When is it optimal to delegate: The theory of fast-track authority[*]

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Abstract

With fast-track authority (FTA), the US Congress delegates trade-policy authority to the President by committing not to amend a trade agreement. Why would it cede such power? We suggest an interpretation in which Congress uses FTA to forestall destructive competition between its members for protectionist rents. In our model: (i) FTA is never granted if an industry operates in the majority of districts; (ii) The more symmetric the industrial pattern, the more likely is FTA, since competition for protectionist rents is most punishing when bargaining power is symmetrically distributed; (iii) Widely disparate initial tariffs prevent free trade even with FTA.

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1 Introduction

A peculiar, but crucial, institution of trade policy in the United States is a legislative device known as *Fast Track Authority* (FTA).[1] This is a temporary authority that Congress sometimes gives to the President at its discretion, and which empowers the President to negotiate a trade agreement under conditions that allow for rapid ratification with a Congressional commitment to vote up or down with – importantly – no amendments permitted. In practice, it is a matter of consensus that FTA is a precondition for US participation in trade negotiations with foreign governments, but it is a paradoxical institution because it is a voluntary cessation of some of Congress' own power to the President.

In this paper we attempt to explain Congress' motivation in adopting FTA. We use some insights from the political economy of public finance to show that Congressional amendments of a trade agreement can result in a sort of ruinous competition as each member of Congress seeks advantage for his constituents, making constituents in all districts worse off in the process. One motivation for a measure like FTA can be to avoid this problem by effectively delegating trade policy to the executive branch.

This argument is similar to observations made by some close observers of US trade policy history, such as Koh (1992, p. 148), who suggests that one of the principal reasons Congress wanted FTA is that "it controlled domestic special interest group pressures that might otherwise have provoked extensive, *ad hoc* amendment of a negotiated trade accord." Destler (1991) argues that the disaster of the Smoot-Hawley tariff of 1930 had motivated Congress to delegate trade policy largely to the executive branch, avoiding the sometimes 'chaotic' process of Congressional amendments (p. 263) and allowing for more liberal outcomes than Congress itself would have adopted on its own (pp. 264-5). He emphasizes that this delegation of authority (through FTA and other measures) was a 'positive-sum game' (p. 265) that was politically useful both for Congress and for the executive branch, as well as good for the country as a whole. These observations are consistent with a story in which Congress

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[1] In recent years, the official name has changed to 'Trade Promotion Authority,' but in this paper we will use the more traditional term.

uses FTA to delegate significant authority over trade policy to the executive branch because it does not trust itself, through the non-cooperative process of Congressional bargaining, to achieve a desirable outcome, and in particular expects the executive branch to achieve more trade-friendly, liberal outcomes than Congress would itself. This is the essence of the story we offer in this paper.

Background. The earliest Congressional delegation of trade-policy authority was the 1934 Reciprocal Trade Agreements Act, which provided for temporary authority for the President to negotiate a trade agreement that, provided it satisfied strict criteria, would be approved in advance. This authority was used several times until modern fast-track authority was first created in 1974 as part of the Trade Reform Act. This form of delegation retained more discretion for Congress, because although it imposed a strict time limit for Congressional decision making on any trade agreement and prohibited amendments to the agreement, it did allow Congress to reject an agreement *ex post*. Ever since, FTA has been an integral part of US trade policy, playing a key role in ratification of the Tokyo and Uruguay rounds, the Canada-US Free Trade Agreement, and the North American Free Trade Agreement. (See Koh (1992), Destler (1991), and Smith (2006) for concise histories.)

Some Earlier Approaches. There have been other notable attempts to interpret FTA. Conconi, Facchini and M. Zanardi (2012) suggest an interpretation of FTA as a way of enhancing US bargaining power relative to the foreign government that is party to a trade negotiation. The model relies on the insight that it is sometimes advantageous to delegate bargaining to an agent whose preferences are different from one's own, in particular an agent who is less eager to arrive at an agreement, in order to extract more concessions from the other bargaining partner. Essentially, without the FTA, Congress is in effect bargaining with the foreign government. A member of Congress from a district that depends on an export industry will be very eager for an agreement, and may wish to delegate bargaining to the President, who is interested in maximizing welfare of the average district and is therefore less eager for an agreement and therefore more likely to be able to receive major concessions from the foreign government. This strategic bargaining-power argument is complementary to ours.

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In order to make the distinction clear, we will artificially shut down the bargaining-power channel by adopting the fiction that the US is a small-open economy.

Another approach to explaining FTA is offered by Lohmann and O'Halloran (1994). In their model, the Congressional process without FTA leads to 'log-rolling,' as each member of Congress in turn proposes a tariff to protect the dominant industry in his own district, and each member of Congress votes in favor of all other members' proposed tariffs in order to ensure that his own tariff will in turn be approved. As a result, the outcome is inefficient, high protection. Depending on parameters, a majority in Congress may prefer to hand responsibility for trade policy setting over to the executive branch, which will set tariffs to maximize weighted utility across districts (the weights depend on partisanship). This story is similar to ours in that it does not depend on an external bargaining effect, but rather on inefficiencies in Congressional tariff-setting that members of Congress themselves seek to avoid by delegation. However, we are interested in economic determinants of FTA, such as of the geographic distribution and size distribution of industries. Lohmann and O'Halloran shut down this topic by assuming economically symmetric districts, in order to focus on the political variables (such as partisanship) that are their main interest.

Our Approach. In our model of a (unicameral) Congress, each Congressional district is represented by a legislator who is concerned with his district's welfare only, whereas the President cares about the whole country's welfare.[2] Each industry is concentrated in one or more districts, so welfare of any district is closely related to the industry operating in that district.

Trade policy formation takes place as a two-stage process: First, Congress decides by majority vote whether or not to grant FTA to the President, and then trade policy is determined either by the President (if FTA is granted in the first stage) or by Congress (if FTA is denied in the first stage). When FTA is granted, Congress either approves or disapproves the chosen policy by the President without amending it. If Congress approves the President's policy, it goes into effect, otherwise no policy change occurs and the *status quo* prevails. When

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[2]This makes sense since, in the United States, legislators come from plurality elections in small districts whereas the President is elected in national elections.

FTA is not granted, trade policy is determined by Congressional bargaining as in Baron and Ferejohn (1989).[3] A legislator is selected randomly to propose a trade bill.[4] If the proposal receives a majority, the bill goes to the President and the President either approves or vetoes it. If the bill is approved, it is implemented and the legislature adjourns. If the bill is vetoed and Congress does not override the veto, then a new legislator (possibly the same as in the previous period) is selected to propose a new trade bill. On the other hand, if the proposal does not receive a majority, there is no change in welfare level of any district (the *status quo* prevails) and the process is repeated with a new legislator to propose a new trade bill. In their voting, legislators compare the current proposal with the alternative of continuing to the next period.

This approach allows us to study the effect of a country's internal political conflict on its trade policy determination, and formalize how the "domestic special interest group pressures" can "[provoke] extensive, *ad hoc* amendment of a negotiated trade accord" (Koh (1992, p. 148)) which Congress might wish to avoid by delegating discretion to the executive branch. This exercise reveals a number of sharp predictions. First, FTA is always granted when the industries are sufficiently symmetric in their geographic distribution, output levels, and *status quo* tariffs. Second, FTA is never granted if an industry is operating in the majority of districts. Third, sufficient asymmetries in the geographic distribution or output levels of industries ensure that FTA will fail.[5] Forth, sufficient asymmetries in initial rates of protection across industries can prevent the economy from reaching free trade even if FTA is granted.

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[3]The adaptation of the Baron and Ferejohn model to this context is not trivial. One reason is that distortionary tariffs mean that the size of the pie is affected by the outcome, and not merely the distribution of the pie. Another reason is that *status quo* tariffs have a significant role in the equilibrium in some cases, as we will see in Case 3 with different initial tariffs for different industries. There is no analogous complication in the original Baron and Ferejohn model.

[4]While random recognition does not mimic any actual procedures of a legislature, it is a useful device for capturing the inherent uncertainty that legislators face in building distributive coalitions. Random recognition is a way of modelling the fact that legislators do not know exactly which coalitions will form in the future if the current coalition fails to enact the legislation. See Celik, Karabay and McLaren (2011) for an extensive discussion of this point with historical examples.

[5]The importance of geographical distribution in trade policy formation is also emphasized in McLaren and Karabay (2004).

Interpretation. The idea that members of Congress may feel empowered by a measure that removes their own future freedom of action may be illustrated by a simple parable. Consider a group of travelers who loathe and distrust each other and who are shipwrecked on a remote island, each carrying some necessary supplies rescued from the sinking ship. If they discover a loaded pistol left behind by some earlier explorer, they all suffer; knowing that whoever wakes up first will be able to gain control of the firearm and obtain all of the supplies for himself, no-one will be able to enjoy a proper night's sleep. As a result, the castaways decide, by majority vote, to destroy the weapon by dropping it in the volcano before sundown. (Yes, the island has a volcano.)

As a helpful guide, in this analogy, the castaways are members of Congress; the gun is the ability to amend a trade agreement; and the volcano is Fast Track Authority.

However, this story depends on the castaways' situation being symmetric, with similar abilities and endowments. The story may end differently if a bare majority of the castaways happen to be unemployed ninjas, who are skilled at disarming an assailant. These would expect to be able to win any conflict involving the firearm, and so they would not wish to drop it into the volcano. This corresponds to a case in which a single industry dominates a majority of Congressional districts, which will be studied as Case 1 below, so that that industry will be able to out-compete other industries in the Congressional bargaining game. Somewhat more subtly, it also corresponds to a case in which a majority of districts are dominated by industries with lower output and higher import-penetration rates than the other industries, studied below as Case 2, because as will be seen, such industries also are better at playing the Congressional tariff-bargaining game and so have an advantage. Enough asymmetry of the sort described by Cases 1 and 2 will result in a failure of FTA to pass.

Related work. Of course, the idea of delegation has appeared in a number of forms in the economics literature. Rogoff (1985) and Melumad and Mookherjee (1989) study delegation as a way of solving a time-consistency problem (in monetary policy and tax auditing, respectively). In addition, Besley and Coate (2003) analyze centralization (through delegation) versus decentralization for provision of public goods. Decentralization creates

under-provision of public goods due to the presence of positive spillovers. Centralization, on the other hand, can create misallocation of resources and uncertainty (if decisions are made by minimum winning coalition) or overprovision of resources (if decisions are made under joint welfare maximization of all legislators). As a result, one needs to evaluate the benefits and costs of each in determining the optimal decision-making structure for public good provision. Fershtman and Judd (1987) show that delegation of management can raise profits for a firm in an oligopoly. Our paper is different from all of these papers since in none of them is delegation motivated by concern for bargaining over rent dissipation as in our paper.

More closely related to our theory, the idea of Congress preventing its own ruinous competition through non-cooperative bargaining over policy has an important antecedent in the theory of self-imposed Congressional budget caps, as explored by Primo (2006). The core of the argument comes from the dynamic theory of Congressional bargaining pioneered by Baron and Ferejohn (1989) and Baron (1993), and applied to trade policy in Celik, Karabay and McLaren (2011).

More generally, the idea of Congressional delegation to avoid competition for rents might be applied to a number of policy areas beyond trade policy. Congress delegates detailed policy-making to specified agencies quite often. In 1990, it created the Base Realignment and Closure Commission (BRAC) to delegate the choice of which military bases to close. This issue would otherwise be embroiled in conflict over which Congressional district would lose local jobs, and so raises bargaining issues quite close to those raised by tariff setting. The BRAC commission periodically submits its national plan to Congress for an up-or-down vote, which is quite similar to the way FTA works. Similarly, in 2010, Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act, which created a Consumer Financial Protection Bureau (CFPB). The CFPB has the power to establish regulations to protect consumers from unscrupulous lenders. Another example is the Environmental Protection Agency (EPA), which has broad power to declare an effluent as harmful to the environment and to write rules restricting it. These are cases in which Congress has delegated

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rule-writing to an outside body; whether in those latter two cases it have chosen to do so because of bargaining inefficiencies we study or for some other reason (complexity, expertise, and so forth) could be an interesting question for another day.

The following section lays out our model. Section 3 derives the conditions under which FTA will be approved, for the fully symmetric case and then for asymmetric Cases 1 through 3. The last section discusses the results and concludes.

2 Model

We consider a small open economy populated with a unit measure of individuals living in N districts (where $N \geqslant 3$ and divisible by 3).[6] There are $M = 4$ industries: one that supplies a homogeneous *numeraire* good (good 0) produced with labor alone, and three others, each of which supplies a homogeneous manufacturing good (goods 1 through 3) produced with sector-specific capital alone. In particular, we assume that the production technology for good 0 yields 1 unit of output *per* unit of labor input, and the technology for each manufacturing good takes the following form: $f(K_i) = \theta K_i$, where K_i and θ denote the amount of the sector-specific capital used in sector i and the economy-wide productivity parameter, respectively. (Unless specified otherwise, we use index letters (i, j, k) only for the manufacturing goods.)

Each district hosts one manufacturing industry along with the *numeraire* good industry.[7,8] In addition, each district is composed of a homogeneous population; each individual residing in a given district is endowed with one unit of labor and also one unit of the same

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[6]We should emphasize, however, that the small-country assumption does *not* drive our results. In our model the optimal tariff is zero, and so the President desires free trade. By contrast, in the case of a large open economy, the optimal tariff vector would be non-zero, and so the President would desire to move policy toward the non-zero optimal tariffs, but all of the dynamics of bargaining and the incentives of legislators to delegate policy making authority would be the same.

[7]Our results carry over even if more than one industry is allowed in each district as long as each resident still holds only one sector-specific capital and in every district there is one industry with majority representation. This is true since each legislator will follow the interests of the median voter, who belongs to a particular industry under the conditions assumed here.

[8]We do not model the location choice of a particular industry, rather we take it as given. However, we acknowledge that this choice may depend on the political influence an industry can exert in each location.

type of sector-specific capital. Let the number of districts producing good i be denoted by n_i such that $n_1 + n_2 + n_3 = N$. Districts that produce the same manufacturing good are populated by the same number of individuals. To save on notation, we let K_i denote both the total amount of type-i capital in a type-i district and the total number of individuals residing in a type-i district. Given that the population is of unit mass, $\sum_{i=1}^{3} n_i K_i = 1$.[9] Let q_i denote the amount of good i produced in a district that hosts industry i, and Q_i denote the total amount of good i produced in the economy. Therefore, we have $q_i = \theta K_i$ and $Q_i = n_i q_i$.[10] This implies that $\sum_{i=1}^{3} Q_i = \theta \sum_{i=1}^{3} n_i K_i = \theta$. In addition, let p_i^* and p_i represent, respectively, the exogenous world price of good i and its domestic price. On the other hand, the *numeraire* good, good 0, has a world and domestic price equal to 1 (see footnote 14). Thus, the total rent that accrues to capital in district i is $p_i q_i = \theta p_i K_i$, and the total labor income earned in district i is K_i.

Each individual has an identical, additively separable quasi-linear utility function given by

$$u = c_0 + \sum_{i=1}^{3} u_i\left(c_i\right),$$

where c_0 is the consumption of good 0 and c_i represents the consumption of good $i = 1, 2, 3$. We assume that $u_i\left(c_i\right) = R_i c_i - (c_i^2/2)$, where $R_i > 0$ and assumed to be sufficiently large.[11] With these preferences, the domestic demand for good i, implicitly defined by $u_i'\left(d(p_i)\right) = p_i$, is given by $d(p_i) = R_i - p_i$. The linearity of demand is not crucial for the main results of our paper, but it simplifies the analysis and permits a closed-form solution. The indirect utility of an individual with income y is $y + s\left(\mathbf{p}\right)$, where $\mathbf{p} = (p_1, p_2, p_3)$ is the vector of domestic

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[9]We allow only those districts that produce different goods to differ in the number of citizens residing. This is done to simplify the notation. Alternatively, it is possible to allow each district (even the ones producing the same good) to be populated by different number of individuals. All of our results continue to hold.

[10]To make things simple and analytically tractable, aggregate output of each industry is perfectly inelastic in our setup. This is merely to eliminate some complexity, but there is some evidence that supply elasticities tend to be quite low in practice; see Marquez (1990) and Gagnon (2003).

[11]To be more precise, we require $R_i > p_i^* + \theta - Q_i$. This ensures that demand for good i is positive at all prices that may occur in equilibrium. We also require $p_i^* \geqslant Q_i$ for each price to be positive. See Lemmas 1 and 2 for the determination of optimal tariffs (hence optimal prices).

prices,[12] and $s\left(\mathbf{p}\right) = \sum_{i=1}^{3} \left[u_i\left(d(p_i)\right) - p_i d(p_i)\right]$ is the resulting consumer surplus.

