Contesting an International Trade Agreement*

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Abstract

After governments sign an international trade agreement (TA), each government must ratify the TA. Often, this ratification process is lengthy and the outcome highly uncertain. We model a two-country TA where, unlike prior literature, pro-trade and anti-trade interest groups in each country recognize that (i) TA implementation requires ratification by *both* governments and (ii) they cannot condition contributions on their government's ratification decision. In this new class of contests, which we call 'parallel contests', we show that (i) anti- and pro-trade lobbies lobby in equilibrium, (ii) the probability of TA ratification lends itself to intuitive and tractable comparative statics, and (iii) the protection embodied in negotiated TA tariffs reflects a tension between the liberalizing force of lobbying and inherently protectionist government preferences.

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1 Introduction

Anecdotal evidence suggests conflicting lobbying interests and inherent ratification uncertainty characterize international trade agreements (TAs). Despite the final text of the Uruguay Round of multilateral negotiations being essentially settled in December 1993, it was not signed until April 1994 and not ratified by the US Congress until December 1994.¹ With about 12 months between completion of negotiations and ratification, Strange (2013, p.121) documents the conflicting lobbying interests between US small businesses, represented by the anti-trade ‘US Business and Industrial Council’, and major US corporations, represented by the pro-trade ‘Alliance for GATT Now’ (also, see Dam (2001, p.14)). Even after the affirmative US House of Representatives vote on November 29th 1994, media reports explicitly documented the uncertain outcome in the Senate citing statements by Senate leaders and last-minute cajoling of wavering Senators by President Clinton.² Thus, conflicting lobbying interests and inherent ratification uncertainty have long characterized multilateral TAs.

Multilateral TAs are the historical cornerstone of the TA landscape with countries negotiating the level of non-discriminatory MFN tariffs. But, TAs between small groups of countries, the Trans-Pacific Partnership (TPP) among 12 countries being a larger example, have proliferated since the Uruguay Round. Known as Preferential Trade Agreements (PTAs) or Free Trade Agreements (FTAs) because members exchange (essentially) reciprocal tariff free access while maintaining tariffs on non-members, negotiations center around duration of product-specific tariff phase-out periods and other non-tariff rules.³ Like multilateral TAs, substantial time elapses between the start of negotiations and implementation with the literature suggesting 3-4 years and around half this time for negotiations.⁴ Again, anecdotal evidence suggests conflicting lobbying interests and inherent ratification uncertainty characterize PTAs.

After release of the final text in October 2015, the TPP provides a recent example spanning North American and Asian-Pacific countries. With increased export market access, various US agricultural groups (e.g. National Pork Producers Council, National Chicken Council, National Council of Farmer Cooperatives, American Farm Bureau and the National Corn Growers Association) and dairy producers (e.g. Land O’Lakes, Kraft-Heinz

¹See https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact5_e.htm.

²See <https://goo.gl/IZ9i1L>.

³Articulated in GATT Article I, non-discrimination is the fundamental principle of global trade whereby a country’s MFN (Most Favored Nation) tariff is imposed on *all* other countries. The main exception to this non-discrimination principle are FTAs, allowed by GATT Article XXIV. GATT Article XXIV only requires FTA members eliminate trade barriers on substantially all trade within a reasonable period of time. Despite this inherently vague language, Hakobyan et al. (2017) document that excluding products from eventually being tariff free is extremely rare for FTAs involving the US, EU or Japan.

⁴See Mölders (2012, 2015) and Freund and McDaniel (2016).

and the National Milk Producers Federation) lobbied in support of the TPP. Further lobby support came from those also benefiting from tariff free intermediate inputs (e.g. Nike, Walmart and the Outdoor Industry Association). Lobby group opposition in the US came from automakers (e.g. Ford and General Motors), based on the TPP not addressing currency manipulation issues, tobacco manufacturers (e.g. Phillip Morris and Altria), because the TPP excluded the tobacco industry from investor-state dispute settlement mechanisms, labor unions (e.g. AFL-CIO, Teamsters and United Steelworkers) and environmental groups (e.g. Sierra Club). Against this backdrop of conflicting lobbying influences, the Trump administration abandoned the TPP in early 2017 despite earlier news reports optimistic over passage during the Obama-Trump transition period.⁵

We model a two-country TA where governments negotiate reciprocal liberalization from initial ‘status quo’ tariffs and interest groups lobby their national government over TA ratification. We take these status quo tariffs as exogenous, remaining agnostic about their origin. Following earlier literature (e.g. Bagwell and Staiger (1999)), our negotiated TA tariffs must respect a ‘reciprocity rule’ that ensures equal exchange of market access. The only additional structure imposed on the negotiation process between governments is that it yields a Pareto efficient outcome. Through modeling negotiated and non-discriminatory MFN tariffs, this setup represents a multilateral TA. However, PTAs can be thought of as a special case in our framework where the ‘negotiated’ TA tariffs are exogenously zero rather than endogenous. Thus, our framework can address either multilateral TAs or PTAs.

Upon negotiation of the TA tariffs, a ‘pro-trade’ and an ‘anti-trade’ lobby make contributions to their national government supporting or opposing the TA. After receiving contributions, each national government decides whether to ‘ratify’ the TA with the negotiated TA tariffs being implemented only if both governments ratify the TA; otherwise, the status quo tariffs prevail. Following the contest literature, we model each government’s ratification decision using a contest success function (CSF); the CSF attaches higher probability to TA ratification as relative contributions of the pro-trade lobby rise.⁶

Our framework is quite general. On the political economy side, we consider the possibility that government TA ratification decisions could depend solely on lobbying contributions or that ‘additional factors’ may also matter; e.g., national welfare, tariff revenue or employment

⁵Ratification uncertainty is not a characteristic particular to the TPP. The US House of Representatives vote on CAFTA-DR, a PTA between the US and Central America, lay on a knife edge before eventually passing by only two votes. Despite being signed in 2007, similar votes for individual US PTAs with Korea, Colombia and Panama appeared dead before resuscitation by the Obama administration in 2010 and eventual Congressional passage in 2011.

⁶The contest literature, or ‘Tullock contest’ literature, starts with Tullock (1980) (see Van Long (2013) for a literature review). Skaperdas (1996) axiomatizes the basic CSF where contestants can only make one type of investment (‘contribution’ in our terminology).

in the import-competing sector. These additional factors combine with lobbying contributions to form an ‘augmented’ contribution.⁷ On the international trade side, choosing a particular model of international trade microfounds the strength of lobby support and opposition for the TA as well as any ‘additional factors’ that influence government TA ratification decisions. We show how our framework lends itself to various well known models including the specific factors model, the oligopoly model, and the Melitz model.

Two immediate results emerge in this general setup. First, the anti-trade and pro-trade lobby groups both make contributions in equilibrium. That is, conditional on the TA tariffs announced by governments, anti-trade *and* pro-trade lobbies directly influence the subsequent equilibrium ratification decision of their own government. As described above, conflicting lobbying interests are a pervasive feature of the real world TA ratification process. Nevertheless, in the benchmark “Protection for Sale” lobbying model, only the anti-trade lobby *or* the pro-trade lobby makes equilibrium contributions when lobbying over TA ratification.⁸ Thus, equilibrium lobbying over TA ratification by the anti-trade and pro-trade lobbies is an important feature of our framework.

Second, we show that the *probability* of a government ratifying the TA depends on the strength of pro-trade lobby support relative to the strength of anti-trade lobby opposition. Thus, uncertainty always characterizes the TA ratification process and in an intuitive manner. Not only do real world TA ratification processes appear subject to inherent uncertainty, as described above, but the benchmark Protection for Sale framework predicts that either TA ratification takes place or that TA ratification does not take place.⁹ Further, given one can microfound the strength of support and opposition using a particular underlying model of trade, our framework allows tractable comparative statics regarding the likelihood of TA formation. In turn, our framework can shed light on the empirical determinants of PTAs pioneered by Baier and Bergstrand (2004). Section 5 illustrates these features using the Melitz model, already a cornerstone of the modern empirical and quantitative trade literature.

In addition to results regarding the TA ratification process, our framework also delivers predictions regarding the TA tariffs negotiated by governments. However, given the general-

⁷In the Appendix, we show our results are robust to an ‘all-pay contest’ setting where the lobby group making the highest contribution sways their government’s TA ratification decision with certainty. Despite certainty over the government TA ratification decisions conditional on contributions, all-pay contests have the well known feature that equilibrium contribution strategies take the form of mixed strategies. Thus, ex-ante, TA ratification decisions remain uncertain.

⁸See Grossman and Helpman (1995a, p.671). Note, Grossman and Helpman (1994) is the seminal Protection For Sale paper where a single small country unilaterally determines its MFN tariff. Grossman and Helpman (1995b) extends their traditional setting to multilateral negotiation of MFN tariffs by two large countries. Grossman and Helpman (1995a) extends their traditional setting to bilateral PTA ratification.

⁹See Definitions 1-2 of Grossman and Helpman (1995a, p.673, p.676), remembering that each lobby group lobbies either for or against the TA (Grossman and Helpman (1995a, p.671)).

ity of the framework described so far, characterizing the TA tariffs requires further structure governing the impact of trade liberalization on the strength of interest group support and opposition for the TA. Specifically, our results use two properties. First, a more liberal TA *polarizes* the pro-trade and anti-trade lobby by strengthening the pro-trade lobby’s support for the TA and strengthening the anti-trade lobby’s opposition to the TA. Second, a more liberal TA generates *pro-trade biased polarization* by strengthening the pro-trade lobby’s support for the TA relative to the anti-trade lobby’s opposition to the TA. In Section 5, we show these two properties hold quite naturally in a variety of standard trade models.

Numerous insights emerge regarding the TA tariffs negotiated by governments. First, once lobbying influences have sufficient sway over government TA ratification decisions, the most liberal TA possible (i.e. subject to the rule of reciprocity discussed above) is the equilibrium TA. Here, the most liberal TA possible maximizes lobbying contributions, which dominate a government’s TA ratification decision, by maximizing both the strength of support and opposition to the TA. This contrasts with typical Protection for Sale setups where protection rises as government decisions increasingly reflect lobbying influences.

Second, given the most liberal TA possible results when lobbying sufficiently sways government TA ratification decisions, our framework suggests that observed real world protection levels stem from governments having inherently *protectionist* preferences (i.e. ‘anti-trade’ additional factors) which balance the liberalizing influence of lobbying. This contrasts with the common theme in the Protection for Sale literature where equilibrium protection results from the balance between protectionist lobbying forces and a national welfare minded government. Nevertheless, Conconi et al. (2014) present compelling empirical evidence that governments, and politicians, have inherent protectionist motives related to re-election motives. Further, Lake and Millimet (2016) show how the PTA voting behavior of US House Representatives become less protectionist as their constituents receive more trade related redistribution, especially when the representative faces non-trivial re-election risk.

Third, this contrast between protection emerging from inherently protectionist government preferences (our framework) versus protection emerging despite inherently welfare-minded government preferences (the traditional framework) has implications for using data to infer the extent to which governments value factors other than lobbying. The empirical Protection For Sale literature where governments inherently value national welfare has shown that relatively low real world tariffs imply strongly welfare minded governments (see, e.g., Goldberg and Maggi (1999) and Gawande and Bandyopadhyay (2000)). Yet, the literature has often acknowledged that “[t]his finding sits poorly with casual observations” (Gawande et al. (2012, p116)) of anecdotal evidence regarding the pervasiveness of lobbying. Our framework offers the perspective that real world tariffs stem from inherent government

preferences for protection and, in turn, relatively low tariffs suggest government negotiations over TA tariffs reflect strong lobbying influences.

The different timing assumption regarding government-lobby interaction explains why our results differ from the benchmark Protection for Sale framework. In our contest framework, lobbies contribute *before* their government’s trade policy decision. However, in the menu auction setting of Protection for Sale, lobbies contribute *after* their government’s trade policy decision. This explains why both lobbies contribute in equilibrium and, in turn, why residual uncertainty prevails over TA ratification. It also explains the different degrees of liberalization across the frameworks. Because a more liberal TA increases the strength of anti-trade lobby opposition, a more liberal TA increases (decreases) anti-trade lobby contributions when they contribute before (after) the government’s trade policy decision. Combined with a more liberal TA increasing pro-trade lobby contributions in both frameworks, greater liberalization prevails in our contest framework. Indeed, our timing assumption reflects the reality of trade policy in many national legislatures, including the US Congress, where lobby groups legally lobby between signing and ratification of a TA but cannot legally link lobbying contributions to future policy outcomes.¹⁰

In Section 5, we explicitly compare our contest framework with the benchmark menu auction Protection for Sale framework using a variety of underlying trade models, including a version of the stylized specific factors model from Grossman and Helpman (1995a). Grossman and Helpman (1995b) show that the status quo tariffs in a two-country world combine a politics component and a terms of trade component. Further, the TA eliminates the terms of trade component but leaves the politics component. In contrast, we show that, when lobbying contributions dominate government ratification decisions among symmetric governments, our contest framework delivers free trade as the equilibrium TA. Extending this simple economic environment to a three-country world, we find a similar result regarding formation of a bilateral Free Trade Agreement (FTA). Although two governments decide against bilateral FTA formation in a menu auction framework like Grossman and Helpman (1995a), the two governments propose an FTA formation in our contest framework.

The seminal contribution of Bagwell and Staiger (1999) says eliminating terms of trade externalities is the sole purpose of TAs. Given our framework suggests TA formation can remove the politics component of status quo tariffs, one may think our results suggest TAs can do more than eliminate terms of trade externalities. We caution against this interpretation. In a simple two-country symmetric environment, reciprocity requires a symmetric TA tariff.

¹⁰Prior literature has argued that the menu auction timing assumption reflects a reduced form for repeated interaction embodying an implicit contract between lobby groups and the government. Nevertheless, taking the TA tariffs as given upon TA ratification and governed by WTO rules, any repeated interaction in our context would necessarily be over variables outside the scope of our model.

Moreover, the key mechanism underlying pro-trade lobby TA support is the market access gained abroad through lower tariffs increasing the world price. Thus, such support relies on terms of trade externalities. That is, our TA formation process can eliminate politics from the status quo tariffs by leveraging these terms of trade externalities. In essence, our results emphasize that a TA can eliminate politics from the status quo tariffs by changing the nature of political interaction between governments and lobbies from that underlying the status quo tariffs to that of our contest framework.

By modeling the real-world feature of TA ratification, and its real-world features of inherent uncertainty and conflicting lobbying interests, our framework also builds on other important strands of the TA literature. Bagwell et al. (2016) describe the main strands of the multilateral TA literature to be those that explain multilateral TA formation via (i) terms of trade externalities (e.g. Bagwell and Staiger (1999)), (ii) domestic commitment problems (e.g. Maggi and Rodriguez-Clare (1998, 2007)), (iii) delocation and profit shifting externalities (e.g. Ossa (2011) and Mrázová (2011)) and (iv) offshoring (e.g. Antras and Staiger (2012)). But none of these strands model TA ratification. Nor has the large extant literature investigating the interactions between Preferential Trade Agreements (i.e. FTAs and Customs Unions) and multilateral tariff liberalization modeled TA ratification (e.g. Levy (1997), Krishna (1998), Ornelas (2005), Saggi and Yildiz (2010), Mrázová et al. (2012) and Lake and Roy (2017)).

Our paper also relates to influential papers in the early trade and political economy literature beyond the seminal contributions of Grossman and Helpman (1994, 1995a,b). Findlay and Wellisz (1982) posit that a “tariff formation” function determines unilateral trade policy by mediating the countervailing influences of lobbying by import-competing and export sectors. In our framework, the interdependence of contests between countervailing lobbies in each country determine *whether* reciprocal liberalization takes place. And, in turn, politically-motivated governments choose the degree of liberalization. Hillman (1982) models a government’s optimal unilateral tariff using a “political support” function that balances future political support by industry against future political opposition by consumers. Hillman and Moser (1996) extend this approach, using a political support function that pits import-competing interests against exporter interests in a setting where two governments negotiate reciprocal liberalization. In contrast to these two papers, our framework formally models interest group influence through contests.¹¹

Building on the existing contest literature, our framework represents a new class of con-

¹¹Moving away from our central interest of ratifying reciprocal trade policy, Hillman and Ursprung (1988) model electoral competition between liberal and protectionist politicians who choose the particular trade policy instrument and its level. These politicians know their election prospects depend on contributions by domestic and foreign interest groups whose trade policy preferences collide.

tests that we call ‘parallel’ contests. In standard contests, interested parties contest each other while attempting to influence a single “decision maker” whose decision decides the contest outcome (e.g. employees expend effort when jockeying for a promotion or firms spend resources in R&D and patent races). However, many real-world settings feature the possibility of beneficial collaboration between two entities where interested parties *within* each entity contest each other when trying to influence the collaboration decision of the decision maker in *their own* entity. Naturally, moving ahead with collaboration requires mutual consent of both entities, which intrinsically links these ‘parallel’ contests. TAs are one such example. We discuss examples spanning international negotiations as well as between-firm and within-firm situations in the Conclusion.¹²

The paper proceeds as follows. Section 2 introduces the basic model, formalizing the TA formation process. Section 3 investigates the contest framework where government TA ratification decisions only depend on lobbying contributions. Section 4 allows ratification decisions to depend on additional factors. Section 5 illustrates our results, making sharp comparisons with the Protection For Sale menu auction framework and our parallel contest framework. Section 6 concludes.

2 Model

2.1 Structure of a Trade Agreement

We model a two-country trade agreement (TA). The national governments in the Home and Foreign countries levy ad-valorem import tariffs $t \geq 1$ and $t^* \geq 1$ respectively so that $t = t^* = 1$ implies free trade. Prior to the TA, the ‘status quo tariffs’ $\mathbf{t}_{SQ} = (t_{SQ}, t_{SQ}^*)$ are exogenously given (hereafter, the superscript $*$ denotes Foreign variables). Through the TA, governments engage in reciprocal tariff liberalization to $\mathbf{t}_{TA} = (t_{TA}, t_{TA}^*) \leq \mathbf{t}_{SQ}$.

We assume $\mathbf{t}_{TA}$ respects an exogenous ‘reciprocity rule’ that fixes the rate that t_{TA} changes relative to t_{TA}^* . The literature suggests various possible interpretations. For Bagwell and Staiger (1999), it reflects a requirement that, measured at the status quo world prices, tariff liberalization induces equal changes in import volumes across countries. They show this is equivalent to tariff liberalization preserving the terms of trade prevailing at $\mathbf{t}_{SQ}$ in a multi-sector model. Following their approach, we assume the reciprocity rule preserves equal

¹²Those familiar with the contest literature may recognize a similarity with the Colonel Blotto game. However, the Colonel Blotto game assumes the pro-collaboration (or anti-collaboration) agents across the parallel contests can perfectly coordinate and pool their resources, whereas we assume away the possibility of such coordination or pooling. Ultimately, the extent and importance of such coordination in the specific application should depend on which end of the modeling spectrum one follows.

changes in import volumes valued at status quo world prices. Specifically, we represent the reciprocity rule by the unit vector $\mathbf{u}(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) = (u_{TA}(\mathbf{t}_{TA}; \mathbf{t}_{SQ}), u_{TA}^*(\mathbf{t}_{TA}; \mathbf{t}_{SQ}))$, where $u_{TA}^*(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) / u_{TA}(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ gives the required rate at which t_{TA}^* must change relative to t_{TA} . Given the status quo tariffs $\mathbf{t}_{SQ}$ are in place before the TA, we suppress the dependence of $\mathbf{u}(\cdot)$ on $\mathbf{t}_{SQ}$ hereafter (and will often do so for other variables throughout the paper).

