Heterogeneous Districts, Interests, and Trade Policy*

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Abstract: Congressional districts, heterogeneous in their trade policy preferences, are key players determining trade protectionism. Yet, they are missing from even the best-established political economy models of trade protection. We characterize the (unobserved) district-level demand for protection, and model national tariffs as an aggregation of district-level preferences. The model centrally features exporter interests as a countervailing force against domestic protectionism. We estimate welfare weights on specific-factor owners implied by tariff and non-tariff protection from 2002, a critical juncture coinciding with China's WTO accession. The findings offer a new reason for the current backlash against free trade–the diminished role of manufacturing exporters.

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1 Introduction

Political economy models of trade posit that a political entity, a "government," decides how much trade protection is optimal for every sector of the economy. This may diverge from free trade because what is politically optimal for the tariff setter may not be optimal for citizens collectively. A classic model explaining this divergence is Grossman and Helpman (1994) in which special interests pay the government for protection from imports according to the willingness of the government to receive. That, in turn, is determined by the weight the government places on (a dollar of) its citizens' welfare relative to (a dollar of) campaign contributions that the government pockets. Thus, protection is endogenous: the payoffs from protection to owners of specific factors of production (workers and capitalists) who benefit from trade restrictions incentivize them to try to alter the government's calculus by making quid pro quo contributions. Helpman (1997) unifies analytically several models of endogenous protection in which the government's calculus is altered by interest groups (Magee, Brock and Young, 1989); by political support from producers and consumers (Hillman, 1982); by competing lobbies (Bhagwati and Feenstra, 1982, Findlay and Wellisz, 1982); or by balancing domestic and foreign policy motivations (Ossa, 2014, Hillman and Ursprung, 1988).

This paper aims to make three primary contributions to the political economy of trade policy literature. The first is to answer the question: Who or what is "government?" The model in this paper brings policy preferences of economically heterogeneous districts to the fore. In most political economy models of trade policy, a centralized decision-maker sets tariffs.[1] But, that sidelines the institutionally most important actors in the tariff game, legislators, who must coalesce to form trade policy. This paper attempts to restore the place of the legislature in a model of endogenous protection.

Heterogeneous districts provide the micro-foundations for the paper's second contribution: the countervailing influence of *exporters* in the determination of the national tariff. The large country version of our model highlights the role of terms of trade externalities and the influence of exporters, who value access to foreign markets, in the political calculus determining domestic protection.[2] This is among the first models of exporters influencing *domestic* U.S. tariffs in the way described in Irwin and Kroszner (1999), Irwin (2017) and Bailey, Goldstein and Weingast (1997), thereby explaining why post-WWII tariffs have been low in

[1] Grossman and Helpman (1996) model the determinants of trade policy platforms chosen by representatives competing at the polls. The model sheds light on the importance of three factors: ideology, uninformed voters, and special interest. The legislature and executive, however, remain passive. Even in models featuring electoral competition (Magee, Brock and Young, 1989, Chapter 6) or direct democracy (Mayer, 1984, Dutt and Mitra, 2002), incentives faced by members of the legislature are abstracted (see Rodrik, 1995).

[2] Ossa (2011) builds a related argument where GATT/WTO allows governments to internalize a production relocation externality.

the U.S.[3] China's 2001 WTO accession is often taken to be de facto evidence of the U.S. as a welfare-maximizing free-trading nation. Our answer to why market access was granted to a large country is motivated by Johnson's (1976) conjecture that political representation of strong exporter interests acted as a counterbalance to the influence of specific factor owners in industries negatively affected by import competition. The model provides an explanation for the reversal of five decades of low tariffs by the 2017 Trump tariffs, namely, the decline of manufacturing exports and consequently of their political influence in Congress.

The third contribution of the paper is to move forward a vast empirical literature on the political economy of trade policy.[4] Taking the predictions from the model to trade and output data at the Congressional District level, we probe the influence of import-competing and exporting interests in determining U.S. tariffs in the early 2000s, the crucial historical juncture of China's entry into the WTO. China's unfettered MFN access to the U.S. market was equivalent to lowering tariffs further to the point where manufacturing imports surged, domestic manufacturing was rendered uncompetitive, and domestic exporters faced competition in other markets. Estimates of our structural parameters, the *welfare weights* accorded to protectionist import-competing interests, and trade-liberalizing exporting interests, quantify the relative influence of these opposing interests in the making of U.S. trade policy.[5] Our empirical strategy relies on Bartik-like instrumental variables to identify welfare weights received by specific factors (versus labor). These weights provide a striking answer to why U.S. manufacturing tariffs have been low, and most importantly, remained low even at the onset of the *China shock*: import-competing interests in Congressional districts that had been politically influential in trade policymaking in the past were rolled over in the legislation of trade policy during this period; the legislative bargaining favored exporters and not import-competing producers, who received low welfare weights.

Substantively, the results suggest that the weights placed by the legislative process on specific factor owners in import-competing industries were distributed unequally across Congressional Districts and industries. Further, the estimates suggest that in the early 2000s Republican-controlled districts took the lion's share of the aggregate weights placed on spe-

[3]The Grossman-Helpman model predicts that in goods where protectionist special interests are organized tariffs should move according to the good's output-to-import ratio scaled by its absolute import demand elasticity. Low levels of tariffs, according to this model, would imply a government not easily moved by lobbying contributions. Our new explanation is that the legislative process enabled exporter interests to be represented in the coalition that enacted trade policy and curbed protectionist interests.

[4]In economics, the empirical literature has sought to explain U.S. protectionism (Deardorff and Stern, 1983, Marvel and Ray, 1983) and its political economy determinants (Baldwin, 1985, Ray, 1981, Trefler, 1993). These empirical examinations make the case that, ultimately, the government dispenses trade protection in response to demands from economic actors affected by trade.

[5]We are recently aware of a paper by Adao, Costinot, Donaldson and Sturm (2023) that uses observed tariffs to interpret welfare weights for U.S. states, which we discuss on page 22.

cific factor owners, outweighing districts controlled by Democratic representatives by a 2-to-1 ratio. Exporting interests are shown to play a significant role in keeping tariffs low despite the shock created by a deluge of imports from a large country: their welfare is weighted as much as the welfare of factor owners in all import-competing industries. Moreover, when accounting for reciprocity with the rest of the world in determining U.S. tariffs, the results suggest that specific factor owners in safe Republican districts in states carried by the Republican Presidential ticket and safe Republican districts in battleground states received positive welfare weights. The legislative majority enacting the tariffs includes representatives from districts with a higher concentration of specific factor owners in exporting industries. These are novel results, not conveyed by existing models of the political economy of trade.

Our attempt to bring theory closer to the policymaking process connects the paper with a large political science literature focusing on the role of Congress. Our supply-side explanation of trade politics has strong ties to the legislative bargaining literature (Baron and Ferejohn, 1989, Eraslan and Evdokimov, 2019, Celik, Karabay and McLaren, 2013, Gawande, Pinto and Pinto, 2024). We have already mentioned the paper's deep connection with an entire empirical literature in two disciplines: in political science, beginning with the seminal paper by Schattschneider (1935), and in economics, encompassing two generations of models, a generation that came before and motivated Grossman and Helpman (1994), including empirical work of Baldwin (1985), Trefler (1993), and empirical investigations of the Grossman-Helpman model such as Goldberg and Maggi (1999), Gawande and Bandyopadhyay (2000). The global contract that held together the trading world in the post WWII period, now under threat, makes the paper especially relevant. It highlights the central role of the agenda setter in Congress in the future of U.S. trade policy and trade policymaking.

The paper proceeds as follows. Section 2 develops the framework assuming world prices are exogenous (small country case). Section 2.1 builds a model of district tariff preferences, and Section 2.2 a model of national tariffs. Section 3 extends the model to a large country setting, featuring terms of trade effects and reciprocity in the tariff determination process. The model's focus is on *export* interests in shaping *domestic* tariffs. Section 4 describes the empirical strategy for estimating the structural parameters of the model: the welfare weights. We use tariff and non-tariff data from 2002, a period that presaged the China shock in our estimation. Results are presented in Section 5. Section 6 concludes.

2 Tariffs in a Small Open Economy

The small country model in this section, in which tariffs are chosen taking world prices as given, is a special case of the large country model with terms of trade effects in Section 3. The small country case is the setting of seminal political economy models of tariffs, cited in the introduction, that started the theoretical literature. We start by deriving tariffs that are preferred by representatives from particular districts, that is, the tariffs applied to the nation selected by a district if it had the authority to do so. These tariffs are unobserved, but reflect the level of protection that each district desires. Next, we model national tariffs chosen by a national "government" to maximize national welfare which is a weighted sum of the welfare of each district. We provide a legislative bargaining interpretation of how national tariffs aggregate district preferences.

2.1 District Tariff Preferences

A small open economy is populated by two types of factors owners. The first type owns factor $K_j, j = 1, \ldots, J$ that is specific to the production of good j, which we refer to as *specific capital* or simply *capital*. The second type owns a homogeneous factor *labor*, denoted L. Each individual owns one unit of either L or K_j. The production of the J goods is dispersed across R districts. The districts are equally represented politically in the nation's legislature. The composition of output, however, depends on the (exogenous) distribution of factor endowments across districts and is therefore heterogeneous across districts. A good j may be produced only by a subset of districts. Factor owners are immobile across districts, that is, a district is a local labor market (Topel, 1986, Moretti, 2011, Autor, Dorn, Hanson and Song, 2014, Autor, Dorn and Hanson, 2013).[6] The non-specific factor (labor) is mobile across goods while the specific factor (capital), by definition, is immobile outside the good in whose production it is employed. The population of district r is $n_r = n_r^L + n_r^K$, comprising n_r^K owners of capital and n_r^L owners of labor, where $n_r^L = \sum_{j=0}^{J} n_{jr}^L$ and $n_r^K = \sum_{j=1}^{J} n_{jr}^K$. Aggregate population $n = \sum_{r=1}^{R} n_r$.

Goods $j = 1, \ldots, J$ are tradable. The world consists of small countries that take world prices as exogenously determined. The domestic price of good j may be changed by raising or lowering tariffs on good j. To keep the model simple—and consistent with data—negative tariffs are disallowed.[7] There are no transport costs and goods are delivered to consumers at these domestic prices.

Production. Each district $r = 1, \ldots, R$ produces a non-tradable numeraire good 0 with a linear technology that uses only labor, $q_{0r} = w_0\, n_{0r}^L$, where n_{0r}^L owners of labor in district r are employed in producing the numeraire good. Units are chosen such that the price of the numeraire good (nationally) is $p_0 = 1$. Labor's wage is therefore fixed at w_0. Prices p_j on

[6] Local labor markets are fundamental to the impact of trade and innovation on manufacturing employment and wages found in (Autor, Dorn and Hanson, 2013, Autor, Dorn, Hanson and Song, 2014).

[7] Import subsidies are, in any case, negligible in U.S. manufacturing. With supply chains, downstream producers may have an interest in subsidizing the purchase of imported upstream inputs. While not in this paper, intermediate goods use may be accounted as in Gawande, Krishna and Olarreaga (2012).

the other j goods are expressed in units of the numeraire good.

Good j is produced using CRS technology. In district r, the technology combines n_{jr}^L units of labor with the fixed endowment of n_{jr}^K units of specific capital. Capital earns the indirect profit function $\pi_{jr}(p_j)$, and labor earns wage w_0 regardless of its sector (good) of employment. If good j is not produced in district r, $n_{jr}^K = n_{jr}^L = 0$ and $\pi_{jr} = 0$. The output of good j in district r is $q_{jr}(p_j) = \pi'_{jr}(p_j) > 0$ and its aggregate output is $Q_j(p_j) = \sum_r q_{jr}(p_j)$.

Preferences. Preferences are homogeneous across individuals regardless of their factor ownership and represented by the quasi-linear utility function $u = x_0 + \sum_j u_j(x_j)$. This implies (separable) demand functions $x_j = d_j(p_j)$ for each good. The indirect utility of an individual who spends z on consumption is $z + \sum_j \phi_j(p_j)$, where $\phi_j(p_j) = v_j(p_j) - p_j\, d_j(p_j)$ is the consumer surplus from good j.[8] Per capita consumer surplus from the consumption of goods $j = 1, \ldots, J$ is $\phi = \sum_j \phi_j(p_j)$. The aggregate demand for good j is $D_j(p_j) = nd_j(p_j)$, where n is the country's population.

Imports, tariffs, and tariff revenue. Aggregate (national) imports of good j, denoted M_j, is given by $M_j(p_j) = D_j(p_j) - Q_j(p_j)$. Trade policy consists of imposing a specific per unit tariff t_j on import of goods j, $j = 1, \ldots, J$, which is assumed to be non-negative. Total revenue generated by the tariffs, denoted T, is given by $T = \sum_j (p_j - \overline{p}_j) M_j(p_j) = \sum (p_j - \overline{p}_j)[D_j(p_j) - Q_j(p_j)]$, where $\overline{p}_j$ is the world price of good j and $t_j = p_j - \overline{p}_j \geq 0$. Tariffs on imports are collected at the country's border and tariff revenue is distributed nationally on an equal per capita basis, so each individual receives $\frac{T}{n}$.

Total utility. In district r, the total utility of the n_{jr}^L owners of labor employed in producing good j in district r is $W_{jr}^L = n_{jr}^L \left(w_0 + \frac{T}{n} + \phi\right)$, and the total utility of the n_{jr}^K capital owners is $W_{jr}^K = n_{jr}^K \left(\frac{\pi_{jr}}{n_{jr}^K} + \frac{T}{n} + \phi\right)$. Common to both is the per capita tariff revenue $\frac{T}{n}$, and per capita consumer surplus ϕ. The expressions differ in the income the tariff delivers to the two factors of production. While labor's wage remains fixed, a tariff on good j raises its domestic price p_j, in turn, increasing the return π_{jr} to specific capital employed in producing good j. The n_{jr}^K owners of capital in district r therefore have a potentially strong interest in demanding protection from imports of good j.

District Preferred Tariffs

While tariffs are decided at the national level, we seek to understand how a policymaking body comprising representatives from each district—like the U.S. House of Representatives—arrives at national tariffs. We approach this problem by answering two questions. First, if a district were granted the authority to choose tariffs for the entire nation, what would its

[8] The index r is dropped as prices are nationally determined and demand functions are the same across districts. Online Appendix B considers heterogeneous tastes for the two types of agents.

preferred tariffs be? Second, how are these (heterogeneous) tariff preferences across districts aggregated into national tariffs? This section addresses the first question.

A representative of district r chooses (national) tariffs to maximize the district's welfare, defined as a weighted sum of the welfare of each factor owner in the district. These welfare weights on the two groups of factor owners may differ across districts and industries of employment. In district r, the welfare of an owner of capital (a unit of capital) employed in producing good j gets weight Λ^K_{jr} and the welfare of a unit of labor employed in producing good j gets weight Λ^L_{jr}. We will assume that at the district level these weights are assigned by the district's government or "representative". A free-trading representative will assign smaller weights to owners of capital relative to labor in his district than will a protectionist representative. District r's aggregate welfare is

$$\Omega_r = \sum_j \Lambda^L_{jr} W^L_{jr} + \sum_j \Lambda^K_{jr} W^K_{jr},$$

where the total welfare of type-m factor owners employed in producing good j in district r, W^m_{jr}, depends on the vector of domestic prices $\mathbf{p} = (p_1, ..., p_J)$. With world price $\overline{p}_j$ exogenous, there is a one-to-one relationship between the tariff t_j and price p_j. Welfare of factor owners W^m_{jr} are therefore functions of tariffs. Decomposing aggregate welfare as

$$\Omega_r = \sum_j \Lambda^L_{jr} n^L_{jr} \left(w_0 + \frac{T}{n} + \phi \right) + \sum_j \Lambda^K_{jr} n^K_{jr} \left(\frac{\pi_{jr}}{n^K_{jr}} + \frac{T}{n} + \phi \right), \quad (1)$$

and noting that T, ϕ and π_{jr} are functions of t_j, the good j tariff preferred by district r is obtained by maximizing (1) with respect to t_j.[9] Denote the aggregate welfare weights on factor owners in district r as $\lambda^K_r = \sum_{j=1}^J \Lambda^K_{jr} n^K_{jr}$ and $\lambda^L_r = \sum_{j=0}^J \Lambda^L_{jr} n^L_{jr}$, respectively, and their sum as $\lambda_r = \lambda^L_r + \lambda^K_r$. Then, district r's preferred tariff on good j, $t_{jr} > 0$, is[10]

$$t_{jr} = -\frac{n}{M'_j} \left[\frac{\Lambda^K_{jr} n^K_{jr}}{\lambda_r} \left(\frac{q_{jr}}{n^K_{jr}} \right) - \frac{D_j}{n} + \frac{M_j}{n} \right], \quad j = 1, \ldots, J, \quad (2)$$

for $r = 1, \ldots, R$, where $\frac{D_j}{n}$ is the country's per capita demand for good j, $\frac{M_j}{n}$ is the country's per capita imports of good j, and $M'_j \equiv \frac{\partial M_j}{\partial t_j} < 0$. (2) reflects the interests of both producers and consumers in district r. Assuming identical preferences, the welfare of a representative

[9] If good j is not produced in district r, $\pi_{jr} = 0$, $n^m_{jr} = 0$, and $\Lambda^m_{jr} = 0$ for $m \in \{L, K\}$.

[10] The solution satisfies the Kuhn-Tucker conditions $\frac{\partial \Omega_r}{\partial t_j} \leq 0$, $t_j \geq 0$, $\frac{\partial \Omega_r}{\partial t_j} \times t_j = 0$. If district r does not produce good j, the solution is $t_j = 0$ (noting $Q_j + M_j = D_j$) since negative t_j is ruled out. Also, since $\frac{\partial^2 \Omega_r}{\partial t_j \partial t_{j'}} = 0$, the second-order conditions simply require that at the solution $\frac{\partial^2 \Omega_r}{\partial t_j^2} < 0$.

consumer in district r aligns with that of a representative consumer at the national level.

Equation (2) characterizes the tariff on good j preferred by the representative of district r, which is one among a federation of districts. In the determination of the tariff on good j, the local interests of district r's capital owners are represented via $\frac{\Lambda^K_{jr} n^K_{jr}}{\lambda_r}\left(\frac{q_{jr}}{n^K_{jr}}\right)$, where $\frac{q_{jr}}{n^K_{jr}}$ is the per capita output of good j of owners of capital employed in producing good j, a measure of their per capita rents. $\frac{\Lambda^K_{jr} n^K_{jr}}{\lambda_r}$ is the share of the district's total welfare weight assigned to those capital owners. The greater the weight assigned to the rents, the higher the tariff τ_{jr}. The tariff lowers consumer surplus of the representative national consumer via $\frac{-D_j}{n}$, and revenue from the tariff is distributed as a lump sum back to all consumers via $\frac{M_j}{n}$. [11] In a majoritarian electoral system such as in the U.S., a member of the House of Representatives representing district r would choose the national tariff $t_j = t_{jr}$ in (2).[12] The following proposition describes the ad-valorem tariff τ_{jr} in equilibrium:

Proposition 1 *District r's demand for tariff protection on good j τ_{jr} is given (at an interior solution) by*

$$\frac{\tau_{jr}}{1+\tau_{jr}} = \frac{\Lambda^K_{jr}\, n}{\lambda_r}\left(\frac{q_{jr}/M_j}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right) = \frac{\Lambda^K_{jr}\, n_r}{\lambda_r}\left(\frac{q_{jr}/M_{jr}}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right), \tag{3}$$

where $\tau_{jr} = \frac{t_{jr}}{\bar{p}_j}$, $\frac{\tau_{jr}}{1+\tau_{jr}} = \frac{t_{jr}}{p_j}$ is the ad-valorem tariff proposed by district r as the national tariff on imports of good j, and $M_{jr} = M_j \times \left(\frac{n_r}{n}\right)$.

Proof Using good j's import demand elasticity $\epsilon_j = M'_j\left(\frac{p_j}{M_j}\right)$, the market clearing condition $D_j = Q_j + M_j$, and defining *ad-valorem* tariffs as $\tau_{jr} = \frac{t_{jr}}{\bar{p}_j}$ or $\frac{\tau_{jr}}{(1+\tau_{jr})} = \frac{t_{jr}}{p_j}$, (2) may be written as:

$$\frac{\tau_{jr}}{1+\tau_{jr}} = \frac{n}{-\epsilon_j M_j}\left(\frac{\Lambda^K_{jr} n^K_{jr}}{\lambda_r}\frac{q_{jr}}{n^K_{jr}} - \frac{Q_j}{n}\right) = \frac{\Lambda^K_{jr}\, n}{\lambda_r}\left(\frac{q_{jr}/M_j}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right). \tag{4}$$

Assuming M_j is distributed according to districts' populations, district r's imports of j are $M_{jr} = M_j \times \left(\frac{n_r}{n}\right)$. Then, (3) predicts tariffs with district output-to-import ratios. □

District r's preferred national tariff on good j is determined by the output-to-import ratio times its inverse import demand elasticity, $\frac{q_{jr}/M_{jr}}{-\epsilon_j}$. If $\Lambda^K_{jr} = \Lambda^L_{jr} = \Lambda_r$ in (3), that is, if

[11] The solution with heterogeneous preferences for owners of L and K is in Online Appendix B.

[12] The district is institutionally constrained, being part of the federation of districts, to distribute tariff revenue equally across all districts in the federation. The market for each good clears at the national level. District r considers the impact of higher tariffs on district r's consumers; because preferences across groups are assumed identical, some effects "wash out" on the consumer side. The good j tariff enacted by Congress for the nation will then reflect the weights Λ^K_{jr} and Λ^L_r "assigned" to each of the R districts by the legislative bargaining process (given the districts' heterogeneous output-to-import ratios and import elasticities).

all factor owners in district r have equal weight, the coefficient on $\frac{q_{jr}/M_{jr}}{-\epsilon_j}$ equals 1. Then,

$$\frac{\tau_{jr}}{1+\tau_{jr}} > 0 \text{ if } \left(\frac{q_{jr}}{M_{jr}}\right) > \left(\frac{Q_j}{M_j}\right), \text{ and } \quad \frac{\tau_{jr}}{1+\tau_{jr}} = 0 \text{ if } \left(\frac{q_{jr}}{M_{jr}}\right) \leq \left(\frac{Q_j}{M_j}\right), \tag{5}$$

where tariffs are constrained to be non-negative. From (5) it is apparent that even when special interests, that is, specific capital owners, have the same welfare weight as labor, tariffs can be positive. If, for example, production of good j is concentrated in district r, then $q_{jr} = Q_j$ and $\tau_{jr} > 0$.

In the Grossman and Helpman (GH 1994) model, the welfare of specific capital employed in good j gets weight $\mathbb{1}_j + a$, where $\mathbb{1}_j$ is a binary indicator equal to one if the specific capital owners are politically organized to lobby and zero otherwise. The parameter a represents the weight on consumers so that the relative weight $\frac{1+a}{a}$ on the welfare of organized capital owners reflects the extent to which their rents are protected by tariffs. We apply the GH model to district r as follows. Let district r's representative assign weight a_r to the welfare of labor and $\mathbb{1}_{jr} + a_r$ to the welfare of capital owners, where $\mathbb{1}_{jr}$ equals one if capital owners employed in producing good j in district r are politically organized to lobby district r's representative, and zero otherwise. That is, $\Lambda^L_{jr} = a_r$ and $\Lambda^K_{jr} = \mathbb{1}_{jr} + a_r$. Then, using (3),

$$\begin{aligned}\frac{\tau_{jr}}{1+\tau_{jr}} &= \frac{(\mathbb{1}_{jr} + a_r)\, n_r}{\sum_{j=1}^{J}(\mathbb{1}_{jr} + a_r) n^K_{jr} + \sum_{j=0}^{J} a_r\, n^L_{jr}} \left(\frac{q_{jr}/M_{jr}}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right) \\ &= \frac{\mathbb{1}_{jr} + a_r}{\alpha^K_r + a_r} \left(\frac{q_{jr}/M_{jr}}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right),\end{aligned}$$

where $\alpha^K_r = \frac{\sum_{j=1}^{J} \mathbb{1}_{jr} n^K_{jr}}{n_r}$ is the fraction of district r's population that is politically organized, (the district-equivalent of α_L in GH). In the GH model, if everyone is politically organized, lobbies contribute but nullify each other's influence, and free trade in all goods results. Our model produces a different result: with everyone organized ($\alpha^K_r = 1$), we get (5).[13]

2.2 National Tariffs

Trade policy is determined by the aggregation of district tariff preferences; the welfare weights reflected in the national tariffs capture the political influence of districts and economic actors. We represent this political process as maximizing the weighted sum of the individual utilities of the population of owners of specific capital and labor,

$$\Omega = \sum_r \sum_j \Gamma^K_{jr} W^K_{jr} + \sum_r \sum_j \Gamma^L_{jr} W^L_{jr}. \tag{6}$$

[13]Expression (5) results, as well, if no one is politically organized ($\mathbb{1}_{jr} = 0$ for all j, r, and $\alpha^K_r = 0$).

