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## Why Legislators are Protectionists: The Role of Majoritarian Voting in Setting Tariffs

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# Why Legislators are Protectionists: the Role of Majoritarian Voting in Setting Tariffs

by Gerald Willmann

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Christian-Albrechts-Universität Kiel

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# Why Legislators are Protectionists: the Role of Majoritarian Voting in Setting Tariffs

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## Abstract

Based on the observation that industries are often geographically concentrated, this paper proposes a new political economy model of trade protection. We associate the sectors of a specific factors model with electoral districts populated by continua of heterogeneous voters who differ in their relative factor endowments. We show how strategic delegation leads each district to elect a representative who is more protectionist than the median voter. The legislature formed by these representatives then sets tariffs that are strictly positive. Introducing additional policy instruments reveals a trade-off between efficiency and regional targetability.

Keywords: trade policy, political economy, representative democracy.

JEL classification: F10, F13, D72.

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# 1 Introduction

Economists like to preach free trade, yet legislators often turn a deaf ear. Whenever the optimists sigh relief that the GATT/WTO has finally brought tariffs down, another tariff or non-tariff-barrier appears under a different guise. More often than not, the political representatives who push hardest for these protectionist measures come from districts that are also home to the industry in question.<sup>1</sup> This geographical correlation seems so common and self-evident that it has gone almost unnoticed. Surprisingly, even the political economy of trade literature has so far largely overlooked the phenomenon.<sup>2</sup>

This paper breaks new ground in addressing the influence of regional politics on trade protection. True to the motto “all politics is local,”<sup>3</sup> we propose a political economy model of trade that is based on two tenets: the geographical concentration of industries and the prevalence of majoritarian or *first past the post* voting. Our starting point is an off-the-shelf specific factors model, slightly modified as in Grossman and Helpman (1994).<sup>4</sup> We associate the different sectors of the specific factors model with electoral districts in order to highlight the geographical concentration of industries. Each district is populated by a continuum of heterogeneous voters who differ in their relative factor endowments. That is, they own

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<sup>1</sup>Take U.S. senator John D. Rockefeller IV of West Virginia, for example. His website [www.senate.gov/~rockefeller](http://www.senate.gov/~rockefeller) tells us all about the senator’s many and ultimately successful efforts to obtain protection for the U.S. steel industry. It will not surprise the reader to hear that West Virginia is home to a large steel mill.

<sup>2</sup>In the context of political contributions, geographical concentration has been used as an explanatory variable on the grounds that it facilitates lobbying. Mitra (1999) provides micro-foundations for this line of argument.

<sup>3</sup>A saying attributed to the late Thomas P. (Tip) O’Neil, former speaker of the U.S. house of representatives.

<sup>4</sup>We essentially use the same economic model. This has the additional advantage of making our results more easily comparable to theirs.

different amounts of the sector specific factor. These endowments represent the individuals' stake in the local economy or, loosely speaking, their local allegiance.

The residents of each district elect one of their own to represent the constituency at the national level. We assume that these citizen-candidates cannot credibly commit to a policy platform but instead pursue their own objectives once in office. The national legislature, formed by all these representatives, then decides on trade policy. In doing so, it seeks to maximize the sum of its members' welfare. Solving the model backwards, we first analyze the tariffs chosen by a given legislature. We find that in the (counter-factual) benchmark case, where every district is represented by its average voter, the outcome is free trade. Were it the median voter, there could even be negative tariffs if the wealth distribution is positively skewed. In local elections, however, the all-important median voter desires a positive tariff because she ignores the negative externalities on other districts. Anticipating the consensual decision making at the national stage which would force her to internalize those externalities, she strategically delegates representation of the district to someone who is more protectionist. The actual legislators are hence more protectionist than their respective median voter and set tariffs that are strictly positive.

There is, of course, a long tradition of explaining tariff protection along political economy lines.<sup>5</sup> Reignited by their seminal contribution, the field has come to be dominated by the "protection for sale" approach of Grossman and Helpman (1994). Applying the theoretical framework of Bernheim and Whinston (1986), they explain trade protection as the outcome of a menu auction where lobbying sec-

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<sup>5</sup>Recent surveys of this literature include Rodrik (1995), Helpman (1997), Ursprung (2000), and Gawande and Krishna (2003).