Given $\mathbf{t}_{SQ}$, Figure 1 illustrates our approach through three examples. In Figure 1(a), the slope of the dashed curve is $u_{TA}^*(\mathbf{t}_{TA}) / u_{TA}(\mathbf{t}_{TA}) = 1$ for all $\mathbf{t}_{TA} \leq \mathbf{t}_{SQ}$ and depicts, for example, two symmetric countries where reciprocity requires one-to-one reductions in t_{TA}^* and t_{TA} with the most liberal TA being free trade. In Figure 1(b), $u_{TA}^*(\mathbf{t}_{TA}) / u_{TA}(\mathbf{t}_{TA})$ is again constant for all $\mathbf{t}_{TA} \leq \mathbf{t}_{SQ}$ but depicts, for example, asymmetric countries whereby reciprocity requires larger reductions in t_{TA}^* than t_{TA} .¹³ Here, tariff liberalization that maintains these import volumes cannot lead to free trade for both countries. Figure 1(c) illustrates the possibility that $u_{TA}^*(\mathbf{t}_{TA}) / u_{TA}(\mathbf{t}_{TA})$ is not constant as the TA becomes more liberal. In any case, the most liberal TA entails at least one country levying a zero tariff.

Figure 1: Reciprocity and TA tariffs

Throughout the paper, we will often want to describe how the value of a variable changes as the TA becomes more liberal through mutual reductions in t_{TA} and t_{TA}^* that respect the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$. For a variable $x(\mathbf{t}_{TA})$ and the standard notation $\nabla x = \left(\frac{\partial x(\mathbf{t}_{TA})}{\partial t_{TA}}, \frac{\partial x(\mathbf{t}_{TA})}{\partial t_{TA}^*} \right)$, we define

$$-\frac{\partial x(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} \equiv -\mathbf{u}(\mathbf{t}_{TA}) \cdot \nabla x = -u_{TA}(\mathbf{t}_{TA}) \frac{\partial x(\mathbf{t}_{TA})}{\partial t_{TA}} - u_{TA}^*(\mathbf{t}_{TA}) \frac{\partial x(\mathbf{t}_{TA})}{\partial t_{TA}^*}.$$

That is, $-\frac{\partial x(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}}$ describes the change in x for a marginal increase in the degree of TA tariff

¹³For example, suppose reciprocity requires that t_{TA}^* must be reduced four times as quickly as t_{TA} . Then $\mathbf{u}(\mathbf{t}_{TA}) = \left(\frac{1}{17^{1/2}}, \frac{4}{17^{1/2}} \right)$, where Pythagoras' theorem gives the length of the vector (1, 4) as $17^{1/2}$ and dividing through by this factor ensures that $\mathbf{u}(\mathbf{t}_{TA})$ is of unit length.

liberalization that respects the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$.

2.2 Contesting a TA

Given the TA structure just described, we analyze a three-stage game throughout the paper:

Stage 1. Given status quo tariffs $\mathbf{t}_{SQ}$, governments announce TA tariffs $\mathbf{t}_{TA} \leq \mathbf{t}_{SQ}$ that respect the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$.

Stage 2. In each country, an anti-trade lobby (L_A or L_A^*) and a pro-trade lobby (L_T or L_T^*) simultaneously make non-negative contributions to their own government.

Stage 3. Each government decides whether to ratify the TA according to a contest success function (defined by (1) below). If both governments ratify, the TA tariffs $\mathbf{t}_{TA}$ are implemented. Otherwise, the status quo tariffs $\mathbf{t}_{SQ}$ prevail.

In principle, the TA tariffs $\mathbf{t}_{TA}$ emerge in Stage 1 through a bargaining process. However, apart from imposing the TA tariffs respect the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$, we merely assume the bargaining process is efficient in that there are no TA tariffs $\mathbf{t}'_{TA} \neq \mathbf{t}_{TA}$ that increase the expected payoff of both governments.

Given the TA tariffs announced in Stage 1, local lobby groups can make contributions in Stage 2 to their own national government either in support or opposition of the TA. Focusing on Home, each lobby L_i , $i \in \{A, T\}$, has a valuation $v_i(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) \geq 0$. These valuations represent the value of the TA going ahead for L_T but the value of the TA *not* going ahead for L_A . Thus, L_A contributes $l_A \geq 0$ in opposition to the TA while L_T contributes $l_T \geq 0$ in support of the TA.¹⁴ At the same time, Foreign lobbies make contributions to the Foreign government. Note that, because lobbies make contributions before knowing whether the TA goes ahead, lobbies *cannot* condition their contributions on the TA ratification outcome.

After receiving lobbying contributions, each government simultaneously decides whether to ratify the TA in Stage 3. Following the contest literature, we model these decisions using a contest success function. A typical contest success function would say that the probability of TA ratification increases with the amount of pro-trade contributions l_T relative to anti-trade contributions l_A . However, in addition to contributions, we assume ‘additional factors’ may enter the contest success function and, hence, the government’s ratification decision.

We capture these additional factors via $h(t, t^*)$. Following the trade literature, we let $a \geq 0$ capture the government’s valuation of these additional factors $h(\cdot)$ relative to contributions. Following the all-pay contest literature, $ah(\mathbf{t}_{SQ}) \equiv ah_A(\mathbf{t}_{SQ})$ and $ah(\mathbf{t}_{TA}) \equiv ah_T(\mathbf{t}_{TA})$

¹⁴The numeraire of a particular trade model that microfounds $v_i(\cdot)$ determines the units in which $v_i(\cdot)$ and l_i are measured. As we note, these contributions could also have the interpretation of effort and/or information provision with an appropriate modification to our baseline government payoff function. In this case, we could measure effort/information provision in units of labor and normalize units of effort so that one unit of effort equates to one unit of labor.

represent ‘head starts’ to, respectively, the anti-trade lobby and pro-trade lobbies. That is, $ah_A(\mathbf{t}_{SQ})$ captures additional factors that boost the government’s payoff, and hence the chance of the government not ratifying the TA, when the status quo prevails. Similarly, $ah_T(\mathbf{t}_{TA})$ captures additional factors that boost the government’s payoff, and hence the chance of the government ratifying the TA, upon implementation of the TA tariffs. Further, we say there are pro-trade head starts if $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) \equiv ah_T(\mathbf{t}_{TA}) - ah_A(\mathbf{t}_{SQ}) > 0$ and $-\frac{\partial h_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$ but there are anti-trade head starts if $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) < 0$ and $-\frac{\partial h_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} < 0$.

The additional factors $h(t, t^*)$ could capture various government motivations including domestic employment, tariff revenue, firm profits, or national welfare.¹⁵ In the Melitz model, $h(\cdot)$ could represent a government preference for employment in smaller firms that only serve the domestic market, implying $h(\cdot)$ would be increasing in t . For a small country in a textbook neoclassical trade model, $h(\cdot)$ could represent tariff revenue or national welfare with the former initially increasing in t and concave but the latter decreasing in t . Among large countries in a wide class of trade models with $h(\cdot)$ representing national welfare, $h(\cdot)$ would initially be increasing in t and concave but would be decreasing in t^* due to standard terms of trade effects. Nevertheless, in a wide class of trade models where $h(\mathbf{t}_{TA})$ represents national welfare we would have $-\frac{\partial h(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$ given our reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$ because, absent terms of trade effects, mutual tariff liberalization generally increases national welfare via more efficient resource allocation.

Given the potential existence of these head starts, the government weighs the ‘augmented contribution’ $s_i = l_i + ah_i(\cdot)$ of each lobby L_i , $i \in \{A, T\}$, when deciding on TA ratification. Specifically, the home government ratifies the TA with probability

$$p_T(s_A, s_T) = \frac{s_T^r}{s_A^r + s_T^r} = \frac{1}{1 + \left(\frac{s_A}{s_T}\right)^r} \quad (1)$$

where $r > 0$ is a sensitivity parameter. Here, p_T is the probability of L_T ‘winning’ the contest by successfully swaying the government to ratify the TA. Alternatively, $1 - p_T$ is the probability that L_A ‘wins’ the contest by successfully swaying the government against ratifying the TA.¹⁶

The contest literature deals with two standard cases. First, the ‘simple Tullock contest’ assumes $r = 1$ so that p_T only depends on the relative size of augmented contributions.¹⁷ An appealing property of this formulation is that the probability of lobbying success rises with

¹⁵The government may have distributional or politically motivated concerns for a particular group and hence value their profits independently of contributions made out of profits.

¹⁶As mentioned elsewhere, we assume that $p_T > 0$ if $s_A = s_T = 0$. This nests the typical assumption that $p_T = \frac{1}{2}$ if $s_A = s_T = 0$.

¹⁷The ‘general Tullock contest’ allows $0 < r < \infty$.

a lobby's augmented contribution without guaranteeing success. Second, the all-pay contest lets $r \rightarrow \infty$ so that making the strictly highest contribution guarantees success: $p_T = 0$ if $s_A > s_T$ but $p_T = 1$ if $s_T > s_A$.¹⁸ Our analysis focuses on the simple Tullock contest where only lobbying matters (i.e. $r = 1$, $a = 0$) before bringing in additional factors $h(\cdot)$ (i.e. $r = 1$, $a > 0$). We relegate the all-pay contest analysis to the Appendix.

Turning to expected payoffs, L_A 's expected payoff is

$$\begin{aligned} & (1 - p_T^*) v_A(\mathbf{t}_{TA}) + p_T^* (1 - p_T) v_A(\mathbf{t}_{TA}) - l_A \\ & \equiv \mu_A + (1 - p_T) \tilde{v}_A(\mathbf{t}_{TA}) - l_A \end{aligned} \quad (2)$$

where $\mu_A \equiv (1 - p_T^*) v_A(\mathbf{t}_{TA})$ and $\tilde{v}_A(\mathbf{t}_{TA}) \equiv p_T^* v_A(\mathbf{t}_{TA})$. L_A 's payoff is $v_A(\mathbf{t}_{TA})$ if the TA stalls but 0 if the TA goes ahead. Moreover, the TA stalls (i) with probability $1 - p_T^*$ because Foreign does not ratify the TA and (ii) with probability $p_T^* (1 - p_T)$ because Foreign ratifies the TA but Home does not ratify. Similarly, L_T 's expected payoff is

$$\begin{aligned} & (1 - p_T^*) \cdot 0 + p_T^* p_T v_T(\mathbf{t}_{TA}) - l_T \\ & \equiv \mu_T + p_T \tilde{v}_T(\mathbf{t}_{TA}) - l_T \end{aligned} \quad (3)$$

where $\mu_T \equiv (1 - p_T^*) \cdot 0$ and $\tilde{v}_T(\mathbf{t}_{TA}) \equiv p_T^* v_T(\mathbf{t}_{TA})$. L_T 's payoff is 0 if the TA stalls but $v_T(\mathbf{t}_{TA})$ if the TA goes ahead. Moreover, the TA goes ahead if and only if both governments ratify the TA which happens with probability $p_T p_T^*$. Finally, the Home government's expected payoff consists of two components,

$$G(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) = l_A + l_T + a [p_T p_T^* h_T(\mathbf{t}_{TA}) + (1 - p_T p_T^*) h_A(\mathbf{t}_{SQ})] \quad (4)$$

First, prior to the TA ratification decision, L_i makes contributions l_i . Second, the government's valuation of the additional factors $h(\cdot)$ depends on whether the TA goes ahead.¹⁹

These expected payoffs display the parallel contest structure and its differences from the regular contest structure. Setting $p_T^* = 1$, Home's ratification decision is pivotal because Foreign ratifies the TA with certainty. In turn, our contest structure collapses to a regular contest: Home country lobbies know their local contest is pivotal to whether the TA goes ahead. But, Home's ratification decision may not be pivotal when $p_T^* < 1$ because Foreign

¹⁸Following the literature, an all-pay auction is one where each player's 'cost' of bidding is simply the bid itself. An all-pay contest allows more general specifications for a player's 'cost' of bidding, including the possibility that players have different head starts. Our model with $r \rightarrow \infty$ is an all-pay contest because of the head starts.

¹⁹If one interprets l_i as L_i 's cost of effort/information provision, one may want to model government valuation of l_i as $\tau_i l_i$ where the parameter τ_i transforms the lobby's cost of effort/information provision into the government's valuation of such action.

may not ratify the TA. Two implications emerge given Foreign fails to ratify with probability $1 - p_T^*$. First, L_A 's expected payoff is $\mu_A = (1 - p_T^*) v_A(\mathbf{t}_{TA}) > 0$ even if it contributes *nothing*. Second, even *conditional* on Home ratifying the TA (which only happens with probability p_T), L_T 's expected payoff is only $\tilde{v}_T(\mathbf{t}_{TA}) \equiv p_T^* v_T(\mathbf{t}_{TA})$ and its realized payoff is, indeed, zero if Foreign fails to ratify the TA. These dependencies across the parallel contests in Home and Foreign are not present in the prior contest literature and generate our 'parallel contest' structure.

The expected payoff functions presented above also reveal how standard solution techniques from the Tullock (and all-pay) contest literature apply in our parallel contest setting. First, Home lobby expected payoffs depend on the probability of 'winning' their Home contest multiplied by their 'effective' valuation $\tilde{v}_i(\mathbf{t}_{TA}) = p_T^* v_i(\mathbf{t}_{TA})$ that, in turn, depends on the probability of Home's ratification decision being pivotal. Indeed, these novel 'effective' valuations provide the crucial link between our parallel contest setup and standard contest (and all-pay contest) setup. In particular, Home lobbies perceive these effective valuations as exogenous because, when deciding on their contributions, they take other lobbies' contributions as given (including Foreign lobby contributions). Hence, they take p_T^* as given. Thus, the $(1 - p_T) \tilde{v}_A(\mathbf{t}_{TA})$ and $p_T \tilde{v}_T(\mathbf{t}_{TA})$ terms effectively mirror those found in prior literature. Second, the parallel nature of the contest implies Home's ratification decision may not be pivotal and, thus, generates the μ_i terms. But, these are exogenous intercept shifters of the expected payoff functions. In turn, they do not affect lobby group preferences over strategy profiles. This implies that the preferences embodied in the expected payoff functions above mirror those of a standard Tullock (or all pay) contest with effective valuations $\tilde{v}_i(\mathbf{t}_{TA})$ and, thus, standard solution techniques apply.

2.3 How TAs affect Interest Group Payoffs

Given the generality of our lobby group payoff structure, we impose some properties to help characterize the equilibrium. By definition, $v_i(\mathbf{t}_{TA} = \mathbf{t}_{SQ}; \mathbf{t}_{SQ}) = 0$: absent tariff liberalization, L_T gains nothing and L_A loses nothing. However, we impose that tariff liberalization 'polarizes' the lobby groups. Specifically, focusing on Home lobbies,

$$-\frac{\partial v_i(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} \equiv -\mathbf{u}(\mathbf{t}_{TA}) \nabla v_i > 0 \text{ for } i \in \{A, T\} \quad (5)$$

so that tariff liberalization respecting the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$ generates stronger TA support by L_T and stronger TA opposition by L_A . Thus, given our focus on tariffs, polarization of the lobby groups is maximized by the most liberal possible TA that respects $\mathbf{u}(\mathbf{t}_{TA})$.

Section 5 applies our general structure to some popular trade models. In the Melitz

model, relatively productive firms not only serve the domestic market but also export while relatively unproductive firms only serve the domestic market. While Foreign liberalization increases export profits, Home liberalization hurts domestic profits. Thus, the nature of the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$ matters for exporters by defining the relative magnitude of liberalization by Home versus Foreign. Nevertheless, intuitively, the most productive firms naturally constitute L_T and should profit from the TA, $-\frac{\partial v_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$, under the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$. Conversely, relatively unproductive exporters together with the low productivity firms that only serve the domestic market naturally constitute L_A and should suffer from the TA, $-\frac{\partial v_A(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} < 0$. Further, this intuition can also apply for simple oligopoly models. Indeed, Section 5 shows how the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$ ensures that reciprocal tariff liberalization polarizes L_A and L_T as defined by (5) in the Melitz and oligopoly models.

In the canonical textbook specific factors model, land is specific to agricultural production, capital is specific to manufacturing production, and labor is perfectly mobile. Suppose Home and Foreign are two small countries in a multi-country world with Home (Foreign) having comparative advantage in manufacturing (agriculture). Home capital owners profit from falling Home tariffs via the tariff-induced contraction of the import competing sector which reallocates labor to manufacturing and increases returns to capital. Thus, capital owners naturally constitute L_T and $-\frac{\partial v_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$. Conversely, the reallocation of labor away from agriculture reduces returns to land, implying land owners naturally constitute L_A and $-\frac{\partial v_A(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} < 0$. Further, given Home and Foreign are small, $-\frac{\partial v_i(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}^*} = 0$ for $i \in \{A, T\}$. Thus, the TA polarizes the lobby groups regardless of the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$.

Now suppose Home and Foreign are both large countries. Holding world prices fixed, the qualitative impacts of tariff liberalization mirror those in the small country case. However, by reducing their terms of trade, tariff liberalization by Home partially reverses the labor market reallocation effects described above and, thus, partially offsets the polarizing impact on Home specific factor owners described above. However, assuming away the Metzler paradox, as is common in the literature, the qualitative impact of Home liberalization mirrors the small country case. Because Foreign tariff liberalization improves Home terms of trade, the labor reallocation effects follow those of Home tariff liberalization and, thus, reinforce the qualitative impact on Home specific factor incomes. Thus, the TA polarizes Home lobby groups for any reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$ that avoids the Metzler paradox.

3 Contesting a TA when Only Lobbying Matters

We now focus on how lobbying alone affects the TA contest (as described above, we use a simple Tullock contest ($r = 1$)). To do this, we remove additional factors $h(\cdot)$ by imposing

$a = 0$. In turn, we consider ‘contributions’ l_i rather than augmented contributions $l_i + ah_i(\cdot)$.

In Stage 3, no strategic interaction takes place. Given lobbying contributions, each government’s ratification decision is determined solely by its contest success function (1):

$$p_T(l_A, l_T) = \begin{cases} \frac{1}{1+l_T} & \text{if } l_T > 0 \text{ or } l_A > 0 \\ \rho \in (0, 1] & \text{if } l_T = l_A = 0 \end{cases} \quad (6)$$

where ρ is an exogenous, known and deterministic tie breaking rule.

In Stage 2, lobbies interact strategically. Focusing on Home lobbies, L_A chooses l_A to maximize its expected payoff (2) given the proposed TA tariffs $\mathbf{t}_{TA}$ from Stage 1 and taking l_T as given. Similarly, taking l_A as given, L_T chooses l_T to maximize (3). The first order conditions (FOCs) are

$$\begin{aligned} p_T^* v_A(\mathbf{t}_{TA}) \frac{1}{l_A + l_T} - p_T^* v_A(\mathbf{t}_{TA}) l_A \frac{1}{(l_A + l_T)^2} - 1 &= 0. \\ p_T^* v_T(\mathbf{t}_{TA}) l_A \frac{1}{(l_A + l_T)^2} - 1 &= 0. \end{aligned}$$

Solving the FOCs given p_T^* and $\mathbf{t}_{TA}$ reveals that in a pure strategy Nash equilibrium

$$l_i = \hat{l}_i(p_T^*, \mathbf{t}_{TA}) \equiv p_T^* \frac{1}{2} \frac{1}{\left(1 + \frac{v_j(\mathbf{t}_{TA})}{v_i(\mathbf{t}_{TA})}\right)} \bar{v}(\mathbf{t}_{TA}) \text{ for } i \in \{A, T\} \text{ and } j \neq i \quad (7)$$

where $\bar{v}(\mathbf{t}_{TA}) = \left[\frac{1}{2} \left(\frac{1}{v_A(\mathbf{t}_{TA})} + \frac{1}{v_T(\mathbf{t}_{TA})} \right) \right]^{-1}$ denotes the harmonic mean of the valuations. An interesting tension emerges here between the ‘average’ valuation, captured by the harmonic mean $\bar{v}(\mathbf{t}_{TA})$, and the relative valuation of the opposing lobby, captured by $\frac{v_j(\mathbf{t}_{TA})}{v_i(\mathbf{t}_{TA})}$. All else equal, contributions of *both* lobbies rise with the average valuation $\bar{v}(\mathbf{t}_{TA})$: highly valued prizes amplify lobbying intensity. But, all else equal, a given lobby shades its contribution downwards as the relative valuation of the opposing lobby group rises.