Each district is represented by a single legislator who is concerned only with the welfare of his own district. A district's welfare is the aggregate utility of all individuals in that district, which is equal to the total income plus the district's share in total consumer surplus and total tariff revenue (or subsidy cost) for each good. Hence, a district that produces good i has a welfare (for $i \neq j \neq k$)

$$W_i(\mathbf{p}) = K_i + p_i \theta K_i + K_i \sum_{l=i,j,k} \frac{(R_l - p_l)^2}{2} + K_i \sum_{l=i,j,k} \left[(p_l - p_l^*)(R_l - p_l - Q_l)\right], \quad (1)$$

where the first term is the district's labor income (equal to one unit of good 0 output *per* person), the second term is the capital rent, the third term is the consumer surplus captured by that district, and the last term is the share of tariff revenue (or subsidy cost).[13] Similarly, we denote $w_i(\mathbf{p})$ as the welfare of an individual with a stake in industry i, hence

$$w_i(\mathbf{p}) = 1 + p_i \theta + \sum_{l=i,j,k} \frac{(R_l - p_l)^2}{2} + \sum_{l=i,j,k} \left[(p_l - p_l^*)(R_l - p_l - Q_l)\right]. \quad (2)$$

Moreover, there is also the President, and unlike the legislators, she has a national constituency and cares about the welfare of the whole country. As a result, her welfare is expressed as

$$W(\mathbf{p}) = \sum_{i=1}^{3} n_i K_i w_i(\mathbf{p}). \quad (3)$$

We consider an infinite-horizon model. Every period, there is a set of prices at which individuals make their production and consumption decisions, and enjoy the resulting welfare. We restrict the set of policy instruments available to politicians and allow only for trade taxes and subsidies. A domestic price in excess of the world price implies an import tariff for an import good and an export subsidy for an export good. Domestic prices below world

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[12] We restrict each domestic price to satisfy: $0 \leq p_i < \bar{p}_i$, where $\bar{p}_i = p_i^* + \frac{(R_i - p_i^*)^2 + (\theta - Q_i)^2}{2(\theta - Q_i)}$. These limits ensure that we get an interior solution in prices.

[13] We assume that tariff revenue (or subsidy cost) is distributed equally as a lump-sum transfer to each individual.

prices correspond to import subsidies and export taxes.[14] The *status quo* domestic prices at the beginning of the game are denoted by $\mathbf{p}^s = (p_1^s, p_2^s, p_3^s)$.

The timing of the trade policy formation game is given in Figure 1.[15] First, Congress decides whether to grant FTA to the President. FTA will be granted if the majority of legislators vote for it. If it is granted, then the President proposes a tariff bill and legislators vote yes or no without amending it.[16] If accepted by Congress, the bill is implemented and legislative process ends. Each district's welfare thereafter is evaluated at these new prices. If Congress rejects the President's proposal, then all districts receive their *status quo* payoffs forever. If FTA is not granted, on the other hand, Congress enters what we will call the *bargaining subgame* where trade policy is determined by Congressional bargaining as in Baron and Ferejohn (1989). A legislator is selected randomly (with equal probability for each legislator) to propose a tariff bill.[17] If the proposal does not receive a majority, the process is repeated with another randomly selected legislator (possibly the same as in the previous period) to make a new proposal. If the proposal receives a simple majority, it is brought before the President for approval. If the President accepts the proposal, then it is implemented and each district's welfare thereafter is evaluated at these new prices. If the President vetoes it, then the same legislator may bring the same proposal to a vote in Congress. If 2/3 of the legislators support the proposal (hence overriding the veto), then it is implemented and the legislature adjourns. Otherwise, another randomly selected legislator is selected to make a new proposal. Bargaining continues until a program is implemented. Districts continue to receive their *status quo* welfare in every period until an agreement is

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[14]Without loss of generality, we assume that the tariff/subsidy on good 0 is equal to 0. Any tariff vector $\boldsymbol{\tau}'$ yielding domestic prices $\mathbf{p}' = \mathbf{p}^* + \boldsymbol{\tau}'$ with $\tau_0' \neq 0$ can be replaced by $\boldsymbol{\tau}'' \equiv \frac{1}{p_0'}[\boldsymbol{\tau}' - \tau_0'\mathbf{p}^*]$ yielding $\mathbf{p}'' = \mathbf{p}^* + \boldsymbol{\tau}''$ without changing relative prices or any real values. Given that good 0 is the *numeraire*, this implies that $p_0'' = p_0^* = 1$.

[15]To simplify, we assume that a period in the trade policy formation game coincides with a production/consumption period.

[16]Of course, in reality FTA is granted to allow the President to negotiate a trade agreement with foreign governments. As mentioned in the introduction, in order to close down the issues of strategic intergovernmental bargaining that are the focus of Conconi *et al.* (2012), and to allow us to focus on the intra-congressional competition that is our interest, we employ the fiction that FTA is granted in order to give the President authority simply to choose a tariff policy. In practice, the calculus of whether or not to authorize FTA would take both sets of issues into account.

[17]Therefore, the probability that the proposer represents industry i is equal to $\frac{n_i}{N}$.

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reached. (A fuller analysis of the bargaining game without the President can be found in Celik, Karabay and McLaren (2011).)

[Insert Figure 1 here]

There are a couple of observations to make. First, it is straightforward to show that the aggregate welfare, $W(\mathbf{p}) = \sum_{i=1}^{3} n_i K_i w_i(\mathbf{p})$, is maximized at the free trade prices of the three goods. Hence, the President would always propose free trade if she thinks that Congress will agree to it.

Second, from equation (1), a manufacturing good affects (through its price) a district's welfare via three channels. The first channel, the rent that accrues to the specific factor, is present if that good is produced in that district. The second channel is the consumer surplus attained from the consumption of that good. The last channel is the tariff revenue (or subsidy cost) due to trade. The effect of price through the first channel is always positive whereas it is always negative through the second channel. Its effect through the third channel, on the other hand, can be positive or negative (in fact the third channel is strictly concave in all three prices with a unique maximum). This is true since good i's price has two distinct effects on tariff revenue/subsidy cost: (1) the direct effect (changing price while keeping imports/exports constant), and (2) the indirect effect through demand. These two effects work in opposite directions. To see this, assume that good i is an imported good. First, start from a price just above the world price. As we increase the price, the direct effect leads to an increase in the tariff revenue whereas the indirect effect leads to a decrease (since import demand goes down). Initially, the direct effect dominates, and therefore, raising the price raises tariff revenue. When the price reaches a certain value, the indirect effect starts dominating and the tariff revenue decreases if we further increase the price.

For the remainder of the analysis, let $\boldsymbol{\tau} = (\tau_1, \tau_2, \tau_3)$ denote the tariff vector, where $\tau_i = p_i - p_i^*$. Therefore, we can rewrite equation (2) as

$$w_i(\boldsymbol{\tau}) = 1 + (p_i^* + \tau_i)\theta + \sum_{l=i,j,k} \frac{(R_l - p_l^* - \tau_l)^2}{2} + \sum_{l=i,j,k} \tau_l (R_l - p_l^* - \tau_l - Q_l). \qquad (4)$$

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Notice that, given our parameter restrictions (see footnotes 11 and 12), the *per-capita* welfare function given in equation (4) is strictly concave in all tariffs and has a unique maximum.

Similarly, let $\boldsymbol{\tau}^s = (\tau_1^s, \tau_2^s, \tau_3^s)$ describe the vector of *status quo* tariffs. It will prove helpful to write down the change in the *per-capita* welfare over *status quo* when Congress agrees on a tariff bill $\boldsymbol{\tau}$. To do so, simply evaluate equation (4) at $\boldsymbol{\tau} = \boldsymbol{\tau}^s$ and subtract it from $w_i(\boldsymbol{\tau})$, which leads to

$$
\begin{aligned}
w_i(\boldsymbol{\tau}) - w_i(\boldsymbol{\tau}^s) = {} & (p_i^* + \tau_i - p_i^* - \tau_i^s)\theta + \sum_{l=i,j,k} \frac{(R_l - p_l^* - \tau_l)^2 - (R_l - p_l^* - \tau_l^s)^2}{2} \\
& + \sum_{l=i,j,k} \left[\tau_l \left(R_l - p_l^* - \tau_l - Q_l \right) - \tau_l^s \left(R_l - p_l^* - \tau_l^s - Q_l \right) \right].
\end{aligned}
$$

After rearranging, this becomes

$$
w_i(\boldsymbol{\tau}) - w_i(\boldsymbol{\tau}^s) = \theta(\tau_i - \tau_i^s) - \frac{1}{2} \sum_{l=i,j,k} \left[(\tau_l + Q_l)^2 - (\tau_l^s + Q_l)^2 \right]. \tag{5}
$$

The first term on the right-hand side of equation (5) is the *per-capita* change in capital rent while the second term indicates the *per-capita* change in consumer surplus plus tariff revenue. This representation is helpful as it allows us to express the *per-capita* welfare change in each district as a function of each industry's tariff and total output.

We can alternatively express the *per-capita* welfare as an increment over free trade. To do so, repeat the same steps as above (or, alternatively, evaluate equation (5) at $\boldsymbol{\tau}^s = (0, 0, 0)$) to obtain

$$
w_i(\boldsymbol{\tau}) = w_i(\mathbf{0}) + \left[\theta \tau_i - \frac{1}{2} \sum_{l=i,j,k} \left((\tau_l + Q_l)^2 - Q_l^2 \right) \right]. \tag{6}
$$

The first-best for each legislator is to maximize his district's welfare without any constraints. Note that since each individual in a given district is identical, maximizing aggregate district welfare $W_i(\boldsymbol{\tau})$ is equivalent to maximizing *per-capita* welfare $w_i(\boldsymbol{\tau})$. For a legislator representing industry i, let $\boldsymbol{\tau}^{U_i} = (\tau_i^{U_i}, \tau_j^{U_i}, \tau_k^{U_i})$, $i \neq j \neq k$, denote the vector of trade taxes that the unconstrained maximization problem leads to, i.e., $\boldsymbol{\tau}^{U_i} = \arg\max_{\boldsymbol{\tau}} w_i(\boldsymbol{\tau})$. Maximizing equation (6) with respect to $\boldsymbol{\tau}$ leads to the following lemma.

Lemma 1. *Unconstrained maximization of* $w_i(\boldsymbol{\tau})$, $i = 1, 2, 3$, *yields (for* $i \neq j \neq k$*)*

$$\tau_i^{U_i} = \theta - Q_i,$$

$$\tau_j^{U_i} = -Q_j,$$

$$\tau_k^{U_i} = -Q_k.$$

Thus, a recognized (selected) legislator would ideally demand an import tariff (or an export subsidy) for the good his district produces (thereby protecting the industry he represents) whereas an import subsidy (or an export tax) for the other goods.[18] Moreover, a producer in a sector that produces a higher aggregate output Q_i will prefer a lower tariff (or export subsidy) for his own product than a producer in a sector that produces lower aggregate output. The reason is as follows. Focus for now on the case of an imported good. Recall the three channels we discussed before through which the tariff affects the *per-capita* welfare of producers in industry i. Aggregate output, Q_i, in this case does not affect the first two channels (the rent and consumer surplus channels – of course, a higher Q_i implies higher total rent, but not higher rent *per* capital owner in industry i). What it does affect is the third channel, tariff revenue. A higher value for Q_i implies a weaker tariff revenue effect since, at a given price and the other parameters, a higher value of Q_i implies fewer imports, hence a lower marginal tariff revenue for a given increase in tariff.[19] Therefore, a higher value of Q_i implies a lower marginal benefit of the tariff, and a lower optimal tariff, from the point of view of a sector-i producer. Parallel reasoning holds for an exported good.

It is natural to assume that the *status quo* prices are in the range defined by the unconstrained maximization problem. For example, a legislator representing a district that produces good i has no reason to set τ_i above $\theta - Q_i$. Similarly, he has no reason to set $\tau_{j \neq i}$ below $-Q_j$. Hence, we make the following assumption.

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[18] Since $Q_1 + Q_2 + Q_3 = \theta$, $\theta - Q_i > 0$, $\forall i$.

[19] The same conclusion holds for a comparison between two industries i and j even if, although $Q_i > Q_j$, the demand parameter R_i is sufficiently higher than R_j that at a common tariff, imports of good i exceed those of good j. The reason is that an increase in R_i, holding all prices and other parameters constant, raises industry i imports, increasing the marginal tariff revenue from the tariff on good i, but at the same time raises domestic consumption of good i, raising the marginal consumer surplus loss from the tariff on good i. The two effects cancel each other out, with the result that the demand parameters R_i have no effect on tariff preferences.

Assumption 1. *The status quo prices satisfy the following:* $-Q_i \leq \tau_i^s = p_i^s - p_i^* \leq \theta - Q_i$, *for* $i = 1, 2, 3$.

A value of $\tau_i^s = \theta - Q_i$ corresponds to the case in which the *status quo* tariff of good i is at its optimum for the districts that produce good i, while $\tau_i^s = -Q_i$ corresponds to the case in which it is at its optimum for the districts that produce good $j \neq i$. Accordingly, the *status quo* corresponds to the optimal tariff vector for the districts that produce good i when $(\tau_i^s, \tau_j^s, \tau_k^s) = (\theta - Q_i, -Q_j, -Q_k)$.

Below, we will first describe the model in greater detail. After that, as a benchmark, we will analyze a fully symmetric case in which each industry has the same output, same *status quo* tariff and the same representation in Congress. We will then relax each of them one at a time.

3   Characterization of equilibrium

Let us look at the problem more in detail. First, if $n_i \geq 2/3$ for any i, the problem becomes trivial; legislators representing industry i will have enough seats to overturn a possible veto by the President. Hence, the legislators that represent industry i refuse FTA and, with the discount factor approaching 1, will subsequently be able to achieve their first-best payoff in the legislative bargaining subgame. For the remainder of the analysis, we assume that $n_i < 2/3$, $\forall i$. Second, as a tie-breaking rule, in case of indifference between payoffs under FTA and under no FTA, we will assume that FTA is preferred.

If Congress grants FTA in the first stage, the President chooses $\boldsymbol{\tau}$ so as to maximize total welfare while making sure that Congress does not reject it. If Congress does not grant FTA, then Congress plays a bargaining game to determine the tariff vector, with a randomly-selected member serving as a proposer each period until an agreement is reached. Each legislator is interested in maximizing his own district's welfare, but even a legislator who has been selected as the proposer may not be able to achieve the first-best payoff for his district. The reason is that in order to build a veto-proof coalition, he may need to compromise a

certain fraction of his payoff and choose a favorable price for at least one of the other two industries. We refer to this situation as the proposer selecting a 'coalition partner' (or simply 'forming a coalition').

As common in multi-person bargaining problems, there may be many subgame perfect equilibria (SPE) in this game.[20] We focus on stationary subgame perfect equilibrium (SSPE) whereby the continuation payoffs for each structurally equivalent subgame are the same.[21] In a stationary equilibrium, a legislator who is recognized to make a proposal in any two different sessions behaves the same way in both sessions (in the case of a mixed-strategy equilibrium, this means choosing the same probability distribution over offers in both sessions). Hence, stationary equilibria are history-independent. To make our results as clear as possible, we focus on the case in which the discount factor (denoted by δ) approaches 1 in the limit.[22]

When a legislator is recognized to make a proposal in the bargaining subgame, he has an incentive to propose a tariff bill that will be accepted, since if rejected, he faces the risk that his district might be worse off by the bill adopted in the future. In equilibrium, in accordance with the "Riker's (1962) size principle," any proposal will be accepted with the minimal number of industries to form a veto-proof coalition. This is true since increasing the number of industries in the coalition would increase the costs without increasing the benefits.

Let the *per*-period equilibrium welfare of a district producing good i, evaluated at the beginning of a period, before a proposer has been selected, be denoted as V_i. This is also the

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[20]Baron and Ferejohn (1989) show that any outcome (in their game that means any division of the dollar) can be supported as an SPE using infinitely nested punishment strategies as long as there are at least five players and the discount factor is sufficiently high. Li (2009) shows that even with three players, there is a vast multiplicity of SPE.

[21]Baron and Kalai (1993) argue that stationarity is an attractive restriction since it is the "simplest" equilibrium and so it requires the fewest computations by agents.

