ and $\tau_F > 1$.

In a Nash setting, the government of country H chooses τ_H to maximize its own welfare W_H, taking τ_F as given. It makes this choice subject to the market-clearing conditions (11)-(14) and the alignment conditions (15)-(16). The government's best response satisfies $\partial W_H / \partial \tau_H = 0$, where

$$\frac{\partial W_H}{\partial \tau_H} = (m_F + m_f)\left[-c(p_f)\frac{dq_f}{d\tau_H} + (\tau_H - 1)\, q_f c'(p_f)\frac{dp_f}{d\tau_H}\right] \\ + m_n\left[-c(p_n)\frac{dq_n}{d\tau_H} + (\tau_H - 1)\, q_n c'(p_n)\frac{dp_n}{d\tau_H}\right] \\ + \left[\beta_H + S(q_h,1) - S(q_n,\tau_H)\right]\frac{dm_h}{d\tau_H} \\ + \left[S(q_f,\tau_H) - S(q_n,\tau_H) - \delta_H\right]\frac{dm_f}{d\tau_H}. \tag{18}$$

The first two lines of the right-hand side of (18) reflect the terms-of-trade and volume-of-trade effects of marginally increasing the tariff on imports from country F and its allies and from non-aligned countries, respectively. The last two lines represent the welfare effects of changes in geopolitical alignment: the third captures the marginal benefit to country H from a change in the number of countries aligning with it, while the fourth expresses the marginal cost to H of a change in the number of countries aligning with its rival.

[16] To simplify the notation we have suppressed the functional dependence of q_h, q_f, q_n, m_h, m_f, and m_n on τ_H and τ_F.

[17] That is,

$$W_F = x + q_F y + m_H S(q_H,\tau_F) + m_F S(q_F,1) \\ + m_h S(q_h,\tau_F) + m_f S(q_f,1) + m_n S(q_n,\tau_F) \\ + \beta_F m_f - \delta_F m_h.$$

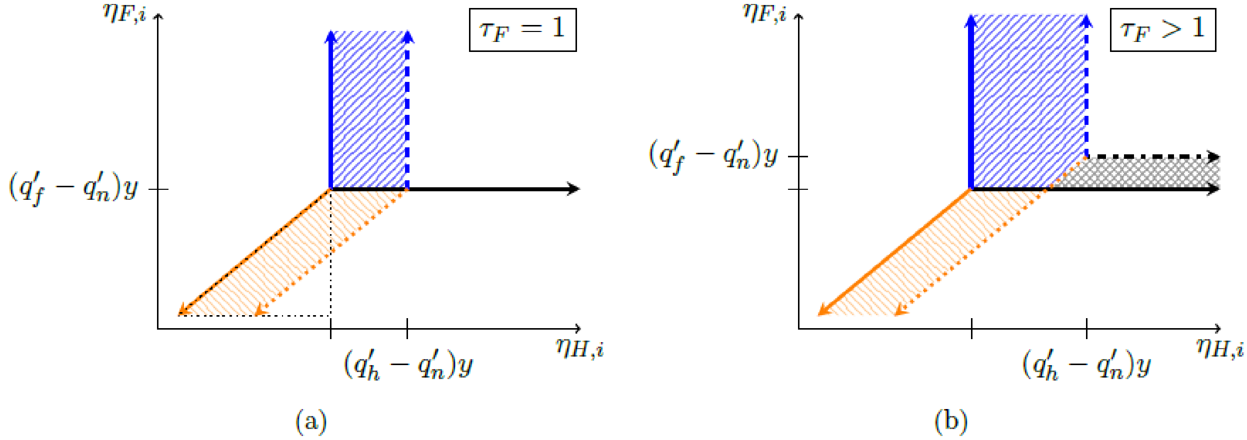


Figure 2: Realignments Induced by an Increase in τ_H

We illustrate the realignments in Figure 2. Panel (a) depicts the special case in which the foreign power imposes no tariffs; i.e., $\tau_F = 1$. In this case, regardless of the value of τ_H, the ex factory and delivered prices of goods exported by non-aligned countries match those of goods exported by countries aligned with F; i.e., $q_n = q_f$ and $p_n = p_f$. As a result, a marginal increase in τ_H preserves the price gap $q_n - q_f$ and so does not disturb the boundary between alignment with F and non-alignment. Meanwhile, both q_n and q_f fall relative to q_h, shifting the boundaries between the regions of alignment with H and each of the other possibilities to the right. The figure highlights two types of geopolitical repositioning: a light-shaded area representing countries that shift allegiance from F to H and a dark-shaded area showing countries that newly align with H rather than remain non-aligned. Together, these adjustments imply an unambiguous increase in m_h, at the expense of both m_f and m_n.

Panel (b) considers the case in which $\tau_F > 1$. Now, small countries that align with F face tariffs only in country H, while non-aligned countries face tariffs in both large markets. As in panel (a), the boundaries separating alignment with H and alignment with F, and with non-alignment both shift rightward, since both $q_h - q_f$ and $q_h - q_n$ increase. However, the declines in q_f and q_n need not be equal. In the figure, we depict the case where q_n falls more than q_f, as must occur under CES preferences with elasticity $\sigma > 1$.[18] In addition to the light- and dark-shaded regions

[18] With CES preferences, (12) and (13) become

$$y = m_H (\tau_H q_f)^{-\sigma} + m_F (q_f)^{-\sigma} + m_S (q_f)^{-\sigma}$$

and

$$y = m_H (\tau_H q_n)^{-\sigma} + m_F (\tau_F q_n)^{-\sigma} + m_S (q_n)^{-\sigma}.$$

Then

$$\frac{dq_f}{d\tau_H} = -y^{-1/\sigma} \left[m_H (\tau_H)^{-\sigma} + m_F + m_S\right]^{\frac{1}{\sigma}-1} m_H (\tau_H)^{-\sigma-1}$$

while

$$\frac{dq_n}{d\tau_H} = -y^{-1/\sigma} \left[m_H (\tau_H)^{-\sigma} + m_F (\tau_F)^{-\sigma} + m_S\right]^{\frac{1}{\sigma}-1} m_H (\tau_H)^{-\sigma-1}.$$

shown in panel (a), panel (b) includes a cross-hatched region representing countries that switch from non-alignment to alignment with F.

One way to understand the incentives captured by the first-order condition (18) is to compare them to those facing a hegemon in a unipolar world. A notable difference reflects the fact that H's MFN tariff now applies to two distinct groups of countries: those aligned with the rival F (including F itself) and those that are non-aligned. This distinction becomes relevant for H's tariff choice whenever $\tau_F > 1$, because non-aligned countries then face steeper trade barriers in F's market than do members of its trading bloc.[19] As a consequence of this, non-aligned countries become more dependent on access to H's market. Such an increased reliance on exports to H can render their export supply more elastic than that of countries in the rival bloc. If so, the presence of a rival with positive MFN tariffs strengthens H's terms-of-trade motive for protection.

A second difference concerns the number of countries subject to H's tariff. When small countries have the option of aligning with a second great power, more of them may fall under H's MFN regime than in the unipolar setting, where their only alternative to aligning with H is non-alignment. If τ_H exceeds the Mill-Bickerdike level—as it typically does when geopolitical motives are active—then this broader tariff base reduces the marginal benefit of further tariff increases.

The remaining differences arise from the induced realignments. For example, to the extent that a tariff hike by H draws countries away from F, as represented by countries with valence shocks in the light-shaded areas of Figure 1, it increases the marginal geopolitical return to raising the tariff. However, a higher tariff may also cause some countries to switch allegiance to F rather than remain non-aligned, as is true for those countries in the cross-hatched region of panel (b). When $\delta_F > 0$, such defections to the rival power dampen H's incentive to raise its tariff.

As the discussion above makes clear, the strategic incentives for tariff setting in a bipolar world may strengthen or weaken relative to the unipolar benchmark. As a result, the best-response tariff for a large country engaged in geopolitical rivalry may be either higher or lower than the tariff that is optimal for a hegemon.

4.1 An Optimal-Tariff Formula for a Great Power in a Bipolar World

In the appendix, we derive a formula for a great power's optimal (best-response) tariff, analogous to (10) above. This formula will prove useful in what follows for describing the various channels through which changes in geopolitical conditions affect a large country's tariff choice. For country H, we find:

$$\tau_H^* - 1 = \frac{1}{\omega_n \varepsilon_{e_n(q_n^*)} + (1-\omega_n)\,\varepsilon_{e_f(q_f^*)}} \left\{ 1 + \omega_n \frac{y}{c\,(p_n)} \Omega_n + (1-\omega_n) \frac{y}{c\,(p_f)} \Omega_f \right\}, \tag{19}$$

Intuitively, Home tariffs move the price of non-aligned varieties more because—by virtue of Foreign's tariff—Home buys a greater share of these goods.

[19] By contrast, when F practices free trade ($\tau_F = 1$), all small countries that do not align with H face the same trade barriers abroad. Their supply elasticities to H are therefore identical, and the terms in the second line of (18) mirror those in the first.

where Ω_n and Ω_f describe the marginal welfare effects of changes in alignment induced by a decline in q_n and q_f, respectively (as discussed further below), and ω_n is the share of the total terms-of-trade effect of a change in the MFN tariff that reflects imports from non-aligned countries.[20] The best response by country H takes τ_F as given. As before, we have suppressed the functional relationship between variables on the right-hand side and the two tariff rates.

The term that precedes the curly bracket is the weighted-average Mill-Bickerdike tariff, considering that the MFN tariff applies now to two sets of imports with potentially different prices and different export supply elasticities. The term plays the same role as the inverse supply elasticity in (10); it balances the terms-of-trade effect and the volume-of-trade effect at a fixed alignment.

The term in the curly brackets is equal to one when alignments are fixed, which means of course that the best response by H in the absence of geopolitical realignments is a Mill-Bickerdike tariff. This policy varies with τ_F, as in the two-country analysis by Johnson (1953).

When realignment does occur, the term that incorporates Ω_f reflects the welfare effects of the changes in alignment induced by the fall in q_f; this includes both countries that shift their alignment from F to H and countries that switch from alignment with F to non-alignment. Meanwhile, the term that incorporates Ω_n reflects the welfare effects of the changes in alignment induced by the fall in q_n; this includes both the shifts from non-alignment to alignment with H and the shifts from non-alignment to alignment with F. The magnitude of these realignments depends in turn on the size of the price movements, which are captured by $(1-\omega_n)\,y/c\,(p_f)$ and $\omega_n y/c\,(p_n)$.

Specifically, we define

$$\begin{aligned}\Omega_f \quad : \quad &= \frac{\mu_{HF}}{m_F+m_f}\left\{\beta_H+\delta_H-\left[S\left(q_f,\tau_H\right)-S\left(q_h,1\right)\right]\right\} \\ &+\frac{\mu_{nF}}{m_F+m_f}\left\{\delta_H-\left[S\left(q_f,\tau_H\right)-S\left(q_n,\tau_H\right)\right]\right\},\end{aligned} \tag{20}$$

where μ_{HF} is the density of "swing states", i.e., small countries that are indifferent between aligning with H or with F. Similarly, μ_{nF} is the density of swing states that are indifferent between aligning with F and remaining non-aligned.[21] These densities play the same role as $g\left(\eta^*\right)$ in the unipolar scenario: they determine the number of small countries that realign as q_f falls. The countries that

[20] More formally,

$$\omega_n = \frac{m_n c\left(p_n\right)\frac{dq_n}{d\tau_H}}{\left(m_F+m_f\right)c\left(p_f\right)\frac{dq_f}{d\tau_H}+m_n c\left(p_n\right)\frac{dq_n}{d\tau_H}}.$$

The numerator of ω_n is the product of the total quantity of imports from non-aligned countries and the marginal impact of the tariff on the world price of these goods. The denominator is the sum of these marginal terms-of trade-effects across all imports subject to the tariff, considering that some of these imports originate in non-aligned countries and the rest originate in the rival large country and its allies. Also, $\varepsilon_{e_n(q_n)}$ and $\varepsilon_{e_f(q_f)}$ are the elasticities of export supply facing country H from non-aligned countries and from country F and its allies, respectively, where $e_n\left(q_n\right)=y-m_F c\left(\tau_F q_n\right)-m_S c\left(q_n\right)$ and $e_f\left(q_f\right)=y-\left(1-m_H\right)c\left(q_f\right)$.

[21] Using Figure 1, μ_{HF} is the total density of countries on the dotted boundary between "Align with H" and "Align with F" and μ_{nF} is the totally density on the solid boundary between "Align with F" and "Non-Aligned". These are calculated as:

$$\mu_{HF} = m_S\int^{\left(q_f-q_n\right)y}\gamma\left[\left(q_h-q_f\right)y+\eta_F,\eta_F\right]d\eta_F$$

pivot from alignment with F to alignment with H generate a direct geopolitical gain of $\beta_H + \delta_H$ for country H and an indirect "loss" of $S(q_f, \tau_H) - S(q_h, 1)$.[22] The ones that switch from alignment to F to non-alignment generate a direct gain of δ_H and an indirect "loss" of $S(q_n, \tau_H) - S(q_f, \tau_H)$.

Similarly,

$$\begin{aligned} \Omega_n \quad : \quad &= \frac{\mu_{Hn}}{m_n} \{\beta_H - [S(q_n, \tau_H) - S(q_h, 1)]\} \\ &+ \frac{\mu_{nF}}{m_n} \{-\delta_H - [S(q_n, \tau_H) - S(q_f, \tau_H)]\}, \end{aligned} \tag{21}$$

where μ_{Hn} is the density of swing countries that are indifferent between aligning with H and remaining non-aligned.[23] As q_n falls, the transitions from non-alignment to alignment with H generate a direct gain of β_H and a "loss" of $S(q_n, \tau_H) - S(q_h, 1)$. The adjustments from non-alignment to alignment with F generate a direct loss of δ_H and a further "loss" of $S(q_n, \tau_H) - S(q_f, \tau_H)$.