In equilibrium, the parallel contest nature of our analysis emerges through the proportionality of Home lobby contributions to p_T^* . If $p_T^* = 1$, Home’s TA ratification decision is pivotal and we have the well known solution in the contest literature. Conversely, $p_T^* = 0$ implies Home’s ratification decision is inconsequential because Home lobbies know Foreign will not ratify the TA and, in turn, Home lobbies will not contribute. However, given $\mathbf{t}_{TA} < \mathbf{t}_{SQ}$ and $p_T^* > 0$, we have $v_i(\mathbf{t}_{TA}) > 0$ and, in turn, $\hat{l}_i(\cdot) > 0$ for $i \in \{A, T\}$. Indeed, (6) says $p_T^* > 0$ for any $l_A^*(\cdot) \geq 0$ and $l_T^*(\cdot) \geq 0$.²⁰ Thus, all lobbies make equilibrium contributions.

²⁰The importance of the tie breaking rule $\rho > 0$ can be seen as follows. Suppose $p_T^* = 0$ if $l_A^*(\cdot) = l_T^*(\cdot) = 0$. Then, $\hat{l}_A(\cdot) = \hat{l}_T(\cdot) = \hat{l}_A^*(\cdot) = \hat{l}_T^*(\cdot) = 0$ constitutes a ‘no-contribution’ pure strategy Nash equilibrium (in

In Stage 1, governments set the TA tariffs $\mathbf{t}_{TA}$ anticipating the Stage 2 lobbying process and its Stage 3 TA ratification process. Given $a = 0$, governments are purely motivated by contributions and, given equilibrium lobby contributions in (7), equilibrium aggregate contributions are

$$\hat{l}(p_T^*, \mathbf{t}_{TA}) = \hat{l}_A(p_T^*, \mathbf{t}_{TA}) + \hat{l}_T(p_T^*, \mathbf{t}_{TA}) = p_T^* \frac{1}{2} \bar{v}(\mathbf{t}_{TA}). \quad (8)$$

In the aggregate, the relative valuation effects underlying each lobby's individual contributions cancel out and leave aggregate lobbying proportional to the average valuation $\bar{v}(\mathbf{t}_{TA})$. Thus, aggregate contributions are increasing in each lobby's valuation $v_i(\mathbf{t}_{TA})$. In turn, for a given $p_T^* > 0$, the polarization property implies aggregate contributions are maximized under the most liberal TA possible since trade liberalization strengthens both the support by L_T for the TA and the opposition by L_A against the TA. This suggests both governments have an incentive to propose the most liberal possible TA to maximize aggregate equilibrium lobbying contributions $\hat{l}(p_T^*, \mathbf{t}_{TA})$.

However, the Home government must also consider how the chosen TA tariffs $\mathbf{t}_{TA}$ affect the probability of Foreign ratification p_T^* . Thus, we now solve for p_T and p_T^* . This not only helps further characterize aggregate contributions, $\hat{l}(p_T^*, \mathbf{t}_{TA})$ and $\hat{l}^*(p_T, \mathbf{t}_{TA})$, but also the equilibrium probability that the TA goes ahead. Noting that the equilibrium relative contributions by lobby groups match their relative valuations, $\frac{\hat{l}_T}{\hat{l}_A} = \frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$, the equilibrium TA ratification probabilities in Home and Foreign are

$$\hat{p}_T(\mathbf{t}_{TA}) = p_T \left(\hat{l}_A(p_T^*, \mathbf{t}_{TA}), \hat{l}_T(p_T^*, \mathbf{t}_{TA}) \right) = \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \right]^{-1} \quad (9)$$

$$\hat{p}_T^*(\mathbf{t}_{TA}) = p_T^* \left(\hat{l}_A^*(p_T, \mathbf{t}_{TA}), \hat{l}_T^*(p_T, \mathbf{t}_{TA}) \right) = \left[1 + \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})} \right]^{-1}. \quad (10)$$

In turn, the equilibrium probability that the TA goes ahead is

$$\hat{p}_T(\mathbf{t}_{TA}) \hat{p}_T^*(\mathbf{t}_{TA}) = \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \right]^{-1} \cdot \left[1 + \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})} \right]^{-1}.$$

Hence, anything that increases the relative valuations $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$ and/or $\frac{v_T^*(\mathbf{t}_{TA})}{v_A^*(\mathbf{t}_{TA})}$ also increases the probability that the TA goes ahead. Indeed, $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$ and $\frac{v_T^*(\mathbf{t}_{TA})}{v_A^*(\mathbf{t}_{TA})}$ are sufficient statistics for, respectively, the likelihood of Home and Foreign TA ratification.

addition to the one that we characterized above with positive contributions). Further, given $l_i(\cdot) > 0$ and $\rho > 0$, the second order condition $-2 \frac{l_j}{(l_i + l_j)^3} p_T^* v_i < 0$ holds. Thus, the tie breaking rule $\rho > 0$ implies (7) characterizes the unique equilibrium for any $\mathbf{t}_{TA} < \mathbf{t}_{SQ}$.

Thus, to help characterize the equilibrium TA tariffs, we need some structure on how a more liberal TA affects relative valuations. We have already assumed, that a more liberal TA polarizes lobby groups: $-\frac{\partial v_i(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$ for $i \in \{A, T\}$. We now say, given a reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$, there is ‘pro-trade biased polarization’ from a more liberal TA if the relative valuation $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$ rises as the TA becomes more liberal:

$$-\frac{\partial \frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}}{\partial \mathbf{t}_{TA}} \equiv -\mathbf{u}(\mathbf{t}_{TA}) \cdot \nabla \frac{v_T}{v_A} > 0.$$

Naturally, the analogous definition applies to Foreign lobbies.

To what extent does pro-trade biased polarization hold in standard models of international trade? Our above discussion established that polarization holds in the Melitz, oligopoly and SF models. In Section 5, we also show pro-trade biased polarization holds in the SF, Melitz and oligopoly models. Intuitively, in the Melitz and oligopoly models, a more liberal TA delivers profits to the pro-trade high productivity export firms that exceed the losses suffered by the less productive remaining firms. Additionally, for the SF model, as trade liberalization reallocates labor, the value of the marginal product for the specific factor in the exporting sector rises faster than it falls in the import-competing sector. Thus, while one may view pro-trade biased polarization as a strong assumption, it actually holds under a fairly general and well-defined set of conditions in (at least) three standard models of international trade.

It should now be clear that the most liberal TA maximizes aggregate lobbying contributions received by each government. For Home, by polarizing the lobby groups, a more liberal TA increases the average contribution $\bar{v}(\mathbf{t}_{TA})$. In turn, conditional on p_T^* , the most liberal TA maximizes aggregation lobbying contributions $\hat{l}(p_T^*, \mathbf{t}_{TA})$. Further, pro-trade biased polarization implies a more liberal TA also increases the relative valuation $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$ which increases $p_T^*(\mathbf{t}_{TA})$. Thus, all else equal, the most liberal TA maximizes p_T^* . Hence, the most liberal TA maximizes both $\bar{v}(\mathbf{t}_{TA})$ and p_T^* and, therefore, maximizes Home aggregate lobbying contributions $\hat{l}(p_T^*, \mathbf{t}_{TA})$.

Proposition 1 *Assume (i) $a = 0$, and (ii) a reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$ that ensures a more liberal TA polarizes the lobby groups and generates pro-trade biased polarization. In equilibrium, (i) the Home and Foreign governments propose the most liberal TA possible, denoted $\hat{\mathbf{t}}_{TA}$, implying at least one country proposes free trade: $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$ and (ii) the*

equilibrium probability of TA formation is

$$\begin{aligned}\hat{p}_T(\hat{\mathbf{t}}_{TA}) \hat{p}_T^*(\hat{\mathbf{t}}_{TA}) &= \left[1 + \frac{\hat{l}_A(p_T^*, \hat{\mathbf{t}}_{TA})}{\hat{l}_T(p_T^*, \hat{\mathbf{t}}_{TA})} \right]^{-1} \cdot \left[1 + \frac{\hat{l}_A^*(p_T, \hat{\mathbf{t}}_{TA})}{\hat{l}_T^*(p_T, \hat{\mathbf{t}}_{TA})} \right]^{-1} \\ &= \left[1 + \frac{v_T(\hat{\mathbf{t}}_{TA})}{v_A(\hat{\mathbf{t}}_{TA})} \right]^{-1} \cdot \left[1 + \frac{v_T^*(\hat{\mathbf{t}}_{TA})}{v_A^*(\hat{\mathbf{t}}_{TA})} \right]^{-1}.\end{aligned}\quad (11)$$

Proposition 1 highlights an important insight of our framework. The lobbying process *itself* can drive governments to propose the most liberal TA possible; even without regard to consumer interests (i.e. $a = 0$), governments can propose the most liberal TA possible. In contrast, consumer interests tend to drive trade liberalization in the prior literature. For example, free trade emerges in an ‘organized sector’ in Grossman and Helpman (1994) only if the consumer interests of *all* agents in the economy are represented by organized lobbies. The idea that the lobbying process itself as opposed to consumer interests drives trade liberalization squares well with a common theme in the popular press that corporate pro-trade lobbying drives government decisions during trade negotiations.

Proposition 1 also highlights that the relative valuation of the pro-trade lobby drives the likelihood of TA formation. Relative contributions of lobby groups match their relative valuations, $\frac{\hat{l}_T(p_T^*, \hat{\mathbf{t}}_{TA})}{\hat{l}_A(p_T^*, \hat{\mathbf{t}}_{TA})} = \frac{v_T(\hat{\mathbf{t}}_{TA})}{v_A(\hat{\mathbf{t}}_{TA})}$, and the probability of TA formation is increasing in the relative valuation of the pro-trade lobby in each country. Thus, changes in relative valuations impact the intensive margin of lobbying and, in turn, the probability of TA formation.

4 Bringing in Additional Factors

We now allow governments to consider additional factors other than contributions when deciding upon TA ratification. Specifically, we now let $a > 0$ so that the head starts $ah_A(\mathbf{t}_{SQ}), ah_T(\mathbf{t}_{SQ}) > 0$ enter the government’s payoff. Our analysis focuses on robustness of the basic results in Proposition 1. But, perhaps more importantly, considering the additional factors $h(\cdot)$ allows us to compare the motivations for TA formation in our contest setting with the motives in a menu auction.

In Stage 3, a government’s TA ratification decision now balances contributions and head starts where the pro-trade head start $ah_T(\mathbf{t}_{TA})$ depends on TA tariffs and the anti-trade head start $ah_A(\mathbf{t}_{SQ})$ depends on status quo tariffs. Using (1), the probability of Home TA ratification now depends on the relative magnitude of augmented contributions $s_i = l_i + ah_i$:

$$p_T(s_A, s_T) = \begin{cases} \frac{1}{1 + \frac{s_A}{s_T}} & \text{for all } l_T \geq 0 \text{ and } l_A \geq 0 \end{cases} \quad (12)$$

Note that $p_T(s_A, s_T) = \frac{1}{1 + \frac{h_A}{h_T}}$ in the special case of $l_T = l_A = 0$.

In Stage 2, head starts introduce lobby participation constraints. Solving the earlier lobby group maximization problems given p_T^* and $\mathbf{t}_{TA}$, we now have equilibrium contributions

$$\hat{l}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) = p_T^* \frac{1}{2 \left(1 + \frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}\right)} \bar{v}(\mathbf{t}_{TA}) - ah_A(\mathbf{t}_{SQ}) \quad (13)$$

$$\hat{l}_T(p_T^*, \mathbf{t}_{TA}) = p_T^* \frac{1}{2 \left(1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}\right)} \bar{v}(\mathbf{t}_{TA}) - ah_T(\mathbf{t}_{TA}). \quad (14)$$

Three observations stand out regarding equilibrium contributions.²¹ First, head starts merely induce lobbies to drop their contributions by the amount of the head start. That is, head starts create ‘lobbying leakage’. Second, contributions are decreasing in head starts which creates participation constraints. For comparability with Proposition 1, we assume a is sufficiently small to ensure positive contributions. Third, like our earlier analysis, the relative valuation $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$ remains a sufficient statistic for Home TA ratification:

$$\hat{p}_T(\mathbf{t}_{TA}) = p_T \left(\hat{l}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}), \hat{l}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}), h_T(\mathbf{t}_{TA}), h_A(\mathbf{t}_{TQ}) \right) = \left(1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \right)^{-1}.$$

Intuitively, head starts leave the equilibrium TA ratification probability unchanged because lobbying leakages exactly offset the head starts that now enter augmented contributions s_i .

In Stage 1, government payoffs from TA tariffs $\mathbf{t}_{TA}$ now depend on lobbying contributions and head starts $ah_i(\cdot)$. Indeed, equilibrium aggregate lobbying contributions are now

$$\begin{aligned} \hat{l}(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) &= \hat{l}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) + \hat{l}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) \\ &= \hat{l}(p_T^*, \mathbf{t}_{TA}; a = 0) - a[h_A(\mathbf{t}_{SQ}) + h_T(\mathbf{t}_{TA})] \end{aligned} \quad (15)$$

where $\hat{l}(p_T^*, \mathbf{t}_{TA}; a = 0)$ is given by (8). Thus, as expected from our above discussion, lobbying leakage reduces aggregate contributions by the head starts.

In turn, the Home government’s expected payoff from the TA tariffs $\mathbf{t}_{TA}$ is

$$\begin{aligned} G(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) &= \hat{l}(\hat{p}_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA}; \mathbf{t}_{SQ}) \\ &\quad + a[\hat{p}_T(\mathbf{t}_{TA}) \hat{p}_T^*(\mathbf{t}_{TA}) h_T(\mathbf{t}_{TA}) + (1 - \hat{p}_T(\mathbf{t}_{TA}) \hat{p}_T^*(\mathbf{t}_{TA})) h_A(\mathbf{t}_{SQ})] \\ &= \hat{l}(\hat{p}_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA}; a = 0) - a\Phi(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) - ah_A(\mathbf{t}_{SQ}) \end{aligned} \quad (16)$$

²¹The second order condition (SOC) is $-2p_T^* v_i(\mathbf{t}_{TA}) \frac{s_j}{(s_i + s_j)^3}$. Given $\mathbf{t}_{TA} < \mathbf{t}_{SQ}$ implies $v_i(\mathbf{t}_{TA}) > 0$ for $i \in \{A, T\}$ and (12) implies $p_T^* > 0$ for any $l_A^* \geq 0$ and $l_T^* \geq 0$, the SOC holds for $\mathbf{t}_{TA} < \mathbf{t}_{SQ}$.

where, remembering that $\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) \equiv h_T(\mathbf{t}_{TA}) - h_A(\mathbf{t}_{SQ})$,

$$\Phi(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) \equiv [1 - \hat{p}_T(\mathbf{t}_{TA}) \hat{p}_T^*(\mathbf{t}_{TA})] \Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}). \quad (17)$$

And, the impact of more liberal TA tariffs on the Home government's expected payoff is

$$-\frac{\partial G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} = -\frac{\partial \hat{l}(\hat{p}_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA}; a=0)}{\partial \mathbf{t}_{TA}} + a \frac{\partial \Phi(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}}. \quad (18)$$

Absent further structure on the impact of TA tariffs on head starts, the general impact of TA tariffs is ambiguous. However, our earlier analysis established a more liberal TA increases aggregate lobbying in the absence of head starts, $-\frac{\partial \hat{l}(\cdot; a=0)}{\partial \mathbf{t}_{TA}} > 0$. In turn, $-\frac{\partial G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} > 0$ holds for sufficiently small $a > 0$ and, in turn, the lobbying process still creates government incentives to propose the most liberal TA possible. Proposition 2 summarizes our discussion.

Proposition 2 *Assume a reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$ that ensures a more liberal TA polarizes the lobby groups and generates pro-trade biased polarization. For sufficiently small $a > 0$, (i) the Home and Foreign governments propose the most liberal TA possible, denoted $\hat{\mathbf{t}}_{TA}$, implying at least one country practices free trade: $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$ and (ii) the equilibrium probability of TA formation is again given by (11).*

Proposition 2 establishes the robustness of Proposition 1 to the presence of head starts. First, when a sufficiently small a mutes the relative influence of head starts, the most liberal TA is still the equilibrium TA. Thus, importantly, our results in the absence of head starts do not depend on the extreme case of $a = 0$. Second, because of lobbying leakage, the probability that the TA goes ahead is independent of a and the head starts. Thus, again, the relative valuations are sufficient statistics for TA ratification.

While Proposition 2 establishes our results thus far do not depend on the assumption that governments *only* care about lobbying contributions, it imposes what could be a fairly restrictive condition on a . However, this sufficient condition is not necessary. Thus, we now relax this condition by imposing more structure on the impact of TA tariffs on head starts.

4.1 Pro-trade Head Start

As described above, pro-trade head starts are defined by $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$ and $-\frac{\partial h_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$ so that the pro-trade lobby enjoys higher head starts than the anti-trade lobby and a more liberal TA increases the pro-trade lobby's head start (as in, e.g., the standard trade model). Our aim is establishing conditions where $-\frac{\partial G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} > 0$ so that the Home (and, analogously, Foreign) government want to propose the most liberal TA possible.

Given pro-trade head starts and that the most liberal TA maximizes aggregate lobbying contributions $\hat{l}(p_T^*, \mathbf{t}_{TA}; a = 0)$ in the absence of head starts, a sufficient condition for the most liberal TA to maximize the government's expected payoff, *regardless* of a , is $-\frac{\partial \Phi(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} \leq 0$ for all $\mathbf{t}_{TA} \in [1, \mathbf{t}_{SQ}]$. This reduces to

$$\frac{1}{1 - \hat{p}_T^*(\mathbf{t}_{TA}) \hat{p}_T(\mathbf{t}_{TA})} \left(-\frac{\partial \hat{p}_T^*(\mathbf{t}_{TA}) \hat{p}_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} \right) \geq \frac{1}{\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})} \left(-\frac{\partial h_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} \right) \quad (19)$$

for all $\mathbf{t}_{TA} \in [1, \mathbf{t}_{SQ}]$. Pro-trade biased polarization implies a more liberal TA increases the probability of the TA going ahead: $-\frac{\partial \hat{p}_T^*(\mathbf{t}_{TA}) \hat{p}_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$. Thus, with pro-trade head starts imposing $h_T(\mathbf{t}_{TA}) > h_A(\mathbf{t}_{SQ})$, a more liberal TA increases the government's expected payoff by increasing the likelihood of realizing $h_T(\mathbf{t}_{TA})$ and decreasing the likelihood of realizing $h_A(\mathbf{t}_{SQ})$. However, a more liberal TA also increases the pro-trade lobby's head start: $-\frac{\partial h_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$. Thus, a more liberal TA increases the extent of lobbying leakage and thereby reduces the government's expected payoff. If the former effect outweighs the latter, the government's expected payoff increases with a more liberal TA regardless of a ; equation (19) expresses the required condition in semi-elasticity form.

What are the implications of pro-trade head starts for our framework's interpretation of the tariff riddled real world? Our pro-trade head start framework says two forces push towards the most liberal TA: the most liberal TA not only maximizes aggregate lobbying contributions absent head starts but also maximizes the probability of TA formation and realization of the pro-trade head start $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$. On the other hand, the countervailing force pushing against the most liberal TA is the lobbying leakage whereby the pro-trade lobby shades their contributions upon their understanding of the government's inherent desire for liberalization. However, it seems (at least) somewhat empirically implausible that governments set positive tariffs because more liberal TA tariffs would sufficiently *depress* pro-trade lobby contributions to outweigh the liberalizing forces of lower TA tariffs on aggregate lobby contributions and realization of the pro-trade head start. Thus, a reasonably plausible empirical explanation of the tariff riddled real world requires looking beyond the pro-trade head start setting.