[22]This may be interpreted such that the time length between any two offers (periods) is infinitesimally short. This assumption on δ is made for analytical convenience, as equilibrium is much harder to solve for general δ. In Celik, Karabay and McLaren (2011, Section 3), we do argue that δ close to 1 is the most empirically relevant case. In addition, in Appendix B of that paper, we show how the equilibrium for the case with δ close to 1 extends to a positive range of δ in the case in which the *status quo* tariffs are the outcome of a previous round of bargaining. Later, in the current paper we will note that Proposition 1 applies for all values of δ. Therefore, we are confident that our focus on the limiting case of δ close to 1 is not deceptive.

per-period equilibrium welfare a district expects in the following period in the event that the period ends without a bill passed, and so we will also call it the 'continuation payoff.' (Recall that we are focussed on the limiting case as $\delta \to 1$.) We can also express the continuation payoff of a district producing good i on a *per capita* basis: $v_i = \frac{V_i}{K_i}$.

3.1   Fully Symmetric Benchmark

In this benchmark, we assume $\frac{n_1}{N} = \frac{n_2}{N} = \frac{n_3}{N} = \frac{1}{3}$, $Q_1 = Q_2 = Q_3 = \frac{\theta}{3}$ and $\tau_1^s = \tau_2^s = \tau_3^s$. The following observations are in order. First, any two-industry coalition can overturn the President's veto, so the President's veto power is ineffective. Second, under FTA, it is easy to see that the President will choose free trade. Recall that the aggregate welfare is maximized at free trade prices. Therefore, when industries have symmetric *status quo* tariffs (as assumed here), their *status quo* welfare is bounded above by what they enjoy in free trade. This, in turn, implies that there will be no objection by the members of Congress when the President chooses free trade under FTA. Third, as we show below, the legislative bargaining makes each industry worse off compared to free trade, and therefore each industry will choose to delegate the decision-making authority to the President in the first stage. All these observations imply that under this benchmark, FTA is granted to the President in the first stage and she chooses free trade in equilibrium.

In order to analyze FTA decision, we need to use backward induction. We first find the *ex ante* expected welfare of each industry in the legislative bargaining subgame (when FTA is not granted), then compare it with the one under FTA and show that the latter is greater than the former for all industries so that FTA is granted in the first stage.

To do so, assume that Congress has not granted FTA and a legislator representing a district which produces good i is recognized to propose a tariff vector, $\boldsymbol{\tau}^i$. To obtain the majority support in Congress, the proposal must make one of remaining two industries happy. Suppose industry $j \neq i$ is chosen as a partner. We assume that a legislator votes yes to a proposal *if and only if* the benefits accruing to his district from the current proposal is at

least as high as the expected payoff it obtains in case the proposal does not pass.[23] Thus, legislators who represent districts that produce good $j \neq i$ would say yes if and only if[24]

$$\frac{w_j(\boldsymbol{\tau}^i)}{1-\delta} \geq w_j(\boldsymbol{\tau}^s) + \frac{\delta v_j}{1-\delta}.$$

The left-hand side of the above inequality indicates the discounted *per-capita* welfare a district that produces good j obtains at the proposed tariffs, whereas the right-hand side is the discounted expected *per-capita* payoff if bargaining is carried over to the following period (the *status quo* welfare for the current period and the continuation welfare thereafter).

The values of v_j are endogenous, as they are determined by the equilibrium tariff bill and the equilibrium probability of being in a winning coalition. However, any recognized legislator will take them as given when designing the tariff bill. Moreover, the recognized legislator will choose $\boldsymbol{\tau}$ such that the constraint is satisfied with equality, which means that $w_j(\boldsymbol{\tau}) = (1-\delta)w_j(\boldsymbol{\tau}^s) + \delta v_j$ in equilibrium. In the limit as δ goes to 1, this reduces to $w_j(\boldsymbol{\tau}) = v_j$.[25] Hence, the recognized industry-i representative's maximization problem becomes

$$\max_{\boldsymbol{\tau}} w_i(\boldsymbol{\tau}) \text{ s.t. } w_j(\boldsymbol{\tau}) = v_j. \tag{7}$$

As defined before, v_j is the welfare an individual with a stake in industry j expects at the beginning of a period; hence, it is a weighted average of possible *ex post* payoffs the individual may obtain depending on the identity of the proposer. Since the *ex post per-capita* welfare function given in equation (4) is independent of *status quo* tariffs, so are the resulting equilibrium tariffs and payoffs found as a solution to expression (7). Intuitively, when legislators are very patient, they place no weight on one-period gains (or losses) regardless of how large they can be.

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[23] In other words, we rule out weakly dominated strategies. In the absence of this assumption, a legislator may choose to say yes to an otherwise unacceptable proposal if he believes that the proposal will receive a majority support even without his vote. This implies there would be an equilibrium in which all legislators vote yes to every proposal.

[24] Note that districts that accommodate the same industry are identical, so if this inequality holds for one, then it also holds for all.

[25] To be more precise, when $w_j(\boldsymbol{\tau}^s) < v_j$ $(w_j(\boldsymbol{\tau}^s) > v_j)$, the proposer offers the coalition partner an *ex post* payoff that is infinitesimally below (above) v_j. In either case, $\lim_{\delta \to 1} w_j(\boldsymbol{\tau}) = v_j$.

As in Baron and Ferejohn (1989), in an SSPE with δ close to 1, generically the proposer randomizes between the two other industries in choosing a coalition partner. (In fact, in the fully symmetric case, randomization occurs for any value of δ.) The proof is in the appendix, but the crux of the idea can be summarized as follows. In an SSPE, by definition, if proposer i ever chooses industry j with probability 1, then (due to stationarity) he *always* will choose industry j with probability 1. But this means that industry j has enormous bargaining power, and consequently at any given date, it will be less attractive for i to choose j than the other industry – a contradiction. Let s denote the probability that i will choose j, and hold constant the behavior of the other players when they are proposers. A reduction in s lowers j's continuation payoff, hence bargaining power, and raises k's bargaining power ($i \neq k \neq j$). Therefore, a critical value of s exists at which i is indifferent between the two potential coalition partners, and this is the equilibrium value. The proper proof must take into account boundary conditions as well as the fact that each player's probability over partners is endogenous, and it turns out that when all three players' probabilities are determined together, the equilibrium choice of probabilities is not unique, although the payoffs are.[26] We present the outcome of the legislative bargaining subgame in the following lemma.

Lemma 2. *The fully symmetric legislative bargaining subgame has an SSPE in which a selected legislator representing a district which produces good i proposes a tariff $\tau_i = \frac{\theta}{3}$ for the good his district produces, a tariff $\tau_j = 0$ for good $j \neq i$ where j is selected randomly, and a tariff $\tau_k = -\frac{\theta}{3}$ for the remaining good. The first proposal receives a two-thirds majority and Congress adjourns after the first session. All SSPE are payoff equivalent.*

Proof. *See appendix.*

Thus, *the logic of congressional bargaining imposes different levels of protection for different industries even if all industries are ex ante identical.* In such a case, most other models

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[26]For a formal proof of payoff uniqueness, see our companion paper Celik, Karabay and McLaren (2011). The same multiplicity is also present in the standard symmetric Baron-Ferejohn game, see Celik and Karabay (2011). Eraslan (2002) shows that all SSPE in the Baron-Ferejohn game are payoff equivalent when the recognition probabilities are asymmetric.

would predict $\tau_1 = \tau_2 = \tau_3$, whereas in our model there would be three separate levels of tariff. We next present the main result of this section.

Proposition 1. *When industries are ex ante identical, they all expect a lower per-capita welfare in the legislative bargaining subgame than their corresponding free trade payoffs, i.e., $v_i < w_i(\mathbf{0})$ for all i. Hence, all legislators vote for FTA in the first stage, the President chooses free trade and Congress agrees to it.*[27]

Proof. *See appendix.*

The competition for rent sharing is the harshest when bargaining power is symmetrically distributed. Under the legislative bargaining subgame, the representatives in Congress will vote for a bill that they do not like, because with the dynamic bargaining, they are afraid that if the current bill does not pass, it will be replaced with something that they like even less. Each industry knows that total welfare will be lower compared to free trade as tariffs are introduced by the bargaining, but no-one knows who the *ex post* beneficiary will be. Consequently, given the symmetry among industries, all coalition partners will be happy to accept a payoff that is worse than free trade rather than being the excluded industry. Knowing this, each representative optimally delegates its decision-making authority to the President and enjoys free trade welfare rather than playing this destructive bargaining subgame. Referring back to our castaway analogy, since each castaway has the same chance to take possession of the firearm, they all prefer to ditch the gun rather than worrying about who will get it first.[28]

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[27]The same result obtains for any number of manufacturing industries. If there are M *symmetric* manufacturing industries, the support of $\frac{M-1}{2}$ industries is required besides the industry the proposer belongs. The respective *ex post* tariffs in this case are

$$
\begin{aligned}
\tau_i &= \frac{M-1}{2M}\theta, \text{ for the proposer industry,} \\
\tau_j &= 0, \text{ for the } \frac{M-1}{2} \text{ partner industries,} \\
\tau_k &= -\frac{\theta}{M}, \text{ for the } \frac{M-1}{2} \text{ remaining industries.}
\end{aligned}
$$

[28]Note that Proposition 1 does not depend on the assumption that δ is close to 1. If the three industries are

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3.2 Asymmetric Configurations

In this subsection, we explore the implications of asymmetric configurations. We do so by relaxing each industry characteristic one at a time. In Case 1, we allow for asymmetric geographic distribution while keeping total outputs and *status quo* tariffs equal across industries. We then analyze the effects of asymmetric outputs in Case 2 while keeping the other two variables equal across industries. Finally, in Case 3, we analyze asymmetric *status quo* tariffs while holding other variables symmetric across industries. These asymmetries introduce a rich set of predictions regarding the FTA decision.

Case 1 *Asymmetric industry dispersion*

Without loss of generality, throughout Case 1, we assume $\frac{n_1}{N} \geqslant \frac{n_2}{N} \geqslant \frac{n_3}{N}$ but still $Q_1 = Q_2 = Q_3$ and $\tau_1^s = \tau_2^s = \tau_3^s$. When industries are symmetrically distributed (hence they have identical political representation in Congress), presidential veto does not play a role since any two-industry coalition can reach 2/3 majority which is enough to bypass the presidential veto. This is no longer true under asymmetric industry dispersion. In this case, the legislative bargaining subgame depends on how the President practices her veto power. For simplicity, we will assume that when using her veto power in the bargaining subgame, the President commits to free trade such that she will veto proposals that dictate a tariff vector $(\tau_1, \tau_2, \tau_3) \neq (0, 0, 0)$.[29]

Case 1a: $\frac{n_1}{N} > \frac{1}{2} > \frac{n_2}{N} \geqslant \frac{n_3}{N}$

As before, since $\tau_1^s = \tau_2^s = \tau_3^s$ and the aggregate welfare is maximized at free trade prices, if FTA is granted in the first stage, the President chooses free trade and Congress approves

symmetric, then each industry's *ex ante* expected welfare is just total welfare divided by 3. Since free trade gives higher total welfare than any other tariff level, all industries will prefer free trade to the bargaining outcome, and they will all vote for FTA.

[29]This is assumed for simplicity. The veto is not central to our analysis, and the most important results emerge with or without it. We conjecture that, since the President's optimal policy is free trade, if she had the option of committing to a veto policy of this nature, it would be optimal to do so. Note that we do *not* assume that, when proposing a trade policy under FTA, the President is committed to *proposing* only free trade; under some cases, it is in her interest to propose something different in order to get an electoral majority. See Case 3 for an example.

it. If FTA is not granted, we show that industry 1 does strictly better than free trade in the bargaining subgame.

It is helpful to analyze this case in detail. Notice that industry 1 controls enough seats to pass a proposal in Congress without the support of any other industry, where in such a case it has to propose free trade due to the presence of presidential veto. However, as we argue here, by forming a veto-proof majority with another industry, it will do strictly better than its free trade payoff. Consider the following observations. First, industry 1 has to be a member of any winning coalition, otherwise no proposal will pass in Congress since $\frac{n_2+n_3}{N} < \frac{1}{2}$. In other words, when either industry 2 or industry 3 is chosen as a proposer, they have to choose industry 1 as a coalition partner with probability 1. Second, in the event that industry 1, as a proposer, offers a tariff vector that is different than free trade, it has to get the support of one of the other two industries to override the presidential veto, since $\frac{n_1}{N} < \frac{2}{3}$. There are two subcases to consider in *forming such a veto-proof majority.* In the first subcase, when $\frac{1}{3} \geqslant \frac{n_2}{N} \geqslant \frac{n_3}{N}$, industry 1 can randomize between industry 2 and industry 3 in choosing its coalition partner and thus has a very strong bargaining position. In fact, in the limit as δ goes to 1, it is easy to show that industry 1 can obtain its first best, $\boldsymbol{\tau}^{U_1}$, in equilibrium. In the second subcase, when $\frac{n_2}{N} > \frac{1}{3} > \frac{n_3}{N}$, as a proposer, industry 1 has to choose industry 2 as a coalition partner. This implies that industry 1 cannot obtain its first best anymore, but even in that case, it can still do better than free trade. This is true since unlike industry 2, it has to be a member of any winning coalition (Consider the case when industry 3 is the proposer, for example.) These observations together entail that industry 1 can do better than free trade by forming a veto-proof coalition and hence will vote against FTA in the first stage.

Lemma 3. *In Case 1a, FTA does not pass, and industry 1 obtains a payoff in excess of its free-trade payoff in the subsequent bargaining subgame.*

Proof. *See appendix.*

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Case 1b: $\frac{1}{2} \geqslant \frac{n_1}{N} \geqslant \frac{n_2}{N} > \frac{1}{3} > \frac{n_3}{N}$; $Q_1 = Q_2 = Q_3$; $\tau_1^s = \tau_2^s = \tau_3^s$

This case is similar to the second subcase of Case 1a except that for a proposal to pass in Congress, industry 1 does not have to be in every winning coalition anymore. This is true since now industry 2 can form a coalition with industry 3 $\left(\frac{n_2+n_3}{N} > \frac{1}{2}\right)$ and propose free trade (they cannot propose anything else since the presidential veto is binding). On the other hand, only industries 1 and 2 can form a veto-proof majority to override the President's veto and propose something other than free trade. These two observations imply that compared to the second subcase of Case 1a, industry 1 has a weaker bargaining position whereas industry 2 has a stronger bargaining position. In addition, although both industries 1 and 2 have the option of forming a coalition with industry 3 and enjoying free trade welfare (since any two-industry coalition involving industry 3 cannot override the presidential veto), they will not do so because each can do strictly better if they form a coalition together and bypass the presidential veto. Here, industry 3 is too small to be a valuable partner. On the other hand, when industry 3 gets the chance to make a proposal, it will have to get a unanimous consent from Congress. This is true since any two-industry coalition with industry 3 being the proposer has to offer free trade but neither industry 1 nor industry 2 will accept this proposal given their strong bargaining positions.

In short, in the bargaining subgame, both industries 1 and 2 have strong positions and both will enjoy payoffs that are above their corresponding free trade payoffs. Hence, they will vote against FTA and FTA will not pass.

Lemma 4. *In Case 1b, FTA does not pass, and both industries* 1 *and* 2 *obtain payoffs in excess of their free-trade payoffs in the subsequent bargaining subgame.*

Proof. *See appendix.*

Case 1c: $\frac{1}{2} \geqslant \frac{n_1}{N} > \frac{1}{3} \geq \frac{n_2}{N} \geq \frac{n_3}{N}$; $Q_1 = Q_2 = Q_3$; $\tau_1^s = \tau_2^s = \tau_3^s$

This case is similar to the first subcase of Case 1a except that industry 1 has no longer majority in Congress and thus, does not have to be in every winning coalition. Industry 2

and industry 3 can form a coalition and propose free trade (since the presidential veto is binding). On the other hand, industry 1 can, as before, randomize between industry 2 and industry 3 in choosing its coalition partner and any coalition involving industry 1 makes the President's veto power ineffective, since $\frac{n_1+n_j}{N} \geqslant \frac{2}{3}$, for $j = 2, 3$.

In this case, although industries 2 and 3 have the option of forming a coalition together and proposing free trade, being uncertain about who will be in the winning coalition when industry 1 is the proposer will lead to an expected payoff that is worse than free trade for both. As a result, in the bargaining subgame, industry 1 still has a strong position (although cannot achieve its first best) but industry 2 and industry 3 have a weak position such that they do not obtain a payoff that is better than free trade. Hence, industry 2 and industry 3 will vote for FTA and given that $\frac{n_2+n_3}{N} > \frac{1}{2}$, FTA will pass.

Lemma 5 *In Case 1c, FTA always passes in the first stage, the President subsequently proposes free trade and Congress agrees to it.*

Proof. *See appendix.*

Lemmas 2 through 5 lead to the following proposition.

Proposition 2. *When industries differ only in their geographic distribution, FTA will pass if and only if* $\frac{1}{2} \geqslant \frac{n_1}{N} > \frac{1}{3} \geq \frac{n_2}{N} \geq \frac{n_3}{N}$.

