Heterogeneous Districts, Interests, and Trade Policy

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August 19, 2021

Abstract

Congressional districts are political entities with heterogeneous trade policy preferences due to their diverse economic structures. Representation of these interests in the legislature is a crucial aspect of trade policy-making that has been missing in the canonical political economy models of trade. This paper attempts to restore the place that districts occupy in these models by proposing a regional specific factor model. The aggregation of heterogeneous district preferences into a national trade policy creates regional political winners and losers, which are central to the politics of trade but earlier models cannot capture. Using data from 435 Congressional districts in the U.S. at a time when the structure of the U.S. economy was dramatically transformed by trade, we estimate welfare weights implied by the vector of tariff and non-tariff measures enacted at the national level. The estimates offer a supply-side explanation for trade policy that, while complementing Grossman and Helpman (1994), reveals the pattern of winners and losers at the district and industry levels. Armed with these estimates we are able to characterize the mismatch between national tariffs and local demands for protection. This "unmet" demand for protection, we argue, is a force behind the political backlash against globalization, including the China shock.

Keywords: Trade Policy, Political Economy, Districts, Tariffs, Non-tariff Measures, Legislature.

JEL Classification: F13, F14, D72, D78,

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The legislature, were it possible that its deliberations could be always directed, not by the clamorous importunity of partial interests, but by an extensive view of the general good. Smith (1776, p. 472).

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 taken together. 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 that 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 (workers and capitalists) who benefit from trade restrictions incentivize them to alter the government's calculus by making quid pro quo contributions. Helpman (1997) unifies analytically a number of models of endogenous protection in which the government's calculus is altered by interest groups (Magee et al., 1989); by political support from producers and consumers (Hillman, 1982); by competing lobbies (Bhagwati and Feenstra, 1982, Findlay and Wellisz, 1982); or by the balance between domestic and foreign policy motivations (Hillman and Ursprung, 1988).

But who or what is "government"? Few models have allowed the actual process of preference aggregation in trade policy-making any significant role. This sidelines the institutionally most important actors in the tariff game, the legislature and the executive who must coalesce in the formulation of trade policy. Even in models featuring electoral competition (Magee et al., 1989, chapter 6) or direct democracy (Mayer, 1984, Dutt and Mitra, 2002), the legislature and executive are abstracted. Grossman and Helpman (1996) model the determinants of trade policy platforms chosen by representatives competing at the polls, which sheds light on the importance of ideology, uninformed voters and special interest. The legislature and executive, however, remain passive players.

This paper attempts to restore the place of representatives, and the executive, in a model of endogenous protection. Our model brings to focus to the preferences of economically heterogeneous districts. These district level preferences must be aggregated into a national policy, a process in which representatives engage to form coalitions and bargain in the legislature to arrive at an agreeable trade policy. The impact of the process of aggregation of heterogeneous regional (or district-level) preferences are absent in political economy models of trade like Grossman and Helpman (1994) where the decision-maker is a central planner. Who wins in these legislative bargains is the subject of a significant literature in political science built around the seminal work of Riker (1962). A principal contribution to the legislative bargain literature is Baron and Ferejohn (1989), whose main prediction about the distribution of gains is tested in this paper in the context of trade policy-making.

The model in this paper yields new insights. For example, it provides an alternative explanation for why U.S. trade protection has remained low in the post-WWII era despite public backlash against globalization. A large 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, government dispenses trade protection. The Grossman and Helpman (1994) model highlights an important aspect of trade-policymaking – the influence of special interests. Examinations of the Grossman-Helpman model of trade protection (Goldberg and Maggi, 1999, Gawande and Bandyopadhyay, 2000) have further advanced the empirical literature on the influence of special interests. They find that while import-competing interests do exert influence, the amount of protection they are able to "buy", at least in liberal democracies, is less than what one might expect. The model in this paper offers a view of this result from a different, more real-world, lens. The structurally estimated results further provide a theory-based view of trade policy-making in the U.S..

Building on the earlier work we make three main contributions. The first contribution is a model of (national) tariff determination with heterogeneous districts. Among other benefits, the model offers an institutional explanation for why tariffs have remained low in the U.S. in the post-WWII era. The analysis retrospectively examines the U.S. tariff structure that was largely determined in the Kennedy and Tokyo rounds of reciprocal trade liberalizations in the GATT. The theory-based investigation provides a resolution with findings in the literature.

The second contribution is an attempt to integrate legislative bargaining into the structural estimation of a political economy model of trade. We model stylized bargaining coalitions in the legislature, based on geography and politics, and estimate the implicit welfare weights that members of these coalitions "win" for their districts as a result of the bargains. This builds on research highlighting the political margin on which special interest can exert influence. We further extend the analysis to non-tariff measures which are determined by a different institutional process than tariffs, and therefore have a distinct region-industry pattern of protection. The vector of national-level tariffs or non-tariff measures derived from the model depends on the regional allocation of sectoral activity, the weights districts place on different agents, and how local preferences are aggregated.[1]

Third, and perhaps most importantly, we use the model to estimate the counterfactual demand for protection by districts, and sectors, if each district was able to fashion its own tariffs independently. The contrast between this independent demand for protection and what the sieve of legislative bargaining actually delivers – our measure of the "unmet demand" for protection – can be stark for industrially important districts. The relevance of this finding cannot be understated – it is the source of the *China shock*, examined in influential articles, such as Autor et al. (2013), that promise to shape the debate over trade policy in the years to come.

A motivation for bringing decentralized decision-makers into the ambit of endogenous protection models is that it provides a natural starting point for addressing important questions such as trust in political institutions of open economies. If institutions of preference aggregation and bargaining dispense protection in a way that makes the economy more efficient, but are inflexible in how they provide respite to sections of the polity who bear the consequence of openness, then political backlash is a fait accompli. Research directed at policy choices should be founded on an understanding of institutional processes that led to those choices. The legislative process that birthed low tariffs in the U.S. should simultaneously have addressed long-term demands by districts for a safer landing. Top-down policies that ignore decentralized policy demands are likely to miss the mark, exacerbating political conflict around trade policy. Our framework supports future structural models that can address these decentralized policy demands.

Trust in government is a driving theme in studies about the backlash against globalization and embrace of populism by those losing from trade. Studies measure this backlash with retrospective voting in recent elections cycles (Margalit, 2019, Autor et al., 2020). Trade models, however, are long-term models and pre- and post-trade policy equilibria are often separated by long lags during which large sectors of the economy transition. In theory, the gains from trade are large enough to allow winners to compensate losers mitigating their opposition to trade liberalization. However, the coalitions formed around liberalization find little incentives to compensate the losers exacerbating localized push-back against trade. Our framework provides some guidance to understanding this backlash: we quantify the sizable "unmet demand" for protection by districts, which decades of Democratic majorities in Congress have been unable or unwilling to provide. Might it be that adverse outcomes like economic anxiety and inequality due to openness, such as found in

[1] The model is consistent with the institutional setup under which trade policy is made, particularly the give-and-take between Congress and the Executive. In the case of NTMs, they result from statutory authority delegated by Congress to the Executive, and they are more likely to reflect the weights placed by the President on different sectors, regions and districts in the shadow of Congressional oversight (Finger et al., 1988, Hall and Nelson, 1992, Destler, 2005).

Pierce and Schott (2020), Autor et al. (2019), have their roots in this unmet demand for protection? Whether the political undercurrents of the China shock are related to these unmet local demands may be a useful starting point for addressing the trust deficit.

The main results from our paper can be summarized as follows. First, the estimated parameters retrieved from import tariff data around 2000 suggest that the underlying political process determining national tariffs weighs consumer interests 1.7 times (a 63-to-37 ratio) as much as the protectionist interests of sector specific factor owners. The 37 percent weight is shared unequally across districts. Specific capital owners in industrial districts in the East North Central region (Illinois, Indiana, Michigan, Ohio, and Wisconsin) are collectively afforded a welfare weight equal to 9.8 percent of the aggregate national welfare weight.

Second, assuming that legislative bargaining coalitions are formed on the basis of both geography and partisan alignments, observed tariffs suggest that the welfare weights are distributed 26-to-11 in favor of Democrats. Districts controlled by Democratic lawmakers overall get larger weights. The smaller weights to Republican–held districts may be due to their being rural. They could also be districts at the threshold of de-industrializing, and therefore turning Republican because of the voters' dissatisfaction with being at the losing end of tariff bargains over the decades while represented by Democrats.

Third, non-tariff measures (NTMs) in place in 2002 imply a different distribution of welfare weights. Republican controlled districts take the lion's share of the aggregate weight placed on specific capital owners. In contrast to tariffs, Republican districts outweigh Democrat districts by a 25-to-9.4 ratio. Republican representatives had more success in obtaining NTM protection to make up the lack of tariff protection, which may imply that NTMS are likely used by the Executive branch to reward co-partisans. The role of political dynamics is further revealed by considering politically motivated coalitions. Districts are classified as politically "safe" or "competitive" depending on their performance in Presidential and House elections. NTM data are consistent with higher weights for safe districts compared to competitive districts. Moreover, the highest estimated weights are those for Republican-controlled districts in states where the Republican ticket easily won the Presidential election, followed by districts in battleground states.

Finally, the framework is used to characterize unobserved district-preferred tariffs, and asses the level of unmet demand for protection by comparing district-preferred to observed tariffs. In most sectors, the mean predicted district-level tariff is an order of magnitude larger than the sum of actual tariffs and NTMs (the actual level of protection granted the sector). However, the amount of unmet tariff demand is stark in many districts, specially in North Central districts that elected Republican representatives to the House in 2000 (in sectors such as Fabricated Metals, Machinery, Paper, Plastics, and Primary Metals), South Atlantic districts regardless of political representation (in the Chemicals, Furniture, Nonmetal Manufacturing and Paper sectors).

The paper proceeds as follows: in Section 2, we develop the model and characterize the tariffs derived from the model. Section 3 describes an empirical strategy to estimate the implicit welfare weights – the underlying structural parameters of the model. We use data from around 2000, a significant period due to China's accession to the WTO. The results are presented in Section 4. Section 5 uses the structurally estimated parameters to derive theoretically grounded, albeit not directly measurable, district-level preferred tariffs. These tariffs are next compared to actual observed tariffs, and the difference is assumed to represent the degree of unmet demand for protection at the local level. To this unmet demand, we attribute the China shock. Section 6 concludes.

2 Determination of National Tariffs

This section characterizes trade policy enacted at the national level, or the *centralized solution*. This policy is described by a vector of sectoral tariffs that result from the welfare maximization of regional constituencies. In the model, the centralized solution places different weights on economic agents that vary by region, sector, and group. The actual observed level of tariffs will therefore depend on the relative intensity of these weights. The rationale is that trade policy is determined through a political process that aggregates the preferences of local districts, and the weights capture the relative political influence of districts in the tariff decision.[2] While this section considers tariffs as the main trade policy instrument, the same setup can be used to assess the political determinants of non-tariff measures (NTMs). In the latter case, NTMs are quantified using their tariff equivalents.[3]

2.1 Framework

A small open economy is populated by two groups of individuals: group L is endowed with labor and group K is endowed with sector specific capital.[4] The production of differ-

[2]The political process can be thought as one in which representatives from every district take the preferences of their local constituents to the institution where the policy is formulated. This setup accurately portrays the setting in which U.S. trade policy is legislated (Destler, 2005). Of course, the resulting vector of tariffs decided at the national will not necessarily coincide with that preferred by each district.

[3]Specifically, the analysis will use the ad-valorem equivalent (AVE) of core NTMs, defined as the uniform tariff that would be have the same effect on imports as that from the enactment of NTMs.

[4]The model is presented in full in Appendix A.1.

ent tradable goods is geographically dispersed, so sectors are distributed across regions.[5] World prices of tradable goods are taken as given by the country. Domestic prices may be changed by raising or lowering tariffs. Price changes affect domestic production and consumption of the goods, and hence the well-being of actors depending on their endowment of labor and specific capital.[6]

Districts are indexed by $r = 1, ..., R$, and sectors by $j = 1, ..., J$. At the national level, the legislature brings together representatives from R districts. They form coalitions and strike a bargain about the level of national tariffs on each of the J sectors. Trade policy preferences are derived from a specific-factors model of trade. The population of district r is comprised of the two types of agents, workers L and specific capital owners K. Agents are immobile across districts (synonymous with regions). Within a region workers are mobile across sectors, but capital is sector-specific and immobile.

Production. Workers are abundant and wage-takers. All workers own one unit of labor ℓ_{jr} and owners of the sector specific factor own one unit of k_{jr}. Sector j in district r employs n_{jr}^K units of the specific factor and n_{jr}^L workers. The population of region r, therefore, is given by $n_r = n_r^K + n_r^L = \sum_{j=1}^J (n_{jr}^K + n_{jr}^L)$. Note that not all sectors are necessarily active in district r. Goods are mobile across the country, with no transport cost. In district r, output in the numeraire sector, *sector 0*, is produced using only labor with a linear technology, $q_{0r} = w_{0r}\ell_{0r}$ where $(w_{0r} > 0)$. Units are chosen such that the price p_0 equals 1. District r workers employed in *sector 0* therefore receive wage w_{0r}. Prices in the other non-numerarire J sectors are expressed in these units. Output in sector j is produced with a CRS technology. In district r this technology combines labor ℓ_{jr} and (a fixed amount of) a sector specific factor k_{jr}. The specific factor earns $\pi_{jr}(p_j)$, which denotes the indirect profit function, while labor, being abundant and perfectly mobile across sectors, earns the numeraire wage w_{0r}. The domestic output of sector j in district r is $\pi'_{jr}(p_j)(\equiv \partial\pi/\partial p_j) = q_{jr}$, and total production of j is $\sum_{r=1}^R q_{jr}(p_j) = Q_j(p_j)$.

Preferences. Following the traditional literature on trade protection, preferences are represented by the quasi-linear utility function $u = x_0 + \sum_{j=0}^J u_j(x_j)$. Solving for the first-order conditions results in (separable) demand functions $x_j = d(p_j)$. Indirect utility for an agent spending z on consumption is $z + \sum_j \phi_j(p_j)$, where $\phi_j(p_j) = v_j(p_j) - p_j\, d_j(p_j)$

[5] In the present setup regions can represent individual or groupings of Congressional districts.

[6] Our model considers a small country case. The terms of trade externalities literature initiated by Bagwell and Staiger (1999) may be incorporated into this framework. In this view, the GATT and WTO have arisen as institutions that prevent an inevitable protectionist race to the bottom because large countries, who can control their terms of trade through tariffs, will erect tariffs that are unilaterally optimal but which beggar their trading partners.

is the agent's consumer surplus from consuming good j, and $v(p_j) = u_j[d(p_j)]$.[7] The national demand for good j is $D_j(p_j) = nd_j(p_j)$, where n is the country's population.

Trade policy. Trade policy is domestically determined through specific, per unit import tariffs t_j on each goods j.[8] The total revenue generated from import tariffs is $T = \sum(p_j - p_j^*)[D_j(p_j) - Q_j(p_j)] = \sum(p_j - p_j^*)M_j(p_j)$, where $M_j(p_j)$ is sector j's import demand function, p_j^* is the world price, and $t_j = p_j - p_j^*$.[9] The higher p_j is, the greater the returns to the specific factor in j. Therefore, it is in the interest of j-specific factor to demand for protection to raise p_j.

2.2 National Tariffs

So far, the setup follows GH and the earlier literature on endogenous protection. At this point the framework departs from previous work in a fundamental way: it incorporates heterogeneity in production across space, which, in turn, explains heterogeneity in districts' demands for tariffs. Elected representatives from each district take their district's preferences to Congress where they form coalitions and bargain to determine the national trade policy, represented by the vector of tariffs $\mathbf{t} \in \mathbb{R}^J$.[10] The underlying political process is summarized by an objective function that consists of a weighted sum of utilities of agents. Specifically, national tariffs are assumed to be set by maximizing the weighted

[7]The index r is dropped from the demand functions because demand by agents does not change across districts (since prices are nationally determined). The basket of goods consumed by the two groups may differ. Appendix A.1 considers the general case with heterogeneous tastes for the two classes of agents. This model assumes that preferences are described by the utility function $u^m = x_0^m + \sum_{j=0}^J u_j^m(x_j^m)$, where $m = \{L, K\}$ indexes owners of labor and owners of the specific factor. These yield demand functions $d_j^m(p_j)$ and consumer surplus $\sum_j \phi_j^m(p_j) = \sum_{j=1}^J [v_j^m(p_j) - p_j d_j^m(p_j)]$.

[8]As in GH, the model can be extended to account for import subsidies, export taxes, export subsidies, and NTMs.

[9]Due to the small country assumption, the effect of the tariff is simply to raise domestic price above the world price by the amount of the tariff. Relaxing this assumption could result in higher tariffs exploiting terms of trade effects.

[10]GH exemplifies a political economy model in which preferences at the national level have already been aggregated in a specific way. The determination of tariffs can be thought of as a two-tiered political process. In the first tier each district's tariff preference is determined. The second tier determines the national tariffs by legislative bargaining. Neither electoral competition in the district nor the formation of winning coalitions in legislature are explicitly modeled in the present analysis. The development of a framework that takes into account all these interactions is left for future research. For the bargaining protocol at the national level we rely on the framework developed by Baron and Ferejohn (1989) where an agenda-setter, the President, proposes an allocation of tariffs which has to be voted up or down by a majority in Congress.

sum of individuals' utility

$$\Omega \;=\; \sum_r \sum_j \Gamma^K_{jr} W^K_{jr} + \sum_r \sum_j \Gamma^L_{jr} W^L_{jr}, \tag{1}$$

where Γ^m_{jr} is the weight attached to an agent of type m, in sector j, and district r, and W^m_{jr} denotes the total welfare of type-m individuals. Ultimately, W^m_{jr} depends on domestic prices $\mathbf{p}$, and since there is a one-to-one relationship between the tariff t_j and price p_j (the world price is exogenously determined), aggregate welfare for the two classes are fully functions of tariffs $\mathbf{t}$.[11]

What is important is the introduction of general heterogeneity in weights. This allows us to capture a much richer set of factors influencing trade policy, such as heterogeneity in production and factor ownership across regions. A sector in which many specific factor owners employ their specific capital can be more politically influential than a sector that employs specific capital of a few factor owners. More diversified districts will have tariff preferences spread over many sectors j, depending on the distribution of factor owners in the district. Concern for consumers in a district results in a larger weight placed on their welfare than on the welfare of agents in other districts. For instance, while a district producing much of the nation's iron and steel but very little of other goods will demand protection from imports of steel, and it may favor free trade on other goods consumed by its residents.