4.2 Are Rivals' Tariffs Strategic Complements or Strategic Substitutes?

In a bipolar world, the Nash equilibrium occurs at the intersection of the two large countries' best-response functions. If these curves slope upward in (τ_H, τ_F) space, then tariffs are strategic complements: an increase in one country's tariff induces the other to raise its tariff as well. If the curves slope downward, tariffs are strategic substitutes, and a tariff hike by one country prompts its rival to lower its own. Whether trade policy instruments behave as complements or substitutes determines whether geopolitical shocks lead to escalating trade conflicts or mutual de-escalation.

As a baseline, consider a world without geopolitical motives—either because α_H and α_F are fixed or because the large countries place no value on alignments. In such a setting, a rise in τ_F increases small countries' reliance on H's export market. With constant-elasticity demand and $\sigma > 1$, this heightened dependence reduces their residual export supply elasticities, thereby strengthening H's incentive to raise its own tariff in order to improve its terms of trade.[24]

Once geopolitical concerns enter the picture, tariff interactions grow considerably more complex. The terms-of-trade motive described above—favoring strategic complementarity—remains active, but changes in τ_F also affect H's geopolitical incentives, and they do so in several ways. First, a rise in τ_F triggers realignments that shift the ratio of marginal to inframarginal allies. These

and

$$\mu_{nF} = m_S \int_{(q_h - q_n)y} \gamma [\eta_H (q_f - q_n) y] \, d\eta_H \; .$$

[22] The quotation marks in "loss" are meant to remind the reader that this loss might be negative.

[23] In Figure 1, μ_{Hn} is the total density of countries on the dashed boundary between "Align with H" and "'Non-Aligned." This is calculated as:

$$\mu_{Hn} = m_S \int_{(q_f - q_n)y} \gamma [(q_h - q_n) y, \eta_F] \, d\eta_F$$

[24] See the online appendix for the proof. Chattopadhyay and Mitka (2019) prove a similar result in an endowment model with two goods and many countries. Dixit (1987) points out that tariffs may be strategic complements or strategic subsitutes in a two-country, two-good tariff game with neoclassical production technologies.

ratios, which function like the hazard rate $\lambda(\cdot)$ in (10), appear in the expressions for Ω_f and Ω_n in (20) and (21). Specifically, a higher foreign tariff expands m_f at the expense of both m_h and m_n. This realignment alters both the number of swing countries on each margin of indifference and the number of countries to which H's MFN tariff applies. For instance, if $\mu_{HF}/(m_f + m_F)$ falls, then τ_H applies to more countries without compensating gains on alignment margin—raising its economic cost. More generally, an increase in τ_F may raise or lower the hazard-rate-like terms in Ω_f and Ω_n, altering the marginal geopolitical payoff from tariff-induced realignments relative to their economic cost.

Second, an increase in the rival's tariff alters the economic value of realignments, which also appear in (20) and (21). A rise in τ_F depresses q_h—the price of goods exported to H by its allies—and thereby increases the surplus $S(q_h, 1)$ that H derives from intra-bloc trade. This amplifies the marginal benefit to H from expanding the size of its alliance bloc at the expense of its rival. However, this channel is relevant only if some small countries change their alignment from H to F in response to the higher τ_F. In our calibration, no countries lie at the margin between alignment with H and F, so this mechanism does not operate.

Meanwhile, a higher τ_F might also affect the value to H of converting non-aligned countries into allies. Whether this value increases or decreases depends on how $S(q_h, 1)$ and $S(q_n, \tau_H)$ respond—that is, whether the surplus gain from improved terms of trade with allies exceeds the corresponding gain from non-aligned trade partners.

Third, a rise in τ_F can affect H's incentives through shifts in its consumption mix. As τ_F increases and q_n falls, H's consumers substitute toward imports from non-aligned countries: $c(p_n)$ rises while $c(p_f)$ remains unchanged.[25] The resulting increase in total import volume dampens H's incentive to raise tariffs beyond the level justified by its market power.

Finally, an increase in τ_F alters the weights that H assigns to targeting price reductions for non-aligned versus F-aligned exports—i.e., it affects ω_n and $1 - \omega_n$ in the bracketed term on the right-hand side of (19). For example, a fall in q_n induced by a higher τ_F shifts H's import demand toward non-aligned countries, raising ω_n. At the same time, a higher τ_F may induce some countries to align with F instead of remaining non-aligned, which decreases ω_n. If the net effect of an increase in τ_F is to increase ω_n, then H places greater weight on inducing transitions from F-alignment to non-alignment. Under CES preferences, it can promote this shift by lowering its tariff, which reduces q_f relative to q_n.

The offsetting forces that determine whether tariff policies are strategic complements or substitutes are too complex to resolve analytically.[26] In our quantification exercise, we find that best-response tariffs respond only weakly to changes in the rival's tariff, and that China's tariffs are strategic substitutes for U.S. policy whereas U.S. tariffs behave as strategic complements for China's policy.

[25] Recall from (12) and (13) that q_n is a decreasing function of τ_F, whereas q_f is independent of τ_F.

[26] In the appendix, we provide a detailed decomposition of the channels of strategic substitutability and complementarity and discuss what can be said about the sign of each one.

4.3 Nash Tariff Responses to Changes in the Geopolitical Environment

How do shifts in geopolitical conditions affect the openness of large countries to world trade? In our model, such conditions are captured by the weights countries place on alignment. In this section, we consider changes in the preference parameters β_H, β_F, δ_H, and δ_F.

In principle, a change in the geopolitical environment has both a direct effect on each large country's incentives and an indirect effect that operates through the strategic interaction between them. However, to keep the discussion relatively simple—and in light of our subsequent finding that these interaction effects are quantitatively modest—we focus here on the direct effects. Specifically, we examine how the parameters affect a country's optimal tariff choice, holding the rival's tariff fixed.

Consider first the effects of an increase in β_H, the value that country H places on securing an additional ally. This parameter could rise in response to heightened political tensions between the great powers. From (20) and (21), we see that a higher β_H increases both Ω_f and Ω_n, thereby raising the marginal benefit to H from attracting allies—whether from the foreign rival's bloc or from the pool of non-aligned countries. Because an increase in τ_H lowers both q_f and q_n relative to q_h, it induces realignments toward H from both sources. As a result, the optimal tariff rises.

The effects of an increase in δ_H are more nuanced. From (20), we know that realignments from the rival to H become more valuable. Since a higher tariff reduces q_f relative to q_h, the marginal benefit of raising τ_H increases through this channel. However, (21) implies a second effect: δ_H also raises the cost to H when small countries switch from non-alignment to alignment with the rival. These transitions occur when a rise in τ_H depresses q_n more than q_f, as happens under CES preferences with $\sigma > 1$. If the rival's tariff is close to zero, the number of such transitions will be small, and the net effect still favors a higher tariff. But if the prices of goods exported by non-aligned countries respond more elastically to τ_H than those from F's allies, and if few states are on the margin between aligning with the two great powers, a higher tariff could lead to an expansion of the rival bloc. In that case, an increase in δ_H would cause H to reduce its MFN tariff.

In the appendix, we prove

Proposition 3 *The best response of τ_H to a given τ_F increases with β_H, and also increases with proportional increases in β_H and δ_H if τ_F is sufficiently close to 1.*

Changes in the rival's geopolitical parameters—β_F and δ_F—affect country H's incentives only through strategic interactions between the tariff rates. While such interactions are possible in theory, they are small in our calibrated model in Section 5. Nonetheless, we will use the quantitative framework to examine how a general heightening of geopolitical tensions between the great powers—modeled as an equiproportionate increase in all four preference parameters—impacts global policy.

5 Quantifying Optimal Tariffs with Geopolitical Alignment

While our analytical results isolate the geopolitical components of the optimal tariff from standard economic forces, they do not indicate how important these elements are for shaping trade policy. Nor do they yield clear predictions about how country size or strategic interactions influence optimal tariff levels, as these responses reflect offsetting and complex forces. To assess the significance and policy relevance of geopolitical considerations, we now turn to a quantitative simulation of our model.

5.1 Model Calibration

To quantify optimal tariffs, we must first calibrate the model's parameters. Our calibration of the economic components relies on readily available data and a demand elasticity drawn from a well-established literature. In contrast, our calibration of the geopolitical components is decidedly more tentative, given the scant precedent that exists for such an exercise. For both aspects, we use data from two periods: the late 1990's, when the United States was arguably the singular world superpower, and the early 2020's, a period marked by heightened geopolitical rivalry.

5.1.1 Economic Components

We begin with the model's economic components: m_H, m_F, m_S, $u(\cdot)$, y, and x. These are relatively straightforward to calibrate. In the unipolar model of Section 3, we set $m_H = 0.277$ to match the United States' share of world GDP in 1997— a time when the United States stood relatively unrivaled as the world's economic and geopolitical leader. In the bipolar version of Section 4, we set $m_H = 0.265$ and $m_F = 0.170$ to match the 2023 GDP shares of the United States and China, respectively. It follows that $m_S = 1 - 0.277 = 0.723$ in the unipolar case and $m_S = 1 - (0.265 + 0.17) = 0.565$ in the bipolar case.

We adopt a standard CES form for the subutility derived from consumption of differentiated products:

$$u(c) = \frac{\sigma}{\sigma - 1} c^{(\sigma-1)/\sigma}.$$

We take $\sigma = 3$, a value near the midpoint of conventional trade elasticity estimates—for instance, between that of Simonovska and Waugh (2014) and the more recent estimates by Boehm et al. (2023).

To calibrate endowments of the two goods, we normalize per capita GDP under free trade to one and then choose x and y such that the gains from free trade in a small country equal 30% of autarky utility, consistent with the estimates of Costinot and Rodriguez Clare (2014).[27] This implies $x = 0.833$ and $y = 0.068$.

[27] Under autarky, the representative household in a small country consumes the per capita endowment of the homogeneous good plus its own differentiated product, which contributes negligibly to utility. Under free trade, the household consumes an equal share of the measure one of differentiated products and achieves utility $x + u(y)$. Thus, the gains from trade relative to autary equal $u(y)/x$.

5.1.2 Costs and Benefits of Alignment for Small Countries

We turn now to the geopolitical components. Because costs and benefits of alignments are not directly observable and the literature offers little guidance, we acknowledge that our estimates of these components are prone to substantial uncertainty. Nonetheless, we make a first attempt with the aim of providing a foundation for future refinements. We also assess the robustness of our results to alternative assumptions.

Our unipolar model requires an estimate of $G(\cdot)$, the distribution of alignment costs with the hegemon. Our bipolar model similarly requires an estimate of $\Gamma(\cdot,\cdot)$, the bivariate distributions of alignment costs with each of the competing powers. Drawing on literatures in international relations and, more recently, geoeconomics, we take voting similarity in the United Nations General Assembly (UNGA)—a deliberative body in which member states cast non-binding votes on a wide range of global policy issues—as a proxy for alignment.[28] For the unipolar model, we classify countries as either aligned with the hegemon or non-aligned according to their voting similarity with the United States during the period from 1995 to 1998. For the bipolar model, we designate countries as aligned with the United States, aligned China, or aligned with neither, according to votes registered between 2021 and 2024.

Following Gopinath et al (2025), we designate a small country as aligned with a great power if it ranks in the top quartile of UNGA voting similarity.[29] According to this definition, countries comprising 48.5% of world GDP aligned with the United States during its hegemonic period. These included Canada, Israel, and most of Europe, including Eastern Europe. The "swing state" on the margin of alignment is North Macedonia, which voted with the United States 38.2% of the time, while Australia (37.0% voting similarity) was the closest non-aligned country.

In the more recent period, U.S.-aligned countries account for 32.6% of world GDP, while China's allies account for 5.4%. The U.S. bloc again includes Canada, Israel, and most of Western Europe, but fewer Eastern European countries. The swing states for U.S. alignment are Japan (50.4% voting similarity) and San Marino (50.4% voting similarity).[30] China's allies include Indonesia, Iran, and North Korea, while Sudan (74.6% voting similarity) and Lesotho (74.6% voting similarity) are on the margin between alignment and non-alignment. According to our metric, India, Brazil, and Russia are among the countries that are non-aligned.

To estimate the valence shocks, we assume that the observed vote patterns were not influenced by geopolitically-motivated trade policies, consistent with the relatively low MFN tariffs during these periods.[31] We take the fraction of roll-call votes in which small country i voted the same as

[28] See, e.g., Voeten (2000), Bailey et al., (2017), and Kleinman et al., (2024).

[29] For each period, we compute the share of resolutions on which two countries cast the same votes—yea, nay, or abstain—among those for which both are present. Gopinath et al. (2025) instead measure voting similarity using the ideal point estimation method of Bailey et al. (2017). We choose the simpler, concordance-based measure because it aligns more closely with the vote-buying estimates cited below.

[30] The classifcation of Japan as marginally aligned accords well with the arguments in Davis (2025), who reports on Japan's "delicate path" as a close trading partner of both countries.

[31] The higher tariffs imposed after 2018 by the United States and China on each other's imports did not apply to smaller third countries and arguably had little effect on their geopolitical alignment. Consistent with this, UN voting patterns during 2021-2024 closely resemble those from the pre-trade-war period, 2014-2017.

large country J as an indicator of its net cost or benefit from alignment. A country that votes with J more frequently than the marginal aligner is treated as inframarginal and assigned a negative cost of alignment. Conversely, a country that votes with J less frequently than the swing state is assigned a positive cost. We use the gap between a country's voting similarity and that of the swing state as a proxy for its taste or distaste for alignment. Specifically, if country i matches J's votes in a fraction $f_{J,i}$ of roll calls and the marginal aligner with J does so in fraction $\bar{f}_J$, we set

$$\eta_{J,i} = \kappa GDP_i \left(\bar{f}_J - f_{J,i} \right), \tag{22}$$

where κ is a proportionality constant.