tors submit conditional bids to the government, who then chooses the tariff vector and collects the contributions.<sup>6</sup> Despite the empirical support this approach has found in the data,<sup>7</sup> we want to explore alternative ways of how the political process affects tariff protection. Baldwin and Magee (2000), who empirically investigate trade related votes in Congress, conclude that “while campaign contributions [...] were important, they were not the only significant factors determining how representatives voted on the trade bills.” We find this hardly surprising, given that the protection for sale approach does not directly account for, among other things, the geographical correlation alluded to above.<sup>8</sup>

This paper provides a complementary explanation, continuing where Mayer (1984) leaves off. He focuses on factor endowments in traditional trade models and combines these with a median voter political process. We take this one step further and use a more elaborate political process in line with recent work on political economy in the field of public finance. As in Besley and Coate (1999) and Ferretti and Perotti (2002), our political process features regional elections under majoritarian voting rules and, subsequently, the ultimate policy decision is taken by the national legislature. Unlike those contributions, we combine this political process with a general equilibrium (trade) model<sup>9</sup> instead of working with ad hoc objective functions.

Virtually all political economy explanations of trade protection rely on the re-

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<sup>6</sup>Ursprung (2000) calls it the “corruption approach” because such contributions tend to be illegal in many countries.

<sup>7</sup>See the recent empirical studies by Goldberg and Maggi (1999), Gawande and Bandyopadhyay (2000), Eicher and Osang (2002) and McCalman (2002).

<sup>8</sup>It also fails to answer the fundamental question posed in Rodrik (1995), a point we return to below.

<sup>9</sup>Admittedly, the simplifications borrowed from Grossman and Helpman (1994) somewhat qualify this statement.

distributive role of tariffs, despite their well-known inefficiency at the task. This leads Rodrik (1995) to pose the fundamental question as to how to explain the use of tariffs when more efficient instruments are available. Our approach provides a partial answer by pointing to regional targetability as the second relevant policy dimension. The availability of an additional, more efficient and equally targetable instrument — sector specific production subsidies, for example — obliterates the use of tariffs in our model as well. As soon as the second, more efficient instrument is less targetable, however, both instruments will in general be used. This implies that there exists a trade-off between efficiency and regional targetability when it comes to the choice of policy instruments.

The plan of the paper is as follows. Section 2 presents the underlying trade model and Section 3 lays out the political process. Solving the model backwards, we analyze the policy choice of a given legislature in Section 4, determine the outcome of the regional elections in Section 5, and combine both to obtain the equilibrium tariff rates in Section 6. In Section 7 we analyze additional policy instruments and Section 8 concludes.

## **2 The underlying trade model**

This section introduces the trade model that will form the basis for the subsequent political analysis. We choose a (slightly modified) specific factors model because it lends itself to a regional interpretation in the context of majoritarian voting. As in Grossman and Helpman (1994), we assume quasi-linear, additively separable utility in order to keep the model tractable. Using this simplification offers the additional benefit of making our analysis comparable to theirs. The model outlined

below differs from theirs, however, in that it introduces a more explicit ownership structure necessary for our version of the political process.

The small, open economy under consideration consists of  $1 + n$  sectors, indexed by  $i = 0, \dots, n$ , that produce under constant returns to scale. These sectors will be interpreted as electoral districts once we turn to the political side. Sectors  $i = 1, \dots, n$  each uses its own sector specific factor plus one common mobile factor. We denote the domestic price of its respective output good by  $p_i$  and the corresponding price on the world market by  $p_i^w$ . Differences  $p_i - p_i^w$  between both price vectors represent import tariffs (subsidies if negative) or export subsidies (taxes). Sector zero is special in that it only uses the mobile factor. By appropriate choice of units, sector zero turns the mobile factor into output one-to-one. Using its output as the numéraire allows us to normalize the price  $p_0$  to one. Strictly positive production in sector zero then implies that the wage of the mobile factor also equals one, as does the world market price  $p_0^w$  if we abstract from trade protection for this sector. The production possibilities of the other  $n$  sectors are summarized by profit functions  $\pi_i(p_i)$  that, at the same time, stand for the factor rewards of their specific factors.

Each sector specific factor  $i$  is owned by a continuum of agents. There are  $n$  such continua — one for each sector — resulting in a total population of mass  $n$ . While all of them own one unit of the mobile factor, individuals within sectors differ in how much they own of their sector specific factor. Denote the amounts they own of the specific factor by  $\theta_i$ . We allow  $\theta_i$  in each sector to be distributed according to any statistical distribution with positive support. By appropriate choice of units, we normalize the first moments of these distributions to one, i.e.  $\bar{\theta}_i = 1$ . For future reference, let us denote the median of these distributions by  $\theta_i^m$ . In a



sense,  $\theta_i$  measures the degree of sector or local specificity of an individual's factor endowment or, in other words, her stake in the local economy. Summing over individuals and districts, we have an economy-wide fixed supply of one unit of each specific factor and  $n$  units of the mobile factor.