National tariffs aggregate preferences in a way that makes it impossible to satisfy the demands of every district, or even most districts. While the bargaining process over the tariff is likely to account for district level preferences, the actual choice made by the legislature needs not coincide with preferred tariffs of any specific district.[12] We assume that the vector of national tariffs, as detailed below, results from a Baron-Ferejohn bargaining protocol with agenda control over the proposal and closed rule voting.

Breaking down national welfare in (1) into the sum of its three components yields

$$\Omega \;=\; \sum_r \sum_j \Gamma^L_{jr} n^L_{jr} \left(w_{0r} + \frac{T}{n} + \phi \right) + \sum_r \sum_j \Gamma^K_{jr} n^K_{jr} \left(\frac{\pi_{jr}}{n^K_{jr}} + \frac{T}{n} + \phi \right). \tag{2}$$

[11] Note that this is different from maximizing the sum of district-level welfare functions since the weights attached to agents at the local level may differ from Γ^m_{jr}. Section 5.1 characterizes the preferred district-level tariffs and compares them to tariffs emerging from the national legislative process.

[12] Section 5.1 derives the preferred tariffs of an individual district. The district-preferred tariffs are the outcome of the processes for aggregating local preferences, which are implicitly captured by a set of weights attached to local economic actors, and the intensity of sectoral activity in the respective districts. The local weights are, however, not necessarily the same as those determining the trade policy at the national level.

On the right-hand side of (2), T/n is per capita tariff revenue, and $\phi = \sum_j \phi_j$ is per capita consumer surplus from the consumption of all goods j. The first expression weights the sum of per capita wage, tariff revenue and consumer surplus to arrive at the aggregate welfare of owners of labor residing in district r. The weights are the product of Γ^L_{jr}, the welfare weights that the district r planner assigns to each individual worker employed in sector j, and the number of district r workers employed in sector j, n_{jr}. The second expression differs in the first component, the per capita returns to owners of sector j-specific capital, π_{jr}/n^K_{jr}. The three components are aggregated using the weights $\Gamma^K_{jr}n^K_{jr}$ to obtain the welfare of district r's specific-capital owners. A region r does not necessarily produce all goods j. By assumption, when sector j is not active in region r, $n^K_{jr} = n^L_{jr} = 0$ and $\pi_{jr} = 0$.

Noting that T, ϕ and π_{jr} are all functions of t_j, the tariffs are obtained by maximizing (2) with respect to each t_j. The resulting tariff on imports of good j is given by[13]

$$t_j \;=\; -\frac{n}{M'_j}\left[\sum_r \frac{\Gamma^K_{jr}n^K_{jr}}{\gamma}\left(\frac{q_{jr}}{n^K_{jr}}\right) - \frac{D_j}{n} + \frac{M_j}{n}\right], \quad j = 1,\ldots,J,\; r = 1,\ldots,R, \tag{3}$$

where $\gamma^L = \sum_j \sum_r \Gamma^L_{jr}n^L_{jr}$, and $\gamma^K = \sum_j \sum_r \Gamma^K_{jr}n^K_{jr}$ are the aggregate national welfare weights for the two groups of factor owners, $\gamma = \gamma^K + \gamma^L$ is the total national welfare weight, D_j/n is per capita demand for good j, M_j/n is per capita imports of good j, and $M'_j \equiv \partial M_j/\partial t_j < 0$.[14]

Expression (3) captures both producer and consumer interests. The first term in the square brackets indicates that the tariffs increase with output through the tariff's positive impact on profits.[15] The second term reflects the negative impact of consumer surplus on tariffs. And the third term indicates that tariff increases with imports through its impact on government revenue, which is redistributed as a lump-sum to domestic residents.

Using good j's import demand elasticity, $\epsilon_j = M'_j(p_j/M_j)$, the ad-valorem national tariff for each sector j, $\tau_j \equiv t_j/p_j$, can be expressed in terms of measurable variables as follows:

$$\tau_j \;=\; \sum_r \frac{\Gamma^K_{jr}n^K_{jr}}{\gamma}\,\frac{n}{n^K_{jr}}\,\frac{(q_{jr}/M_j)}{(-\epsilon_j)} - \frac{(D_j/M_j)}{(-\epsilon_j)} + \frac{1}{(-\epsilon_j)}, \tag{4}$$

[13]Details are provided in Appendix A.1.

[14]Upper case denotes national aggregates, lower case is used for employment, and n is the total number of labor and capital owners.

[15]By the envelope theorem the derivative of profits with respect to price is output; the first term is the impact of the tariff on returns to owners of specific capital. On the other hand, since labor is perfectly mobile across sectors within region r, $w_{0r} = w_{jr}$ for all j in region r, where w_{0r} is determined by labor's productivity in the numeraire sector. Therefore, a change in the price of j due to a change in tariff t_j does not affect labor income.

Equation (4) has three components. The first term on the right hand side is a demand-for-protection component of the type familiar from the GH model according to which the tariff on sector j imports increases with the output-to-import ratio.[16] The intensity of this effect is measured, in the present case, by a weighted sum of the output-to-import ratio in each region r scaled by the import demand elasticity. The second term is the consumption component. According to this effect, τ_j decreases with the national consumption-to-import ratio. The third term keeps up with the Ramsey rule of minimizing the distortion from the tariff (since $-\epsilon > 0$, the tariff decreases as the absolute import demand elasticity increases). Using $D_j = Q_j + M_j$, equation (4) may be expressed as

$$\tau_j \;=\; \sum_{r=1}^{R} \frac{\Gamma_{jr}^K n_{jr}^K}{\gamma^K + \gamma^L} \frac{n}{n_{jr}^K} \left(\frac{q_{jr}/M_j}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right). \tag{5}$$

In this case, consumer interests, which include both consumer surplus and tariff revenue, are succinctly captured by the national output-to-import ratio (scaled by import demand elasticity).

As a final remark, suppose the welfare weights are equal for all factors, sectors and regions, $\{m, j, r\}$ respectively, such that $\Gamma_{jr}^m = \Gamma$. In other words, suppose political economy considerations do not have any influence on the outcome. Then, the resulting tariffs are zero and there is free trade. The reason is that, in this case, the weights reduce to a constant times population sizes, which cancel out. To see this note that $\gamma^m = \Gamma \sum_r \sum_s n_{sr}^m = \Gamma n^m$, and $\gamma = \Gamma(n^L + n^K) = \Gamma n$. As a result, expression (5) reduces to

$$\tau_j = \frac{n}{(-\epsilon_j)} \left[\sum_r \frac{n_{jr}^K}{n} \frac{q_{jr}}{n_{jr}^K} - \left(\frac{D_j}{n} - \frac{M_j}{n}\right)\right] = \frac{1}{(-\epsilon_j)} \left[\sum_r q_{jr} - (D_j - M_j)\right] = 0.$$

The last equality follows from the fact that $Q_j = \sum_r q_{jr}$, and market clearing for good j requires $D_j = Q_j + M_j$.

2.3 A folded model: Comparing with Grossman-Helpman

In the Grossman and Helpman (1994) model some sectors organize into lobbies for the purpose of influencing government to bend trade policy in their favor. A strong assumption

[16] The general derivation, which considers heterogeneous preferences between the two classes of factor owners, is derived in Appendix A.1. In this case, tariffs are given by:

$$\tau_j \;=\; \sum_r \frac{\Gamma_{jr}^K n_{jr}^K}{\gamma^K + \gamma^L} \frac{n}{n_{jr}^K} \frac{(q_{jr}/M_j)}{(-\epsilon_j)} - \frac{\gamma^L}{\gamma} \frac{n}{n^L} \frac{(D_j^L/M_j)}{(-\epsilon_j)} - \frac{\gamma^K}{\gamma} \frac{n}{n^L} \frac{(D_j^K/M_j)}{(-\epsilon_j)} + \frac{1}{(-\epsilon_j)}.$$

of the model is that the government is a unitary entity, capable on its own of supplying trade policy; the government is hired as an agent of industry j organized interests (principals) who pay to buy protection. The amount of distortion introduced by the policy is determined by balancing the cost (welfare loss to consumers) with benefits (support from specific factor owners or contributions from lobbies). This trade-off is captured by the government's objective function $aW + C$, where W is societal welfare, C is the sum of contributions from organized interests, and a is the rate at which the government trades welfare for contribution dollars. A high a indicates the government is welfare-oriented and costly for organized interests to entice. A low a indicates the government will cheaply deviate from free trade.[17] While GH simplify their model on the supply side in order to develop a structural model of the demand for protection, *institutional* checks on the preferences of local industry interests (the specific factors) are the driving force for our model.[18]

The framework developed here is agnostic about the process that determines the relative weights on different classes of factor owners. Different relative weights may be attributable to a number of reasons: to quid-pro-quo contributions; to the lobbying prowess of specific factor owners in communicating information to politicians; to an institutional bias that makes it hard to change a historical status quo; to ideological bias of the electorate; or to ideological leanings of decision-makers. We return to this process in the structural estimation of the relevant parameters of the model.

Expression (5) above may be used to draw a connection between GH and the present model. Consider the GH model in which all sectors are organized as lobbies, and α^K denotes the fraction of the population that owns specific factors and whose interests lobbies represent. In our model this fraction is $\alpha^K = n^K/n$. Their unitary government dispenses with legislatures and districts, so the GH counterpart to (5) may be written as Proposition 2 in Grossman and Helpman (1994):

$$\tau_j = \frac{(1-\alpha^K)}{a+\alpha^K}\left(\frac{Q_j/M_j}{-\epsilon_j}\right). \tag{6}$$

Eliminating districts in (5) is achieved by reducing the coefficient on the $\left(\frac{q_{jr}/M_j}{-\epsilon_j}\right)$ terms

[17] In other words, for every dollar of contributions it receives, the government is willing to provide an amount of protection that imposes (no more than) $1/a$ dollars of welfare loss on the public. Previous studies have found a to be large in the U.S., meaning protection is not easily sold in the U.S. (Goldberg and Maggi, 1999, Gawande and Bandyopadhyay, 2000). Other countries seem to be willing to sell out more cheaply (Gawande et al., 2009).

[18] The structure of lobbying, a key feature of the GH model, takes a back seat here in our empirical estimation due to data constraints, and is assumed to be reflected in the relative weights placed on specific factor owners. Section A.4 in the Appendix presents an extension incorporating lobbying as in GH.

to a constant. Forcing the welfare weight on each owner of specific factors to be invariant across regions r enables the model to be folded in this manner. Suppose $\Gamma^K_{jr} = \Gamma^K$ for all j and r. Then (5) may be rewritten as

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

The first equality uses $\alpha^K = n^K/n$, the second equality uses the fact that $\Gamma^K n^K$ is the aggregate weight to owners of specific capital, and the third equality uses $\sum_r q_{jr} = Q_j$. Defining $\tilde{\gamma}^K$ as the share of the aggregate welfare weight given to specific capital owners in the economy (i.e., $\tilde{\gamma}^K = \gamma^K/(\gamma^K + \gamma^L)$) yields

$$\tau_j = \frac{(\tilde{\gamma}^K - \alpha^K)}{\alpha^K} \left(\frac{Q_j/M_j}{-\epsilon_j}\right). \tag{7}$$

In the GH model (6), τ_j approaches zero as $a \to \infty$, or the government becomes singularly welfare-minded. In our model, folded to simulate a unitary government, τ_j approaches zero as $\tilde{\gamma}^K \to \alpha^K$. This is the same situation noted above where labor and specific factors owners get exactly the same welfare weights (α^K is the proportion of the population with specific factor ownership). If owners of capital and owners of labor are treated equally, the classic free trade result obtains. 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 that $\tilde{\gamma}^K > \alpha^K$. But the reason why specific factors get a larger representation than their numbers is left unexplained, since legislative bargaining is folded. The GH model builds a lobbying structure to provide an explanation.

A closer parallel with the GH model is possible by letting the weight on specific capital owners to be sector-varying before folding, or $\Gamma^K_{jr} = \Gamma^K_j$ for all r. From (5),

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

Using $\alpha^K_j = n^K_j/n$, the fraction of specific factor owners that are employed in sector j, yields the first equality. Defining $\tilde{\gamma}_j^K = \Gamma_j^K n_j^K/(\gamma^K + \gamma^L)$, the share of aggregate welfare given to specific factors in sector j, yields the second equality. In this way, sector j interests are represented by the continuous variable $(\tilde{\gamma}_j^K - \alpha_j^K)/\alpha_j^K$ reflecting sector j interests – akin to the binary existence-of-lobbying-organization variable in the GH model – bringing our version closer to the GH model. Still, the mechanism generating this reduced form is the legislative bargaining structure from which it is derived.

3 From Theory to Data

The weights derived in the previous sections are, of course, not observable, and our primary objective is to estimate them. This exercise entails quantifying the set of weights that would rationalize the observed vector of tariffs (and NTMs). The resulting estimated values reveal, among other things, which group of agents, regions, and sectors were influential at the moment of enacting the trade policy.

Specifically, the goal is to estimate the welfare weights in expression (1) based on observed trade data. The estimation requires an empirical strategy. The basic building block of this strategy is estimating the weight that capital employed in sector j in region r receives, or $\Gamma_{jr}^K n_{jr}^K$. Equation (4) indicates how to estimate this fundamental weight as a proportion of the total weight that labor and capital receive nationally,

$$\frac{\Gamma_{jr}^K n_{jr}^K}{\sum_r \sum_j \left(\Gamma_{jr}^K n_{jr}^K + \Gamma_{jr}^L n_{jr}^L\right)}. \tag{8}$$

The set of parameters $\{\Gamma_{jr}^K, \Gamma_{jr}^L\}$, $r = 1, \ldots, R, j = 1, \ldots, J$, are excessive. The first step in our strategy is, therefore, to eliminate the over-parameterization so the welfare weights in (8) are identified.

3.1 Legislative Bargaining and U.S. Trade Policy

The estimation of the relative weights (8) relies on detailed U.S. data at the line level on U.S. tariffs, as well as core NTMs. These policy instruments are enacted under constitutional and statutory authority which vary by instrument and change over time. Tariffs and specific NTMs are also subject to different constraints resulting from U.S. participation in multilateral, bilateral and regional trade regimes. The history of tariff-making in the U.S., specifically the Kennedy and Tokyo Rounds of multilateral tariff cutting under GATT, provides guidance on how we interpret the estimated welfare weights when the instruments of choice are tariffs. The prevailing most favored nation (MFN) tariffs of the

U.S. in 2002 were largely shaped by the tariffs at the completion of the Tokyo Round cuts in 1985.[19]

The Kennedy Round negotiations, which begun in 1964 and comprised 27 mostly developed countries, focused exclusively on cutting manufacturing sector tariffs and exempted agriculture products. Including agriculture in the multilateral tariff cutting process would otherwise have had to satisfy a new set of interest groups. U.S. tariff cuts averaged 36 percent, and covered two-thirds of manufacturing imports; as a result the import-weighted average tariff fell from 9.2 to 5.9 percent. Textiles, which had long been governed by separate rules, continued to be protected under a system of bilateral quotas known as the Multi-Fiber Agreement. Negotiators in the Tokyo Round of GATT, launched in 1973, agreed to the Swiss formula where higher tariffs were targeted with the highest cuts. As a result, U.S. tariffs further dropped to an average of 4.3 percent after the Tokyo Round cuts were implemented in the 1980s. The main difference between actual tariffs in the 2000s, the data we use in our estimation, and post-Tokyo Round MFN tariffs is due to trade agreements the U.S. entered with a number of countries, notably NAFTA in 1994. These developments further lowered the tariffs on manufacturing in the U.S. to the levels observed in the data.

Credibly negotiating tariff cuts under GATT required each member country to believe that the agreed upon reciprocal cuts would actually be legislated by their trading partners. In the U.S. such credibility resulted from the authority that Congress extended to President Kennedy via the 1962 Trade Expansion Act; this statute set the scope of the tariffs cuts, and explicitly limited liberalization of agricultural products. Once the U.S. Trade Representative (USTR) completed the negotiations on behalf of the Executive Branch, the President brought the proposal to Congress for a final up-or-out vote. This set a precedent for a similar process leading to the Tokyo Round. In the Trade Act of 1974 (as in the 1962 Act) Congress granted this "fast track" to President Ford, delegating authority to determine the tariff cuts to be negotiated during the Tokyo Round. In addition, as discussed below, the law attempted to check executive power over NTMs. Crucially, Congressional voting on the President's negotiated tariffs was subject to a *closed* rule vote - the fast–track procedure meant the motion would receive an up-or-out vote, not subject to amendments.

This process of trade policy formation in the U.S. fits the legislative bargaining protocol in Baron and Ferejohn (1989) (henceforth BF). The BF model makes predictions about the distribution of gains in a legislature under different voting rules. In the BF model, a fixed amount of money A is to be distributed among n (homogeneous) districts. An

[19] The 2007 World Trade Report (WTO 2007, Ch II.D) details the process of tariff cuts. See, for example Whalley (1985) for a CGE analysis of the process of tariff cutting in the Tokyo Round.

agenda setter proposes a specific distribution of A across n districts, with the motion holding if a majority of representatives of the districts votes in favor. Under a closed rule, if the proposal by the agenda setter is rejected the session terminates. In a new session, another legislator, the current agenda setter, proposes a new motion, and so on. An equilibrium exists because discounting depreciates payoffs over successive sessions (a discount factor $0 < \delta < 1$ depreciates A every time a motion is rejected and a session ends). Impatience balances out greed, and an equilibrium is reached.