4.2 Anti-trade Head Start

Anti-trade head starts are defined by $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) < 0$ and $-\frac{\partial h_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} < 0$ so that the anti-trade lobby enjoys a larger head start than the pro-trade lobby and this net head start increases with a more liberal TA.

Given anti-trade head starts and that the most liberal TA maximizes aggregate lob-

bying contributions $\hat{l}(p_T^*, \mathbf{t}_{TA}; a = 0)$ in the absence of head starts, a sufficient condition for the most liberal TA to maximize the government's expected payoff, *regardless* of a , is $-\frac{\partial \Phi(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} \leq 0$ for all $\mathbf{t}_{TA} \in [1, \mathbf{t}_{SQ}]$. This reduces to

$$\frac{1}{1 - \hat{p}_T^*(\mathbf{t}_{TA}) \hat{p}_T(\mathbf{t}_{TA})} \left(-\frac{\partial \hat{p}_T^*(\mathbf{t}_{TA}) \hat{p}_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} \right) \leq \frac{1}{\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})} \left(-\frac{\partial h_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} \right) \quad (20)$$

for all $\mathbf{t}_{TA} \in [1, \mathbf{t}_{SQ}]$. Relative to (19), the inequality has reversed because now $\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) < 0$. Pro-trade biased polarization still implies a more liberal TA increases the probability that the TA goes ahead: $-\frac{\partial \hat{p}_T^*(\mathbf{t}_{TA}) \hat{p}_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$. But, unlike above, this decreases the government's expected payoff in the presence of anti-trade head starts by decreasing the likelihood of realizing $h_A(\mathbf{t}_{SQ})$ and increasing the likelihood of realizing $h_T(\mathbf{t}_{TA})$. Also unlike above, a more liberal TA decreases the pro-trade lobby's head start: $-\frac{\partial h_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} < 0$. Nevertheless, this now increases the government's expected payoff by decreasing the extent of lobbying leakage by the pro-trade lobby. If the latter effect outweighs the former, the government's expected payoff increases with a more liberal TA regardless of a ; equation (20) expresses the required condition in semi-elasticity form.

What are the implications of anti-trade head starts for our framework's interpretation of the tariff riddled real world? A more liberal TA still increases the likelihood of TA formation, and hence realization of $h_T(\mathbf{t}_{TA})$ rather than $h_A(\mathbf{t}_{TA})$, but this now *reduces* the government's payoff given the anti-trade nature of the head start $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) < 0$. That is, inherent government preferences, captured by the anti-trade head start, now act as a force against liberalization. On the other hand, the inherent government preference against liberalization also shrinks the degree of lobbying leakage by the pro-trade lobby. As such, the lobbying process, both via the lobbying leakage channel and also via aggregate contributions $\hat{l}(p_T^*, \mathbf{t}_{TA}; a = 0)$, now act as a liberalizing force. Thus, in our anti-trade head start setting, inherent anti-trade government preferences drive any move away from the most liberal TA.

The idea that protectionism emerges as a balance between the liberalizing force of lobbying and the protectionist force of inherent government preferences stands in stark contrast to the typical view of the TA literature where the opposite is true. Representative of this literature is the broad intuition from the Protection For Sale framework where the fundamental tension pits lobbying induced protectionist forces against an inherent government preference for liberalization based on national welfare. However, as we mentioned earlier, our view squares with anecdotal evidence that suggests popular concern over the influence of pro-trade corporate lobbying over TA negotiations and trade policy more generally. Further consistent with the idea of inherent government preferences for protection is the recent empirical work of Conconi et al. (2014) who find compelling evidence that electoral moti-

vations underpin protectionist preferences of politicians. Additionally, Lake and Millimet (2016) find that, empirically, trade-related redistribution towards a politician’s constituents can mitigate this inherent protectionist tendency. Thus, our alternative perspective squares with recent empirical evidence and popular concerns over trade policy.

Our alternative perspective also suggests a novel explanation for the puzzle in the empirical Protection for Sale literature that the relatively low observed tariff levels imply implausibly high levels of government regard for national welfare as measured by a (e.g. Gawande et al. (2012, p116)). Intuitively, trade barriers should be much higher than the relatively low levels observed in the data if, as anecdotal evidence suggests, governments are fairly responsive to protectionist lobbying forces. To this end, recent contributions (e.g. Gawande et al. (2012, 2015)) have investigated modifications of the earlier empirical Protection for Sale literature (e.g. Goldberg and Maggi (1999) and Gawande and Bandyopadhyay (2000)). But, theoretical channels mapping observed tariff barriers to a in these modifications still view governments as inherently desiring liberalization to maximize national welfare. In our anti-trade head start setting, this channel operates via inherent protectionist desires of governments. That is, low tariff barriers result because inherently protectionist governments enact liberal trade policies through heavy influence from the lobbying process.

5 Examples with particular underlying trade models

5.1 Partial equilibrium specific factors model

To concretely illustrate and relate our results to existing literature, we now explore two and three-country versions of the simple and stylized specific factors model from Grossman and Helpman (1995a). The Protection for Sale framework developed by Grossman and Helpman (1994, 1995a,b) presented a specific factors model whose features have permeated the subsequent trade policy literature: utility is (i) quasi-linear in non-numeraire goods produced using sector specific factors and labor and (ii) linear in a numeraire good that is freely traded and produced one-for-one with labor. This setup eliminates substitution effects between non-numeraire goods and implies the numeraire good absorbs all income effects. Moreover, production of the numeraire good pins wages to 1 (with appropriate normalization for units of labor), making labor income independent of trade policy. Thus, effectively, a general equilibrium setup becomes a partial equilibrium setup.

Eventually, Grossman and Helpman (1995a) simplify further. They impose (i) inelastic domestic supply and (ii) linear demand for non-numeraire goods resulting from quadratic utility for non-numeraire goods. In a two-country world, the essential structure (see the

appendix for further details) is two non-numeraire goods where Home and Foreign have comparative advantage in different goods. Further, (i) each country has endowments e (d) of their comparative advantage (disadvantage) good and (ii) the intercepts on each country's linear inverse demand curves are α (θ) for their comparative advantage (disadvantage) good. Like earlier, we assume governments only negotiate over import policies rather than export policies. While Grossman and Helpman do not make this restriction, we describe below why it is without loss of generality.

In a two-country world, negotiating a TA over trade liberalization serves a clear purpose in Grossman and Helpman (1995b). Given the menu auction framework, the Home government chooses their status quo tariff t_{SQ} to maximize $G^{GH} = PS(t_{SQ}; \cdot) + aW(t_{SQ}; \cdot)$ where $PS(\cdot)$ denotes producer surplus (of both sectors) and $W(\cdot)$ denotes national welfare. Under a TA, the unique Pareto efficient outcome is given by the symmetric TA tariff t_{TA}^{GH} that maximizes the joint payoff $G^{GH} + G^{*,GH}$. Thus,

$$\begin{aligned}
 t_{SQ}^{GH} &= \frac{1}{3} \left[(\theta - \alpha) + (e - d) + 2\frac{d}{a} \right] = \underbrace{\frac{1}{3} \left[(\theta - \alpha) + (e - d) - \frac{d}{a} \right]}_{\text{Terms of trade effect}} + \underbrace{\frac{d}{a}}_{\text{Politics effect}} \\
 t_{TA}^{GH} &= \underbrace{\frac{d}{a}}_{\text{Home politics effect}} - \underbrace{\frac{e}{a}}_{\text{Foreign politics effect}}
 \end{aligned}$$

The status quo tariff t_{SQ}^{GH} combines a terms of trade effect and a politics effect with the politics effect dissipating with the welfare mindedness of governments as governed by a . Imposing $d > e$, the TA tariff $t_{TA}^{GH} > 0$ merely combines the politics effects and, in doing so, removes the terms of trade effect from t_{SQ}^{GH} .²² That is, the sole purpose of the TA is removing the negative externality associated with the terms of trade effect.²³ Bagwell and Staiger (1999) emphasize this point in a much broader class of economic environments and government preferences that embeds Grossman and Helpman (1995b) as an example.

While a TA cannot eliminate the politics component of the status quo tariffs in a menu auction, a TA can eliminate these effects in our framework. Noting that $v_T(\mathbf{t}_{TA}) = \frac{1}{2}e(t_{SQ} - t_{TA})$ and $v_A(\mathbf{t}_{TA}) = \frac{1}{2}d(t_{SQ} - t_{TA})$, our polarization property holds ($-\frac{\partial v_i(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$ for $i \in \{A, T\}$) and our pro-trade biased polarization property holds ($-\partial \frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})} / \partial \mathbf{t}_{TA} = 0$). Thus, Proposition 2 implies that, for sufficiently small a , free trade is the equilibrium TA.²⁴

²²In general, the terms of trade effect is the inverse export supply elasticity (in absolute value). In our linear setup, it is merely equilibrium Foreign exports of $\frac{1}{2}[(e + \theta) - (\alpha + d) - t_{SQ}^{GH}]$. Hence, $t_{SQ}^{GH} > 0$ given positive foreign exports.

²³Here, the TA also brings in the Foreign politics effect but that would show up as part of a status quo Foreign export subsidy if we also allowed export policy.

²⁴If a is large enough, the equilibrium TA can shift from having a symmetric TA tariff of $t_{TA} = 0$ to

The greater degree of liberalization that emerges in our framework stems from our departure from the menu auction assumption that lobbies contribute *after* the government makes its trade policy decision. In both frameworks, the pro-trade lobby benefits, and contributes more, under more liberal TAs. But, by hurting the anti-trade lobby, greater trade liberalization reduces anti-trade lobby contributions. Thus, the more protectionist policy outcome in the menu auction reflects the government's understanding that the pro-trade lobby contributes *after* the government makes its trade policy decision. Conversely, the more liberal outcome in our contest framework reflects the government's understanding that lobbies contribute *prior* to when the government makes its policy decision and a more liberal TA increases contributions from the anti-trade lobby by strengthening their opposition to the TA. Thus, taking a stand on the timing of interaction between lobbies and governments fundamentally impacts the equilibrium degree of trade liberalization.

One may be tempted to interpret our result as saying a TA can do more than eliminate terms of trade externalities. We caution against such an interpretation. In the symmetric model outlined above, reciprocity requires a symmetric TA tariff t_{TA} . A key mechanism underlying our polarization property is that Foreign tariff liberalization increases Home exports. Moreover, given Home's export supply function maps world prices into export volumes, Foreign tariff liberalization raises Home exports by raising the world price. Thus, our polarization property relies on terms of trade externalities. That is, our TA formation process can eliminate politics from the status quo tariffs by leveraging these terms of trade externalities. In essence, our results emphasize that a TA can eliminate politics from the status quo tariffs by changing the nature of political interaction between governments and lobbies from that underlying the status quo tariffs to that of our contest framework.

By extending the above example to a three-country setting, we now illustrate how our results differ from a menu-auction over a bilateral Free Trade Agreement (FTA). Perhaps the most prominent exception to the overarching non-discrimination principle in the GATT/WTO is that bilateral FTA members can engage in reciprocal bilateral tariff reductions if they completely eliminate their bilateral tariffs. Formally, we now consider three non-numeraire goods where each country has an endowment e of its comparative advantage good and endowments d of its two comparative disadvantage goods (each country has a different comparative advantage good).

To focus attention on the differences between the menu auction framework and our contest framework, let $a = 0$ so that governments merely maximize lobby welfare. In our simple symmetric economic environment, the FTA-induced change in lobby welfare is the change

$$t_{TA} = \frac{2d}{a} \left(\frac{e}{e+d} \right)^2. \text{ This shift not only requires } a \text{ large enough but also } t_{TA} \leq t_{SQ} \text{ and } l_i \geq 0 \text{ for } i \in \{A, T\}.$$

in producer surplus $\frac{1}{3}t_{SQ}(e - 2d)$. Thus, governments oppose the FTA in a menu auction framework when $d > \frac{1}{2}e$.²⁵ Faced with the choice of preserving the status quo tariffs or proposing a bilateral FTA with zero bilateral tariffs in our contest framework, Proposition 2 implies a pair of governments propose the bilateral FTA when a is sufficiently small and our polarization and pro-trade biased polarization properties hold. Indeed, they hold given $v_T(\mathbf{t}_{TA}) = \frac{1}{3}et_{SQ}$, $v_A(\mathbf{t}_{TA}) = \frac{2}{3}dt_{SQ}$ and $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})} = \frac{1}{2}\frac{e}{d}$. Thus, we have a concrete example where lobby pressure leads governments to not form the FTA in a menu auction setting (like Grossman and Helpman (1995a)) but governments propose FTA formation in our contest framework. Again, the intuition described above regarding the different timing assumptions over lobby-government interaction drive this result.

5.2 Oligopoly model

Intra-industry conflicts over trade liberalization could naturally emerge. To this end, we now illustrate how our contest framework differs from the menu auction framework using a simple oligopoly model (we relegate a detailed presentation to the Appendix).

Two symmetric countries each have two firms. They apply symmetric status quo tariffs $\mathbf{t}_{SQ} = (t_{SQ}, t_{SQ}^* = t_{SQ})$ with $t_{SQ} < \bar{t}$ where $t > \bar{t}$ would prohibit trade. In each country, one firm has zero marginal cost (i.e. $c = 0$) and the other has constant marginal cost $c = \bar{c} > 0$. Exporting requires a fixed cost $f_X > 0$; thus, in equilibrium, inefficient firms may only serve their domestic market. A linear inverse demand curve, with an intercept normalized to 1, governs demand for the oligopolistic good. We make the standard assumptions outlined in Section 5.1 that reduces a general equilibrium to a partial equilibrium setup.

The fixed export cost f_X generates intra-industry conflict over trade liberalization. Once f_X exceeds a threshold $\underline{f}_X(c)$, exporting is unprofitable for the inefficient firms for all $t \leq t_{SQ}$. Thus, as Figure 2(a) shows, liberalization hurts the inefficient domestic firm via increased competition in the domestic market with the efficient foreign firm: $-\frac{\partial \pi(\bar{c})}{\partial \mathbf{t}_{TA}} < 0$ where $\pi(c)$ denotes profits of a home firm. In turn, the inefficient firm constitutes L_A and, fixing t_{SQ} , Figure 2(b) shows that $-\frac{\partial v_A(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$. Unlike the inefficient firm, trade liberalization benefits the efficient firm via higher export profits. However, as Figure 2(a) shows, the convexity of $\pi_0(\cdot)$ implies that a sufficiently high t_{SQ} actually requires a sufficiently liberal t_{TA} for the benefit of higher exports profits to outweigh lost domestic profits. In turn, the efficient firm constitutes L_T when the benefit of additional foreign market access outweighs lost domestic profits. In this case, $v_T(\mathbf{t}_{TA}) > 0$ and, as Figure 2(b) shows, $-\frac{\partial v_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0$. Thus, once $v_T(\mathbf{t}_{TA}) > 0$, our polarization property holds and, in turn, Figure 2(c) illustrates that our

²⁵Incidentally, this condition is weaker than the condition required for a tariff to maximize the three-country joint government payoff.

pro-trade biased polarization property also holds.

Figure 2: Oligopoly model: contest vs menu auction frameworks

Given the polarization and pro-trade biased polarization properties hold, our earlier results apply. In particular, the TA that maximizes aggregate contributions within each country is free trade. So, this is the equilibrium TA when governments only care about contributions. In particular, this holds for any t_{SQ} . What would the equilibrium TA look like in a menu auction noting that, in the equilibrium of a menu auction, governments merely maximize lobby welfare when $a = 0$? To highlight differences with our results, focus on $t_{SQ} > \tilde{t}$ so that any liberalization reduces aggregate profits of domestic firms (see Figure 2(a)). Thus, in a setup like Grossman and Helpman (1995b) where negotiation is over the TA tariffs given the agreement is going ahead, liberalization would not arise in equilibrium. Further, in a setup like Grossman and Helpman (1995b) where negotiation is over whether to form a TA that involves zero tariffs, the TA would fail. Thus, the oligopoly setup clearly illustrates the different implications stemming from the menu auction setting versus the contest setting. As described in the previous section, these differences stem from the different timing assumptions regarding lobby-government interaction.

5.3 Melitz model

We now illustrate our framework in a symmetric two-country Melitz model, focusing on the essential structure in the Home country (the Appendix contains a more formal presentation).

A representative agent obtains per-period utility $U = \omega \ln(X) + Y$. Here, ω parameterizes expenditure on the composite differentiated good $X = \left(\int_{i \in \Omega} x(i)^\theta di \right)^{\frac{1}{\theta}}$ that aggregates over a set Ω of possible varieties with an elasticity of substitution $\varepsilon = \frac{1}{1-\theta} > 1$ where $\theta \in (0, 1)$. In contrast, Y is a freely traded homogenous good produced one-to-one using labor.

Sector X firms face three forms of fixed costs. First, firms pay a one time market entry fixed cost f_E . Once paid, firm i draws a constant marginal cost c_i (labor is the only

input) from the Pareto distribution $G(c) = \left(\frac{c}{c_U}\right)^k$ with $0 < c < c_U$ and shape parameter $k > (\varepsilon - 1)$. Thus, a competitive fringe of potential entrants awaits favorable market conditions to make entry profitable. Second, after observing c_i , firm i decides whether to produce knowing production incurs a per-period fixed cost f_D . Thus, in response to adverse changes in market conditions, relatively unproductive firms exit the market. Third, firm i pays an additional fixed cost $f_X = \gamma f_D$ if it serves the foreign market. Because $\gamma > 1$, any firm that produces will serve the domestic market and only the most productive firms export. Summarizing, the three key parameters in the model are (i) the elasticity of substitution between differentiated varieties $\varepsilon = \frac{1}{1-\theta} > 1$, (ii) $\gamma = \frac{f_X}{f_D}$, capturing the additional cost of exporting relative to domestic production and (iii) the Pareto shape parameter k , governing the dispersion of firm productivity.

5.3.1 Equilibrium and lobbying

Zero profit conditions and a free entry condition allow closing the model and the Pareto distribution for marginal cost allows closed form solutions. Conditional on a set of firms having paid the fixed market entry cost f_E , zero profit conditions pin down the marginal cost cutoffs that define firm production choices. Given the status quo tariffs $\mathbf{t}_{SQ}$, (i) firms with $c_i \leq c_{X,SQ}$ serve the domestic market and export, (ii) firms with $c_i \in (c_{X,SQ}, c_{D,SQ}]$ only serve the domestic market, and (iii) firms with $c_i > c_{D,SQ}$ exit without producing. Importantly, these zero profit conditions are zero ‘operating’ profit which do not take into account the fixed market entry cost f_E . The free entry condition determines the mass of firms $N_{E,SQ}$ that enter and force a potential entrant’s expected operating profit to equal the fixed market entry cost f_E . The Appendix presents derivations and closed form solutions for $c_{X,SQ}$, $c_{D,SQ}$ and $N_{E,SQ}$ and the associated profits for the different types of firms.

Upon implementation of the TA tariffs $\mathbf{t}_{TA}$, we can solve for new marginal cost cutoffs $c_{X,TA}$ and $c_{D,TA}$. In doing so, one must take a stand on how the mass of firms, N_E , adjusts. First, one could take a ‘short-run’ view that holds $N_{E,SQ}$ fixed.²⁶ Second, one could take a ‘long-run’ view that allows N_E to adjust given the new market conditions. In this latter case, we assume that only the mass of firms $N_{E,SQ}$ lobby over the TA. To do otherwise would allow the seemingly unrealistic possibility that ‘potential’ firms, i.e. those who are not yet producing anything, lobby over the TA. Having solved for the endogenous marginal cost cutoffs, as well as other endogenous variables, we again obtain closed form solutions for the profits of the different types of firms.