Individuals have quasi-linear, additive separable utility, that is,  $u = x_0 + \sum_{i=1}^n u_i(x_i)$ , where  $x_i$  is the individual's consumption of good  $i$  and the  $u_i(\cdot)$  are differentiable, strictly concave subutility functions. Optimizing subject to a given income level  $I$ , every individual demands  $x_i = d_i(p_i) \equiv (u_i')^{-1}(p_i)$  of goods  $i = 1, \dots, n$  and  $x_0 = I - \sum_{i=1}^n p_i d_i(p_i)$  of the numéraire.

The individuals' indirect utility takes the form  $V(p, I) = I + CS(p)$ , where  $p$  is the domestic price vector  $(p_1, \dots, p_n)$  and  $CS(p) \equiv \sum_{i=1}^n (u_i(d_i(p_i)) - p_i d_i(p_i))$  the consumer surplus per capita. Using the individual's actual income, individual  $\theta_i$ 's indirect utility is given by

$$V_i(p; \theta_i) = 1 + \theta_i \pi_i(p_i) + R(p) + CS(p), \quad (1)$$

where it is assumed that per capita tariff revenue  $R(p) \equiv \sum_{i=1}^n (p_i - p_i^w)(d_i(p_i) - y_i(p_i)/n)$  is rebated uniformly and  $y_i(p_i)$  is the output supply of sector  $i$  derived from  $\pi_i(p_i)$  via Hotelling's lemma. Before turning to the political process, note that utilitarian social welfare  $W(p) = \sum_{i=1}^n \int V(p, \theta_i) d\theta_i$  attains its global maximum at  $p = p^w$ . In other words, free trade is indeed the optimal policy for our small, open economy.

### 3 The political process

After having laid out the economic side of the model, this section focuses on the political process. Our point of departure is the majoritarian component enshrined in the electoral rules of most representative democracies, which gives rise to a strong representation of regional interests. The representative nature of modern democracies is hardly in question.<sup>10</sup> As for majoritarian versus proportional representation, in many countries the former plays a direct and sometimes exclusive role in national elections.<sup>11</sup> Where this is not the case we often see majoritarian elements supplementing an otherwise proportional system. Furthermore, the majoritarian or regional component often stems from an intermediate, regional layer of democratic representation. The electoral system at this intermediate level might well be proportional. The end result at the national level still resembles the outcome of a majoritarian system if the federal representatives are selected by the regions.<sup>12</sup>

How do these ubiquitous majoritarian elements relate to trade policy? The crucial link is the observation that many industries are geographically concentrated. Examples abound: old industries such as coal mining or ship building have located in the obvious places, other industries cluster in particular locations due to agglomeration effects. Audretsch and Feldman (1996) find an average Gini-coefficient of 0.56 for the location of industries across U.S. states at the four digit SIC level.<sup>13</sup> We do not seek to explain the reasons behind these locational

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<sup>10</sup>Admittedly, most democracies possess direct elements, Switzerland being the prime example, but trade policy is rarely —if ever—submitted to popular vote.

<sup>11</sup>Although the nuances of countries' electoral systems are a fascinating topic, we refrain from offering a detailed discussion, being beyond the scope of this paper.

<sup>12</sup>An important example is the European Council of Ministers.

<sup>13</sup>Brühlhart (2001) presents empirical evidence of geographical concentration in Europe.

choices.<sup>14</sup> We take this widespread phenomenon as given and investigate its political implications for trade policy.<sup>15</sup> To this end, we associate electoral districts with the  $n$  sectors of our specific factors model. The implicit assumption that an electoral district is the sole home to a single industry is clearly extreme. We use this simplification to facilitate our analysis and to elucidate the effects of majoritarian voting. The other extreme, namely a geographically uniform distribution, is at least as unrealistic, and we want to explore the consequences of moving away from it.