The Congressional vote on a "trade agreement", a J-vector of manufacturing tariffs $\boldsymbol{\tau}$, brought by the President to Congress is appropriately characterized as a closed rule vote with a high discount rate: it concludes in one session with either the proposal or the status quo prevailing. In the present model, the value of the game is represented by the denominator in (8), or the aggregate welfare weights $\sum_r \sum_j \left(\Gamma^K_{jr} n^K_{jr} + \Gamma^L_{jr} n^L_{jr}\right)$. The proposed tariff resulting from a trade agreement $\hat{\boldsymbol{\tau}}$ implies weights $\hat{\Gamma}^K_{jr} n^K_{jr}$ and $\hat{\Gamma}^L_{jr} n^L_{jr}$, for each $\{j, r\}$. In the BF framework, the President's proposal moves a closed rule House vote on the distribution of $\left(\hat{\Gamma}^K_{jr} n^K_{jr} + \hat{\Gamma}^L_{jr} n^L_{jr}\right)$ across sectors and regions. Since the President's objective in the GATT rounds was to support trade liberalization, the proposal was constructed to achieve the largest possible weight on aggregate citizen welfare without losing a majority of votes in Congress. Greater citizen welfare in the model is achieved by a larger aggregate labor welfare $\sum_r \sum_j \Gamma^L_{jr} n^L_{jr}$.[20] However, if region r's population has significant numbers of specific capital owners then its representative's vote on the President's proposal would mainly be driven by the weight $\sum_r \sum_j \Gamma^K_{jr} n^K_{jr}$.

The exclusion of agriculture from the GATT rounds was strategically beneficial to the President by delivering the votes of rural districts (districts with little or no manufacturing). With these votes in hand, the President's proposal conceded less to manufacturing districts. In our framework, we assume that the President's proposal was constructed to win a majority on the closed rule vote in two steps. The first was to distribute the pie $\sum_r \sum_j \left(\Gamma^K_{jr} n^K_{jr} + \Gamma^L_{jr} n^L_{jr}\right)$ such that a significant part was taken by aggregate labor (or citizen welfare) $\sum_r \sum_j \Gamma^K_{jr} n^K_{jr}$. The canonical BF model with homogeneous voting provides a benchmark – it predicts that the proposer takes 50 percent of the pie. The second step was to distribute the remainder across districts to satisfy specific factor owners in a way that got the support of a majority of districts r. Proposition 1 in Baron and Ferejohn (1989) predicts the remainder is shared with the minimum number of representatives required

[20] To be more specific, while in the present model the mobile factor, labor, unambiguously favors lower tariffs (due to the presence of consumption effects only), owners of specific factors face a trade-off between the production and consumption effects of tariffs. Overall, owners of specific factors in region r, sector j would prefer higher (relative) tariffs for good j (which would also benefit producers of j in other regions r'), and lower tariffs for all other goods j'. This means that owners of specific factors in sector j may favor lower tariffs (due to consumption) in sectors other than j.

to form a majority. In a legislature of 200, for example, the President takes 50 percent of the pie and 101 districts required for a majority each get 1/101 or approximately a 0.01 share.

In our model, this second component is different in two fundamental aspects. First, districts are heterogeneous: if there were a fair number of districts with a higher concentration of steel producers, they could form a steel coalition by joining other districts with a similar concentration of activity in other sectors and credibly threaten the President's proposal (Busch and Reinhardt (2000)). Knowing this, the President proposes tariffs τ_j for each sector j, where sectors are heterogeneous according to (5). Districts that are capable of forming coalitions, and can therefore present a credible threat to the President's proposal, earn a higher welfare weight and therefore lower tariff cuts (or higher τ_j). It is an open issue in the BF model whether heterogeneous districts weaken or strengthen the President's proposal power. For example, if a majority of districts simply did not have manufacturing, they would prefer free trade in all manufacturing sectors, strengthening the President's hand. Exempting agriculture from trade liberalization allowed the President to maximize his share of the pie (that is, consumer surplus).

In order to examine the implications of the BF hypothesis, the empirical exercise combines the framework developed earlier with trade and political data. The analysis uses district level data for the 107^{th} Congress (year 2002). The data is described in more detail below. Four types of empirical exercises are conducted: The first is a test the BF prediction about the winning proposal applied to GH trade framework with heterogeneous districts. Specifically, we test the conjecture that the President, who faces electoral incentives to maximize aggregate welfare, negotiates a trade policy that, while granting consumers at least half the share of the aggregate weight, is acquiesced by a majority in Congress. We also address whether heterogeneity among districts allows the President to weigh consumer surplus more heavily. This is the first step in unpacking the relatively large estimates of the GH parameter a for the U.S., implying a high degree of welfare-mindedness despite strong demands for protection from owners of specific factors in the districts.

The second empirical exercise is to estimate the weights that sector-specific factor owners in each district get in the 107^{th} Congress. In addition to the already low tariffs inherited from the tariff-cutting in early GATT rounds and trade agreements that followed, China's formal accession to the multilateral trade system and the U.S. decision to permanently grant China MFN status effectively decimated protection to the manufacturing sector. Over several decades U.S. manufacturing had faced strong competition from Japan, Korea, Taiwan, and NAFTA countries; yet large segments of manufacturing maintained comparative advantage and were able to survive the competition. The China shock swamped the productivity gains in these industries and routed them in short time. The labor content of imports from China replaced specific labor (and capital) in large swaths of US manufacturing, effectively de-industrializing many regions (Autor et al., 2015, 2013).

To understand the institutional sources of the China shock, we estimate the sectoral and district level weights that would result from bargaining (in the BF sense) among three plausible legislative coalitions. These stylized coalitions are founded on: (i) political geography, reflecting the spatial clustering of industries in districts; (ii) geography and partisan alignment of the elected representatives, adding a political-geography dimension to the grouping based on economic geography; and (iii) purely political coalitions, based on competitiveness of the Presidential election at the state level, and whether the Congressional District election is competitive, or safe for Democratic and Republican incumbents. This last grouping intends to capture the differential electoral incentives faced by local representatives, parties and the President.[21]

The third analysis quantifies the weights that rationalize the implementation of NTMs for the three stylized coalitions. The authority for enacting NTMs is distinct from tariffs. It emerges from multiple statutes; further, granting protection through NTMs faces fewer constraints from international commitments and is more unilateral. In principle, the President is assumed to enjoy greater agency in granting NTM protection, and this agency should be reflected in the structural estimated regional and sectoral weights. Therefore, the distribution of weights underlying the decision to implement sector–specific NTMs is expected to differ from that estimated using tariff data.

A final exercise, presented in Section 5, provides a foundation for understanding the political response to the deluge of imports from China. For this, the time frame of our analysis – the Bush Presidency and the 107^{th} Congress – is appropriate. The timing coincides with China's accession to WTO and the unfolding of the China shock. A counterfactual analysis attempts to address the questions: how much protection was demanded by districts, and how much of that demand went unmet? Arguably, this is the source of the political backlash to the China shock.

In sum, the estimation of the underlying structural parameters of the model using historical data is motivated by the following reasons. First, given that the 2002 tariffs are largely inherited, the estimated welfare weights on owners of specific factors and regions provide an apt setting to test the BF model. Second, the grouping of districts on the the basis of geography and political dynamics contributes to identify which legislative coalitions received higher levels of protection. Third, the estimated (counterfactual) region-specific sectoral demand for protection, which accounts for how much of the de-

[21] A more detailed explanation about the characteristics of each coalition is provided in Section 3.2.

mand was unmet, is likely a strong determinant of the political reaction to the China shock.

3.2 Specification and Identification

Expressing the demand-for-protection term in (5) with *regional* output-to-imports ratios q_{jr}/M_{jr}, the tariff equation (5) for each district r can be rewritten in a form resembling the GH prediction for each district. Since sector j imports by region r, M_{jr} are unobservable (only national imports M_j are observed) we approximate M_{jr} as $M_j \times (n_r/n)$, apportioning national sector j imports to region r according to r's population share. Using this approximation in equation (5), the national tariff for sector j is:[22]

$$\tau_j \quad = \quad \sum_{r=1}^{R} \frac{\Gamma_{jr}^K n_{jr}^K}{\gamma^K + \gamma^L} \frac{n_r}{n_r^K} \left(\frac{q_{jr}/M_{jr}}{-\epsilon_j} \right) - \left(\frac{Q_j/M_j}{-\epsilon_j} \right). \tag{9}$$

The goal is to estimate the sectoral and district welfare weights in (9) implied by the observed vector of tariffs. As discussed earlier, these weights are estimated for three cases, each one representing stylized coalitions founded on geography, political geography and political alignments respectively.[23] At the same time, the aggregation reduces dimensionality and achieves identification.

3.2.1 Cases

The baseline case, *Case 1*, relies on a geography-based aggregation of the 435 districts into nine geographic regions ($R = 9$) defined by the US Census: New England, Mid-Atlantic, South Atlantic, East North Central, West North-Central, East South Central, West South Central, Mountain, and Pacific. This achieves two goals: Since geography is

[22] The tariff equation is different from GH in two fundamental respects. First, as we have shown, the regional-interest components are assumed away in the GH model. Second, the GH model emphasizes the role of lobbying which is absent from our model to maintain our focus on the two-level process by which trade policy is actually determined. Lobbying may be incorporated in a manner similar to prior work testing the GH model (Goldberg and Maggi, 1999, Gawande and Bandyopadhyay, 2000) as shown in A.4. More structure on lobbying is left for future research, noting that such work would significantly contribute original measures of lobbying at the region and sector level, not just at sector as in previous studies. Additionally, this framework would need to allow for lobbies to emerge endogenously, as in Mitra (1999). Lobbying groups may decide to organize and target their activities at either the local or national levels depending on the ability of those efforts to influence policy outcomes.

[23] The same grouping of districts is used to estimate different sets of relative weights that sectors and districts receive as a result of the instrument of protection (tariffs or NTMs) and legislative bargaining. Beyond the three types of groupings, the details of the underlying legislative bargaining protocol is treated as a black box at this stage. An important step in this research agenda is unpacking this box, which requires modeling bargaining structures, institutions that aggregate preferences, institutions that frame legislative bargaining, and institutions that regulate the instrument for granting protection.

unchanged over time, the distribution of tariffs in 1985 across these geographies is similar to the distribution of inherited by these geographies in the 2000s. We can therefore test the BF prediction that the proposer is able to capture at least 50 percent of the value of the game.[24]

The second grouping of districts, *Case 2*, captures coalitions that combine both geography and party, i.e., whether the district elected a Democrat or a Republican representative. By considering simultaneously partisan alignments and geography, this case is able to estimate the weights for a larger and richer set of possible coalitions: in this case $R = 18$, twice the number of coalitions considered in *Case 1*).

The third case, *Case 3*, combines Congressional districts into nine groups ($R = 9$) according to purely political factors. The classification of districts is based on the electoral competitiveness of the state in the 2000 Presidential Election, the competitiveness of the representative's district in the Congressional race closest to (and prior to) 2002, and the party that carried the state in the Presidential election and the district in the Congressional race. This grouping captures electoral motivations by the national party to win the Electoral College with the incentives faced by individual legislators to respond to demands from their districts.

3.2.2 Additional assumptions

The absolute welfare weights $\Gamma^L_{jr} n^L_{jr}$ and $\Gamma^K_{jr} n^K_{jr}$ in (9) are not identified without additional assumptions. Since it is sufficient for our purpose to estimate the relative welfare weights $\Gamma^K_{jr} n^K_{jr}/(\gamma^K + \gamma^L)$ in (8), the identification strategy focuses on parameter-reduction.[25] Welfare weights are estimated by OLS from the econometric specification motivated by (9):

$$\tau_j = \sum_{r=1}^{R} \beta_r \left(\frac{q_{jr}/M_{jr}}{-\epsilon_j} \right) + \alpha \left(\frac{Q_j/M_j}{-\epsilon_j} \right) + u_j, \tag{10}$$

where each coefficient β_r is a function of the welfare weights $\Gamma^K_{jr} n^K_{jr}$ and $\Gamma^L_{jr} n^L_{jr}$, and $\alpha = -1$. These welfare weights are under-determined: from the R parameters β_r, it is not possible to uniquely recover the $2 \times (J \times R)$ region-sector welfare weights $\Gamma^K_{jr} n^K_{jr}$ and $\Gamma^L_{jr} n^L_{jr}$. To identify these weights, two additional tenable assumptions are made: (1) the welfare weights for both classes of factor owners have no within-region variation, that is,

[24] A stylized interpretation is that the President proposes, through tariffs, a distribution of welfare weights that (i) gives more than a 50 percent share to mobile labor (or consumption) resulting in lower protection, and (ii) distributes the remainder weights to specific factors owners in the nine geographic regions to muster a minimum winning coalition in Congress who supports the proposed vector of tariffs.

[25] Weights are constrained to be non-negative, so import subsidies (negative tariffs) are not considered. But it is possible to do so by admitting negative weights.

in district r owners of capital specific to sector j are treated the same as owners of capital specific to any other sector: i.e.: $\Gamma^K_{jr} = \Gamma^K_r$; and (2) the same assumption applies to labor: i.e.: $\Gamma^L_{jr} = \Gamma^L_r$.[26] Under these assumptions, the coefficient β_r is expressed as

$$\beta_r = \frac{\Gamma^K_r n^K_r}{(\gamma^K + \gamma^L)} \frac{n_r}{n^K_r} = \frac{\Gamma^K_r n^K_r}{(\sum_r \Gamma^K_r n^K_r + \sum_r \Gamma^L_r n^L_r)} \frac{n_r}{n^K_r}, \tag{11}$$

where within-sector variation in welfare weights is eliminated, and (n_r/n^K_r) is measured as described above. There are $2R$ parameters, $\Gamma^K_r n^K_r$ and $\Gamma^L_r n^L_r$, $r = 1, \ldots, R$, but for our purpose it is sufficient to recover $R+1$ parameters: R welfare weights on specific capital in each region, $\Gamma^K_r n^K_r$, and the collective economy-wide welfare weight on labor, $\gamma^L = \sum_r \Gamma^L_r n^L_r$. This is straightforward once we have estimates of β_r in hand.

3.3 Data

A spatial dataset is constructed with output (q_{jr}), imports (M_j), import demand elasticities (ϵ_j) and tariffs (τ_j). Our data on sectoral tariffs, trade flows, output, wages, employment and consumption come from a variety of sources, and are at different levels of geographical and industry aggregation. Output and employment data are from the Census Bureau (County Business Patterns: 2002); the import and tariff data are from the United States International Trade Commission's Dataweb;[27] tariffs are duties collected at customs (from USTradeOnline, available at HS10).[28]

Import elasticity data at 6-digit HS are from Kee et al. (2008). The values of ϵ_j's in (9) are measured as the elasticity estimates of Kee et al. (2008) adjusted for errors-in-variables as in Gawande and Bandyopadhyay (2000). Missing HS 6-digit elasticities are imputed as their 3-digit means. For the NTM results, the analysis uses ad-valorem equivalents of core NTMs at the 6-digit HS level from Kee et al. (2009).[29] These core NTMs are price controls, quantity restrictions, monopolistic measures, and technical regulations, as defined by UNCTAD's TRAINS database where the original NTM incidence is recorded (see Kee et al. (2009, 2008)). Sectoral distribution of tariffs and NTMs by region and party are presented in figure D in Appendix D. Output and employment data from CBP were converted to the NAICS 3-digit level, and mapped from Metropolitan Statistical

[26]Our view is that departure from this assumption should be structurally supported in the model. For example, a lobbying structure may be introduced into the model to distinguish capital specific to one sector versus another.

[27]Available at dataweb.usitc.gov.

[28]Using MFN tariffs instead produces results that are qualitatively close to those reported in the paper.

[29]Kee et al. (2009) obtain the average of NTMs by first estimating the quantity-impact of NTMs on imports and then transforming these quantity-impacts into price effects, using the import demand elasticities in Kee et al. (2008)

Areas and Counties onto the 435 Congressional districts for the 107^{th} Congress (year 2002). This year was chosen because of data requirements and availability, and because the analysis intends to focus on a time period that includes the impact of China's MFN access to the U.S. market.[30]

The share of workers in region r who own specific capital in any sector, n_r^K/n_r is measured in two steps. A significant part of the compensation of white collar (non-production) workers is rents due to their sector-specificity, while the compensation of blue collar (production) workers, who are not "stuck" to a sector, is earned wage.[31] From the 2000 Census of Manufacturing we calculate the proportion of non-production workers in every NAICS sector (nationally, non-production workers constituted 28 percent of the total manufacturing workforce in 2000). The ratio n_r^K/n_r is then computed as the average of the national proportions using region r's sectoral manufacturing employment as weights. Region r's sectoral manufacturing employment is from the 2000 County Business Patterns, in turn, from the Geographical Area Series of the 2000 Census of Manufacturing.

Sectoral output data are missing for 49 of the 435 districts. This occurs in districts with few manufacturing firms so that identifying a sector's output would reveal information about the firm. Due to confidentiality issues, the Census does not report this information. For these districts there is available data on the number of employees by sector. Using the employment data, output in the missing districts is predicted from a regression estimated with data on districts with both employment and output. The regressions have a strong fit and allow us to include these 49 districts in the analysis. Figures E and F in Appendices E and F present the distribution of sectoral output and the ratio of sectoral output to imports by region and party respectively.

4 Results

This section presents the estimated weights from the line-level vector of observed tariffs for the three different groupings of districts described earlier.

4.1 Tariffs, Regions and the Baron-Ferejohn Hypothesis

The BF hypothesis, that the proposer captures (at least) 50 percent of the value of the game, is tested here. To our knowledge, this is the first attempt to test the hypothesis

[30] The economic and trade data from the early 2000s are appropriately reflect the "start" of the China shock. We offer a model-based perspective below.

[31] While this is stylized - blue collar autoworkers have specificity in the auto sector and white collar accountants are mobile across sectors - the national ratio of 0.28 has been used as a fair approximation of the proportion of workers who stand to lose the most from displacement due to import competition.

in the context of trade policymaking. Table 1 reports coefficient estimates from the regression (10) for the baseline case with census-defined regions.[32]

Table 1: Regression Model for Welfare Weights

Dependent Variable: *Applied Tariff, 2002*	
	Eq. (10)
β_1: New England	0.046
	(0.013)
β_2: Mid-Atlantic	0.115
	(0.016)
β_3: East North Central	0.269
	(0.015)
β_4: West North Central	0.000
β_5: South Atlantic	0.171
	(0.010)
β_6: East South Central	0.000
β_7: West South Central	0.127
	(0.039)
β_8: Mountain	0.026
	(0.013)
β_9: Pacific	0.188
	(0.030)
α: $(q_j/M_j)/\lvert\epsilon_j\rvert$	-1
Constant	0.043
	(0.020)
N	8315
Pseudo R^2	0.173

Notes: (1) Standard errors are clustered at NAICS 3-digits. (2) Unconstrained estimates of β_4 and β_6 are negative. To disallow negative welfare weights β_4 and β_6 are constrained to zero. α is constrained to equal (-1). (3) R-squared is not reported for constrained regressions. The squared correlation of predicted tariffs with actual tariffs is reported.