To define lobby group valuations, let $\bar{c}$ denote the threshold marginal cost for a firm

²⁶Holding N_E fixed in the ‘short-run’ is similar to Eaton and Kortum (2005), Chaney (2008), Do and Levchenko (2009) and Arkolakis et al. (2012).

indifferent between the TA tariffs $\mathbf{t}_{TA}$ and the status quo tariffs $\mathbf{t}_{SQ}$. Further, let $\pi(c, (t, t^*))$ denote a firm's operating profit with marginal cost c and tariffs (t, t^*) . Then, $L_A(L_T)$ constitutes firms with marginal cost above (below) $\bar{c}$ and their valuations are

$$v_A = N_E \int_{\bar{c}}^{c_{D,SQ}} (\pi(c, \mathbf{t}_{SQ}) - \pi(c, \mathbf{t}_{TA})) dG(c) \quad (21)$$

$$v_T = N_E \int_0^{\bar{c}} (\pi(c, \mathbf{t}_{TA}) - \pi(c, \mathbf{t}_{SQ})) dG(c). \quad (22)$$

To ensure that $v_T(\mathbf{t}_{TA}) > v_A(\mathbf{t}_{TA})$, we impose $t_{SQ} < \frac{k}{k-\theta}$.

Given this assumption, we numerically investigate the properties imposed in our earlier analysis: (i) a more liberal TA polarizes the lobby groups, $-\partial v_i(\mathbf{t}_{TA})/\partial \mathbf{t}_{TA} > 0$ for $i \in \{A, T\}$, and (ii) a more liberal TA generates pro-trade biased polarization: $-\partial \frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}/\partial \mathbf{t}_{TA} \geq 0$.²⁷ In the 'long-run', these properties hold without any restrictions.²⁸ In the short-run case, the former property fails for the anti-trade lobby as the equilibrium mass of non-exporting firms vanish. Intuitively, we need a non-trivial mass of 'import-competing' firms for a more liberal TA to strengthen the anti-trade lobby's TA opposition.²⁹ Thus, this condition appears rather unrestrictive. In turn, application of Proposition 2 implies that the equilibrium TA is free trade in the symmetric Melitz model as long as a is sufficiently small, γ is sufficiently large, and TA tariffs respect the reciprocity rule $\mathbf{u}(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$.

5.3.2 Comparative statics

While free trade is the equilibrium TA, the probability of TA ratification depends on the relative valuations $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$ in Home and $\frac{v_T^*(\mathbf{t}_{TA})}{v_A^*(\mathbf{t}_{TA})}$ in Foreign. Thus, we can investigate how the model's parameters affect the probability of TA formation.

For the 'short-run' cases, we can numerically show that (i) $d \frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}/d\gamma < 0$, so that larger barriers to exporting decrease the probability of TA formation, (ii) $d \frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}/dk < 0$, so that more dispersion in firm productivity decreases the probability of TA formation, and (iii) $d \frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}/d\varepsilon > 0$, so that a higher willingness to substitute between varieties increases the probability of TA formation.³⁰ Intuitively, we can think of these results working through the marginal cost cutoff for an exporter relative to a non-exporter and, in turn, the composition

²⁷Note, the reciprocity rule of equal changes in imports requires symmetric tariff reductions.

²⁸Indeed, free entry implies aggregate profits are fixed and thus $v_T(\cdot) = v_A(\cdot)$ and $-\partial \frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}/\partial \mathbf{t}_{TA} = 0$.

²⁹In general, the anti-trade lobby in the Melitz model consists of low productivity exporting firms and non-exporting firms. The latter set of firms constitutes what one would normally think of as 'import-competing' firms.

³⁰For the 'long-run' cases, $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})} = 1$ and is independent of the parameters.

of firms across the anti-trade and pro-trade lobbies.³¹ Larger barriers for becoming an exporter (i.e. higher γ) make it tougher to be an exporter, thereby shifting firm composition towards non-exporters and lowering $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$. A higher k skews firm composition towards low productivity firms, making it tougher to be an exporter and lowering $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$. With consumers more willing to substitute between varieties (i.e. higher ε), markups fall which disproportionately hurts low productivity firms and induces exit. In turn, firm composition shifts towards high productivity export firms and raises $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$. These comparative statics illustrate how one could start thinking about taking our framework to the data.

6 Conclusion

Once governments sign a TA, the ratification process in each country is often lengthy and uncertain. Illustrative examples include the TPP, US FTAs with Korea and Central America and the 1994 Uruguay Round. Motivated by these stylized facts, we develop a new two-country political economy framework with two key features. First, pro-trade and anti-trade interest groups make contributions to influence their own government's subsequent ratification decision. Second, these interest groups recognize that the TA's ultimate fate depends on the ratification decisions of both governments. The former feature distinguishes our contest framework from the standard approach in the trade and political economy literature where the ratification process is ignored and interest groups condition their contributions on their government's policy decision. The latter feature distinguishes our framework from the prior contest literature by linking the outcome in one contest to the outcome in a different 'parallel' contest and gives rise to the new class of contests that we call 'parallel contests'.

In our framework, anti-trade and pro-trade interest groups make contributions in equilibrium and uncertainty prevails over the ratification decision of each government. These features match both the contesting real world lobbying interests during the TA ratification process and the uncertainty over the outcome of this process. In contrast, the benchmark political economy model in the literature predicts that either the anti-trade *or* pro-trade interest group lobbies in equilibrium and there is no uncertainty over a government's TA ratification decision (e.g. Grossman and Helpman (1995a)). Thus, our framework offers a firm foundation for empirical work on the role of lobbying on TA formation.

Regarding the level of negotiated TA tariffs, the key new insight is the lobbying process itself drives governments towards proposing the most liberal TA possible. In turn, our

³¹This relative cutoff is $\frac{c_X}{c_D} = \left[\gamma^{\frac{1}{\varepsilon-1}} t^{\frac{1}{\theta}} \right]^{-1}$ and the relative mass of exporter to non-exporter firms is $\frac{N_X}{N_D} = \left(\frac{c_X}{c_D} \right)^k$.

framework suggests that inherent government protectionist tendencies, perhaps driven by electoral motivations as in Conconi et al. (2014), drive real world protection levels. While our view of lobbying echoes the typical non-academic view that corporate lobbying drives liberal trade policy, our view contrasts starkly with the typical view in the literature that real world protection levels balance protectionist lobbying forces against inherent government desires for national welfare improving liberalization. Nevertheless, in doing so, our alternative perspective suggests that the relatively low tariff levels observed across many countries reflects governments that place relatively large value on lobbying contributions. This offers a reconciling perspective on the empirical ‘puzzle’ whereby matching data with the benchmark Protection for Sale framework requires governments have, arguably, implausibly high degrees of welfare-mindedness.

In a two-country world, Grossman and Helpman (1995b) illustrate the more general point emphasized by Bagwell and Staiger (1999) that a TA eliminates the terms of trade component from status quo tariffs but leaves the politics component intact. Nevertheless, we show that, by leveraging externalities traveling through world prices, our lobbying process can eliminate the politics component of status quo tariffs. In other words, the TA can itself remove politics from status quo tariffs by changing the nature of government-lobby interaction from that underlying the status quo tariffs to that underlying our contest. This difference with the menu auction setup stems directly from the different timing assumption on government-lobby interaction: governments receive contributions after their policy decision in a menu auction but before receiving contributions in a contest framework. In turn, this dichotomy determines whether a more liberal TA depresses or boosts anti-trade lobby contributions.

Our framework also opens the door to future research directions. Our framework predicts that the probability of TA formation increases in the strength of pro-trade interest group support relative to the strength of anti-trade interest group opposition. Given the empirical economic determinants of FTA literature spawned by Baier and Bergstrand (2004), this property can drive empirical investigation through the lens of a microfounded political economy model of FTA formation. Another useful property of our framework is that, as we show in the all-pay contest setup of the Appendix, one can make predictions about the extensive margin of lobbying; namely, the extent to which interest groups refrain from making contributions. Again, this prediction lends itself naturally to empirical investigation.

Adding more countries to our framework represents another direction for future research. In our TA context, a TA with more countries would polarize the anti-trade and pro-trade lobbies further by increasing the export market access gained and increasing the degree of import competition. All else equal, this would increase lobbying contributions. However, on the other hand, by decreasing the likelihood of each country’s TA ratification decision

being pivotal, adding more countries would reduce lobbying contributions. Our framework can analyze the balance between these tensions. These tensions could also be present in an international environmental agreement like the Kyoto Protocol. Unlike our TA context, implementation of the Kyoto Protocol only required a two-thirds majority rather than unanimity, thereby creating large free riding incentives. Despite being implemented, the US, the largest CO₂ emitter, did not ratify the Kyoto Protocol. Our framework is well suited to analyze these free riding issues in international negotiations.

Indeed, our parallel contest framework has broad applicability. International agreements over the environment and safety (e.g. the The Limited Nuclear Test Ban Treaty) share the basic features of our setup: local interest groups contest each other to influence their government’s ratification decision knowing implementation of the agreement requires mutual ratification. A between-firm example is the collaboration between British Aerospace, MBB of West Germany, and Aeritalia of Italy to produce the Panavia Tornado fighter jet. One could imagine within-firm divergent views over the balance between collaboration among Europe’s best military aircraft producers and concerns over proprietary knowledge and/or national security. A within-firm example is the collaboration of architectural and engineering departments of the London-based firm Arup who built The Shard. One could imagine tension within each department arising from some agents wanting to abandon The Shard in favor of other projects, yet moving ahead with The Shard requires agreement of both department heads. Interest groups contesting to influence their own decision maker and collaboration requiring approval of both decision makers ties these examples into a ‘parallel contest’.

Our framework also invites reflection on the extent of possible coordination between groups in different entities whose interests are aligned (e.g. pro-collaboration groups across firms or across departments within a firm). Our parallel contest insights inform the nature of strategic interaction between such groups who cannot perfectly coordinate whereas the well-known Colonel Blotto game does so in an environment of perfect coordination. However, an ideal framework would allow flexibility in the degree of imperfect coordination. For example, in a between-firm collaboration setting, interest groups of one firm may not be able to lobby the other firm’s decision maker but could perhaps undertake actions that make it easier for their aligned interest group in the other firm to lobby their own decision maker. An interesting question becomes whether, as the scope for ‘cross-subsidization’ rises, the predictions move from those of a parallel contest towards those of the Colonel Blotto game.

Appendix

A Proofs from main text

PROOF OF PROPOSITION 1

Proof. Focusing on the home country without loss of generality,

$$G(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) = \hat{l}(\hat{p}_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA}) = \hat{p}_T^*(\mathbf{t}_{TA}) \frac{1}{2} \bar{v}(\mathbf{t}_{TA})$$

given $a = 0$ and (6)-(8). Two observations establish the proposition. First, $\hat{p}_T(\mathbf{t}_{TA}) = \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}\right]^{-1}$ follows from (6)-(8) and, by analogy, $\hat{p}_T^*(\mathbf{t}_{TA}) = \left[1 + \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})}\right]^{-1}$. Thus, the pro-trade biased polarization property implies $\hat{p}_T^*(\mathbf{t}_{TA})$ is maximized by the most liberal TA satisfying $\mathbf{u}(\mathbf{t}_{TA})$. Second, the polarization property implies $\bar{v}(\mathbf{t}_{TA}) = \left[\frac{1}{2} \left(\frac{1}{v_T(\mathbf{t}_{TA})} + \frac{1}{v_A(\mathbf{t}_{TA})}\right)\right]^{-1}$ is maximized by the most liberal TA, $\hat{\mathbf{t}}_{TA}$, satisfying $\mathbf{u}(\mathbf{t}_{TA})$. Thus, $G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and, by analogy, $G^*(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ are maximized by the most liberal TA satisfying $\mathbf{u}(\mathbf{t}_{TA})$. In turn, the restriction $\mathbf{t}_{TA} \geq 1$ implies $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$. ■

PROOF OF PROPOSITION 2

Proof. Focusing on the home country without loss of generality, (16) says $-\frac{\partial G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} = -\frac{\partial \hat{l}(p_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA}; a=0)}{\partial \mathbf{t}_{TA}} + a \frac{\partial \Phi(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}}$ where (17) defines $\Phi(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$. The proof of Proposition 1 establishes $-\frac{\partial \hat{l}(p_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA}; a=0)}{\partial \mathbf{t}_{TA}} > 0$ for all $\mathbf{t}_{TA} \leq \mathbf{t}_{SQ}$ such that $\mathbf{t}_{TA}$ satisfies $\mathbf{u}(\mathbf{t}_{TA})$. Thus, $G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ is maximized by the most liberal TA satisfying $\mathbf{u}(\mathbf{t}_{TA})$ for sufficiently small $a > 0$ if $\left| \lim_{a \rightarrow 0} \frac{\partial \Phi(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} \right| \neq \infty$. Note that

$$\begin{aligned} \frac{\partial \Phi(\cdot)}{\partial \mathbf{t}_{TA}} &= -\Delta h(\cdot) \left[\frac{\partial \hat{p}_T^*(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} \hat{p}_T(\mathbf{t}_{TA}) + \frac{\partial \hat{p}_T(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} \hat{p}_T^*(\mathbf{t}_{TA}) \right] \\ &= -\Delta h(\cdot) \left[\frac{\left(\frac{\partial \hat{l}_T(\cdot; a=0)}{\partial \mathbf{t}_{TA}} - a \frac{\partial h_T(\cdot)}{\partial \mathbf{t}_{TA}} \right) \hat{l}_A(\cdot) - \frac{\partial \hat{l}_A(\cdot; a=0)}{\partial \mathbf{t}_{TA}} \hat{l}_T(\cdot)}{\left(\hat{l}_A(\cdot) + \hat{l}_T(\cdot) \right)^2} \right. \\ &\quad \left. + \frac{\left(\frac{\partial \hat{l}_T^*(\cdot; a=0)}{\partial \mathbf{t}_{TA}} - a \frac{\partial h_T^*(\cdot)}{\partial \mathbf{t}_{TA}} \right) \hat{l}_A^*(\cdot) - \frac{\partial \hat{l}_A^*(\cdot; a=0)}{\partial \mathbf{t}_{TA}} \hat{l}_T^*(\cdot)}{\left(\hat{l}_A^*(\cdot) + \hat{l}_T^*(\cdot) \right)^2} \right]. \end{aligned} \quad (23)$$

where $\hat{l}_i(\cdot; a=0), \hat{l}_i^*(\cdot; a=0), h_i(\cdot), h_i^*(\cdot) \in \mathbb{R}$ for $i \in \{A, T\}$ and independent of a . Further,

$\hat{l}_i(\cdot), \hat{l}_i^*(\cdot) > 0$ for $i \in \{A, T\}$ and for any $a \geq 0$. Combined with $\frac{\partial \hat{l}_i(\cdot; a=0)}{\partial \mathbf{t}_{TA}}, \frac{\partial \hat{l}_i^*(\cdot; a=0)}{\partial \mathbf{t}_{TA}}, \frac{\partial h_T(\cdot)}{\partial \mathbf{t}_{TA}}, \frac{\partial h_T^*(\cdot)}{\partial \mathbf{t}_{TA}} \in \mathbb{R}$ we have $\lim_{a \rightarrow 0} \frac{\partial \Phi(\cdot)}{\partial \mathbf{t}_{TA}} \in \mathbb{R}$. In turn, $\lim_{a \rightarrow 0} a \frac{\partial \Phi(\cdot)}{\partial \mathbf{t}_{TA}} = 0$. Hence, for sufficiently small $a > 0$, $G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ is maximized by the most liberal TA satisfying $\mathbf{u}(\mathbf{t}_{TA})$, denoted $\hat{\mathbf{t}}_{TA}$. The restriction $\mathbf{t}_{TA} \geq 1$ implies $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$.

Finally, substituting (13)-(14) into (12), and remembering $s_i = l_i + ah_i$, establishes $\hat{p}_T(\mathbf{t}_{TA}) = \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}\right]^{-1}$ and, by analogy, $\hat{p}_T^*(\mathbf{t}_{TA}) = \left[1 + \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})}\right]^{-1}$. ■

B The Extensive Margin of a TA Contest

In our Tullock contest setting, i.e. $r = 1$, only the intensive margin of lobbying appeared. However, moving to an all pay contest by letting $r \rightarrow \infty$ introduces the extensive margin of lobbying because interest groups may refrain from making contributions in equilibrium. Letting $r \rightarrow \infty$ and using (1):

$$p_T = \begin{cases} 0 & \text{if } s_T < s_A \\ 1 & \text{if } s_T > s_A \\ \rho \in (0, 1] & \text{if } s_T = s_A \end{cases}.$$

We now investigate various forms of our parallel all pay contest.

The ‘all-pay contest’ literature builds on the ‘all-pay auction’ literature by generalizing the cost function of a bid/contribution beyond the bid/contribution itself. Hillman and Samet (1987), Hillman and Riley (1989) and Baye et al. (1996) pioneered the all-pay auction literature to model rent-seeking and lobbying activities. For example, Hillman (2013) argues unilateral trade policy can be viewed as an all-pay auction. Siegel (2009, 2010, 2014) develops the theory of all-pay contests by allowing the cost of contributions to vary across players. This generalization allows some players to have a ‘head start’ over others.

B.1 All pay auctions: no head starts

In the absence of head starts, $s_i = l_i$, the all pay contest reduces to an all pay auction and their equilibrium characterization was developed by Hillman and Riley (1989) and Baye et al. (1996). As described in the main text, the standard solution techniques and theorems used therein apply in our parallel contest because the preferences underlying the expected payoff functions are identical to those in a standard all pay auction where the exogenous valuations are given by our exogenous ‘effective’ valuations $\tilde{v}_i(\mathbf{t}_{TA})$.

As is well known in the literature, the standard all pay auction has no pure strategy equilibrium. Intuitively, given the deterministic nature of the Home government’s TA rati-

fication decision, Home lobbies only want to contribute if they are successful in swaying the Home government's ratification decision. That is, fixing the positive probability of Foreign ratification, each Home lobby prefers not contributing rather than making a contribution arbitrarily lower than the other lobby because any such contribution does not sway the Home government's ratification decision. However, in turn, the lobby that succeeds in swaying the government's decision will make an arbitrarily small contribution. The lack of a pure strategy equilibrium now becomes clear because the so-called 'unsuccessful' lobby benefits from becoming the 'successful' lobby through a contribution slightly above the arbitrarily small contribution of the other lobby. As a result, the Nash equilibrium of the all pay auction is a mixed strategy equilibrium where lobbies randomize uniformly over an interval. Because these randomization strategies depend on the valuation structure, we now build our discussion around the valuation structure.

B.1.1 Homogenous valuations: $v_T(\mathbf{t}_{TA}) = v_A(\mathbf{t}_{TA})$

In Stage 2, each lobby randomizes its contributions uniformly over $[0, \tilde{v}(\mathbf{t}_{TA})]$ or, equivalently, over $[0, p_T^* v(\mathbf{t}_{TA})]$ where $v(\mathbf{t}_{TA}) = v_T(\mathbf{t}_{TA}) = v_A(\mathbf{t}_{TA})$. While no lobby benefits from contributing above their effective valuation $\tilde{v}(\mathbf{t}_{TA})$, lobby competition forces the upper bound of their contribution to $\tilde{v}(\mathbf{t}_{TA})$. Moreover, two observations imply each lobby's lower bound contribution is zero. First, the lobbies must have equal lower bound contributions because otherwise the lobby with the larger lower bound could benefit by reducing their lower bound. Second, given equal lower bound contributions, a lobby's lower bound contribution never sways the government's ratification decision and hence the lower bound must be zero. Thus, ultimately, the interval $[0, \tilde{v}(\mathbf{t}_{TA})]$ characterizes the intensive margin of lobbying. Moreover, given the symmetric nature of the homogenous valuations all pay auction, the extensive margin plays no role in equilibrium. Formally, letting α_i denote the probability that $l_i = 0$, we have $\hat{\alpha}_A = \hat{\alpha}_T = 0$ in equilibrium.