The political process of our model involves local elections where each district elects a representative, and a national stage where the legislature formed by the local representatives decides on policy. Let us consider these two stages in turn. The choice of the local representative clearly depends on her behavior once she becomes a member of the national legislature. In our model, so-called citizen-candidates are chosen from among the voters.<sup>16</sup> We assume that they are unable to commit to a particular platform and instead pursue their own personal objectives once in office.<sup>17</sup> Election promises are possible but not credible and therefore irrelevant. The election of the representative in each district basically amounts to choosing her degree  $\theta_i$  of local allegiance to the district. Due to the single-crossing property of the voters' objective function (Appendix 1 establishes this property formally), it will be the median voter of each district who picks a citizen-

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<sup>14</sup>Cf. Fujita, Krugman, and Venables (1999) for a treatment of the new economic geography.

<sup>15</sup>We acknowledge that companies could possibly choose locations based on where they would wield the most political influence. However, we do not entertain this possibility in the current paper.

<sup>16</sup>The term "citizen-candidate" was coined by Osborne and Slivinski (1996) who provide a more explicit analysis of this stage, as do Besley and Coate (1997).

<sup>17</sup>Note that allowing for commitment does not invalidate our results. Instead it leads to an interesting, alternative interpretation. We return to this point below.

candidate — not necessarily herself.

At the national level, the legislature is made up of the locally elected representatives. This legislature, call it the house of representatives, then decides on trade policy. By assuming that the entire legislature decides, we abstract from parties, coalitions, and the formation of a government.<sup>18</sup> In choosing policy, the house of representatives seeks to maximize the sum of its members’ personal welfare. Assuming such an efficient bargaining solution seems natural in the context of rational, self-interested legislators. Formally, it gives rise to the following objective function:

$$W(p; \theta^{rep}) = \sum_{i=1}^n (1 + \theta_i^{rep} \pi_i(p_i) + R(p) + CS(p)). \quad (2)$$

Note that we assume implicitly that all members of the legislature have equal say in determining policy.<sup>19</sup>

## 4 The legislature’s policy choice

Solving the model backwards, this section takes the composition of the house of representatives as given. That is, the selection of representatives in their respective electoral districts has supposedly taken place and we regard the resulting set  $\{\theta_i^{rep} : i = 1, \dots, n\}$  as exogenously given. We want to analyze how this given

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<sup>18</sup>A previous version of the paper explicitly modelled the formation of the government. This does not affect our main result, however, and is therefore omitted here.

<sup>19</sup>It is straightforward to relax this assumption and introduce individual weights on each sector’s objective which stand for the importance or influence of the sector’s representative. In a reduced form way, this allows us to integrate other approaches that provide the micro-foundation for said weights: they could capture the monetary contributions of the “protection for sale” framework or, for example, the advantages of incumbency, were one to model this aspect more explicitly.

legislature chooses tariffs.

When deciding on trade protection, the legislature seeks to maximize its objective function (2) over the price vector  $p$  or, equivalently, over the tariff vector  $p - p^w$ . The corresponding  $n$  first order conditions are

$$\theta_i^{rep} - 1 = f_i(p_i) \quad \forall i = 1, \dots, n, \quad (3)$$

$$\text{where } f_i(p_i) \equiv -\frac{(p_i - p_i^w)(nd_i'(p_i) - y_i'(p_i))}{y_i(p_i)}.$$

Note that the RHS can be written as a function of one sole argument, the price of commodity  $i$ , because none of its three terms — the import tariff  $p_i - p_i^w$ , the domestic supply of good  $i$  in the denominator and, in particular, the price derivative of aggregate import demand (the second term in the numerator) — depends on the prices (or tariffs) of other goods.<sup>20, 21</sup> Similarly, the LHS depends on  $\theta_i^{rep}$  but not on the types of the other representatives. In terms of political factors, the tariff protection granted to a sector is thus determined — at least at this stage — solely by the preferences of its local representative.

To analyze in greater detail how the political process influences the choice of tariffs, it is convenient to rewrite the first order conditions. First, note that the  $f_i(p_i)$  are strictly increasing as long as we impose mild regularity conditions<sup>22</sup> on the subutility and profit functions. We can then rewrite the above first order

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<sup>20</sup>This is, of course, due to the separability assumption. Even without it, however, the effects through tariff revenue and consumer surplus would tend to zero as  $n$  increases.

<sup>21</sup>Note that the  $f_i(\cdot)$  functions closely resemble price elasticities of excess demand, only that they involve tariffs instead of prices in the numerator and domestic production instead of excess demand in the denominator. We will return to their economic interpretation below.