The coefficient α on the consumption-side variable, $(Q_j/M_j)/(-\epsilon_j)$, is constrained to -1 as required by the model. The estimates indicate positive welfare weights on specific

[32]The 433 districts (out of the 435) for which we were able to assemble output, trade, protection and employment data are classified into nine geographical blocs according to the US Census. **Division 1**: New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont). **Division 2**: Mid-Atlantic (New Jersey, New York, and Pennsylvania). **Division 3**: East North Central (Illinois, Indiana, Michigan, Ohio, and Wisconsin). **Division 4**: West North Central (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota). **Division 5**: South Atlantic (Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, District of Columbia, and West Virginia). **Division 6**: East South Central (Alabama, Kentucky, Mississippi, and Tennessee). **Division 7**: West South Central (Arkansas, Louisiana, Oklahoma, and Texas). **Division 8**: Mountain (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming). **Division 9**: Pacific (Alaska, California, Hawaii, Oregon, and Washington). Table 2 (first column) shows the number of districts in each regional bloc.

capital ownership in all but two regions.[33] Notably, the small set of regional variables is able to explain a significant proportion of the variation in the 8315 HS 8-digit tariff lines. Each regressor is measured at the 3-digit NAICS level of eighteen manufacturing sectors.[34] This finding indicates there is clustering during the legislative process of tariff–making.[35] If observed tariffs were independently determined line by line, the regression would likely show poorer fit. If sector-based interests determine tariff preferences, tariffs that are legislated are likely to be conceptualized at the sector level. This imparts greater explanatory power to our regional measures of sectoral interests $(q_{jr}/M_{jr})/(-\epsilon_j)$.[36]

What do these estimates imply for the BF hypothesis and for the distribution of welfare weights across owners of specific capital in the nine regions? Table 2 provides the answers. Recall that under delegated trade authority the President proposed to Congress the negotiated vector of tariffs, on which motion Congress would take an up-or-out closed rule vote. The BF hypothesis is that the proposer wins at least half the value of the game, which in the tariff game is essentially the sum of the welfare weights $(\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L)$. The tariff game is about how this aggregate is split between profits accruing to owners of specific capital (the first component) and consumers (the second component).[37]

Table 2: Estimated Weights on Capital Owners, by Geography

Estimated K_r-weights (normalized)

Region	#Districts	K_r-weight
1. New England	23	0.019
2. Mid-Atlantic	65	0.047
3. East North Central	73	0.098
4. West North Central	31	0.000
5. South Atlantic	75	0.068
6. East South Central	26	0.000
7. West South Central	47	0.052
8. Mountain	24	0.011
9. Pacific	69	0.080
Total	433	0.375

Notes: (1) The normalized K_r-weight is defined as the proportion of the national weight that is placed on a region's capital ownership, or $\frac{\Gamma_r^K n_r^K}{\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L}$. (2) $\frac{\text{Aggregate L-weight}}{\text{Aggregate L-weight + Aggregate K-weight}} = 1 - 0.375 = 0.625$.

[33] The estimated coefficients, β_r, are constrained to be non-negative as import subsidies are ruled out as policy instruments.

[34] Three primarily exporting sectors – whose specific capital owners do not seek tariff protection - are dropped: Printing (NAICS=323), Beverage and Tobacco (312) and Food Processing (311).

[35] Evidence for this is also in Conconi et al. (2014) and Bohara et al. (2005).

[36] Presumably, sector-level tariffs determined by the winning legislative coalition are administratively translated to the line level by applying the same tariff to the line-level cluster of products.

[37] Note that specific capital owners are part of the set of consumers as well.

The difference between the BF prediction, which establishes that the proposer receives a lower bound of 50 percent in the symmetric-legislators game, and the estimated 62.5 percent captured by the proposer in this tariff game is in part due to heterogeneity among legislators. The reason why the proposer captures more than 50 percent of the pie is the existence of legislators who are satisfied with zero tariffs (and therefore zero welfare weights). These are districts whose votes counted, but being primarily exporters they had no skin in the manufacturing tariff game. Alternatively, these are rural districts and since agriculture remained exempt from multilateral trade liberalization until future rounds, their representatives were indifferent to manufacturing tariff cuts.[38] This kind of heterogeneity, where some votes came for free, enabled the proposer to capture more than the baseline BF prediction under the closed rule vote. The findings therefore affirm the BF hypothesis. The underlying logic is that the proposer will give only what it takes to win a minimum winning coalition of voters. That logic is clear in the large share of welfare weights given to consumers and not to special-interests.

How were the 37.5 percent shared among districts? The second column of the table shows how this weight was distributed across the owners of sector-specific capital in the nine regions. West North Central and East South Central (Regions 4 and 6, respectively) got no weight in determining the nations tariff preferences. These were largely rural, export-oriented, or both, and did not need tariff protection to vote for the post-Tokyo round trade agreement bill. Specific capital owners in districts comprising the East North Central region (Region 3) – the mid-western states of Illinois, Indiana, Michigan, Ohio, and Wisconsin – were collectively afforded a welfare weight equal to 9.8 percent of the aggregate national welfare weight (Figure 1).[39] The estimates reveal these concessions are meager winnings in the legislative bargain. Based on the results, it would be fair to conclude that the closed rule vote muted their demands for tariff protection. Other "winners" were districts in the Pacific (8.0 percent of the aggregate weight), South Atlantic (6.8), West South Central (5.2), and Mid-Atlantic (4.7).[40]

[38] Bilateral agricultural agreements, for example tariff free access of U.S. soybeans exports to Japan and beef to the EC helped gain the political supports of rural districts exporting these products (USITC 2003). On the other hand, opening up the U.S. market to tropical products from developing countries as well as relaxing import quotas on cheese may have cost the support of some districts.

[39] The next section further investigates what their bliss-point tariffs were.

[40] A region's share is presumed to be distributed across their region's districts in proportion to the number of specific capital owners in sectors receiving a positive level of protection in each district.

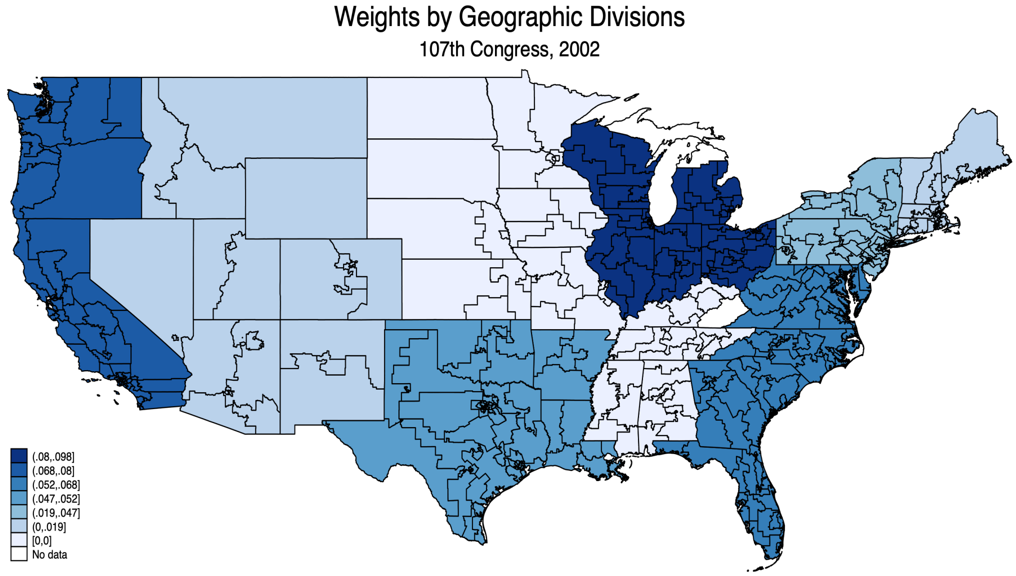

Figure 1: Estimated Weights based on Geographic Subdivisions

Results for NTMs are presented in Appendix B. The pattern of estimated regional weights on sector-specific capital owners is different from that for tariffs (See Table B, and Figure B for the geographic distribution of welfare weights). Specific capital owners overall get an even lower weight in the NTM case. It should be noted, however, that the "delegated authority" game that explains how tariffs are decided does not accurately describe the process that determines NTMs.[41]

4.2 Case 2: Coalitions based on political geography

The baseline case, while useful to test for the BF hypothesis, is less informative about coalition bargaining that characterizes voting in Congress. For example, strong parties unify party-based coalitions. The second case takes politics into account and considers coalitions formed on the basis of both geography (as in the baseline case) and politics. Political alignment is measured by the party of the representative of each Congressional District in the 107th Congress. Table 3 indicates the number of districts that comprise these 9×2 political geography "regions".

As stated earlier, the ability of district representatives (regions) and owners of specific factors (sectors) to influence the decision-making process varies depending on the specific trade protection instrument under consideration. Therefore, this section estimates the welfare weights underlying the determination of both tariffs and NTMs, and examines the extent to which the distribution of weights differ.

[41] In principle, there is more flexibility in modifying NTMs than tariffs, so the determination of NTMs may more closely follow current political and partisan influences.

4.2.1 Implicit welfare weights: Tariffs

Legislative bargains made at the time of enacting tariffs presumably pitted the region-party coalitions against the President in determining the share of aggregate welfare weights allowed to specific factors, and then pitted the coalitions against one another to determine the division of this share among themselves. Districts forming into coalitions belonging to the party of the President may also have allowed the President-as-proposer greater bargaining power in setting tariffs (Lohmann and O'Halloran, 1994). Whether these coalitions determined the tariffs and, as a result, the distribution of welfare weights, is the subject of further research. This case focuses on the political make-up of the political-geography coalitions in the early 2000s, long after the tariffs were legislated but just when the China shock was imminent. The number of districts in each party-geography blocs in 2002 are indicated in Table 3.

Table 3: Districts, by Political Geography of 2002

	Republican	Democrat
1. New England	5	18
2. Mid-Atlantic	29	36
3. East North Central	39	34
4. West North Central	19	12
5. South Atlantic	48	27
6. East South Central	16	10
7. West South Central	24	23
8. Mountain	18	6
9. Pacific	25	44
Total	223	211

The welfare weights on sector-specific capital for each bloc are presented in Table 4 below. The welfare pie was split 0.629 to mobile labor (or consumption) and 0.371 to sector-specific capital. The distribution of weights across the 9 rows (the row sums) is consistent with the distribution of weights under the purely geographic groupings in Table 3. Districts in East North Central (Region 3) get a slightly higher weight 0.105 in *Case 2* compared with 0.098 in *Case 1*. The weights in this region are split equally between Democrat and Republican held districts. However, the overall distribution favors Democrat held districts by 0.260 to 0.111 (Republican districts in the New England, Mid-Atlantic, and West South Central regions receive a zero weight while Democrat districts in those same regions receive a positive weight). The smaller weights to Republican held districts may be due to their being rural districts uninterested in manufacturing tariffs (Figure 2), but they could also be industrial districts that turned Republican *because* their coalition was at the losing end of the tariff bargain over the decades and were at the threshold of de-industrializing. We further discuss this possibility below.

Table 4: Estimated Weights, by Political Geography of 2000

Estimated K_r-weights (normalized)

	Republican	Democrat
1. New England	0.000	0.015
2. Mid-Atlantic	0.000	0.056
3. East North Central	0.055	0.050
4. West North Central	0.000	0.000
5. South Atlantic	0.034	0.050
6. East South Central	0.000	0.000
7. West South Central	0.000	0.028
8. Mountain	0.000	0.000
9. Pacific	0.022	0.062
Total	0.111	0.260

Notes: (1) The normalized K_r-weight is defined as the proportion of total national welfare weight that is placed on owners of specific capital in region r, $\frac{\Gamma_r^K n_r^K}{\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L}$. (2) The normalized L-weights may be calculated by distributing the aggregate L-to-total weight (0.629) across the 18 "regions" according to the size of their workforce.

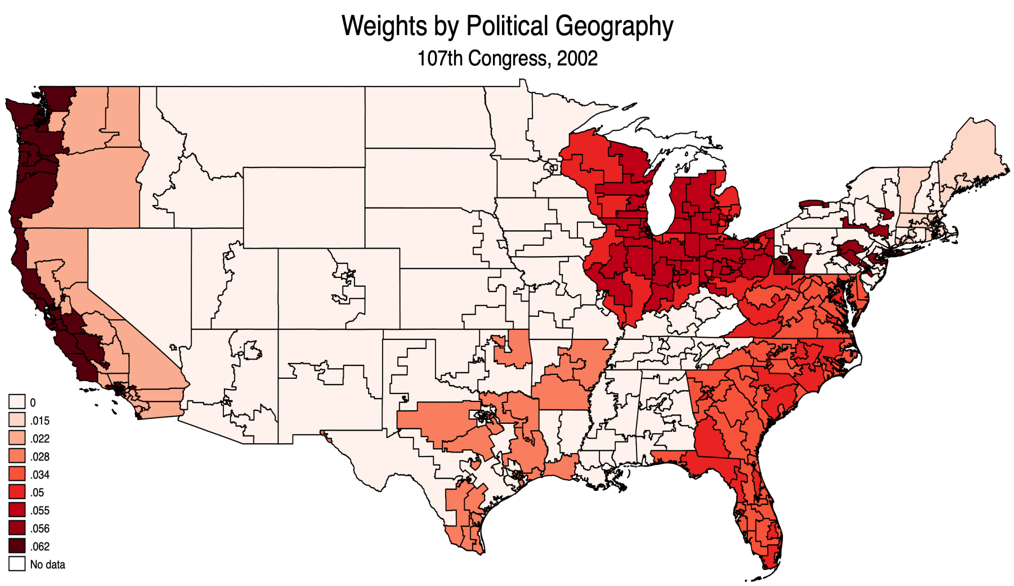

Figure 2: Estimated Weights based on Geography and Representative's Party

4.2.2 Implicit Welfare Weights: NTMs

Tariffs negotiated under past multilateral and regional agreements are hard for subsequent legislative coalitions to reverse. There is, however, greater flexibility with NTMs. Since the time of the Tokyo Round, U.S. trade legislation by Congress has, while ceding tariff making authority to the executive, attempted to keep control over trade legislation regarding NTMs. The President was able to negotiate tariff cuts so long as any negotiations on NTMs benefited the U.S.. Section 102 (fast-track) authority was given to the President to negotiate and enter into trade agreements on non-tariff barriers provided that Congress retained the final authority to approve the implementing legislation for these trade agreements (USITC 2003, p 50). The implication was that the President needed to "bring home the bacon" on NTMs for Congress to accept the tariff cuts negotiated.[42] Importantly, NTMs were less likely to be bound, granting the President more flexibility when choosing to target protection to sectors and districts when using these instruments. Moreover, the implementation of NTMs does not require Congressional approval once the statute delegating authority to the Executive has been passed. While legislators still play a role in the formation of NTMs, as Congress has the ability to rein in the President, the party controlling the Presidency is more likely to get its way.

What did NTMs in place at this time imply for the distribution of welfare weights in the present model? To address this question, the regional weights are recalculated using ad-valorem equivalents of core NTMs at the HS 6-digit line level (in 1999 for the U.S.) from Kee et al. (2009). Table 5 shows the estimated weights on specific capital by geography and party; Figure 3 presents a visualization of the intensity of the estimated weights. In contrast to the tariff weights, specific capital in Republican controlled districts get the lion's share of the aggregate weight to specific capital owners. While tariffs imply an aggregate weight for Republican (Democrat) districts of 0.111 (0.260) (Table 4), the weights flip with NTMs: Republican (Democrat) districts get 0.252 (0.094) (Table 5). Republican districts in the South Atlantic, East South Central, West South Central regions received weights 0.048, 0.061, and 0.142, respectively; weights for Democrat districts in these regions sum to 0.032. The comparison of weights for tariffs and NTMs suggests that the Executive branch rewarded co-partisans through NTMs.

[42] In their study of NTMs after the Kennedy Round, Marvel and Ray (1983) find NTMs complemented tariffs and made up for the tariff cuts suffered in many sectors. Deardorff and Stern (1983) analyze the Tokyo Round cuts proposed across sectors by 18 developed countries. They identify a number of sectors – such as apparel, textiles and leather goods, or agriculture – where NTMs remained in place and replaced the protectionist role of tariffs. Textiles were governed by bilateral quotas under the Multi-Fiber Agreement, keeping them relatively protected. However, the Kennedy Round granted developing country MFN access to developed country markets under the General System of Preferences (GSP). Imports of apparel and leather goods soared as a result.

Table 5: NTMs: Estimated Weights by Political Geography of 2000

Estimated K_r-weights (normalized)

	Republican	Democrat
1. New England	0.000	0.017
2. Mid-Atlantic	0.000	0.000
3. East North Central	0.000	0.023
4. West North Central	0.000	0.000
5. South Atlantic	0.061	0.000
6. East South Central	0.048	0.005
7. West South Central	0.142	0.027
8. Mountain	0.000	0.000
9. Pacific	0.000	0.021
Total	0.252	0.094

Notes: (1) The normalized K_r-weight is defined as the proportion of total national welfare weight that is placed on owners of specific capital in region r, $\frac{\Gamma_r^K n_r^K}{\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L}$. (2) Normalized L-weights may be calculated by distributing the aggregate L-to-total weight (0.653) across the 18 "regions" according to the size of their workforce.