In (6), the weight Γ^K_{jr} is assigned to the welfare of each capital owner employed in producing j in district r *not* by a government but, because the national tariffs aggregate the heterogeneous tariff preferences of districts, by the political process the determines the national tariff τ_j in Congress. As in the case of districts, the domestic price of good j is $p_j = \overline{p}_j + t_j$, where, under the small-country assumption, $\overline{p}_j$ is the exogenously given world price of good j . The welfare W^m_{jr} of both types of factor owners are therefore functions of the (specific) tariff t_j. National welfare (6) can be expressed as the sum of its three components,

$$\Omega \;=\; \sum_r \sum_j \Gamma^L_{jr} n^L_{jr} \left(w_{0r} + \frac{T}{n} + \phi_j \right) + \sum_r \sum_j \Gamma^K_{jr} n^K_{jr} \left(\frac{\pi_{jr}}{n^K_{jr}} + \frac{T}{n} + \phi_j \right), \tag{7}$$

where $\frac{T}{n}$ is per capita tariff revenue and ϕ_j is per capita consumer surplus from the consumption of good j. (7) is a weighted sum of the district welfare functions, and national tariffs are obtained by maximizing (7) with respect to each t_j. The national per-unit (specific) tariff on imports of good j is

$$t_j \;=\; -\frac{n}{M'_j} \left[\sum_r \frac{\Gamma^K_{jr} n^K_{jr}}{\gamma} \left(\frac{q_{jr}}{n^K_{jr}} \right) - \frac{D_j}{n} + \frac{M_j}{n} \right], \quad j = 1, \ldots, J, \tag{8}$$

where $\frac{\sum_r \Gamma^K_{jr} n^K_{jr}}{\gamma}$ is the share of the total welfare weight received by the nation's owners of specific capital employed in good j. Aggregate welfare γ is given by $\gamma = \gamma^K + \gamma^L$, where the aggregate welfare weights on non-specific (labor) and specific (capital) factors are given, respectively, by $\gamma^L = \sum_{j=0}^J \sum_{r=1}^R \Gamma^L_{jr} n^L_{jr}$ and $\gamma^K = \sum_{j=1}^J \sum_{r=1}^R \Gamma^K_{jr} n^K_{jr}$. As in the district case, $\frac{D_j}{n}$ is per capita demand for good j, $\frac{M_j}{n}$ is per capita imports of good j, and $M'_j \equiv \frac{\partial M_j}{\partial t_j} < 0$. We have the following result about the national ad valorem tariff τ_j.

Proposition 2 *The ad-valorem tariff protection to good j is given by:*[14]

$$\frac{\tau_j}{1+\tau_j} = \frac{n}{-\epsilon_j M_j} \left(\sum_{r=1}^R \frac{\Gamma^K_{jr} n^K_{jr}}{\gamma} \frac{q_{jr}}{n^K_{jr}} - \frac{Q_j}{n} \right) = \sum_{r=1}^R \frac{\Gamma^K_{jr} n^K_{jr}}{\gamma} \frac{n}{n^K_{jr}} \left(\frac{q_{jr}/M_j}{-\epsilon_j} \right) - \left(\frac{Q_j/M_j}{-\epsilon_j} \right), \tag{9}$$

where $\tau_j = \frac{t_j}{\overline{p}_j}$ (so $\frac{\tau_j}{1+\tau_j} = \frac{t_j}{p_j}$), and $\epsilon_j = M'_j \left(\frac{p_j}{M_j} \right)$ is good j's import demand elasticity.

The proof follows the same steps as in Proposition 1. Drawing on Gawande, Pinto and Pinto (2024), we can interpret Γ^K_{jr} as welfare weights "assigned" by the legislative bargaining process

[14]The welfare weight shares $\frac{\Gamma^K_{jr} n^K_{jr}}{\gamma}$ open the black box of unitary government in the Grossman and Helpman (1994) model and provide institutional micro-foundations for their parameter a. See Appendix B.4 for details.

that determines the national tariff.[15] Since individual districts do not have the power to impose their tariff preferences, they must form a majority coalition in the legislature to decide the national tariffs. Gawande, Pinto and Pinto (2024) show in a legislative bargaining model that the national tariff on good j in (9) linearly aggregates the district tariff preferences, given by (3), of the majority coalition of districts. Specifically, τ_j is the convex combination

$$\frac{\tau_j}{1+\tau_j} = \sum_{r \in C_\iota} s_r \frac{\tau_{jr}}{1+\tau_{jr}},$$

where C_ι is the winning coalition formed around district ι whose representative sets the agenda by proposing an initial tariff $\tau_{j\iota}$. The weights satisfy $0 \leq s_r \leq 1$ and $\sum_{r \in C_\iota} s_r = 1$. Tariff preferences of districts not in the winning coalition get zero weight.[16]

3 Tariffs in a Large Open Economy: Role of Exporters

Models of trade policy have yet to address the historical reality that *exporters* have been highly influential in creating trade liberalizing institutions like the RTAA (Irwin, 2017, Irwin and Kroszner, 1999, Bailey, Goldstein and Weingast, 1997). With heterogeneous districts, we are able to resolve the significant omission in political economy models, of the role of exporters in actively pursuing a free trade agenda.

In the large country case, world prices are no longer exogenous. Partner country tariffs can worsen the terms of trade of exporters by lowering their world price. Grossman and Helpman (1995) centrally features the terms of trade motive for tariffs, but in that model exporters lobby only for export subsidies to benefit themselves; exporters do not react to protectionist demands of import-competing producers, and therefore play no role in tariff-setting. Johnson (1976) conjectured the countervailing role of exporters, as Corden (1984) describes in his survey of Johnson's work (our additions in brackets):

... the approach of (Johnson (1965), An Economic Theory of Protectionism, Tariff Bargaining, and the Formation of Customs Unions), where industrial production is a collective consumption good, and a country's aim in bargaining is to swap extra exports of industrial products for extra imports.[Johnson] came back to the logic of reciprocity in "Trade Negotiations and the New International Monetary System" (1976), where he favored an explanation of [tariff] bargaining policies in terms of a balancing of domestic effects within each country—

[15] Gawande, Pinto and Pinto (2024) develops a theoretical framework, built on the work by Baron and Ferejohn (1989) and Celik, Karabay and McLaren (2013), that rationalizes observed national tariffs as the outcome of a legislative bargaining process.

[16] The welfare weights Γ^K_{jr} in (9) assigned by the nation's legislature may thus bear little, if any, relationship with the welfare weights Λ^K_{jr} in (3) assigned by the representative in his determination of district r's tariff preference. If district r is not in the winning coalition, for example, the legislative bargaining process may ignore the district's preference and assign $\Gamma^K_{jr} = 0$.

damaging effects of extra imports on particular import-competing sectors being set against expected gains for exporters and consumers. "Further, what is influential politically is ... the number of people and managers sufficiently affected either adversely or favorably by that change to motivate them to try to influence government policy" (p. 21)... Clearly, had Harry lived he would have developed this line of thought further...

Johnson's (1953) model of escalating tariffs motivates the Bagwell and Staiger (1999) view of trade liberalizing institutions like the GATT as a commitment by countries to avoid a beggar-thy-neighbor strategy in which countries impose terms of trade externalities on each other. In the model we develop, political representation of exporter interests achieves the goal that trade liberalizing institutions seek, as in Johnson's conjecture.

Model. Consider a world with two countries, *US* and *RoW*, and three types of goods: a numeraire (good 0), import goods, and export goods. *US*, as in the previous section, imports J goods (the M-sector) indexed by j, $j \in \mathcal{M}$. To gain intuition, we assume US exports a single good (the X-sector) indexed by g.[17] The three sectors in US employ $n^L = n^{L^0} + n^{L^M} + n^{L^X}$ units of labor, where $n^{L^0} = \sum_r n_r^{L^0}$, $n^{L^M} = \sum_r \sum_{j \in \mathcal{M}} n_{jr}^{L^M}$, $n^{L^X} = \sum_r n_{gr}^{L^X}$, and $n^K = n^{K^M} + n^{K^X}$ units of specific capital, where $n^{K^M} = \sum_r \sum_{j \in \mathcal{M}} n_{jr}^{K^M}$ and $n^{K^X} = \sum_r n_{gr}^{K^X}$. Total employment is $n = n^L + n^K$.

On the demand side, consumer surplus from the M and X sectors are $\phi_j = u_j(d_j) - p_j d_j$ and $\phi_g = u_g(d_g) - p_g d_g$. In this two-country world *US* imports of good j, M_j, are equal to exports of good j by *RoW*, X_j^*. Similarly, *US* exports of good g, X_g, equal *RoW* imports of good g, M_g^*. Therefore, the market clearing conditions are $D_j - Q_j = Q_j^* - D_j^*$ (> 0), and $D_g - Q_g = Q_g^* - D_g^*$ (< 0), where asterisks refer to *RoW* quantities.

If *US* imposes an ad valorem tariff $\tau_j = \frac{p_j - \overline{p}_j}{\overline{p}_j}$ on imports of good j, the domestic price of good j in *US* is $p_j = (1 + \tau_j)\overline{p}_j$. Tariffs generate tariff revenue $T = \sum_i \tau_i^M \overline{p}_i^M M_i$, where $T \geq 0$ since import subsidies are not allowed. As before, tariff revenue is distributed back to all domestic residents as a lump sum. The world price of good j, $\overline{p}_j$, is implicitly determined by the market clearing condition, $M_j[(1 + \tau_j)\overline{p}_j] - X_j^*(\overline{p}_j) = 0$, making $\overline{p}_j$ a function of τ_j. Export subsidies are disallowed, so the domestic price prevailing in *RoW* is simply $p_j^* = \overline{p}_j$. Reciprocally, if *RoW* imposes tariff τ_g^* on *US* exports of good g, its price in *RoW* is $p_g^* = (1 + \tau_g^*)\overline{p}_g$, where $\overline{p}_g$ is g's world price determined by market clearing, $M_g^*[(1 + \tau_g^*)\overline{p}_g] - X_g(\overline{p}_g) = 0$. The price of good g in the *US* is the world price, $p_g = \overline{p}_g$.[18]

Aggregate welfare in *US* is the sum of the welfare of owners of the mobile factor and owners of specific capital, or $\Omega = \Omega^L + \Omega^K$. Let $\Upsilon = \sum_{j \in \mathcal{M}} \phi_j^M(p_j) + \phi_g^X(p_g^X) + \frac{T}{n}$ denote

[17] Online Appendix B Section B.3 extends the results to many export goods.

[18] Comparative statics for $\frac{\partial \overline{p}_j}{\partial \tau_j}$, $\frac{\partial p_j}{\partial \tau_j}$, $\frac{\partial \overline{p}_g}{\partial \tau_g^*}$, and $\frac{\partial p_g}{\partial \tau_g^*}$ (used later) are in the Online Appendix B, Section B.2.

the sum of per capita consumer surplus and tariff revenue. Then, the welfare of labor and specific capital owners is given by

$$\begin{aligned}
\Omega^L &= \Omega^{L^0} + \Omega^{L^M} + \Omega^{L^X} \\
&= \sum_r \left(\Gamma_r^{L^0} n_{0r}^{L^0} w_{0r} + \sum_{j\in\mathcal{M}} \Gamma_{jr}^{L^M} n_{jr}^{L^M} w_{0r} + \Gamma_{gr}^{L^X} n_{gr}^{L^X} w_{0r} \right) + \gamma^L \Upsilon, \\
\Omega^K &= \Omega^{K^M} + \Omega^{K^X} \\
&= \sum_r \left[\sum_{j\in\mathcal{M}} \Gamma_{jr}^{K^M} n_{jr}^{K^M} \left(\frac{\pi_{jr}^M(p_j)}{n_{jr}^{K^M}} \right) + \Gamma_{gr}^{K^X} n_{gr}^{K^X} \left(\frac{\pi_{gr}^X(p_g^X)}{n_{gr}^{K^X}} \right) \right] + \gamma^K \Upsilon,
\end{aligned}$$

where γ^L and γ^K are welfare weights received by the national population of the two types of factor owners, specifically $\gamma^L = \sum_r \Gamma_r^{L^0} n_{0r}^L + \sum_r \sum_{j\in\mathcal{M}} \Gamma_{jr}^{L^M} n_{jr}^{L^M} + \sum_r \Gamma_{gr}^{L^X} n_{gr}^{L^X}$ and $\gamma^K = \sum_r \sum_{j\in\mathcal{M}} \Gamma_{jr}^{K^M} n_{jr}^{K^M} + \sum_r \Gamma_{gr}^{K^X} n_{gr}^{K^X}$. Their sum is the aggregate welfare weight $\gamma = \gamma^L + \gamma^K$. The distinct welfare weights on each factor owner allows the empirical exercise to quantify their separate influences on home tariffs.

Nash Bargaining. Tariffs are negotiated between *US* and *RoW* in a Nash bargaining game.[19] Denoting the *US* and *RoW* tariff vectors, respectively, by $\boldsymbol{\tau} = (\tau_1, ..., \tau_j, ..., \tau_J)$, and τ_g^*, the equilibrium tariffs $\boldsymbol{\tau}$ and τ_g^* maximize $\left(\Omega^{US} - \overline{\Omega}^{US}\right)^\sigma \times \left(\Omega^{RoW} - \overline{\Omega}^{RoW}\right)^{1-\sigma}$, where $\overline{\Omega}^{US}$ and $\overline{\Omega}^{RoW}$ are threat point welfare outcomes for *US* and *RoW*, respectively, should bargaining fail.[20] The first order conditions with respect to τ_j and τ_g^*, taking *RoW* tariffs and *US* tariffs as given, are

$$\tau_j : \omega^{US} \frac{d\Omega^{US}}{d\tau_j} + \omega^{RoW} \frac{d\Omega^{RoW}}{d\tau_j} = 0, \qquad \tau_g^* : \omega^{US} \frac{d\Omega^{US}}{d\tau_g^*} + \omega^{RoW} \frac{d\Omega^{RoW}}{d\tau_g^*} = 0,$$

for $j = 1, \ldots, J$, where $\omega^{US} = \frac{\sigma}{\left(\Omega^{US} - \overline{\Omega}^{US}\right)}$, $\omega^{RoW} = \frac{(1-\sigma)}{\left(\Omega^{RoW} - \overline{\Omega}^{RoW}\right)}$, and the total derivatives are $\frac{d\Omega^{US}}{d\tau_j} = \frac{\partial\Omega^{US}}{\partial p_j}\frac{\partial p_j}{\partial \tau_j} + \frac{\partial\Omega^{US}}{\partial \tau_j}$, $\frac{d\Omega^{US}}{d\tau_g^*} = \frac{\partial\Omega^{US}}{\partial \overline{p}_g}\frac{\partial \overline{p}_g}{\partial \tau_g^*}$, $\frac{d\Omega^{RoW}}{d\tau_g^*} = \frac{\partial\Omega^{RoW}}{\partial p_g}\frac{\partial p_g}{\partial \tau_g^*} + \frac{\partial\Omega^{RoW}}{\partial \tau_g^*}$, and $\frac{d\Omega^{RoW}}{d\tau_j} =$

[19] Bagwell et al. (2020) follow a similar approach. Related work combines cooperative and non-cooperative elements in the context of multilateral trade negotiations, including Chan (1988), Bagwell and Staiger (2005), Saggi and Yildiz (2010), Ossa (2011), and Ossa (2014), among others. The Nash bargaining approach results in a theoretical framework that we can take to data.

[20] $\overline{\Omega}^{US}$ and $\overline{\Omega}^{RoW}$ are determined exogenously. They could represent welfare levels at prevailing *status quo* tariffs or welfare levels attained at the optimal unilateral tariffs (the national tariffs described in Section 2.2). The empirical analysis is unaffected by how the threat points are determined.

$\frac{\partial \Omega^{RoW}}{\partial \overline{p}_j}\frac{\partial \overline{p}_j}{\partial \tau_j}$. Rearranging the FOCs and taking their ratio, [21]

$$\frac{d\Omega^{US}}{d\tau_j} - \left[\frac{d\Omega^{RoW}/d\tau_j}{d\Omega^{RoW}/d\tau_g^*}\right]\frac{d\Omega^{US}}{d\tau_g^*} = 0. \tag{10}$$

This is the familiar Nash-bargaining equilibrium condition that equalizes the slopes of the iso-welfare functions, $\frac{d\Omega^{US}/d\tau_j}{d\Omega^{US}/d\tau_g^*} = \frac{d\Omega^{RoW}/d\tau_j}{d\Omega^{RoW}/d\tau_g^*}$. The second term in (10) captures the interaction between the countries. If there are no terms of trade effects, that is, if $\frac{\partial \overline{p}_j}{\partial \tau_j} = 0$ and $\frac{\partial p_j}{\partial \tau_j} = \overline{p}_j$, the interaction term vanishes and we are in the small country case.

Let $\mu_j = -\frac{d\Omega^{RoW}/d\tau_j}{d\Omega^{RoW}/d\tau_g^*}$ denote the slope of RoW's iso-welfare function. Then,

$$\frac{d\Omega^{US}}{d\tau_j} + \mu_j\frac{d\Omega^{US}}{d\tau_g^*} = 0, \tag{11}$$

where μ_j depends only on RoW's preferences. For now, assume $\mu_j = mu$[22] Following Bagwell and Staiger (2005), we consider the scenario where tariffs satisfy these conditions: (i) $\frac{d\Omega^{RoW}}{d\tau_g^*} > 0$ and $\frac{d\Omega^{US}}{d\tau_j} > 0$, (ii) $\frac{d\Omega^{RoW}}{d\tau_j} < 0$ and $\frac{d\Omega^{US}}{d\tau_g^*} < 0$. Condition (i) implies that each country benefits from a unilateral increase in its own tariff. Condition (ii) indicates that the US tariff harms RoW's welfare while the RoW tariff harms US's welfare. Consequently, $\mu_j > 0$ and, in equilibrium, (11) shows that $\frac{d\Omega^{US}}{d\tau_j} > 0$.

In a Nash-equilibrium without TOT effects, US chooses tariff τ_j to satisfy $\frac{d\Omega^{US}}{d\tau_j} = 0$. In the Nash-bargaining equilibrium, US chooses a lower tariff, since $\frac{d\Omega^{US}}{d\tau_j} > 0$ and Ω^{US} is concave in τ_j. A small μ_j implies that the TOT effect of a US tariff has little impact on RoW's welfare (relative to the positive effect that even a small tariff τ_g^* has on RoW's welfare). This mutes the role of US exporters in domestic tariff formation. A large μ_j, on the other hand, requires US to internalize τ_j's impact on RoW's welfare and on its own exporters given RoW's tariff on US exports. The countervailing role of US exporters in the second term of (11) therefore drives the US tariff downward.

Decomposing the domestic impact of a change in τ_j and τ_g^* . To quantify their opposing influences, the welfare weight on specific capital employed in import-competing

[21] With many export goods (see derivations in Online Appendix B, Section B.2), RoW can theoretically impose tariffs $\boldsymbol{\tau}^*$ on all US exports. Then, (10) generalizes to

$$\frac{d\Omega^{US}}{d\tau_j} - \left[\frac{d\Omega^{RoW}/d\tau_j}{\sum_g d\Omega^{RoW}/d\tau_g^*}\right]\sum_g \frac{d\Omega^{US}}{d\tau_g^*} = 0.$$

[22] A complete specification of RoW's payoffs is beyond the paper's scope. While the model is unaltered, the magnitude of μ_j may matter empirically. We explore the sensitivity of results to plausible values of μ_j.

goods in district r, is distinguished from the welfare weight on specific capital employed in the export good in district r, by denoting them, respectively, by $\Gamma_r^{K^M}$ and $\Gamma_r^{K^X}$. We will solve (11) to obtain a prediction that we can take to trade and production data. Recall that $\frac{d\Omega^{US}}{d\tau_j} = \frac{\partial\Omega^{US}}{\partial p_j}\frac{\partial p_j}{\partial \tau_j} + \frac{\partial\Omega^{US}}{\partial \tau_j}$, and express the components as follows. First,

$$\frac{\partial\Omega^{US}}{\partial p_j} = \sum_r \Gamma_r^{K^M} n_r^{K^M}\left(\frac{q_{jr}}{n_r^{K^M}}\right) - \frac{\gamma}{n}D_j + \frac{\gamma}{n}\tau_j\overline{p}_j M_j', \tag{12}$$

where $n_r^{K^M}$ is district r's employment of specific capital in import-competing goods. The first term in (12) is the impact of the change in p_j on producer surplus, the second term is its impact on consumer surplus, and the third term is its (indirect) effect on tariff revenue $T = \tau_j\overline{p}_j M_j$. Next, the impact of τ_j on Ω^{US} via tariff revenue T is

$$\frac{\partial\Omega^{US}}{\partial\tau_j} = \frac{\gamma}{n}\frac{\partial T}{\partial\tau_j} = \frac{\gamma}{n}\left(\overline{p}_j M_j + \tau_j M_j\frac{\partial\overline{p}_j}{\partial\tau_j}\right). \tag{13}$$

Finally, recall that $\frac{d\Omega^{US}}{d\tau_g^*}$ in (11), the impact of RoW's tariff τ_g^* on US exports of good g, works through the TOT effect of the tariff on the world price $\overline{p}_g$ as

$$\frac{\partial\Omega^{US}}{\partial\overline{p}_g} = \sum_r \Gamma_r^{K^X} n_r^{K^X}\left(\frac{q_{gr}}{n_r^{K^X}}\right) - \frac{\gamma}{n}D_g^X, \tag{14}$$

where $n_r^{K^X}$ is district r's employment of specific capital in the export good, $\frac{q_{gr}}{n_r^{K^X}}$ is output per unit of the specific capital, which gets a welfare weight $\Gamma_r^{K^X} n_r^{K^X}$, and $\frac{\gamma}{n}$ is the welfare weight on the representative consumer. The impact of a decrease in the world price of US export good g due to a tariff increase by RoW is the negative of this expression. The solution to the Nash bargaining game is stated in this proposition.