<sup>22</sup>The exact condition is  $(p_i - p_i^w)(nd_i'' - y_i'') + f_i y_i' / y_i + (nd_i' - y_i') < 0$ , that is, as long as the third derivatives of the subutility and the profit function and the curvature of the latter do not dominate the linear component.

conditions by inverting the  $f_i(\cdot)$  functions

$$p_i = f_i^{-1}(\theta_i^{rep} - 1) \quad \forall i = 1, \dots, n. \quad (3')$$

Clearly, the inverse functions  $f_i^{-1}(\cdot)$  will also be strictly increasing. Furthermore, given that the original  $f_i(\cdot)$  have their horizontal intercept at  $p_i^w$ , the inverted functions have their vertical intercept at the world market price.

We are now in a position to discuss the political mechanism at work here. If the representative of district  $i$  were its average voter, then  $\theta_i^{rep}$  would equal one — recall that we normalized the first moment to one — and the argument of the  $f_i^{-1}(\cdot)$  functions would equal zero. Since the vertical intercept of these functions lies at  $p_i^w$ , we see immediately that the average voter representing her district would obtain a zero tariff — free trade in other words — for the industry located in that particular district. More generally, since the  $f_i^{-1}(\cdot)$  functions are strictly increasing, the domestic price and, hence, the tariff will be strictly increasing in  $\theta_i^{rep}$ . The tariff protection offered to a sector increases with the local allegiance of its representative. A representative who has an above (below) average stake in the local economy obtains a positive (negative) tariff because the higher (lower) the representative's stake in the sector specific factor, the more she benefits from a positive (negative) tariff.

This argument, of course, applies equally to the one voter who is especially prominent in the political economy arena: the median voter. If the distribution of  $\theta_i$  is skewed to the right (left), then the median lies below (above) the average and the median voter's endowment of the sector specific factor will be less (greater) than one. In the case of positive (negative) skewness, the median voter would therefore obtain a negative (positive) tariff. Note that empirical wealth dis-

tributions are typically skewed to the right, making it more likely that the median voter would obtain an import subsidy or export tax for the locally produced output good. These results are reminiscent of Mayer (1984) and Helpman (1997). In our analysis, however, they are only intermediate steps because we have not yet determined who will actually represent the  $n$  districts.

Before turning to that question, let us take a quick look at the economic forces that so far have been hidden behind the  $f_i(\cdot)$  functions. To this end, it proves convenient to rewrite the first order conditions once more:

$$\frac{t_i}{1 + t_i} = \frac{(\theta_i^{rep} - 1)z_i(p_i)}{\varepsilon_i(p_i)} \quad \forall i = 1, \dots, n, \quad (3'')$$

where  $t_i$  denotes the ad valorem tariff  $(p_i - p_i^w)/p_i^w$ ,  $\varepsilon_i$  the price elasticity of import demand in absolute value, and  $z_i$  the ratio of domestic supply to imports. Note that the LHS is a monotone transformation of the ad valorem tariff. Written this way, the first order conditions reveal that a higher import demand elasticity reduces tariff protection, as one would expect in the light of Ramsey pricing. On the other hand, a higher ratio of domestic production to imports increases tariffs, as it amplifies the tariff's positive effect on profits. In terms of economic determinants, these are exactly the same results — albeit still preliminary in our case — as in Grossman and Helpman (1994).<sup>23</sup> The political process, to which we now return, differs substantially though.

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<sup>23</sup>We have deliberately chosen their notation for this version of the first order conditions in order to highlight the analogy.

## 5 Choosing representatives

Having analyzed the policy decision of a given national legislature, we now turn to the local elections that precede it. In each district, the electorate selects one of its own to represent the district at the national level. These representatives then constitute the national legislature. Beforehand, when participating in local elections, voters are fully aware of how their choice of representative will influence the resulting tariff to be set by the national legislature. In our model, obtaining the desired tariff is, in fact, the main objective of voting in local elections.<sup>24</sup> The voter pursues this objective by choosing the type of the local representative. Formally, she maximizes her indirect utility function taking into account the dependence of prices on the type of representative:

$$\begin{aligned} \max_{\theta_i^{rep}} V_i(p_1(\theta_1^{rep}), \dots, p_n(\theta_n^{rep}); \theta_i) = & 1 + \theta_i \pi_i(p_i(\theta_i^{rep})) + \\ & R(p_1(\theta_1^{rep}), \dots, p_n(\theta_n^{rep})) + \\ & CS(p_1(\theta_1^{rep}), \dots, p_n(\theta_n^{rep})), \end{aligned} \quad (4)$$

where the  $p_i(\theta_i^{rep})$  are shorthand for the inverted first order conditions (3') of the legislature's optimization problem. Their reappearance here shows how the voter anticipates the outcome of the political process at the next stage that was analyzed above.