We lack data that would allow us to identify distinct values of κ for the different time periods. Instead, we crudely estimate a single value that we apply in both settings, using evidence from a recent study of U.N. vote buying.[32] The study by Dreher et al. (2022) focuses on voting in the U.N. Security Council (UNSC), which allows the authors to leverage the quasi-random assignment of countries to UNSC membership. They estimate that UNSC members who consistently vote with the United States receive 42% more U.S. aid during their tenure on the council than those that do not. If this increased aid is what induces a marginal UNSC member to align with the United States—and if that country previously had median UNGA voting similarity and faces the same cost of alignment in both settings—then this implies $\kappa = 0.126$.[33]

To put this estimate in context, consider Malaysia, a non-aligned country by our reckoning, but one that is very close to the margin of alignment with China. Between 2021 and 2024, Malaysia voted with the United States on 23.7% of UNGA resolutions. To draw Malaysia into its own orbit, the United States would have needed to induce an increase in vote alignment of 26.7 percentage points—bringing Malaysia's similarity with U.S. positions to 50.4%, the level of its own swing state—at an estimated cost of 3.4% of Malaysia's GDP, or approximately $13.5 billion.

Figure 3 displays a histogram of our estimates of $\eta_{H,i}$ for all of the 180 countries in our data set that participated in UNGA voting during the period from 1995 through 1998. The figure also shows our estimate of $G(\cdot)$ for the unipolar model, which we obtained by smoothing the distribution of η's using a three-component Gaussian mixture model that we fit to the discrete distribution of alignment costs.

Figure 4 illustrates our country-by-country estimates of the pairs, $\left(\eta_{H,i}, \eta_{F,i}\right)$, for the bipolar case. The slanted ovals represent the equal-density contours of $\Gamma(\cdot)$ that we computed by fitting a Gaussian mixture model to the discrete estimates. The figure conveys two clear visual impressions.

[32] Several studies document that large countries—especially the United States—use geopolitically conditional foreign aid and other economic inducements to influence U.N. votes; see, for example, Alesina and Dollar (2000), Kuziemko and Weber (2006), and Davis and Pratt (2021).

[33] Under our assumptions, inducing alignment from a country with the median 2021-2024 UNGA voting similarity (i.e., voting with the United States 28.2% of the time) requires a U.S. aid increase equal to 42% of 6.7% of the country's GDP—i.e., 2.8% of GDP. Moving this country to the marginal aligner position (with 50.4% voting similarity) involves a shift of 22.2 percentage points in vote alignment. This implies $\kappa = 0.028/0.222 = 0.1264$. We ignore concessional lending by the IMF and World Bank, which also rises for U.S.-aligned UNSC members, because the transfer implicit in these loans contributes far less than direct U.S. aid in the Dreher et al. (2022) sample.

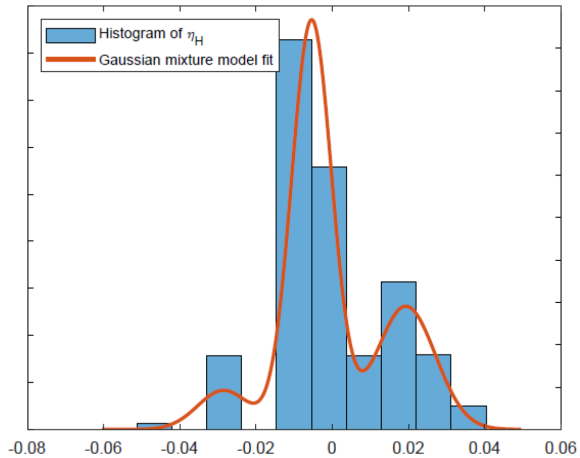


Figure 3: Histogram and Estimated Distribution of Alignment Costs for Unipolar Case

First, the cost of a country's potential alignment with the United States is strongly negatively correlated with the cost of its potential alignment with China. Second, and relatedly, no countries lie near the indifference boundary between the two great powers. For nearly all countries, the operative choice appears to be whether to align with one of the great powers or to remain non-aligned.[34] This pattern accords well with the view among international-relations scholars that the unipolar world of the post-Cold War period has been giving way to deepening bipolarization in the years since the financial crisis.[35]

5.1.3 Preference for Alignments by Large Countries

Calibrating the value of allies to the superpowers poses an even greater challenge. The relevant parameters reflect the large countries' *willingness to pay* for alignment in a world in which they hold most of the bargaining power. Because these preferences are not directly revealed by observed transfers or policies, we must rely on indirect evidence. Given the uncertainty, we do not attempt to distinguish between β_H in the unipolar model and its counterpart in the bipolar setting. Instead, we construct rough estimates for the bipolar case and also apply the resulting U.S. value to the hegemon in the unipolar world. We then simulate a range of parameter values around this baseline to evaluate how the hegemon's optimal tariff varies with the strength of its geopolitical preferences.

To estimate the preference parameters, we assume that military spending by the United States and China is motivated primarily by the need to deter threats from non-aligned countries—and especially from countries aligned with the opposing power. To operationalize this idea, we posit

[34] This observation reflects the fact that the United States and China vote similarly on only 16% of UNGA proposals. It follows that any country that is nearly indifferent between aligning with one of the great powers and remaining independent will have a high cost of aligning with the other power.

[35] On the emergence of unipolarity after the end of the Cold War, see Krauthammer (1991) and the various chapters in Ikenberry et al. (2012). On the re-emergence of bipolarity with the rise of China and after the financial crisis, see, for example, Ali (2015) and Øystein (2018).

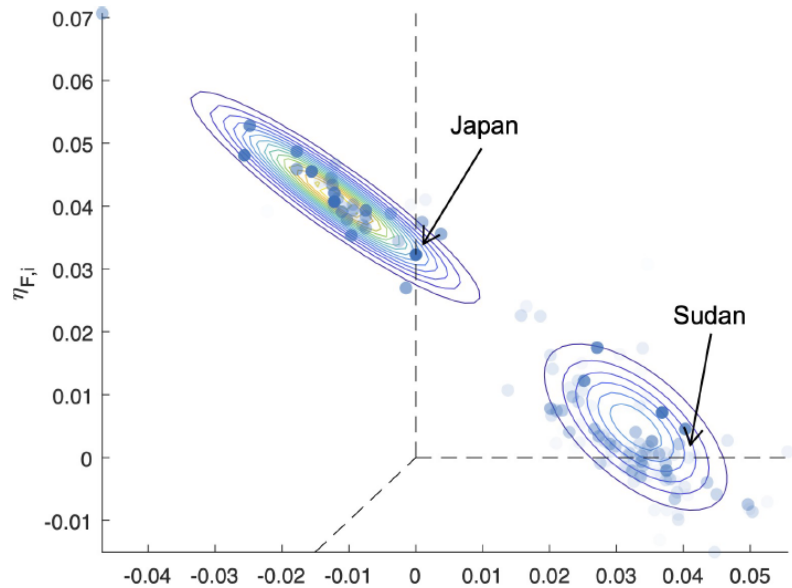


Figure 4: Estimated Alignment Costs for Bipolar Case

that each large country J engages in military spending (in units of the numeraire) equal to

$$S_J = \phi_J m_J \left[m_n + 2\left(m_{-j} + m_{-J}\right)\right] \tag{23}$$

for some constant ϕ_J. Assuming that military spending delivers no direct utility, this implies $\beta_J = \delta_J = \phi_J$. In 2023, the United States and China spent 3.4% and 1.7% of their respective GDPs on their militaries, which implies $\beta_H = \delta_H = 0.054$ and $\beta_F = \delta_F = 0.012$.[36]

To better understand the implications of these estimates, consider the value the United States places on its alliance with South Korea. In 2023, South Korea and the United States accounted for 1.7% and 26.5% of world GDP, respectively. Our model normalizes world GDP to 1. With $\beta_{US} = 0.054$, equation (23) implies that the United States would be willing to spend up to $0.054 \times 0.017 \times 0.265$ units of world GDP to secure South Korea's alignment—an amount equivalent to approximately \$26 billion in 2023 dollars.

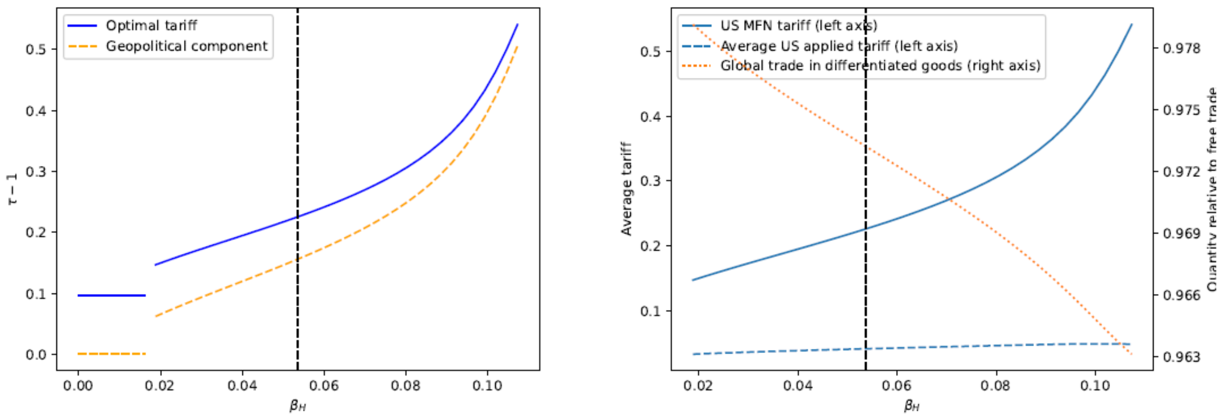
5.2 Quantifying the Optimal Tariff in a Unipolar World

The United States has been a dominant economic and geopolitical power for many decades. What are the implications of this dominance for non-cooperative trade policy? We address this question quantitatively using our calibrated model. We begin by analyzing the case in which the United States acts as a lone hegemon, before turning to a setting with competing great powers in Section

[36] Inverting (23) yields

$$\phi_J = \frac{S_J}{GDP_J}\frac{GDP_J}{m_J}\frac{1}{m_n + 2\left(m_{-j} + m_{-J}\right)}.$$

We approximate GDP_J/m_J by its free-trade value, which we have normalized to one, and substitute in the observed military spending shares and the model-implied shares of the non-aligned and rival-aligned countries in world GDP.



(a) (b)

Figure 5: Optimal Tariff for Hegemon as Function of Preferences for Allies

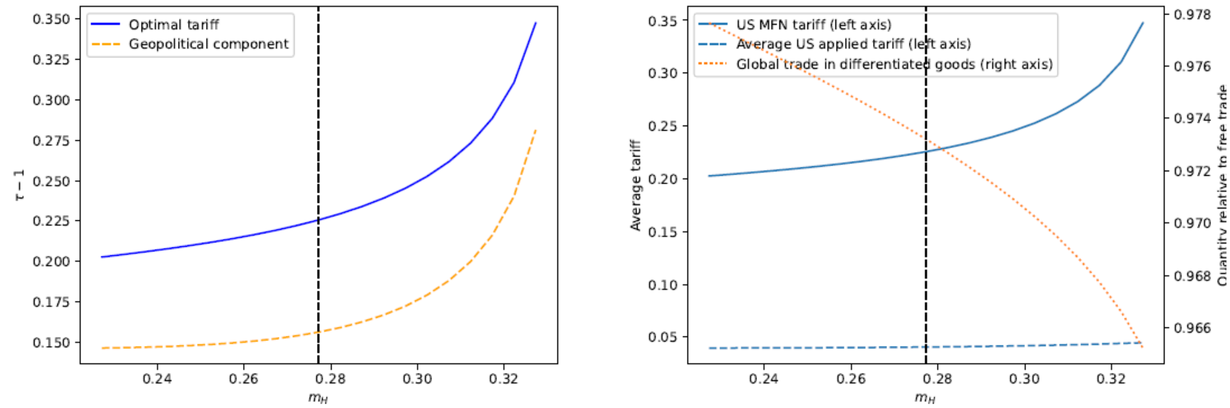
5.3.

Our quantitative model implies that the hegemon's optimal MFN tariff is 22.6%. As can be seen in panel (a) of Figure 5—where the baseline calibration is indicated by the vertical dashed line—the geopolitical component accounts for nearly three-fifths of this tariff. Absent geopolitical considerations, the hegemon would impose a uniform tariff of 9.7% and would offer no FTAs to any partners. In our baseline calibration, however, the hegemon has ample incentive to use trade policy as a strategic tool, and it succeeds in attracting the alignment of countries comprising 52.7% of world GDP (compared to 50.7% under free trade). This stick-and-carrot approach yields an average applied tariff of 4.1%, far lower than the MFN rate levied on non-aligners. Taken together, these results point to a central role for geopolitical factors in shaping non-cooperative trade policy.

To understand why the analysis yields such a large geopolitical component, we refer back to Figure 3. The figure shows a sizable mass of countries near the margin of alignment, which implies a high value of the hazard rate of alignment costs. According to the optimal tariff formula (10), the hazard rate $\lambda(\eta^*)$ has a strong positive effect on the hegemon's marginal benefit from imposing tariffs: it enables the hegemon to attract many allies while applying the punitive MFN tariff to relatively few others.

In the appendix, we present an alternative calibration of the alignment cost distribution, using the marginal distribution of $\Gamma(\cdot)$ estimated for 2021-2024 in place of the voting patterns from 1995-1998. With far fewer countries near the margin—see Figure A.1—the calibration implies a lower optimal tariff of 14.4%, and a diminished (though still quite meaningful) role for geopolitics. This comparison highlights the importance of the alignment cost distribution in shaping geopolitical influences on trade policy

Returning to panel (a) of Figure 5, we examine how the optimal MFN tariff varies with the hegemon's preference for alignment. When β_H is below roughly 0.017, the hegemon offers no FTAs and defaults to the Mill-Bickerdike tariff. Consistent with our theoretical analysis, the optimal tariff



(a) (b)

Figure 6: Optimal Tariff for Hegemon a Function of its Size

rises with β_H whenever the hegemon finds it advantageous to offer preferential access to encourage alignment. For example, our estimates suggest that doubling the value that the hegemon places on allies would push the optimal tariff well above 40%.

Panel (b) shows the MFN tariff rate and the average applied tariff (i.e., tariff revenues divided by the hegemon's total f.o.b. imports) relative to their estimated baseline levels for preference parameters large enough to induce FTAs.[37] The dotted line—with values shown on the right axis—depicts a measure of "openness": the value of world trade in the tariff-ridden equilibrium relative to the value under free trade. The figure underscores how openness can decline in response to an intensification of geopolitical conflict.