In Stage 1, government incentives for setting TA tariffs match those described earlier. Given the absence of head starts, the Home government's expected payoff is merely the expected equilibrium aggregate lobbying contributions $\mathbb{E}[\hat{l}(\hat{p}_T^*(\cdot), \mathbf{t}_{TA})] = \hat{p}_T^*(\cdot) v(\mathbf{t}_{TA})$. But, the symmetric mixed strategy equilibrium implies $\hat{p}_T(\cdot) = \hat{p}_T^*(\cdot) = \frac{1}{2}$ and, in turn, $\mathbb{E}[\hat{l}(\hat{p}_T^*(\cdot), \mathbf{t}_{TA})] = \frac{1}{2} v(\mathbf{t}_{TA})$. Thus, we only need the assumption that trade liberalization polarizes lobby groups to ensure that the most liberal TA possible maximizes lobbying contributions received by governments. Intuitively, because homogeneous valuations pins down $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$ as constant, we no longer need the pro-trade biased polarization assumption that we needed in the Tullock contest setting. Thus, we see that our results in Propositions 1-2 of the main text are robust to the all pay auction homogenous valuation setting.

B.1.2 Heterogenous valuations: $v_T(\mathbf{t}_{TA}) \neq v_A(\mathbf{t}_{TA})$

Without loss of generality, we now assume $v_T(\mathbf{t}_{TA}) > v_A(\mathbf{t}_{TA})$. This heterogeneity assumption is consistent with our polarization and pro-trade biased polarization properties whereby a more liberal TA increases $v_T(\mathbf{t}_{TA})$, $v_A(\mathbf{t}_{TA})$ and also $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$.

In Stage 2, both lobbies randomize their contributions uniformly over $[0, \tilde{v}_A(\mathbf{t}_{TA})]$ or, equivalently, over $[0, p_T^* v_A(\mathbf{t}_{TA})]$. As the low valuation lobby, L_A never contributes above its effective valuation $p_T^* v_A(\mathbf{t}_{TA})$. Thus, despite its higher effective valuation, L_T never benefits from bidding above L_A 's effective valuation when trying to sway the government's ratification decision. The same logic from the homogeneous valuations case implies each lobby's lower bound contribution remains zero. Thus, the interval $[0, p_T^* v_A(\mathbf{t}_{TA})]$ characterizes the intensive margin of lobbying.

The symmetric lobbying strategies at the intensive margin combined with the asymmetric lobby valuations generate an extensive margin of lobbying. Intuitively, as the low valuation lobby, L_A refrains from lobbying and more so as the relative valuation of the pro-trade lobby rises. Specifically, $\hat{\alpha}_A(\mathbf{t}_{TA}) = 1 - \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}$ while $\hat{\alpha}_T = 0$. Combining this extensive lobbying margin with the intensive lobbying margin where the government ratifies the TA with probability $\frac{1}{2}$ conditional on both lobbies contributing, the unconditional probability of Home ratification is

$$\hat{p}_T(\mathbf{t}_{TA}) = \hat{\alpha}_A(\mathbf{t}_{TA}) + [1 - \hat{\alpha}_A(\mathbf{t}_{TA})] \frac{1}{2} = 1 - \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}. \quad (24)$$

In Stage 1, this extensive margin of lobbying has an important impact on government preferences over TA tariffs. Expected equilibrium aggregate contributions are

$$\mathbb{E} \left[\hat{l}(p_T^*, \mathbf{t}_{TA}) \right] = \frac{1}{2} p_T^* v_A(\mathbf{t}_{TA}) \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \right]. \quad (25)$$

Like earlier, these contributions are proportional to p_T^* . But, unlike earlier, the proportionality with respect to $v_A(\mathbf{t}_{TA})$ now reflects the common upper bound on valuations. In any case, our polarization and pro-trade biased polarization properties ensure the most liberal TA maximizes both of these components. But, the square bracketed term says, all else equal, contributions are decreasing in $\frac{v_T(\mathbf{t}_{TA})}{v_A(\mathbf{t}_{TA})}$. Thus, here, pro-trade biased polarization says a more liberal TA *hurts* the government's expected payoff by increasing the probability that L_T refrains from contributing. That is, the extensive margin of lobbying introduced by the heterogeneous valuations all pay auction interferes with the processes that would otherwise lead to the most liberal possible TA.

Nevertheless, in reasonable situations, the impact of a more liberal TA increasing the

probability of foreign TA ratification via pro-trade biased polarization outweighs the impact of a more liberal TA reducing the probability of L_T refraining from contributing. Specifically, letting $\nu(\mathbf{t}_{TA}) \equiv \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} < 1$ and $\nu^*(\mathbf{t}_{TA}) \equiv \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})} < 1$,

$$\begin{aligned} -\frac{\partial \hat{l}(\hat{p}_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0 &\Leftrightarrow \frac{1}{2} \frac{\partial \nu^*(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} [1 + \nu(\mathbf{t}_{TA})] - \left[1 - \frac{1}{2} \nu^*(\mathbf{t}_{TA})\right] \frac{\partial \nu(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}} > 0 \\ &\Leftrightarrow f(\nu(\mathbf{t}_{TA}), \nu^*(\mathbf{t}_{TA})) \equiv \frac{1 + \nu(\mathbf{t}_{TA})}{2 - \nu^*(\mathbf{t}_{TA})} > \frac{\partial \nu(\mathbf{t}_{TA}) / \partial \mathbf{t}_{TA}}{\partial \nu^*(\mathbf{t}_{TA}) / \partial \mathbf{t}_{TA}}. \end{aligned} \quad (26)$$

With symmetric countries, this condition merely reduces to $\nu^*(\mathbf{t}_{TA}) = \nu(\mathbf{t}_{TA}) > \frac{1}{2}$. An analogous condition for the foreign country's TA ratification decision is $f^*(\nu(\mathbf{t}_{TA}), \nu^*(\mathbf{t}_{TA})) \equiv \frac{2 - \nu(\mathbf{t}_{TA})}{1 + \nu^*(\mathbf{t}_{TA})} < \frac{\partial \nu(\mathbf{t}_{TA}) / \partial \mathbf{t}_{TA}}{\partial \nu^*(\mathbf{t}_{TA}) / \partial \mathbf{t}_{TA}}$. Thus, $\frac{\partial \nu(\mathbf{t}_{TA}) / \partial \mathbf{t}_{TA}}{\partial \nu^*(\mathbf{t}_{TA}) / \partial \mathbf{t}_{TA}} \in (f(\cdot), f^*(\cdot))$ is a sufficient (but not necessary) condition for a more liberal TA to increase lobbying contributions in the home and foreign countries, and hence for the most liberal TA to be the equilibrium TA. This sufficient condition can fail among symmetric countries when lobbies within a country are widely asymmetric (e.g. $\nu^*(\mathbf{t}_{TA}) = \nu(\mathbf{t}_{TA}) < \frac{1}{2}$) or among widely asymmetric countries. Proposition 3 summarizes our discussion.

Proposition 3 *Assume $r \rightarrow \infty$ and a reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$ that ensures a more liberal TA polarizes the lobby groups and generates pro-trade biased polarization. Further, for heterogeneous valuations, assume $\frac{\partial \nu(\mathbf{t}_{TA}) / \partial \mathbf{t}_{TA}}{\partial \nu^*(\mathbf{t}_{TA}) / \partial \mathbf{t}_{TA}} \in (f(\cdot), f^*(\cdot))$ where $f(\cdot)$ defined by (26). Then, in equilibrium, (i) the extensive margin of lobbying is given by $\hat{\alpha}_A(\mathbf{t}_{TA}) = 1 - \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}$ and $\hat{\alpha}_T = 0$, (ii) aggregate expected lobbying contributions are $\frac{1}{2} p_T^* v_A(\mathbf{t}_{TA}) \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}\right]$, (iii) the probability of TA formation is $\hat{p}_T(\mathbf{t}_{TA}) \hat{p}_T^*(\mathbf{t}_{TA}) = \left[1 - \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}\right] \cdot \left[1 - \frac{1}{2} \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})}\right]$ and (iv) the Home and Foreign governments propose the most liberal TA possible, denoted $\hat{\mathbf{t}}_{TA}$, implying at least one country practices free trade: $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$.*

Proof. First, consider the homogenous valuations case of $v_A(\mathbf{t}_{TA}) = v_T(\mathbf{t}_{TA}) \equiv v(\mathbf{t}_{TA})$, and $v_A^*(\mathbf{t}_{TA}) = v_T^*(\mathbf{t}_{TA}) \equiv v^*(\mathbf{t}_{TA})$:

- (i) Follows from Theorem 1 in Baye et al. (1996), noting that homogeneous valuations imply $\hat{\alpha}_A(\mathbf{t}_{TA}) = 1 - \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} = 0$.
- (ii) Given homogenous valuations, $\mathbb{E} \left[\hat{l}(p_T^*, \mathbf{t}_{TA}) \right] = \frac{1}{2} p_T^* v_A(\mathbf{t}_{TA}) \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \right] = p_T^* v(\mathbf{t}_{TA})$. By Theorem 1 in Baye et al. (1996) and (i) above, $\hat{l}_i(p_T^*, \mathbf{t}_{TA}) \stackrel{U}{\sim} [0, \tilde{v}(\mathbf{t}_{TA})]$ for $i \in \{A, T\}$ where $\tilde{v}(\mathbf{t}_{TA}) = p_T^* v(\mathbf{t}_{TA})$. Thus, $\mathbb{E} \left[\hat{l}_i(p_T^*, \mathbf{t}_{TA}) \right] = \frac{1}{2} \tilde{v}(\mathbf{t}_{TA}) = \frac{1}{2} p_T^* v(\mathbf{t}_{TA})$ for $i \in \{A, T\}$. In turn, $\mathbb{E} \left[\hat{l}_i(p_T^*, \mathbf{t}_{TA}) \right] = \tilde{v}(\mathbf{t}_{TA}) = p_T^* v(\mathbf{t}_{TA})$.

- (iii) Given homogenous valuations, $\hat{p}_T(\mathbf{t}_{TA})\hat{p}_T^*(\mathbf{t}_{TA}) = \left[1 - \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}\right] \cdot \left[1 - \frac{1}{2} \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})}\right] = \frac{1}{4}$. Further, $\hat{p}_T(\mathbf{t}_{TA}) = \Pr(l_T > l_A) = \frac{1}{2}$ and, analogously, $\hat{p}_T^*(\mathbf{t}_{TA}) = \Pr(l_T^* > l_A^*) = \frac{1}{2}$ because $\hat{l}_i(p_T^*, \mathbf{t}_{TA}) \stackrel{U}{\sim} [0, \tilde{v}(\mathbf{t}_{TA})]$ and $\hat{l}_i^*(p_T^*, \mathbf{t}_{TA}) \stackrel{U}{\sim} [0, \tilde{v}^*(\mathbf{t}_{TA})]$ for $i \in \{A, T\}$.
- (iv) Focusing on the home country without loss of generality, $G(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) = \mathbb{E}[\hat{l}(\hat{p}_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA})] = \hat{p}_T^*(\mathbf{t}_{TA})v(\mathbf{t}_{TA})$ given $a = 0$. Because $\hat{p}_T^*(\mathbf{t}_{TA})$ is independent of $\mathbf{t}_{TA}$, the polarization property implies $G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ is maximized by the most liberal TA that satisfies $\mathbf{u}(\mathbf{t}_{TA})$. The restriction $\mathbf{t}_{TA} \geq 1$ implies $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$.

Second, consider heterogeneous valuations:

- (i) Follows from Theorem 3 in Baye et al. (1996).
- (ii) By Theorem 3 in Baye et al. (1996), $\hat{l}_T(p_T^*, \mathbf{t}_{TA}) \stackrel{U}{\sim} [0, \tilde{v}_A(\mathbf{t}_{TA})] = [0, p_T^*v_A(\mathbf{t}_{TA})]$ while $\hat{l}_A(p_T^*, \mathbf{t}_{TA}) \stackrel{U}{\sim} [0, \tilde{v}_A(\mathbf{t}_{TA})] = [0, p_T^*v_A(\mathbf{t}_{TA})]$ with probability $\hat{\alpha}_A(\mathbf{t}_{TA})$ and $\hat{l}_A(p_T^*, \mathbf{t}_{TA}) = 0$ with probability $1 - \hat{\alpha}_A(\mathbf{t}_{TA})$. In turn, $\mathbb{E}[\hat{l}(p_T^*, \mathbf{t}_{TA})] = \frac{1}{2}p_T^*v_A(\mathbf{t}_{TA}) + (1 - \hat{\alpha}_A(\mathbf{t}_{TA}))\frac{1}{2}p_T^*v_A(\mathbf{t}_{TA}) = \frac{1}{2}p_T^*v_A(\mathbf{t}_{TA}) \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}\right]$.
- (iii) Note the common support when L_A and L_T lobby and that ratification requires $l_T > 0$. Thus, $\hat{p}_T(\mathbf{t}_{TA}) = \hat{\alpha}_A(\mathbf{t}_{TA})(1 - \hat{\alpha}_T) + \frac{1}{2}(1 - \hat{\alpha}_A(\mathbf{t}_{TA}))(1 - \hat{\alpha}_T)$. In turn, $\hat{p}_T(\mathbf{t}_{TA}) = \left(1 - \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}\right) + \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} = 1 - \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}$. And, analogously, $\hat{p}_T^*(\mathbf{t}_{TA}) = 1 - \frac{1}{2} \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})}$.
- (iv) Given (25) combined with the polarization property and (26), we have $-\frac{\partial G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} > 0$ and $-\frac{\partial G^*(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} > 0$ for all $\mathbf{t}_{TA} \leq \mathbf{t}_{SQ}$. Thus, the most liberal TA satisfying $\mathbf{u}(\mathbf{t}_{TA})$ maximizes $G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and $G^*(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$. The restriction $\mathbf{t}_{TA} \geq 1$ implies $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$.

■

B.2 All pay contests: head starts

When lobby groups have head starts, the government's ratification decision in Stage 3 depends on the augmented contributions $s_i = l_i + ah_i(\cdot)$. Effectively, head starts subsidize the cost of augmented contributions s_i (the cost is merely l_i) and distinguish the all pay contest from an all pay contest. Drawing on novel techniques developed by Siegel (2009, 2010, 2014), we now analyze the all pay contest. For the sake of exposition, we continue to assume heterogenous valuations where $v_T(\mathbf{t}_{TA}) > v_A(\mathbf{t}_{TA})$ so that L_A is the low valuation

lobby and that any anti-trade head start does not outweigh the heterogeneity in valuations: $p_T^* v_T(\mathbf{t}_{TA}) + a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > p_T^* v_A(\mathbf{t}_{TA})$.³²

First, consider the impact of anti-trade head starts $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) < 0$ in Stage 2. At the intensive margin, L_A still randomizes over $[0, p_T^* v_A]$ as the low valuation lobby with a net head start that does not outweigh the valuation difference. However, facing a net head start disadvantage, L_T must contribute $-a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and $p_T^* v_A - a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ to compete against, respectively, L_A 's lowest and highest contribution. Thus, L_T randomizes over $[-a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}), p_T^* v_A - a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})]$. For the extensive margin, notice the impact of the anti-trade head start on the highest payoffs that lobbies can guarantee themselves. For L_A , as in the absence of head starts, this zero payoff comes by not contributing. For L_T , as in the absence of head starts with $p_T^* v_T(\mathbf{t}_{TA}) > p_T^* v_A(\mathbf{t}_{TA})$, this payoff still comes via a contribution that guarantees Home ratification. But, given the anti-trade head start, this contribution rises, and the associated payoff falls, by $-a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$. Importantly, the adjustment at the intensive margin perfectly reflects these effects: the probability of Home ratification remains $\frac{1}{2}$ with L_A 's expected contributions remaining unchanged but L_T 's expected contributions rising by $-a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$. Thus anti-trade head starts impact the intensive margin but not the extensive margin so that, in turn, TA ratification probabilities (in Stage 3) and the equilibrium TA (in Stage 1) mirror our earlier analysis.

Second, consider the impact of pro-trade head starts $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$ in Stage 2. At the intensive margin, as the low valuation lobby facing a net head start disadvantage, L_A adjusts its lower bound upward to compete with L_T 's zero contribution and, thus, randomizes over $[a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}), p_T^* v_A]$. Further, because of its head start advantage, L_T adjusts its upper bound downwards to compete against L_A 's highest contribution and, thus, randomizes over $[0, p_T^* v_A - a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})]$. For the impact at the extensive margin, notice that the increase in L_A 's expected contribution implies that, absent any adjustment at the extensive margin, it would benefit from not contributing and ensuring a zero payoff. The required adjustments at the extensive margin imply $\hat{\alpha}_A(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) = 1 - \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \left[1 - \frac{a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{p_T^* v_A(\mathbf{t}_{TA})} \right]$ and $\hat{\alpha}_T(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) = \frac{a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{p_T^* v_A(\mathbf{t}_{TA})}$ so that these adjustments rise with the size of the pro-trade head start $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$. Proposition 4 summarizes this discussion.

Proposition 4 *Assume $r \rightarrow \infty$ and a reciprocity rule $\mathbf{u}(\mathbf{t}_{TA})$ that ensures a more liberal TA polarizes the lobby groups and generates pro-trade biased polarization. Further, assume $\frac{\partial \nu(\mathbf{t}_{TA})/\partial \mathbf{t}_{TA}}{\partial \nu^*(\mathbf{t}_{TA})/\partial \mathbf{t}_{TA}} \in (f(\cdot), f^*(\cdot))$ where $f(\cdot)$ defined by (26). Then, in equilibrium,*

- (i) *the extensive margin of lobbying is given by $\hat{\alpha}_A(\mathbf{t}_{TA}) = 1 - \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}$ and $\hat{\alpha}_T(\mathbf{t}_{TA}) = 0$*

³²This latter assumption implies L_A is the ‘marginal’ lobby in Siegel’s terminology.

- when $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) < 0$ but $\hat{\alpha}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) = 1 - \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \left[1 - \frac{a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{p_T^* v_A(\mathbf{t}_{TA})} \right]$ and $\hat{\alpha}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) = \frac{a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{p_T^* v_A(\mathbf{t}_{TA})}$ when $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$;
- (ii) expected aggregate contributions differ from those when $a = 0$ by $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$;
- (iii) the probability of Home TA ratification (and analogously for Foreign) is $\hat{p}_T(\mathbf{t}_{TA}) = 1 - \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}$ when $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) < 0$ but $\hat{p}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) = 1 - \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \left[1 - \left(\frac{a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{p_T^* v_A(\mathbf{t}_{TA})} \right)^2 \right]$ when $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$;
- (iv) for sufficiently small $a > 0$, the Home and Foreign governments propose the most liberal TA possible, denoted $\hat{\mathbf{t}}_{TA}$, implying that at least one country practices free trade: $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$.

Proof. First, consider the anti-trade head start case, $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) < 0$.