The first order conditions that pertain to the voter's optimization problem (4) take the form

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<sup>24</sup>Clearly, we are sidestepping the question of why an infinitesimal voter takes part in elections at all if her influence is nil.



$$p_i(\theta_i^{rep}) = f_i^{-1}(n\theta_i - 1) \quad \forall i = 1, \dots, n. \quad (5)$$

Note that, except for the dependence of the price on the type of representative, these are the same first order conditions that would obtain if the voter maximized her indirect utility function by choosing the price directly. This is due to the fact that selecting the local representative affects the objective solely through the price of the corresponding sector. We can simplify these first order conditions by substituting the actual functions (3') for the prices on the LHS, resulting in

$$\theta_i^{rep} = n\theta_i \quad \forall i = 1, \dots, n. \quad (5')$$

We see that the voter prefers a representative who owns  $n$  times as much of the specific factor as she herself. Obviously, the number of districts  $n$  is crucial. We leave aside the limiting case  $n = 1$  because it corresponds to a proportional system and focus instead on the role played by multiple districts. For  $n > 1$ , the voter would like to send someone who owns a higher share of the specific factor and is therefore more protectionist than the voter herself. The intuition is straightforward. A higher tariff, by raising the price of the locally produced good, solely benefits the owners of the factor that is specific to the sector in question. The welfare cost, net of tariff revenue, on the other hand, is born uniformly by everyone. Imposing a tariff thus entails a negative externality on other districts that do not share in the benefits but bear part of the cost. At the national stage analyzed previously, these externalities are internalized because when the entire legislature sets trade policy, every representative has to compromise. Anticipating this internalization, the voter prefers to send someone who is more protectionist

than herself.

Given the voters' preferences, what will be the political outcome? That is, what type of representative will eventually represent each district? As political economy settings go, the local elections we have modelled are relatively simple. In each district, voters differ along only one dimension, namely  $\theta_i$ . The policy space is one dimensional as well: voters choose a representative from their own characteristics space. Facilitating matters further, we show in Appendix 1 that the above objective function possesses the single-crossing property. This allows us to invoke the median voter result. For a wide variety of electoral settings, it is thus the median voter in each district who decides the outcome. In other words, the median voter alone chooses who will represent the district. From the above first order conditions (5') we see that the representatives chosen by their respective median voters will be of the type

$$\theta_i^{rep} = n\theta_i^m \quad \forall i = 1, \dots, n. \quad (6)$$

We have thus established the following proposition:

**Proposition 1** *In a majoritarian system ( $n > 1$ ), legislators are more protectionist than their respective median voters.*

Let us stress the intuition behind this result. The previous discussion of voter preferences obviously applies to the median voter as well. The median voter could in fact decide to represent the district herself. Yet her preferences with regards to the tariff would then be watered down by the legislature's consensual decision-making that obliges every representative to internalize those parts of the cost that are born by her colleagues. Anticipating such compromises, the median voter in-

stead sends someone who owns a higher share of the sector specific factor. That is, she strategically delegates representation of the district to someone who is more protectionist than herself. That representative will, of course, also be forced to compromise and internalize the total cost of protection, but she obtains a higher tariff — as intended by the median voter — because her personal trade-off between costs and benefits favors protection, due to a larger share in the sector specific factor. In broader terms, the consensual decision making process we assume at the national stage would normally act as a built-in commitment device. This device is leveraged, however, by the strategic delegation taking place at the local level. Only in a proportional system ( $n = 1$ ) does the median voter choose to actually represent the district herself. In that case, there are no externalities that could be internalized, and the median voter would be the only representative, free to set the tariff she prefers.<sup>25</sup>

Beyond this special case, the degree of strategic delegation is increasing in  $n$ , the number of districts, as we can see from equation (6) above. Starting from the proportional case, where there is no strategic delegation, the ratio of the local representative's endowment of the specific factor to what the median voter calls her own increases one-for-one with  $n$ . This aspect of our result is also quite intuitive. The cost of the tariff is split uniformly across the residents of all  $n$  districts. As the number of districts increases, less and less of the cost of a particular tariff has to be borne by the district itself. The rest is paid for by the  $n - 1$  remaining districts. This stimulates the median voter's appetite for protection and, at the same time,

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<sup>25</sup>Note an interesting re-interpretation of our model if we allow for commitment: the median voter would then always choose to represent the district herself, irrespective of  $n$ . However, instead of strategically delegating she would strategically misrepresent her true preferences by committing to a protectionist platform that corresponds to  $\theta_i^{rep}$  in order to obtain her preferred policy.

sharpens the Damocles sword of the externalities' internalization. Both effects create an ever greater incentive for strategic delegation. Note that this comparative static consideration implies that in a purely proportional system, legislators would *ceteris paribus* be the least protectionist, and that their gusto for protection increases as the number of districts multiplies. Our approach can thus explain the varying fervor for protection of the U.S. president, the Senate, and the House of Representatives. We return to this point below in the context of tariff levels that are discussed next.