Proposition 3 *The tariff on good j in the two-country bargaining game satisfies*

$$\begin{aligned}\frac{\tau_j}{1+\tau_j} \quad = \quad & \sum_{r=1}^{R}\frac{\Gamma_r^{K^M} n_r^{K^M}}{\gamma}\left(\frac{n}{n_r^{K^M}}\right)\left(\frac{q_{jr}/M_j}{-\delta_j}\right) + \sum_{r=1}^{R}\frac{\Gamma_r^{K^X} n_r^{K^X}}{\gamma}\left(\frac{n}{n_r^{K^X}}\right)\mu_j\theta_{jg}\left(\frac{q_{gr}/M_j}{-\delta_j}\right) \\ & -\left(\frac{Q_j/M_j}{-\delta_j}\right) + \frac{1}{1+\epsilon_j^*} - \mu_j\theta_{jg}\left(\frac{D_g/M_j}{-\delta_j}\right),\end{aligned} \tag{15}$$

where $\tau_j = \frac{(p_j - \overline{p}_j)}{\overline{p}_j}$ is the ad-valorem tariff applied to imports of good j, $\frac{\tau_j}{(1+\tau_j)} = \frac{(p_j-\overline{p}_j)}{p_j}$, $\frac{\sum_r \Gamma_r^{K^M} n_r^{K^M}}{\gamma}$ is the share of the national welfare weight received by specific capital employed in producing the nation's import-competing goods, and $\frac{\sum_r \Gamma_r^{K^X} n_r^{K^X}}{\gamma}$ is the share of the national *welfare weight received by specific capital employed in producing the nation's export good. Further,* $\gamma = \gamma^L + \gamma^K$*, and* $\delta_j = \epsilon_j \left(\frac{1}{\epsilon_j^*} + 1\right) < 0$*, where* $\epsilon_j = \frac{\partial M_j}{\partial p_j}\frac{p_j}{M_j} < 0$ *is the import-demand elasticity of good* j *and* $\epsilon_j^* = \frac{\partial X_j^*}{\partial \overline{p}_j}\frac{\overline{p}_j}{X_j^*} > 0$ *is its export supply elasticity. The term* $\mu_j = -\frac{d\Omega^{RoW}/d\tau_j}{d\Omega^{RoW}/d\tau_g^*} > 0$*, and* $\theta_{jg} = \frac{\partial \overline{p}_g/\partial \tau_g^*}{\partial p_j/\partial \tau_j} < 0$ *is the ratio of price effects of the two tariffs.*[23]

Proof Substituting expressions (12), (13), and (14) into $\frac{d\Omega^{US}}{d\tau_j} = \frac{\partial \Omega^{US}}{\partial p_j}\frac{\partial p_j}{\partial \tau_j} + \frac{\partial \Omega^{US}}{\partial \tau_j}$ and $\frac{d\Omega^{US}}{d\tau_g^*} = \frac{\partial \Omega^{US}}{\partial \overline{p}_g}\frac{\partial \overline{p}_g}{\partial \tau_g^*}$, and using the first-order condition (10),

$$\left\{\sum_r \Gamma_r^{K^M} n_r^{K^M}\left(\frac{q_{jr}}{n_r^{K^M}}\right) + \frac{\gamma}{n}\left[\tau_j \overline{p}_j M_j' + \frac{\tau_j}{(1+\tau_j)}\frac{\epsilon_j}{\epsilon_j^*}M_j - D_j\right]\right\}\frac{\partial p_j}{\partial \tau_j} + \frac{\gamma}{n}\overline{p}_j M_j =$$
$$-\mu_j\left[\sum_r \Gamma_r^{K^X} n_r^{K^X}\left(\frac{q_{gr}}{n_r^{K^X}}\right) - \frac{\gamma}{n}D_g\right]\frac{\partial \overline{p}_g}{\partial \tau_g^*},$$

where $\frac{\partial \overline{p}_j}{\partial \tau_j} = \frac{1}{(1+\tau_j)}\frac{\epsilon_j}{\epsilon_j^*}\frac{\partial p_j}{\partial \tau_j}$, $\frac{\partial p_j}{\partial \tau_j} = \overline{p}_j \frac{\epsilon_j^*}{\epsilon_j^* - \epsilon_j} > 0$, $\frac{\partial \overline{p}_g}{\partial \tau_g^*} = \frac{\overline{p}_g}{(1+\tau_g^*)}\frac{\epsilon_g^*}{\epsilon_g - \epsilon_g^*} < 0$, $\epsilon_g = \frac{\partial X_g}{\partial \overline{p}_g}\frac{\overline{p}_g}{X_g} < 0$ (*US* export supply elasticity of good g), and $\epsilon_g^* = \frac{\partial M_g^*}{\partial p_g^*}\frac{p_g^*}{M_g^*} > 0$ (*RoW* import demand elasticity of good g). These comparative static results are obtained by differentiating the market clearing conditions $M_j(p_j) = X_j^*(\overline{p}_j)$, where $p_j = (1+\tau_j)\overline{p}_j$, and $M_g[(1+\tau_g^*)\overline{p}_g] = X_g(\overline{p}_g)$. Completing elasticities and defining $\delta_j = \epsilon_j\left(\frac{1}{\epsilon_j^*} + 1\right)$, the expression $\tau_j \overline{p}_j M_j' + \frac{\tau_j}{(1+\tau_j)}\frac{\epsilon_j}{\epsilon_j^*}M_j$ can be rewritten as $\frac{\tau_j}{(1+\tau_j)}M_j\delta_j$. Substituting these expressions and isolating $\frac{\tau_j}{1+\tau_j}$ yields (15). □

The two terms on the right-hand side of the importers-only small country case (9) also appear in (15), except that the absolute import elasticity $-\epsilon_j$ is now replaced by $-\delta_j$ ($-\delta_j > -\epsilon_j$). In the large country case, $-\delta_j$ incorporates the response along *RoW*'s export supply function as the international price $\overline{p}_j$ changes. Three additional terms for the large country case appear in (15). The term $\sum_r \frac{\Gamma_r^{K^X} n_r^{K^X}}{\gamma}\left(\frac{n}{n_r^{K^X}}\right)\mu_j\theta_{jg}\left(\frac{q_{gr}/M_j}{-\delta_j}\right) < 0$ captures the welfare loss to exporters that would result from reduced market access to *RoW*. These losses are internalized by *US* in the Nash bargain with *RoW*, inducing lower tariffs on imports from *RoW*. The term $\frac{1}{1+\epsilon_j^*}$ accounts for the impact of tariffs on the equilibrium world price of good j, and the term $-\mu_j\,\theta_{jg}\left(\frac{D_g/M_j}{-\delta_j}\right) > 0$ is the beneficial effect of *RoW*'s tariff on *US* consumers of the exportable good. We can now take the models' predictions to data.

[23] In the second term on the right-hand side of (15), q_{gr}/M_j is a ratio of quantities measured in different units. While theoretically accurate, it is not measurable. But, note that $\theta_{jg} = \frac{\partial \overline{p}_g/\partial \tau_g^*}{\partial p_j/\partial \tau_j}$ is the ratio of the prices of precisely these goods, so that the product $\theta_{jg}\,(q_{gr}/M_j)$ is the ratio of values. See Section 4.2 below.

4 Estimating Welfare Weights

Our empirical strategy is two-fold. First, we use Proposition 2 to estimate welfare weight shares of groups (coalitions) of districts. The proposition provides supply-side foundations for the predictions from the small-country Grossman and Helpman (1994) model; our welfare weight estimates help us better understand the high estimates of the parameter a in previous empirical studies of the GH model with U.S. data (Goldberg and Maggi, 1999, Gawande and Bandyopadhyay, 2000), which implied that the U.S. government placed considerably more weight on consumer welfare than on lobbying contributions by import-competing interests. Next, we use Proposition 3 to estimate welfare weights on import-competing interests *and* exporting interests. The weights on exporting interests, motivated by the Johnson conjecture, are new to the literature. Estimates of the weights on import-competing interests after conditioning on exporter interests and terms of trade externalities, that is, under the large country assumption, are also novel to the political economy of trade literature.

We use tariff and non-tariff barrier data from 2002, a watershed year in the history of U.S. trade. On December 27, 2001, President Bush signed a proclamation establishing permanent normal trading relations (PNTR) with China, putting an end to the annual reviews of US-China relations mandated the Trade Act of 1974. To American manufacturers, granting MFN status to a large country like China meant that existing tariff protections were insufficient.[24] Import-competing districts mobilized, correctly perceiving China's MFN access to portend a large trade shock. The 107$^{\text{th}}$ Congress moved resolutions to terminate China's conditional trade access to the U.S. market.[25] One such resolution, H. J. Res. 50, was referred to the Ways and Means Committee, negatively reported to the floor, and ultimately defeated by a 169-259 vote.[26] Thus, U.S. trade policy in 2002 remained rooted in reciprocal concessions negotiated under earlier GATT Rounds. The will of the legislative coalition of the time was to stay with the status quo. The unsuccessful challenges by import-competing districts are reflected in the welfare weights they received by those sectors and districts in that era's legislative bargain. Our estimates reveal districts that were influential (and not so influential) in determining protection in the era that presaged the China shock.

[24]History has much to do with the pattern of U.S. tariffs—the Kennedy and Tokyo Rounds of tariff cuts in the 1960s and 70s were reflected in the commodity composition of U.S. tariffs in 2002 (Table 1; see also 2007 World Trade Report (Ch II.D) and Whalley (1985), which continued until the Trump tariffs of 2017.

[25]See Congressional Research Service, CRS Report RL30225, "Most-Favored-Nation Status of the People's Republic of China," June 7, 2001–July 25, 2001: Link (accessed 1/2020).

[26]We analyzed the roll call vote on H.J. Res. 50 using a logit model. The role of exporters in defeating the resolution on the House floor was significant. Controlling for partisanship, representatives from Congressional Districts (CDs) whose employment share in the export-oriented computers (NAICS 334) industry was in the top quartile across the 435 CDs were almost twice as likely to vote "Nay" on H. J. Res. 50 as representatives from districts in the lowest quartile (odds ratio 0.54, z-stat$=-2.09$; p-value$=0.04$).

Data

The year 2002 as the window for estimating the parameters from the model is deliberate, and attempts to capture trade politics at the inception of the China shock. We use a measure of overall protection that includes tariffs and non-tariff measures (NTMs) as our dependent variable.[27] Kee, Nicita and Olarreaga (2009*a*) define the ad-valorem equivalent (AVE) of an NTM (e.g. quota) as the uniform tariff that would have the same effect on imports as the NTMs. We use their measure of the AVE of Core NTMs and add it to ad-valorem tariffs to measure τ_j in (20).[28] Ad valorem tariffs at HS 10 digits, based on duties collected at customs, are from USTradeOnline. Trade data are from the United States International Trade Commission's DataWeb.[29] Import elasticities at 6-digit HS are from Kee, Nicita and Olarreaga (2008). Table 1 summarizes the dependent variable τ_j, the sum of tariff and (ad valorem equivalents of) NTMs in 2002 at ISIC 3-digits, the level at which the regressors are measured.

Table 1: Average tariffs and NTMs at NAICS-3 digits

NAICS-3 Industry No. & Label	Number of lines	Tariffs Average	Core NTMs Average
311 - Foods	966	0.058	0.411
312 - Beverages	74	0.018	0.094
313 - Textiles	606	0.078	0.181
314 - Text. Prods.	211	0.047	0.234
315 - Apparel	584	0.091	0.353
316 - Leather	196	0.115	0.109
321 - Wood	143	0.011	0.172
322 - Paper	139	0.006	0.000
324 - Petroleum	19	0.004	0.000
325 - Chemicals	1,553	0.027	0.051
326 - Plastic	175	0.022	0.005
327 - Non-metal	292	0.039	0.001
331 - Prim. Metal	449	0.019	0.000
332 - Fab. Metal	389	0.025	0.031
333 - Machinery	819	0.011	0.041
334 - Computers	535	0.020	0.061
335 - Elec. Eq.	278	0.016	0.163
336 - Transp.	229	0.013	0.161
337 - Furniture	54	0.004	0.055
339 - Miscellaneous	499	0.024	0.029
Total	8,210	0.037	0.131

Notes: Ad valorem equivalents of NTMs are from Kee, Nicita and Olarreaga (2009*a*). Core NTMs include price controls, quantity restrictions, monopolistic measures, and technical regulations. Ad valorem tariffs are from US Trade Online (United States Census Bureau).

[27] The authority to enact NTMs, distinct from tariffs, emerges from multiple statutes. Further, granting protection through NTMs faces fewer constraints from international commitments and is more unilateral.

[28] The measure of Core NTMs includes: price controls, quantity restrictions, monopolistic measures, and technical regulations (for details see Kee et al., 2009*b*, pp. 181).

[29] See USITC DataWeb.

Output and employment data from County Business Patterns (CBP) were converted to the NAICS 3-digit level, and mapped from Metropolitan Statistical Areas and Counties onto 433 congressional districts for the 107$^{\text{th}}$ Congress.[30] The share of workers in district r who own specific factors $\frac{n_r^K}{n_r}$ is measured under the assumption that compensation to white-collar (non-production) workers are rents due to their specificity, while blue-collar (production) workers who are mobile across sectors earn wages. National manufacturing employment and the proportion of production workers $\frac{n^L}{n}$ and non-production workers $\frac{n^K}{n}$ in each NAICS industry are taken from the Census of Manufacturing. The ratio $\frac{n_r^K}{n_r}$ is computed as the average of the national proportions weighted by district r's NAICS industry employment. District-NAICS employment data are from the Geographical Area Series of the 2000 Census of Manufacturing. Alternative measures of specific factor ownership by industry based on the classification of occupations in manufacturing and services (Autor and Dorn, 2013) are similar in magnitude. These measures, however, are not available at the district level.

4.1 Small Open Economy: Import Competing Interests

Specification

The small country case is the setting for the majority of empirical studies of trade protection. Imputing district-level imports as $M_{jr} = M_j \times \left(\frac{n_r}{n}\right)$, (9) may be expressed with district output-to-imports ratios $\frac{q_{jr}}{M_{jr}}$ as:[31]

$$\frac{\tau_j}{1+\tau_j} = \sum_{r=1}^{R} \frac{\Gamma_{jr}^K n_{jr}^K}{\gamma} \frac{n}{n_{jr}^K} \left(\frac{q_{jr}/M_j}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right) = \sum_{r=1}^{R} \frac{\Gamma_{jr}^K n_r^K}{\gamma} \frac{n_r}{n_r^K} \left(\frac{q_{jr}/M_{jr}}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right).$$

We estimate the welfare weight shares $\frac{\Gamma_{jr}^K n_{jr}^K}{\gamma}$ in the small-country case using the econometric specification

$$\frac{\tau_j}{1+\tau_j} = \sum_{r=1}^{R} \beta_r \left(\frac{q_{jr}/M_{jr}}{-\epsilon_j}\right) + \alpha \left(\frac{Q_j/M_j}{-\epsilon_j}\right) + u_j, \tag{16}$$

with $\beta_r \geq 0$. The coefficient α on the national output-import ratio scaled by absolute import elasticity is constrained to -1.

Clearly, the relative welfare weights are under-determined: the R parameters β_r do not

[30] The sample accounts for 77% of U.S. manufacturing output in 2002. Non-disclosure restrictions prevent the Census from reporting any data for 2 of the 435 congressional districts. In other cases of non-disclosure, we impute missing district-industry output data using district-industry employment data (17 percent of the sample). See also Online Appendix C.

[31] To keep the model simple, lobbying is not made explicit. Lobbying (as in Grossman and Helpman (1994)) may be incorporated into the model to influence policy stances at both district and national levels. We sketch such a model in Online Appendix B.1.3.

uniquely determine the $[(J+1) \times R + J \times R]$ industry-district welfare weights $\Gamma^K_{jr} n^K_{jr}$ and $\Gamma^L_{jr} n^L_{jr}$. We proceed under the assumption that the welfare weights of specific capital owners have no within-region variation. That is, the welfare of specific capital owners employed in all goods j produced in district r receive the same weight, $\Gamma^K_{jr} = \Gamma^K_r$. In this case, $\gamma^K = \sum_r \Gamma^K_r n^K_r$. This assumption is plausible if weights were assigned based on each factor owner's voting strength. Then, the coefficient β_r is

$$\beta_r = \frac{\Gamma^K_r n^K_r}{\gamma} \frac{n_r}{n^K_r} = \frac{\Gamma^K_r n^K_r}{\sum_r \Gamma^K_r n^K_r + \gamma^L} \frac{n_r}{n^K_r}, \tag{17}$$

where $\frac{n_r}{n^K_r}$ is the inverse of the proportion of district r's population that are specific capital owners.[32] There are R parameters, Γ^K_r and $(J+1)\times R$ parameters Γ^L_{jr}, but for our purpose it is sufficient to recover $(R+1)$ parameters: R welfare weights on specific capital in each district, $\Gamma^K_r n^K_r$, and the collective economy-wide welfare weight on labor, γ^L. This is straightforward with estimates of β_r in hand.

Coalitions of Districts

The number of parameters $(R+1)$ exceeds the degrees of freedom in our sample.[33] Consistent with the idea that legislative bargaining occurs among coalitions of districts, R may be reduced by aggregating districts into coalitions. We form coalitions of districts according to electoral outcomes. Thus, welfare weights of factor owners are constant within, but vary across, coalitions. Our coalitions are based both on the state's competitiveness in the 2000 presidential election and whether the district's election was competitive or safe for incumbent Democratic or Republican representatives. These groups of district captures the variety of electoral incentives faced by local representatives, parties, and the president. They represent real-world coalitions built to make policy. Without loss of generality, we continue to use R to denote the number of coalitions of districts, or "regions", and r to index the regions.

Identification

The endogeneity of the regressors $\frac{q_{jr}/M_{jr}}{-\epsilon_j}$, which can bias OLS estimates of β_r (and therefore welfare weights), originates from two sources. The first is reverse causality–in specification

[32] Equivalently, the specification with the ratio q_{jr}/M_j (rather than q_{jr}/M_{jr}) may be used:

$$\frac{\tau_j}{1+\tau_j} = \sum_{r=1}^{R} \beta_r \left(\frac{q_{jr}/M_j}{-\epsilon_j}\right) + \alpha \left(\frac{Q_j/M_j}{-\epsilon_j}\right) + u_j,$$

and welfare weight shares $\frac{\Gamma^K_r n^K_r}{\gamma}$ estimated using $\beta_r = \frac{\Gamma^K_r n^K_r}{\gamma} \frac{n}{n^K_r}$.

[33] As described, output data for the 433 districts in the sample are most completely available at NAICS 3-digits (NAICS-332 Printing and Related Support Activities, is a non-tradable sector and is dropped) comprising twenty manufacturing industries. This is the upper bound on the number of estimable parameters.

(16), shocks to the tariff τ_j can move the output-to-import ratio $\frac{q_{jr}}{M_{jr}}$ in region r, so that $\mathrm{E}\Big(\frac{q_{jr}}{M_{jr}} u_j\Big) \neq 0$, violating exogeneity. Tariff-raising shocks, for example, can lower M_{jr} and increase q_{jr}, so that $\mathrm{E}\Big(\frac{q_{jr}}{M_{jr}} u_j\Big) > 0$ causing OLS to overstate β_r.[34]

Our strategy to identify coefficients on the endogenous regressors $\frac{q_{jr}/M_{jr}}{-\epsilon_j}$ employs Bartik-like instruments. In Bartik (1991), the (inverse) elasticity of labor supply from a regression of wage growth on employment growth using county-level data is not identified because of reverse causality. The Bartik solution isolates exogenous variation in county employment rates using the fact that, because of its pre-existing industrial structure, a county's share of employment in manufacturing remains invariant to local shocks. Blanchard et al. (1992), Card (2009), and Autor et al. (2013) use Bartik-like IVs with continuous treatment exposures.

The identifying assumptions are clear to see with $R = 2$ regions in (16). Let region r's share of output Q_j equal z_{jr} where for each good j, $\sum_{r=1}^{R} z_{jr} = 1$. In the 2-region case, $z_{j1} = 1 - z_{j2}$. We construct the Bartik IV for the import-to-output ratio of region 1, $\frac{M_{j1}}{q_{j1}}$ (the inverse of the endogenous regressor $\frac{q_{j1}}{M_{j1}}$, and simpler to construct) as

$$\left(\frac{M_{j1}}{q_{j1}}\right)^{BIV} = \frac{1}{z_{j1}}\left(\frac{M}{Q} - \frac{M_2}{q_2}\right) + \frac{M_2}{q_2} = \frac{1}{z_{j1}}\frac{M}{Q} - \frac{z_{j2}}{z_{j1}}\frac{M_2}{q_2}, \tag{18}$$

where M/Q is the aggregate national import-to-output ratio and M_2/q_2 is region 2's aggregate import-to-output ratio. $\left(\frac{M_{j1}}{q_{j1}}\right)^{BIV}$ is the weighted difference of M/Q and M_2/q_2 with weights $\frac{1}{z_{j1}}$ and $\frac{z_{j2}}{z_{j1}}$, respectively. If both import-output ratios in (18) are exogenous, then $\left(\frac{M_{j1}}{q_{j1}}\right)^{BIV}$ is clearly an IV candidate. However, while a policy shock to the tariff τ_j in (16) may not affect the nation's output-to-import ratio—which is historically determined, and therefore exogenous—the same may not be true about region 2's output-to-import ratio. If region 2's output is concentrated on good j, its overall output-to-import ratio M_2/q_2 may not differ greatly from M_2/q_{j2}, and fail exogeneity.

Goldsmith-Pinkham, Sorkin and Swift (2020) emphasize that the identifying variation in the IV in this exposure-to-shocks design comes from the shares z_{j1} and z_{j2}.[35] Because these shares are determined by the pre-existing industrial structure of regions, they are exogenous. Their variation comes from the heterogeneity in these industrial structures. The IV $\left(\frac{M_{j1}}{q_{j1}}\right)^{BIV}$ breaks down the effect of the tariff shock on region 1's import-to-output ratio, M_1/q_1, as an "exposure" effect due to the share of q_1 in Q, and the "size" of the shock,

[34] Another reason for selection bias is as follows. The legislative bargaining process "assigns" the welfare weight shares implicitly by, first, choosing districts in the winning coalitions, and, next, combining their unilateral tariff preferences into a national tariff. Without accounting for the selection into the winning coalition, OLS estimates of $\beta_r, r = 1, \ldots, R$ are prone to bias.

[35] The "exposure" design terminology is from Goldsmith-Pinkham, Sorkin and Swift (2020), which discusses the identification of the classic labor supply curve regression in Bartik (1991).

or the difference $\frac{1}{z_{j1}}\left(\frac{M}{Q}-\frac{M_2}{q_2}\right)$. The weighted sum—the IV—is the product of these two effects. Instrumenting $\frac{M_{j1}}{q_{j1}}$ in the first stage with $\left(\frac{M_{j1}}{q_{j1}}\right)^{BIV}$ achieves identification from the differential exogenous variation in the output shares.

In the 2-region example, these differential exposures affects the change in τ_j only through the endogenous variable $\frac{M_{j1}}{q_{j1}}$ and not through any confounding channel. The IV are derived by, first, using accounting identities to define $\frac{M_{j1}}{q_{j1}}$ as the shares-weighted difference between the national import-to-output ratio and $\frac{M_{j2}}{q_{j2}}$ and, next, ignoring the idiosyncratic (the j-r components of the identity), retaining only the regional and national aggregate ratios as in (18). Any correlation of u_j in (16) with the idiosyncratic ratios is avoided (details in Section C.2 in the Appendix).

Going deeper into the legislative bargaining process affords another source of endogeneity that the IVs resolve. The equilibrium tariff vector $\boldsymbol{\tau}$, is decided in a legislative bargaining game in which districts seek to coalesce with each other and form a majority in Congress. This winning coalition of districts ultimately determines the entire vector of tariffs. To understand the role of the Bartik-like IVs, we construct BIVs for the (inverse of) each of the $R > 2$ endogenous regressors $\frac{q_{jr}}{M_{jr}}$ in (16), as

$$\left(\frac{M_{jr}}{q_{jr}}\right)^{BIV} = \frac{1}{z_{jr}}\frac{M}{Q} - \sum_{d\neq r}\frac{z_{jd}}{z_{jr}}\frac{M_d}{q_d}, \tag{19}$$

where the sum is taken over $d \neq r$. Each endogenous variable is associated with one BIV, so the coefficients in (16) are exactly identified. The accounting identities used to derive (19) are detailed in Section C.2 in the Appendix. In the legislative bargaining game that determines national tariffs in Gawande, Pinto and Pinto (2024), a key prediction is that the more concentrated is the national output of good j in region r, the higher is region r's demand for tariffs τ_j, and the less desirable it is for other regions to form a winning coalition with r. Specifically, when proposing a vector of protection to potential coalition partners in the legislature, representatives from regions that produce several goods, or that do not specialize in producing a good, or that do not produce any tradable good at all, consider regions with a concentration of production of good j as "costly dates" to the tariff dance. Such regions will tend to be excluded from winning coalitions. The BIVs in (19) measure the costliness of these "dates". To take an extreme example, in (19) suppose the share $z_{jd} = 0$ for all regions $d \neq r$, and $z_{jr} = 1$, that is, output of good j is fully concentrated in region r. The high z_{jr} means region r will not be invited to the coalition, and its lack of political influence in Congress means a low or zero tariff τ_j.[36] In turn, this implies a low or zero share

[36]This case is in fact not so extreme. As depicted in Appendix Figure A.1, the distribution of $\frac{q_{jr}/M_{jr}}{-\epsilon_j}$ in

of the total welfare weight is placed on the region's demand-for-protection variable $\frac{q_{jr}}{M_{jr}}$. As z_{jd} (output share of regions other than r) increases, production is shared across regions, and r's industrial structure does not disadvantage it in legislative bargaining.