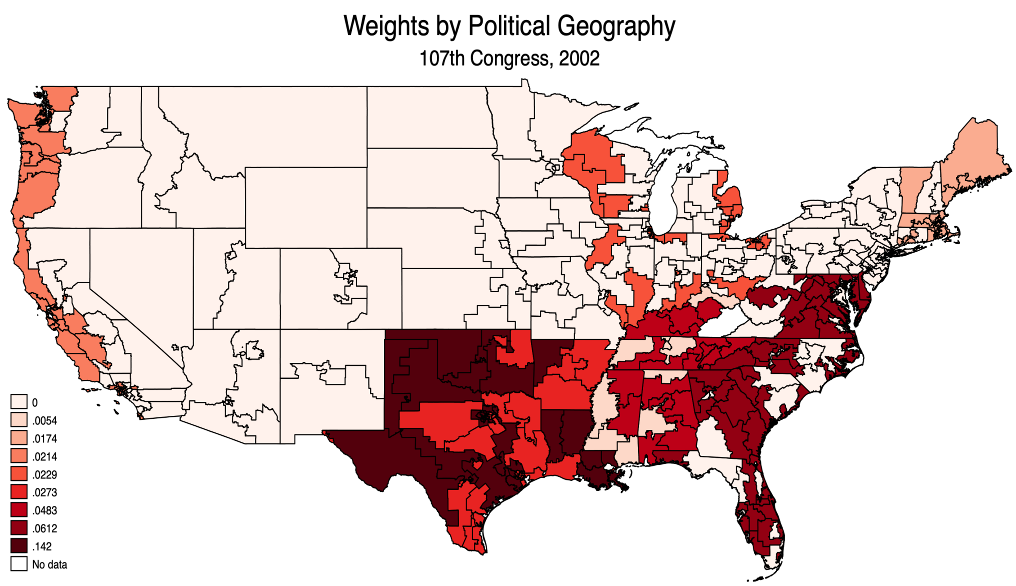

Figure 3: NTMs: Estimated Weights based on Party and Geographic Subdivisions

4.3 Case 3: Coalitions based on electoral dynamics

The final stylized case aggregates districts into purely political coalitions. This grouping is constructed on the basis of how states voted in the 2000 Presidential elections (reflecting the incentives faced by the Executive Branch in the formation of trade policy) and how districts voted that same year in elections to the House of Representatives. Districts are formed into nine blocs ($R = 9$), combining election outcomes and the party winning the state or district. 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 more than 52 percent of the vote are considered safe for each party. Otherwise they are considered competitive in the House elections.

Table 6 indicates how districts were distributed across the nine political blocs after the 2000 elections. The numbers between square brackets indicate the proportion of the nation's manufacturing workforce represented by the nine blocs. The last column indicates that states that voted strongly Republican for the President in 2000 contained 136 U.S. districts; states that voted strongly Democrat for President contained 125 districts; and states where votes for the President were competitive contained 172 districts.

Table 6: 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	72	83	172
	[.03]	[.16]	[.22]	[.41]
Safe Democrat	8	75	42	125
	[.02]	[.16]	[.09]	[.27]
Safe Republican	5	51	80	136
	[.02]	[.11]	[.20]	[.33]
Total	30	198	205	433
	[.07]	[.43]	[.51]	[1.00]

Notes: (1) Cells contain the number of districts. (2) The proportion of manufacturing workforce in the cell is shown in brackets.

The pattern of weights consistent with observed sectoral tariffs (reported, for brevity, in Table C and Figure C in Appendix C) suggests that tariffs and electoral dynamics in the Presidential and district level elections bear a strong correlation: specific factors in states that the Republican Presidential candidate carried, and safe Republican Congressional districts receive higher weights in the formation of trade policy.

4.3.1 An NTM Strategy?

Tariffs are inherited and immovable, negating a tariff strategy for individual Congress members responding to demands for protection when the China shock hit the U.S. manufacturing sector. NTMs, on the other hand, are a policy instrument that Presidents can use to enhance their electoral fate.[43] Therefore, it seems more appropriate to use the coalitions considered in *Case 3* to asses their influence on the enactment of NTMs. The

[43] The Section 301 Steel case that President Bush brought on the heels of his election is a case in point.

vector of NTM ad-valorem equivalents in 2002, presented in Table 7 imply that specific factor owners are provided 0.347 share of aggregate welfare weights. These weights are in line with the estimates presented in section 4.1.

Table 7: NTMs: Estimated Weights, by Political Blocs

State-wide Vote in Presidential Election	**Districts in House elections** Competitive	Safe Democrat	Safe Republican	Total
Competitive	0.000	0.030	0.012	0.042
Safe Democrat	0.000	0.045	0.017	0.063
Safe Republican	0.000	0.116	0.126	0.242
Total	0.000	0.192	0.155	0.347

Notes: (1) Cells show normalized K_r-weights defined as the proportion of total national welfare weight that is placed on owners of specific capital in region r, $\frac{\Gamma_r^K n_r^K}{\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L}$. (2) Normalized L-weights may be calculated by distributing the aggregate L-to-total weight (0.653) across the 9 "regions" according to the size of their workforce.

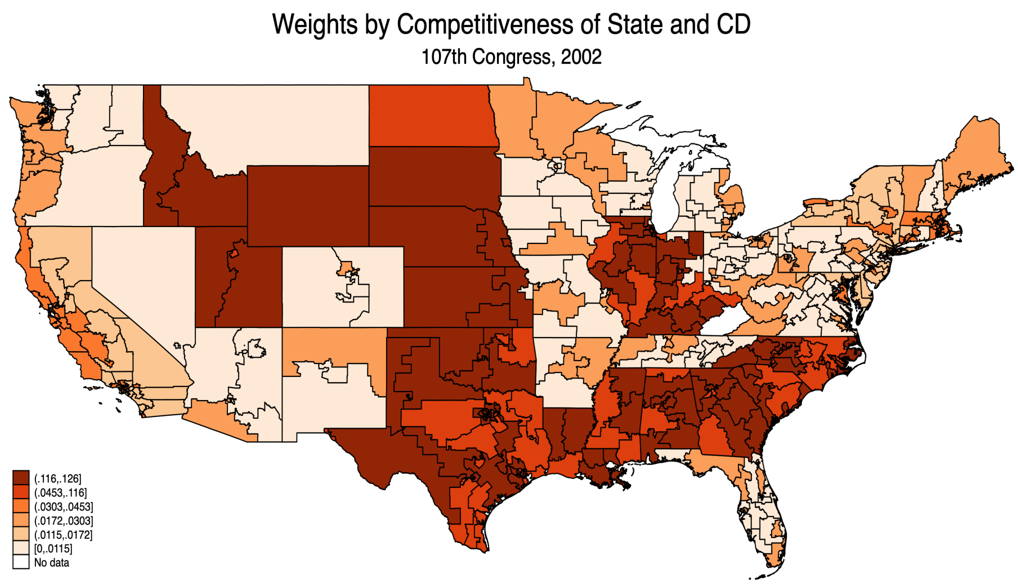

Figure 4: NTMs: Estimated Weights based on Competitiveness of Presidential and Congressional Elections

Table 7 and Figure 4 also show how this share is distributed among the nine politics-based coalitions. The last column is the sum of the weights across the three types of states and the last row the sum across the three types of districts. For example, districts in safe Republican states in the Presidential elections (136 in total) receive a 0.242 proportion of the aggregate welfare weights; safe Democratic districts in House elections (198 in total) receive a 0.192 proportion.

Republican candidate George W. Bush won the 2000 Presidential election by a thin margin. Had he contemplated an NTM strategy to gain more votes in the next election, what might such a strategy have been? And what could Republican coalitions have done to bring about a favorable result? In the Grossman and Helpman (1996) model candidates choose the trade policy platforms that get them enough campaign contributions from specific capital owners to pay for votes from uninformed voters – as different from ideological voters whose vote may not be bought – to swing the election in their favor.

Suppose that, in the present model, there is a known mapping from welfare weights on specific factors to votes, similar to the Grossman and Helpman (1996) model. Further, suppose winning a state delivers all its districts to the President and winning the majority of districts (rather than the electoral college system in place) delivers the Presidency. A strategy based on the distribution of districts in Table 6 would work as follows. Assuming the President has the 136 safe Republican districts in hand without any new policy, he needs 81 more for a majority. He seeks these from Competitive states containing 172 districts. One possibility, based on the last column in Table 7 is to propose a vector of augmented NTMs (measured in ad-valorem equivalents) that raises the proportion of welfare weights from 0.042 to what is needed to induce the necessary votes to swing the election. Equation (9) suggests how this may be accomplished on the basis of economic structure of competitive *states*.[44]

In sum, the institutions determining trade policy affect the relative weights placed on economic agents across dispersed political units. While Congress plays a stronger role in the process of enacting tariffs in the U.S., its influence over the formulation of NTMs is less direct. The Executive branch has a stronger influence in NTM determination.[45] Does the President's more direct involvement lead to different coalitional bargains in Congress over NTMs? The present analysis suggests this is true: electoral incentives faced by the

[44]New NTMs need not require legislation, and the President is empowered to take actions under the various Trade Acts and other statutes in force (e.g. Laws and Statutes as of 1997). The model with politics-based coalitions accommodates situations where the President's proposal requires support from a majority in the House. The bottom row of Table 6 shows the party of the President is 12 votes short of a partisan majority coalition in the House, assuming the strength of ideology holds the 205 Republican House votes (217 is the majority in our 433 district world). The problem is then to device an NTM vector that wins enough states to deliver the Presidency as above, and delivers a minimum winning coalition in the House to legislate the policy. We suppose there is a known mapping from welfare weights on specific factors in a district to the representative's vote in the House. The existence of such a vector, given the distribution of districts in Table 6, depends on how changing the welfare weights translates into legislative voting. Our estimates suggests that getting the additional 12 votes from competitive states using a strategy that keeps aggregate welfare on consumers unchanged and transfers some of the specific factors weights from safe Democratic states and districts to competitive states and districts seems plausible.

[45]Even in cases where firms initiate proceedings, the hand of the President plays a role though election of Commissioners who adjudicate disputes.

President rather than members of Congress will likely yield a different pattern of regional weights, as observed by comparing weights using tariffs and NTMs.

5 Trade Policy Sources of the China Shock

The literature on the China shock has moved even beyond its focus on U.S. manufacturing job losses, into assessing the shock's manifold repercussions (Autor et al., 2015, 2020). Autor et al. (2020) find the shock has electoral consequences; Pierce and Schott (2020) find the shock has health and morbidity consequences. A message is that a trade shock that was massively and singularly targeted at U.S. manufacturing not only displaced workers, but revealed that U.S. institutions were incapable of responding to the plight of workers who saw an erosion of their standard of living for the remainder of their working lives. What does our framework tell us about the China shock and institutions that deliver U.S. trade policy?

Specific factors are antagonists in stories that special interest models of trade policy tell. They are rightly vilified because their goal is to protect the rents they can extract as owners of sector-specific factors at the expense of aggregate welfare; if they were forced to find employment in another sector, these rents would disappear. But what if white collar workers – most likely to own specific factors – also invested in expertise that was specific to the sector, that is, their excess earnings over rank and file workers were not pure rents? Then their lobbying is not pure rent-seeking, but rather seeks to protect the returns to their investment.[46] In the absence of a labor market in the model we do not have structure to address this problem. Yet, with this altered view of specific factor owners less as pure rent seekers and more as protectors of their investment, our model and estimates suggest that the China shock is a symptom of institutional failure, not a cause. The fundamentals for the China shock were laid over decades of Democratic majorities in Congress which seemed to ignore the message that a group of constituents – the owners of sector specific factors – sent to the legislature through their district representatives (Bombardini et al., 2020, Conconi et al., 2014).

The framework developed in this paper can help answer the counterfactual that gets to the bottom of the issue: What tariffs would district r choose if it were independently able to implement them? To perform this exercise, the analysis derives the vector of sectoral tariffs preferred by each district following a similar approach as the one used to

[46] Trade theory says that if these returns are not competitive, then it is welfare improving for trade to eliminate these investments and jobs. With no time frame to limit its scope, trade theory is right. But real-world decisions about investing in human capital and skills are made with a different time frame in mind, particularly in the absence of compensatory mechanisms to mitigate the adjutment losses. These frictions require institutions to make the promise of trade bear fruit.

determine national tariffs. The main difference is that the district's preferred tariff vector is obtained by maximizing a district-level welfare function. This welfare function places weights on groups of individuals or sectors within the region which, in general, differ from those considered in the centralized solution.

5.1 District-specific tariff preferences

District's r preferred tariffs are assumed to maximize regional welfare, defined as a weighted sum of the utility of the local population. As in Section 2.2, welfare weights are differentiated by region (or district), by sector, and by the two groups of factor owners, but the weights may differ from their national counterpart. District r gives the welfare weight Λ_{jr}^L to labor employed in sector j, and Λ_{jr}^K to specific capital employed in sector j. Therefore, district r's aggregate welfare is

$$\Omega_r = \sum_j \Lambda_{jr}^L W_{jr}^L + \sum_j \Lambda_{jr}^K W_{jr}^K.$$

Implicitly, the district's preferred tariffs are assumed to be chosen by a local "decision maker" who internalizes the influence of local economic agents. The weighted welfare function Ω_r is supposed to capture these local political influences.[47]

The vector of preferred tariffs for district r is given by[48]

$$t_{jr} = -\frac{n}{M_j'}\left[\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r}\left(\frac{q_{jr}}{n_{jr}^K}\right) - \frac{D_j}{n} + \frac{M_j}{n}\right], \quad j = 1, \ldots, J,\ r = 1, \ldots, R, \tag{12}$$

where $\lambda_r = \lambda_r^K + \lambda_r^L = \left(\sum_j \Lambda_{jr}^K n_{jr}^K + \sum_j \Lambda_{jr}^L n_{jr}^L\right)$ is the aggregate welfare weight on residents of district r. As in the case of national tariffs, the preferred tariff by district r depends positively on profits from local activities (first term in the squared-brackets) and tariff revenue (third term), and negatively on consumer surplus (second term). Using good j's import demand elasticity, $\epsilon_j = M_j'(p_j/M_j)$ and the ad-valorem tariff $\tau_{jr} = t_{jr}/p_j$,

[47] Presumably, the decision maker from district r would represent these preferences in the legislature and attempt to build a coalition that will legislate a national tariff as close as possible to district r's preferences.

[48] The details are included in Appendix A.1.

(12) may be rewritten as:[49]

$$\tau_{jr} = \frac{\Lambda^K_{jr} n^K_{jr}}{\left(\sum_j \Lambda^K_{jr} n^K_{jr} + \sum_j \Lambda^L_{jr} n^L_{jr}\right)} \frac{n}{n^K_{jr}} \left(\frac{q_{jr}/M_j}{-\epsilon_j}\right) - \left(\frac{D_j/M_j}{-\epsilon_j}\right) + \frac{1}{-\epsilon_j}. \tag{13}$$

Note that while in the case of national tariffs $\tau_j = 0$ for all $j \in J$ when all weights are equal (as shown in Section 2.2), this does not necessarily hold for τ_{jr}. In other words, the preferred tariff for sector j by district r is not necessarily zero when weights are equal for all sectors and groups. This is because a policymaker representing district r does not internalize the impact of the tariff on lost consumer surplus in other regions or districts.

5.2 Comparing tariffs

How does the vector of preferred tariffs by district r differ from those effectively chosen at the national level? The difference between τ_{jr} and τ_j (eq. (3)) can be expressed as:

$$\tau_{jr} - \tau_j = \frac{n}{(-\epsilon_j M_j)} \left[\left(\frac{\Lambda^K_{jr} n^K_{jr}}{\lambda_r} \frac{q_{jr}}{n^K_{jr}} - \sum_r \frac{\Gamma^K_{jr} n^K_{jr}}{\gamma} \frac{q_{jr}}{n^K_{jr}}\right)\right]. \tag{14}$$

This expression identifies three sources of discrepancy between district r's preferred tariff on good j, τ_{jr}, and the central tariff τ_j. The sign of $(\tau_{jr} - \tau_j)$ depends on: (i) the difference between the weights Λ^K_{jr} and Γ^K_{jr}, (ii) the spatial distribution of n^K_{jr}, and (iii) the production levels of good q_{jr} across all locations r.[50] Even when each district r places the same weights to each sector j and group m as those chosen at the central or national level, expression (14) may still be different from zero if the allocation of production across jurisdictions is not homogeneous, i.e., n^K_{jr} differs across locations r. In other words, there will be districts that win and districts that lose just because of a non-uniform allocation

[49] The counterpart to (13) with heterogeneous preferences is

$$\tau_{jr} = \frac{\Lambda^K_{jr} n^K_{jr}}{\lambda_r} \frac{n}{n^K_{jr}} \frac{(q_{jr}/M_j)}{-\epsilon_j} - \frac{\lambda^L_r}{\lambda_r} \frac{n}{n^L} \frac{(D^L_j/M_j)}{-\epsilon_j} - \frac{\lambda^K_r}{\lambda_r} \frac{n}{n^K} \frac{(D^K_j/M_j)}{-\epsilon_j} + \frac{1}{-\epsilon_j},$$

where $\lambda^L_r = \sum_{j=1}^J \Lambda^L_{jr} n^L_{jr}$, and $\lambda^L_r = \sum_{j=1}^J \Lambda^L_{jr} n^L_{jr}$ denote the aggregate weights given to the two classes of factor owners in region r, and the total weight for all agents in district r is $\lambda_r = \lambda^K_r + \lambda^L_r$.

[50] Note that if $n_{jr} = 0$, then since capital is essential in the production of good j, $q_{jr} = 0$. However, to the extent that $q_{jr} > 0$, not only the spatial distribution of activity, but also the scale, represented by q_{jr}/n^K_{jr} becomes relevant in determining tariffs and explaining the difference between τ_{jr} and τ_j.

of activity across space, and the legislative bargaining carried out at the national level.[51]

5.3 Approximating unmet demand

From (13), and assuming (i) no within-sector variation in weights to owners of K and L; and (ii) the same method to approximate M_{jr} as in Section 3.2 above, tariff protection to sector j in district r is

$$\tau_{jr} \;=\; \frac{\Lambda_r^K n_r^K}{\Lambda_r^K n_r^K + \Lambda_r^L n_r^L} \frac{n_r}{n_r^K} \left(\frac{q_{jr}/M_{jr}}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right). \tag{15}$$

Expression (15) quantifies district r's trade policy stance, that is, its preferred J-vector of tariffs $\boldsymbol{\tau}_r$. Rewriting the national tariff in equation (9) using the same assumptions gives

$$\tau_j \;=\; \sum_{r=1}^{R} \frac{\Gamma_r^K n_r^K}{\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L} \frac{n_r}{n_r^K} \left(\frac{q_{jr}/M_{jr}}{-\epsilon_j}\right) - \left(\frac{Q_j/M_j}{-\epsilon_j}\right). \tag{16}$$

So the relative "importance" of district r in the national legislative bargain is $\frac{\Gamma_r^K n_r^K}{\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L}$, whereas it is $\frac{\Lambda_r^K n_r^K}{\Lambda_r^K n_r^K + \Lambda_r^L n_r^L}$ when district r is free to determine its own tariffs. Even if the respective weights on each agent type are the same, $\Lambda_r^K = \Gamma_r^K$ and $\Lambda_r^L = \Gamma_r^L$, the importance of district r in the national bargain may be dwarfed. That is in fact what U.S. tariff data show.