Figure 6 plots the optimal tariff as a function of the hegemon's size. The tariff rises with m_H, reflecting the enhanced market power and stronger terms-of-trade motive that come with increased size. Notably, the share of the geopolitical component in the total tariff also rises under our baseline calibration. This resolves the theoretical ambiguity identified in Section 3.3, where we highlighted competing effects of country size. The fact that the geopolitical component grows relative to the economic one indicates that, as the hegemon expands, the hazard rate of alignment costs becomes more favorable to high tariffs—outweighing both the rising opportunity cost of offering preferential access and the expanding MFN tariff base associated with improved terms of trade. Meanwhile, panel (b) shows that openness—whether measured by average applied tariffs or by the volume of trade relative to the free-trade benchmark—declines as the hegemon comes to dominate the global economy.

[37] The average applied tariff is defined here as the tariff revenues collected by the hegemon divided by its total f.o.b. imports.

5.3 Quantifying the Optimal Tariff in a Bipolar World

Our quantitative analysis of the unipolar case assumes that any change in the hegemon's GDP share reflects an offsetting change in the shares of the small, non-hegemonic countries. In practice, however, recent shifts in geopolitical power dynamics have been driven less by U.S. decline relative to smaller economies and more by the rise of China as a second great power. This observation raises several questions: How does a challenge to a hegemon's status affect its geopolitical motives for setting tariffs? In what ways do strategic interactions between rival powers reshape global trade policy in a non-cooperative environment? And what are the implications of rising geopolitical tensions for trade openness in a world of contested alignment? To explore these questions, we turn to the bipolar version of our calibrated model.

We begin by computing the Nash-equilibrium tariffs in a bipolar world. Under our calibration, the United States sets an optimal tariff of 12.4% when competing with China for allies, while China sets a tariff of 7.0%. China's lower tariff reflects both its smaller economic size and its weaker preference for alignment. Geopolitical considerations figure prominently in the tariff-setting calculus for both countries, contributing about one-third of the United States' optimal tariff and one-sixth of China's.

Notably, the U.S. tariff in the bipolar setting is considerably lower than its optimal tariff as a hegemon, reported in Section 5.2. Part of this difference reflects China's emergence as a major power: now accounting for 17% of world GDP, it draws away potential alignments that might have been available by the United States in its absence. However, this explanation goes only so far. In the alternative calibration of the hegemonic case presented in the appendix—where China is replaced by small countries drawn from the same alignment cost distribution as those present in 2021–2024—the optimal U.S. tariff is 14.4%, only modestly higher than the 12.4% tariff in the bipolar setting.

The principal reason for the lower Nash tariff lies in the evolution of geopolitical preferences among smaller countries, as reflected in the change in UNGA voting patterns. In the earlier period (1995–1998), the distribution of alignment costs appears to have been unimodal, with many countries bunched near the margin of alignment. In contrast, by the 2021–2024 period the distribution appears to have become bimodal, with few countries near the swing threshold. The paucity of states in Figure 4 that are just over the swing margin limits the set of countries that the United States can plausibly attract through trade concessions. In other words, the rationale for using trade policy to induce alignment can erode in a more polarized world.

Another possible explanation for the lower U.S. tariff in the bipolar setting is strategic interaction: the U.S. may treat its tariff as a strategic substitute for China's. Whereas China sets a tariff of 7.0% in the Nash equilibrium, its tariff is zero in the hegemonic case, where it is treated as a small country. While our analysis does identify a strategic-substitute relationship between China's tariff and the United States' own, the magnitude of this effect is negligible and cannot explain the bulk of the observed difference.

More broadly, our calibrated model predicts only limited strategic interaction between the two great powers' tariff levels. Figure A.4 in the appendix plots the best-response functions under the baseline parameterization. China's Nash tariff rises slightly in response to an exogenous increase in the U.S. tariff, while the United States lowers its tariff modestly in response to an increase in China's. But both effects are quantitatively small. Among the channels of influence identified in Section 4.2, the most significant involve the economic effect on the Mill-Bickerdike tariff and the impact of the tariff levels on the hazard rates of alignment. But even these effects are minimal and largely offsetting, reflecting the modest realignments that emerge from great-power competition for allies. See Figure A.5, which illustrates the alignments under the Nash tariffs relative to a baseline of universal free trade.

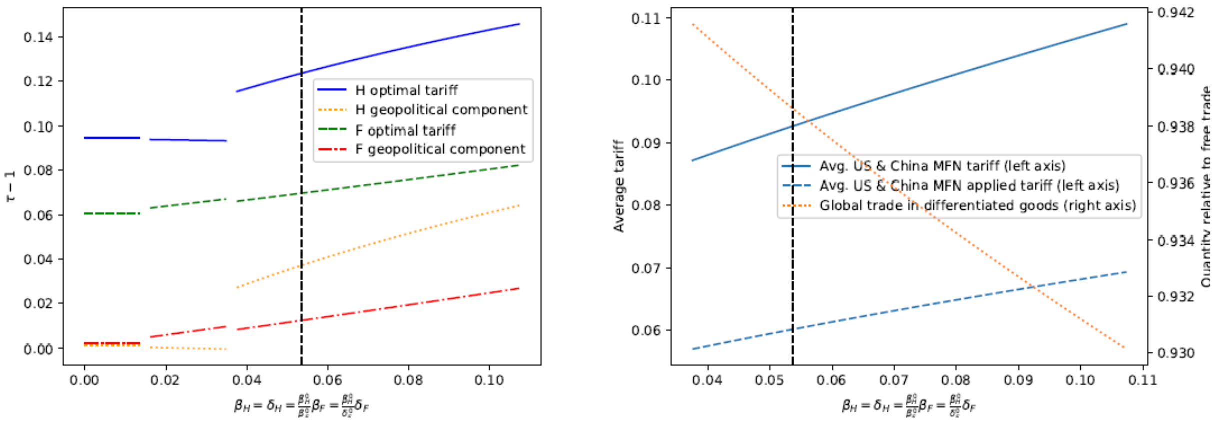
Figure 7 examines how trade policies reflect the intensity of geopolitical competition. Panel (a) shows how each country's Nash tariff and its geopolitical component respond to proportional changes in the geopolitical preference parameters—where again the baseline calibration is indicated by the vertical dashed line. Despite the slight strategic substitutability between China's tariff and the U.S. tariff (as shown in Figure A.4), a stronger desire for allies, combined with a greater aversion to the rival's bloc size, raises MFN tariffs and increases the share of each tariff attributable to geopolitical motives. A heightened salience of geopolitical considerations also draws more countries into each great power's preferential trading bloc. Notably, the two discontinuities in panel (a) mark threshold values of the preference parameters at which countries stop offering FTAs as inducements for alignment, indicating a discrete shift in strategic posture.

Panel (b) turns to the implications for global trade openness. The left axis gauges the average MFN tariff and average applied tariffs in the two large countries, as indicated by the solid and dashed upward-sloping curves, respectively.[38] The right axis tracks total trade volume for the two large countries relative to a benchmark of universal free trade. Across all three measures, rising geopolitical tensions diminish global openness, though the expansion of free trade agreements somewhat tempers the rise in applied tariffs.

Next, we consider how growth in the GDP share of a second superpower affects the openness of the global trading system. In principle, such growth could come at the expense of small countries, the rival great power, or both. In reality, however, China's global GDP share rose from 3.1% in 1997 to 17.0% in 2024 while the U.S. share held steady throughout. Rather, it was the rest of the world that experienced a decline in relative economic share. Accordingly, we focus on a simulation in which m_F rises at the expense of m_S, holding m_H constant.

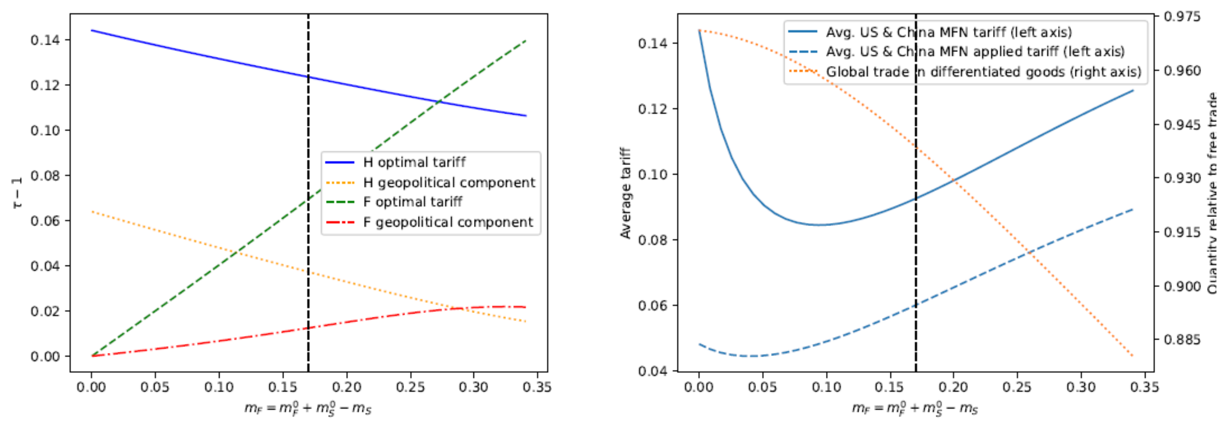
Figure 8 reports the results of this simulation. Panel (a) shows a near-linear increase in the optimal tariff for country F, from zero when that country is small, to 7.0% in the baseline calibration, to about 14% when that country bears twice its calibrated weight. Most of the tariff hike reflects the country's growing market power, as the geopolitical component remains modest. This finding reflects China's relatively limited taste for allies and the resulting need to apply its MFN tariff to a broad set of trading partners.

[38] We define the average MFN tariff as the sum of the tariff revenues collected by the two great powers divided by the total f.o.b. imports by both great powers that is subject to the their MFN tariffs. The average applied tariff is the sum of the tariff revenues collected by the two great powers divided by their total f.o.b. imports.



(a) (b)

Figure 7: Nash Tariffs as Function of Geopolitical Preferences



(a) (b)

Figure 8: Expansion in the Relative Size of Country F Holding m_H Constant

Meanwhile, the expansion of country F at the expense of the small countries raises the purely economic component of country H's tariff, consistent with our analytical result that Mill-Bickerdike tariffs are strategic complements under CES preferences. Nonetheless, τ_H declines modestly as m_F grows at the expense of m_S, for geopolitical reasons. As the small countries shed economic weight, their value to H as allies diminishes, which dampens the country's incentive to maintain a high MFN tariff.

Panel (b) shows that average tariffs respond non-monotonically to changes in the size of country F. When F is relatively small, the rise in m_F tilts the composition of trade toward the low-tariff country, which dominates the effects of any changes in the two tariff rates. However, once F reaches approximately 9.4% of world GDP, its continued growth pushes average MFN tariffs higher, even as τ_H continues to decline.

Because these results are driven by compositional shifts, as the weight grows on the initially smaller of the two tariffs, they are somewhat mechanical. For this reason, we find the volume-of-trade measure of openness more informative. As the figure shows, the ratio of global trade in differentiated goods to its free-trade benchmark declines steadily—and at an accelerating pace—as m_F grows and m_S shrinks. Evidently, the emergence of a second great power can contribute meaningfully to a retreat from globalization when trade policies are set non-cooperatively.[39]

6 Conclusions

This paper develops an analytical framework that incorporates key insights from the international relations (IR) literature into a standard economic model of optimal tariff policy. The core premises from IR are twofold: (i) large countries derive strategic benefits from attracting small-country allies, and (ii) small countries face heterogeneous costs and benefits in choosing whether to align with a major power. These features imply that great powers may use trade policy to reward alignment and punish nonalignment, while small countries weigh the "sticks and carrots" on offer when choosing their allegiances.

Our framework is deliberately stylized, but flexible enough to accommodate a variety of realistic extensions. On the economic side, future work could incorporate multiple production sectors, richer substitution patterns in demand, or explicit geography with heterogeneous trade costs and natural trading partners. On the geopolitical side, one could allow for cross-country variation in the strategic value of alliances—perhaps tied to geography—or model how the costs and benefits of alignment depend endogenously on a country's location or on others' alignment choices. One could also incorporate interactions between the civilian economy and the risks or consequences of conflict, as in Thoenig (2024) and Alekseev and Liu (2025). On the policy front, additional instruments such as foreign aid or military expenditures could be introduced. These extensions would deepen the interplay between economic and strategic motives in trade policy design.

We take an initial step toward quantifying the geopolitical environment by using voting similarity in the United Nations—as is common in both IR and economics—as a proxy for alignment. We propose a method for estimating the distribution of alignment costs, based on the share of a country's UNGA votes that coincide with those of the great powers. More tentatively, we suggest using military spending and UN voting responses to foreign aid as indicators of the value each side places on its alliances.

Substantively, our results suggest that geopolitical considerations can raise optimal tariffs significantly above the Mill–Bickerdike benchmark based solely on terms-of-trade motives. In our calibration, a unipolar hegemon sets tariffs more than twice as high when accounting for the strategic value of geopolitical alignment. This is especially true in periods, such as the late 1990s, when many small countries had similar alignment costs and were clustered near the margin between

[39] Figure A.6 in the appendix depicts the alternative simulation that results when m_F grows at the expense of m_H, with m_S held constant. The patterns look qualitatively similar to those in Figure 8. However, the decline in global trade volume is decidedly more gradual in this case.

aligning and remaining nonaligned. In such circumstances, preferential access becomes a potent tool of influence, and the hegemon uses the threat of an elevated MFN tariff to induce alignment from a broad set of countries.

In contrast, our calibration for a bipolar world suggests that fewer countries lie near the boundary between alignment with the dominant powers and nonalignment. This dulls the country's incentives for setting tariffs much above the Mill-Bickerdike level, because the economic cost of doing so yields relatively little geopolitical fruit. Even so, we find that the geopolitical components account for nontrivial shares of optimal tariffs—roughly 30% and 18% for the respective large countries in our model. A key insight from our analysis is that the distribution of alignment costs across small countries—more than just the intensity of great powers' preferences—critically shapes the geopolitical impact on trade policy.