## 6 Equilibrium tariffs

We are now in a position to complete the picture we have been developing so far. The main objective of every political economy model of trade — and we make no exception — is to explain the trade protection we observe. So what are the equilibrium tariff rates that will be set in our model by a legislature composed of the above representatives? To answer this question, we draw on the results of the previous sections and combine both stages of the political process. Plugging equation (6) into (3'), we obtain the equilibrium tariffs

$$p_i = f_i^{-1}(n\theta_i^m - 1) \quad \forall i = 1, \dots, n. \quad (7)$$

What can be said about these equilibrium tariffs? To begin with, we are interested in the sign of each tariff, i.e., whether it will take the form of an import tariff or an import subsidy (export subsidy or tax). In order to determine the sign, recall that the functions  $f_i^{-1}(\cdot)$  are strictly increasing and have their vertical intercepts at  $p_i^w$ , the world market price. Clearly then, the equilibrium tariffs will be positive as

long as the median endowment  $\theta_i^m$  is greater than  $1/n$ . Since we normalized the mean of each distribution to one, this inequality is satisfied, especially as  $n$  grows large, except for pathologically skewed distributions. For all empirically relevant cases, we have thus established the following proposition:

**Proposition 2** *The equilibrium tariff rates  $p_i - p_i^w$  are strictly positive as long as the median  $\theta_i^m > 1/n$ .*

We know that, had the median voter chosen to represent the district in person, the result would have been a slightly negative tariff (in the case of a positively skewed distribution). We see here that, in equilibrium, strategic delegation allows the median voter to obtain the positive tariff she prefers.

We now turn to the comparative statics of our result. Equation (7) and the fact that the  $f_i^{-1}(\cdot)$  are strictly increasing clearly show that:

**Proposition 3** *The equilibrium tariff rates  $p_i - p_i^w$  are strictly increasing in the number of districts  $n$ .*

As a way of elucidating the intuition behind this result, let us deduce it from prior insights. We saw in the preceding section that the degree of strategic delegation is increasing in the number of districts. The reason was that, as the number of districts grows, an ever increasing part of the cost of protection is forced upon other shoulders. This prompts the median voter to desire more protection and, at the same time, to become more concerned about the looming internalization of those costs. As a consequence, being keen on strategic delegation, she chooses a representative with a higher endowment of the sector specific factor. This higher endowment tilts the representative's personal trade-off between benefits and costs

in favor of protection. Hence, the tariff is increasing in the local representative's endowment, which in turn increases with the number of districts.

As was already mentioned, this result has interesting implications in the context of U.S. institutions. Take the U.S. president, for example, who (supposedly) represents the interests of the nation at large. Our theory predicts that the president should be less protectionist than Congress. This implication is confirmed by Baldwin (1985) who reports that "an abundance of evidence supports the hypothesis that the president tends to be more liberal on trade policy matters than the Congress." We thus provide one possible explanation why the president seeks fast track negotiating power and Congress is reluctant to grant it. Comparing both chambers of Congress, our model implies that the House should be even more protectionist than the Senate.<sup>26</sup>

The above proposition has another interesting corollary in the context of comparative institutional analysis:

**Corollary** *The equilibrium tariffs in a purely proportional system ( $n = 1$ ) are lower than in a majoritarian electoral system.*

The result is potentially testable.<sup>27</sup> This being a theoretical paper, we only point to the Dutch case for anecdotal evidence. The Netherlands is one of the few countries with a purely proportional system and has traditionally been a free trader.

Finally, let us revisit the economic forces at work behind the scenes. The  $f_i^{-1}(\cdot)$  functions still contain the same economic mechanisms that we analyzed

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<sup>26</sup>Also this implication is corroborated by Baldwin (1985) who concludes that "the Senate does seem more receptive to protectionist petitions from particular industries than the House."