The ratio of the district's aggregate labor welfare weight to aggregate capital welfare weight $\left(\frac{\Lambda_r^L n_r^L}{\Lambda_r^K n_r^K}\right)$ that drives τ_{jr} is not estimable, since district-specific tariffs τ_{jr} are unobservable. Suppose, for the counterfactual exercise, this weight is equal to its national counterpart $\left(\frac{\sum_r \Gamma_r^L n_r^L}{\sum_r \Gamma_r^K n_r^K}\right)$ that was estimated from (11). Conditional on this relative weight, district r's unilateral tariff preference is given by expression (15). The contrast between district r's tariff preferences and what it actually receives is a measure of unmet tariff demand, *the* underlying reason for the China shock whose economic and political ramifications would start to unfold over the coming decade.

[51]When preferences differ across groups, expression (14) becomes

$$\tau_{jr} - \tau_j = \frac{n}{(-\epsilon_j M_j)} \left[\left(\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r} \frac{q_{jr}}{n_{jr}^K} - \sum_r \frac{\Gamma_{jr}^K n_{jr}^K}{\gamma} \frac{q_{jr}}{n_{jr}^K} \right) - \left(\frac{\lambda_r^L}{\lambda_r} - \frac{\gamma^L}{\gamma} \right) \frac{D_j^L}{n^L} - \left(\frac{\lambda_r^K}{\lambda_r} - \frac{\gamma^K}{\gamma} \right) \frac{D_j^K}{n^K} \right].$$

The last two terms capture the impact of the tariff on consumption. The effects contribute positively or negatively to the difference $(t_{jr} - t_j)$ depending on the relationship between the weights attached the each group by region r. Suppose $\Gamma_{jr}^m = \Gamma$ and $\Lambda_{jr}^m = \Lambda$. Then, $\lambda_r^m/\lambda_r = n_r^m/n_r$ and $\gamma^m/\gamma = n^m/n$. If the proportion of group m in district r is the same as the respective average proportion, then the last two terms of the previous expression cancel out.

5.4 Results: Unmet Demand for Protection

Consider the stylized coalitions based on political geography (*Case 2*), which yield the welfare weights reported in Table 4. From (15) we calculate district-specific tariff demand at HS 6-digits (region r's demand is replicated for districts in the region) using the assumption that the aggregate labor-to-aggregate capital weight for each region is the same as that of the nation (0.629 from Table 4). Figure 5 shows the mean district-specific tariff demand for each manufacturing sector, together with actual tariffs and (ad-valorem equivalent) NTMs means as of 2002. In most sectors, the predicted means are an order of magnitude greater than the sum of actual tariffs and NTMs, which measures the level of total import protection effectively granted to the sector.

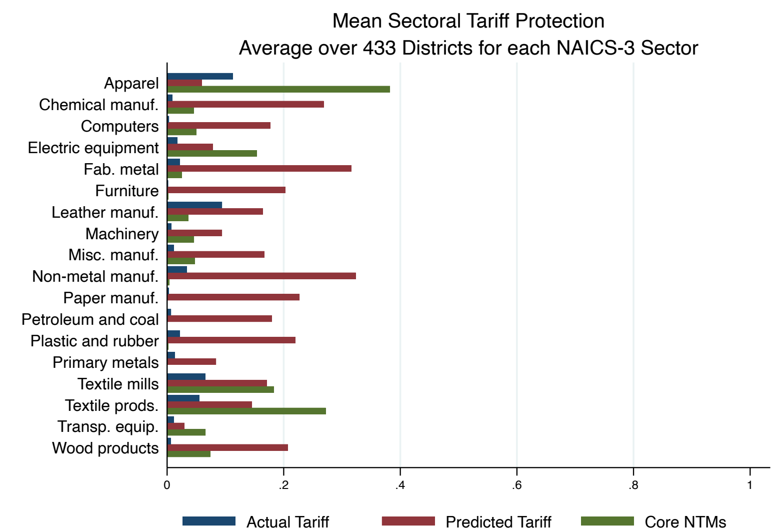

Figure 5: District-Specific Demand for Protection
Predicted and Observed Mean ISIC (3-digit) Sectoral Ad-valorem Tariffs and Equivalent NTMs

In sectors like Apparel, Textiles and Leather goods, the sum of ad valorem tariff and ad-valorem-equivalent NTM protection exceeds what is demanded. The reason is that the high U.S. output (relative to imports) in these industries in the 1970s, when protections were first afforded to them, had dwindled to low output-to-import ratios over the next 30 years. From (15), this decline meant lower demand for protection than in prior decades.[52]

The averages hide a strong protectionist demand from regions with sectors that are

[52]Apparel and Textiles, which have been declining since the 1970s, were historically granted NTM protection under the GATT's Multi-fiber Agreement which continued after 1995 (until it was phased out in 2005) as the WTO's Agreement on Textiles and Clothing. The hysteresis in protection, even as their output contracted over the decades, makes these sectors stand out as receiving more protection than they demand.

significant sources of employment and output. Figure 6 displays the same graphs but for four selected regions defined by our political-geography coalition of districts. The East North Central districts that elected Republican representatives to the House in 2000 have strong unmet demand for protection in Fabricated Metals, Machinery, Paper, Plastics, and Primary Metals. Their regional counterparts with Democrat representation demand protection in the same sectors, but the extent of their demand is even stronger in Fabricated Metals and Plastics. The South Atlantic districts regardless of political representation, had strong unmet demand for protection in Chemicals and Furniture, Nonmetal Manufacturing and Paper. In 2000 they also had significant output in Textiles and Wood Products for which they demanded more protection than they received from extant tariffs and NTMs.[53]

One caveat with this exercise is that our model has not accounted for intermediate goods. The demand for protection in sectors that are baseline in supply chains and whose output is used intensively by other sectors, such as the industries in which East North Central districts specialize, are unlikely to receive protection. Doing so would raise the price of final goods and lower consumer welfare. The present model may be extended to include intermediates as, for example, in Gawande et al. (2012). The effect would be to reduce the size of the red bars in Figure 6, especially in sectors whose output is primarily used as intermediates by downstream sectors. By what amount demand for protection in these upstream sectors would be reduced is an open research question. In any event, there is still likely a significant gap in the demand for and supply of protection at the district level. This unmet demand is a measure of the source of the China shock. A back of the envelope calculation is provided by inflating $\left(\frac{\Lambda_r^L n_r^L}{\Lambda_r^K n_r^K}\right)$ in (15). Even if $\left(\frac{\Lambda_r^L n_r^L}{\Lambda_r^K n_r^K}\right)$ is four times the nationally implied relative weight $\left(\frac{\sum_r \Gamma_r^L n_r^L}{\sum_r \Gamma_r^K n_r^K}\right)$ (the red bars in Figure 6 are reduced to a third of their size), a significant demand for protection would remain unmet.

[53]The distribution of the predicted district-specific tariffs is shown in Figure G in Appendix G. The patterns in the figure suggests that, just like in the case of protection through NTMs, sectoral demand for protection is concentrated in a few districts.

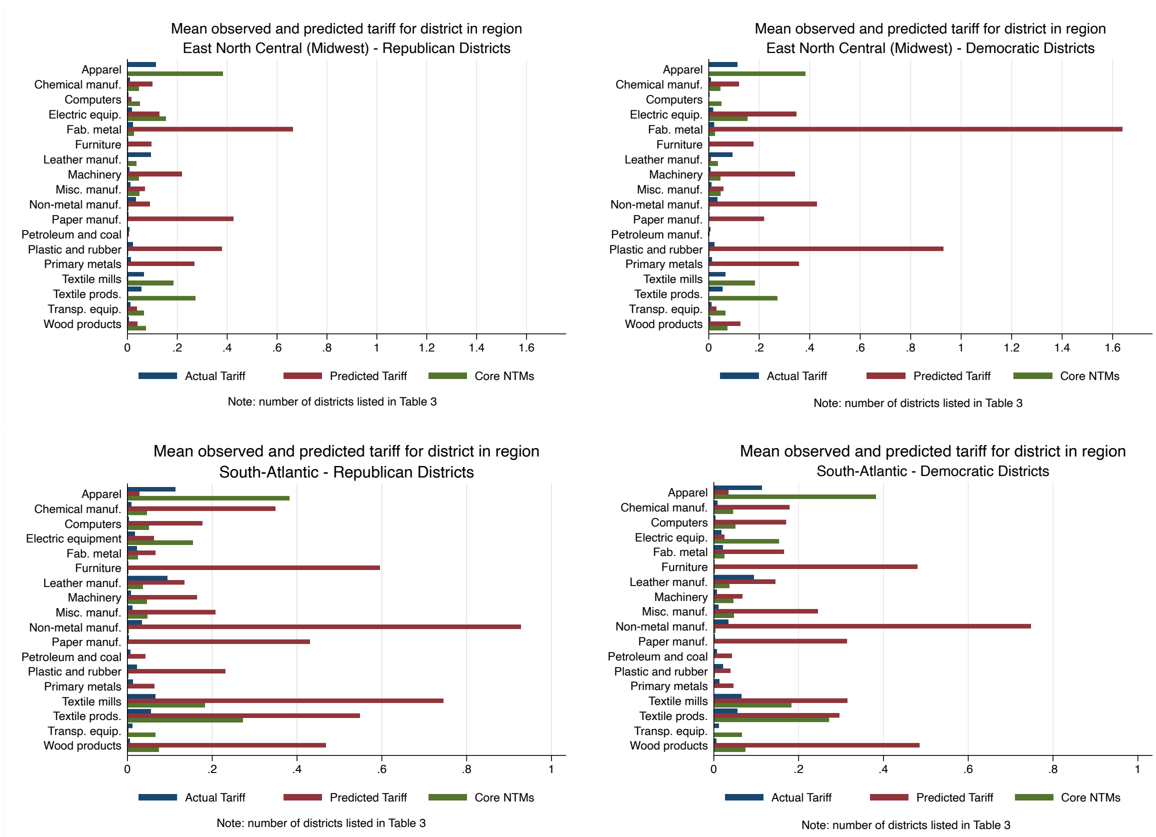

Figure 6: Demand for Protection by Districts for Geography-Party "Coalitions"
Predicted and Observed Mean ISIC (3-digit) Sectoral Ad-valorem Tariffs and Equivalent NTMs

A similar story might be told of the "Japan" shock of the 1980s. However, while the labor content of Japan's exports to the U.S. did hurt U.S. wages and unemployment, it was not large enough to wipe out entire import-competing sectors. Furthermore, trade negotiations in sectors like autos succeeded in imposing voluntarily export restraints on Japanese producers. This provided the time needed by the U.S. auto industry to restructure, make the necessary investments and become competitive. The China shock, bereft of shock absorbers, decimated many manufacturing sectors.

Arguably, the electoral consequences of the China shock are payback for the decades of Democratic control of Congress in which liberalization sped, and relief to manufacturing districts failed to materialize. Our results could be used to support the positive argument that, as a result, the trust that institutions would fulfill the promise of trade theory – leaving society better off after trade liberalization than it was before – was eroded. Erosion of that trust had political consequences. A positive question for scholars of American politics is why the Democratic party, chosen to deliver trade policy in line with the preferences from constituents in districts most hurt by trade openness, failed to respond to those demands when they were in the majority. And whether this failure was the reason that a number of industrial districts, traditionally blue, turned red after 2000.

If the results are taken as suggesting the need for institutions and policies better able to deal with the consequences of trade liberalization, the distance between observed tariffs and the predicted demand for tariffs by districts are indicators of which district-sectors are most vulnerable. As such, they indicate different policy needs for different districts rather than a single national policy to respond trade-related job losses. Even in America, workers do not migrate as costlessly as trade theory imagines. Labor markets are geographically segmented and remain largely local (Topel (1986), Moretti (2011)).

Bloom et al. (2019) show that the China shock had positive and negative employment effects across the U.S. economy. However, these effects were not evenly distributed across local labor markets. The positive employment effects were observed in non-manufacturing sectors, located mainly in the West and East coasts, areas that also hosted workers with high levels of human capital. The negative effects on employment, on the other hand, occurred mainly in the South and Midwest. These areas concentrated a large proportion of the U.S. manufacturing sector, and a labor force with lower levels of human capital.

It is possible to imagine that legislators did not knowingly place low weights on districts that were negatively affected by the China shock, but it is also likely that they underestimated the magnitude of the local economic impact of the shock. Recent work by Bombardini et al. (2020) addresses this precise issue. They find that while politicians might have not accurately predicted the full effects of the China shock in the early 1990s, they did have this information by the year 2000, suggesting that the levels of protection reflect the weights placed on different industries and districts.

6 Conclusion

This paper integrates regions and Congressional districts into a political economy model of trade. This is necessary because trade policy-making in the U.S. and in many democracies is a highly institutionalized process with elected legislative bodies playing a central role. The lead up to Trade Acts in the U.S. sees intense legislative activity that shapes the rules of the trade policymaking game. For example, delegating trade authority to the President to negotiate multilateral agreements, and then granting “fast track” authority to the President to propose a decisive vote on trade policy to Congress are institutions upon which the current structure of protection rests.

Closely related is the protection-for-sale framework of Grossman and Helpman (1994). However, the emphasis of our approach differs: while GH models the demand for protection by special interests, our setup builds on a political-geography structure to explain the supply of protection. This framework allows us 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.[54] Both approaches feature special interests, but the present work incorporates the main actors and institutions that participate in the legislative processes. Their influence is ultimately reflected in the weights received by local political groups and interests in the formation of trade policy.

Estimates of structural parameters in this model suggest that while protection could be affected by lobbying, the geographic distribution of economic activity and the way preferences are aggregated in the legislative bargaining process are important determinants of trade policy. Using district-level manufacturing data and national imports and tariff data around 2002, we estimate the welfare weights on agents – specific factor owners and mobile labor – implied by the model. We consider three stylized legislative "coalitions" of districts: the first case is based on geography, the second one on political geography, and the third one purely on political alignments at the state and district levels.

Our findings have important implications for a large body of research in the political economy of trade protection, which has focused on the role of special interests and how they bend trade policy to their ends. A remarkably consistent result is the high aggregate weight received by mobile labor (consumers) relative to sector specific capital (special interests) in determining of protection through tariffs and NTMs. This is consistent with, and indeed a test of, the model of Baron and Ferejohn (1989), specifically their proposition about the distribution of benefits under closed-rule voting with an agenda setter. Consumer welfare overwhelms that of sector specific capital owners in the determination of both tariffs and NTMs: the analysis reveals a welfare weight on special interests that is one-third the aggregate welfare weights. The low average tariff and NTMs rates reflects this bias in the U.S.

The structural estimation of our political economy framework provides important insights for understanding the political repercussions of the China shock (Autor et al., 2013, 2020) as an event that was decades in the making. Equipped with the parameter estimates, we predict the counterfactual tariffs and NTMs preferred by districts and sectors, and quantify the divergence of actual protection with this (unobserved) local demand for protection. Districts with the greatest divergence between observed and predicted tariffs are the ones hurt most by the China shock. Whether the shock reflects institutional failure or simply a necessary step that free trade requires the country to take to move to more efficient frontiers, is left for further research. What deserves concern is whether the China shock exacerbated distrust of political institutions, already brewing

[54] Although the demand side is kept simple, the role of lobbying may be built up, as explained in Appendix A.4.

among displaced workers as the U.S. hurtled through a free-trading agenda in the 1990s. More recent trends such as growing inequality, gig work without guaranteed protections, and the absence of labor market institutions that should distribute the gains from free trade, are contributors to this distrust. The trust deficit can ultimately denude political institutions. The framework introduced in this paper is possibly capable of addressing these bigger questions facing trade today.

On scholarship, the paper connects the political economy of trade literature to several others. To date the large and influential literature in political science on legislative bargaining has remained distant from trade legislation. This is surprising since as noted earlier tariff-making in democracies is a politically institutionalized process. By formally integrating districts, whose representatives seek to serve their local economies through bargaining for policy outcomes in legislatures, into a specific factors model of trade, the model in this paper immediately connects the two strands of literature. The paper shows the benefits of this coherent research frame by taking the Baron-Ferejohn prediction to the data.

Finally, the present framework can be naturally extended and augmented in several relevant directions. First, labor markets effects are, as in much of the literature on trade protection, absent in our model. The setup presented in the paper offers a framework capable of integrating local labor market effects into a model of the political economy of trade. Second, our model can be extended to include intermediate goods as in, for example, Gawande et al. (2012). Accounting for intermediate goods can result in a more accurate measurement of unmet demand for protection, especially in sectors and districts whose production is heavily used as inputs by downstream sectors. Third, the model can be extended to examine the specific role of lobbies in determining trade protection.[55] The analysis would need to allow for lobbies to organize not just at the sectoral level, as in previous studies, but regionally or nationally. Within such framework, lobbies would emerge endogenously (Mitra, 1999) and target their activities to influence either the local or the national decision-making process. Their decisions would depend, among other things, on the relative ability of those efforts to steer policy outcomes in their own favor. While important these extensions are beyond the original scope of our paper and ripe for future research.

[55]One possible extension of the present model that incorporates lobbying à la GH is considered in Appendix A.4.