Our model potentially sheds light on recent trends. The rise of China and the intensification of great-power rivalry may be contributing factors to the retreat from globalization. We show that stronger preferences for alignment lead systematically to higher non-cooperative tariffs, in both unipolar and bipolar settings. Quantitatively, the emergence of a second great power can significantly raise global protection levels and reduce trade volumes, particularly when that growth comes at the expense of smaller countries' economic weight rather than that of the incumbent hegemon.

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Online Appendix

This Online Appendix provides technical details for the arguments in the main text and additional details about the calibration. It is organized by section, following the structure of the main text. Equation numbers are prefixed with "A" to indicate their location in the appendix.

3.1 Optimal MFN Tariff Conditional on Offering an FTA to Allies

To derive (7) in Section 3.1, we begin from the welfare function (5), reproduced here:

$$W = x + qy + (1-\alpha) m_S S(q_n, \tau) + (m + \alpha m_S) S(q, 1) + \beta \alpha m_S. \tag{A.1}$$

Differentiating this equation with respect to τ yields

$$\frac{W'(\tau)}{m_S} = (1-\alpha) \frac{dS(q_n, \tau)}{d\tau} + [\beta + S(q, 1) - S(q_n, \tau)] \frac{d\alpha}{d\tau}. \tag{A.2}$$

The surplus function is defined by

$$\begin{aligned} S(q_n, \tau) &= u[c(\tau q_n)] - \tau q_n c(\tau q_n) + (\tau - 1) q_n c(\tau q_n) \\ &= u[c(p_n)] - p_n c(p_n) + (\tau - 1) q_n c(p_n), \end{aligned}$$

where $p_n := \tau q_n$. Using the first-order condition

$$u'[c(p_n)] = p_n,$$

we can differentiate the surplus function, which implies

$$\begin{aligned} \frac{dS(q_n, \tau)}{d\tau} &= -c(p_n) \frac{dp_n}{d\tau} + (\tau - 1) q_n c'(p_n) \frac{dp_n}{d\tau} + q_n c(p_n) + (\tau - 1) c(p_n) \frac{dq_n}{d\tau} \\ &= -c(p_n) \left(q_n + \tau \frac{dq_n}{d\tau} \right) + (\tau - 1) q_n c'(p_n) \frac{dp_n}{d\tau} + q_n c(p_n) + (\tau - 1) c(p_n) \frac{dq_n}{d\tau} \\ &= -c(p_n) \frac{dq_n}{d\tau} + (\tau - 1) q_n c'(p_n) \frac{dp_n}{d\tau}. \end{aligned}$$

Substituting into (A.2) we obtain

$$\frac{W'(\tau)}{m_S} = (1-\alpha) \left[-c(p_n) \frac{dq_n}{d\tau} + (\tau - 1) q_n c'(p_n) \frac{dp_n}{d\tau} \right] + [\beta + S(q, 1)) - S(q_n, \tau)] \frac{d\alpha}{d\tau},$$

which yields equation (7) in the main text.

From the market clearing condition for non-aligned goods (2), reproduced here as

$$mc(\tau q_n) + m_S c(q_n) = y, \tag{A.3}$$

we obtain

$$\frac{dq_n}{d\tau} = -\frac{mc'(\tau q_n)\, q_n}{mc'(\tau q_n)\,\tau + m_S c'(q_n)} < 0. \tag{A.4}$$

Then from (6), reproduced here as

$$\alpha = G\left[y\left(q - q_n\right)\right], \tag{A.5}$$

we obtain

$$\frac{d\alpha}{d\tau} = -G'\left[y\left(q-q_n\right)\right] y \frac{dq_n}{d\tau} > 0 \qquad \text{for} \qquad G'\left[y\left(q-q_n\right)\right] > 0. \tag{A.6}$$

That is, as the price of differentiated products from non-aligned countries falls with τ, the fraction of countries that align with the hegemon rises—so long as the density $G' > 0$, i.e., the set of swing states is non-empty.

3.2 To Offer FTAs to Allies or Not?

From the definition of $W^{FTA}(\beta)$ in Section 3.2 of the main text, we have

$$\begin{aligned} W^{FTA}(\beta) &= \max_{\tau}\ \left[x + qy + (1-\alpha)\, m_S S(q_n,\tau) + (m + \alpha m_S)\, S(q,1) + \beta\alpha m_S\right] \\ & \qquad \text{subject to equations (A.3) and (A.5).} \end{aligned} \tag{A.7}$$

If the hegemon does not offer FTAs, its welfare is

$$W^{no-FTA}(\beta) = x + qy + m_S S\left(q_n^{\circ}, \tau^{\circ}\right) + mS(q,1) + \beta\alpha^{\circ} m_S,$$

where $\alpha^{\circ} = G(0)$, τ° is the Mill-Bickerdike tariff given by (8), and q_n° is the corresponding price, determined from (A.3). By the envelope theorem,

$$\frac{dW^{FTA}(\beta)}{d\beta} = \alpha(\beta)\, m_S > 0,$$

where $\alpha(\beta)$ is the fraction of countries that align with the hegemon in the solution to (A.7). Under the assumption that $G(\cdot)$ has positive density over a wide support, this fraction is strictly positive. The solution to (A.7) also yields a price function $q_n(\beta)$, which satisfies $\alpha(\beta) \equiv G\left[y\left(q - q_n(\beta)\right)\right]$.

Define the normalized welfare as

$$\Delta(\beta) := \frac{W^{FTA}(\beta) - W^{no-FTA}(\beta)}{m_S} = \left[1 - \alpha(\beta)\right]\mathcal{S}(\beta) + \alpha(\beta)\, S(q,1) - S\left(q_n^{\circ},\tau^{\circ}\right) + \beta\left[\alpha(\beta) - \alpha^{\circ}\right]$$

where $\mathcal{S}(\beta)$ denotes the surplus $S(q_n,\tau)$ from trade with non-aligned countries after accounting for the dependence of q_n and τ on β in the maximization of W^{FTA}, and $\alpha(\beta)$ is the fraction of countries that align with the hegemon when the MFN tariff is optimally chosen. Since $S\left(q_n^{\circ},\tau^{\circ}\right) > \max\left\{\mathcal{S}(\beta), S(q,1)\right\}$, it follows that $\Delta(0) < 0$. Next note that the first-order condition $W'(\tau) = 0$—from which we derive $\tau(\beta)$—implies that as long as the second-order condition $W''\left[\tau(\beta)\right] < 0$

is satisfied, we have

$$\text{sign}\left[\tau'(\beta)\right] = \text{sign}\frac{\partial W'(\tau)}{\partial \beta}.$$

Using equation (A.2), we have

$$\frac{\partial W'(\tau)}{\partial \beta} = \frac{d\alpha}{d\tau} > 0,$$

and therefore $\tau'(\beta) > 0$. Thus, the tariff is strictly increasing in β and by (A.6), so is $\alpha(\beta)$. It follows that $\lim_{\beta\to\infty} \alpha(\beta) > \alpha^{\circ}$ and therefore $\lim_{\beta\to\infty} \Delta(\beta) > 0$. Hence, there exists a threshold β^* such that $W^{FTA}(\beta^*) = W^{no-FTA}(\beta^*)$, where

$$\beta^* = \frac{[1-\alpha(\beta^*)]\,\mathcal{S}(\beta^*) + \alpha(\beta^*)\,S(q,1)}{\alpha(\beta^*) - \alpha^{\circ}} > 0.$$

To verify this inequality, note from (A.2) that

$$\frac{W'(1)}{m_S} = (1-\alpha)\frac{dS(q,1)}{d\tau} + \beta\frac{d\alpha}{d\tau} > 0,$$

which implies that $\tau(\beta) > 1$ and therefore $\alpha(\beta) > \alpha^{\circ}$. That is, whenever FTAs are offered, the optimal tariff is strictly positive and alignment exceeds what it would be without FTAs.

3.3 Characterizing the Optimal Tariff

The first-order condition in (7) together with (A.6) and $p_n = \tau q_n$, can be restated as $W'(\tau) = 0$, where

$$\begin{aligned}\frac{W'(\tau)}{m_S} &= (1-\alpha)\left[-c(p_n)\frac{dq_n}{d\tau} + (\tau-1)\,q_n c'(p_n)\left(q_n + \tau\frac{dq_n}{d\tau}\right)\right] \\ &\quad - [\beta + S(q,1)) - S(q_n,\tau)]\,G'[y(q-q_n)]\,y\frac{dq_n}{d\tau}.\end{aligned} \tag{A.8}$$

Using the definition of the foreign supply function, $e(q_n) := y - (1-m)\,c(q_n)$, and the market clearing condition for non-aligned goods (A.3), which can be expressed as $e(q_n) = mc(\tau q_n)$, we obtain

$$-c(p_n)\frac{dq_n}{d\tau} + (\tau-1)\,q_n c'(p_n)\left(q_n + \tau\frac{dq_n}{d\tau}\right) = c(p_n)\frac{dq_n}{d\tau}\left[(\tau-1)\,\varepsilon_{e(q_n)} - 1\right], \tag{A.9}$$

where $\varepsilon_{e(q_n)}$ is the elasticity of the supply function $e(q_n)$. Substituting this equation, along with (A.5), into (A.8) yields

$$\begin{aligned}\frac{W'(\tau)}{m_S} &= \{1 - G[y(q-q_n)]\}\,c(p_n)\left[(\tau-1)\,\varepsilon_{e(q_n)} - 1\right]\frac{dq_n}{d\tau} \\ &\quad - [\beta + S(q,1)) - S(q_n,\tau)]\,G'[y(q-q_n)]\,y\frac{dq_n}{d\tau}.\end{aligned} \tag{A.10}$$

Since $dq_n/d\tau < 0$, the first-order condition $W'(\tau) = 0$ implies the following expression for the optimal tariff:

$$T(\tau^*) := \tau^* - 1 = \frac{1}{\varepsilon_{e(q_n^*)}} \left\{ 1 + [\beta + S(q,1) - S(q_n^*, \tau^*)] \frac{y}{c(\tau^* q_n^*)} \lambda(\eta^*) \right\}, \tag{A.11}$$

where

$$\lambda(\eta^*) := \frac{G'(\eta^*)}{1 - G(\eta^*)}$$

is the hazard rate of $G(\cdot)$ evaluated at $\eta^* := y(q - q_n^*)$. This corresponds to (10) in the main text.

Now consider how the optimal tariff responds to a parameter ζ. The sign of $d\tau^*/d\zeta$ is the same as the sign of $\partial W'(\tau^*)/\partial\zeta$, which represents the shift in the marginal utility $W'(\tau^*)$ when τ is held constant at its optimal level, τ^*. From (A.10), we have

$$\begin{aligned}
\text{sign}\frac{\partial}{\partial\zeta}\left[\frac{W'(\tau^*)}{m_S}\right] &= -\text{sign}\frac{\partial}{\partial\zeta}\left[\frac{W'(\tau^*)}{m_S \left.\frac{dq_n}{d\tau}\right|_{\tau=\tau^*} \varepsilon_{e(q_n^*)} \{1 - G[y(q - q_n^*)]\} c(p_n^*)}\right] \\
&= \text{sign}\frac{\partial}{\partial\zeta}\frac{1}{\varepsilon_{e(q_n^*)}}\left\{1 + [\beta + S(q,1) - S(q_n^*,\tau^*)]\frac{y}{c(\tau^* q_n^*)}\lambda(\eta^*)\right\} \\
&= \text{sign}\frac{\partial T(\tau^*)}{\partial\zeta},
\end{aligned}$$

because $dq_n^*/d\tau < 0$. That is, the direction in which the optimal tariff responds to any parameter ζ corresponds to the sign of the partial derivative of the expression in equation (A.11).

The elasticity of the supply function $e(q_n) = y - (1-m)c(q_n)$ is

$$\varepsilon_{e(q_n)} = \frac{(1-m)c(q_n)}{y - (1-m)c(q_n)}\left[-\varepsilon_{c(q_n)}\right] > 0,$$

where $\varepsilon_{c(q_n)} < 0$ is the elasticity of the demand function $c(q_n)$. For a given tariff level τ, the impact of an increase in m on this elasticity operates directly through $(1-m)$ and indirectly through q_n. The direct effect is negative. The impact on q_n is obtained from (A.3), expressed as

$$mc(\tau q_n) + (1-m)c(q_n) = y.$$

Therefore

$$\frac{\partial q_n}{\partial m} = -\frac{c(\tau q_n) - c(q_n)}{mc'(\tau q_n)\tau + (1-m)c'(q_n)}.$$

For $\tau > 1$ this derivative is negative. Namely, q_n declines with m for constant τ. Therefore if the demand function has an elasticity that is increasing in price, $\left[-\varepsilon_{c(q_n)}\right]$ is declining with m. Next note that $\frac{(1-m)c(q_n)}{y-(1-m)c(q_n)}$ is declining in m if and only if $(1-m)c(q_n)$ is declining in m. However, holding τ constant,

$$\begin{aligned}\frac{d\left(1-m\right)c\left(q_{n}\right)}{dm} &= -c\left(q_{n}\right)+\left(1-m\right)c'\left(q_{n}\right)\frac{\partial q_{n}}{\partial m} \\ &= -\frac{mc'\left(\tau q_{n}\right)\tau}{mc'\left(\tau q_{n}\right)\tau+\left(1-m\right)c'\left(q_{n}\right)}c\left(q_{n}\right)-\frac{\left(1-m\right)c'\left(q_{n}\right)}{mc'\left(\tau q_{n}\right)\tau+\left(1-m\right)c'\left(q_{n}\right)}c\left(\tau q_{n}\right)<0.\end{aligned}$$

It follows that a sufficient condition for $\varepsilon_{e(q_n)}$ to decline with m is that the demand function $c\left(q_n\right)$ satisfies Marshall's Second Low of Demand, i.e., that $\left[-\varepsilon_{c(q_n)}\right]$ is increasing in q_n.