To summarize this section, in the event of asymmetric political clout due to differences in the n_j's, if one industry is dominant (Case 1a, with $n_1 > \frac{1}{2}$), then FTA is not granted. This is analogous to the case in the introduction in which a bare majority of castaways are unemployed ninjas; they know that they will win any competition for resources, so they welcome the competition. The outcome for Case 1b is similar, because industries 1 and 2 can form a veto-proof majority but neither industries 1 and 3 nor industries 2 and 3 can. Thus a bare majority in Congress have power over a minority. On the other hand, in Case 1c, no industry has a majority, and no industry needs more than one other partner to form a

veto-proof majority,[30] so the distribution of bargaining power is relatively symmetric, and all industries dread the inter-industry congressional bargaining process, thus FTA is granted.

Case 2 *Asymmetric industry output*

Without loss of generality, throughout Case 2, we assume that $Q_1 \geqslant Q_2 \geqslant Q_3$. As stated earlier, since $\tau_1^s = \tau_2^s = \tau_3^s$ and the aggregate welfare is maximized at free trade prices, if FTA is granted in the first stage, the President chooses free trade and Congress approves it. If FTA is not granted, larger industries that produce more output tend to benefit less from congressional negotiations over tariffs than smaller industries.[31] The reason is that such an industry will generate fewer imports (since it will satisfy more of domestic demand from domestic production), and so the tariff revenue produced by a given tariff will be small; but this means that if a large industry is a member of the coalition that forms the tariff bill, the coalition partner will receive little benefit from a tariff on the large industry, and so will be unwilling to agree to a high tariff. As a result, the largest industry (industry 1) always obtains a lower welfare under the legislative bargaining than under free trade if FTA is not granted to the President. Hence, industry 1 always votes in favor of FTA. In addition, since each industry has the same geographic dispersion and industry 2 produces more output than industry 3, the final decision to grant FTA depends on whether industry 2 is better off under FTA or not.

We show that if industry 2's output is large enough, industry 2 does worse under the legislative bargaining than under free trade (which will result if FTA is granted) and therefore industry 2 also votes in favor of FTA (in addition to industry 1) and FTA is granted. On the other hand, if industry 2's output is small enough, then we can show that industry 2 does better (along with industry 3) under the legislative bargaining and therefore FTA is not granted. We can state these outcomes in detail with the following proposition, which is illustrated by Figure 2.

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[30]In Case 1c, unlike in Case 1b, even industry 3 can form a veto-proof coalition if it forms a partnership with industry 1.

[31]In particular, as we show in the appendix (see equation (12)), each industry's payoff is decreasing in its own output and increasing in other industries' output.

Proposition 3. *When industries produce asymmetric outputs, FTA will not be granted if* $Q_2 < \frac{\theta}{2}\left(1 - \frac{\sqrt{7}}{3\sqrt{3}}\right)$ *whereas FTA will be granted if* $Q_2 \geqslant \frac{\theta}{3}$ *and the President will choose free trade. On the other hand, when* $\frac{\theta}{2}\left(1 - \frac{\sqrt{7}}{3\sqrt{3}}\right) \leq Q_2 < \frac{\theta}{3}$, *there is a critical value of* Q_3, *say* $\overline{Q}_3(Q_2)$, *a decreasing function of* Q_2, *such that if* $Q_3 < \overline{Q}_3$, *FTA is not granted; whereas if* $Q_3 \geqslant \overline{Q}_3$, *FTA is granted and free trade will be adopted by the President.*

Proof. *See appendix.*

[Insert Figure 2 here]

Another way of looking at this is, again, through the castaway analogy of the introduction. Figure 2 shows that the region in which FTA is rejected is the lower-left-hand corner of the cone under the 45° line. Since, by assumption, $Q_1 \geqslant Q_2 \geqslant Q_3$ and $Q_1 + Q_2 + Q_3 = \theta$, this is the same as saying that *FTA will be granted provided that the largest industry is not too large relative to the smaller industries.* Again, it is asymmetry in power that leads FTA to be rejected. In this case, holding constant the number of seats represented by each industry (and thus the size of the population dependent on each industry), a larger industry has less ability to compete for tariffs, and thus less power in the bargaining subgame than a smaller industry. If industry 1 is large enough relative to industries 2 and 3, the smaller two industries understand that they can successfully gang up on it in the bargaining subgame, just like the ninja castaways, and as a result have no interest in FTA.

Case 3 *Asymmetric status quo tariffs*

Without loss of generality, throughout Case 3, we assume that $\tau_1^s \geqslant \tau_2^s \geqslant \tau_3^s$. There are two points to make here. First, given that all industries are symmetrically dispersed and their outputs are the same, each industry will have the same *ex ante* expected payoff in the bargaining subgame (recall that we analyze the equilibrium when the discount factor is approaching 1 in the limit, so one period gains or losses are unimportant). Since total welfare is maximized under free trade, this implies that all industries will be worse off under the

bargaining subgame compared to free trade. Second, once FTA has been granted, Congress has the option to reject the President's proposal and return to the *status quo*. Therefore, under FTA, the President cannot make two industries (which constitute the majority in Congress) worse off compared to the *status quo*. As a result, there are two possibilities to explore. In the first scenario, if at least two industries prefer free trade to the *status quo*, the President will choose free trade under FTA and since the *ex ante* expected payoff of each industry is lower under the bargaining subgame compared to free trade, FTA will be given in the first stage. In the second scenario, if two of the three industries prefer the *status quo* to free trade, then the President must offer a tariff vector that will not make the majority of the industries worse off compared to the *status quo*. In such a case, the President cannot choose free trade but will choose a tariff vector that is in the neighborhood of free trade. As we show in the appendix, all industries will still do strictly better under FTA than what they expect to get under the legislative bargaining. This is true since due to harsh competition between industries, the legislative bargaining makes the total available surplus shrink too much whereas under FTA, the President still chooses a tariff vector that is around free trade and thus the total surplus available is not as small as in the case of bargaining subgame. These observations imply that under Case 3, *all industries* will vote for FTA, and FTA will always be granted to the President.

Let's focus on the second scenario described above where two of the three industries prefer the *status quo* to free trade. Since each industry's payoff is increasing in its own protection and decreasing in other industries' protection (see equation (14) in the appendix), these two industries that prefer the *status quo* to free trade must be industries 1 and 2 (remember $\tau_1^s \geqslant \tau_2^s \geqslant \tau_3^s$). This automatically implies that industry 3's *status quo* payoff is lower compared to free trade (all three industries cannot be better off under the *status quo* since free trade maximizes the aggregate welfare). When FTA is granted, the President will offer a tariff vector that is as close as possible to free trade while keeping median industry's (industry 2) payoff constant at its *status quo* value. This makes industry 1 worse off and industry 3 better off compared to the *status quo*. Notice that even in this case, in addition

to industries 2 and 3, industry 1 also prefers FTA, since it would do even worse under the legislative bargaining if FTA had not been granted. These results are outlined in detail in Proposition 4.

Proposition 4. *When industries differ only in their status quo tariffs, FTA is always granted. However, unlike before, the President cannot always choose free trade when FTA is granted. In particular, when $\tau_2^s > \frac{(1+\sqrt{3})\theta}{6}$ or $\tau_2^s < \frac{(1-\sqrt{3})\theta}{6}$, free trade will be chosen by the President. On the other hand, if $\frac{(1-\sqrt{3})\theta}{6} \leq \tau_2^s \leq \frac{(1+\sqrt{3})\theta}{6}$, there is a critical value of τ_3^s, say $\overline{\tau}_3^s(\tau_1^s, \tau_2^s)$, which is decreasing in τ_1^s and increasing in τ_2^s, such that if $\tau_3^s < \overline{\tau}_3^s$, the President will offer a tariff vector $\boldsymbol{\tau}^P \neq (0,0,0)$ that makes the median industry (industry 2) indifferent to the status quo, whereas if $\tau_3^s \geqslant \overline{\tau}_3^s$, the President chooses free trade.*

Proof. *See appendix.*

We can summarize Case 3 as follows. Because in this case each industry controls the same number of seats and produces the same level of output, power is symmetrically allocated in the bargaining subgame. Each castaway has the same probability of acquiring the gun. As a result, every member of Congress prefers FTA to the bargaining subgame, and so FTA will always be granted.

One wrinkle appears that is not present in Cases 1 and 2, namely that under FTA the President may not offer free trade. If there is enough asymmetry in initial tariffs, it is quite possible that a majority of industries with high tariffs will prefer the *status quo* to free trade, and so the President will be forced to make the best of FTA by offering the closest thing to it that makes the median industry as well off under the *status quo*. This involves letting that median industry keep a positive tariff, while saddling the other industries with a negative tariff. If the median industry only slightly prefers the *status quo* to free trade, then the tariff vector offered will be only a slight perturbation away from free trade. This outcome is summarized on Figure 3, which shows, for a given value of τ_1^s, the values of τ_2^s and τ_3^s for which the President will propose a tariff vector different from free trade – the region marked $\boldsymbol{\tau}^P \neq 0$ in the figure. The right-hand boundary of this figure is τ_1^s (which we have set at

the value $\tau_1^s = 0.3\theta$ for illustrative purposes), due to our convention that $\tau_1^s \geqslant \tau_2^s \geqslant \tau_3^s$. The upward-sloping curve plots the values of $\overline{\tau}_3^s(\tau_1^s, \tau_2^s) = \overline{\tau}_3^s(0.3\theta, \tau_2^s)$, the critical value of τ_3^s below which industry 2 prefers the *status quo* to free trade. If we allow τ_1^s to increase, this curve will shift down (since $\overline{\tau}_3^s(\tau_1^s, \tau_2^s)$ is decreasing in τ_1^s) at the same time as the $\tau_1^s = 0.3\theta$ boundary shifts to the right. The point is that for a given value of τ_1^s, *industry 2 is more likely to acquiesce to free trade, the lower is its initial tariff and the higher is industry 3's initial tariff.* In addition, if the initial point is, say, point **A**, so that industry 2 would refuse free trade, then if we increase τ_1^s sufficiently, the $\overline{\tau}_3^s(\tau_1^s, \tau_2^s)$ curve will shift down until eventually **A** is above the curve. At that point, industry 2 will prefer free trade to the *status quo*, and so the President will offer free trade and it will be accepted.

[Insert Figure 3 here]

4   Conclusion

In this paper, we analyze an important institution of trade policy: Fast-track authority (FTA), by which Congress delegates a portion of its trade-policy authority to the executive branch, and which has been a feature of almost every major trade agreement entered into by the United States. We suggest an interpretation in which FTA is used by Congress to forestall destructive competition between its members for protectionist rents, competition that can leave a majority or even all members of Congress worse off *ex ante*. In our model, each district hosts an industry and therefore each district's welfare is closely related to the industry operating in it. We model the congressional bargaining game as in Baron and Ferejohn (1989), and analyze the conditions under which a majority of members of Congress will choose to vote for FTA.

Our analysis shows the following. First, FTA is never granted if an industry is operating in the majority of districts. This is true since if an industry operates in a majority of districts, it can benefit at the expense of other districts under no FTA. Second, the more equally distributed are the industries across districts and the more similar are the industries'

sizes, the more likely it is that FTA is granted. This is true since competition between rents is most punishing when bargaining power is symmetrically distributed, and in that case the *ex ante* expected welfare of each district is lower when Congress does not grant FTA to the President. Third, if existing levels of protection are very different across industries, even if FTA is granted, it may not lead to free trade because a majority of industries may prefer the *status quo* to free trade.

Notice that even though we use small open economy model in which prices are taken as given, the logic should apply to the more realistic case of a large country negotiating a trade agreement, in which case the issues of strategic bargaining that are the focus of Conconi *et al.* (2012) would also arise.

Appendix

Proof of Lemma 2. Here, we present a general proof for any industry configuration. When a legislator representing industry i is selected as the proposer and chooses industry $j \neq i$ as the coalition partner, we denote the chosen tariffs as $\boldsymbol{\tau} = (\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij})$, where τ_i^{ij} is the tariff industry i gets, τ_j^{ij} is the tariff industry j gets and τ_k^{ij} is the tariff industry $k \neq i, j$ gets.

Now, suppose a legislator representing industry i is selected as the proposer and he chooses industry $j \neq i$ as the coalition partner. His maximization problem is

$$\max_{\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}} w_i(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}) \text{ s.t. } w_j(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}) \geqslant (1 - \delta) w_j(\boldsymbol{\tau}^s) + \delta v_j,$$

The recognized legislator will choose $\boldsymbol{\tau}$ such that the constraint is satisfied with equality. Furthermore, in the limit as $\delta \to 1$, the constraint can be rewritten as $w_j(\boldsymbol{\tau}) = v_j$. Hence, the maximization problem becomes

$$\max_{\boldsymbol{\tau}} w_i(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}) \text{ s.t. } w_j(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}) = v_j.$$

where

$$w_i(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}) = w_i(\boldsymbol{\tau}^s) + \left[\theta(\tau_i^{ij} - \tau_i^s) - \frac{1}{2} \sum_{l=i,j,k} \left[\left(\tau_l^{ij} + Q_l \right)^2 - \left(\tau_l^s + Q_l \right)^2 \right] \right],$$

$$w_j(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}) = w_j(\boldsymbol{\tau}^s) + \left[\theta(\tau_j^{ij} - \tau_j^s) - \frac{1}{2} \sum_{l=i,j,k} \left[\left(\tau_l^{ij} + Q_l \right)^2 - \left(\tau_l^s + Q_l \right)^2 \right] \right].$$

The Lagrangian can be expressed as

$$
\begin{aligned}
\mathcal{L}(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}) = {} & \left[\theta(\tau_i^{ij} - \tau_i^s) - \frac{1}{2} \sum_{l=i,j,k} \left[\left(\tau_l^{ij} + Q_l \right)^2 - \left(\tau_l^s + Q_l \right)^2 \right] \right] \\
& + \lambda^{ij} \left[\theta(\tau_j^{ij} - \tau_j^s) - \frac{1}{2} \sum_{l=i,j,k} \left[\left(\tau_l^{ij} + Q_l \right)^2 - \left(\tau_l^s + Q_l \right)^2 \right] - v_j \right],
\end{aligned}
$$

where λ^{ij} is the Lagrange multiplier when a legislator representing industry i is selected as the proposer and he chooses industry $j \neq i$ as the coalition partner. It represents the cost to the proposing legislator of obtaining the additional votes needed to pass the proposal.

The first-order conditions, after simplification, are

$$\tau_i^{ij} = \frac{\theta}{1 + \lambda^{ij}} - Q_i,$$

$$\tau_j^{ij} = \frac{\theta \lambda^{ij}}{1 + \lambda^{ij}} - Q_j,$$

$$\tau_k^{ij} = -Q_k.$$

We first show that, in an SSPE in which all proposers employ mixed strategies in choosing their coalition partners, the value of λ^{ij} is independent of the identity of the proposer and of the coalition partner, i.e., $\lambda^{ij} = \lambda$ for all $i \neq j$, $i, j = 1, 2, 3$. This follows from the following two observations. First, a legislator would employ a mixed strategy in choosing a coalition partner only when the *ex post* payoff his district enjoys is the same under each alternative. In other words, when a legislator representing industry i is selected as the proposer, he randomly picks an industry as a coalition partner if, for all $i \neq j \neq k$,

$$w_i(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}) = w_i(\tau_i^{ik}, \tau_j^{ik}, \tau_k^{ik})$$

$$\Leftrightarrow \quad \theta(\tau_i^{ij} - \tau_i^s) - \frac{1}{2} \sum_{l=i,j,k} \left[\left(\tau_l^{ij} + Q_l\right)^2 - \left(\tau_l^s + Q_l\right)^2 \right]$$

$$= \quad \theta(\tau_i^{ik} - \tau_i^s) - \frac{1}{2} \sum_{l=i,j,k} \left[\left(\tau_l^{ik} + Q_l\right)^2 - \left(\tau_l^s + Q_l\right)^2 \right].$$

Using the equilibrium values of $(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij})$ and $(\tau_i^{ik}, \tau_j^{ik}, \tau_k^{ik})$, we have

$$\frac{\theta^2}{1 + \lambda^{ij}} - \frac{1}{2} \left[\frac{\left(1 + \left(\lambda^{ij}\right)^2\right) \theta^2}{\left(1 + \lambda^{ij}\right)^2} \right] = \frac{\theta^2}{1 + \lambda^{ik}} - \frac{1}{2} \left[\frac{\left(1 + \left(\lambda^{ik}\right)^2\right) \theta^2}{\left(1 + \lambda^{ik}\right)^2} \right].$$

It is easy to see that this is possible only if $\lambda^{ij} = \lambda^{ik}$. Second, when industry j is chosen as a coalition partner, the *ex post* welfare it is offered would be independent of the identity of the proposer, because whoever is the proposer always offers an *ex post* welfare of v_j to this industry, otherwise the proposal is rejected. Thus, for any $i \neq j \neq k$,

$$w_j(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij}) = w_j(\tau_i^{kj}, \tau_j^{kj}, \tau_k^{kj})$$

$$\Leftrightarrow \quad \theta(\tau_j^{ij} - \tau_j^s) - \frac{1}{2} \sum_{l=i,j,k} \left[\left(\tau_l^{ij} + Q_l\right)^2 - \left(\tau_l^s + Q_l\right)^2 \right]$$

$$= \quad \theta(\tau_j^{kj} - \tau_j^s) - \frac{1}{2} \sum_{l=i,j,k} \left[\left(\tau_l^{kj} + Q_l\right)^2 - \left(\tau_l^s + Q_l\right)^2 \right].$$

Using the equilibrium values of $(\tau_i^{ij}, \tau_j^{ij}, \tau_k^{ij})$ and $(\tau_i^{kj}, \tau_j^{kj}, \tau_k^{kj})$, we have

$$\frac{\lambda^{ij}\theta^2}{1 + \lambda^{ij}} - \frac{1}{2} \left[\frac{\left(1 + \left(\lambda^{ij}\right)^2\right) \theta^2}{\left(1 + \lambda^{ij}\right)^2} \right] = \frac{\lambda^{kj}\theta^2}{1 + \lambda^{kj}} - \frac{1}{2} \left[\frac{\left(1 + \left(\lambda^{kj}\right)^2\right) \theta^2}{\left(1 + \lambda^{kj}\right)^2} \right].$$

Again, this is possible only if $\lambda^{ij} = \lambda^{kj}$. Together with the earlier observation, $\lambda^{ij} = \lambda^{kj} = \lambda^{ik}$, which implies that $\lambda^{ij} = \lambda$ for all $i \neq j$, $i, j = 1, 2, 3$. Next, we find the equilibrium value of λ in an SSPE in which all proposers employ mixed strategies in choosing their coalition partners. We first write down the equilibrium *ex post per-capita* welfare in three distinct cases.