Recent work by Adao, Costinot, Donaldson and Sturm (2023) also attempts to estimate underlying welfare weights considering a more aggregate regional structure than in our paper (states rather than Congressional districts). Their estimation uses trade taxes on (net) imports by sector. While both taxes and subsidies are possible on imports and exports, our choice to focus on non-negative import tariffs is based on a historical regularity: neither export taxes nor import subsidies—negative values of the dependent variable—have been used in U.S. manufacturing in the post-WWII period (such subsidies and taxes may be incorporated in our model by admitting negative welfare weights). Moreover, in our model, exporters, which has eluded political economy models, play an important role in lowering tariffs on U.S. manufacturing imports.[37] Adao et al. (2023)'s IV strategy follows Trefler (1993) and Goldberg and Maggi (1999) to predict trade due to forces other than trade policy. IV and OLS estimates are similar, indicating low simultaneity bias. Our identification strategy introduces new Bartik-like IVs to the literature.

4.2 Large Open Economy: Exporting Interests

Econometric specification

How significant were U.S. export interests in the minds of policymakers determining 2002 U.S. tariffs? The share of the aggregate welfare weight received by specific capital employed in producing the export good g, $\frac{\Gamma_r^{K^X} n_r^{K^X}}{\gamma}$, quantifies the impact of export interests in liberalizing trade. By estimating this expression, we contribute to the political economy of trade policy literature a new answer to this key question.

An econometric specification to estimate the relative welfare weights $\frac{\Gamma_r^{K^M} n_r^{K^M}}{\gamma}$ and $\frac{\Gamma_r^{K^X} n_r^{K^X}}{\gamma}$ based on Proposition 3 is

$$\begin{aligned} \frac{\tau_j}{1+\tau_j} \;=\; & \sum_{r=1}^{R} \beta_r \left(\frac{q_{jr}/M_{jr}}{-\delta_j} \right) + \beta^X \left(\mu_j \widetilde{\theta}_{jg} \frac{(\overline{p}_g Q_g)/(p_j M_j)}{-\delta_j} \right) \\ & + \alpha \left(\frac{Q_j/M_j}{-\delta_j} - \frac{1}{1+\epsilon_j^*} + \mu_j \widetilde{\theta}_{jg} \frac{(\overline{p}_g D_g)/(p_j M_j)}{-\delta_j} \right) + u_j, \qquad (20) \end{aligned}$$

many NAICS 3-digit industries j is concentrated in few districts r.

[37] Under the assumption of no factor mobility across sectors and regions (as we also assume) Adao et al. (2023) estimate "the marginal change in the real earnings of a given individual relative to the average earnings change in the population associated with a marginal increase in the (net) imports m_g of good g", as the mechanism determining tariffs. In our model, this is the difference between district-level production and average production, which measures a range of influences and consolidates all the effects that we consider separately in our specification.

where $\beta_r \geq 0$ and $\beta^X \geq 0$.[38] The $(R+1)$ coefficients $\beta_r = \frac{\Gamma_r^{K^M} n_r^{K^M}}{\gamma} \frac{n_r}{n_r^{K^M}}$ and $\beta^X = \frac{\Gamma^{K^X} n}{\gamma}$ are estimable with our data. Elasticity measures are from Nicita, Olarreaga and Silva (2018) (NOP). The variable $\delta_j = \epsilon_j \left(\frac{1}{\epsilon_j^*} + 1 \right)$ is computed at HS 6-digits using NOP's estimates of the elasticity of RoW's export supply of good j to the U.S., ϵ_j^*, and good j's U.S. import demand elasticity, ϵ_j. In (15), $\frac{D_g}{M_j}$ and $\frac{q_{gr}}{M_j}$ are ratios of quantities of different goods. We use this notation to clarify the measurement of these variables, given that the data are expressed in terms of values. Multiplying by the price ratio $\frac{\overline{p}_g}{p_j}$ converts them to ratios of values. The new term $\widetilde{\theta}_{jg}$ is used so that ratios of quantities in (15) now appear as (measurable) ratios of values in (20). We are able to measure $\widetilde{\theta}_{jg}$ as well. Denote the import demand elasticities in US and RoW, respectively, by ϵ_j and ϵ_g^*, and export supply elasticities in US and RoW, respectively, by ϵ_j^* and ϵ_g. Then, $\frac{\partial p_j}{\partial \tau_j} = \overline{p}_j \frac{\epsilon_j^*}{(\epsilon_j^* - \epsilon_j)} > 0$, $\frac{\partial \overline{p}_g}{\partial \tau_g^*} = \frac{\overline{p}_j}{1+\tau_j} \frac{\epsilon_g^*}{(\epsilon_g - \epsilon_g^*)} < 0$[39], and

$$\widetilde{\theta}_{jg} = \frac{p_j / \overline{p}_j}{p_g^* / \overline{p}_g} \times \frac{\frac{\epsilon_g^*/\epsilon_g}{1-\epsilon_g^*/\epsilon_g}}{\frac{1}{1-\epsilon_j/\epsilon_j^*}} < 0. \tag{21}$$

We use NOP's estimates for ϵ_g^* (RoW's import demand elasticity of good g) and ϵ_g (US export supply elasticity of exports of good g to RoW) to measure $\widetilde{\theta}_{jg}$.

Additionally, model (20) imposes $\alpha = -1$. In going from Proposition 3 to (20) we assume that owners of specific capital employed in producing the export good g coalesce nationally, equalizing the welfare weight of every specific capital owner in the export sector, that is, $\Gamma_r^{K^X} = \Gamma^{K^X}$.[40] We will estimate the relative welfare weights $\frac{\Gamma_r^{K^M} n_r^{K^M}}{\gamma}$ and $\frac{\Gamma_r^{K^X} n_r^{K^X}}{\gamma}$ by 2SLS using the Bartik-like IVs described in Section 4.1. Finally, we must make different assumptions about the parameter μ_j because it is not measurable. Our benchmark considers $\mu_j = 1$, but we also show the sensitivity of our results to various values of μ_j.[41]

5 Results: Trade Policy Influencers

District Blocs

Equations (16) and (20) that form the basis of our empirical investigation are estimated with

[38]Weights are non-negative: import subsidies on j-goods and export tax on good g are disallowed.

[39]See Online Appendix B for details. The numerator is negative since $\epsilon_g^* < 0$.

[40]Access to disaggregate geographic area series from the U.S. Census, which remains confidential and not publicly available, would enlarge the set of estimable parameters.

[41]The value of μ_j is not necessarily equal to 1, and can theoretically even be negative. As in Bagwell and Staiger (1999) and Bagwell, Staiger and Yurukoglu (2020), we assume $d\Omega^{RoW}/d\tau_j < 0$ and $d\Omega^{RoW}/d\tau_g^* > 0$, so that $\mu_j > 0$. If $\mu_j = 1$ in equilibrium, then $-d\Omega^{RoW}/d\tau_j = d\Omega^{RoW}/d\tau_g^*$, which means that an increase in τ_j has the same impact on Ω^{RoW} as an increase in τ_g^*. In a sensitivity analysis, we consider μ_j values from 0.3 to 3, covering a wide range of possible scenarios.

trade barriers measured at the HS 8-digit level. For our estimations, we assign legislators to regions or "blocks" based on electoral dynamics and partisan alignments at the state and Congressional District levels. The groupings used for estimating the welfare weights derived from our model are consistent with the incentives created by the electoral system and the institutions under which trade policy is made in the U.S., capturing the give-and-take between Congress and the Executive (Krehbiel, 1999, Cox and McCubbins, 2005). The combination of the Presidential system of government and the majoritarian electoral which determines the need for a majority in Congress to coalesce with the President to enact and implement policy. This incentive structure has framed the institutional setting that has historically governed trade policymaking in the United States (Finger, Hall and Nelson, 1988, Hall and Nelson, 1992, McGillivray, 2004, Destler, 2005).

Members of Congress are elected from single-member districts but no individual representative can enact policy on their own; they instead must build legislative coalitions. For instrumental, and ideological issues, legislators sort themselves into parties whose labels provide valuable cues to voters (Cox and McCubbins, 1993, 2005, Snyder Jr and Ting, 2002). The President is elected indirectly through the Electoral College, where delegates are selected based on state-level results. These Electoral and institutional incentives have resulted in a weak party system in the U.S. in comparative perspective.[42]

Table 2: Districts, by Political Blocs, Based on 2000 Election Outcomes

State-Wide Vote in Presidential Election	**Districts in House Elections**			**Total**
	Competitive	Safe Democrat	Safe Republican	
Competitive	17 [0.03]	72 [0.16]	83 [0.22]	172
Safe Democrat	8 [0.02]	75 [0.16]	42 [0.09]	125
Safe Republican	5 [0.02]	51 [0.11]	80 [0.20]	136
Total	30	198	205	433

Notes: (1) Each cell in the 3 × 3 represents a "coalition". A cell contains (i) the number of districts in the coalition (summing to 433), and (ii) the proportion of the nation's manufacturing workforce in districts comprising coalition r, $\frac{n_r}{n}$, in brackets.

Legislating an issue with long-run consequences, such as trade policy, coalitions may be built around safe districts whose representatives can form a longer-term bond. When parties are weak, leaders have incentives to cater to co-partisan legislators in districts that the

[42]Party leaders in Congress have incentives to cater to states that can determine the winner of the Presidential election. When a party controls Congress and the Presidency it gains agenda-setter powers which can be used to target marginal districts, that is, districts in competitive states which can determine the fate of the Presidential election. While there are benefits for individual legislators to be a member of the party that controls the Presidency, because the electoral fate of individual legislators are determined at the district level, they can, and often do, vote against the party line. Party leaders in Congress and the Executive face a trade-off: reward districts to secure a majority of votes in Congress at or garner the support of a majority of voters in enough states to win the Presidency.

party controls while targeting enough districts in competitive states to secure the Presidency at the lowest cost to all members of the coalition. To capture the crosscutting incentives of catering to marginal districts and states or rewarding co-partisans, we partition Congressional districts along two dimensions: the competitiveness of the state in Presidential elections and the competitiveness of the Congressional District in legislative elections. The first dimension, how states voted in the 2000 presidential elections, reflects incentives faced by the Executive Branch in the formation of trade policy. The second dimension, how the districts voted the same (or in the closest) year in elections to the House of Representatives, reflects the interests of agenda setters in Congress, such as House Ways and Means and other committee chairs, to build a minimum winning coalition. Districts in states where a party won more than 52 percent of the votes in the presidential election are coded as safe for the winning party; they are considered competitive otherwise. Districts in which a candidate to the House won by more than 52 percent of the vote are considered safe for the winning party; they are considered competitive otherwise.

Districts are thus aggregated into nine blocs ($R = 9$) based on whether the district was competitive, safe Democrat or safe Republican in the 2000 presidential election, and whether the district was competitive, safe Democrat or safe Republican in the 2002 congressional race (or the closest prior election). Table 2 shows how districts were distributed across the nine blocs. In square brackets are the proportion of the nation's manufacturing workforce in each bloc. In the elections that determined the House, whose powerful Ways and Means Committee holds sway over trade policy, 205 districts were strongly Republican, 198 were strongly Democrat, and just 30 were competitive. The results in this section exemplify how conflicts pitting party loyalty against constituency interests are sorted out by Congress, with the leader of the party controlling the Executive branch serving as an agenda setter.

2SLS estimates

Table 3 reports 2SLS estimates of coefficients β_r in (16), the small country case, and (20), the large country case.[43] The coefficients are constrained to be non-negative, as import subsidies

[43]Errors are clustered at the HS 2-digit level of 94 goods. Evidence for clustering of the 8210 HS 8-digit tariffs+NTMs at the more aggregate level is in Conconi, Facchini and Zanardi (2014), also implicit in the vast number of industry-level studies of protection. Presumably, these are administratively translated to HS 8-digit by replicating the clustered tariffs and NTMs at this "line level." Abadie, Athey, Imbens and Wooldridge (2023) suggest that the decision of whether to cluster and at what level be determined by both sampling and design. The HS 8-digit sample is the entire population tariff line products. Unlike field experiments which (randomly) sample micro-units from a few clusters in a population, our sample includes all clusters of the population of interest. Therefore, our first step is to determine the clustering in the population. Based on the account of policymakers and the above studies, it is reasonable to suppose that tariff decisions are taken up in clusters of (the 94) HS 2-digit level product groups. That is, "assignment to treatment" by policymakers, which is unobserved, occurs at HS 2-digits. Abadie et al. (2023) suggest that the decision to cluster standard errors depends on whether this within-cluster assignment is perfectly

and export taxes are ruled out. The small country model (16) requires the coefficient of $\frac{Q_j/M_j}{-\epsilon_j}$ to be constrained to -1, and the large country model (20) requires the same constraint on the coefficient of $\frac{Q_j/M_j}{-\delta_j} - \frac{1}{1+\epsilon_j^*} + \mu_j\, \theta_{jg} \frac{D_g/M_j}{-\delta_j}$. As mentioned, μ_j is assumed to equal 1 in these tables. The large country sample of 7675 HS 8-digit goods is lower than the small country sample by the 535 export sector products in the Computer industry (NAICS=334) that are excluded.

Table 3: 2SLS estimates for models (16) and (20)—Political Coalitions
Dependent Variable: *Applied Tariff + Ad-valorem NTMs* 2002

	Small Country Eq. (16)	$\frac{Q_{gr}}{Q_r}$	Large Country Eq. (20)
β_1: Comp State, Comp CD	0	0.09	0
β_2: Comp State, Safe D CD	0	0.09	0
β_3: Comp State, Safe R CD	0.350 (0.035)	0.09	0.322 (0.056)
β_4: Safe D State, Comp CD	0	0.12	0
β_5: Safe D State, Safe D CD	0.261 (0.041)	0.27	0
β_6: Safe D State, Safe R CD	0	0.15	0
β_7: Safe R State, Comp CD	0	0.05	0
β_8: Safe R State, Safe D CD	0.151 (0.056)	0.12	0
β_9: Safe R State, Safe R CD	0.252 (0.035)	0.06	0.439 (0.035)
β^X: $\mu_j\ \theta_{jg} \cdot \frac{Q_g/M_j}{-\delta_j}$			2.690 (0.281)
α: $\frac{Q_j/M_j}{-\epsilon_j}$	-1		
α: $\frac{Q_j/M_j}{-\delta_j} - \frac{1}{1+\epsilon_j^*} + \mu_j\ \widetilde{\theta}_{jg} \cdot \frac{\overline{p}_g D_g/p_j M_j}{-\delta_j}$			-1
N	8210		7675
First Stage Statistics			
Anderson-Rubin χ^2(10 df)	1099		676.4
Anderson-Rubin p-value	(0.00)		(0.00)
Kleibergen-Paap weak IV	539.2		2566

Notes: (1) Standard errors (in parentheses) clustered at 2-digit HS. (2) α is constrained to equal -1 required by (16) and (20). (3) Q_{gr}/Q_r is the share of export industry COMPUTER (i.e. industry g or 3-digit NAICS=334 Computer and Electronic Product Manufacturing, or COMPUTER hereafter) output produced by districts in coalition r. Larger shares (in blue) suggest export-oriented coalitions. (4) In the large country case, μ_j is assumed to equal 1 for all j, and $\widetilde{\theta}_{jg}$ is calculated as in (21). (5) Where the unconstrained estimate of $\beta_r \leq 0$, it is constrained to equal zero to disallow import subsidies or export taxes.

With multiple endogenous regressors, a weak-instruments problem arises if the IVs are strongly correlated. The first-stage Kleibergen-Paap weak IV test reported in Table 3 shows no weak-instruments problem with the BIVs. Each BIV has independent (of other BIVs) exogenous variation. The first-stage regressions reported in Table 4 indicate that the BIVs

correlated (in which case, use clustered standard errors), uncorrelated (i.e. random assignment, in which case use cluster-robust standard errors) or imperfectly correlated (use the Abadie et al. (2023) bootstrap procedure). We consider the assignment within HS 2 digits to be nearly perfect; for example, within the HS 2-digit Apparel and Textile group, *all* HS 8-digit units are assigned to treatment and receive a positive tariff+NTM outcome. This errs on the conservative side, so standard errors are overstated compared to the zero correlation or imperfect correlation cases.

can isolate significant *individual* exogenous variation in each regressor. There is, therefore, a strong theoretical and empirical case for the use of Bartik-like IVs founded on heterogeneous regional structures.

Table 4: First Stage Regressions for **Small** Country results in Table 3.
Using Bartik IVs (BIVs) constructed as in (19)

	Dependent variable: $\frac{q_{jr}/M_{jr}}{-\epsilon_j}$, with r indexing the 9 regions:								
	Comp State Comp CD	Comp State Safe D CD	Comp State Safe R CD	Safe D State Comp CD	Safe D State Safe D CD	Safe D State Safe R CD	Safe R State Comp CD	Safe R State Safe D CD	Safe R State Safe R CD
$\text{BIV}^{\text{Comp State}}_{\text{Comp CD}}$	3.096	2.721	3.450	0.669	1.019	1.752	2.537	3.282	3.009
	(5.82)	(6.85)	(7.69)	(1.39)	(2.96)	(6.15)	(9.28)	(6.55)	(7.20)
$\text{BIV}^{\text{Comp State}}_{\text{Safe D CD}}$	1.846	3.685	4.850	-10.67	6.293	4.281	1.542	3.531	7.174
	(0.66)	(1.62)	(2.21)	(4.01)	(6.52)	(4.23)	(1.02)	(1.42)	(3.44)
$\text{BIV}^{\text{Comp State}}_{\text{Safe R CD}}$	25.20	20.49	26.23	11.65	14.08	13.09	11.31	31.25	14.15
	(4.43)	(4.83)	(5.36)	(2.26)	(4.03)	(4.14)	(3.68)	(5.42)	(3.06)
$\text{BIV}^{\text{Safe D State}}_{\text{Comp CD}}$	0.0190	0.0385	0.0640	0.0254	0.0305	0.0328	0.0227	0.0530	0.0588
	(0.58)	(1.41)	(2.51)	(0.89)	(3.65)	(4.31)	(1.35)	(1.97)	(2.55)
$\text{BIV}^{\text{Safe D State}}_{\text{Safe D CD}}$	27.01	24.67	34.19	-0.600	20.93	18.20	14.45	32.06	27.02
	(3.40)	(3.94)	(5.02)	(0.10)	(5.31)	(5.11)	(3.15)	(4.49)	(4.31)
$\text{BIV}^{\text{Safe D State}}_{\text{Safe R CD}}$	-50.03	-45.62	-59.78	7.464	-39.33	-32.03	-24.93	-65.77	-46.62
	(4.33)	(5.29)	(6.19)	(0.62)	(5.55)	(5.27)	(4.79)	(5.73)	(5.16)
$\text{BIV}^{\text{Safe R State}}_{\text{Comp CD}}$	-1.850	-1.628	-2.235	-0.942	-0.158	-1.137	-1.655	-1.995	-2.339
	(5.51)	(6.97)	(7.53)	(2.70)	(0.60)	(4.88)	(8.21)	(5.95)	(8.16)
$\text{BIV}^{\text{Safe R State}}_{\text{Safe D CD}}$	-15.49	-15.24	-20.83	-0.167	-13.63	-11.90	-7.560	-20.90	-19.69
	(3.36)	(4.27)	(5.48)	(0.04)	(5.94)	(5.83)	(3.33)	(4.86)	(5.53)
$\text{BIV}^{\text{Safe R State}}_{\text{Safe R CD}}$	21.70	22.85	31.26	-10.78	20.89	16.97	10.30	31.14	31.50
	(2.86)	(3.90)	(5.18)	(1.54)	(5.84)	(5.34)	(3.03)	(4.38)	(5.54)
Constant	-13.72	-14.08	-20.20	7.123	-11.67	-10.25	-6.847	-15.72	-16.21
	(2.49)	(3.24)	(4.43)	(1.65)	(4.76)	(4.41)	(2.32)	(3.15)	(3.81)
N	8,210	8,210	8,210	8,210	8,210	8,210	8,210	8,210	8,210
R^2	0.696	0.765	0.740	0.786	0.810	0.790	0.725	0.791	0.789
adj. R^2	0.695	0.765	0.740	0.785	0.809	0.790	0.724	0.791	0.789

Note: (i) t-values in parentheses. Errors clustered at HS 2-digits. (ii) In the first column as listed the nine Bartik IVs (BIV) for the nine endogenous variables $\frac{q_{jr}/M_{jr}}{-\epsilon_j}$, $r = 1, \ldots, 9$. The BIVs for q_{jr}/M_{jr} are constructed as in (19), and then scaled by $-\epsilon_j$. (iv) Weak-instrument statistics are reported in Table 3.

5.1 Small country case: Import-competing interests

Most empirical work on protectionism, including the tests of the Grossman and Helpman (1994) model, have been predicated on the small country assumption. The 2SLS estimates in the "Small Country" column indicate positive welfare weights on specific capital employed in producing import-competing goods in four of the nine coalitions. The coefficients reveal coalitions of districts that influence tariff-making (positive coefficients) versus coalitions of districts that do not move the agenda and are expendable (zero). When translated into welfare weights on owners of specific capital in these blocs, the estimates provide a micro-founded institutional explanation of previous tests of the Grossman-Helpman model.

What do the small country 2SLS estimates imply about the distribution of welfare weights across the nine blocs? Table 5 provides the answer. The welfare weight on an owner of the specific capital relative to the average weight on owners of the mobile labor, $\frac{\Gamma_r^K}{\overline{\Gamma}^L}$, where $\overline{\Gamma}^L = \frac{\gamma^L}{n^L}$, measures the importance granted to the interests of specific capital owners in the tariff determination process (recall, the welfare weight on an owner of labor is invariant). In blocs where $\frac{\Gamma_r^K}{\overline{\Gamma}^L} > 1$, the welfare of the pool of specific capital owners receives a weight greater than the rest of the population. Intuitively, their tariff preference gets more weight than the tariff preference of regions where $\frac{\Gamma_r^K}{\overline{\Gamma}^L} \leq 1$. In four of the nine regions, specific capital receives favorable treatment. One way of understanding the high estimates of the parameter a, the rate at which a dollar of welfare is traded for a dollar of contributions, in empirical examinations of the Grossman-Helpman model (Goldberg and Maggi (1999), Gawande and Bandyopadhyay (2000)) is this: the demand for protection by specific capital owners that were *not* in the winning legislative coalition, even if they made campaign contributions, are ignored. The interest of specific capital owners constituting blocs with $\frac{\Gamma_r^K}{\overline{\Gamma}^L} > 1$ are represented, but those with $\frac{\Gamma_r^K}{\overline{\Gamma}^L} \leq 1$ are not. The legislative process thus blunts the impact of lobbying spending.

Table 5: K_r Weight Shares and the $\frac{\Gamma_r^K}{\overline{\Gamma}^L}$ ratio: Small Country model
Dependent Variable: *Applied Tariffs + NTMs, 2002*

State-wide Vote in Presidential Election	**Districts in House elections** Competitive	Safe Democrat	Safe Republican	Total
Competitive	0.000 [0.000]	0.000 [0.000]	0.104 [1.560]	0.104
Safe Democrat	0.000 [0.000]	0.093 [2.100]	0.000 [0.000]	0.093
Safe Republican	0.000 [0.000]	0.047 [1.576]	0.073 [1.212]	0.120
Total K_r share	0.000	0.140	0.177	0.317

Notes: (1) Each cell (coalition r) reports the K_r-share of total welfare weights and, in square brackets, the $\Gamma_r^K/\overline{\Gamma}^L$ ratio these shares imply for individual factor owners. Note that $\overline{\Gamma}^L$ is invariant. (2) Computational details: Specific capital employed in import-competing sectors determines tariffs. The proportion of specific capital owners in coalition r's population is measured in two steps. First, we measure the proportion of specific capital owners in an NAICS 3-digit industry as the proportion of non-production workers in the industry. Second, its weighted average, using region r's output across the NAICS 3-digit industries as weights, yields n_r^K / n_r. In the table, (i) K_r-share is the proportion of the national weight placed on region r's specific capital owners, $\gamma_r^K = \frac{\Gamma_r^K n_r^K}{\sum_r \Gamma_r^K n_r^K + \gamma^L}$. (ii) In the table, the aggregate weight share of specific capital $\sum_r \gamma_r$ is 0.317. The remainder, 0.683, is the aggregate weight share of labor. (iii) Relative weights $\Gamma_r^K/\overline{\Gamma}^L$ are calculated by dividing coalition r's K-share by the aggregate labor weight share, and multiplying by n^L/n_r^K.