4 Nash Tariff in a Bipolar World

In a bipolar world the market clearing condition are (11)-(14) in the main text, reproduced here as:

$$m_{H}c\left(q_{h}\right)+m_{F}c\left(\tau_{F}q_{h}\right)+m_{S}c\left(q_{h}\right)=y, \tag{A.12}$$

$$m_{H}c\left(\tau_{H}q_{f}\right)+m_{F}c\left(q_{f}\right)+m_{S}c\left(q_{f}\right)=y, \tag{A.13}$$

$$m_{H}c\left(\tau_{H}q_{n}\right)+m_{F}c\left(\tau_{F}q_{n}\right)+m_{S}c\left(q_{n}\right)=y, \tag{A.14}$$

$$m_{J}c\left(q_{J}\right)+m_{-J}c\left(\tau_{-J}q_{J}\right)+m_{S}c\left(q_{J}\right)=y,\ \ J\in\{H,F\}, \tag{A.15}$$

where m_J is the size of large country J, q_J is the price in J of good y produced in country J and τ_J is the tariff in country J, $J \in \{H, F\}$; q_h is the price in a small country that aligns with H of y produced in this small country, q_f is the price in a small country that aligns with F of y produced in this small country and q_n is the price in a small unaligned country of y produced in this small country. The symbol $-J$ represents a large country that is not J. It follows from these market clearing conditions that $q_h = q_H$ and $q_f = q_F$, and that q_h depends on the tariff in F but not in H while q_f depends on the tariff in H but not in F. Price q_n is the only one that depends on both tariff levels. Since the demand functions $c\left(\cdot\right)$ are declining, it follows that q_h is declining in τ_F, q_f is declining in τ_H and q_n is declining in each one of the tariff levels. Therefore $q_n < \min\{q_H, q_F\}$ for $\tau_H > 1$ and $\tau_F > 1$.

In the bipolar world the objective function of the policy maker in country H is (17) in the main text, reproduced here as:

$$\begin{aligned}W_{H}\left(\tau_{H},\tau_{F}\right) &= x+q_{H}y+m_{H}S\left(q_{H},1\right)+m_{F}S\left(q_{F},\tau_{H}\right) \\ &+m_{h}S\left(q_{h},1\right)+m_{f}S\left(q_{f},\tau_{H}\right)+m_{n}S\left(q_{n},\tau_{H}\right) \\ &+\beta_{H}m_{h}-\delta_{H}m_{f},\end{aligned} \tag{A.16}$$

where $m_h = \alpha_H m_S$, $m_f = \alpha_F m_S$ and $m_h = (1 - \alpha_H - \alpha_F)\, m_S$. Therefore

$$\frac{dm_{h}}{d\tau_{H}}=\frac{d\alpha_{H}}{d\tau_{H}}m_{S},\quad \frac{dm_{f}}{d\tau_{H}}=\frac{d\alpha_{F}}{d\tau_{H}}m_{S},\quad \frac{dm_{n}}{d\tau_{H}}=-\left(\frac{d\alpha_{H}}{d\tau_{H}}+\frac{d\alpha_{F}}{d\tau_{H}}\right)m_{S}.$$

Using properties of the surplus functions outlined in the previous section, this yields (18) in the main text, reproduced here as

$$\frac{\partial W_H}{\partial \tau_H} = (m_F + m_f)\left[-c(p_F)\frac{dq_F}{d\tau_H} + (\tau_H - 1)\, q_F c'(p_F)\frac{dp_F}{d\tau_H}\right] + m_n\left[-c(p_n)\frac{dq_n}{d\tau_H} + (\tau_H - 1)\, q_n c'(p_n)\frac{dp_n}{d\tau_H}\right] + [\beta_H + S(q_h, 1) - S(q_n, \tau_H)]\frac{dm_h}{d\tau_H} + [S(q_f, \tau_H) - S(q_n, \tau_H) - \delta_H]\frac{dm_f}{d\tau_H}. \tag{A.17}$$

Recall from (15)-(16) in the main text that

$$\alpha_H = \int \int^{\min\left\{(q_h - q_n)y, (q_h - q_f)y + \eta_{F,i}\right\}} \gamma(\eta_H, \eta_F)\, d\eta_H d\eta_F, \tag{A.18}$$

$$\alpha_F = \int \int^{\min\left\{(q_f - q_n)y, (q_f - q_h)y + \eta_{H,i}\right\}} \gamma(\eta_H, \eta_F)\, d\eta_F d\eta_H. \tag{A.19}$$

Therefore

$$\alpha_J = \left(\int_{(q_{-J} - q_n)y} \int^{(q_J - q_n)y} + \int^{(q_{-J} - q_n)y} \int^{(q_J - q_{-J})y + \eta_{-J}}\right) \gamma(\eta_H, \eta_F)\, d\eta_J d\eta_{-J}$$

and

$$\frac{d\alpha_H}{d\tau_H} = \left\{\int_{(q_F - q_n)y} \gamma[(q_H - q_n)y, \eta_F]\, d\eta_F\right\} \frac{d(q_H - q_n)y}{d\tau_H} + \left\{\int^{(q_F - q_n)y} \gamma[(q_H - q_F)y + \eta_F, \eta_F]\, d\eta_F\right\} \frac{d(q_H - q_F)y}{d\tau_H}, \tag{A.20}$$

$$\frac{d\alpha_F}{d\tau_H} = \left\{\int_{(q_H - q_n)y} \gamma[\eta_H, (q_F - q_n)y]\, d\eta_H\right\} \frac{d(q_F - q_n)y}{d\tau_H} + \left\{\int^{(q_H - q_n)y} \gamma[\eta_H, (q_F - q_H)y + \eta_H]\, d\eta_H\right\} \frac{d(q_F - q_H)y}{d\tau_H}. \tag{A.21}$$

4.1 An Optimal-Tariff Formula for a Great Power in a Bipolar World

In the main text we present the optimal tariff formula (19) for τ_H in a bipolar world, which we reproduce here as:

$$\tau_H^* - 1 = \frac{1}{\omega_n \varepsilon_{e_n(q_n^*)} + (1-\omega_n)\,\varepsilon_{e_f(q_f^*)}} \left[1 + \omega_n \frac{y}{c\,(p_n^*)}\Omega_n + (1-\omega_n)\,\frac{y}{c\left(p_f^*\right)}\Omega_f\right]. \tag{A.22}$$

The expressions for Ω_f and Ω_n are given in (20) and (21), respectively, in the main text. They are reproduced here as

$$\begin{aligned} \Omega_f \;\; &= \;\; \frac{\mu_{HF}}{m_F + m_f^*}\left\{\beta_H + \delta_H - \left[S\left(q_f^*, \tau_H^*\right) - S\left(q_h^*, 1\right)\right]\right\} \\ &\quad + \frac{\mu_{nF}}{m_F + m_f^*}\left\{\delta_H - \left[S\left(q_f^*, \tau_H^*\right) - S\left(q_n^*, \tau_H^*\right)\right]\right\}, \end{aligned} \tag{A.23}$$

$$\begin{aligned} \Omega_n \;\; &= \;\; \frac{\mu_{Hn}}{m_n^*}\left\{\beta_H - \left[S\left(q_n^*, \tau_H^*\right) - S\left(q_h^*, 1\right)\right]\right\} \\ &\quad + \frac{\mu_{nF}}{m_n^*}\left\{-\delta_H - \left[S\left(q_n^*, \tau_H^*\right) - S\left(q_f^*, \tau_H^*\right)\right]\right\}, \end{aligned} \tag{A.24}$$

where

$$\omega_n := \frac{m_n^* c\,(p_n^*)\,\frac{dq_n}{d\tau_H}}{\left(m_F + m_f^*\right) c\,(p_F^*)\,\frac{dq_f}{d\tau_H} + m_n^* c\,(p_n^*)\,\frac{dq_n}{d\tau_H}},$$

$dq_n/d\tau_H$ is evaluated at $\tau = \tau^*$ and

$$\begin{aligned} \mu_{HF} \;\; &= \;\; m_S \int^{(q_F^* - q_n^*)y} \gamma\left[\left(q_H^* - q_F^*\right)y + \eta_F, \eta_F\right] d\eta_F \\ &= \;\; m_S \int^{(q_H^* - q_n^*)y} \gamma\left[\eta_H, \left(q_F^* - q_H^*\right)y + \eta_H\right] d\eta_H, \end{aligned}$$

$$\mu_{nF} = m_S \int_{(q_H^* - q_n^*)y} \gamma\left[\eta_H, \left(q_F^* - q_n^*\right)y\right] d\eta_H,$$

$$\mu_{nH} = m_S \int_{(q_F^* - q_n^*)y} \gamma\left[\left(q_H^* - q_n^*\right)y, \eta_F\right] d\eta_F.$$

The terms Ω_f and Ω_n, evaluated at the optimal tariff, describe the marginal welfare effects of changes in alignment induced by a decline in q_n and q_F, respectively, and ω_n is the share of the total terms-of-trade effect of a change in the MFN tariff that reflects imports from non-aligned countries. Note that τ_H^* is the best response to a given tariff level τ_F in country F. As before, we have suppressed the functional relationship between variables on the right-hand side and the two tariff rates. The term μ_{HF} describes the density ("number") of small countries that are indifferent between aligning with H or with F, and similarly, μ_{nF} represents the density of countries that are indifferent between aligning with F and remaining nonaligned while μ_{Hn} represents the density of countries that are indifferent between aligning with H and remaining nonaligned. Using these densities, and recalling that q_H does not depend on τ_H, we can express the derivatives of α_H and α_F in (A.20) and (A.21), evaluated at $\tau_H = \tau_H^*$, as

$$m_S \frac{d\alpha_H}{d\tau_H} = -\left(\mu_{Hn} \frac{dq_n}{d\tau_H} + \mu_{HF} \frac{dq_F}{d\tau_H}\right) y, \tag{A.25}$$

$$m_S \frac{d\alpha_F}{d\tau_H} = -\mu_{nF} y \frac{dq_n}{d\tau_H} + \left(\mu_{HF} + \mu_{nF}\right) y \frac{dq_F}{d\tau_H}. \tag{A.26}$$

To derive (A.22), we use (A.17), $m_h = \alpha_H m_S$, $m_f = \alpha_F m_S$ and (A.25)-(A.26) to express the first order condition $\partial W_H / \partial \tau_H = 0$ as

$$\begin{aligned}
0 = \frac{\partial W_H}{\partial \tau_H} &= \left(m_F + m_f^*\right) \left[-c\left(p_f^*\right) \frac{dq_f}{d\tau_H} + \left(\tau_H^* - 1\right) q_f^* c'\left(p_f^*\right) \frac{dp_f}{d\tau_H}\right] \\
&+ m_n^* \left[-c\left(p_n^*\right) \frac{dq_n}{d\tau_H} + \left(\tau_H^* - 1\right) q_n^* c'\left(p_n^*\right) \frac{dp_n}{d\tau_H}\right] \\
&- \left[\beta_H + S\left(q_h^*, 1\right) - S\left(q_n^*, \tau_H^*\right)\right] \left(\mu_{Hn} \frac{dq_n}{d\tau_H} + \mu_{HF} \frac{dq_F}{d\tau_H}\right) y \\
&+ \left[S\left(q_f^*, \tau_H\right) - S\left(q_n^*, \tau_H^*\right) - \delta_H\right] \left[-\mu_{nF} \frac{dq_n}{d\tau_H} + \left(\mu_{HF} + \mu_{nF}\right) \frac{dq_F}{d\tau_H}\right] y.
\end{aligned}$$

The first two lines on the right-hand side of this equation describe the marginal response of surpluses from imported goods from the powerful rival, small countries that align with this rival and small countries that are nonaligned. The last two lines describe the impact of changes in the measure of countries that align with H and the measure of countries that align with F. Using (A.9) and its comparable expression for changes in q_f, we obtain

$$\begin{aligned}
&\left(m_F + m_f^*\right) \left[-c\left(p_f^*\right) \frac{dq_f}{d\tau_H} + \left(\tau_H^* - 1\right) q_f^* c'\left(p_f^*\right) \frac{dp_f}{d\tau_H}\right] \\
&+ m_n^* \left[-c\left(p_n^*\right) \frac{dq_n}{d\tau_H} + \left(\tau_H^* - 1\right) q_n^* c'\left(p_n^*\right) \frac{dp_n}{d\tau_H}\right] \\
&= \left(m_F + m_f^*\right) \left[\left(\tau_H^* - 1\right) \varepsilon_{e\left(q_F^*\right)} - 1\right] c\left(p_f^*\right) \frac{dq_f}{d\tau} \\
&+ m_n^* \left[\left(\tau_H^* - 1\right) \varepsilon_{e\left(q_n^*\right)} - 1\right] c\left(p_n^*\right) \frac{dq_n}{d\tau},
\end{aligned}$$

where the derivatives $dq_f / d\tau_H$ and $dq_n / d\tau_H$ are evaluated at $\tau_H = \tau_H^*$. Therefore, recalling that

$q_f = q_F$,

$$
\begin{aligned}
0 = \frac{\partial W_H}{\partial \tau_H} &= \left(m_F + m_f^*\right)\left[\left(\tau_H^* - 1\right)\varepsilon_{e\left(q_F^*\right)} - 1\right] c\left(p_f^*\right)\frac{dq_f}{d\tau_H} \\
&+ m_n^*\left[\left(\tau_H^* - 1\right)\varepsilon_{e\left(q_n^*\right)} - 1\right] c\left(p_n^*\right)\frac{dq_n}{d\tau_H} \\
&- \left[\beta_H + S\left(q_h^*, 1\right) - S\left(q_n^*, \tau_H^*\right)\right]\left[\frac{\mu_{HF}}{m_F + m_f^*} c\left(p_f^*\right)\frac{dq_f}{d\tau_H}\frac{\left(m_F + m_f^*\right)y}{c\left(p_f^*\right)} + \frac{\mu_{Hn}}{m_n^*} c\left(p_n^*\right)\frac{dq_n}{d\tau_H}\frac{m_n^* y}{c\left(p_n^*\right)}\right] \\
&+ \left[S\left(q_f^*, \tau_H\right) - S\left(q_n^*, \tau_H^*\right) - \delta_H\right]\left[\frac{\mu_{HF} + \mu_{nF}}{m_F + m_f^*} c\left(p_f^*\right)\frac{dq_f}{d\tau_H}\frac{\left(m_F + m_f^*\right)y}{c\left(p_f^*\right)} - \frac{\mu_{nF}}{m_n^*} c\left(p_n^*\right)\frac{dq_n}{d\tau_H}\frac{m_n^* y}{c\left(p_n^*\right)}\right]
\end{aligned}
$$

or

$$
\begin{aligned}
0 &= \frac{\partial W_H}{\partial \tau_H}\frac{1}{\left(m_F + m_f^*\right) c\left(p_f^*\right)\frac{dq_f}{d\tau_H} + m_n^* c\left(p_n^*\right)\frac{dq_n}{d\tau_H}} \\
&= \left(\tau_H^* - 1\right)\left[\omega_n \varepsilon_{e\left(q_n^*\right)} + \left(1 - \omega_n\right)\varepsilon_{e\left(q_f^*\right)}\right] - 1 \\
&- \omega_n \frac{y}{c\left(p_n^*\right)}\Omega_n - \left(1 - \omega_n\right)\frac{y}{c\left(p_f^*\right)}\Omega_f .
\end{aligned}
$$

This yields the optimal tariff formula (A.22).