(i) when the districts that produce good j are selected as the proposer:

$$w_j^{proposer} = w_j(\boldsymbol{\tau}^s) + \left[\frac{\theta^2}{1 + \lambda} - \theta(\tau_j^s + Q_j) - \frac{1}{2} \left(\frac{\left(1 + \lambda^2\right) \theta^2}{\left(1 + \lambda\right)^2} - \sum_{l=i,j,k} (\tau_l^s + Q_l)^2 \right) \right].$$

(ii) when the districts that produce good j are selected as a coalition partner:

$$w_j^{partner} = w_j(\boldsymbol{\tau}^s) + \left[\frac{\lambda\theta^2}{1+\lambda} - \theta(\tau_j^s + Q_j) - \frac{1}{2}\left(\frac{(1+\lambda^2)\,\theta^2}{(1+\lambda)^2} - \sum_{l=i,j,k}(\tau_l^s + Q_l)^2\right)\right].$$

(iii) when the districts that produce good j are left outside the coalition:

$$w_j^{outside} = w_j(\boldsymbol{\tau}^s) + \left[-\theta(\tau_j^s + Q_j) - \frac{1}{2}\left(\frac{(1+\lambda^2)\,\theta^2}{(1+\lambda)^2} - \sum_{l=i,j,k}(\tau_l^s + Q_l)^2\right)\right].$$

We next express the equilibrium continuation welfare of a district on a *per capita* basis. To do so, we need to introduce randomization probabilities. Let s_{ij} denote the probability that a legislator representing a district that produces good i chooses the districts producing good j as a coalition partner. Then, v_j can be expressed as

$$\begin{aligned}
v_j &= \frac{n_j}{N}[s_{ji}w_j^{proposer} + (1 - s_{ji})w_j^{proposer}] + \frac{n_i}{N}[s_{ij}w_j^{partner} + (1 - s_{ij})w_j^{outside}] \\
&\quad + \frac{n_k}{N}[s_{kj}w_j^{partner} + (1 - s_{kj})w_j^{outside}].
\end{aligned}$$

After simplification, this becomes

$$v_j = w_j(\boldsymbol{\tau}^s) + \frac{\theta^2}{1+\lambda}\left(\frac{n_j}{N} + \left(s_{ij}\frac{n_i}{N} + s_{kj}\frac{n_k}{N}\right)\lambda\right) - \theta(\tau_j^s + Q_j) - \frac{1}{2}\left(\frac{(1+\lambda^2)\,\theta^2}{(1+\lambda)^2} - \sum_{l=i,j,k}(\tau_l^s + Q_l)^2\right).$$

Next, observe that the maximization problem implies $w_j^{partner} = v_j$ (since the constraint is binding in equilibrium). Hence, it must be true that

$$\sum_{j=1}^{3} w_j^{partner} = \sum_{j=1}^{3} v_j.$$

Also note that

$$\begin{aligned}
\sum_{\substack{j=1 \\ i\neq k\neq j}}^{3}\left(s_{ij}\frac{n_i}{N} + s_{kj}\frac{n_k}{N}\right) &= \left(s_{12}\frac{n_1}{N} + s_{32}\frac{n_3}{N}\right) + \left(s_{13}\frac{n_1}{N} + s_{23}\frac{n_2}{N}\right) + \left(s_{21}\frac{n_2}{N} + s_{31}\frac{n_3}{N}\right) \\
&= (s_{12} + s_{13})\frac{n_1}{N} + (s_{21} + s_{23})\frac{n_2}{N} + (s_{31} + s_{32})\frac{n_3}{N} \\
\\
&= \frac{n_1 + n_2 + n_3}{N} \\
&= 1.
\end{aligned}$$

The condition $\sum_{j=1}^{3} w_j^{partner} = \sum_{j=1}^{3} v_j$ can now be expressed as

$$\frac{3\lambda\theta^2}{1+\lambda} - \theta \sum_{j=1}^{3} \left(\tau_j^s + Q_j\right) - \frac{3}{2}\left(\frac{\left(1+\lambda^2\right)\theta^2}{\left(1+\lambda\right)^2} - \sum_{l=i,j,k} \left(\tau_l^s + Q_l\right)^2\right)$$

$$= \frac{\theta^2}{1+\lambda}\left(1+\lambda\right) - \theta\sum_{j=1}^{3}\left(\tau_j^s + Q_j\right) - \frac{3}{2}\left(\frac{\left(1+\lambda^2\right)\theta^2}{\left(1+\lambda\right)^2} - \sum_{l=i,j,k}\left(\tau_l^s + Q_l\right)^2\right)$$

$$\Leftrightarrow \lambda = \frac{1}{2}.$$

So, the value of λ can be determined without the knowledge of the randomization probabilities. Plugging the equilibrium value of λ into the tariffs we found earlier gives

$$\tau_i^{ij} = \frac{2\theta}{3} - Q_i,$$

$$\tau_j^{ij} = \frac{\theta}{3} - Q_j,$$

$$\tau_k^{ij} = -Q_k.$$

The continuation payoff of each industry can be determined easily by the condition $v_j = w_j^{partner}$. Evaluating $w_j^{partner}$ at $\lambda = 1/2$ leads to

$$v_j = w_j(\boldsymbol{\tau}^s) + \left[\frac{\theta^2}{3} - \theta(\tau_j^s + Q_j) - \frac{1}{2}\left(\frac{5\theta^2}{9} - \sum_{l=i,j,k}\left(\tau_l^s + Q_l\right)^2\right)\right]. \tag{8}$$

With $Q_1 = Q_2 = Q_3 = \frac{\theta}{3}$, the equilibrium tariffs are

$$\tau_i^{ij} = \frac{\theta}{3},$$

$$\tau_j^{ij} = 0,$$

$$\tau_k^{ij} = -\frac{\theta}{3}.$$

The final step of the proof is to show that there is an interior solution to all of the randomization probabilities (this is what we assumed at the beginning of the proof). Since the continuation *per*-period, *per-capita* welfare is equal to *ex post* welfare when chosen as a coalition partner (by the maximization problem), i.e., $v_j = w_j^{partner}$, we have

$$\frac{\theta^2}{1+\lambda}\left(\frac{n_j}{N} + \left(s_{ij}\frac{n_i}{N} + s_{kj}\frac{n_k}{N}\right)\lambda\right) = \frac{\lambda\theta^2}{1+\lambda}.$$

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Evaluated at $\lambda = 1/2$, this becomes

$$s_{ij}\frac{n_i}{N} + s_{kj}\frac{n_k}{N} = 1 - 2\frac{n_j}{N}.$$

For simplicity, let $s_{12} = s_1$, $s_{23} = s_2$ and $s_{31} = s_3$. Then,

$$s_1\frac{n_1}{N} + (1 - s_3)\frac{n_3}{N} = 1 - 2\frac{n_2}{N},$$

$$s_2\frac{n_2}{N} + (1 - s_1)\frac{n_1}{N} = 1 - 2\frac{n_3}{N},$$

$$s_3\frac{n_3}{N} + (1 - s_2)\frac{n_2}{N} = 1 - 2\frac{n_1}{N}.$$

It is easy to check that, when $\frac{n_3}{N} \leq \frac{n_2}{N} \leq \frac{n_1}{N} \leq \frac{1}{2}$, there is an interior solution in which $s_i \in [0, 1]$ for all i. To see this, fix s_3 and express s_1 and s_2 in terms of s_3

$$s_1 = \frac{1 - 2\frac{n_2}{N} - (1 - s_3)\frac{n_3}{N}}{\frac{n_1}{N}},$$

$$s_2 = 1 - \frac{1 - 2\frac{n_1}{N} - s_3\frac{n_3}{N}}{\frac{n_2}{N}}.$$

Any value of $s_3 \in \left[0, \frac{1-2\frac{n_1}{N}}{\frac{n_3}{N}}\right]$ yields $s_1, s_2 \in [0, 1]$.

When $\frac{n_1}{N} = \frac{n_2}{N} = \frac{n_3}{N} = \frac{1}{3}$, the above system reduces to $s_1 = s_2 = s_3$, so any $s_3 \in [0, 1]$ is a solution.

Proof of Proposition 1. To express the equilibrium continuation payoff as a deviation from an industry's free trade payoff, evaluate equation (8) at $\boldsymbol{\tau}^s = (0, 0, 0)$ to obtain

$$v_j = w_j(\mathbf{0}) + \left[\theta(\frac{\theta}{3} - Q_j) - \frac{1}{2}\left(\frac{5\theta^2}{9} - \sum_{l=i,j,k} Q_l^2\right)\right]. \tag{9}$$

Evaluating equation (9) at $Q_i = Q_j = Q_k = \frac{\theta}{3}$ leads to

$$v_j = w_j(\mathbf{0}) - \frac{\theta^2}{9}. \tag{10}$$

Hence, for all $j = 1, 2, 3$, $v_j < w_j(\mathbf{0})$ since $\theta > 0$.

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Proof of Lemma 3. Here, we prove that $v_1 > w_1(\mathbf{0})$, so FTA does not pass. Suppose on the contrary that FTA passes. Given that $\frac{n_1}{N} > \frac{1}{2}$, this is possible only when the representatives of industry 1 say yes to FTA, which requires $v_1 \leq w_1(\mathbf{0})$. Since industries 2 and 3 are too small to form a coalition together, both will choose industry 1 as their partner when either of them becomes the proposer. For a given value of $\delta < 1$, let $v_i(\delta)$ indicate the equilibrium *per-capita* continuation payoff of industry $i = 1, 2, 3$. Both industries 2 and 3 will offer a *per*-period payoff of $(1-\delta)w_1(\boldsymbol{\tau}^s) + \delta v_1(\delta)$ to industry 1. Given that industry 1 can always propose free trade when it is the proposer, we have

$$v_1(\delta) \geq \frac{n_1}{N} w_1(\mathbf{0}) + \frac{(n_2 + n_3)}{N} \left[(1-\delta)w_1(\boldsymbol{\tau}^s) + \delta v_1(\delta)\right].$$

Solving for v_1 gives

$$v_1(\delta) \geq \frac{n_1}{N - \delta(n_2 + n_3)} w_1(\mathbf{0}) + \frac{(n_2 + n_3)}{N - \delta(n_2 + n_3)}(1-\delta)w_1(\boldsymbol{\tau}^s).$$

Denote the right-hand side of the above inequality as $v_1^{\min}(\delta)$. Note that $\lim_{\delta \to 1} v_1^{\min}(\delta) = w_1(\mathbf{0})$ (since $w_1(\boldsymbol{\tau}^s) \leq w_1(\mathbf{0})$, $v_1^{\min}(\delta)$ approaches $w_1(\mathbf{0})$ from below as $\delta \to 1$).

Define $\tilde{w}_i(v)$, $\Re \mapsto \Re$, by

$$\tilde{w}_i(v) \equiv \max_{\boldsymbol{\tau}} w_i(\boldsymbol{\tau}) \text{ subject to } w_j(\boldsymbol{\tau}) = (1-\delta) w_j(\boldsymbol{\tau}^s) + \delta v, \tag{11}$$

where $i = 1, 2, 3$, and $i \neq j$. In words, $\tilde{w}_i(v)$ is the (*per*-period) *ex post* payoff that industry i is able to obtain for itself as the proposer when the equilibrium continuation payoff of the coalition partner – industry j here – is v (assuming i and j can form a coalition that overturns a possible veto by the President). This problem is symmetric for all players since n_i's do not matter once a proposer is selected. By equation (6), then, it follows that $\tilde{w}_i(v) - w_i(\mathbf{0})$ is the same for all $i = 1, 2$ or 3.[32] Clearly, the derivative $\tilde{w}_i'(v) < 0$, so $\tilde{w}_i(v)$ is a strictly decreasing function of v.[33] Also note that $\tilde{w}$ has the property that $\lim_{\delta \to 1} \tilde{w}_i(\tilde{w}_j(v)) = v$ for any value of v. In other words, if, say, industry 2 has a continuation payoff of $v_2 = \tilde{w}_2(v)$, then

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[32] Note that we do not limit the domestic prices of the manufacturing goods to be identical. Hence, $w_i(\mathbf{0})$'s need not be equal.

[33] If λ is the Kuhn-Tucker multiplier for the optimization in expression (11), then the envelope theorem shows that $\tilde{w}_i'(v) = -\delta\lambda < 0$.

industry 1 can obtain at most v for itself when it is the proposer and chooses industry 2 as the coalition partner.

Since we have assumed that all industries are very patient, we will focus on the limiting case $\delta \to 1$ in the remainder of the proof. Unless otherwise stated, all payoffs are evaluated in the limit as $\delta \to 1$ (so, we are not going to use 'lim' argument unless necessary).

There are two subcases to consider. First, suppose that $\frac{n_2}{N} \leq \frac{1}{3}$. This is the scenario in which industry 1 can form a veto-proof coalition with either of the other two industries. Given that $v_1 \leq w_1(\mathbf{0})$, industry 2's as well as industry 3's proposer payoff will be higher than free trade. This follows from the observation that industry 2 (industry 3) can always make itself better off than free trade by proposing a tariff vector that provides negative protection to industry 3 (industry 2) while providing free trade welfare to industry 1, i.e., $\tilde{w}_j(w_1(\mathbf{0})) > w_j(\mathbf{0})$, $j = 2,3$. Given $v_1 \leq w_1(\mathbf{0})$, this implies that $\tilde{w}_{j \neq 1}(v_1) > w_{j \neq 1}(\mathbf{0})$ a fortiori. It also directly follows from the same observation that the industry that is left outside the winning coalition will surely obtain a payoff that is less than its free trade payoff. For $i \neq j \neq k$, denote w_k^{ij} as the payoff industry k receives when industry i is the proposer and it chooses industry j as the coalition partner. The value of w_k^{ij} may certainly depend on the identity of the proposer, but it is always true that $w_k^{ij} < w_k(\mathbf{0})$. When industry 1 is the proposer, it will either choose free trade or choose (possibly with a mixed strategy) one of the other two industries to form a veto-proof coalition, so the highest industry $j \neq 1$ can obtain is $\max\{v_j, w_j(\mathbf{0})\}$. So,

$$v_j \leq \frac{n_j}{N}\tilde{w}_j(v_1) + \frac{n_1}{N}\max\{v_j, w_j(\mathbf{0})\} + \frac{n_k}{N}w_j^{k1}, \ j \neq k \neq 1.$$

Since $\tilde{w}_j(v_1) > w_j(\mathbf{0}) > w_j^{k1}$, it follows that $v_j < \tilde{w}_j(v_1)$, $j = 2,3$. This means that $\tilde{w}_1(v_j) > \tilde{w}_1(\tilde{w}_j(v_1)) = v_1$, where we have used the two properties of $\tilde{w}_i$ described before: $\tilde{w}_i'(v) < 0$ and $\tilde{w}_i(\tilde{w}_j(v)) = v$. Given that $v_1 \geq v_1^{\min}$, $\tilde{w}_1(v_j) > v_1^{\min} = w_1(\mathbf{0})$, so industry 1, as a proposer, would choose to form a coalition with one of the other two industries rather than proposing free trade. This implies

$$v_1 = \frac{n_1}{N}\max\{\tilde{w}_1(v_2), \tilde{w}_1(v_3)\} + \frac{(n_2 + n_3)}{N}v_1,$$

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which, after simplifying, reduces to $v_1 = \max\{\tilde{w}_1(v_2), \tilde{w}_1(v_3)\}$. However, this constitutes a contradiction since we had earlier found that $\tilde{w}_1(v_j) > v_1$ for $j = 2, 3$. Hence, it must be that $v_1 > w_1(\mathbf{0})$ when $\frac{n_2}{N} \leq \frac{1}{3}$.