Whose preferences get represented and why? The pattern of estimated weights reported in Table 5 suggests a bargain in the trade policymaking process in the 107$^{\text{th}}$ Congress, plausibly involving Representative Cliff Stearns, Chairman of the Commerce, Trade, and Consumer Protection Subcommittee of the powerful Ways and Means Committee as the "agenda setter." The process is as follows: Stearns proposes the vector $\boldsymbol{\tau}$ and takes a roll-call vote. Stearns represented the 6th CD in Florida, a Safe Republican district in the most competitive State in the 2000 Presidential elections. To form a winning coalition, his proposal would need the support of a legislative majority. The results show that the majority was formed by representatives from districts in four blocs: Safe Republican States + Safe Republican District (80 districts); Safe Democratic State + Safe Democratic District (75); Safe Republican State + Safe Democratic District (51) and Stearns' bloc, Competitive State + Safe Republican District (83). Only in these blocs did the relative weights $\frac{\Gamma_r^{K^M}}{\Gamma^L}$, shown in square brackets in Table 5, exceed one. The cheapest dates were districts in the Safe Republican States + Safe Republican District while the costliest were districts in the Safe Democratic State + Safe Democratic District. Presumably, striking a bargain with them was cheaper (lower tariffs) than other districts, whose support was not required to build the winning coalition.

Figure 1: Estimated $\frac{\Gamma_r^K}{\Gamma^L}$ Weights—Small Country Case

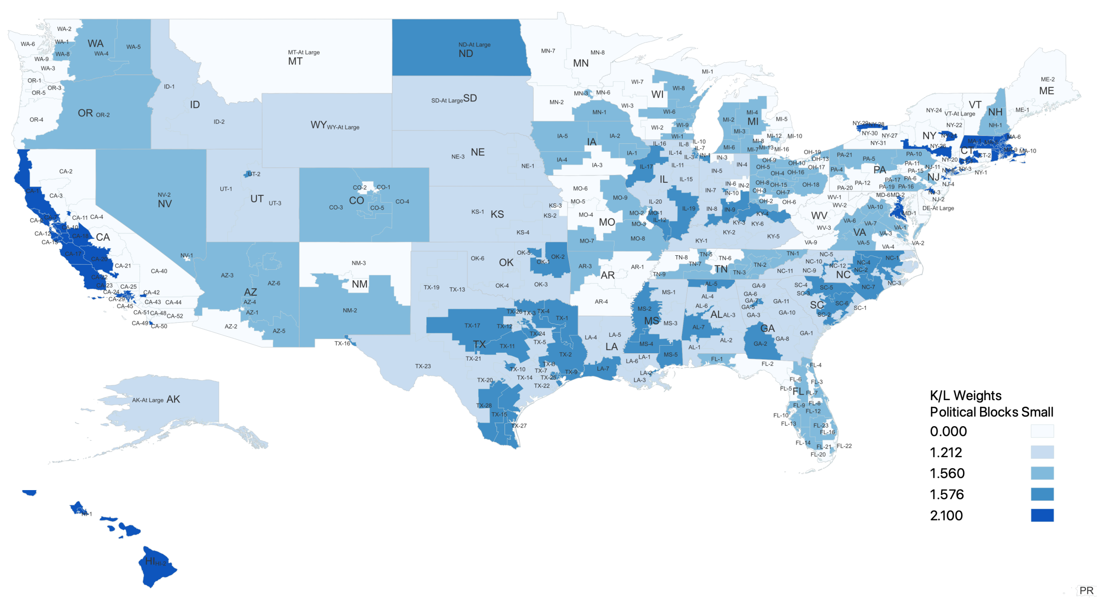


Figure 1 provides a view of the geographic clustering of Congressional Districts based on the ratio of the estimated welfare weights assigned to specific and mobile factors owners. Our estimates suggest that the proposal went even further—it garnered the support of a super-majority in Congress (289 districts), making it presidential veto-proof. There were losers, as well. Districts in the remaining blocs were inessential to winning the vote so the preferences of specific capital owners in the losing coalition were ignored. The estimate suggests evidence of a free-trade bias in the agenda setter's proposed tariffs that garnered a majority in Congress. Populous districts in the industrial East North Central region—the Rust Belt, most in need of protection—were left out of the winning coalition.[44]

[44] Districts with output concentrated in a small set of industries appear to have suffered this fate, because

5.2 Large country case: Countervailing exporter interests

The large country case activates exporter interest, significantly altering the picture. In the specification (20), interests of specific capital employed in the exporting sector Computers (NAICS 3-digit 334) oppose the protectionist interests of specific capital employed in the remaining 3-digit NAICS industries.[45] The 2SLS estimates in the "Large Country" column of Table 3 are used to back out the welfare weights in Table 6 (Appendix Table A.1 contains the first-stage results).

Table 6: K_r^M and K^X Weight Shares (from 2SLS estimates): Large Country Model
Dependent Variable: *Applied Tariffs + NTMs, 2002*

State-Wide Vote in Presidential Election	**Districts in House Elections** Competitive	Safe Democrat	Safe Republican	Total
Competitive	0.000 [0.000]	0.000 [0.000]	0.081 [1.537]	0.081
Safe Democrat	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000
Safe Republican	0.000 [0.000]	0.000 [0.000]	0.113 [2.252]	0.113
Total K_r^M share	0.000	0.000	0.194	0.194
Total K^X share				0.166 [2.906]

Notes: (1) Cells above the Total K^X share row (coalition r) report (i) share of welfare weights placed on import-competing interests K_r^M, and (ii) individual $\Gamma_r^{K^M}/\overline{\Gamma}^L$ ratio in brackets. (2) The Total K^X share row reports the aggregate share of welfare weights on export sector interests and (in brackets) the individual $\Gamma^{K^X}/\overline{\Gamma}^L$ ratio. (4) Computational details: Specific capital employed in both import-competing and export-producing sectors. Aggregate weight on agents' welfare is $\gamma = \sum_r \Gamma_r^{K^M} n_r^{K^M} + \Gamma_r^{K^X} n_r^{K^X} + \gamma^L$. The proportion of coalition r's population owning specific capital in the import-competing and export sectors $n_r^{K^M}/n_r$ and $n_r^{K^X}/n_r$, respectively, are determined as in the small country case. In the Table, (i) K_r^M-share is the proportion of the national weight placed on Coalition r's specific capital owners employed in manufacturing import-competing goods, $\Gamma_r^{K^M} n_r^{K^M}/\gamma$. The welfare-weight share of specific capital employed in import-competing goods is 0.194 (in contrast to 0.317 in the small-country case). (ii) K^X-share is the share of aggregate welfare weight placed on specific capital employed in the export industry "COMPUTER," $\Gamma^{K^X} n^{K^X}/\gamma$, where n^{K^X} is the total employment of specific capital in "COMPUTER." From Table 4, $\widetilde{\beta}^X = 2.690$ is the estimate of $\Gamma^{K^X} n/\gamma$ (see equation 20). Multiplying by n^{K^X}/n $(= 0.063)$ yields the share 0.194 reported in the bottom row. The remainder $1 - 0.166 - 0.194 = 0.640$ is the aggregate weight share of labor. (iii) The relative weights $\Gamma_r^{K^M}/\overline{\Gamma}^L$ are calculated as described in the small country case.

The new finding is the high welfare weight share on K^X owners, equal to 0.166. This came at the expense of specific capital owners employed in import-competing goods. All but two coalitions—Safe Republican State + Safe Republican District (80 districts), and Stearns' bloc, Competitive State + Safe Republican District (83)—got zero welfare weight. The "K_r^M-share" row shows the countervailing power of export interests, that sharply lowered the welfare weight share to K^M owners, from 0.317 (in the small country case) to 0.194. Specific capital on both sides of trade protection got a total welfare weight share equal to

their strong preference for protecting those industries made it costly for them to be included in the winning coalition. Appendix Figure A.1 shows industrial output to often be geographically concentrated.

[45] Our model follows the tradition of one-way trade models (Grossman and Helpman, 1994), where either the good/industry is entirely import-competing or exporting, but not both.

0.360.[46]

The second significant finding about export interests is the high weight placed on an individual specific-factor owner in Computers relative to labor, $\frac{\Gamma^{K^X}}{\overline{\Gamma}^L} = 2.906$. The legislative bargain determining U.S. protection in 2002 was won by export interests. They handily defeated manufacturing interests in the remaining (import-competing) industries. The representation of export interests in (20) is a new contribution to the literature. They account for low overall U.S. tariffs and the large number of tariff lines (70 percent) with zero tariffs. These results also show the potentially moderating effects of exporters on the trade war outcomes estimated by Ossa (2014).

A legislative bargaining interpretation is that the presence of anti-protection export interests reduces the need to satisfy coalitions of protectionist districts. The estimated weights in Table 6 suggest that the agenda setter in Congress, conceivably the Trade Sub-committee Chair representing the coalition of 83 Safe Republican CDs in battleground states, could propose a vector of tariffs and NTMs that would muster the support of representatives from the 80 Safe Republican CDs in Safe Republican states. The vote of the additional 55 representatives that would result in a legislative majority could be drawn from CDs with a presence of specific capital owners in the export industry, such as those in safely controlled by Democratic Congress members in states where the Democrat ticket carried in the 2000 presidential election in the Northeast and the West. The pattern of protection through tariffs and NTMs in the data, thus, resulted in a winning proposal for a majority in Congress. In the winning coalition, the relative weight $\frac{\Gamma_r^{K^M}}{\overline{\Gamma}^L}$ on a specific factor owner employed in the import-competing sector was 1.54 in Safe Republican Districts located in Competitive Presidential states, and 2.25 in Safe Republican Districts located in Safe Republican states. In 2002, exporter interests prevailed in Nash bargaining game where trade policymaking coalitions internalized the TOT effects of a tariff U.S. exports. It is also an explanation for why U.S. trade protection remained low on average and concentrated in a few industries—facts that are not captured in previous political economy models of trade policy.

The agenda setter needs to add only "cheap dates" to exporter coalitions and ignore the strong demands for protection from, for example, manufacturing districts in the East North Central region strongly in need of protection. From this lens, a strategy for the agenda setter is to form a majority by first including all export-oriented regions and then adding protection-seeking regions needed to get a majority in the cheapest way possible. Based on

[46] With exporters, fewer specific capital owners in import-competing industries– only those in regions with $\Gamma_r^{K^M}/\overline{\Gamma}^L > 1$–get represented. Exporters as a strong force behind U.S. protection, a missing variable in the Grossman-Helpman model, is a reason for the large empirical estimates of their parameter a. Here, the impact of lobbying contributions is blunted because only a few of those protection-seeking contributors are needed to build a winning legislative coalition supporting free trade when exporter interests are present.

the share of the export industry (COMPUTER) in the region's total manufacturing output (the $\frac{Q_{gr}}{Q_r}$ column in Table 3 highlights export-oriented blocs), the agenda setter need only satisfy the protectionist demands the two blocs with non-zero weights in Table 6.

Finally, we note that the term $\left(\frac{Q_j/M_j}{-\delta_j} - \frac{1}{1+\epsilon_j^*} + \mu_j \widetilde{\theta}_{jg} \frac{(\overline{p}_g D_g)/(p_j M_j)}{-\delta_j}\right)$ in (20), whose coefficient is constrained to -1, plays an important role in the results.[47] The three individual terms move tariffs in sometimes opposite directions. The optimal tariff, $\frac{1}{1+\epsilon_j^*}$, whose values vary between 0.16 and 0.71, could potentially increase the U.S. tariff on good j by an order of magnitude. On the other hand, the harm to consumer welfare from tariffs on imports, $\frac{Q_j/M_j}{-\delta_j}$, calls for lower tariffs. In the net, the sum of the three components varies between -1.35 and 1.81 with a mean of 0.29. If its variation dominated the variation in tariffs, then the results would be driven largely by this constraint. That is, the portion of tariffs explained by import-competing special interest variables would be of second-order importance relative to concerns about consumer welfare and the optimal tariff. This is the case with U.S. tariffs and is reflected in the low weights received by special interests in the import-competing sector. Applying the model to countries with high tariffs (for instance, India before its 1990s liberalization) would more appropriately highlight the role of special interests in India's protectionism before liberalization, and the influence of export interests in the liberalization.

5.3 Geographic distribution of welfare weights

The distribution of the winning coalitions shows that the small versus large country assumption can produce contrasting results. Figure 1 depicts the geographic distribution of the estimated relative weights $\frac{\Gamma_r^{K^M}}{\overline{\Gamma}^L}$ under the small country assumption, where exporters cannot affect domestic protection. The estimates show how tariffs and NTMs observed in the 2002 data came to be a winning proposal, even when legislators knew the consequence to domestic manufacturing from granting market access to a manufacturing powerhouse like China. Figure 1 suggests that the legislative sieve through which protection was legislated at the time—granting MFN access to China at this time is considered equivalent to legislating the level of protection—resulted in the crowding out, from the winning coalition, of blocs that strongly supported protection (denying China access) by blocs that were ambivalent about protection. The end result was that the politically acceptable protection at the national level for any good was lower than any bloc's district-good preference.

[47] The coefficient -1 implies that: $\frac{Q_j/M_j}{|\delta_j|}$ lowers tariffs (concern for consumer welfare) on average by 0.81; $\frac{1}{1+\delta_j}$ raises tariffs (imposition of optimal tariff) on average by 0.38 and $\frac{\mu_j \widetilde{\theta}_{jg}(\overline{p}_g D_g/p_j M_j)}{|\delta_j|}$ lowers tariffs (TOT effect in the Nash bargaining game of an RoW tariff) on average by 0.14.

Figure 2: Estimated $\frac{\Gamma_r^K}{\Gamma^L}$ Weights—Large Country Case

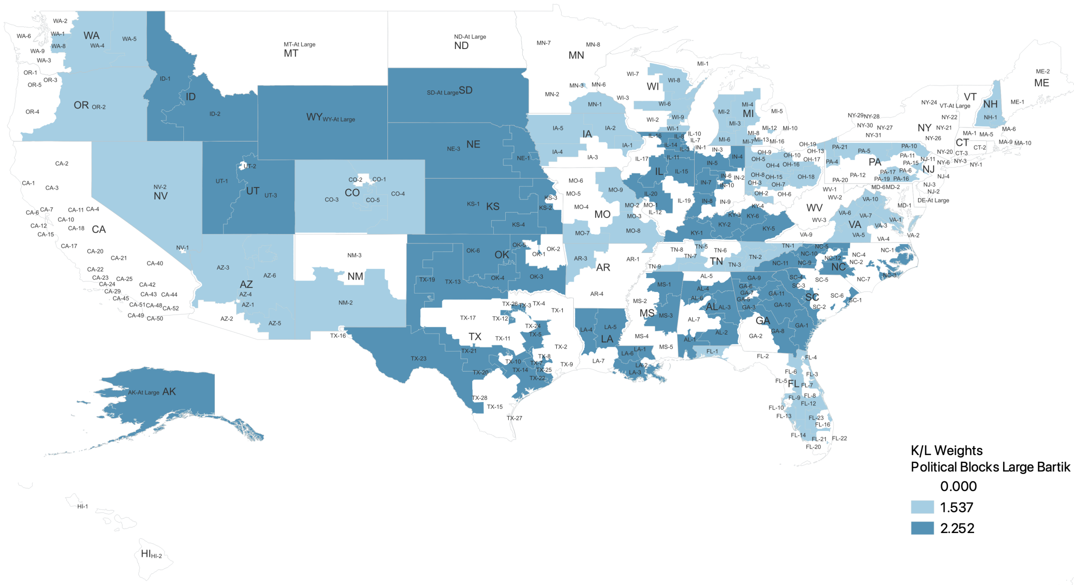
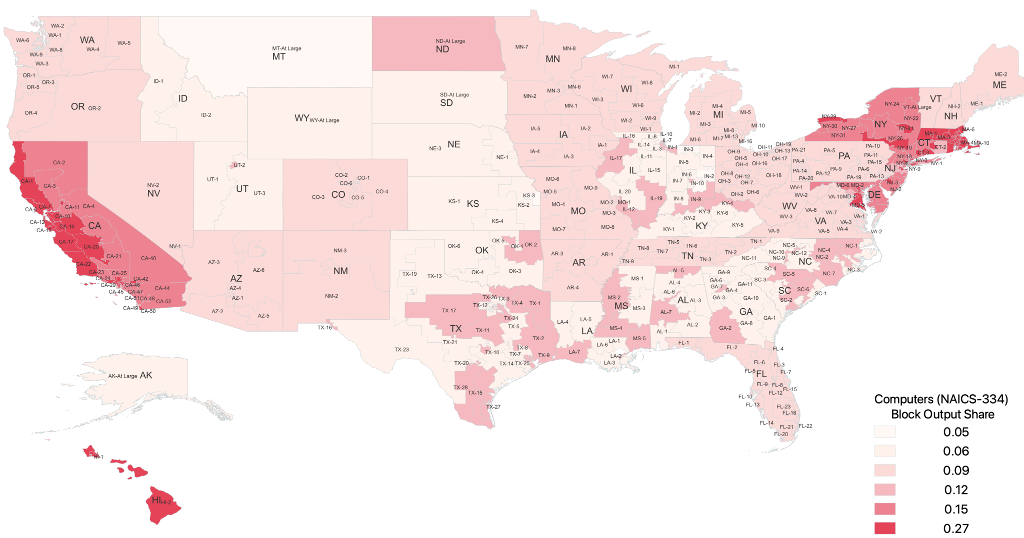


Figure 3: Output Share Computers (NAICS 334) by Political Coalitions



The geographic distribution of relative welfare weights on import-competing interests in the winning coalition in the presence of export interests, producers of computers, is depicted in Figure 2. In this large country case, Congressional districts in California (the Safe Democratic State + Safe Democratic District bloc) are no longer in the protectionist coalition, as they were in Figure 1. While these districts have specific capital employed in import-competing industries, their export interests dominate the tariff game. Figure 3 shows the large output shares of these districts in the export sector.

5.4 Sensitivity Analysis

Our benchmark estimates from equation (20) in the large country model (Table 3 and Table 6) assumed $\mu_j = \mu = 1$ for all goods j. Here, we investigate the sensitivity of K^X-share, the welfare weight shares of specific capital employed in exports, to a range of μ values.[48] Given the set of observed tariffs, this exercise aims to empirically assess how the estimated values of the welfare weights on exporters vary when we choose different values of μ. For instance, lower μ would require a larger welfare weight on the exporters to rationalize the observed level of protection (so that equation (10) holds for a given vector) of tariffs and NTMs. But by how much? Table 7 presents these counterfactual exporter welfare weights.

Table 7: Sensitivity Analysis of Large Country Results

μ	Politics-based Coalitions	
	K^X-share	$\Gamma^{K^X}/\overline{\Gamma}^L$
0.33	0.324	7.56
0.50	0.214	4.87
0.75	0.192	3.51
1.00	0.166	2.91
1.25	0.150	2.57
1.50	0.140	2.35
3.00	0.113	1.84

Notes: Results for $\mu = 1$ correspond to estimates from Table 6.

The estimated welfare weights on export interests to the counterfactual μ's convey information about the upper and lower bounds of the influence of exporters' interests in shaping U.S. tariffs. When μ is low, for example $\mu = 0.33$, the welfare weight share on K^X that rationalizes observed tariffs+NTMs is 0.324, double the share estimated with $\mu = 1$. Notably, even when μ is large, say, $\mu = 3$, the share of the total welfare weight placed on export interests remains significant, equal to 0.113.

6 Conclusion

This paper integrates congressional districts into a political economy model of trade. This is necessary because in the U.S., and many democracies, trade policymaking is an institutionalized process where elected legislative bodies play a central role. In the U.S., the institutional process regulating trade policy relies on delegating "fast track" authority to the Executive

[48]In equation (20), since μ is not separately identified from the price ratio $(p_j/\overline{p}_j)/(p^*_g/\overline{p}_g)$ in equation (21), the thought experiment is to explore sensitivity to μ conditional on $(p_j/\overline{p}_j)/(p^*_g/\overline{p}_g) = 1$.

branch to negotiate a bilateral or multilateral agreement. Under fast track, the trade policy proposal negotiated by the president is subject to an up or down vote by Congress, without amendments, granting the majority party in Congress agenda-setting power over trade policy.

Closely related to our model is the protection-for-sale framework of Grossman and Helpman (1994). However, while GH models the demand for protection by special interests, we build on political geography to explain the supply of protection. We are, thus, able to unpack the parameter "a" in the GH model, the rate at which the government trades welfare for contribution dollars, to account for the relative influence of local interests in the formation of trade policy. Both approaches feature special interests, but our model is built around the representation of congressional districts, the main actors, in the legislative processes. The relative influence of districts is ultimately reflected in the weights received by local economic actors and interests.

The first step in our framework is to characterize the tariff vectors that each congressional district would choose if they were to set the national tariff on their own. These predictions may be used to retrieve the otherwise unobservable local demand for protection at the industry and congressional district levels. The tariff preferences of districts, in turn, reflect the heterogeneous geographic distribution of economic activity. The "independent" demand for protection by districts is much larger than the protection delivered after district preferences are aggregated into national trade policy. This disparity is one explanation for the public backlash against globalization. Our next step is to characterize the national tariff vector as the solution to a legislative bargaining process among district representatives that aggregates their tariff preference into national tariffs.[49]

Using district-level manufacturing data and national imports and tariff data for 2002, we estimate the welfare weights of specific and mobile factors implied by the model. We consider legislative "coalitions" based on electoral dynamics at the Congressional District and the state in Presidential elections. These electoral dynamics are reflected in a weak party system that has historically driven trade policymaking in the U.S. The results from this exercise are substantively important and intuitive: specific factor owners employed in import-competing goods located in districts that can deliver a majority in Congress to the party controlling the Executive branch of government receive positive welfare weights in the determination of national tariffs.

The previous exercise is, however, incomplete. A large body of research on the political economy of protectionism addressed in the paper has neglected the potential influence of *exporter interests*. We account for the *countervailing* influence of specific factor owners in

[49] A model with legislative bargaining determining trade policy is Gawande, Pinto and Pinto (2024).

exporting sectors in a large country setting. The extended model's prediction allows the estimation of a new set of welfare weights separately for specific-factor owners employed in exporting industries and import-competing industries. We find that specific-factor owners in exporting sectors receive welfare weights on par with factor owners in import-competing industries. Further, once exporters are accounted, only specific factor owners located in safe Republican districts in battleground states and in states that voted Republican in the 2000 presidential elections receive positive weights. The influence of exporter interests reflects how the political process in the U.S. has internalized market access concerns in the formation of the country's trade policy. These are important and novel results that add significantly to the literature.

The literature on democratic policymaking, where representatives serve their local economies by bargaining in the legislature for the policies preferred by their constituents, and the literature on the influence of businesses and special interests in policymaking has remained distant from each other. By formally integrating districts—whose tariff preferences are represented in the legislature—into a specific factors model of trade, our paper builds a bridge between these two influential bodies of literature. The model and empirical estimation of its parameters provide a theoretically motivated and empirically grounded explanation for the low tariffs in the U.S. despite the growing public backlash against globalization in the face of the surge of Chinese manufacturing imports starting in the late 1990s and culminating in the China shock. They also provide a foundation for analyzing the political economy underpinnings of both the Smoot-Hawley tariffs in the early twentieth century and the current US-China tariff wars, when the relative influence of exporting industries was overwhelmed by concerns about the distributional effects of trade at home.

The framework developed in the paper naturally extends in several relevant directions. Although labor markets are abstracted in our model, local labor market effects can be integrated into the framework. Second, intermediate goods, both imported and produced domestically, are easily incorporated, as well, into the model.[50] Finally, the model may be extended to examine the role of lobbies in determining trade protection.[51] The analysis would allow lobbies to organize not only nationally at the industry level as in previous studies, but regionally as well, capturing the influence of the surge in political spending on congressional elections. We hope the paper paves the way for future research in this rich and important area.

[50]By accounting for tariff preferences of downstream users of inputs subject to tariffs, Gawande, Krishna and Olarreaga (2012) find that politically organized downstream users are able to reduce these tariffs. The insights of Antras and Chor (2022) into the structure of global supply chains enable our model to be extended in these important directions.