Assuming that the second-order condition is satisfied, we have for every parameter ζ the relationship

$$
\text{sign}\frac{d\tau_H^*}{d\zeta} = \text{sign}\frac{d}{d\zeta}\left(\frac{\partial W_H}{\partial \tau_H}\right).
$$

Therefore, since $dq_f/d\tau_H < 0$ and $dq_n/d\tau_H < 0$, at $\tau = \tau^*$, we also have

$$
\begin{aligned}
\text{sign}\frac{d\tau_H^*}{d\zeta} &= -\text{sign}\frac{d}{d\zeta}\left\{\frac{\partial W_H}{\partial \tau_H}\frac{\left[\omega_n \varepsilon_{e\left(q_n^*\right)} + \left(1 - \omega_n\right)\varepsilon_{e\left(q_f^*\right)}\right]^{-1}}{\left(m_F + m_f^*\right) c\left(p_f^*\right)\frac{dq_f}{d\tau_H} + m_n^* c\left(p_n^*\right)\frac{dq_n}{d\tau_H}}\right\} \\
&= \text{sign}\frac{d}{d\zeta}\left\{\frac{1}{\omega_n \varepsilon_{e_n\left(q_n^*\right)} + \left(1 - \omega_n\right)\varepsilon_{e_f\left(q_f^*\right)}}\left[1 + \omega_n \frac{y}{c\left(p_n^*\right)}\Omega_n + \left(1 - \omega_n\right)\frac{y}{c\left(p_f^*\right)}\Omega_f\right]\right\},
\end{aligned}
$$

where the left-hand side holds τ_F fixed and the right-hand side holds both τ_H and τ_F fixed.

4.2 Are Rival's Tariffs Strategic Complements or Strategic Substitutes?

Consider the case in which there are no geopolitical considerations in both large countries. In this event every country J imposes its tariff τ_J on all small countries as well as on country $-J$. As a result, the market clearing conditions are (A.14) and (A.15), where q_n is the price of y produced in a small country and q_J is the price of y produced in large country J. Prices q_h and q_f do not exist. In this case $m_f^* = 0$, $m_n^* = m_S$ and the objective function of country H is

$$W_H(\tau_H, \tau_F) = x + q_H y + m_H S(q_H, 1) + m_F S(q_F, \tau_H) + m_S S(q_n, \tau_H),$$

which yields

$$\tau_H^* - 1 = \frac{1}{\omega_n \varepsilon_{e(q_n^*)} + (1 - \omega_n)\varepsilon_{e\left(q_F^*\right)}}, \tag{A.27}$$

where $e_n(q_n^*) := y - m_F c(\tau_F q_n^*) - m_S c(q_n^*)$ and $e_F(q_F^*) := y - m_F c(q_F^*) - m_S c(q_F^*)$ and

$$\omega_n := \frac{m_S c(p_n^*) \frac{dq_n}{d\tau_H}}{m_F c\left(p_F^*\right) \frac{dq_F}{d\tau_H} + m_S c(p_n^*) \frac{dq_n}{d\tau_H}}. \tag{A.28}$$

In this expression $p_n^* = \tau_H^* q_n^*$ and $p_F^* = \tau_H^* q_F^*$. An increase in τ_F does not change the elasticity $\varepsilon_{e\left(q_F^*\right)}$, because the tariff of country F does not impact the market clearing condition (A.15) for $J = F$. Therefore the foreign tariff impacts the best response τ_H^* through two channels: the elasticity $\varepsilon_{e(q_n^*)}$ and the weight ω_n.

With a constant demand elasticity function $c(p) = p^{-\sigma}$,

$$\varepsilon_{e_n(q_n^*)} = \sigma \frac{m_F (\tau_F q_n^*)^{-\sigma} + m_S (q_n^*)^{-\sigma}}{y - m_F (\tau_F q_n^*)^{-\sigma} - m_S (q_n^*)^{-\sigma}}$$

and the market clearing condition (A.14) implies that

$$y - m_F (\tau_F q_n^*)^{-\sigma} - m_S (q_n^*)^{-\sigma} = m_H (\tau_H^* q_n^*)^{-\sigma}.$$

Therefore

$$\varepsilon_{e_n(q_n^*)} = \sigma \frac{m_F (\tau_F)^{-\sigma} + m_S}{m_H \left(\tau_H^*\right)^{-\sigma}}.$$

For constant τ_H^* this elasticity is declining in τ_F, which implies that through this channel an increase in τ_F raises the best response τ_H^*.

Next note that

$$\varepsilon_{e_F(q_F^*)} = \sigma \frac{m_F \left(q_F^*\right)^{-\sigma} + m_S \left(q_F^*\right)^{-\sigma}}{y - m_F \left(q_F^*\right)^{-\sigma} - m_S \left(q_F^*\right)^{-\sigma}}$$

and from the market clearing condition (A.15),

$$y - m_F \left(q_F^*\right)^{-\sigma} - m_S \left(q_F^*\right)^{-\sigma} = m_H \left(\tau_H^* q_F^*\right)^{-\sigma}.$$

Therefore

$$\varepsilon_{e_F(q_F^*)} = \sigma \frac{m_F + m_S}{m_H \left(\tau_H^*\right)^{-\sigma}}.$$

It follows that $\varepsilon_{e_n(q_n^*)} < \varepsilon_{e_f\left(q_f^*\right)}$ as long as $\tau_F > 1$. In this case τ_H^* also responds to a change in τ_F through the weight ω_n; it rises through this channel in response to an increase in τ_F if the increase in τ_F raises the weight ω_n. For a constant elasticity demand function this weight can be expressed as

$$\omega_n := \frac{m_S \left(q_n^*\right)^{-\sigma} \frac{dq_n}{d\tau_H}}{m_F \left(q_F^*\right)^{-\sigma} \frac{dq_F}{d\tau_H} + m_S \left(q_n^*\right)^{-\sigma} \frac{dq_n}{d\tau_H}}.$$

An increase in τ_F, holding constant τ_H^*, does not change q_F^*, but it reduces q_n^*, which increases this weight for given $dq_n/d\tau_H$ and $dq_f/d\tau_H$. However, (A.14) and (A.15) imply that

$$\frac{dq_F}{d\tau_H} = -\frac{m_H \left(\tau_H^*\right)^{-\sigma-1}}{m_H \left(\tau_H^*\right)^{-\sigma} + m_F + m_S} q_F^*,$$

$$\frac{dq_n}{d\tau_H} = -\frac{m_H \left(\tau_H^*\right)^{-\sigma-1}}{m_H \left(\tau_H^*\right)^{-\sigma} + m_F \left(\tau_F\right)^{-\sigma} + m_S} q_n^*,$$

and therefore

$$\omega_n = \frac{\frac{m_S (q_n^*)^{1-\sigma}}{m_H\left(\tau_H^*\right)^{-\sigma} + m_F (\tau_F)^{-\sigma} + m_S}}{\frac{m_F\left(q_F^*\right)^{1-\sigma}}{m_H\left(\tau_H^*\right)^{-\sigma} + m_F + m_S} + \frac{m_S (q_n^*)^{1-\sigma}}{m_H\left(\tau_H^*\right)^{-\sigma} + m_F (\tau_F)^{-\sigma} + m_S}}.$$

It follows that for constant τ_H^* this weight is increasing in the tariff τ_F if and only if

$$\frac{m_S \left(q_n^*\right)^{1-\sigma}}{m_H \left(\tau_H^*\right)^{-\sigma} + m_F \left(\tau_F\right)^{-\sigma} + m_S}$$

is increasing in τ_F. Next note that τ_F has a direct effect on this expression and an indirect effect through q_n^*. The direct effect raises ω_n when τ_F increases. An increase in τ_F also reduces q_n^*, which raises this expression when $\sigma > 1$. We therefore conclude that an increase in τ_F raises ω_n both through the direct and the indirect effects.

In summary, an increase in τ_F reduces the elasticity $\varepsilon_{e_n(q_n^*)}$ and raises the weight ω_n, and both these effects increase the best response τ_H^*.

5.1 Model Calibration

We obtain data from two sources. First, we obtain voting records for the U.N. General Assembly from 1946 through September 10, 2024 from the UN Digital Library.[40] Each entry in the dataset is a country-resolution pair that indicates how the country voted on the UNGA resolution (either Yes, No, Abstention, or Non-Voting). Second, we obtain annual GDP data for UN countries from 1970 through 2023 from the UN Statistics Division.[41]

The only substantive data cleaning step is to attach GDP data to the UN voting dataset. Our analysis only requires us to do this for the years 1997 and 2023; these are the years we use for GDP in the hegemon and bipolar calibrations, respectively, as we discussed in the main text. We perform

[40] Data are available at https://digitallibrary.un.org/record/4060887?ln=en#files.

[41] Data are available at https://data.un.org/Data.aspx?q=gdp+us+dollars&d=SNAAMA&f=grID%3a101%3bcurrID%3aUSD%3bpcFlag%3a0.

	1995-1998 voting	**2021-2024 voting**
Number of Small Countries	180	191
Unweighted Average of $f_{H,i}$	0.293	0.347
Unweighted Average of $f_{F,i}$	n/a	0.636

Table A.1: Summary Statistics for Voting Similarity Measure

this merge using a crosswalk from UN Statistical Division between M49 codes (used in GDP data) and ISO3 codes (used in voting data).[42] We manually correct this crosswalk in three cases:

1. We add GDP attributed to Greenland to that of Denmark. Greenland is an autonomous territory of Denmark that Denmark represents in the UN.
2. We set the GDP of Tanzania to the sum of GDPs of the sub-national entities of Mainland Tanzania and Zanzibar.
3. We reassign M49 code 736 (pres-2011 unified Sudan) to the code 729, which the crosswalk maps to pre-2011 Sudan in the UN voting data.

As described in the main text, we use UN voting data to calibrate the distribution of small country alignment costs in both the unipolar and bipolar models. We calibrate the distribution of alignment costs in the hegemon model, $G(\cdot)$, based on UN voting from 1995-1998 and GDP in 1997, and we calibrate the distribution of alignment costs in the bipolar model, $\Gamma(\cdot)$, based on UN voting data from 2021-2024 and GDP in 2023.

To calibrate these distributions, we compute, for each great power J and each small country i, the share of votes $f_{J.i}$ (in the relevant range of years) for which J and i cast the same vote, among resolutions on which neither is non-voting.[43] Letting V be the set of all votes v and letting $v_j \in \{\text{Yes, No, Abstention, Non-Voting}\}$ be j's vote on v, we compute

$$f_{J,i} = \frac{\sum_{v \in V} \mathbf{1}_{v_J \neq \text{Non-Voting}} \mathbf{1}_{v_i \neq \text{Non-Voting}} \mathbf{1}_{v_J = v_i}}{\sum_{v \in V} \mathbf{1}_{v_J \neq \text{Non-Voting}} \mathbf{1}_{v_i \neq \text{Non-Voting}}}.$$

In the 1995-1998 period, there are four countries—Iraq, Somalia, São Tomé and Príncipe, and Yugoslavia—that appear in the UN voting data but whose votes are all "Non-Voting." We remove these countries from our analysis. In the 2021-2024 period, there are no such countries. All remaining countries vote on some (usually all, or almost all) of the same votes as the United States and China, allowing us to compute $f_{J,i}$.

The following table reports summary statistics for our voting similarity measure.

[42] The crosswalk is available at https://unstats.un.org/unsd/methodology/m49/overview/

[43] In the calibration of the unipolar model, we treat China as a small country. So $J = H$ and we consider $i = CHN$. In the calibration of the bipolar model, we treat China as a large country. So we consider $J = H$ and $J = F$, and we do not consider $i = CHN$.

We compute each country's alignment costs by setting

$$\eta_{J,i} = \kappa GDP_i(\bar{f}_J - f_{J,i})$$

as described in the main text. Finally, we set $G(\cdot)$ and $\Gamma(\cdot)$ by fitting one- and two-dimensional Gaussian mixture models to $\eta_{H,i}$ and $(\eta_{H,i}, \eta_{F,i})$, respectively. In doing so, we weight each small country by its GDP by fitting the Gaussian mixture models to an augmented empirical distribution of alignment costs that repeats each small country's costs a number of times that it proportional to its GDP. Guided by the data, we allow for three Gaussian mixture components when fitting $G(\cdot)$ and two when fitting $\Gamma(\cdot)$.

5.2 Alternative Calibration for Alignments with the Hegemon

The main text refers to an alternative calibration of the unipolar model based on UN voting in the 2021-2024 period. This section of the appendix details that alternative calibration and the corresponding results.