The other possible scenario is $\frac{n_2}{N} > \frac{1}{3}$. In this case, a coalition between industries 1 and 3 is not veto-proof. So, industry 1 needs the support of industry 2 if it wants to obtain a payoff that is strictly higher than free trade. First, assume that $v_2 \leq w_2(\mathbf{0})$. In this case, industry 1 would always form a coalition with industry 2 whenever it gets to make a proposal, because $\tilde{w}_1(v_2) > w_1(\mathbf{0})$ as discussed earlier. Industry 2 would also always form a coalition with industry 1 since we have $v_1 \leq w_1(\mathbf{0})$ by assumption. Industry 3, on the other hand, makes a proposal that will be accepted by all members of Congress, because given that $v_1 \leq w_1(\mathbf{0})$ and $v_2 \leq w_2(\mathbf{0})$, industry 3 can obtain a payoff at least as much as its free trade payoff. Hence,

$$v_1 = \frac{n_1}{N}\tilde{w}_1(v_2) + \frac{(n_2 + n_3)}{N}v_1.$$

This expression implies that $v_1 = \tilde{w}_1(v_2) > w_1(\mathbf{0})$, which is a contradiction to the initial assertion that $v_1 \leq w_1(\mathbf{0})$.

Next, assume that $v_2 > w_2(\mathbf{0})$. Note that with $v_2 > w_2(\mathbf{0})$ and $v_1^{\min} = w_1(\mathbf{0})$, industry 3 cannot obtain a payoff that is better than free trade by making a proposal that will be accepted by all industries. Hence, it must be that industry 3 proposes free trade when it gets to be the proposer, and given that $v_1 \leq w_1(\mathbf{0})$, industry 1 agrees to it. Given that $v_1 \leq w_1(\mathbf{0})$, industry 2 strictly prefers to form a coalition with industry 1. Industry 1, on the other hand, would form a coalition with industry 2 if $\tilde{w}_1(v_2) > w_1(\mathbf{0})$, would randomize between forming a coalition with 2 and proposing free trade if $\tilde{w}_1(v_2) = w_1(\mathbf{0})$, and would propose free trade if $\tilde{w}_1(v_2) < w_1(\mathbf{0})$. So, the highest industry 2 can expect is v_2. Thus,

$$v_2 \leq \frac{n_2}{N}\tilde{w}_2(v_1) + \frac{n_1}{N}v_2 + \frac{n_3}{N}w_2(\mathbf{0}).$$

Given that $v_1 \leq w_1(\mathbf{0})$, $\tilde{w}_2(v_1) > w_2(\mathbf{0})$, so the above expression implies $v_2 < \tilde{w}_2(v_1)$. Using $\tilde{w}_i'(v) < 0$ and $\tilde{w}_1(\tilde{w}_2(v)) = v$, then, $\tilde{w}_1(v_2) > \tilde{w}_1(\tilde{w}_2(v_1)) = v_1$. Given that $v_1 \geq v_1^{\min} =$

$w_1(\mathbf{0})$, we reach $\tilde{w}_1(v_2) > w_1(\mathbf{0})$. Thus,

$$v_1 = \frac{n_1}{N}\tilde{w}_1(v_2) + \frac{n_2}{N}v_1 + \frac{n_3}{N}w_1(\mathbf{0}),$$

which implies that $v_1 > w_1(\mathbf{0})$. This again constitutes a contradiction. Hence, it must be that $v_1 > w_1(\mathbf{0})$.

Proof of Lemma 4. Suppose on the contrary that FTA passes. Note that a coalition of industries 1 and 2 will have enough seats to bypass presidential veto, whereas a coalition between industries 1 and 3 or industries 2 and 3 is not veto-proof. Hence, industry 3 has to either propose a bill that is unanimously agreed on, or propose free trade and get the support of at least one of the other two industries. As in the proof of Lemma 3, all payoffs in the following are evaluated in the limit as δ goes to 1 unless otherwise stated.

First assume that both industries 1 and 2 say yes to FTA (industry 3 may say yes or no; it does not make a difference for what follows). This requires that both industries expect a payoff that is not better than free trade in the bargaining subgame, i.e., $v_1 \leq w_1(\mathbf{0})$ and $v_2 \leq w_2(\mathbf{0})$. Given that $v_1 \leq w_1(\mathbf{0})$, industry 2 would always form a coalition with industry 1 whenever it gets to make a proposal. This follows from the observation that industry 2 can always make itself better off than free trade by proposing a tariff vector that provides negative protection to industry 3 while providing free trade welfare to industry 1, i.e., $\tilde{w}_2(w_1(\mathbf{0})) > w_2(\mathbf{0})$, where $\tilde{w}_i$ is as defined in expression (11) in the proof of Lemma 3. Given $v_1 \leq w_1(\mathbf{0})$, this implies that $\tilde{w}_2(v_1) > w_2(\mathbf{0})$. The same reasoning is true for industry 1, too. That is, industry 1 would always form a coalition with industry 2 whenever it gets to make a proposal. Industry 3, on the other hand, makes a proposal that will be accepted by all members of Congress, because given that $v_1 \leq w_1(\mathbf{0})$ and $v_2 \leq w_2(\mathbf{0})$, industry 3 can obtain a payoff that is at least as much as its free trade payoff. Hence,

$$v_1 = \frac{n_1}{N}\tilde{w}_1(v_2) + \frac{(n_2 + n_3)}{N}v_1,$$

$$v_2 = \frac{n_2}{N}\tilde{w}_2(v_1) + \frac{(n_1 + n_3)}{N}v_2.$$

These expressions imply that $v_1 = \tilde{w}_1(v_2) > w_1(\mathbf{0})$ and $v_2 = \tilde{w}_1(v_1) > w_2(\mathbf{0})$, which is a contradiction to the initial assertion that $v_1 \leq w_1(\mathbf{0})$ and $v_2 \leq w_2(\mathbf{0})$. Thus, both industries 1 and 2 cannot do worse than free trade in the bargaining subgame.

Next, assume $v_1 > w_1(\mathbf{0})$, $v_2 \leq w_2(\mathbf{0})$ and $v_3 \leq w_3(\mathbf{0})$, so that industries 2 and 3 say yes to FTA. Under these conditions, industry 1 would again always form a coalition with industry 2 whenever it gets to be the proposer in the bargaining subgame. Industry 2 may choose to form a coalition with industry 1 if $\tilde{w}_2(v_1) \geq w_2(\mathbf{0})$, or propose free trade and get the support of industry 3. So, industry 2 can assure a payoff of $w_2(\mathbf{0})$ at the minimum in either case. Finally, industry 3 may make a proposal that will be accepted by all members of Congress, or propose free trade and get the support of industry 2. First, suppose that industry 3 makes a proposal that will be accepted by all industries. For a given δ,

$$v_2(\delta) \geq \frac{n_2}{N} w_2(\mathbf{0}) + \frac{(n_1 + n_3)}{N} \left[(1 - \delta) w_2(\boldsymbol{\tau}^s) + \delta v_2(\delta) \right],$$

which, after solving for v_2, becomes

$$v_2(\delta) \geq \frac{n_2}{N - \delta(n_1 + n_3)} w_2(\mathbf{0}) + \frac{(n_1 + n_3)}{N - \delta(n_1 + n_3)} (1 - \delta) w_2(\boldsymbol{\tau}^s).$$

Similar to the proof of Lemma 3, denote the right-hand side of the above inequality as $v_2^{\min}(\delta)$. Note that $\lim_{\delta \to 1} v_2^{\min}(\delta) = w_2(\mathbf{0})$.

Now, observe that with $v_1 > w_1(\mathbf{0})$ and $v_2^{\min} = w_2(\mathbf{0})$, industry 3 cannot obtain a payoff that is better than free trade by making a proposal that will be accepted by all industries. Hence, industry 3 proposes free trade when it is the proposer.

Given that industry 3 proposes free trade when it gets to be the proposer,

$$v_1 = \frac{n_1}{N} \tilde{w}_1(v_2) + \frac{n_2}{N} v_1 + \frac{n_3}{N} w_1(\mathbf{0}).$$

Since $\tilde{w}_1(v_2) > w_1(\mathbf{0})$, this expression implies that $v_1 < \tilde{w}_1(v_2)$. As a result, $\tilde{w}_2(v_1) > \tilde{w}_2(\tilde{w}_1(v_2)) = v_2$. Since $v_2 \geq v_2^{\min} = w_2(\mathbf{0})$, it follows that $\tilde{w}_2(v_1) > w_2(\mathbf{0})$. In other words, when industry 2 is the proposer, it chooses to form a coalition with industry 1 rather than proposing free trade and obtaining the support of industry 3. Hence,

$$v_2 = \frac{n_2}{N} \tilde{w}_2(v_1) + \frac{n_1}{N} v_2 + \frac{n_3}{N} w_2(\mathbf{0}).$$

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which implies $v_2 > w_2(\mathbf{0})$, so a contradiction.

The last scenario under which FTA would be granted is when $v_1 \leq w_1(\mathbf{0})$, $v_2 > w_2(\mathbf{0})$ and $v_3 \leq w_3(\mathbf{0})$. This scenario is identical to the preceding scenario with the identities of industries 1 and 2 switched. So, again, it will lead to a contradiction. As a result, in the limit as $\delta \to 1$, both industries 1 and 2 must be doing strictly better than free trade in the bargaining subgame, and therefore, both would say no to FTA in the first stage.

Proof of Lemma 5. In this case, similar to Case 1b, industries 2 and 3 have the option of forming a coalition with each other and proposing free trade. However, now, in contrast to Case 1b, industry 1 can form a veto-proof coalition with either of the other two industries, so industry 2 will not have a strong bargaining position anymore. Here, we show that both industries 2 and 3 do worse than free trade in the legislative bargaining subgame (i.e., $v_j \leq w_j(\mathbf{0})$ for $j = 2, 3$), so they vote in favor of FTA in the first stage. For convenience, all payoffs are evaluated in the limit as $\delta \to 1$ in the remainder of the proof.

Suppose, on the contrary, that $v_j > w_j(\mathbf{0})$ for $j = 2$, $j = 3$ or for both. Without any loss of generality, assume $v_2 - w_2(\mathbf{0}) \geq v_3 - w_3(\mathbf{0})$ (all of the following equally applies when identities of 2 and 3 are switched). There are two possibilities to consider: $v_2 - w_2(\mathbf{0}) \geq v_3 - w_3(\mathbf{0}) > 0$ and $v_2 - w_2(\mathbf{0}) > 0 \geq v_3 - w_3(\mathbf{0})$.

First, suppose that $v_2 - w_2(\mathbf{0}) \geq v_3 - w_3(\mathbf{0}) > 0$. This implies that $v_1 < w_1(\mathbf{0})$. This is so since total surplus is maximized at free trade, implying that $\sum_{i=1}^{3}(v_i - w_i(\mathbf{0})) \leq 0$. As a result, industries 2 and 3 always form a coalition with industry 1 whenever they get to make a proposal, because they can ensure a payoff in excess of free trade by doing so, i.e., $\tilde{w}_{j \neq 1}(v_1) > w_{j \neq 1}(\mathbf{0})$, where the function $\tilde{w}_j$ is as defined in expression (11) in the proof of Lemma 3. Note that, by the symmetry of $\tilde{w}_i$, $\tilde{w}_2(v_1) - w_2(\mathbf{0}) = \tilde{w}_3(v_1) - w_3(\mathbf{0})$. Industry 1 will have a strict preference for industry 3 as a coalition partner if $v_2 - w_2(\mathbf{0}) > v_3 - w_3(\mathbf{0})$, and will randomize between the two if $v_2 - w_2(\mathbf{0}) = v_3 - w_3(\mathbf{0})$ (in which case $\tilde{w}_1(v_2) = \tilde{w}_1(v_3)$). In either case, we can write the proposer payoff of industry 1 as $\tilde{w}_1(v_3)$. Thus, the

continuation payoff of industry 1 can be expressed as

$$v_1 = \frac{n_1}{N}\tilde{w}_1(v_3) + \frac{(n_2 + n_3)}{N}v_1,$$

which, after solving for v_1, becomes

$$v_1 = \tilde{w}_1(v_3).$$

In other words, as $\delta \to 1$, industry 1 obtains the same payoff in all possible outcomes of the legislative bargaining. But, then, using the property $\tilde{w}_i(\tilde{w}_j(v)) = v$, it follows that $\tilde{w}_3(v_1) = \tilde{w}_3(\tilde{w}_1(v_3)) = v_3$. Given that industry 3 will be left out of the winning coalition and obtain a payoff $w_3^{21} < w_3(\mathbf{0})$ when industry 2 is the proposer, and will obtain at most v_3 when industry 1 is the proposer, we have the following

$$v_3 \le \frac{n_3}{N}\tilde{w}_3(v_1) + \frac{n_1}{N}v_3 + \frac{n_2}{N}w_3^{21}.$$

Given that $\tilde{w}_3(v_1) = v_3$, the above condition implies that $v_3 = w_3^{21} < w_3(\mathbf{0})$, which is a contradiction to the initial assertion that we made.

The second possible scenario is $v_2 - w_2(\mathbf{0}) > 0 \ge v_3 - w_3(\mathbf{0})$. In this case, industry 1 will have a strict preference for industry 3 as a coalition partner. First, suppose $\tilde{w}_2(v_1) - w_2(\mathbf{0}) = \tilde{w}_3(v_1) - w_3(\mathbf{0}) > 0$ so that both industries 2 and 3 choose to form a coalition with industry 1 whenever they get to make a proposal. Following the same steps as in the previous scenario, it is easy to reach $v_1 = \tilde{w}_1(v_3)$ and $\tilde{w}_3(v_1) = v_3$. The continuation payoff of industry 2 can be written as

$$v_2 = \frac{n_2}{N}\tilde{w}_2(v_1) + \frac{n_1}{N}w_2^{13} + \frac{n_3}{N}w_2^{31}.$$

Given that $\tilde{w}_2(v_1) - w_2(\mathbf{0}) = \tilde{w}_3(v_1) - w_3(\mathbf{0})$ and that $\tilde{w}_3(v_1) = v_3$, we have

$$v_2 = \frac{n_2}{N}(w_2(\mathbf{0}) + v_3 - w_3(\mathbf{0})) + \frac{n_1}{N}w_2^{13} + \frac{n_3}{N}w_2^{31}.$$

Since $v_3 - w_3(\mathbf{0}) \le 0$ by assumption and also $w_2^{13} < w_2(\mathbf{0})$ and $w_2^{31} < w_2(\mathbf{0})$, it follows that $v_2 < w_2(\mathbf{0})$, which is a contradiction. Next, suppose that $\tilde{w}_2(v_1) - w_2(\mathbf{0}) = \tilde{w}_3(v_1) - w_3(\mathbf{0}) \le 0$. In this case, industry 2 will obtain a payoff of $w_2(\mathbf{0})$ when it is the proposer

(it will randomize between forming a coalition with industry 1 and proposing free trade if $\tilde{w}_2(v_1) = w_2(\mathbf{0})$; otherwise, it will propose free trade and industry 3 will say yes). Industry 3, on the other hand, will always form a coalition with industry 1 (because, given that $v_2 > w_2(\mathbf{0})$, industry 2 would not agree to free trade). Hence, v_2 can be expressed as

$$v_2 = \frac{n_2}{N} w_2(\mathbf{0}) + \frac{n_1}{N} w_2^{13} + \frac{n_3}{N} w_2^{31}.$$

Since $w_2^{13} < w_2(\mathbf{0})$ and $w_2^{31} < w_2(\mathbf{0})$, it follows that $v_2 < w_2(\mathbf{0})$, so again a contradiction. Hence, $v_j \leq w_j(\mathbf{0})$ for $j = 2, 3$, and therefore both industries 2 and 3 vote in favor of FTA in the first stage.