[51]Appendix B.1.3 develops an extension with lobbying as in Grossman and Helpman (1994).

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Online Appendix A: Additional Figures and Tables

Figure A.1: Distribution of $\frac{q_{jr}/M_{jr}}{-\epsilon_j}$ for NAICS 3-digit industries, Lorenz curve and Gini

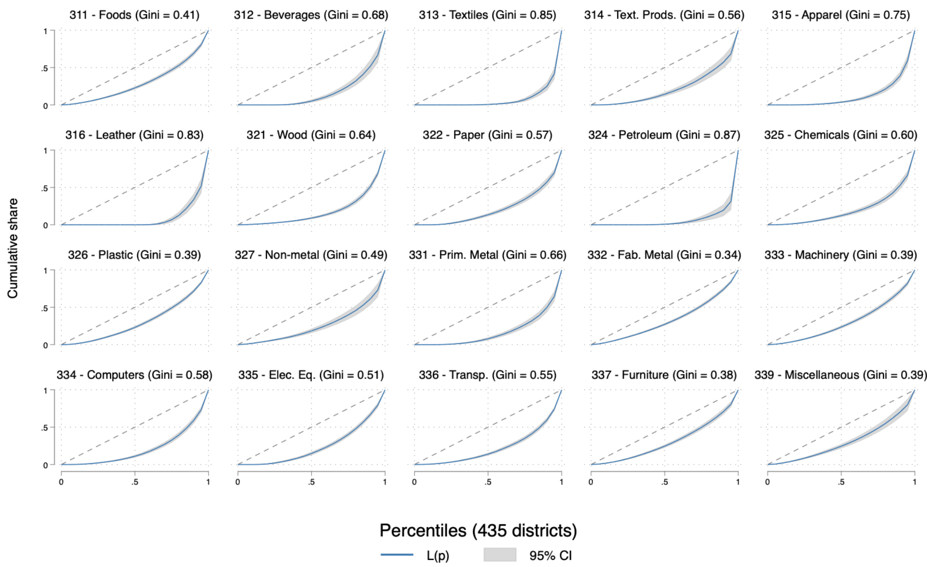

Table A.1: First Stage Regressions for **Large** Country results in Table 4
Using Bartik IVs (BIV) constructed as in (19)

	Competitive State Safe Rep CD $\frac{q_j/M_j}{-\delta_j}$	Safe Rep State Safe Rep CD $\frac{q_j/M_j}{-\delta_j}$	$\mu_j\,\theta_{jg}\,.\,\frac{Q_g/M_j}{-\delta_j}$
$BIV_{Comp\ State/Comp\ CD}$	3.544***	3.182***	0.0785
	(3.67)	(4.05)	(0.84)
$BIV_{Comp\ St./Safe\ Dem\ CD}$	1.395	3.499	0.684***
	(0.71)	(1.97)	(3.94)
$BIV_{Comp\ State/Safe\ Rep\ CD}$	17.93***	7.363*	-2.735***
	(4.81)	(2.14)	(10.49)
$BIV_{Safe\ Dem\ State/Comp\ CD}$	0.117	0.113*	-0.00856
	(1.85)	(2.18)	(1.43)
$BIV_{Safe\ Dem\ State/Safe\ Dem\ CD}$	23.24***	17.65***	-1.808***
	(4.81)	(4.07)	(5.47)
$BIV_{Safe\ Dem\ State/Safe\ Rep\ CD}$	-38.95***	-28.14***	4.717***
	(5.14)	(4.09)	(7.51)
$BIV_{Safe\ Rep\ State/Comp\ CD}$	-3.013*	-3.055**	-0.178
	(2.55)	(3.20)	(1.51)
$BIV_{Safe\ Rep\ State/Safe\ Dem\ CD}$	-13.46***	-12.57***	0.651**
	(4.81)	(4.90)	(3.19)
$BIV_{Safe\ Rep\ State/Safe\ Rep\ CD}$	20.44***	21.11***	-1.738***
	(4.32)	(4.83)	(4.75)
Constant	-13.60***	-10.69***	0.712**
	(4.08)	(3.49)	(3.02)
N	7675	7675	7675
R^2	0.743	0.827	0.862
adj. R^2	0.742	0.826	0.862

Notes: (i) t-values in parentheses; errors clustered at HS 2-digits. (ii) See notes to Table 4 in the paper. Weak-instrument statistics are at the bottom of the table containing 2SLS estimates.

Online Appendix B – Model Derivations and Extensions

B.1 Model with importing sectors only

B.1.1 General framework

Notation. The following notation is used throughout this section:

- The economy consists of J sectors, with $j = 0, 1, ..., J$, and R regions, with $r = 1, ..., R$. There are two types of economic agents: $m = L$, owners of a non-specific factor (often defined as a mobile factor of production); $m = K$, and owners of sector-specific factors of production (often defined as sector-specific capital).
- Non-sector specific factor: Mobile across sectors, but immobile across regions.
  - L_r: units of nonspecific factors in region r.
  - n_r^L: number of type-L individuals in r.
  - $\mathbf{n}_r^L = (n_{0r}^L, n_{1r}^L, n_{2r}^L, \ldots, n_{Jr}^L)$: vector of mobile factors across sectors in district r.
  - $n^L = \sum_r n_r^L$: total number of owners of the mobile factor in the economy.
- Owners of specific factors: Immobile across sectors and regions.
  - K_r: number of owners of the specific factor of production in region r.
  - n_{jr}^K: number of type-K individuals producing in sector j in r; $n_{jr}^K \geq 0$ (not all regions are active in sector j).
  - $\mathbf{n}_r^K = (n_{1r}^K, n_{2r}^K, \ldots, n_{Jr}^K)$: distribution of the specific factor across sectors (vector); the distribution of endowments may differ across regions r.
  - $n_r^K = \sum_{i \in J} n_{ir}^K$: number of type-$K$ individuals in r.
  - $n^K = \sum_r n_r^K$: total number of specific factor owners in the economy.
- Total population in region r is $n_r = n_r^L + n_r^K$, and total population in the economy is $n = n^L + n^K$, where $n^L = \sum_r n_r^L$, $n^K = \sum_r n_r^K$.
- Welfare weights: District and national weights may differ.
  - Λ_{jr}^m: weight district r places on a type-m agent in sector j;
  - Γ_{jr}^m: weight placed at the national level on a type-m agent in sector j and district r.
- Prices:[52] Domestic prices are denoted by $p_0 = 1$, $\mathbf{p} = (p_1, ..., p_J)$, and world prices by $\overline{\mathbf{p}} = (\overline{p}_1, ..., \overline{p}_J)$.

[52] Initially, we develop a framework that does not include terms-of-trade effects (we assume that world prices are taken as exogenously given). We later extend this framework and include terms-of-trade effects.

- Tariffs: Specific tariffs are denoted by t_j, so that $p_j = \overline{p}_j + t_j$, and ad-valorem tariffs by τ_j, so that $p_j = (1+\tau_j)\overline{p}_j$.

Preferences. Following the literature on trade protection, we assume preferences are represented by a quasi-linear utility function: $u^m = x_0 + \sum_{i \in J} u_i^m(x_i)$. Good 0, the numeraire, is sold at price $p_0 = 1$. Goods x_j, the imported goods, are sold domestically at prices p_j. In general, preferences for the imported goods j may differ across types $m = L, K$.[53]

Demand for goods. Consider the utility maximization problem for a representative consumer of type m in region r, with income z_r^m: $\max_{\{x_{jr}^m, j=1,...,J\}} u_r^m = z_r^m - \sum_i p_i x_{ir}^m + \sum_i u_i^m(x_{ir}^m)$. From the FOCs, $-p_j + u^{m\prime}(x_{jr}^m) = 0 \Rightarrow d_{jr}^m \equiv d_{jr}^m(p_j)$, where d_{jr}^m is the demand for good j of a representative consumer of type m in region r. Then, $n_r^m d_{jr}^m$ is the demand for good j of all consumers of type m in region r, and $D_j^m = \sum_r n_r^m d_{jr}^m$ is the aggregate demand for good j for all individuals of type m. Consumers of type m are identical across regions r, so the demand for good j for all individuals of type m is $D_j^m = \left(\sum_r n_r^m\right) d_j^m = n^m d_j^m$. Finally, aggregate demand for good j is $D_j = \sum_m D_j^m = \sum_m n^m d_j^m$.

Consumer surplus. Consumer surplus for a type-m individual from the consumption of good j is defined by $\phi_j^m(p_j) = v_j^m(d_j^m) - p_j d_j^m$, where $v_j^m(p_j) \equiv u_j^m[d_j^m(p_j)]$. Summing over all goods gives the surplus $\sum_i \phi_i^m$. Therefore, consumer surplus for type-m individuals in region r is $\phi_r^m(\mathbf{p}) = n_r^m \sum_i [v_i^m(d_i^m) - p_i d_i^m] = n_r^m \sum_i \phi_i^m = n_r^m \phi^m$, and aggregate consumer surplus for type-m individuals is $\Phi^m = \sum_r \phi_r^m = \sum_r n_r^m \sum_i \phi_i^m = n^m \phi^m$. Note that $\partial \Phi^m / \partial p_j = -n^m d_j^m = -D_j^m$. The indirect utility can be expressed as $v_r^m(\mathbf{p}, z_r^m) = z_r^m + \sum_i [v_i^m(p_i) - p_i d_i^m] = z_r^m + \sum_i \phi_i^m(p_i)$. When individuals have identical preferences, $\Phi^m = n^m \phi = n^m \sum_i \phi_i$.

Production. The production of good 0 only requires the mobile non-specific factor of production and uses a linear technology represented by $q_{0r} = w_{0r} n_{0r}^L$, where $w_{0r} > 0$. The wage received by workers in sector $\{0r\}$ is w_{0r}. Good j is produced domestically using a CRS production function $q_{jr} = F_{jr}(n_{jr}^K, n_{jr}^L) = f_{jr}(n_{jr}^L)$, where n_{jr}^K is sector-region specific (immobile across sectors and regions). We omit, to simplify notation, n_{jr}^K from the production function from now onwards.

Profits. Profits in sector-region $\{jr\}$ are $\pi_{jr} \equiv p_j f_{jr}(n_{jr}^L) - w_{jr} n_{jr}^L$, and the demand for the mobile factor in sector-region jr is defined by $p_j f_{jr}'(n_{jr}^L) = w_{jr}$, which defines $n_{jr}^{L,D} \equiv n_{jr}^L(p_j, w_{jr})$. The profit function becomes $\pi_{jr}(p_j, w_{jr}) \equiv p_j f_{jr}(n_{jr}^{L,D}) - w_{jr} n_{jr}^{L,D}$. The production of good j in region r (using the envelope theorem) is given by $\partial \pi_{jr}(p_j, w_{jr}) / \partial p_j = q_{jr}(p_j, w_{jr})$. Aggregate production of good j is $Q_j = \sum_r q_{jr}$. Workers employed in sector $\{jr\}$ receive w_{jr}, $j = 0, 1, ..., J$. Since workers are perfectly mobile across sectors, $w_{0r} = w_{jr} = w_r$ in equilibrium.

[53]The analysis performed in the text assumes that agents have identical preferences.

Imports and tariff revenue Imports of good j are $M_j = D_j - Q_j$. Let $\overline{p}_j$ denote the internationally given price of good j. Revenue generated from tariff collection is $T = \sum_i t_i M_i$, where $t_i = p_i - \overline{p}_i$. Note that

$$\frac{\partial T}{\partial t_j} = M_j + t_j M_j' = M_j \left(1 + \frac{t_j}{p_j}\epsilon_j\right), \ \text{ where } \epsilon_j \equiv M_j' p_j / M_j.$$

Total utility. The total utility of the mobile factor in sector-region $\{jr\}$ is

$$W_{jr}^L = w_{jr} n_{jr}^L + n_{jr}^L \frac{T}{n} + n_{jr}^L \phi_r^L = w_{jr} n_{jr}^L + n_{jr}^L \frac{T}{n} + n_{jr}^L \frac{\Phi^L}{n^L}.$$

An increase in the tariff on good j affects the utility of the mobile factor as follows:

$$\frac{\partial W_{jr}^L}{\partial p_j} = \frac{n_{jr}^L}{n}\frac{\partial T}{\partial p_j} + \frac{n_{jr}^L}{n^L}\frac{\partial \Phi^L}{\partial p_j} = \frac{n_{jr}^L}{n}(M_j + t_j M_j') - n_{jr}^L \frac{D_j^L}{n^L}.$$

The total utility of specific factor owners in sector-region $\{jr\}$ is

$$W_{jr}^K = \pi_{jr} + n_{jr}^K \frac{T}{n} + n_{jr}^K \frac{\Phi^K}{n^K}.$$

Note that

$$\frac{\partial W_{jr}^K}{\partial p_j} = q_{jr} + \frac{n_{jr}^K}{n}(M_j + t_j M_j') - n_{jr}^K \frac{D_j^K}{n^K}.$$

Region r's welfare. The welfare of mobile factors in region r is $\Omega_r^L = \sum_i \Lambda_{ir}^L W_{ir}^L$, or

$$\Omega_r^L \;=\; \sum_i \Lambda_{jr}^L w_{jr} n_{jr}^L + \frac{\sum_i \Lambda_{ir}^L n_{ir}^L}{n} T + \frac{\sum_i \Lambda_{ir}^L n_{ir}^L}{n^L} \Phi^L = \lambda_r^L \left(w_r + \frac{T}{n} + \frac{\Phi^L}{n^L}\right),$$

where $\lambda_r^L = \sum_{i=0}^J \Lambda_{ir}^L n_{ir}^L$, and $\Phi^L = n^L \sum_i \phi_i^L$. The welfare of specific factor owners in region r is given by $\Omega_r^K = \sum_i \Lambda_{ir}^K W_{ir}^K$, or

$$\Omega_r^K = \sum_i \Lambda_{ir}^K \pi_{ir} + \frac{\sum_i \Lambda_{ir}^K n_{ijr}^K}{n} T + \frac{\sum_i \Lambda_{ijr}^K n_{ir}^K}{n^K} \Phi^K = \sum_i \Lambda_{ir}^K n_{ir}^K \left(\frac{\pi_{ir}}{n_{ir}^K}\right) + \lambda_r^K \left(\frac{T}{n} + \frac{\Phi^K}{n^K}\right),$$

where $\lambda_r^K = \sum_i \Lambda_{ir}^K n_{ir}^K$. For region r, welfare is given by $\Omega_r = \Omega_r^L + \Omega_r^K = \sum_i \sum_m \Lambda_{ir}^m W_{ir}^m$, or

$$\Omega_r = \lambda_r^L \left(w_r + \frac{T}{n} + \frac{\Phi^L}{n^L}\right) + \sum_i \Lambda_{ir}^K n_{ir}^K \left(\frac{\pi_{ir}}{n_{ir}^K}\right) + \lambda_r^K \left(\frac{T}{n} + \frac{\Phi^K}{n^K}\right)$$

When preferences are identical,

$$\Omega_r = \lambda_r^L w_r + \sum_i \Lambda_{ir}^K n_{ir}^K \left(\frac{\pi_{ir}}{n_{ir}^K}\right) + \lambda_r \left(\frac{T}{n} + \phi\right),$$

where $\lambda_r = \lambda_r^L + \lambda_r^K$, and and $\Phi = n\phi = n\sum_i \phi_i$.

Aggregate welfare. National total welfare is $\Omega = \sum_r \sum_i \sum_m \Gamma_{ir}^m W_{ir}^m$, or

$$\Omega = \sum_r w_r \sum_i \Gamma_{ir}^L n_{ir}^L + \gamma^L \left(\frac{T}{n} + \frac{\Phi^L}{n^L}\right) + \sum_r \sum_i \Gamma_{ir}^K n_{ir}^K \left(\frac{\pi_{ir}}{n_{ir}^K}\right) + \gamma^K \left(\frac{T}{n} + \frac{\Phi^K}{n^K}\right),$$

where $\gamma^m = \sum_r \sum_i \Gamma_{ir}^m n_{ir}^m$. Note that the weights used at the national level, Γ_{jr}^m, may not coincide with those considered at the district level, Λ_{jr}^K. When preferences are identical

$$\Omega = \sum_r w_r \sum_i \Gamma_{ir}^L n_{ir}^L + \sum_r \sum_i \Gamma_{ir}^K n_{ir}^K \left(\frac{\pi_{ir}}{n_{ir}^K}\right) + \gamma \left(\frac{T}{n} + \frac{\Phi}{n}\right),$$

where $\gamma = \gamma^L + \gamma^K$, and $\Phi = n\phi = n\sum_i \phi_i$.

B.1.2 Tariffs

District specific tariffs. Consider the case of specific tariffs with no terms-of-trade effects, i.e. $p_j = \overline{p}_j + t_j$, where $\overline{p}_j$ is taken as exogenously given, so that $\partial p_j / \partial t_j = 1$. The tariff vector that maximizes the total welfare of region r, Ω_r, is determined by the following FOCs:

$$\frac{\partial \Omega_r}{\partial p_j} \equiv \lambda_r^L \left[\frac{1}{n}\left(M_j + t_j M_j'\right) - \frac{D_j^L}{n^L}\right] + \Lambda_{jr}^K n_{jr}^K \left(\frac{q_{jr}}{n_{jr}^K}\right) + \lambda_r^K \left[\frac{1}{n}\left(M_j + t_j M_j'\right) - \frac{D_j^K}{n^K}\right] = 0,$$

for $j = 1, ..., J$, where $D_j^m = n^m d_j^m$. Isolating t_{jr} gives

$$t_{jr} = -\frac{n}{M_j'}\left[\underbrace{\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r}\frac{q_{jr}}{n_{jr}^K}}_{(i)} - \underbrace{\left(\frac{\lambda_r^L}{\lambda_r}\frac{D_j^L}{n^L} + \frac{\lambda_r^K}{\lambda_r}\frac{D_j^K}{n^K}\right)}_{(ii)} + \underbrace{\frac{M_j}{n}}_{(iii)}\right] \tag{22}$$

where $\lambda_r = \lambda_r^L + \lambda_r^K$. Expression (i) in (22) captures the effect of tariff t_j on domestic producers of good j in region r. This effect would tend to rise t_j. Expression (ii) captures the impact of the tariff on consumer surplus. The effect is different for the different groups of individuals L and K. This term tends to put downward pressure on t_j. Finally, expression (iii) captures the impact of the tariff on tariff revenue. Since domestic residents benefit from tariff revenue, this term would tend to increase t_j.

Note that expression (i) reflects the impact of the tariff on the returns to the specific factors, in this case, owners of specific factors in sector j. Given that the model assumes the nonspecific factor is perfectly mobile across sectors within region r (but not across regions), $w_r = w_{jr}$ for all j

in region r. Changes in tariffs do not have an impact on the income of the mobile factor because w_r does not depend on t_j.[54]

When agents have identical preferences i.e., $D_j^L/n^L = D_j^K/n^K = D_j/n$, expression (22) can written as

$$t_{jr} = -\frac{n}{M_j'}\left(\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r}\frac{q_{jr}}{n_{jr}^K} - \frac{n_j^K}{n}\frac{Q_j}{n_j^K}\right). \tag{23}$$

Moreover, if $\Lambda_{jr}^L = \Lambda_{jr}^K = \Lambda_r$,

$$t_{jr} = -\frac{n}{M_j'}\left(\frac{n_{jr}^K}{n_r}\frac{q_{jr}}{n_{jr}^K} - \frac{n_j^K}{n}\frac{Q_j}{n_j^K}\right).$$

Then, $t_{jr} > 0$ if and only if $(n_{jr}^K/n_r)(q_{jr}/n_{jr}^K) > (n_j^K/n)(Q_j/n_j^K)$, or $q_{jr}/n_r > Q_j/n$.

National tariffs. The tariff that maximizes aggregate welfare satisfies

$$\frac{\partial \Omega}{\partial p_j} = \sum_r \Gamma_{jr}^K n_{jr}^K \frac{q_{jr}}{n_{jr}^K} + t_j \gamma \frac{M_j'}{n} - \left(\gamma^L \frac{D_j^L}{n^L} + \gamma^K \frac{D_j^K}{n^K} - \gamma \frac{M_j}{n}\right),$$

where $\gamma = \gamma^L + \gamma^K$. Isolating t_j gives

$$t_j = -\frac{n}{M_j'}\left[\sum_r \frac{\Gamma_{jr}^K n_{jr}^K}{\gamma}\frac{q_{jr}}{n_{jr}^K} - \left(\frac{\gamma^L}{\gamma}\frac{D_j^L}{n^L} + \frac{\gamma^K}{\gamma}\frac{D_j^K}{n^K}\right) + \frac{M_j}{n}\right]. \tag{24}$$

If preferences are identical across groups, then

$$t_j = -\frac{n}{M_j'}\left(\sum_r \frac{\Gamma_{jr}^K n_{jr}^K}{\gamma}\frac{q_{jr}}{n_{jr}^K} - \frac{Q_j}{n}\right). \tag{25}$$

Ad-valorem Tariffs Suppose, as before, that world prices are fixed (i.e., there are no terms-of-trade effects), but tariffs are now ad-valorem. Specifically, $p_j = (1+\tau_j)\overline{p}_j$. This means that $\partial p_j/\partial \tau_j = \overline{p}_j$. Note that $\tau_j = (p_j - \overline{p}_j)/\overline{p}_j$, which means that $\tau_j/(1+\tau_j) = (p_j - \overline{p}_j)/p_j$. When agents have identical preferences i.e., $D_j^L/n^L = D_j^K/n^K = D_j/n$. Then, the district-preferred and national ad-valorem tariffs can be expressed, respectively as

$$\frac{\tau_{jr}}{1+\tau_{jr}} = \frac{n}{-\epsilon_j M_j}\left[\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r}\frac{q_{jr}}{n_{jr}^K} - \frac{Q_j}{n}\right], \quad \frac{\tau_j}{1+\tau_j} = \frac{n}{-\epsilon_j M_j}\left[\sum_r \frac{\Gamma_{jr}^K n_{jr}^K}{\gamma}\frac{q_{jr}}{n_{jr}^K} - \frac{Q_j}{n}\right], \tag{26}$$

where $\epsilon_j \equiv M_j' p_j / M_j < 0$.

[54]If the mobile factor were completely immobile across sectors (also sector-specific), then changes in tariffs would have a differential effect on wages across sectors as well.

B.1.3 Tariffs and Lobbying

Suppose lobbying is organized at the national level and owners of the specific factors (sectors) are in charge of deciding the level of political contributions. Moreover, lobbying is decided at the sectoral level. Specifically, a subset of sectors $\mathcal{O} \subset J$ are organized and engaged in lobbying, and the "central authority" chooses the tariff vector $\mathbf{t} \equiv \{t_1, \ldots, t_J\}$ that maximizes $(C + a\Omega)$, where C are campaign contributions, Ω aggregate welfare, and a captures the trade-off between welfare and contribution dollars (as in GH). The latter is equivalent to maximizing $\mathcal{U} = \sum_{i \in \mathcal{O}} W_i^K + a\Omega$ w.r.t. $\mathbf{t}$, or

$$\max_{\{t_1,\ldots,t_J\}} \mathcal{U} \quad = \quad a \sum_r \sum_i \Gamma_r^L W_{ir}^L + a \sum_r \sum_{i \in J \backslash \mathcal{O}} \Gamma_{ir}^K W_{ir}^K + \sum_r \sum_{i \in \mathcal{O}} (1 + a\Gamma_{ir}^K) W_{ir}^K.$$

For organized sectors $j \in \mathcal{O}$, the specific tariff becomes

$$t_j^{\mathcal{O}} = -A \frac{n}{M_j'} \left\{ \sum_r \left(\frac{\Gamma_{jr}^K n_{jr}^K}{\gamma} + \frac{n_{jr}^K}{a\gamma} \right) \frac{q_{jr}}{n_{jr}^K} - \left[\frac{\gamma^L}{\gamma} \frac{D_j^L}{n^L} + \left(\frac{\gamma^K}{\gamma} + \frac{n_j^K}{a\gamma} \right) \frac{D_j^K}{n^K} \right] + \frac{1}{A} \frac{M_j}{n} \right\},$$

where $A \equiv a\gamma/(a\gamma + n_j^K)$. For sectors that are not organized (i.e., $j \in J \backslash \mathcal{O}$), the tariff t_j is the same as before.