- (i) Follows from the algorithm in Siegel (2014).
- (ii) Following the algorithm in Siegel (2014), $\hat{l}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) \stackrel{U}{\sim} [-a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}), \tilde{v}_A(\mathbf{t}_{TA}) - a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})]$ where $\tilde{v}_A(\mathbf{t}_{TA}) = p_T^* v_A(\mathbf{t}_{TA})$ while $\hat{l}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) \stackrel{U}{\sim} [0, \tilde{v}_A(\mathbf{t}_{TA})]$ with probability $\hat{\alpha}_A(\mathbf{t}_{TA})$ and $\hat{l}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) = 0$ with probability $1 - \hat{\alpha}_A(p_T^*)$. Thus,

$$\begin{aligned} \mathbb{E}[\hat{l}(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})] &= \frac{1}{2} [p_T^* v_A(\mathbf{t}_{TA}) - 2a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})] + (1 - \hat{\alpha}_A(\mathbf{t}_{TA})) \frac{1}{2} p_T^* v_A \\ &= \frac{1}{2} p_T^* v_A(\mathbf{t}_{TA}) \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \right] - a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}). \end{aligned}$$

- (iii) When lobbying with positive probability, (i) above establishes that $\hat{l}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and $\hat{l}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$ have common support and, hence, so do $\hat{s}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and $\hat{s}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$. Thus, $\hat{p}_T(\mathbf{t}_{TA}) = \hat{\alpha}_A(\mathbf{t}_{TA}) [1 - \hat{\alpha}_T(\mathbf{t}_{TA})] + \frac{1}{2} [1 - \hat{\alpha}_A(\mathbf{t}_{TA})] [1 - \hat{\alpha}_T(\mathbf{t}_{TA})]$ given $\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) < 0$ and that ratification requires $l_T > 0$. In turn,

$$\hat{p}_T(\mathbf{t}_{TA}) = \left(1 - \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \right) + \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} = 1 - \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})}.$$

- (iv) Given (ii) above, equations (16)-(18) apply as in the main text. Focusing on the Home country's perspective without loss of generality and combining $\frac{\partial \hat{p}_T^*(\mathbf{t}_{TA})}{\partial \mathbf{t}_{TA}}, \frac{\partial \Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\partial \mathbf{t}_{TA}} \in \mathbb{R}$ and independent of a with the logic from the proof of Proposition 2(iii), we have $\lim_{a \rightarrow 0} \frac{\partial \Phi(\cdot)}{\partial \mathbf{t}_{TA}} \in \mathbb{R}$. In turn, $\lim_{a \rightarrow 0} a \frac{\partial \Phi(\cdot)}{\partial \mathbf{t}_{TA}} = 0$. Further, note that $-\frac{\partial \hat{l}(p_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA}; a=0)}{\partial \mathbf{t}_{TA}} > 0$

for all $\mathbf{t}_{TA} \leq \mathbf{t}_{SQ}$ such that $\mathbf{t}_{TA}$ satisfies $\mathbf{u}(\mathbf{t}_{TA})$. Thus, for sufficiently small $a > 0$, $G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and $G^*(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ are maximized by the most liberal TA satisfying $\mathbf{u}(\mathbf{t}_{TA})$, denoted $\hat{\mathbf{t}}_{TA}$, when $\frac{\partial \nu(\mathbf{t}_{TA})/\partial \mathbf{t}_{TA}}{\partial \nu^*(\mathbf{t}_{TA})/\partial \mathbf{t}_{TA}} \in (f(\cdot), f^*(\cdot))$. The restriction $\mathbf{t}_{TA} \geq 1$ implies $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$.

Second, consider the pro-trade head start case, $a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$.

(i) Follows from the algorithm in Siegel (2014).

(ii) Following the algorithm in Siegel (2014), $\hat{l}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) \overset{U}{\sim} [0, \tilde{v}_A(\mathbf{t}_{TA}) - a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})]$ where $\tilde{v}_A(\mathbf{t}_{TA}) = p_T^* v_A(\mathbf{t}_{TA})$ with probability $1 - \hat{\alpha}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and $\hat{l}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) = 0$ with probability $\hat{\alpha}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$ while $\hat{l}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) \overset{U}{\sim} [a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}), \tilde{v}_A(\mathbf{t}_{TA})]$ with probability $\hat{\alpha}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and $\hat{l}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) = 0$ with probability $1 - \hat{\alpha}_T(\cdot)$. Thus,

$$\begin{aligned} \mathbb{E}[\hat{l}(\cdot)] &= \frac{1}{2} [p_T^* v_A(\mathbf{t}_{TA}) - 2a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})] + [1 - \hat{\alpha}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})] \frac{1}{2} p_T^* v_A(\mathbf{t}_{TA}) \\ &= \frac{1}{2} p_T^* v_A(\mathbf{t}_{TA}) \left[1 + \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \right] - a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}). \end{aligned}$$

(iii) Given $\hat{l}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and $\hat{l}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$ when lobbying with positive probability from (ii) above,

$$\begin{aligned} \hat{s}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) &\overset{U}{\sim} [ah_T(\mathbf{t}_{TA}), p_T^* v_A(\mathbf{t}_{TA}) + ah_A(\mathbf{t}_{SQ})], \text{ and} \\ \hat{s}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) &\overset{U}{\sim} [ah_T(\mathbf{t}_{TA}), p_T^* v_A + ah_A(\mathbf{t}_{SQ})] \end{aligned}$$

have common support. Thus, $\hat{p}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) = \hat{\alpha}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) [1 - \hat{\alpha}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})] + \frac{1}{2} [1 - \hat{\alpha}_A(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})] [1 - \hat{\alpha}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})]$ given $\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$ and that ratification requires $l_T > 0$. In turn,

$$\begin{aligned} \hat{p}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) &= 1 - \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \left[1 - \left(\frac{a\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{p_T^* v_A(\mathbf{t}_{TA})} \right)^2 \right] \\ \hat{p}_T^*(p_T, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) &= 1 - \frac{1}{2} \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})} \left[1 - \left(\frac{a\Delta h^*(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{p_T v_A^*(\mathbf{t}_{TA})} \right)^2 \right]. \end{aligned}$$

(iv) Given (ii) above, equations (16)-(18) apply as in the main text. Here, we focus on the Home country's perspective without loss of generality. Given $\hat{p}_T^*(p_T, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$, then

$\hat{p}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ})$ is an implicit function. Thus, letting

$$f(\cdot) = \hat{p}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) - 1 + \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \left[1 - \left(\frac{a \Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\hat{p}_T^*(p_T, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) v_A(\mathbf{t}_{TA})} \right)^2 \right],$$

we have

$$\frac{\partial f(\cdot)}{\partial p_T} = 1 - \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \frac{v_A^*(\mathbf{t}_{TA})}{v_T^*(\mathbf{t}_{TA})} \left(\frac{a \Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{v_A(\mathbf{t}_{TA})} \right)^2 \left(\frac{a \Delta h^*(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{v_A^*(\mathbf{t}_{TA})} \right)^2 \frac{1}{\hat{p}_T^*(\cdot)^4 \hat{p}_T(\cdot)^3}$$

and, given $\lim_{a \rightarrow 0} \hat{p}_T(p_T^*, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) = \lim_{a \rightarrow 0} \hat{p}_T^*(p_T, \mathbf{t}_{TA}; \mathbf{t}_{SQ}) > 0$, we have $\lim_{a \rightarrow 0} \frac{\partial f(\cdot)}{\partial p_T} = 1$. Further,

$$\begin{aligned} \frac{\partial f(\cdot)}{\partial \mathbf{t}_{TA}} &= \frac{1}{2} \frac{\partial [v_A(\mathbf{t}_{TA})/v_T(\mathbf{t}_{TA})]}{\partial \mathbf{t}_{TA}} \left[1 - \left(\frac{a \Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})}{\hat{p}_T^*(\cdot) v_A(\mathbf{t}_{TA})} \right)^2 \right] \\ &\quad - \frac{1}{2} \frac{v_A(\mathbf{t}_{TA})}{v_T(\mathbf{t}_{TA})} \left(\frac{a}{\hat{p}_T^*(\cdot)} \right)^2 \frac{\partial [\Delta h(\mathbf{t}_{TA}; \mathbf{t}_{SQ})/v_T(\mathbf{t}_{TA})]}{\partial \mathbf{t}_{TA}} \end{aligned}$$

where $\lim_{a \rightarrow 0} \frac{\partial f(\cdot)}{\partial \mathbf{t}_{TA}} = \frac{1}{2} \frac{\partial [v_A(\mathbf{t}_{TA})/v_T(\mathbf{t}_{TA})]}{\partial \mathbf{t}_{TA}}$. Thus, by the implicit function theorem, $\frac{\partial p_T}{\partial \mathbf{t}_{TA}} = -\frac{\partial f(\cdot)/\partial \mathbf{t}_{TA}}{\partial f(\cdot)/\partial p_T}$ where $\lim_{a \rightarrow 0} \frac{\partial p_T}{\partial \mathbf{t}_{TA}} = \frac{1}{2} \frac{\partial (v_A/v_T)}{\partial \mathbf{t}_{TA}}$. In turn, using (23), $\lim_{a \rightarrow 0} \frac{\partial \Phi}{\partial \mathbf{t}_{TA}} > 0$ and $\lim_{a \rightarrow 0} a \frac{\partial \Phi}{\partial \mathbf{t}_{TA}} = 0$. Further, note that $-\frac{\partial l(p_T^*(\mathbf{t}_{TA}), \mathbf{t}_{TA}; a=0)}{\partial \mathbf{t}_{TA}} > 0$ for all $\mathbf{t}_{TA} \leq \mathbf{t}_{SQ}$ such that $\mathbf{t}_{TA}$ satisfies $\mathbf{u}(\mathbf{t}_{TA})$. Hence, for sufficiently small $a > 0$, $G(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ and, by analogous logic, $G^*(\mathbf{t}_{TA}; \mathbf{t}_{SQ})$ are maximized by the most liberal TA satisfying $\mathbf{u}(\mathbf{t}_{TA})$, denoted $\hat{\mathbf{t}}_{TA}$, when $\frac{\partial \nu(\mathbf{t}_{TA})/\partial \mathbf{t}_{TA}}{\partial \nu^*(\mathbf{t}_{TA})/\partial \mathbf{t}_{TA}} \in (f(\cdot), f^*(\cdot))$. The restriction $\mathbf{t}_{TA} \geq 1$ implies $\hat{t}_{TA} = 1$ and/or $\hat{t}_{TA}^* = 1$.

■

C Examples of particular underlying trade models

In this section, we illustrate how the generality of our contest framework allows for a variety of popular trade models, including general equilibrium and partial equilibrium specific factors models, the oligopoly model and the Melitz model.

C.1 Specific Factors Models

C.1.1 General equilibrium model

Consider two sectors, X and Y , produced using labor and a specific factor $\bar{K}_X$ and $\bar{K}_Y$ respectively. Formally, $X = F(L_X, \bar{K}_X)$ and $Y = G(L_Y, \bar{K}_Y)$ subject to the full employment condition $\bar{L} = L_X + L_Y$ where (i) $F_L > 0$ and $G_L > 0$, (ii) $F_{LL} < 0$ and $G_{LL} < 0$ and (iii) $F_{KL} > 0$ and $G_{KL} > 0$ with the subscripts K and L denoting partial derivatives.

Profit maximization by firms gives the following equilibrium factor price conditions: $w_X = p_X F_L$, $r_X = p_X F_K$, $w_Y = p_Y G_L$ and $r_Y = p_Y G_K$ where the subscripts X and Y denote the sector. Labor mobility also implies wage equalization, so $w_X = w_Y$ and, in turn, $h(p_X, p_Y, L_X) \equiv p_X F_L(L_X, \bar{K}_X) - p_Y G_L(\bar{L} - L_X, \bar{K}_Y) = 0$. Thus,

$$\frac{\partial L_X}{\partial p_X} = -\frac{\partial h / \partial p_X}{\partial h / \partial L_X} = -\frac{F_L}{p_X F_{LL} + p_Y G_{LL}} > 0 \text{ and } \frac{\partial L_X}{\partial p_Y} = -\frac{\partial h / \partial p_Y}{\partial h / \partial L_X} = \frac{G_L}{p_X F_{LL} + p_Y G_{LL}} < 0.$$

What are the impacts of tariffs on real factor incomes for the specific factors? Without loss of generality, suppose the home country imports good X . Then, assuming the home country is small, the local price is $p_X = p_X^* + t$ where p_X^* is the world price of good X and t is the tariff. Then, for any variable z , we have $\frac{dz}{dt} = \frac{dz}{dp_X} \frac{dp_X}{dt} = \frac{dz}{dp_X}$. In turn, we have:

$$\frac{d \frac{r_X}{p_X}}{dp_X} = F_{KL} \frac{\partial L_X}{\partial p_X} > 0 \text{ and } \frac{d \frac{r_Y}{p_Y}}{dp_X} = \frac{dF_K}{dp_X} \frac{p_X}{p_Y} + F_K \frac{1}{p_Y} > 0 \quad (27)$$

$$\frac{d \frac{r_Y}{p_Y}}{dp_X} = G_{KL} \frac{\partial L_Y}{\partial p_X} < 0 \text{ and } \frac{d \frac{r_X}{p_X}}{dp_X} = \frac{dG_K}{dp_X} \frac{p_Y}{p_X} - G_K \frac{p_Y}{p_X} \frac{1}{p_X} < 0. \quad (28)$$

Note, these results hold for *any* marginal tariff reduction. Hence, consider a tariff reduction from t_0 to t_1 . And, without loss of generality given (27)-(28), let the exportable good Y be the numeraire and choose its units of measurement so that $p_Y^* = 1$. Then, the real income changes associated with a TA are $v_T = \bar{K}_Y \cdot (r_Y(t_1) - r_Y(t_0)) > 0$ and $v_A = \bar{K}_X \cdot (r_X(t_0) - r_X(t_1)) > 0$. Finally, fixing t_0 , v_T and v_A are decreasing in t_1 which establishes our polarization property.

Note that, in the limit as $t_1 - t_0$ gets arbitrarily small, we have (letting good Y be the numeraire) $v_T = -\bar{K}_Y \frac{\partial G_K}{\partial p_X} > 0$ and $v_A = \bar{K}_X \frac{\partial (p_X F_K)}{\partial p_X} > 0$. For our pro-trade biased

polarization property, we want to show $\frac{\partial \frac{v_T}{v_A}}{\partial p_X} < 0$:

$$\begin{aligned}
\frac{\partial \frac{v_T}{v_A}}{\partial p_X} &\propto \frac{\partial v_T}{\partial p_X} v_A - \frac{\partial v_A}{\partial p_X} v_T < 0 \\
&\Rightarrow -\bar{K}_Y \frac{\partial^2 G_K}{\partial p_X^2} \cdot \bar{K}_X \frac{\partial (p_X F_K)}{\partial p_X} + \bar{K}_X \frac{\partial^2 (p_X F_K)}{\partial p_X^2} \cdot -\bar{K}_Y \frac{\partial G_K}{\partial p_X} < 0 \\
&\Rightarrow -\frac{\partial G_K}{\partial p_X} \left[\frac{\partial^2 G_K}{\partial p_X^2} \right]^{-1} > -\frac{\partial (p_X F_K)}{\partial p_X} \left[\frac{\partial^2 (p_X F_K)}{\partial p_X^2} \right]^{-1}. \tag{29}
\end{aligned}$$

Note that, given v_T and v_A are both positive and decreasing in p_X , both sides of (29) are positive. Thus, pro-trade biased polarization requires that, as the tariff decreases and labor shifts into the comparative advantage sector Y then $VMPK_Y = p_Y G_K$ increases at a faster rate than the rate at which $VMPK_X = p_X F_K$ falls. Put simply, the free trade production point cannot get too close to the corner of the PPF.

C.1.2 Two country partial equilibrium model

Each country i has a ‘comparative advantage’ good $Z = I$ with an endowment $e_i^Z = e > 0$ and a ‘comparative disadvantage’ in any good $Z \neq I$ with an endowment $e_i^Z = d > 0$. Demand curves in each country i are $q_i^I = \alpha - p_i^I$ and, for $Z \neq I$, $q_i^Z = \theta - p_i^Z$. No arbitrage conditions link equilibrium cross-country local prices of each good and balanced trade determines equilibrium local prices. In turn, country i ’s national welfare $W_i(\cdot)$ is then given by the sum of consumer surplus $CS_i(\cdot)$, producer surplus of the export and import-competing sectors $PS_i^X(\cdot)$ and $PS_i^M(\cdot)$, and tariff revenue $TR_i(\cdot)$. With two countries $z = i, j$ and two goods $Z = I, J$ we have

$$\begin{aligned}
CS_i(\cdot) &= \frac{1}{8} [(\theta - \alpha) + (e + d) - t_{ij}]^2 + \frac{1}{8} [(\alpha - \theta) + (e + d) - t_{ji}]^2, \\
PS_i^X(\cdot) &= \frac{1}{2} e [(\alpha + \theta) - (e + d) - t_{ji}], \\
PS_i^M(\cdot) &= \frac{1}{2} d [(\alpha + \theta) - (e + d) + t_{ij}] \\
TR_i(\cdot) &= t_{ij} [(\theta - \alpha) + (e - d) - t_{ij}]
\end{aligned}$$

and analogously for country j . In turn, $v_T = PS_i^X(t_{TA}, \cdot) - PS_i^X(t_{SQ}, \cdot) = \frac{1}{2}e(t_{SQ} - t_{TA})$ and $v_A = PS_i^M(t_{SQ}, \cdot) - PS_i^M(t_{TA}, \cdot) = \frac{1}{2}d(t_{SQ} - t_{TA})$.

In a symmetric Protection for Sale setting, t_{SQ} maximizes $G_i(t_{SQ}, \cdot) = PS_i^I(t_{SQ}, \cdot) + PS_i^J(t_{SQ}, \cdot) + aW_i(t_{SQ}, \cdot)$ while t_{TA} maximizes $G_i(t_{TA}, \cdot) + G_j(t_{TA}, \cdot)$. This yields $t_{SQ}^{GH} = \frac{1}{3} [(\theta - \alpha) + (e - d) - \frac{d}{a}] + \frac{d}{a}$ and $t_{TA}^{GH} = \frac{d-e}{a}$. Because of our linear structure, the terms of

trade effect, i.e. the inverse export supply elasticity faced by the importer, is merely equal to the level of imports: $t_{TOT}^{GH} = \frac{1}{3} [(\theta - \alpha) + (e - d) - \frac{d}{a}]$. Thus, t_{TA}^{GH} eliminates t_{TOT}^{GH} from t_{SQ}^{GH} and merely combines the politics effects of home $\frac{d}{a}$ and foreign $-\frac{e}{a}$.

In our setting, t_{SQ} is exogenous while t_{TA} maximizes $G_i(t_{TA}, \cdot) + G_j(t_{TA}, \cdot)$ where, for the Home country, $G_i(t_{TA}, \cdot) = \hat{l}_T(\hat{p}_T^*(t_{TA}), t_{TA}, \cdot) + \hat{l}_A(\hat{p}_T^*(t_{TA}), t_{TA}, \cdot) + aW_i(t_{TA}, \cdot)$. Note that our polarization and pro-trade biased polarization properties hold: $-\frac{\partial v_T(t_{TA})}{\partial t_{TA}} > 0$, $-\frac{\partial v_A(t_{TA})}{\partial t_{TA}} > 0$ and $-\frac{\partial[v_T(t_{TA})/v_A(t_{TA})]}{\partial t_{TA}} = 0$. Thus, Proposition 2 implies $\hat{t}_{TA} = 0$.

C.1.3 Three country partial equilibrium model

The setup is the same as the two country case except we now have three countries $z = i, j, k$ and three goods $Z = I, J, K$. In turn,

$$\begin{aligned} CS_i(\cdot) &= \frac{1}{18} [2(\alpha - \theta) + (e + 2d) + (t_{ji} + t_{ki})]^2 + \frac{1}{18} \sum_{\substack{h=j,k; \\ h' \neq i,h}} [(\theta - \alpha) + (e + 2d) - (2t_{ih} - t_{h'h})]^2, \\ PS_i^X(\cdot) &= \frac{1}{3} e [(2\theta + \alpha) - (e + 2d) - (t_{ji} + t_{ki})], \\ PS_i^M(\cdot) &= \frac{1}{3} d \sum_{\substack{h=j,k; \\ h' \neq i,h}} [(2\theta + \alpha) - (e + 2d) + (2t_{ih} - t_{h'h})], \\ TR_i(\cdot) &= \sum_{\substack{h=j,k; \\ h' \neq i,h}} t_{ih} [(\theta - \alpha) + (e - d) + (t_{ih} - 2t_{ih'})], \end{aligned}$$

and analogously for countries j and k . Letting $\mathbf{t}_{SQ}$ denote the global tariff vector before the FTA and $\mathbf{t}_{FTA}$ denote the global tariff vector in the presence of an FTA between countries i and j which now forces $t_{ij} = t_{ji} = 0$, we have $v_T = PS_i^X(\mathbf{t}_{FTA}, \cdot) - PS_i^X(\mathbf{t}_{SQ}, \cdot) = \frac{1}{3} e t_{SQ}$ and $v_A = PS_i^M(\mathbf{t}_{FTA}, \cdot) - PS_i^M(\mathbf{t}_{SQ}, \cdot) = \frac{2}{3} d t_{SQ}$.