Proof of Proposition 3. Recall that $Q_1 + Q_2 + Q_3 = \theta$. Given that the industries are symmetrically dispersed, the legislative bargaining has a full randomization SSPE. Hence, the continuation *per-capita* payoff of districts that produce good i is the same as in equation (9) (which is given in the proof of Proposition 1)

$$v_i = w_i(\mathbf{0}) + \theta\left(\frac{\theta}{3} - Q_i\right) - \frac{1}{2}\left(\frac{5}{9}\theta^2 - \sum_{l=i,j,k} Q_l^2\right). \tag{12}$$

There are couple of observations to make here. First, from equation (12), $\sum_{i=1}^{3}(v_i - w_i(\mathbf{0})) \leq 0$ since total surplus is maximized at free trade. As a result, if FTA is given to the President, she will always choose free trade since for each industry, free trade is not worse than any symmetric *status quo* tariff vector ($\boldsymbol{\tau} = \boldsymbol{\tau}^s$) that would continue to prevail in case the President's proposal is rejected. Second, given our assumption that $Q_1 \geqslant Q_2 \geqslant Q_3$, as long as we determine the range in which $v_2 - w_2(\mathbf{0}) > 0$, this will automatically imply $v_3 - w_3(\mathbf{0}) > 0$ and hence FTA will not be given. This is true since each district's payoff is decreasing in its own industry's total output and increasing in other industries' total output. Therefore, if industry 2 does better than free trade, then industry 3, which has a lower output than industry 2, will do better than free trade, too. In addition, industry 1 cannot be made better off than free trade and therefore always votes yes to FTA.[34]

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[34]This is easy to see since the best possible scenario for industry 1 (given that $Q_1 \geqslant Q_2 \geqslant Q_3$) is the one where $Q_1 = Q_2 = Q_3$ and this corresponds to fully symmetric case where each industry prefers free trade to the bargaining subgame.

To analyze the possible cases in detail, let's rewrite Q_1 as $Q_1 = \theta - Q_2 - Q_3$. If we substitute this value in equation (12) and solve for a critical value of Q_3, $\overline{Q}_3$, as a function of Q_2 that makes $v_2 - w_2(\mathbf{0}) = 0$, we get

$$\overline{Q}_3 = \frac{1}{2}(\theta - Q_2) - \frac{\sqrt{54\theta Q_2 - 11\theta^2 - 27Q_2^2}}{6}. \tag{13}$$

We can see from equation (13) that $\frac{d\overline{Q}_3}{dQ_2} < 0$. In addition, we know that $0 \leq Q_3 \leq Q_2$. Using these conditions in equation (13), we can determine the region where FTA is given and where it is not given.

Case 2a: $Q_2 \geqslant \frac{\theta}{3}; \frac{n_1}{N} = \frac{n_2}{N} = \frac{n_3}{N} = \frac{1}{3}; \tau_1^s = \tau_2^s = \tau_3^s$

It is possible to show that, when $Q_2 \geqslant \frac{\theta}{3}$, industries 1 and 2 cannot do better than free trade and hence FTA will be granted.[35] Since each industry's payoff is decreasing in its own output, we need to find the upper bound of Q_2 that satisfies equation (13). This gives us the maximum amount of Q_2 that makes industry 2 indifferent between granting FTA or not granting FTA. Above that level, it is not possible for industry 2 to do better than free trade, thus FTA will be granted. Since $\frac{d\overline{Q}_3}{dQ_2} < 0$, we can find the upper bound of Q_2 by setting $\overline{Q}_3$ equal to zero in equation (13), which gives us $Q_2 = \frac{\theta}{3}$. From equation (13), any $Q_2 \geqslant \frac{\theta}{3}$ requires $\overline{Q}_3 < 0$ for industry 2 to do strictly better than free trade by not granting FTA, which is not possible.

Case 2b: $Q_2 < \frac{\theta}{2}\left(1 - \frac{\sqrt{7}}{3\sqrt{3}}\right); \frac{n_1}{N} = \frac{n_2}{N} = \frac{n_3}{N} = \frac{1}{3}; \tau_1^s = \tau_2^s = \tau_3^s$

It is possible to show that, when $Q_2 < \frac{\theta}{2}\left(1 - \frac{\sqrt{7}}{3\sqrt{3}}\right)$, industries 2 and 3 do better than free trade and as a result FTA will not be granted. Since each industry's payoff is decreasing in its own total output, we need to find the lower bound of Q_2 that satisfies equation (13). This gives us the minimum amount of Q_2 that makes industry 2 indifferent between granting FTA and not granting FTA. Below that level, it is always possible for industry 2 to do better

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[35] Given our assumption that $Q_1 \geqslant Q_2 \geqslant Q_3$, under this case, industries 1 and 2 cannot do better than free trade for sure. On the other hand, depending on the value of Q_3, industry 3 can do better or worse than free trade.

than free trade, thus FTA will not be granted. Since $\frac{d\overline{Q}_3}{dQ_2} < 0$ and $Q_3 \leq Q_2$, we can find the lower bound of Q_2 by setting $Q_2 = \overline{Q}_3$ in equation (13), which gives us $Q_2 = \frac{\theta}{2}\left(1 - \frac{\sqrt{7}}{3\sqrt{3}}\right)$. From equation (13), any $Q_2 < \frac{\theta}{2}\left(1 - \frac{\sqrt{7}}{3\sqrt{3}}\right)$ requires a value of $\overline{Q}_3 \leq \widehat{Q}$, where the value of $\widehat{Q}$ is such that $Q_2 < \widehat{Q}$, for industry 2 to benefit from not granting FTA, which is always satisfied since $Q_3 \leq Q_2$.

Case 2c: $\frac{\theta}{2}\left(1 - \frac{\sqrt{7}}{3\sqrt{3}}\right) \leq Q_2 < \frac{\theta}{3}$; $\frac{n_1}{N} = \frac{n_2}{N} = \frac{n_3}{N} = \frac{1}{3}$; $\tau_1^s = \tau_2^s = \tau_3^s$

In this case, we again use equation (13). For any value of Q_2 such that $\frac{\theta}{2}\left(1 - \frac{\sqrt{7}}{3\sqrt{3}}\right) \leq Q_2 < \frac{\theta}{3}$, if $Q_3 < \overline{Q}_3$, industries 2 and 3 do better than free trade and FTA is not given. This is true since $\frac{d\overline{Q}_3}{dQ_2} < 0$ and each industry's payoff is decreasing in its own output. As a result, a value of $Q_3 < \overline{Q}_3$, for a given value of Q_2, results in a strictly higher welfare for industry 2 when FTA is not granted. On the other hand, if $Q_3 \geqslant \overline{Q}_3$, then industry 2 cannot be made better off than free trade and FTA will be given (recall that industry 1 always votes YES to FTA).[36]

Proof of Proposition 4. In the first part of the proof, we will *assume* that FTA is always granted to the President and analyze the President's problem accordingly. In the second part, we show that all three industries are better off under FTA relative to the bargaining subgame, hence FTA is always granted.

Given Assumption 1, we have

$$-\frac{\theta}{3} \leq \tau_i^s \leq \frac{2\theta}{3}.$$

Using equation (5), each district's expected welfare is given by

$$w_i - w_i(\boldsymbol{\tau}^s) = \left[\theta(\tau_i - \tau_i^s) - \frac{1}{2}\sum_{l=i,j,k}\left(\left(\tau_l + \frac{\theta}{3}\right)^2 - \left(\tau_l^s + \frac{\theta}{3}\right)^2\right)\right].$$

Moreover, using equation (6), we can also write each district's welfare as

$$w_i - w_i(\mathbf{0}) = \theta\tau_i - \frac{1}{2}\sum_{l=i,j,k}\left(\left(\tau_l + \frac{\theta}{3}\right)^2 - \left(\frac{\theta}{3}\right)^2\right).$$

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[36] In this case, industry 3 can do better or worse than free trade depending on the value of Q_3.

Then, by subtracting the former equation from the latter, we get

$$w_i(\boldsymbol{\tau}^s) - w_i(\mathbf{0}) = \theta\tau_i^s - \frac{\theta}{3}\sum_{l=i,j,k}\tau_l^s - \sum_{l=i,j,k}\frac{(\tau_l^s)^2}{2}. \tag{14}$$

There are a couple of things to note here. First, $\sum_{i=1}^{3}(w_i(\boldsymbol{\tau}^s)-w_i(\mathbf{0})) \leq 0$ since $\max_{\boldsymbol{\tau}}\sum_{i=1}^{3}w_i(\boldsymbol{\tau}) = \sum_{i=1}^{3}w_i(\mathbf{0})$. Therefore, there is at least one industry that will be worse off under any *status quo* relative to free trade (except if the *status quo* is free trade). Second, given our assumption that $\tau_1^s \geqslant \tau_2^s \geqslant \tau_3^s$, and since each industry's payoff is increasing in its own protection and decreasing in other industries' protection, if $w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) > 0$, this will automatically imply that $w_1(\boldsymbol{\tau}^s) - w_1(\mathbf{0}) > 0$. As a result, the *status quo* payoffs of industries 1 and 2 will be strictly higher than their payoffs under free trade and thus the President cannot choose free trade under FTA. In addition, industry 3 cannot be better off than free trade and therefore always prefers free trade. To analyze Case 3 in detail, we write equation (14) for industry 2,

$$w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) = \theta\tau_2^s - \frac{\theta}{3}\sum_{l=i,j,k}\tau_l^s - \sum_{l=i,j,k}\frac{(\tau_l^s)^2}{2}. \tag{15}$$

In addition, we rewrite the President's welfare function given in equation (3) by using equation (6) as

$$W = W(\mathbf{0}) + \left[\frac{\theta}{3}\sum_{l=i,j,k}\tau_l - \frac{1}{2}\sum_{l=i,j,k}\left(\left(\tau_l + \frac{\theta}{3}\right)^2 - \left(\frac{\theta}{3}\right)^2\right)\right].$$

Note that whenever $w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) \leq 0$, the President can do unconstrained maximization under FTA and choose free trade (since both industry 2 and industry 3 are better off under free trade compared to the *status quo*). On the other hand, if $w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) > 0$, then under FTA, the President needs to offer a tariff vector that makes the pivotal industry (industry 2) indifferent with respect to the *status quo*. As a result, by using equation (15), we can state the President's constraint as

$$w_2(\boldsymbol{\tau}^P) - w_2(\mathbf{0}) \geqslant w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0})$$

OR

$$\theta\tau_2^P - \frac{\theta}{3}\sum_{l=i,j,k}\tau_l^P - \sum_{l=i,j,k}\frac{(\tau_l^P)^2}{2} \geqslant w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}),$$

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where $\boldsymbol{\tau}^P = (\tau_1^P, \tau_2^P, \tau_3^P)$ represents the tariff vector the President chooses under FTA. The maximization problem the President faces is then given by

$$\max_{\boldsymbol{\tau}^P} \ W(0) + \left[\frac{\theta}{3} \sum_{l=i,j,k} \tau_l^P - \frac{1}{2} \sum_{l=i,j,k} \left(\left(\tau_l^P + \frac{\theta}{3}\right)^2 - \left(\frac{\theta}{3}\right)^2 \right) \right]$$

$$+ \mu \left[\theta \tau_2^P - \frac{\theta}{3} \sum_{l=i,j,k} \tau_l^P - \sum_{l=i,j,k} \frac{\left(\tau_l^P\right)^2}{2} - (w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0})) \right].$$

It is easy to show that when $w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) < 0$, the constraint is not binding (so $\mu = 0$) and $\boldsymbol{\tau}^P = (0,0,0)$, i.e., free trade. On the other hand, when $w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) \geqslant 0$, the constraint binds (so $\mu \geqslant 0$). Then, first order conditions imply that $\tau_1^P = \tau_3^P = -\frac{\tau_2^P}{2}$. Putting these back into the constraint gives us

$$\tau_1^P = \tau_3^P = -\frac{1}{3}\left(\theta - \sqrt{\theta^2 - 3\left(w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0})\right)}\right) < 0$$

$$\tau_2^P = \frac{2}{3}\left(\theta - \sqrt{\theta^2 - 3\left(w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0})\right)}\right) > 0.$$

(16)

Notice that when $w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) = 0$, we still have $\boldsymbol{\tau}^P = (0,0,0)$, i.e., free trade. Hence, we can conclude that whenever $w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) > 0$, the tariff vector the President chooses is different than free trade, i.e., $\boldsymbol{\tau}^P \neq (0,0,0)$. On the other hand, when $w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) \leq 0$, the President always chooses free trade.

In addition to the above analysis, it is also possible to determine the boundary of the region where free trade is chosen by the President under FTA, which is the same as the set of *status quo* tariffs such that $w_2(\boldsymbol{\tau}^s) = w_2(\mathbf{0})$. This condition yields

$$\bar{\tau}_3^s \equiv \frac{\sqrt{\theta^2 + 12\theta\tau_2^s - 6\theta\tau_1^s - 9\left(\tau_1^s\right)^2 - 9\left(\tau_2^s\right)^2}}{3} - \frac{\theta}{3}.$$

(17)

Equation (17) defines a surface in the three-dimensional space of tariff vectors, for $\tau_2^s \in (-\frac{\theta}{3}, \frac{2\theta}{3})$ and $\tau_1^s \in (\tau_2^s, \frac{2\theta}{3})$. Any point on this surface is a point for which industry 2 is indifferent between the *status quo* and free trade. If we begin on the surface and reduce τ_1^s or τ_3^s or increase τ_2^s, industry 2 will now strictly prefer the *status quo* to free trade, and the

President will not propose free trade. If we perturb the tariff vector in the opposite direction, industry 2 will strictly prefer free trade, and free trade will be the equilibrium result.

We can see from equation (17) that $\frac{d\bar{\tau}_3^s}{d\tau_2^s} \geqslant 0$ and $\frac{d\bar{\tau}_3^s}{d\tau_1^s} \leq 0$. In addition, we know that $\tau_3^s \leq \tau_2^s \leq \tau_1^s$. Using these conditions in equation (17), under FTA we can determine the region where the President chooses free trade and where she does not.

Case 3a: $\tau_2^s > \frac{(1+\sqrt{3})\theta}{6}$ or $\tau_2^s < \frac{(1-\sqrt{3})\theta}{6}$; $\frac{n_1}{N} = \frac{n_2}{N} = \frac{n_3}{N} = \frac{1}{3}$; $Q_1 = Q_2 = Q_3 = \frac{\theta}{3}$

It is possible to show that, when $\tau_2^s > \frac{(1+\sqrt{3})\theta}{6}$ or $\tau_2^s < \frac{(1-\sqrt{3})\theta}{6}$, industries 2 and 3 do worse than free trade and hence once FTA is given to the President, she will choose free trade and it will be approved by Congress with the support of industries 2 and 3.[37] We need to find the bounds of τ_2^s that satisfy equation (17). This gives us the values of τ_2^s that make industry 2's payoff equal under the *status quo* and free trade. Above that level, it is not possible for industry 2 to do better than free trade (since that requires $\bar{\tau}_3^s < -\frac{\theta}{3}$, which is not possible by Assumption 1) thus free trade will result once FTA is granted to the President. Since each industry's payoff is increasing in its own *status quo* tariff and decreasing in other industries' *status quo* tariffs, we can find the bounds of τ_2^s that satisfy equation (17) by setting $\tau_1^s = \tau_2^s$ and $\tau_3^s = -\frac{\theta}{3}$ (its lower bound) and solving for τ_2^s, which gives us

$$\tau_1^s = \tau_2^s = \frac{(1+\sqrt{3})\theta}{6} \text{ and}$$
$$\tau_1^s = \tau_2^s = \frac{(1-\sqrt{3})\theta}{6}.$$

Given that $\tau_1^s \geqslant \tau_2^s$, for any value of $\tau_2^s > \frac{(1+\sqrt{3})\theta}{6}$ or $\tau_2^s < \frac{(1-\sqrt{3})\theta}{6}$, we will have $w_2(\boldsymbol{\tau}^s) - w_2(\mathbf{0}) < 0$. Therefore, once FTA is given, free trade will be chosen by the President.