The alternative calibration uses the same values of all model parameters, except three: the size of Home, whose alternative calibration we denote $m_{H,\text{alt}}$, the complementary mass of all small countries, $m_{\text{S,alt}}$, and the distribution of alignment costs, $G_{\text{alt}}(\cdot)$. We set $m_{H,\text{alt}}$ to the US's share of 2023 world GDP, i.e., $m_{H,\text{alt}} = 0.265$, as in the bipolar calibration. We accordingly set $m_{S,\text{alt}} = 1 - m_{H,\text{alt}} = 0.735$. We set $G_{\text{alt}}(\cdot)$ equal to the marginal distribution over $\eta_{H,i}$ of the distribution of alignment costs $\Gamma(\cdot)$ used in the main text for the bipolar case. Formally, for all $\eta_{H,i}$,

$$G_{\text{alt}}(\eta_{H,i}) = \lim_{\eta_{F,i} \to \infty} \Gamma(\eta_{H,i}, \eta_{F,i}).$$

Because of this construction, the marginally aligning countries under $G_{\text{alt}}(\cdot)$ are the same as the marginally Home-aligning countries under $\Gamma(\cdot)$. These are Japan and San Marino, both of whom vote with the US 50.4% of the time in the UNGA. Figure A.1 displays a histogram of the estimates of $\eta_{H,i}$ that underlie our calibration of $\Gamma(\cdot)$ and, therefore, $G_{\text{alt}}(\cdot)$, as well as our estimate of $G_{\text{alt}}(\cdot)$ itself.

This calibration implies that the hegemon's optimal tariff is 14.4%. As can be seen in Figure A.2, the geopolitical component accounts for close to half of this tariff. Absent geopolitical considerations, the hegemon would impose a uniform tariff of 9.2% and offer no FTA to any partners. Under our calibration, however, the hegemon attracts as allies countries comprising 43.0% of world GDP, compared to the 40.2% that would align under free trade. This stick-and-carrot approach yields an average applied tariff of 4.8%, far lower than the MFN rate levied on non-aligners.

Panel (a) of Figure A.2 also allows us to examine how the optimal MFN tariff varies with the hegemon's preference for alignment. When β_H is below roughly 0.033, the hegemon offers no FTAs and defaults to the Mill-Bickerdike tariff. Consistent with our theoretical analysis, the optimal tariff rises with β_H whenever the hegemon finds it advantageous to offer preferential access to encourage alignment. For example, our estimates suggest that doubling the value that the hegemon places

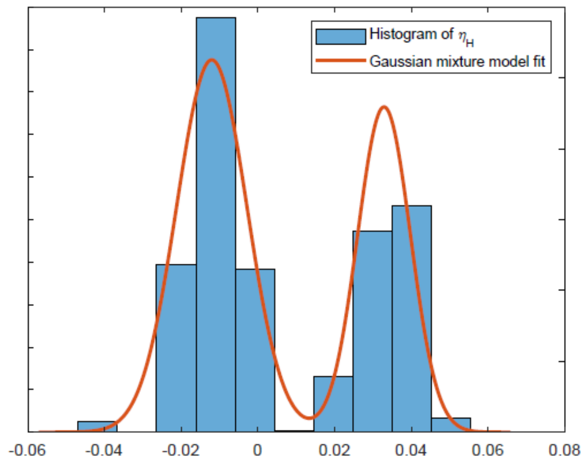


Figure A.1: Histogram and Estimated Distribution of Alignment Costs for Alternative Calibration

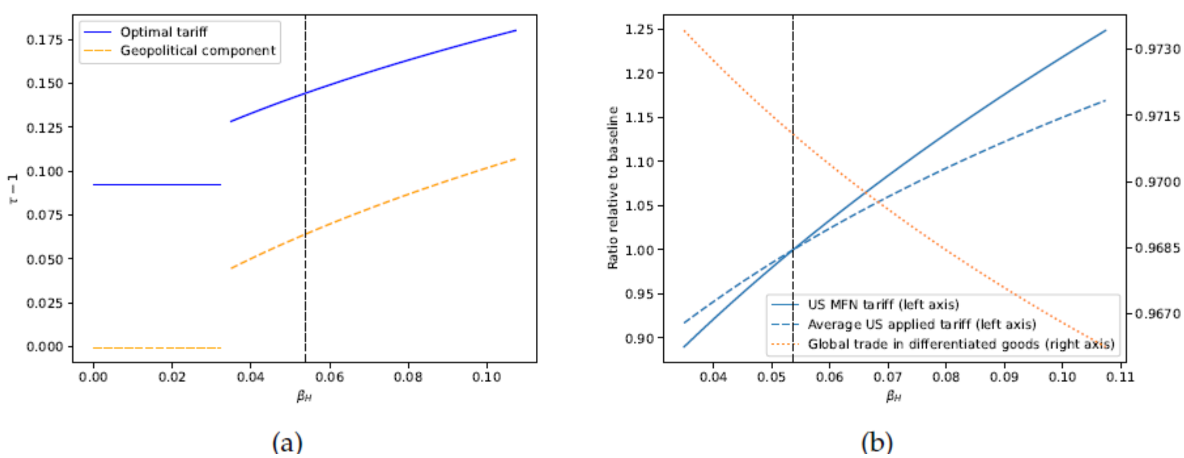
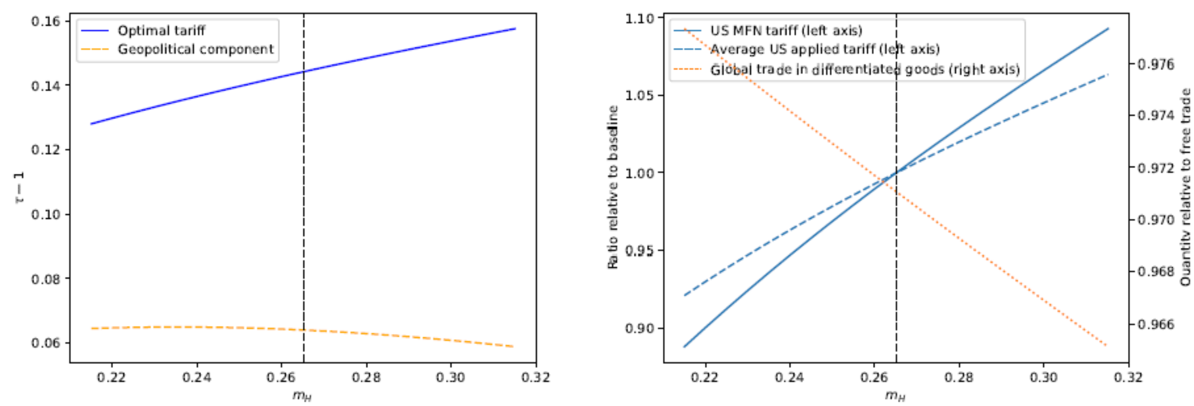


Figure A.2: Optimal Tariff as Function of β_H in Alternative Unipolar Calibration



(a) (b)

Figure A.3: Optimum Tariff as Function of Size in Alternative Calibration

on allies would push the optimal tariff to around 18%. As in the main text, panel (b) shows the MFN tariff rate and the average applied tariff (i.e., tariff revenues divided by the hegemon's total f.o.b. imports) relative to their estimated baseline levels for preference parameters large enough to induce FTAs. Predictably, stronger geopolitical preferences lead to larger tariffs and less trade.

Figure A.3 plots the optimal tariff as a function of the hegemon's size. The tariff rises with m_H, reflecting the enhanced market power and stronger terms-of-trade motive that come with increased size. Unlike in our primary unipolar calibration in the main text, here we find that the geopolitical component in the total tariff falls in the hegemon's size. Evidently, the hazard rate effect no longer counteracts the rising opportunity cost of offering preferential access and the expanding MFN tariff base associated with improved terms of trade. Still, panel (b) shows that, as in the main text, openness—whether measured by average applied tariffs or by the volume of trade relative to the free-trade benchmark—declines as the hegemon comes to dominate the global economy.

5.3 Optimal Tariffs in the Bipolar World

Best Response Functions

Within our calibrated bipolar model, we compute the best response functions for both H and F. As discussed in Section 4.2, there are many competing channels that can make either country's tariffs a complement or substitute to that of the other. Figure A.4 illustrates the net impact of these forces by plotting the best-response functions. The plot shows that from H's perspective, F's tariff is a modest substitute to its own, while from F's perspective, H's tariff is a very slight complement to its own.

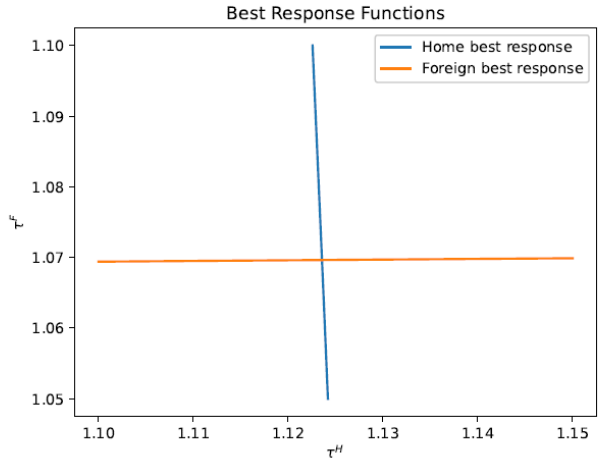


Figure A.4: Best Response Functions in the Bipolar Calibration

Alignment with and without FTAs

In our calibrated bipolar model, both large countries offer free trade agreements and impose tariffs on countries that do not align with them. In Figure A.5 we provide a visual representation of how these optimal policies affect the alignment decisions of small countries. The figure shows the empirical distribution of alignment costs inferred from UN voting data as well as contour lines of the Gaussian mixture model that we fit to it. The vertical, horizontal, and diagonal lines in the plot represent the boundaries between regions of alignment costs within which small countries align with either H, F, or neither. The black dashed lines represent these boundaries under free trade, i.e., when neither country uses trade as a carrot or a stick. In this case, 54.6% of small countries align with H, 9.3% of small countries align with F, and 36.1% remain non-aligned. The red dash-dotted lines, by contrast, represent the boundaries between alignment regions under H's and F's optimal (Nash) policies. Since each large country offers an FTA to aligners and imposes a positive tariff on others, more small countries align with each of them than under free trade: 58.2% of small countries align with H, 13.0% align with F, and 28.8% remain non-aligned.

Expansion of *F* at the Expense of *H*

In the main text, we considered the case where F expands at the expense of small countries. This mirrors the rise of China between 1990 and the present, which has come mostly at the expense of countries other than the United States. In this appendix, we instead consider the case where F's size m_F expands at the expense of H's size m_H, while the size of all other countries m_S is held fixed. One interpretation is that this reflects a possible future in which China grows faster than the rest of the world while the United States grows slower than the rest of the world.

Figure A.6 reports the results of this simulation. Panel (a) shows that F's tariff grows roughly linearly in its size, from 7.0% in our baseline calibration to 19.0% when F grows to fully subsume

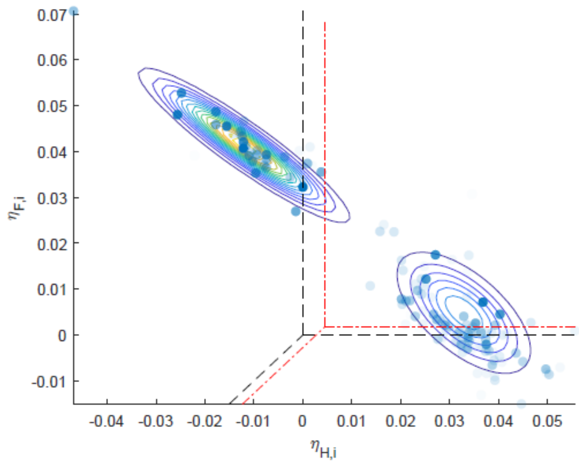
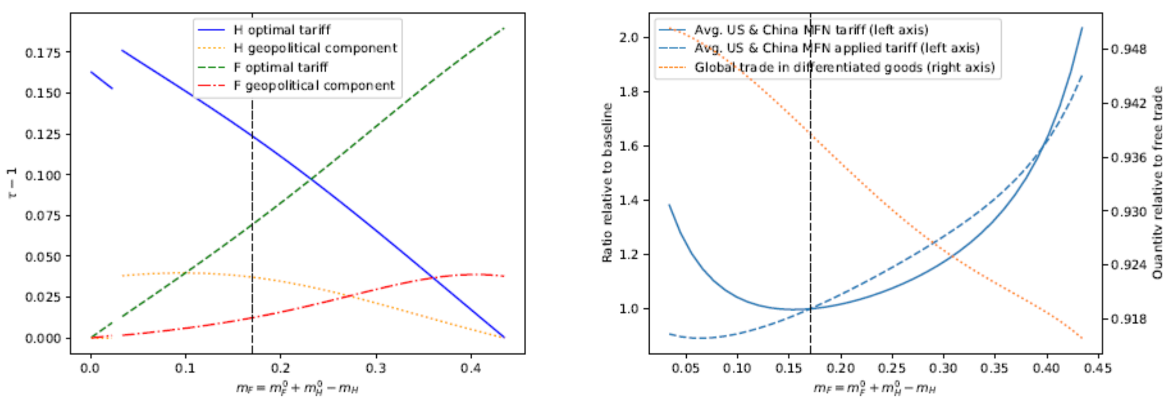


Figure A.5: Estimated Alignment Costs for Bipolar Case Under Free Trade and Nash Tariffs



(a) (b)

Figure A.6: Expansion of F at the expense of H

H's mass. As in the comparative static we consider in the main text, most of this tariff hike reflects F's rising market power, while the geopolitical component for its tariff remains modest.

Somewhat less similarly to the main text, H's tariff now responds sharply to the growth of F. This is unsurprising because, as F's growth comes at H's expense, any growth in F reduces H's market power and so—except when it affects H's decision about whether to offer an FTA—decreases H's optimal tariff.[44]

Panel (b) shows that, as in the main text, average tariffs respond non-monotonically to changes in the size of country F while global trade overall falls. However, the decline in trade is substantially more gradual than in the comparative static considered in the main text. This reflects the simple fact that, in the comparative static considered here, the total share of world GDP controlled by tariff-imposing great powers does not rise as F grows, since H shrinks one-for-one in this growth.

[44] The jump in H's tariff when F reaches about 3% of world GDP reflects that H does not offer FTA's when it is sufficiently large compared to F.

The fact that global trade falls, despite this fact, mainly reflects that—since a smaller mass of countries align with F than H—F applies its tariff to more small countries.