With $a = 0$ in a Protection for Sale setting, $G_i(\cdot) = PS_i^X(\cdot) + PS_i^M(\cdot)$ and an FTA forms if and only if $G_i(\mathbf{t}_{FTA}, \cdot) - G_i(\mathbf{t}_{SQ}, \cdot) = \frac{1}{3} t_{SQ} (e - 2d) > 0$. Thus, an FTA does not form if $d > \frac{1}{2} e$.

With $a = 0$ in our setting, the polarization and pro-trade biased polarization properties hold: $-\frac{\partial v_T}{\partial t_{TA}} > 0$, $-\frac{\partial v_A}{\partial t_{TA}} > 0$ and $-\frac{\partial v_T/v_A}{\partial t_{TA}} = 0$. Thus, Proposition 2 implies that, in this three country world, countries i and j would propose a bilateral TA with zero bilateral tariffs. This is precisely an FTA between countries i and j .

C.2 Oligopoly Model

We assume two symmetric countries where country 1 (2) is the home (foreign) country. Two firms exist in each country: firm 1 has marginal cost $c = \bar{c} > 0$ and firm 0 has zero marginal cost (i.e. $c = 0$). A firm incurs a fixed cost of exporting $f_X \geq 0$ so that inefficient firms can be “domestic only” firms in equilibrium. Each country imposes the common TA tariff t_{TA} and has a linear inverse demand function with intercept α .

Let $x_i(c)$ denote the sales of a home country firm in country $i \in \{1, 2\}$ and $x_i^*(c)$ denote the sales of a foreign country firm in country i . Assume inefficient firms do not export. Then, local sales by home country firms are (i) $x_1(0) > 0$ and (ii) $x_1(\bar{c}) > 0$ if $t_{TA} > 3\bar{c} - \alpha$ which holds if $\bar{c} < \frac{1}{3}\alpha$. And, export sales of the efficient foreign firm are $x_1^*(0) > 0$ if $t_{TA} < \frac{\alpha + \bar{c}}{3}$. Taking these equilibrium quantities as given, the inefficient foreign firm does not export if $\pi_1^*(\bar{c}) = (x_1^*(\bar{c}))^2 = \frac{1}{64}[\alpha - 3\bar{c} - 3t_{TA}]^2 < f_X$. Since $\pi_1^*(\bar{c})$ is maximized at free trade (i.e. $t_{TA} = 0$) then a lower bound on f_X that ensures $\pi_1^*(\bar{c}) < f_X$ is $\underline{f}_X \equiv \frac{1}{64}[\alpha - 3\bar{c}]^2$.

What about our polarization properties? Let $\pi(c)$ and $\pi^*(c)$ denote total profits for, respectively, a Home and Foreign firm. Then, imposing $f_X > \underline{f}_X$, inefficient firms are anti-trade, i.e. $v_A = \pi(\bar{c}; t_{TA}) - \pi(\bar{c}; t_{SQ}) > 0$, because $\frac{\partial \pi(\bar{c})}{\partial t_{TA}} > 0$ for all t_{TA} if and only if $\bar{c} < \frac{1}{3}\alpha$ which is the condition required for, regardless of t_{TA} , strictly positive local sales by inefficient firms. Whether efficient firms are pro-trade depends on t_{TA} : $\frac{\partial \pi(0)}{\partial t_{TA}} > 0$ iff $t_{TA} > \frac{\alpha + \bar{c}}{5}$ so that efficient firms suffer from small tariff cuts when $t_{TA} > \frac{\alpha + \bar{c}}{5}$ but benefit from marginal tariff cuts when $t_{TA} < \frac{\alpha + \bar{c}}{5}$. Specifically, efficient firms are pro-trade, i.e. $v_T(0; t_{TA}, t_{SQ}) > 0$, if and only $t_{TA} < t_{SQ} - \frac{\alpha + \bar{c}}{5}$. Thus, our polarization properties hold for a well defined area of the parameter space. And, noting that conditions above required $\bar{c} < \frac{1}{3}\alpha$, our pro-trade biased polarization property also holds: $-\frac{\partial v_T(\cdot)/v_A(\cdot)}{\partial t_{TA}} = \frac{8(3\alpha - 7\bar{c})}{(t_{SQ} + t_{TA} + 2\alpha - 6\bar{c})^2} > 0$. Hence, Proposition 2 applies.

C.3 Melitz Model

Within-period utility of the representative agent in Home is given by

$$U = \omega \ln(X) + Y \quad (30)$$

where

$$X = \left(\int_{i \in \Omega} x(i, t)^\theta di \right)^{\frac{1}{\theta}}$$

aggregates over a set Ω of varieties (potentially) available to the consumer with an elasticity of substitution $\varepsilon = 1/(1 - \theta)$ where $0 < \theta < 1$. Demand for each variety in Home is

$$x(i, t) = \begin{cases} \frac{p(i)^{-\varepsilon} \omega}{\mathcal{P}(t)^{1-\varepsilon}} & \text{for domestic firm } i \\ t^{-\varepsilon} \frac{p(i)^{-\varepsilon} \omega}{\mathcal{P}(t)^{1-\varepsilon}} & \text{for foreign firm } i \end{cases}$$

where $p(i)$ is the producer price charged by a monopolistically competitive firm selling variety i in Home and $\mathcal{P}(t)^{1-\varepsilon}$ is the aggregate consumer price index in Home for a symmetric tariff t imposed by Home and Foreign. An analogous set of equations holds for the foreign country where, by assumption, $\omega^* = \omega$.

Firms considering entry to sector X face a one time sunk market entry cost f_E (measured in units of labor). If paid, the firm draws a constant marginal cost c from the Pareto distribution with shape parameter $k > \varepsilon - 1$:

$$G(c) = \left(\frac{c}{c_U} \right)^k \text{ for } 0 < c < c_U$$

where c_i will denote firm i 's marginal cost draw. Once observed, a firm decides whether to undertake production. Upon production, it incurs an additional fixed cost f_D paid each period. Additionally, it incurs an additional per-period fixed cost $f_X = \gamma f_D > f_D$ if it serves the foreign market. Production exhibits constant returns to scale with labor as the only input.

The decisions of whether to produce and export depend on the associated profits. Given the wage of 1, the per-period operating profit of firm i in the domestic market is

$$\pi_D(i, t) = \left[\frac{(p(i) - c_i) \omega}{\mathcal{P}(t)^{1-\varepsilon}} \right] p(i)^{-\varepsilon} - f_D.$$

In turn, given profit maximization implies a constant markup over marginal cost, $p(i) = \frac{c_i}{\theta}$:

$$\pi_D(i, t) = c_i^{1-\varepsilon} B - f_D \text{ where } B = \frac{1}{\varepsilon \theta^{1-\varepsilon}} \left(\frac{\omega}{\mathcal{P}(t)^{1-\varepsilon}} \right). \quad (31)$$

In addition to the fixed cost γf_D of exporting, firms also faces a symmetric ad valorem tariff across countries $t > 1$. As is common in the literature for tractability, we assume governments consume the numeraire with tariff revenue. Thus, given profit maximization implies a constant markup over marginal cost, $p(i) = \frac{c_i}{\theta}$, operating profit from exporting for

a Home firm is

$$\pi_X(i, t) = t^{-\varepsilon} c_i^{1-\varepsilon} B^* - \gamma f_D \text{ where } B^* = \frac{1}{\varepsilon \theta^{1-\varepsilon}} \left(\frac{\omega}{\mathcal{P}^*(t)^{1-\varepsilon}} \right). \quad (32)$$

C.3.1 Equilibrium

Status Quo Letting SQ denote the status quo, a firm with marginal cost $c_{D,SQ}$ is indifferent between supplying the domestic market and exiting. Further, a firm with marginal cost $c_{X,SQ}$ is indifferent between exporting and only supplying the domestic market. Using equations (31) and (32), $c_{D,SQ}$ and $c_{X,SQ}$ are defined by

$$f_D = \frac{\omega}{\varepsilon} \left[\frac{c_{D,SQ}}{\theta \mathcal{P}_{SQ}(t_{SQ})} \right]^{1-\varepsilon} \quad (33)$$

$$\gamma f_D = \frac{\omega}{t_{SQ} \varepsilon} \left[\frac{t_{SQ} c_{X,SQ}}{\theta \mathcal{P}_{SQ}^*(t_{SQ})} \right]^{1-\varepsilon}. \quad (34)$$

Free entry implies an entrepreneur takes a marginal cost draw if the expected present value of operating profits exceeds the sunk entry cost f_E . We assume firms fully discount expected period 2 profits so that current period expected profits determine their entry decision.³³ The zero-operating profit and free entry conditions close the model. The zero-operating profit conditions pin down $c_{D,SQ}$ and $c_{X,SQ}$ and the free entry condition pins down the mass of firms N_E taking a marginal cost draw from the Pareto distribution:

$$N_E = \left[\frac{\gamma^\psi t_{SQ}^{\frac{k}{\theta}} + 1}{\gamma^\psi t_{SQ}^{\frac{k}{\theta}} + t_{SQ}} \right] \left(\frac{\theta \omega}{k f_E} \right) \quad (35)$$

$$c_{D,SQ} = \left(\gamma^{\psi+1} t_{SQ}^{\frac{k}{\theta}} \right)^{\frac{1}{k}} c_{X,SQ} \quad (36)$$

$$c_{X,SQ} = \left(\frac{1}{\gamma^\psi t_{SQ}^{\frac{k}{\theta}} + 1} \frac{\psi f_E}{\gamma f_D} \right)^{\frac{1}{k}} c_U \quad (37)$$

where

$$\psi \equiv \frac{k - (\varepsilon - 1)}{\varepsilon - 1} > 0.$$

Given symmetric countries, $c_{D,SQ} = c_{D,SQ}^*$ and $c_{X,SQ} = c_{X,SQ}^*$.

³³This assumption does not affect the qualitative results, but affects the number of firms taking a draw, N_E .

Finally, in the status quo, ex post aggregate per period operating profits are

$$\begin{aligned}\Pi_{SQ} &= N_E f_E \\ &= \left[\frac{\gamma^\psi t_{SQ}^{\frac{k}{\theta}} + 1}{\gamma^\psi t_{SQ}^{\frac{k}{\theta}} + t_{SQ}} \right] \frac{\theta \omega}{k}\end{aligned}\quad (38)$$

and tariff revenue is

$$TR_{SQ} = \left[\frac{t_{SQ} - 1}{\gamma^\psi t_{SQ}^{\frac{k}{\theta}} + t_{SQ}} \right] \omega. \quad (39)$$

Proposed TA Using the same methods as above and noting that N_E is fixed, we have new marginal cost cutoffs given a symmetric TA tariff across countries t_{TA} :

$$c_{D,TA} = \left(\gamma^{\psi+1} t_{TA}^{\frac{k}{\theta}} \right)^{\frac{1}{k}} c_{X,TA} \quad (40)$$

$$c_{X,TA} = \left[\left(\frac{\gamma^\psi t_{SQ}^{\frac{k}{\theta}} + t_{SQ}}{\gamma^\psi t_{TA}^{\frac{k}{\theta}} + t_{TA}} \right) \left(\frac{1}{\gamma^\psi t_{SQ}^{\frac{k}{\theta}} + 1} \right) \frac{\psi f_E}{\gamma f_D} \right]^{\frac{1}{k}} c_U. \quad (41)$$

Additionally, a firm with marginal cost $\bar{c}$ is indifferent between the status quo and the TA:

$$\pi_{TA}(\bar{c}, t_{TA}) = \pi_{SQ}(\bar{c}, t_{SQ}) \text{ if and only if } \bar{c} = \left(\lambda t_{SQ}^{\frac{1}{\theta}} \right) c_{X,SQ} \quad (42)$$

where

$$\lambda = \left[(1 + t_{TA}^{-\varepsilon}) \Omega^{\varepsilon-1} - 1 \right]^{\frac{1}{\varepsilon-1}}, \text{ and} \quad (43)$$

$$\Omega \equiv \left(\frac{\gamma^\psi t_{SQ}^{\frac{k}{\theta}} + t_{SQ}}{\gamma^\psi t_{TA}^{\frac{k}{\theta}} + t_{TA}} \right)^{\frac{1}{k}} \left(\frac{t_{TA}}{t_{SQ}} \right)^{\frac{1}{\theta}}. \quad (44)$$

Finally, aggregate operating profits and tariff revenue are

$$\Pi_{TA} = \left[\frac{\gamma^\psi t_{TA}^{\frac{k}{\theta}} + 1}{\gamma^\psi t_{TA}^{\frac{k}{\theta}} + t_{TA}} \right] \left(\frac{\theta \omega}{k} \right) \quad (45)$$

$$TR_{TA} = \left[\frac{t_{TA} - 1}{\gamma^\psi t_{TA}^{\frac{k}{\theta}} + t_{TA}} \right] \omega. \quad (46)$$

C.3.2 Lobbying, Strategies and Comparative Statics

Given the status quo and TA equilibrium, the value to L_A of maintaining status quo is

$$v_A(t_{TA}) = N_E \int_{\bar{c}}^{c_{D,SQ}} [\pi_{SQ}(c, t_{SQ}) - \pi_{TA}(c, t_{TA})] dG(c), \quad (47)$$

and the value to L_T of the TA being adopted is

$$v_T(t_{TA}) = N_E \int_0^{\bar{c}} [\pi_{TA}(c, t_{TA}) - \pi_{SQ}(c, t_{SQ})] dG(c). \quad (48)$$

Note that

$$v_T(t_{TA}) - v_A(t_{TA}) = \Pi_{TA} - \Pi_{SQ} = \frac{\theta}{k} (TR_{SQ} - TR_{TA}). \quad (49)$$

Given the concavity of tariff revenue in t_{TA} , we assume t_{SQ} is below the tariff revenue maximizing tariff (a sufficient condition is $t_{SQ} \leq \frac{k}{k-\theta}$) so that $t_{TA} < t_{SQ}$ implies $TR_{SQ} > TR_{TA}$ and hence $v_T(t_{TA}) > v_A(t_{TA})$.

We now confirm our properties regarding the impact of t_{TA} on valuations.

Remark 1 *In our symmetric Melitz model with symmetric trade liberalization, a more liberal TA polarizes lobby groups, $-\frac{\partial v_T(t_{TA})}{\partial t_{TA}} > 0$, and $-\frac{\partial v_A(t_{TA})}{\partial t_{TA}} > 0$ when γ is sufficiently large.*

Proof. Differentiating (47) and (48) with respect to t_{TA} yields:

$$\begin{aligned} -\frac{\partial v_T(t_{TA})}{\partial t_{TA}} &= -N_E \left[\int_0^{\bar{c}} \underbrace{\left(\frac{\partial \pi_X(c; t_{TA})}{\partial t_{TA}} + \frac{\partial \pi_D(c; t_{TA})}{\partial t_{TA}} \right)}_{(-)} dG(c) \right] \\ -\frac{\partial v_A(t_{TA})}{\partial t_{TA}} &= N_E \left[\int_{\bar{c}}^{c_{X,TA}} \underbrace{\left(\frac{\partial \pi_X(c; t_{TA})}{\partial t_{TA}} + \frac{\partial \pi_D(c; t_{TA})}{\partial t_{TA}} \right)}_{(-)} dG(c) + \int_{c_{X,TA}}^{c_{D,TA}} \underbrace{\frac{\partial \pi_D(c; t_{TA})}{\partial t_{TA}}}_{(+)} dG(c) \right]. \end{aligned}$$

While $-\frac{\partial v_T(t_{TA})}{\partial t_{TA}} > 0$ trivially reflects export profits increasing in foreign tariff liberalization, offsetting effects underlie $-\frac{\partial v_A(t_{TA})}{\partial t_{TA}}$. On one hand, L_A consists of some purely domestic firms and $-\frac{\partial \pi_D(c; t_{TA})}{\partial t_{TA}} < 0$. On the other hand, L_A also consists of some ex post exporting firms and $-\frac{\partial \pi_X(c; t_{TA})}{\partial t_{TA}} > 0$. However the effect from purely domestic firms always dominates for a sufficiently high γ . To see this is the case, note that we can rewrite

$$-\frac{\partial v_A}{\partial t_{TA}} = -\frac{\theta}{k} \left[\frac{\partial \delta}{\partial t_{TA}} TR_{SQ} + \frac{\partial TR_{TA}}{\partial t_{TA}} \right]$$

where $\delta \equiv \frac{t_{SQ}^{\frac{k}{\theta}} \lambda^{k-1}}{t_{SQ}-1}$. And, using (46),

$$\begin{aligned} \lim_{\gamma \rightarrow \infty} -\frac{\partial v_A}{\partial t_{TA}} &= -\frac{\theta}{k} \left[\frac{TR_{SQ}}{TR_{TA}} \lim_{\gamma \rightarrow \infty} \frac{\partial \delta}{\partial t_{TA}} + \frac{1}{TR_{TA}} \lim_{\gamma \rightarrow \infty} \frac{\partial TR_{TA}}{\partial t_{TA}} \right] TR_{TA} \\ &= \left[\frac{k-\theta}{k(t_{TA}-1)} \right] \cdot \lim_{\gamma \rightarrow \infty} TR_{TA} = 0. \end{aligned}$$

Furthermore, (i) for very low values of γ and as t_{TA} approaches free trade we can see that

$$\lim_{\gamma \rightarrow 1, t_{TA} \rightarrow 1} -\frac{\partial v_A(t_{TA})}{\partial t_{TA}} = -\frac{\theta}{k} \left[1 - \left(\frac{\lambda}{\Omega} \right)^{k-(\varepsilon-1)} \right] \frac{\omega}{2} < 0,$$

and (ii) $-\frac{\partial v_A(t_{TA})}{\partial t_{TA}} > 0$ for all values of γ when t_{TA} lies in a sufficiently small neighborhood around t_{SQ} . ■

We can further verify through numerical analysis that pro-trade biased polarization holds.

Remark 2 *In our symmetric Melitz model with symmetric trade liberalization, a more liberal TA generates pro-trade biased polarization, $-\frac{\partial [v_T(t_{TA})/v_A(t_{TA})]}{\partial t_{TA}} > 0$.*

Proof. By numerical grid search. ■

Given Remarks 1 and 2, we can apply our general results to conclude that governments will propose free trade.

Proposition 5 *Consider our symmetric Melitz model with symmetric trade liberalization and a sufficiently high γ . Then, for sufficiently small a , governments propose free trade, i.e. $\hat{t}_{TA} = 0$, in the Tullock contest setting ($r = 1$) and the all pay contest setting ($r \rightarrow \infty$).*

Proof. This follows directly from Results 1 and 2 and Propositions 1-2 and 3-4. ■

Finally, we perform comparative statics on $\frac{v_T(t_{TA})}{v_A(t_{TA})}$.

Proposition 6 *With symmetric countries and a common TA tariff t_{TA} below the tariff revenue maximizing tariff, the following comparative static results hold: $\frac{d \frac{v_T(t_{TA})}{v_A(t_{TA})}}{d\gamma} < 0$, $\frac{d \frac{v_T(t_{TA})}{v_A(t_{TA})}}{d\varepsilon} > 0$, and $\frac{d \frac{v_T(t_{TA})}{v_A(t_{TA})}}{dk} < 0$.*

Proof. Note that $\frac{v_T(t_{TA})}{v_A(t_{TA})} = \frac{\theta}{k} \left[\frac{\delta TR(t_{SQ})}{(\delta-1)TR(t_{SQ})+TR(t_{TA})} \right]$ where $\delta = \frac{t_{SQ}^{\frac{k}{\theta}} \lambda^{k-1}}{t_{SQ}-1}$. We establish the proof by numerical grid search. ■

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