Comparing tariffs How do the (specific) tariffs change if a sector becomes organized and lobbies for protection? We now compare the tariff t_j derived earlier in (24) to $t_j^{\mathcal{O}}$. Specifically,

$$t_j^{\mathcal{O}} - t_j \quad = \quad \frac{n_j^K}{\left(a\gamma + n_j^K\right)} \left[\frac{n}{M_j'} \left(\frac{D_j^K}{n^K} - \frac{Q_j}{n_j^K} - \frac{M_j}{n} \right) - t_j \right].$$

As $a \to \infty$, $A \to 1$, and $(t_j^{\mathcal{U}} - t_j) \to 0$; this means that tariffs are exactly the same. If $a = 0$, then the tariff for sector j becomes $t_j^{\mathcal{U}} = (n/M_j')[(D_j^K/n^K) - (Q_j/n_j^K) - (M_j/n)]$. Note that in this case, the tariff does not depend on Γ_{jr}^m.

B.2 Model with multiple ($G > 1$) exporting sectors

Suppose there are two countries: country US (or the domestic country), and country RoW (the foreign country, or, the rest of the world). We will the symbol "$*$" to denote variables referring to RoW. We also incorporate into the present framework terms of trade (TOT) effects, so that tariffs imposed by an individual country may affect equilibrium world prices.

Notation. From the perspective of the domestic country US, the economy can be described as follows. There are three types of goods: a numeraire good 0, or sector 0, importable goods: $i = 1, ..., \langle j \rangle, ..., J$, or sector M (exportable sector for RoW or M^*), and more than one exportable good: $g = 1, ..., \langle s \rangle, ..., G$, or sector X (importable sector for RoW, or X^*). Factors of production are allocated across sectors as follows: $n^L = n^{L^0} + n^{L^M} + n^{L^X}$, $n^L = n^{L^0} + n^{L^M} + n^{L^X}$, and $n = n^L + n^K$, where $n^{L^0} = \sum_r n_r^{L^0}$, $n^{L^M} = \sum_r \sum_i n_{ir}^{L^M}$, $n^{L^X} = \sum_r \sum_g n_{gr}^{L^X}$, $n^{K^M} = \sum_r \sum_i n_{ir}^{K^M}$, $n^{K^X} = \sum_r \sum_g n_{gr}^{K^X}$. Moreover, since there are only two "countries" (US and RoW), the set of importable goods for US is equal to the set of exportable goods for RoW, and the set of exportable goods for US is equal to the set of importable goods for RoW. Additionally, the market clearing conditions are given by $D_j^M - Q_j^M = Q_j^{M*} - D_j^{M*}$, and $D_s^X - Q_s^X = Q_s^{X*} - D_s^{X*}$.

Ad-valorem tariffs. Suppose that countries set ad-valorem tariffs on importable goods, but they cannot use export subsidies. Specifically, country US sets tariffs on importable goods from RoW, τ_j, and country RoW sets tariffs on importable goods from country US, τ_s^*. The domestic price of good j in country US (p_j) and the foreign country RoW ($\overline{p}_j$) are, respectively,

$$p_j = (1+\tau_j)\overline{p}_j, \quad p_j^* = \overline{p}_j, \tag{27}$$

$$p_s = \overline{p}_s, \quad p_s^* = (1+\tau_s^*)\overline{p}_s. \tag{28}$$

where $\overline{p}_j$ is the international (world) price of good j, and $\overline{p}_s$ is the international (world) price of good s.[55] Note that $\tau_j = (p_j - \overline{p}_j)/\overline{p}_j$, and $(1+\tau_j) = p_j/\overline{p}_j$, so that $\tau_j/(1+\tau_j) = (p_j - \overline{p}_j)/p_j$. This is the wedge between domestic and world price as a proportion of the **domestic price** p_j.

Given the tariffs, the equilibrium prices are determined by the following equations (from the perspective of country US):

$$M_j(p_j) = X_j^*(\overline{p}_j), \quad \text{market for importable goods,} \tag{29}$$

$$X_s(\overline{p}_s) = M_s^*(p_s^*), \quad \text{market for exportable goods.} \tag{30}$$

It follows from (27) and (29) that $p_j(\tau_j)$ and $\overline{p}_j(\tau_j)$. Similarly, from (28) and (30), $p_s^*(\tau_s^*)$ and $\overline{p}_s(\tau_s^*)$.

Comparative static analysis: Domestic country US. Consider good j imported by country US. Differentiating the system of equations (27) and (29) with respect to τ_j gives

$$\frac{\partial \overline{p}_j}{\partial \tau_j} = \frac{\overline{p}_j M_j'(p_j)}{X_j^{*\prime}(\overline{p}_j) - (1+\tau_j)M_j'(p_j)} < 0, \frac{\partial p_j}{\partial \tau_j} = \frac{\overline{p}_j X_j^{*\prime}(\overline{p}_j)}{X_j^{*\prime}(\overline{p}_j) - (1+\tau_j)M_j'(p_j)} > 0.$$

We define elasticities as

$$\epsilon_j = \frac{\partial M_j}{\partial p_j}\frac{p_j}{M_j}, \quad \epsilon_j^* = \frac{\partial X_j^*}{\partial \overline{p}_j}\frac{\overline{p}_j}{X_j^*}, \quad \epsilon_{\tau_j}^{p_j} = \frac{\partial p_j}{\partial \tau_j}\frac{\tau_j}{p_j}, \quad \epsilon_{\tau_j}^{\overline{p}_j} = \frac{\partial \overline{p}_j}{\partial \tau_j}\frac{\tau_j}{\overline{p}_j}.$$

Rewriting the comparative static results in terms of elasticities:

$$\frac{\partial \overline{p}_j}{\partial \tau_j} = \frac{\overline{p}_j}{(1+\tau_j)}\frac{\epsilon_j}{(\epsilon_j^* - \epsilon_j)}, \quad \frac{\partial p_j}{\partial \tau_j} = \overline{p}_j\frac{\epsilon_j^*}{(\epsilon_j^* - \epsilon_j)},$$

or

$$\epsilon_{\tau_j}^{\overline{p}_j} = \frac{\tau_j}{(1+\tau_j)}\frac{\epsilon_j}{(\epsilon_j^* - \epsilon_j)}, \quad \epsilon_{\tau_j}^{p_j} = \frac{\tau_j}{(1+\tau_j)}\frac{\epsilon_j^*}{(\epsilon_j^* - \epsilon_j)} \quad \Rightarrow \quad \frac{\epsilon_{\tau_j}^{\overline{p}_j}}{\epsilon_{\tau_j}^{p_j}} = \frac{\epsilon_j}{\epsilon_j^*}.$$

[55] Since good j is imported by country US, then country US chooses $\tau_j \geq 0$. For the foreign country RoW, $\tau_j^{M*} = 0$, i.e., RoW does not subsidize exports of good j.

Note that

$$\frac{\partial \overline{p}_j/\partial \tau_j}{\partial p_j/\partial \tau_j} = \frac{M_j'}{X_j^{*\prime}} = \frac{1}{(1+\tau_j)}\frac{\epsilon_j}{\epsilon_j^*}, \quad \text{and} \quad \frac{\overline{p}_j}{\partial p_j/\partial \tau_j} = 1 - \frac{\epsilon_j}{\epsilon_j^*}.$$

Comparative statics: Foreign country *RoW*. Consider good s exported by US and imported by RoW. Differentiating the system of equations (28) and (30) with respect to the tariff chosen by RoW, τ_s^*, gives

$$\frac{\partial \overline{p}_s}{\partial \tau_s^*} = \frac{\overline{p}_s M_s^{*\prime}(p_s^*)}{X_s{}'(\overline{p}_s) - (1+\tau_s^*)M_s^{*\prime}(p_s^*)} < 0, \quad \frac{\partial p_s^*}{\partial \tau_s^*} = \frac{\overline{p}_s X_s'(\overline{p}_s)}{X_s{}'(\overline{p}_s) - (1+\tau_s^*)M_s^{*\prime}(p_s^*)} > 0.$$

Using elasticities,

$$\frac{\partial \overline{p}_s}{\partial \tau_s^*} = \frac{\overline{p}_s}{(1+\tau_s^*)}\frac{\epsilon_s^*}{(\epsilon_s - \epsilon_s^*)} = \frac{(\overline{p}_s)^2}{p_s^*}\frac{\epsilon_s^*}{(\epsilon_s - \epsilon_s^*)}, \quad \frac{\partial p_s^*}{\partial \tau_s^*} = \overline{p}_s \frac{\epsilon_s}{(\epsilon_s - \epsilon_s^*)},$$

or

$$\epsilon_{\tau_s^*}^{\overline{p}_s} = \frac{\tau_s^*}{(1+\tau_s^*)}\frac{\epsilon_s^*}{(\epsilon_s - \epsilon_s^*)}, \quad \epsilon_{\tau_s^*}^{p_s^*} = \frac{\tau_s^*}{(1+\tau_s^*)}\frac{\epsilon_s}{(\epsilon_s - \epsilon_s^*)},$$

where ϵ_s is the elasticity of exports of good s from the domestic country US, and ϵ_s^* is elasticity of imports of good s by the foreign country RoW.

Tariff revenue. Using ad-valorem tariffs, the tariff revenue is given by $T = \sum_i \tau_i^M \overline{p}_i^M M_i$. Note that $T \geq 0$, since export subsidies are not allowed in our model. Differentiating T with respect to τ_j:

$$\frac{dT}{d\tau_j} = \frac{\partial T}{\partial \tau_j} + \frac{\partial T}{\partial p_j}\frac{\partial p_j}{\partial \tau_j} = \overline{p}_j M_j + \frac{\tau_j}{(1+\tau_j)} M_j \delta_j \frac{\partial p_j}{\partial \tau_j},$$

where $\delta_j = \epsilon_j \left(\frac{1+\epsilon_j^*}{\epsilon_j^*}\right) < 0$. Note that in the absence of TOT effects, $\delta_j = \epsilon_j$.

Total welfare. The aggregate welfare (in both countries) includes the welfare of both owners of the mobile factor and owners of the specific factors across all sectors: $\Omega = \Omega^L + \Omega^K = \Omega^{L^0} + \Omega^{L^M} +$

$\Omega^{L^X} + \Omega^{K^M} + \Omega^{K^X}$, where[56]

$$\Omega^L = \sum_r \left(\Gamma_r^{L^0} n_{0r}^{L^0} w_{0r} + \sum_i \Gamma_{ir}^{L^M} n_{ir}^{L^M} w_r + \sum_g \Gamma_{gr}^{L^X} n_{gr}^{L^X} w_r \right) + \gamma^L \Upsilon,$$

$$\Omega^K = \sum_r \left[\sum_i \Gamma_{ir}^{K^M} n_{ir}^{K^M} \left(\frac{\pi_{ir}^M (p_i^M)}{n_{ir}^{K^M}} \right) + \sum_g \Gamma_{gr}^{K^X} n_{gr}^{K^X} \left(\frac{\pi_{gr}^X (p_g^X)}{n_{gr}^{K^X}} \right) \right] + \gamma^K \Upsilon,$$

$$\Upsilon = \sum_i \phi_i^M (p_i^M) + \sum_g \phi_g^X (p_g^X) + \frac{T}{n},$$

$$\gamma^L = \sum_r \left(\Gamma_r^{L^0} n_{0r}^L + \sum_i \Gamma_{ir}^{L^M} n_{ir}^{L^M} + \sum_g \Gamma_{gr}^{L^X} n_{gr}^{L^X} \right),$$

$$\gamma^K = \sum_r \left(\sum_i \Gamma_{ir}^{K^M} n_{ir}^{K^M} + \sum_g \Gamma_{gr}^{K^X} n_{gr}^{K^X} \right).$$

Suppose that $\Gamma_r^{L^0} = \Gamma_{jr}^{L,M} = \Gamma_{sr}^{L,X} = \Gamma_r^L$, and $\Gamma_{jr}^{K^M} = \Gamma_{sr}^{K^X} = \Gamma_r^K$ for all j, s. Then, $\gamma^L = \sum_r \Gamma_r^L n_r^L$, and $\gamma^K = \sum_r \Gamma_r^K n_r^K$.

B.2.1 Nash Bargaining

Tariffs are the outcome of the following Nash Bargaining game between the domestic country US and the RoW: choose the vectors of tariffs $\{\tau^M, \tau^{X^*}\}$ that maximize

$$N = \left(\Omega^{US} - \overline{\Omega}^{US} \right)^{\sigma} \left(\Omega^{RoW} - \overline{\Omega}^{RoW} \right)^{(1-\sigma)},$$

taking the tariffs of the other country as given. Equivalently, the tariffs are the solution to the problem: $\max_{\{\tau^M, \tau^{X^*}\}} N = \sigma Log \left(\Omega^{US} - \overline{\Omega}^{US} \right) + (1-\sigma) Log \left(\Omega^{RoW} - \overline{\Omega}^{RoW} \right)$, where $\tau^M = (\tau_1^M, ..., \tau_j, ..., \tau_j)$, and $\tau^{X^*} = (\tau_1^{X^*}, ..., \tau_s^*, ..., \tau_g^*)$. The FOCs with respect to each τ_j (chosen by the domestic country) and τ_s^* (chosen by the foreign country) are given by:[57]

$$\tau_j \quad : \quad \frac{\sigma}{\left(\Omega^{US} - \overline{\Omega}^{US} \right)} \frac{d\Omega^{US}}{d\tau_j} + \frac{(1-\sigma)}{\left(\Omega^{RoW} - \overline{\Omega}^{RoW} \right)} \frac{d\Omega^{RoW}}{d\tau_j} = 0, \quad (31)$$

$$\tau_s^* \quad : \quad \frac{\sigma}{\left(\Omega^{US} - \overline{\Omega}^{US} \right)} \frac{d\Omega^{US}}{d\tau_s^*} + \frac{(1-\sigma)}{\left(\Omega^{RoW} - \overline{\Omega}^{RoW} \right)} \frac{d\Omega^{RoW}}{d\tau_s^*} = 0. \quad (32)$$

Intuition from a two-good model. Suppose that country US produces one importable good j and one exportable good s (this means that the foreign country exports the good j and imports the good s). Rearranging (31) and (32) gives

$$\frac{d\Omega^{US}/d\tau_j}{d\Omega^{US}/d\tau_s^*} = \frac{d\Omega^{RoW}/d\tau_j}{d\Omega^{RoW}/d\tau_s^*} \quad \Rightarrow \quad \frac{d\Omega^{US}}{d\tau_j} - \left[\frac{d\Omega^{RoW}/d\tau_j}{d\Omega^{RoW}/d\tau_s^*} \right] \frac{d\Omega^{US}}{d\tau_s^*} = 0. \quad (33)$$

[56]We assume identical preferences for the two types of agents.

[57]Remember that countries only choose import tariffs, i.e., countries cannot subsidy exports.

Consider the following interpretation of expression (33). Suppose that the agreement between countries U and RoW is such that when a country US raises the tariff on exports from country RoW, RoW is "entitled" to increase the tariff on exports from U such that the utility in RoW is unchanged (similarly if RoW is the country raising the tariff). In other words, $\frac{d\Omega^{RoW}/d\tau_j}{d\Omega^{RoW}/d\tau_s^*} = \frac{d\tau_s^*}{d\tau_j}$, because RoW increases its tariff so that Ω^{RoW} remains constant. In this case, the expression between $[\cdot]$ in (33) would represent the increase in the tariff by country RoW in response to an increase in the tariff by country US "authorized" by the agreement in place. Now, this increase in τ_s^* would negatively affect country US's (net) welfare because a higher τ_s^* lowers the price received by exporters from US.[58]

General case. Now, assume country US (RoW) imports (exports) J goods and exports (imports) G goods. The analysis below focuses on the determination of tariffs from the perspective of the domestic country US. From (31):

$$\frac{d\Omega^{US}}{d\tau_j} + \left[\frac{(1-\sigma)/\left(\Omega^{RoW} - \overline{\Omega}^{RoW}\right)}{\sigma/\left(\Omega^{US} - \overline{\Omega}^{US}\right)}\right] \frac{d\Omega^{RoW}}{d\tau_j} = 0. \tag{34}$$

We want to derive an expression for $[\cdot]$ in (34) above. Summing (32) over all goods exported (imported) by country US (RoW):

$$\frac{\sigma}{\left(\Omega^{US} - \overline{\Omega}^{US}\right)} \sum_g \frac{d\Omega^{US}}{d\tau_g^*} + \frac{(1-\sigma)}{\left(\Omega^{RoW} - \overline{\Omega}^{RoW}\right)} \sum_g \frac{d\Omega^{RoW}}{d\tau_g^*} = 0. \tag{35}$$

Isolating $[\cdot]$ from the previous expression gives

$$\left[\frac{(1-\sigma)/\left(\Omega^{RoW} - \overline{\Omega}^{RoW}\right)}{\sigma/\left(\Omega^{US} - \overline{\Omega}^{US}\right)}\right] = -\frac{\sum_g d\Omega^{US}/d\tau_g^*}{\sum_g d\Omega^{RoW}/d\tau_g^*}. \tag{36}$$

Substituting (36) into (34) and rearranging, we obtain

$$\frac{d\Omega^{US}}{d\tau_j} - \underbrace{\left[\frac{d\Omega^{RoW}/d\tau_j}{\sum_g d\Omega^{RoW}/d\tau_g^*}\right]}_{\mu_j > 0} \times \underbrace{\sum_g \frac{d\Omega^{US}}{d\tau_g^*}}_{\substack{\text{impact of } RoW\text{'s tariffs} \\ \text{on the welfare of} \\ US \text{ producers of exportables}}} = 0. \tag{37}$$

where

$$\frac{d\Omega^{US}}{d\tau_j^M} = \frac{\partial\Omega^{US}}{\partial p_j}\frac{\partial p_j}{\partial \tau_j^M} + \frac{\partial\Omega^{US}}{\partial \tau_j}, \quad \text{and} \quad \frac{d\Omega^{US}}{d\tau_s^*} = \frac{\partial\Omega^{US}}{\partial \overline{p}_s}\frac{\partial \overline{p}_s}{\partial \tau_s^*}. \tag{38}$$

Note that in the previous expression $\partial\Omega^{US}/\partial\tau_s^* = 0$, since the impact of τ_s^* on the welfare of country US only takes place through the TOT effects, and for ad-valorem tariffs, $\partial p_j/\partial\tau_j^M = \overline{p}_j + \tau_j \frac{\partial \overline{p}_j}{\partial \tau_j}$.

[58] We say "net" because the lower price would benefit consumers of the exportable good s in US.

Interpretation of the term between $[\cdot]$ in (37). When country US increases τ_j, it affects RoW because τ_j has a negative impact on $\overline{p}_j$. This effect is captured by $\frac{d\Omega^{RoW}}{d\tau_j}$. RoW, in turn, may potentially raise all tariffs in τ^*.[59] This increase ultimately affects producers and consumers of the exportable goods in country US (because τ_s^* negatively affects $\overline{p}_s$).

Suppose country US is "small" relative to RoW. In this case, $\partial\overline{p}_j/\partial\tau_j = 0$, $d\Omega^{RoW}/d\tau_j = 0$, so there is no interaction between US and RoW, and $d\Omega^{US}/d\tau_j = \partial\Omega^{US}/\partial\tau_j$, which is the same expression we obtained earlier when only importable goods are considered.

B.2.2 Effect of changes in prices and tariffs on welfare

Impact of a change in $\overline{p}_s$. What is the impact on the welfare of US of a change in the international price of exports (due to a change in tariffs by the foreign country RoW)? A change in $\overline{p}_s$ (a decrease in $\overline{p}_s$ when country RoW imposes a higher import tariff on good s) affects both producers and consumers of good s in US. Producers of good s are active in different regions r in the domestic country. Therefore, the impact of a change in $\overline{p}_s$ is spread across all (active) regions in country US affecting welfare in U as follows:

$$\frac{\partial\Omega^{US}}{\partial\overline{p}_s} = \sum_r \Gamma_{sr}^{K^X} n_{sr}^{K^X} \left(\frac{q_{sr}^X}{n_{sr}^{K^X}}\right) - \frac{\gamma}{n} D_s^X.$$

However, country RoW chooses a vector of tariffs τ^{X^*} that affect all prices received by domestic producers of exportable goods, $\overline{p}_g$. The impact of such change on the domestic country US is

$$\sum_g \frac{\partial\Omega^{US}}{\partial\overline{p}_g} = \sum_r \sum_g \Gamma_{gr}^{K^X} n_{gr}^{K^X} \left(\frac{q_{gr}^X}{n_{gr}^{K^X}}\right) - \frac{\gamma}{n} \sum_g D_g^X.$$

Impact of change in p_j. The direct impact of changes in domestic prices on the domestic country's welfare (the first term of (38)) is given by

$$\frac{\partial\Omega^{US}}{\partial p_j} = \sum_r \Gamma_{jr}^{K^M} n_{jr}^{K^M} \left(\frac{q_{jr}^M}{n_{jr}^{K^M}}\right) + \frac{\gamma}{n}(\tau_j \overline{p}_j M_j' - D_j).$$

Direct impact of a change in τ_j. A change in τ_j also affects Ω^{US} by affecting tariff revenue T directly and through its impact on the equilibrium world price $\overline{p}_j$:

$$\frac{\partial\Omega^{US}}{\partial\tau_j} = \frac{\gamma}{n} \underbrace{\left(\overline{p}_j + \tau_j \frac{\partial\overline{p}_j}{\partial\tau_j}\right)}_{\partial p_j/\partial\tau_j} M_j.$$

[59] Note that this is a simultaneous decision.

B.2.3 Solution - Ad-valorem tariffs

Suppose the weights placed on fixed factors producing importable (exportable) goods is the same across sectors j (g). Specifically, $\Gamma_{jr}^{K^M} = \Gamma_r^{K^M}$, $\Gamma_{sr}^{K^X} = \Gamma_r^{K^X}$. Substituting the previous expressions into (37), gives

$$\left[\sum_r \Gamma_r^{K^M} n_r^{K^M} \left(\frac{q_{jr}^M}{n_r^{K^M}}\right) + \frac{\tau_j}{1+\tau_j}\frac{\gamma M_j \delta_j}{n} - \frac{\gamma D_j^M}{n}\right]\frac{\partial p_j}{\partial \tau_j} = -\frac{\gamma \overline{p}_j M_j}{n} - \mu_j \sum_g \frac{d\Omega^{US}}{dt_g^{X*}}.$$

Isolating $\tau_j/(1+\tau_j)$ gives

$$\begin{aligned}\frac{\tau_j}{1+\tau_j} \quad = \quad & -\frac{1}{\delta_j}\sum_r \left[\frac{\Gamma_r^{K^M} n_r^{K^M}}{\gamma}\left(\frac{n_r}{n_r^{K^M}}\right)\left(\frac{q_{jr}^M}{M_{jr}}\right)\right] \\ & -\frac{1}{\delta_j}\sum_r \left[\frac{\Gamma_r^{K^X} n_r^{K^X}}{\gamma}\left(\frac{n_r}{n_r^{K^X}}\right)\mu_j \sum_g \theta_{jg}\left(\frac{q_{gr}^X}{M_{jr}}\right)\right] \\ & +\frac{1}{\delta_j}\left[\frac{\epsilon_j}{\epsilon_j^*} + \frac{Q_j^M}{M_j} + \mu_j \sum_g \theta_{jg}\left(\frac{D_g^X}{M_j}\right)\right], \qquad (39)\end{aligned}$$

where $\gamma^L = \sum_r \left(\Gamma_r^{L^0} n_{0r}^L + \Gamma_r^{L^M} n_r^{L^M} + \Gamma_r^{L^X} n_r^{L^X}\right)$, $\gamma^K = \sum_r \left(\Gamma_r^{K^M} n_r^{K^M} + \Gamma_r^{K^X} n_r^{K^X}\right)$, $\gamma = \gamma^L + \gamma^K$, $D_j^M = Q_j^M + M_j$, $M_{jr} = M_j(n_r/n)$, and

$$\delta_j = \epsilon_j \frac{(1+\epsilon_j^*)}{\epsilon_j^*} < 0, \; \theta_{jg} = \frac{\partial \overline{p}_g/\partial \tau_g^*}{\partial p_j/\partial \tau_j} < 0, \; \mu_j = -\frac{d\Omega^{RoW}/d\tau_j}{\sum_g d\Omega^{RoW}/d\tau_g^*} > 0.$$

Note that μ and θ_{jg} capture two related but distinct effects. While μ_j reflects the extent to which the US internalizes the impact of tariffs on the rest of the world (RoW), a consequence of assuming that tariffs are determined through a Nash bargaining process, θ_{jg} represents the effect of tariffs (imposed by both US and RoW) on the prices of US exportable and importable goods.[60] Expression $\theta_{jg}\left(\frac{D_g}{M_j}\right)$ can be rewritten as $\theta_{jg}\frac{D_g}{M_j} = \widetilde{\theta}_{jg}\frac{\overline{p}_g D_g}{p_j M_j}$, where

$$\widetilde{\theta}_{jg} = \frac{(p_j/\overline{p}_j)}{(p_g^*/\overline{p}_g)} \frac{\frac{\epsilon_g^*}{(\epsilon_g - \epsilon_g^*)}}{\frac{\epsilon_j^*}{(\epsilon_j^* - \epsilon_j)}} < 0.$$

[60]With many exportable goods ($G > 1$), the denominator of μ_j sums over all exportable goods. On the other hand, θ_{jg} is specific to each exportable good. Terms of trade (TOT) effects may be nonexistent for some exportable goods (for instance, $\frac{\partial \overline{p}_s}{\partial \tau_s^*}$ could be zero for certain goods s, so that $\theta_{jg} = 0$), but as long as this is not the case for all exportable goods, μ_j would still be positive.