Case 3b: $\frac{(1-\sqrt{3})\theta}{6} \leq \tau_2^s \leq \frac{(1+\sqrt{3})\theta}{6}$; $\frac{n_1}{N} = \frac{n_2}{N} = \frac{n_3}{N} = \frac{1}{3}$; $Q_1 = Q_2 = Q_3 = \frac{\theta}{3}$

In this case, for any value of τ_2^s such that $\frac{(1-\sqrt{3})\theta}{6} \leq \tau_2^s \leq \frac{(1+\sqrt{3})\theta}{6}$, we can find a critical value of τ_3^s, say $\bar{\tau}_3^s$, that satisfies equation (17). Then, if $\tau_3^s < \bar{\tau}_3^s$, industries 1 and 2 do better

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[37]Given our assumption that $\tau_1^s \geqslant \tau_2^s \geqslant \tau_3^s$, under this case, industries 2 and 3 will do worse than free trade for sure. On the other hand, industry 1 can do better or worse than free trade depending on the value of τ_1^s.

than free trade and under FTA, the President has to offer a tariff vector $\boldsymbol{\tau}^P \neq (0,0,0)$ given in equation (16) that makes the pivotal industry (industry 2) indifferent to the *status quo*. At the same time, this tariff vector makes industry 3 better off whereas industry 1 worse off compared to the *status quo*. On the other hand, if $\tau_3^s \geqslant \bar{\tau}_3^s$, industries 2 and 3 cannot do better than free trade and under FTA, the President chooses free trade, $\boldsymbol{\tau}^P = (0,0,0)$.

So far, we have assumed that FTA is always given to the President. In this part, we show it is indeed the case that granting FTA to the President is optimal for all industries. To do so, we will compare each industry's payoff under FTA and under no FTA and show that the payoffs under FTA are strictly better than the payoffs under no FTA.

Under FTA, since the President has to keep industry 2 as well off as it would be under the *status quo*, the payoffs industry 1 and industry 3 obtain are strictly decreasing in the *status quo* payoff of industry 2. Given that $w_2(\boldsymbol{\tau})$ is decreasing in τ_1 and τ_3 and increasing in τ_2, and given our ordering $\tau_1^s \geqslant \tau_2^s \geqslant \tau_3^s$, the vector of *status quo* tariffs that maximize $w_2(\boldsymbol{\tau}^s)$ necessarily implies $\tau_1^s = \tau_2^s$. Hence, using equation (15), the maximization problem can be written as

$$\max_{\boldsymbol{\tau}^s} w_2(\boldsymbol{\tau}^s) = w_2(\mathbf{0}) + \theta\tau_2^s - \frac{\theta}{3}\sum_{l=i,j,k}\tau_l^s - \sum_{l=i,j,k}\frac{(\tau_l^s)^2}{2} \text{ s.t. } \tau_1^s = \tau_2^s,$$

leads to the vector of *status quo* tariffs

$$\tau_1^s = \tau_2^s = \frac{\theta}{6},$$

$$\tau_3^s = -\frac{\theta}{3}.$$

The value of $w_2(\boldsymbol{\tau}^s)$ evaluated at these tariffs is,

$$w_2(\boldsymbol{\tau}^s) = w_2(\mathbf{0}) + \frac{\theta^2}{12}. \tag{18}$$

Given $\tau_1^s \geqslant \tau_2^s \geqslant \tau_3^s$, this is the highest payoff industry 2 can obtain under the *status quo*.

By equation (16), when $\boldsymbol{\tau}^s = \left(\frac{\theta}{6}, \frac{\theta}{6}, -\frac{\theta}{3}\right)$, the President chooses

$$\tau_1^P = \tau_3^P = -\frac{1}{3}\left(\theta - \sqrt{\frac{3\theta^2}{4}}\right),$$

$$\tau_2^P = \frac{2}{3}\left(\theta - \sqrt{\frac{3\theta^2}{4}}\right).$$

Plugging these back into equation (6), we have

$$
\begin{aligned}
w_3 &= w_3(\mathbf{0}) - \frac{\theta}{3}\left(\theta - \sqrt{\frac{3\theta^2}{4}}\right) - \frac{1}{2}\left(\left(\theta - \frac{2}{3}\sqrt{\frac{3\theta^2}{4}}\right)^2 + \frac{2}{9}\left(\frac{3\theta^2}{4}\right) - \frac{\theta^2}{3}\right) \\
&= w_3(\mathbf{0}) - \frac{\theta^2}{3} + \frac{\theta}{3}\sqrt{\frac{3\theta^2}{4}} - \frac{1}{2}\left(\theta^2 - \frac{4\theta}{3}\sqrt{\frac{3\theta^2}{4}} + \frac{2}{9}\left(\frac{3\theta^2}{4}\right)\right) \\
&= w_3(\mathbf{0}) - \theta^2\left(\frac{11}{12} - \sqrt{\frac{3}{4}}\right).
\end{aligned}
$$

Since $\tau_1^P = \tau_3^P$, we have $w_1 = w_3$ under FTA. Notice that this is the lowest payoff industries 1 and 3 can get. If we compare this payoff with the one under the bargaining subgame given in equation (10), we can see that it is larger since the second term in the last line, $\theta^2\left(\frac{11}{12} - \sqrt{\frac{3}{4}}\right)$, is less than $\frac{\theta^2}{9}$. Moreover, we know that industry 2's payoff under FTA is bounded below by what it obtains under free trade, thus industry 2 does always better under FTA relative to the bargaining subgame. As a result, all three industries obtain strictly higher payoffs under FTA than what they would obtain in the bargaining subgame, and therefore FTA is granted in the first stage to the President.

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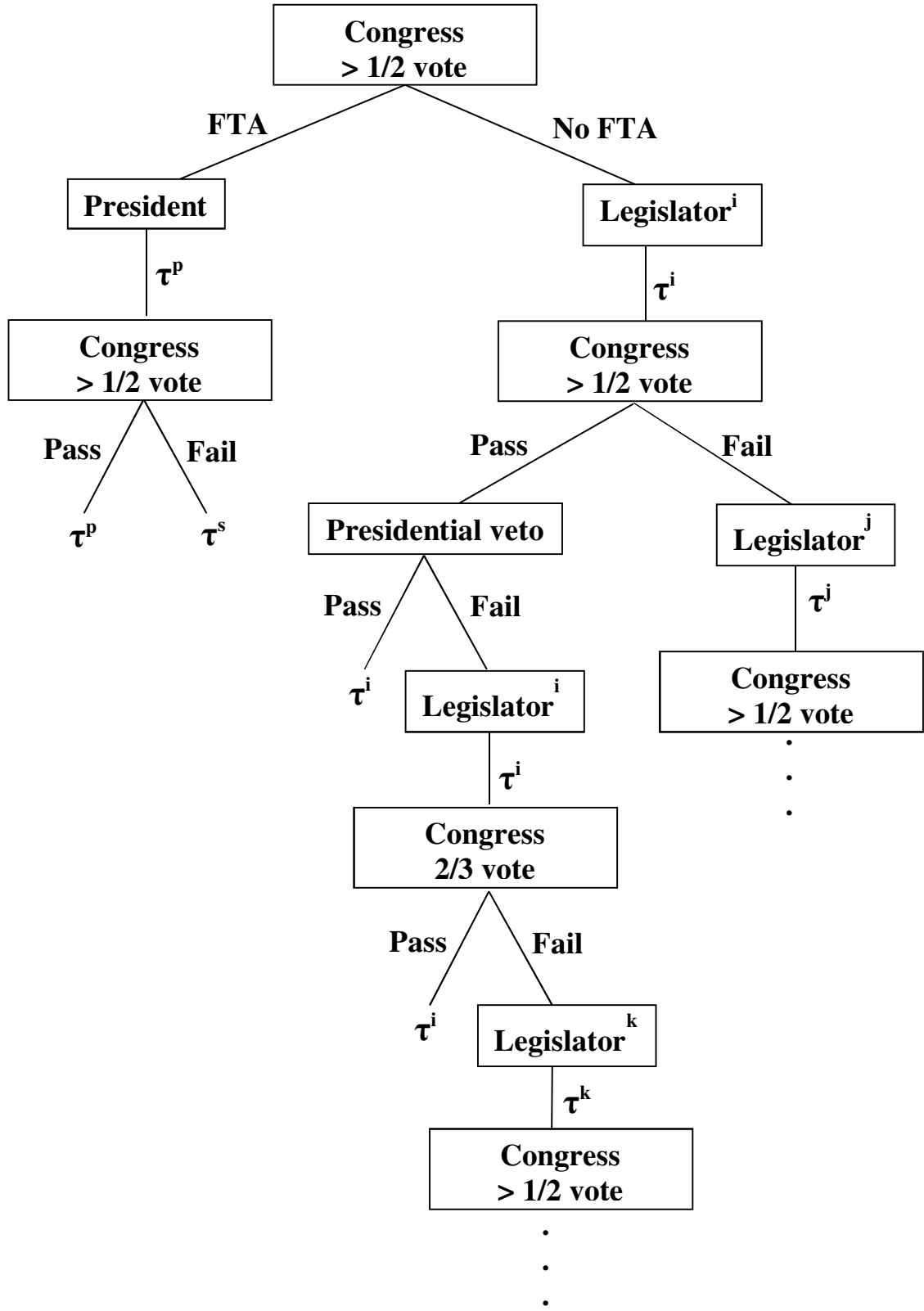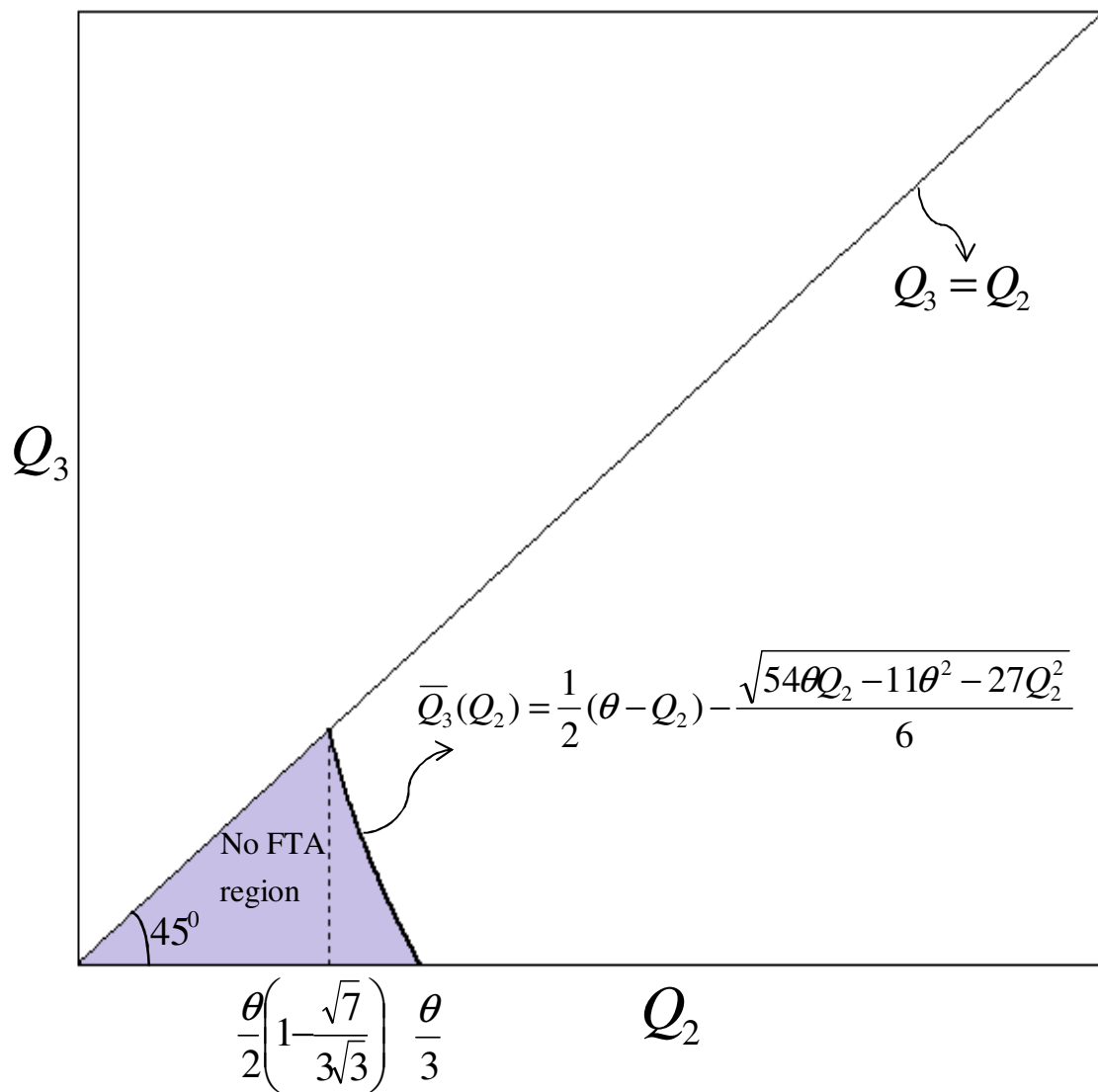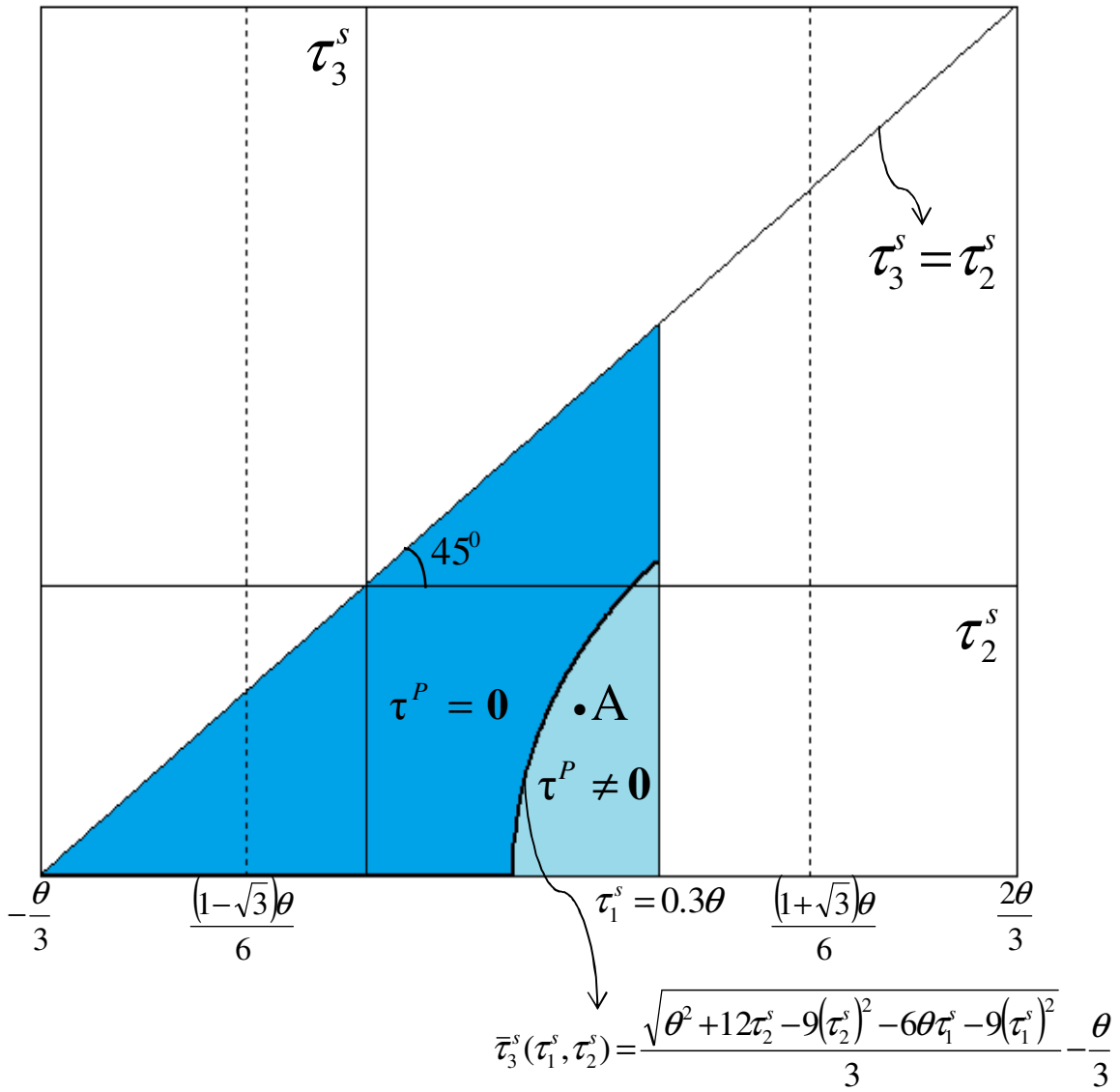
Figure 1. Timing of the Trade Policy Formation Game

Figure 2. Asymmetric Industry Outputs

Figure 3. Asymmetric *Status quo* Tariffs