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Online Appendix

A The Political Economy Model of Trade Protection

A.1 The Model

Notation

The following notation is used throughout the paper:

- i: individuals; j: sectors, $j = 0, 1, ..., J$; r: regions, $r = 1, ..., R$.
- Population in region r: n_r.
- Two types of individuals: $m = L$ (labor), K (capital owners).
- Labor:
  - Labor is mobile across sectors, but immobile across regions. Each $i \in L$ is endowed with one unit of labor.
  - Labor in region r: $i \in L_r$.
  - n_r^L: number (measure) of type-L individuals in r.
  - $\mathbf{n}_r^L = (n_{0r}^L, n_{1r}^L, n_{2r}^L, \ldots, n_{Jr}^L)$: allocation of labor across sectors in district r (vector).
  - Total number of labor: $n^L = \sum_r n_r^L$.
- Capital owners:
  - Specific factors: immobile across sectors and regions. Each $i \in K$ is endowed with one unit of the specific factor k_{jr}.
  - Owners of the specific factor of production in region r: $i \in K_r$.
  - n_{jr}^K: number of type-K individuals in r endowed with specific factor k_{jr}, $n_{jr}^K \geq 0$.
  - $\mathbf{n}_r^K = (n_{1r}^K, n_{2r}^K, \ldots, n_{Jr}^K)$: distribution of the specific factor across sectors (vector); the distribution of endowments may differ across regions r.
  - $n_r^K = \sum_{j \in J} n_{jr}^K$: number of type-$K$ individuals in r.
  - $\mathbf{k}_r = (k_{1r}, k_{2r}, \ldots, k_{Jr})$: vector of sector specific inputs, $k_{jr} \geq 0$.
  - In fact, $\mathbf{n}_r^K = \mathbf{k}_r$.
  - Total number of capital owners: $n^K = \sum_r n_r^K$.
- $n_r = n_r^L + n_r^K$: total population in region r.
- Total population: $n = n^L + n^K$, where $n^L = \sum_r n_r^L$, $n^K = \sum_r n_r^K$.
- Welfare weights:
  - Λ_{jr}^m: weight district r places on type-m agents in sector j;
  - Γ_{jr}^m: weight placed at the national level on type-m agents in sector j and district r.

Utility Maximization

Preferences. Following the literature on trade protection, we assume preferences are represented by a quasi-linear utility function (subindex i has been omitted): $u^m = x_0 + \sum_{j \in J} u_j^m(x_j)$. 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 $m = L, K$.

Demand for goods. Consider the utility maximization problem for consumer i of type m in region r (subindex i is omitted below), with income z_r^m:

$$\max_{\{x_{jr}^m\}} \quad u_r^m = z_r^m - \sum_j p_j x_{jr}^m + \sum_j u_j^m(x_{jr}^m).$$

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. Note that consumers of type m are identical across regions r, i.e., $d_{ijr'}^m = d_{ijr''}^m = d_j^m$, so the demand for good j for all individuals of type m becomes $D_j^m = \left(\sum_r n_r^m\right) d_j^m = n^m d_j^m$. 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 is defined by $\phi_j^m(p_j) = v_j^m(d_j^m) - p_j d_j^m$, where $v_j^m(p_j) \equiv u_j^m[d_j^m(p_j)]$. Therefore, consumer surplus for a type-m individual in region r is

$$\phi_r^m(\mathbf{p}) = n_r^m \sum_j \left[v_j^m(d_j^m) - p_j d_j^m\right] = n_r^m \sum_j \phi_j^m,$$

Total consumer surplus for type-m individuals is

$$\Phi^m = \sum_r \phi_r^m = \sum_r n_r^m \sum_j \phi_j^m = n^m \phi^m.$$

Note that $\partial \Phi^m / \partial p_j = -n^m d_j^m = -D_j^m$. The indirect utility can be expressed as

$$v_r^m(\mathbf{p}, z_r^m) \quad = \quad z_r^m + \sum_j \left[v_j^m(p_j) - p_j d_j^m\right] = z_r^m + \sum_j \phi_j^m(\mathbf{p}).$$

Production and profits

Production. The production of good 0 only requires labor, and uses a linear technology represented by $q_{0r} = w_{0r}\ell_{0r}$, 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 $q_{jr} = F_{jr}(k_{jr}, \ell_{jr}) = f_{jr}(\ell_{jr})$, where k_{jr} is sector-region specific (immobile across sectors and regions). We omit, to simplify notation, k_{jr} from the production function from now onwards.

Profits. Profits in sector-region $\{jr\}$ are $\pi_{jr} \equiv p_j f_{jr}(\ell_{jr}) - w_{jr}\ell_{jr}.$, and demand for labor in sector-region jr is defined by

$$p_j f_{jr}'(\ell_{jr}) = w_{jr} \Rightarrow \ell_{jr}^D \equiv \ell_{jr}(p_j, w_{jr}).$$

The profit function becomes $\pi_{jr}(p_j, w_{jr}) \equiv p_j f_{jr}(\ell^D_{jr}) - w_{jr}\ell^D_{jr}$. The production of good j in region r (using the envelope theorem) is given by

$$\frac{\partial \pi_{jr}(p_j, w_{jr})}{\partial p_j} = q_{jr}(p_j, w_{jr}).$$

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, in equilibrium $w_{0r} = w_{jr}$.

Imports and tariff revenue

Imports of good j are $M_j = D_j - Q_j$. Let p_j^* denote the internationally given price of good j. We use the normalization $p_j^* = 1$. Revenue generated from tariff collection is $T = \sum_s t_s M_s$, where $t_j = p_j - p_j^* = p_j - 1$. Note that

$$\frac{\partial T}{\partial t_j} = M_j + t_j M_j' = M_j(1 + \epsilon_j^M),$$

where j is a representative sector $j \in J$ (with some abuse of notation). Alternatively, defining tariff revenue as $T = \sum_j [t_j (D_j - Q_j)]$, then

$$\begin{aligned}
\frac{\partial T}{\partial t_j} &= (D_j - Q_j) + t_j(D_j' - Q_j'), \\
&= D_j \left(1 + \frac{t_j}{D_j} D_j'\right) - Q_j \left(1 + \frac{t_j}{Q_j} Q_j'\right), \\
&= M_j - D_j \epsilon_j^D - Q_j \epsilon_j^Q.
\end{aligned}$$

A.2 Welfare

Labor welfare in region r. The utility of labor in sector-region $\{jr\}$ is

$$\begin{aligned}
W_{jr}^L &= w_{jr}\ell_{jr} + n_{jr}^L \frac{T}{n} + n_{jr}^L \phi_r^L, \\
&= w_{jr}\ell_{jr} + n_{jr}^L \frac{T}{n} + n_{jr}^L \frac{\Phi^L}{n^L}
\end{aligned} \tag{17}$$

An increase in the tariff on good s affects the utility of labor as follows:

$$\begin{aligned}
\frac{\partial W_{jr}^L}{\partial p_j} &= \frac{n_{jr}^L}{n} \frac{\partial T}{\partial p_j} + \frac{n_{jr}^L}{n^L} \frac{\partial \Phi^L}{\partial p_j}, \\
&= \frac{n_{jr}^L}{n} (M_j + t_j M_j') - n_{jr}^L \frac{D_j^L}{n^L}
\end{aligned} \tag{18}$$

Labor welfare in region r is

$$\begin{aligned}
\Omega_r^L &= \sum_j \Lambda_{jr}^L W_{jr}^L, \\
&= \sum_j \Lambda_{jr}^L w_{jr}\ell_{jr} + \frac{\sum_j \Lambda_{jr}^L n_{jr}^L}{n} T + \frac{\sum_j \Lambda_{jr}^L n_{jr}^L}{n^L} \Phi^L, \\
&= w_{0r} \sum_j \Lambda_{jr}^L \ell_{jr} + \frac{\sum_j \Lambda_{jr}^L n_{jr}^L}{n} T + \frac{\sum_j \Lambda_{jr}^L n_{jr}^L}{n^L} \Phi^L, \\
&= \lambda_r^L \left(w_{0r} + \frac{T}{n} + \frac{\Phi^L}{n^L} \right), \qquad (19)
\end{aligned}$$

where $\lambda_r^L = \sum_j \Lambda_{jr}^L n_{jr}^L$.

Welfare of capital owners in region r. The utility of capital owners in sector-region $\{jr\}$ is

$$\begin{aligned}
W_{jr}^K &= \pi_{jr} + \frac{n_{jr}^K}{n} T + n_{jr}^K \phi_r^K, \\
&= \pi_{jr} + n_{jr}^K \frac{T}{n} + n_{jr}^K \frac{\Phi^K}{n^K}. \qquad (20)
\end{aligned}$$

Note that

$$\begin{aligned}
\frac{\partial W_{jr}^K}{\partial p_j} &= q_{jr} + \frac{n_{jr}^K}{n} \frac{\partial T}{\partial p_j} + \frac{n_{jr}^K}{n^K} \frac{\partial \Phi^K}{\partial p_j}, \\
&= q_{jr} + \frac{n_{jr}^K}{n} (M_j + t_j M_j') - n_{jr}^K \frac{D_j^K}{n^K}. \qquad (21)
\end{aligned}$$

The welfare of capital owners in region r is given by

$$\begin{aligned}
\Omega_r^K &= \sum_j \Lambda_{jr}^K W_{jr}^K, \\
&= \sum_j \Lambda_{jr}^K \pi_{jr} + \frac{\sum_j \Lambda_{jr}^K n_{jr}^K}{n} T + \frac{\sum_j \Lambda_{jr}^K n_{jr}^K}{n^K} \Phi^K, \\
&= \sum_j \Lambda_{jr}^K n_{jr}^K \left(\frac{\pi_{jr}}{n_{jr}^K} \right) + \lambda_r^K \left(\frac{T}{n} + \frac{\Phi^K}{n^K} \right), \qquad (22)
\end{aligned}$$

where $\lambda_r^K = \sum_j \Lambda_{jr}^K n_{jr}^K$.

Welfare of capital owners in sector j. As an aside, the utility of capital owners in sector j (aggregate utility across regions r) is given by

$$W_j^K = \sum_r \pi_{jr} + \frac{n_j^K}{n} T + \frac{n_j^K}{n^K} \Phi^K.$$

This means that welfare of capital owners in sector j:

$$\begin{aligned}\Omega_j^K &= \sum_r \Lambda_{jr}^K W_{jr}^K, \\ &= \sum_r \Lambda_{jr}^K \pi_{jr} + \frac{\sum_r \Lambda_{jr}^K n_{jr}^K}{n} T + \frac{\sum_r \Lambda_{jr}^K n_{jr}^K}{n^K} \Phi^K.\end{aligned}$$

Region r's welfare. Total welfare in region r is defined as

$$\begin{aligned}\Omega_r &= \sum_j \sum_m \Lambda_{jr}^m W_{jr}^m, \\ &= \Omega_r^L + \Omega_r^K, \\ &= \lambda_r^L \left(w_{0r} + \frac{T}{n} + \frac{\Phi^L}{n^L} \right) + \sum_j \Lambda_{jr}^K n_{jr}^K \left(\frac{\pi_{jr}}{n_{jr}^K} \right) + \lambda_r^K \left(\frac{T}{n} + \frac{\Phi^K}{n^K} \right) \qquad (23)\end{aligned}$$

Aggregate welfare. Total welfare at the national level is given by

$$\begin{aligned}\Omega &= \sum_r \sum_j \sum_m \Gamma_{jr}^m W_{jr}^m, \qquad (24) \\ &= \sum_r \sum_j \Gamma_{jr}^L n_{jr}^L w_{0r} + \gamma^L \left(\frac{T}{n} + \frac{\Phi^L}{n^L} \right) + \sum_r \sum_j \Gamma_{jr}^K n_{jr}^K \left(\frac{\pi_{jr}}{n_{jr}^K} \right) + \gamma^K \left(\frac{T}{n} + \frac{\Phi^K}{n^K} \right),\end{aligned}$$

where $\gamma^m = \sum_r \sum_j \Gamma_{jr}^m n_{jr}^m$.

A.3 Tariffs

District specific tariffs

The tariff that maximizes the total welfare in region r, Ω_r, satisfies $\partial \Omega_r / \partial p_j = 0$. Isolating t_{jr} gives:

$$t_{jr} = -\frac{n}{M_j'} \left[\underbrace{\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r} \frac{q_{jr}}{n_{jr}^K}}_{(1)} - \underbrace{\left(\frac{\lambda_r^L}{\lambda_r} \frac{D_j^L}{n^L} + \frac{\lambda_r^K}{\lambda_r} \frac{D_j^K}{n^K} \right)}_{(2)} + \underbrace{\frac{M_j}{n}}_{(3)} \right] \qquad (25)$$

where $\lambda_r = \lambda_r^L + \lambda_r^K$. Expression (1) captures the effect tariff t_j has on domestic producers of good j in region r. This effect would tend to rise t_j. Expression (2) 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 a downward pressure on t_j. Finally, expression (3) captures the impact of the tariff on tariff revenue. Since domestic residents benefit from the tariff revenue, this term would tend to increase t_j.

Note that expression (1) reflects the impact of the tariff on the returns to the specific factors, in this case, owners of capital in sector j. Since the model assumes that labor is perfectly mobile across sectors within region r (but not across regions), $w_{0r} = w_{jr}$ for all j in region r. Given that w_{0r} is not affected by changes in the tariff, then changes in t_j do not have an impact on labor income. Note that if labor is completely immobile across sectors (i.e., it is also sector specific, the same as capital), then changes in tariffs will have a differential effect on wages across sectors as well.

Finally, when the the groups have identical preferences i.e., $D_j^L/n^L = D_j^K/n^K = D_j/n$, expression (25) becomes

$$t_{jr} \quad = \quad -\frac{n}{M_j'}\left[\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r}\frac{q_{jr}}{n_{jr}^K} - \left(\frac{D_j}{n} - \frac{M_j}{n}\right)\right]. \tag{26}$$

Using the market clearing condition for good j, $D_j = Q_j + M_j$, it follows that

$$\begin{aligned} t_{jr} \quad &= \quad -\frac{n}{M_j'}\left(\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r}\frac{q_{jr}}{n_{jr}^K} - \frac{Q_j}{n}\right), \\ &\quad\ -\frac{n}{M_j'}\left(\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r}\frac{q_{jr}}{n_{jr}^K} - \frac{n_j^K}{n}\frac{Q_j}{n_j^K}\right). \end{aligned} \tag{27}$$

Suppose that $\Lambda_{jr}^L = \Lambda_{jr}^K = \Lambda_r$. Then,

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

So the tariff preferred by region r is positive if and only if $(n_{jr}^K/n_r)(q_{jr}/n_{jr}^K) > (n_j^K/n)(Q_j/n_j^K)$.

National tariffs

The tariff that maximizes aggregate welfare satisfies

$$\frac{\partial \Omega}{\partial p_j} \quad = \quad t_j\gamma\frac{M_j'}{n} - \left(\gamma^L\frac{D_j^L}{n^L} + \gamma^K\frac{D_j^K}{n^K} - \gamma\frac{M_j}{n}\right) + \sum_r \Gamma_{jr}^K n_{jr}^K\frac{q_{jr}}{n_{jr}^K}, \tag{28}$$

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

$$t_j \quad = \quad -\frac{n}{M_j'}\left[\sum_r\frac{\Gamma_{jr}^K n_{jr}^K}{\gamma}\frac{q_{jr}}{n_{jr}^K} - \left(\frac{\gamma^L}{\gamma}\frac{D_j^L}{n^L} + \frac{\gamma^K}{\gamma}\frac{D_j^K}{n^K}\right) + \frac{M_j}{n}\right]. \tag{29}$$

As before, if preferences are identical across groups, then

$$t_j \quad = \quad -\frac{n}{M_j'}\left[\sum_r\frac{\Gamma_{jr}^K n_{jr}^K}{\gamma}\frac{q_{jr}}{n_{jr}^K} - \frac{Q_j}{n}\right]. \tag{30}$$

Comparing tariffs

Evaluating the FOC for t_{jr} at the FOC that determines t_j gives

$$\begin{aligned} &t_{jr} - t_j = \\ &-\frac{n}{M_j'}\left[\left(\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r}\frac{q_{jr}}{n_{jr}^K} - \sum_r\frac{\Gamma_{jr}^K n_{jr}^K}{\gamma}\frac{q_{jr}}{n_{jr}^K}\right) - \left(\frac{\lambda_r^L}{\lambda_r} - \frac{\gamma^L}{\gamma}\right)\frac{D_j^L}{n^L} - \left(\frac{\lambda_r^K}{\lambda_r} - \frac{\gamma^K}{\gamma}\right)\frac{D_j^K}{n^K}\right]. \end{aligned} \tag{31}$$

A.4 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 $\mathbf{t}$ 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 solving for the following maximization program:

$$\begin{aligned}
\max_{\{t_1,\ldots,t_J\}} \mathcal{U} &= \sum_{j\in\mathcal{O}} W_j^K + a\Omega, \\
&= \sum_r \sum_{j\in\mathcal{O}} W_{jr}^K + a\sum_r \sum_{j\in J}\sum_m \Gamma_{jr}^m W_{jr}^m, \\
&= a\sum_r\sum_j \Gamma_r^L W_{jr}^L + a\sum_r \sum_{j\in J\backslash\mathcal{O}} \Gamma_{jr}^K W_{jr}^K + \sum_r\sum_{j\in\mathcal{O}}(1+a\Gamma_{jr}^K)W_{jr}^K
\end{aligned} \tag{32}$$

The FOC for organized sectors $j \in \mathcal{O}$ are

$$\begin{aligned}
\frac{\partial \mathcal{U}}{\partial p_j} &= a\left\{t_j\left(\gamma+\frac{n_j^K}{a}\right)\frac{M_j'}{n} - \left[\gamma^L\frac{D_s^L}{n^L} + \left(\gamma^K+\frac{n_j^K}{a}\right)\frac{D_s^K}{n^K} - \left(\gamma+\frac{n_j^K}{a}\right)\frac{M_j}{n}\right] + \sum_r \Gamma_{sr}^K n_{sr}^K\frac{q_{sr}}{n_{sr}^K}\right\} \\
&\quad + \sum_r n_{jr}^K \frac{q_{jr}}{n_{jr}^K},
\end{aligned} \tag{33}$$

where $n_j^K = \sum_r n_{jr}^K$. Isolating t_j gives

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

where $A \equiv a\gamma/(a\gamma + n_j^K)$. For sectors that are not organized (i.e., $j \in J\backslash\mathcal{O}$), it follows that $t_j^{\mathcal{U}} = t_j$.