B.3 Nash bargaining model with importing and exporting sectors

Suppose the domestic country US consists of three regions A, B, C. One of the regions is the agenda setter (or "formateur"). The agenda setter also negotiates with the W. In this case, a minimum coalition in the US is formed by two regions.[61]

Consider the coalition form by A and B. Tariffs are the outcome of the following (asymmetric) Nash Bargaining game between the domestic country US and the W: choose the vectors of tariffs $\{\tau, \tau^*\}$ that maximize

$$N = \left(\Omega_A - \overline{\Omega}_A\right)^{\sigma_A} \left(\Omega_B - \overline{\Omega}_B\right)^{\sigma_B} \left(\Omega_W - \overline{\Omega}_W\right)^{\sigma_W}, \quad \Omega_i \geq \overline{\Omega}_i, i = A, B, W,$$

where $\tau = (\tau_1, ..., \tau_j, ..., \tau_J)$, and $\tau^* = (\tau_1^*, ..., \tau_s^*, ..., \tau_S^*)$. Equivalently, the tariffs are the solution to the problem: $\max_{\{\tau,\tau^*\}} \sigma_A Log\left(\Omega_A - \overline{\Omega}_A\right) + \sigma_B Log\left(\Omega_B - \overline{\Omega}_B\right) + \sigma_W Log\left(\Omega_W - \overline{\Omega}_W\right)$. The FOCs for each τ_j (chosen by the domestic country) and τ_s^* (chosen by the foreign country) are given by:[62]

$$\tau_j \quad : \quad \Psi_A \frac{d\Omega_A}{d\tau_j} + \Psi_B \frac{d\Omega_B}{d\tau_j} + \Psi_W \frac{d\Omega_W}{d\tau_j} = 0, \tag{40}$$

$$\tau_s^* \quad : \quad \Psi_A \frac{d\Omega_A}{d\tau_s^*} + \Psi_B \frac{d\Omega_B}{d\tau_s^*} + \Psi_W \frac{d\Omega_W}{d\tau_s^*} = 0. \tag{41}$$

where $\Psi_r \equiv \sigma_r / \left(\Omega_r - \overline{\Omega}_r\right)$.

The analysis below focuses on the determination of tariffs from the perspective of the domestic country US. Consider initially the case of two goods: j, imported by US, and s, exported by US. Then, (40) and (41) can be combined as follows:

$$\psi_A \frac{d\Omega_A}{d\tau_j} + \psi_B \frac{d\Omega_B}{d\tau_j} = \frac{\frac{d\Omega_W}{d\tau_j}}{\frac{d\Omega_W}{d\tau_s^*}} \left(\psi_A \frac{d\Omega_A}{d\tau_s^*} + \psi_B \frac{d\Omega_B}{d\tau_s^*}\right), \tag{42}$$

where $\psi_r \equiv \Psi_r / (\Psi_A + \Psi_B)$. Consider next the general case with J imported goods and S exported goods. From (40):

$$\psi_A \frac{d\Omega_A}{d\tau_j} + \psi_B \frac{d\Omega_B}{d\tau_j} + \frac{\Psi_W}{\Psi_A + \Psi_B} \frac{d\Omega_W}{d\tau_j^M} = 0. \tag{43}$$

Summing (41) over all goods exported (imported) by country US (W):

$$\Psi_A \sum_g \frac{d\Omega_A}{d\tau_g^*} + \Psi_B \sum_g \frac{d\Omega_B}{d\tau_g^*} + \Psi_W \sum_g \frac{d\Omega_W}{d\tau_g^*} = 0 \Rightarrow \frac{\Psi_W}{\Psi_A + \Psi_B} = -\frac{\psi_A \sum_g \frac{d\Omega_A}{d\tau_g^*} + \psi_B \sum_g \frac{d\Omega_B}{d\tau_g^*}}{\sum_g \frac{d\Omega_W}{d\tau_g^*}}. \tag{44}$$

[61] Coalitional Nash Bargaining, as in Battaglini (2021).

[62] Countries can only choose import tariffs (exports cannot be subsidized).

Substituting into (43) and rearranging, we obtain

$$\psi_A \frac{d\Omega_A}{d\tau_j} + \psi_B \frac{d\Omega_B}{d\tau_j} - \underbrace{\left[\frac{d\Omega_W/d\tau_j}{\sum_g d\Omega_W/d\tau_g^*}\right]}_{\mu_j}\left(\psi_A \sum_g \frac{d\Omega_A}{d\tau_g^*} + \psi_B \sum_g \frac{d\Omega_B}{d\tau_g^*}\right) = 0, \tag{45}$$

where

$$\frac{d\Omega_r}{d\tau_j} = \frac{\partial \Omega_r}{\partial p_j^M}\frac{\partial p_j^M}{\partial \tau_j} + \frac{\partial \Omega_{US}}{\partial \tau_j}, \quad \text{and} \quad \frac{d\Omega_r}{d\tau_s^*} = \frac{\partial \Omega_r}{\partial \overline{p}_s^X}\frac{\partial \overline{p}_s^X}{\partial \tau_s^*}, \quad r = A, B. \tag{46}$$

In this case, ψ_r is a weight on region r. Region r, in turn, may have different weights on capital and labor.

Suppose again that region A is the agenda setter and bargains with W, but offers a take-it-or-leave-it offer to B. Then, in this case, A and W would solve:

$$\max_{\{\tau,\tau^*\}} \sigma_A Log[\big(\Omega_A - \overline{\Omega}_A\big) + \sigma_W Log[\big(\Omega_W - \overline{\Omega}_W\big)], \quad \text{subject to} \quad \Omega_B \geq \overline{\Omega}_B. \tag{47}$$

The solution is therefore the same as (45) with weights

$$\psi_A \equiv \frac{\Psi_A}{\Psi_A + \rho_B}, \quad \psi_B \equiv \frac{\rho_B}{\Psi_A + \rho_B}, \tag{48}$$

where ρ_B is the Lagrange multiplier associated with the constraint $\Omega_B \geq \overline{\Omega}^B$.

Welfare in region r includes the welfare of both owners of the mobile factor and owners of the specific factors across all sectors: $\Omega_r = \Omega_r^L + \Omega_r^K = \Omega_r^{L^0} + \Omega_r^{L^M} + \Omega_r^{L^X} + \Omega_r^{K^M} + \Omega_r^{K^X}$, where[63]

$$\begin{aligned}
\Omega_r^L &= \lambda_r^L w_r + \lambda_r^L \Upsilon(\mathbf{p}), \\
\Omega_r^K &= \sum_i \Lambda_{ir}^{K^M} n_{ir}^{K^M}\left(\frac{\pi_{ir}^M(p_i^M)}{n_{ir}^{K^M}}\right) + \sum_g \Lambda_{gr}^{K^X} n_{gr}^{K^X}\left(\frac{\pi_{gr}^X(p_g^X)}{n_{gr}^{K^X}}\right) + \lambda_r^K \Upsilon(\mathbf{p}), \\
\Upsilon(\mathbf{p}) &= \sum_i \phi_i^M(p_i^M) + \sum_g \phi_g^X(p_g^X) + \frac{T(\mathbf{p})}{n}, \\
\lambda_r^L &= \Lambda_r^{L^0} n_{0r}^L + \sum_i \Lambda_{ir}^{L^M} n_{ir}^{L^M} + \sum_g \Lambda_{gr}^{L^X} n_{gr}^{L^X}, \\
\lambda_r^K &= \sum_i \Lambda_{ir}^{K^M} n_{ir}^{K^M} + \sum_g \Lambda_{gr}^{K^X} n_{gr}^{K^X}, \\
\lambda_r &= \lambda_r^L + \lambda_r^K.
\end{aligned} \tag{49}$$

[63] We assume identical preferences for the two types of agents.

Note that

$$\begin{aligned}
\frac{\mathrm{d}\Omega_r}{\mathrm{d}\tau_j} &= \Lambda_{jr}^{K^M} n_{jr}^{K^M} \frac{q_{jr}^M}{n_{jr}^{K^M}} \frac{\partial p_j^M}{\partial \tau_j} + \lambda_r \frac{\partial \Upsilon}{\partial \tau_j}, \\
&= \Lambda_{jr}^{K^M} n_{jr}^{K^M} \frac{q_{jr}^M}{n_{jr}^{K^M}} \frac{\partial p_j^M}{\partial \tau_j} + \lambda_r \left(-\frac{D_j}{n} \frac{\partial p_j^M}{\partial \tau_j} + \overline{p}_j^M \frac{M_j}{n} + \frac{\tau_j}{1+\tau_j} \frac{M_j}{n} \delta_j \frac{\partial p_j^M}{\partial \tau_j} \right) \\
\sum_g \frac{\mathrm{d}\Omega_r}{\mathrm{d}\tau_s^*} &= \sum_g \Lambda_{gr}^{K^X} n_{gr}^{K^X} \frac{q_{gr}^X}{n_{gr}^{K^X}} \frac{\partial p_g^X}{\partial \tau_g^*} + \sum_g \lambda_r \frac{\partial \Upsilon}{\partial \tau_g^*}, \\
&= \sum_g \Lambda_{gr}^{K^X} n_{gr}^{K^X} \frac{q_{gr}^X}{n_{gr}^{K^X}} \frac{\partial p_g^X}{\partial \tau_g^*} - \sum_g \lambda_r \frac{D_g}{n} \frac{\partial p_g^X}{\partial \tau_g^*} \qquad (50)
\end{aligned}$$

where $p_j^M = (1+\tau_j)\overline{p}_j^M$, and $p_g^X = \overline{p}_g^X$. As a result, the solution to

$$\psi_A \frac{d\Omega_A}{d\tau_j} + \psi_B \frac{d\Omega_B}{d\tau_j} = -\mu_j \left(\psi_A \sum_g \frac{d\Omega_A}{d\tau_g^*} + \psi_B \sum_g \frac{d\Omega_B}{d\tau_g^*} \right) \Rightarrow$$

can be expressed as

$$\begin{aligned}
\frac{\tau_j}{1+\tau_j} &= \frac{1}{\delta_j} \left(\frac{\varepsilon_j^M}{\varepsilon_j^{X^*}} + \frac{Q_j^M}{M_j} + \mu_j \sum_g \theta_{jg} \frac{D_g}{M_j} \right) \\
&\quad - \frac{1}{\delta_j (M_j/n)} \sum_{r=A,B} \frac{\psi_r \Lambda_{jr}^{K^M} n_{jr}^{K^M}}{\tilde{\lambda}} \frac{q_{jr}^M}{n_{jr}^{K^M}} \\
&\quad - \frac{\mu_j}{\delta_j (M_j/n)} \sum_g \theta_{jg} \sum_{r=A,B} \left(\frac{\psi_r \Lambda_{gr}^{K^X} n_{gr}^{K^X}}{\tilde{\lambda}} \frac{q_{gr}^X}{n_{gr}^{K^X}} \right), \qquad (51)
\end{aligned}$$

where $\tilde{\delta} = \psi_A \lambda_A + \psi_B \lambda_B$. This means that weights on importers and exporters are given in this case by

$$\text{importers}: \quad \frac{\psi_r \Lambda_{gr}^{K^X} n_{gr}^{K^X}}{\tilde{\lambda}}, \qquad (52)$$

$$\text{exporters}: \quad \frac{\psi_r \Lambda_{gr}^{K^X} n_{gr}^{K^X}}{\tilde{\lambda}}. \qquad (53)$$

B.4 Comparison with Grossman–Helpman Model

Our model provides supply-side foundation with decentralized policymakers for the parameter a in the Grossman and Helpman (1994) model. Consider the GH model in which all sectors are organized as lobbies, where α^K denotes the fraction of the population that owns specific capital and whose interests lobbies represent. In our model, this fraction is $\alpha^K = n^K/n$. While a unitary government dispenses protection in the GH model, with legislatures and districts, expression (9) becomes the counterpart to GH's Proposition 2, where the tariff on good j is predicted to be

$$\frac{\tau_j}{1+\tau_j} = \frac{(1-\alpha^K)}{a+\alpha^K}\left(\frac{Q_j/M_j}{-\epsilon_j}\right). \tag{54}$$

In (54), α^K is the proportion of the population with specific capital ownership. Eliminating districts in (9) is achieved by reducing the coefficients on the $\left(\frac{q_{jr}/M_j}{-\epsilon_j}\right)$ terms to a constant. Forcing the welfare weight on specific capital owners to be invariant across (goods and) districts r "folds" our model in this manner. Suppose $\Gamma^K_{jr} = \Gamma^K$ for all j and r. Then, noting that the aggregate welfare weight to owners of specific capital $\gamma^K = \Gamma^K n^K$, (9) may be written as

$$\frac{\tau_j}{1+\tau_j} = \sum_{r=1}^{R} \frac{\Gamma^K n^K}{(\gamma^K+\gamma^L)}\frac{1}{\alpha^K}\left(\frac{q_{jr}/M_j}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right) = \left[\frac{\gamma^K}{(\gamma^K+\gamma^L)}\frac{1}{\alpha^K} - 1\right]\left(\frac{Q_j/M_j}{-\epsilon_j}\right),$$

where the first equality uses $\alpha^K = \frac{n^K}{n}$ and the second equality uses $\sum_r q_{jr} = Q_j$. Defining $\widetilde{\gamma}^K$ as the share $\widetilde{\gamma}^K = \frac{\gamma^K}{(\gamma^K+\gamma^L)}$, yields

$$\frac{\tau_j}{1+\tau_j} = \frac{(\widetilde{\gamma}^K - \alpha^K)}{\alpha^K}\left(\frac{Q_j/M_j}{-\epsilon_j}\right).$$

In the GH model (54), τ_j approaches zero as $a \to \infty$, i.e., the government becomes singularly welfare-minded. In our model, folded to simulate a unitary government, τ_j approaches zero as $\widetilde{\gamma}^K \to \alpha^K$. This is the same situation noted above where the owner of (mobile) labor and the owner of specific capital get the same welfare weights. If owners of capital and owners of labor are treated equally, the classic free trade result is obtained. The unitary government chooses positive tariffs in the GH model if a is finite. In the folded version of our model, with no role for legislative bargaining, the reason for positive tariffs is $\widetilde{\gamma}^K > \alpha^K$. However, why specific factors get a larger representation than their numbers is unclear since legislative bargaining is eliminated as an explanation. The GH framework offers an explanation based on lobbying activities. A closer parallel with the GH model is possible by letting the weight on specific capital owners be sector-varying before folding, or $\Gamma^K_{jr} = \Gamma^K_j$ for all r. From (9),

$$\frac{\tau_j}{1+\tau_j} = \sum_{r=1}^{R} \frac{\Gamma^K_j n^K_j}{(\gamma^K+\gamma^L)}\frac{1}{\alpha^K_j}\left(\frac{q_{jr}/M_j}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right) = \frac{(\widetilde{\gamma}^K_j - \alpha^K_j)}{\alpha^K_j}\left(\frac{Q_j/M_j}{-\epsilon_j}\right).$$

Using $\alpha_j^K = \frac{n_j^K}{n}$, the fraction of specific capital owners employed in sector j yields the first equality. Defining $\widetilde{\gamma}_j^K = \frac{\Gamma_j^K n_j^K}{\gamma^K + \gamma^L}$, the share of aggregate welfare given to specific capital in sector j, yields the second equality. Thus, sector j interests are represented by the continuous variable $\frac{(\widetilde{\gamma}_j^K - \alpha_j^K)}{\alpha_j^K}$ – akin to the binary existence-of-lobbying-organization variable in the GH model – bringing our version closer to GH. However, the mechanism determining the national tariff in our model as a function of legislative bargaining differs from GH.

Online Appendix C

C.1 Congressional District Data

C.1.1 Employment Data

Source: Bureau of Labor Statistics. **File names:** 2002_qtrly_by_industry
Data Source: BLS Employment Data

1. Employment by State S and industry IND (E^S_{IND}).
2. Employment by State S for all the manufacturing sector (E^S_{MANUF}).
3. Employment by County C and industry IND (E^C_{IND}): there are non-disclosed observations at this level; however, these values represent a small proportion of total observations (less than 17% of the data).
4. Despite data being reported at the state level, there are a number of non-disclosed observations. In some instances, we use data available at the county level to impute the aggregate as follows:
   (a) Output per worker: $\bar{A}_i = \frac{Employment_i}{RealSectoralOutput_i}$,
   (b) Re-scaled output per worker: $A_i = n\frac{A_{ind}}{\sum_{ind \in I} \bar{A}_{ind}}$.

C.1.2 GDP Data

Source: Bureau of Economic Analysis (BEA). **Files names:** SAGDP2N and CAGDP2
Data Source: BEA Output Data

1. GDP by State S and industry IND, for all industries (Y^S_{IND}): these data are dissaggregated for most industries, except for $Y^S_{311-312} = Y^S_{311} + Y^S_{312}$; $Y^S_{313-314} = Y^S_{313} + Y^S_{314}$; and $Y^S_{315-316} = Y^S_{315} + Y^S_{316}$.
   We impute Y^S_{311}, Y^S_{312}, Y^S_{313}, Y^S_{314}, Y^S_{315}, Y^S_{316}, as follows:
   (a) Estimate weights using employment data calculated above:
   $\phi^S_{311} = \frac{N^S_{311}}{N^S_{311}+N^S_{312}}$; $\phi^S_{312} = \frac{N^S_{312}}{N^S_{311}+N^S_{312}}$; $\phi^S_{313} = \frac{N^S_{313}}{N^S_{313}+N^S_{314}}$; $\phi^S_{314} = \frac{N^S_{314}}{N^S_{313}+N^S_{314}}$; $\phi^S_{315} = \frac{N^S_{315}}{N^S_{315}+N^S_{316}}$; and $\phi^S_{316} = \frac{N^S_{316}}{N^S_{315}+N^S_{316}}$
   (b) Calculate Y^S_{311}, Y^S_{312}, Y^S_{313}, Y^S_{314}, Y^S_{315} and Y^S_{316} as:
   $Y^S_{311} = \phi^S_{311} * Y^S_{311-312}$; $Y^S_{312} = \phi^S_{312} * Y^S_{311-312}$; $Y^S_{313} = \phi^S_{313} * Y^S_{313-314}$; $Y^S_{314} = \phi^S_{314} * Y^S_{313-314}$; $Y^S_{315} = \phi^S_{315} * Y^S_{315-316}$; and $Y^S_{316} = \phi^S_{316} * Y^S_{315-316}$
2. GDP by county C and industry IND (Y^C_{IND}): In contrast to state level data, county GDP data are only available at the aggregated level of total manufacturing (and also durables, and non-durables). We construct Y^C_{IND} as follows:
   Calculate employment weights: $\phi^C_{31} = \frac{N^C_{31}}{N^C_{31}+N^C_{32}+N^C_{33}}$; $\phi^C_{32} = \frac{N^C_{32}}{N^C_{31}+N^C_{32}+N^C_{33}}$; $\phi^C_{33} = \frac{N^C_{33}}{N^C_{31}+N^C_{32}+N^C_{33}}$, and impute $Y^C_{31} = \phi^C_{31} * Y^C_{Manuf}$; $Y^C_{32} = \phi^C_{32} * Y^C_{Manuf}$; $Y^C_{33} = \phi^C_{33} * Y^C_{Manuf}$. We proceed similarly to construct each Y^C_{IND}.

C.2 Instrumental Variables

The Bartik-like IVs isolate exogenous variation in a region's output-to-import ratio for good j using the overall output-to-import ratios for each of the R regions. To construct Bartik instrumental variables (BIVs), we start by decomposing good j's overall import-to-output ratio using the accounting identity

$$\frac{M_j}{Q_j} = z_{j1}\frac{M_{j1}}{q_{j1}} + z_{j2}\frac{M_{j2}}{q_{j2}} + \ldots\ldots + z_{jR}\frac{M_{jR}}{q_{jR}},$$

where z_{jr} is region r's share of output Q_j, where for each j, $\sum_{r=1}^{R} z_{jr} = 1$. The weights $\{z_{jr}\}$ are constructed using output data for each regional bloc. The BIV for the endogenous variable $\frac{q_{j1}}{M_{j1}}$, that is, region 1's output-to-import ratio for good j, is constructed as follows. Rewrite the identity as

$$\frac{M_{j1}}{q_{j1}} = \frac{1}{z_{j1}}\frac{M_j}{Q_j} - \frac{z_{j2}}{z_{j1}}\frac{M_{j2}}{q_{j2}} - \ldots\ldots - \frac{z_{jR}}{z_{j1}}\frac{M_{jR}}{q_{jR}}, \tag{55}$$

and decompose region r's import penetration $\frac{M_{jr}}{q_{jr}}$ and national import penetration $\frac{M_j}{Q_j}$ as

$$\frac{M_{jr}}{q_{jr}} = \frac{M_r}{q_r} + \widetilde{\frac{M_{jr}}{q_{jr}}}, \text{ and } \frac{M_j}{Q_j} = \frac{M}{Q} + \widetilde{\frac{M_j}{Q_j}},$$

where $\frac{M_r}{q_r}$ is region r's overall import-output ratio and $\widetilde{\frac{M_{jr}}{q_{jr}}}$ is the idiosyncratic good-region component. Similarly, $\frac{M}{Q}$ is the nation's aggregate import-output ratio and $\widetilde{\frac{M_j}{Q_j}}$ the idiosyncratic component. The BIV for $\frac{M_{j1}}{q_{j1}}$ is formed by using the non-idiosyncratic components on the right-hand side of (55) as

$$\left(\frac{M_{j1}}{q_{j1}}\right)^{BIV} = \frac{1}{z_{j1}}\frac{M}{Q} - \frac{z_{j2}}{z_{j1}}\frac{M_2}{q_2} - \ldots\ldots - \frac{z_{jR}}{z_{j1}}\frac{M_R}{q_R}.$$

The general BIV for regressor $\frac{M_{jr}}{q_{jr}}$ is

$$\left(\frac{M_{jr}}{q_{jr}}\right)^{BIV} = \frac{1}{z_{jr}}\frac{M}{Q} - \sum_{d=1}^{d=R}\frac{z_{jd}}{z_{jr}}\frac{M_d}{q_d}, \tag{56}$$

where the sum is taken over $d \neq r$. The BIV avoids the correlation between the idiosyncratic component of $\frac{M_{jr}}{q_{jr}}$ and the structural error u_j. An unobservable variable that shocks the idiosyncratic component of $\frac{M_{jr}}{q_{jr}}$ and τ_j, causing endogeneity, is eliminated (Goldsmith-Pinkham, Sorkin and Swift, 2020, p. 2593). Any simultaneity bias or reverse causality between τ_j and $\frac{M_{jr}}{q_{jr}}$ that arises from the impact of τ_j on the idiosyncratic component of $\frac{M_{jr}}{q_{jr}}$, but not on the stable component, is eliminated.

The output-to-import ratios $\frac{q_{jr}}{M_{jr}}$ in (16) are instrumented using (56). Identifying variation comes from output share ratios $\frac{z_{jd}}{z_{jr}}$.