Comparing tariffs

How do the tariffs change if a sector becomes organized and lobbies for protection? We now compare the tariff t_j derived earlier in (29) to $t_j^{\mathcal{U}}$, for sectors $j \in \mathcal{O}$. Specifically,

$$t_j^{\mathcal{U}} - t_j = \frac{n_j^K}{(a\gamma + n_j^K)}\left[\frac{n}{M_j'}\left(\frac{D_j^K}{n^K} - \frac{Q_j}{n_j^K} - \frac{M_j}{n}\right) - t_j\right]. \tag{34}$$

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 situation, the tariff does not depend on Γ_{jr}^m.

B Case 1: Geographic Coalitions and NTMs

Table B: Geography-based Weigths: NTMs

Estimated weights on K_r to aggregate

Region	#Districts	Normalized K-wt
1. New England	23	0.013
2. Mid-Atlantic	65	0.000
3. East North Central	73	0.056
4. West North Central	31	0.000
5. South Atlantic	75	0.077
6. East South Central	26	0.023
7. West South Central	47	0.145
8. Mountain	24	0.000
9. Pacific	69	0.034
Total	433	0.347

Notes: (1) Normalized K weight is the proportion of the national weight that is placed on a region's sector-specific capital owners, or $\frac{\Gamma_r^K n_r^K}{\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L}$. (2) $\frac{\text{Aggregate L weight}}{\text{Aggregate L + K weight}} = 1 - 0.347 = 0.653$. (3) Normalized L weights may be calculated by distributing this aggregate L-to-total weight (=0.653) across regions according to the size of their workforce.

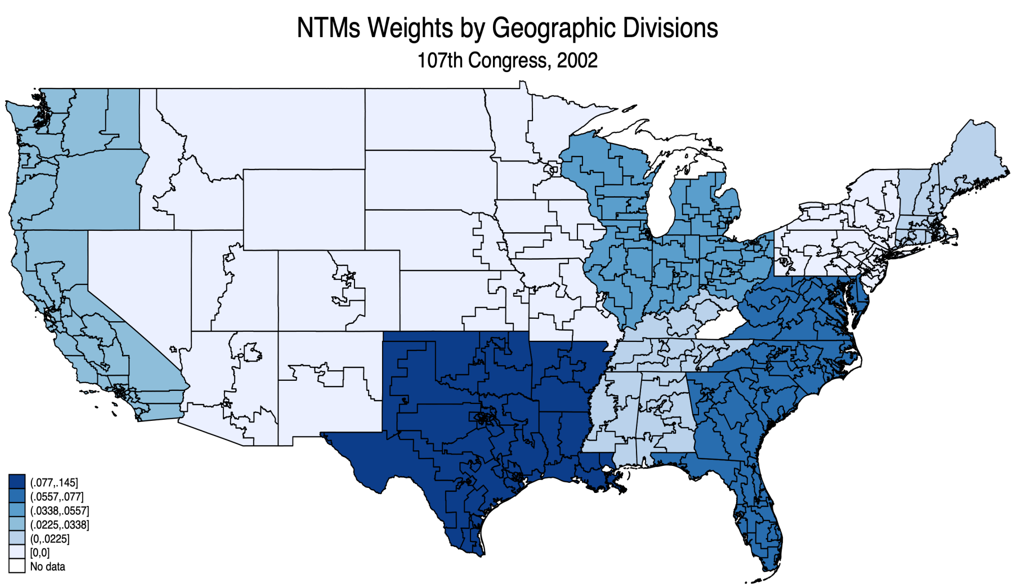

Figure B: NTMs: Estimated Weights based on Geographic Subdivisions

C Case 3: Tariffs and Implicit Welfare Weights

Table C: Welfare Weights, by Political Blocs in 2000

State-wide Vote in Presidential Election	**Districts in House elections** Competitive	Safe Democrat	Safe Republican	Total
Competitive	0.010	0.048	0.071	0.129
Safe Democrat	0.014	0.061	0.037	0.112
Safe Republican	0.004	0.059	0.094	0.157
Total	0.028	0.168	0.202	0.398

Notes: (1) Cells contain normalized K_r-weights defined as the proportion of total national welfare weight that is placed on owners of specific capital in region r, $\frac{\Gamma_r^K n_r^K}{\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L}$. (2) Normalized L-weights may be calculated by distributing the aggregate L-to-total weight (0.604) across the nine "regions" according to the size of their workforce.

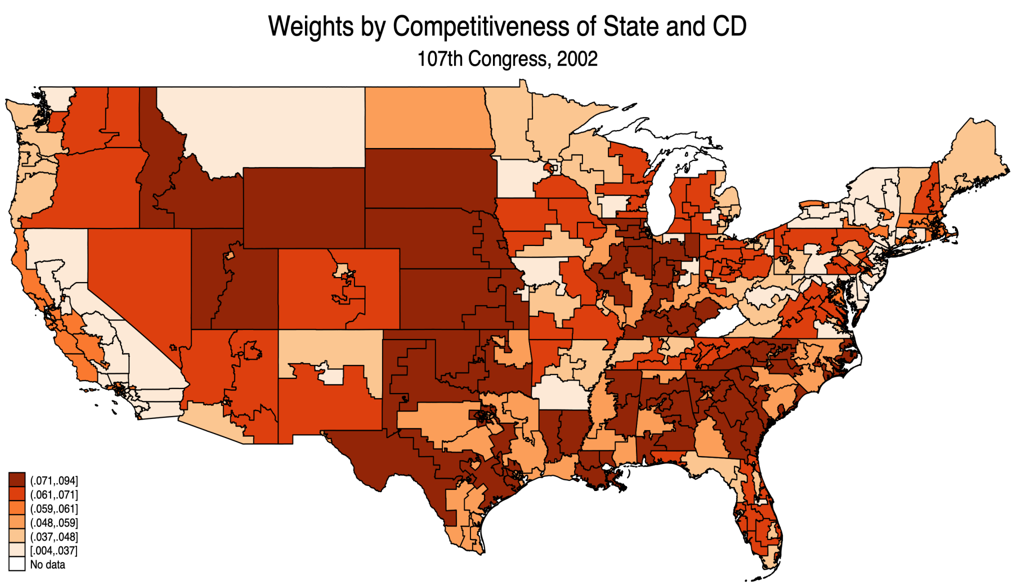

Figure C: Estimated Weights from coalitions based on competitiveness of state and district

D Sectoral Protection by Region and Party

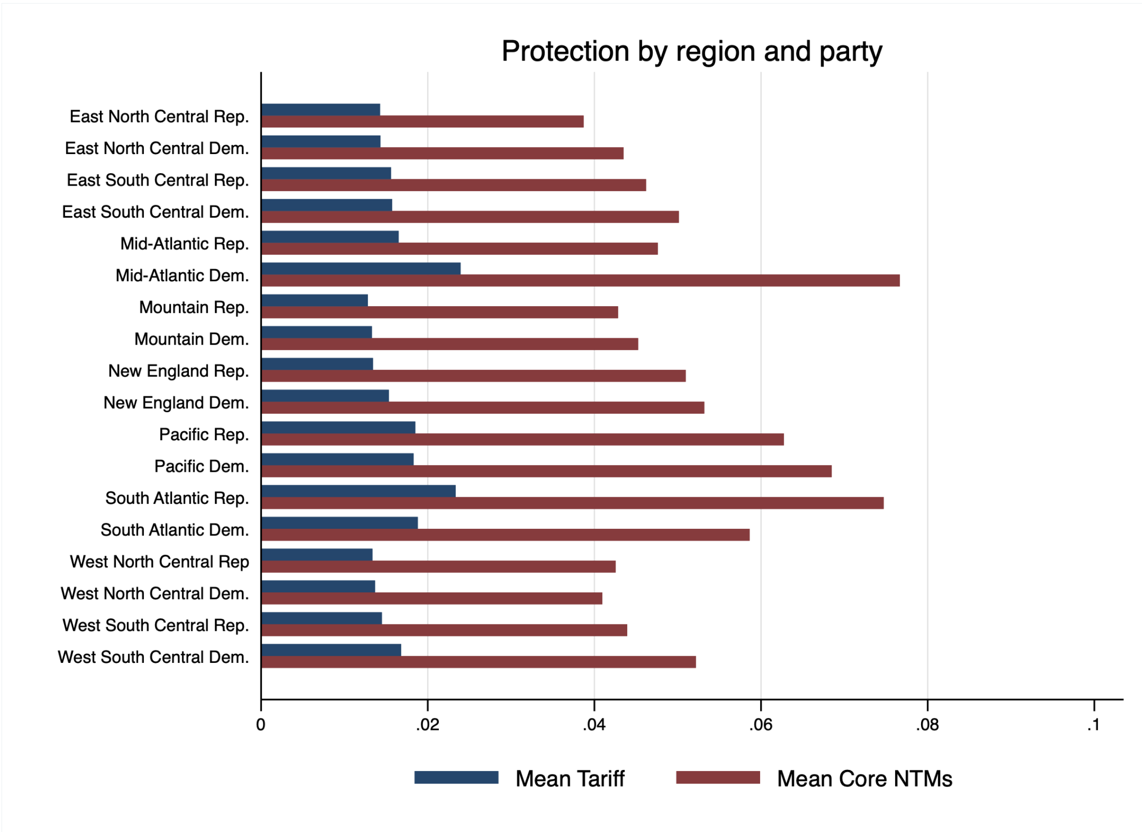

Figure D: Observed Mean ISIC (3-digit) Sectoral Ad-valorem Tariffs and Equivalent NTMs

E Sectoral Output by Region and Party

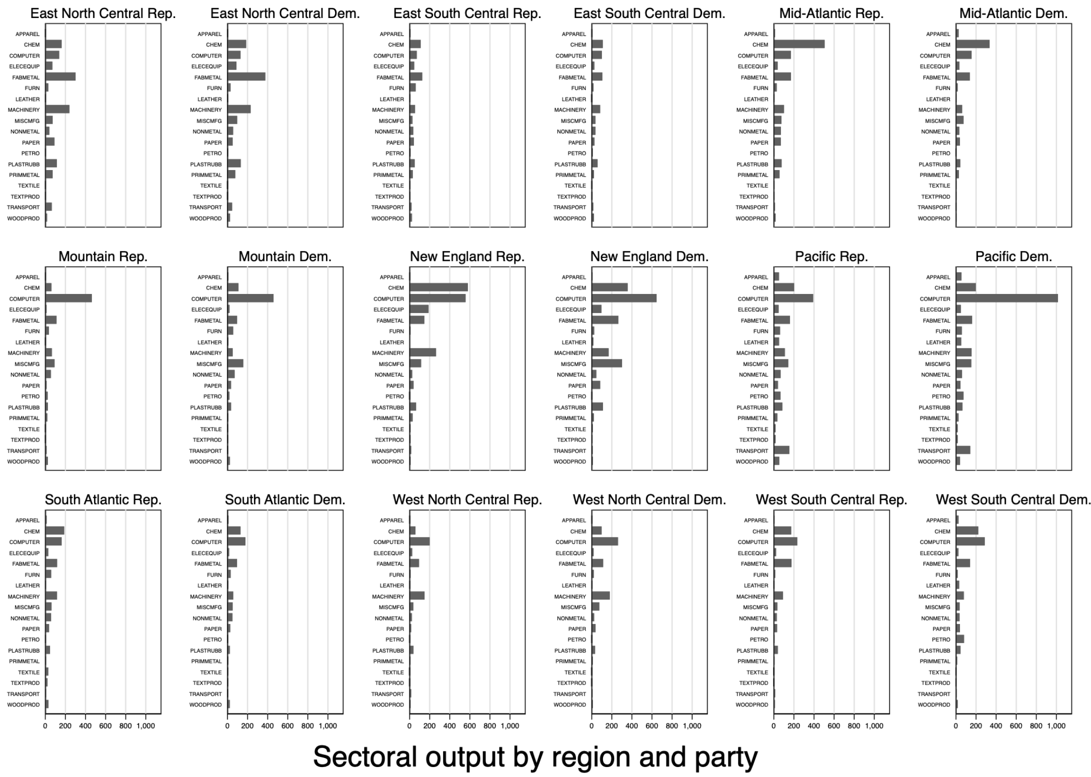

Figure E: Mean ISIC (3-digit) Sectoral Output by Region and Party

F Sectoral Output over Imports by Region and Party

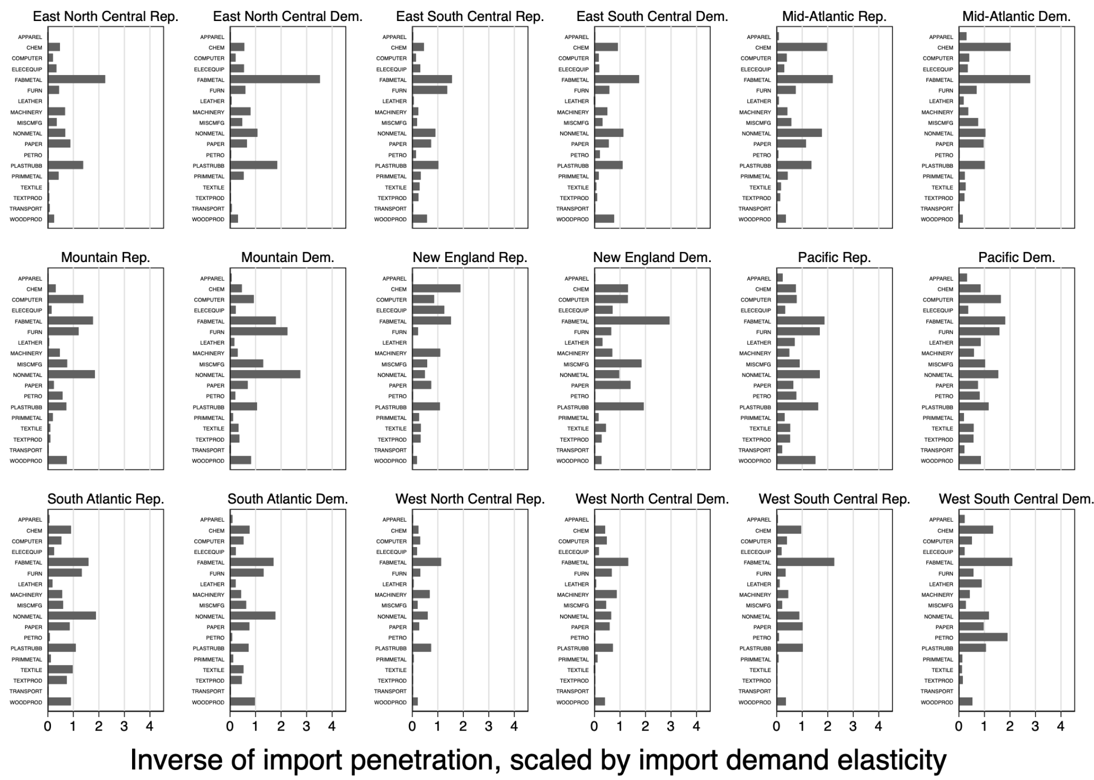

Figure F: Mean ISIC (3-digit) Output over Imports, scaled by Import Demand Elasticity

G Distribution of Predicted Tariffs by Sector

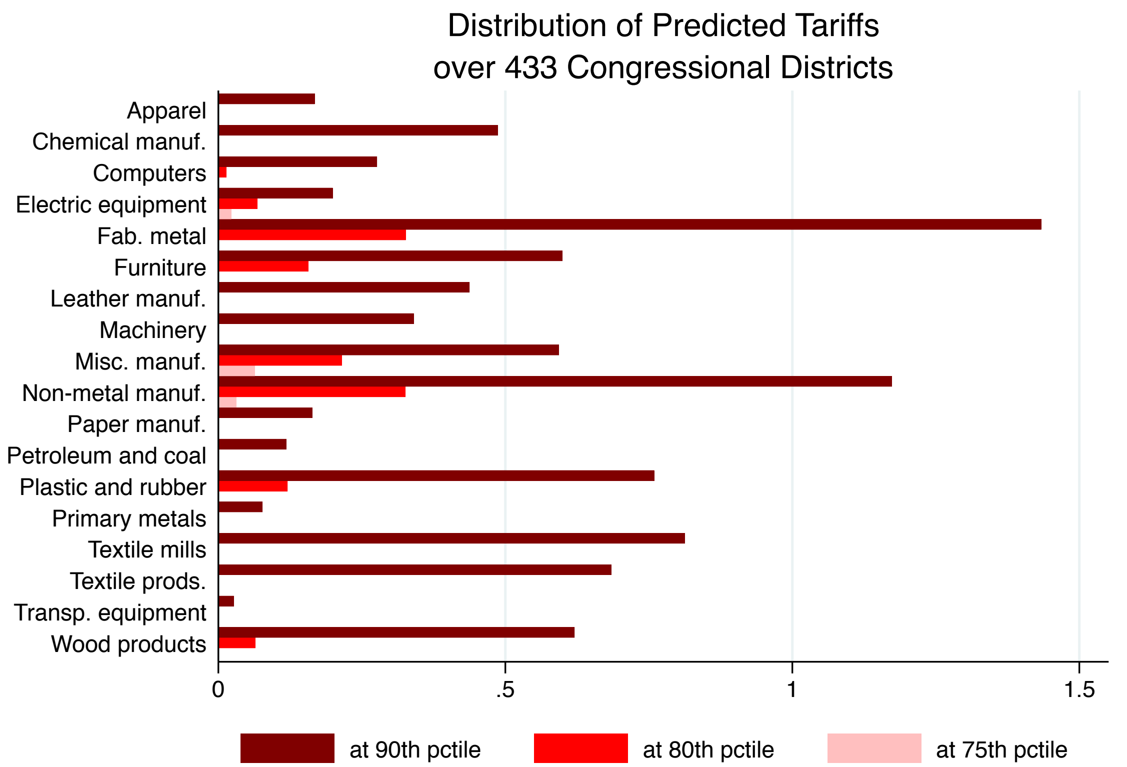

Figure G: Predicted ISIC (3-digit) Tariffs at the 90th, 80th and 75th percentiles of Districts