<sup>27</sup>Ferretti and Perotti (2002) develop an index of proportionality for a large number of countries that could be used to explain national protection levels. We leave this for future research.

before. Substituting equation (6) into (3'') would show that the equilibrium tariff rates depend negatively on the import demand elasticities (Ramsey pricing) and positively on the ratio of domestic production to imports. We thus conclude that our final results exhibit the same economic effects that are present in the “protection for sale” approach. This is no surprise given that the economic side of both models is identical.

## 7 Additional policy instruments

Having developed a new political economy model of tariff protection, we need to investigate whether our approach suffers from the same shortcoming that afflicts other approaches. They bring about the use of tariffs solely for their redistributive role. Yet, as is well known, tariffs are less efficient at this task than most other instruments. Once such additional instruments enter the frame of alternative models, tariffs perform a disappearing act. Our competitors therefore fail to answer the fundamental question posed by Rodrik (1995), how to explain the use of tariffs when more efficient instruments are available.<sup>28</sup> The model we have developed does answer this question by emphasizing a second policy dimension: regional targetability. More precisely, there exists a trade-off between the redistributive efficiency of a policy instrument and its regional targetability. As long as the additional, more efficient instrument is less targetable, our model predicts a policy mix that involves tariffs.

As a first step towards understanding this trade-off, consider another policy

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<sup>28</sup>Grossman and Helpman (1994) offer an informal discussion of this question in the context of their model. However, as Helpman (1997) points out, “good answers to this question are not yet available.”

instrument that is more efficient but equally targetable. Sector specific production subsidies, for example, are equally targetable, and they are clearly more efficient. As we rigorously show in Appendix 2, individuals prefer the exclusive use of these subsidies and zero tariffs once both instruments are available. Because the representatives have the same preferences, they only enact production subsidies. We conclude that, in the presence of another instrument that is more efficient and equally targetable, tariffs disappear in our model as well. This was to be expected, given that the additional instrument dominates trade policy. Before we move on to less targetable instruments, note one interesting feature of this case (also shown in the appendix): Voters desire and representatives enact higher rates of the more efficient instrument (subsidies) than they do of the less efficient instrument (tariffs) when the former is not available.<sup>29</sup>

As soon as the second, more efficient instrument is less targetable, things become interesting. By way of example, consider income taxation, an important channel for redistribution in practice that is clearly less targetable but more efficient. In our model, it is actually distortion-free because, for simplicity, we assume fixed factor supplies. We confine attention to linear income taxation as progressive elements would needlessly complicate matters without offering additional insights. Note that even linear income taxation implies redistribution, because tax revenue tends to be spent uniformly, if it is not biased in favor of low income earners. Let  $t$  denote the income tax rate and let the tax base be factor income from the mobile as well as from the specific factors. The per capita revenue from income taxation then amounts to  $t(n + \sum_i \pi_i(p_i))/n$ , where the first term in parentheses represents the income of the mobile factor. Recall that there

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<sup>29</sup>This result is reminiscent of Wilson (1990).



are  $n$  units of the mobile factor that are each paid a normalized wage of one. To avoid corner solutions, we introduce a small ad hoc inefficiency. This concession to reality takes the form of a function  $g(\cdot)$  applied to income tax revenue, where we require  $g(0) = 0$ ,  $g'(0) = 1$ , and strict concavity. Actual tax revenue available for distribution thus amounts to  $g(t(n + \sum_i \pi_i(p_i))/n)$ .

A given legislature then maximizes the following modified objective function over the  $n$  tariffs and the income tax rate  $t$ :

$$W(p, t; \theta^{rep}) = \sum_i (1 - t)(1 + \theta_i^{rep} \pi_i(p_i)) + n(R(p) + CS(p) + g(t(n + \sum_i \pi_i(p_i))/n)).$$

The resulting first order conditions with respect to the  $n$  tariff rates are

$$\theta_i^{rep}(1 - t) - (1 - f't) = f_i(p_i) \quad \forall i = 1, \dots, n.$$

One such first order condition is depicted by dashed lines in Figure 1. As before, the higher the representative's endowment of the sector specific factor, the higher will be the tariff she obtains. Only if income is completely taxed away ( $t = 1$ ) does the the endowment  $\theta_i^{rep}$  not matter. The sickle shape of those curves is due to the ad hoc distortion we assume. As the distortion increases in either direction, obtaining a higher tariff becomes less worthwhile. If there were no distortion, then those dashed curves would be straight lines radiating down from a zero tariff at  $t = 1$ .

The first order condition with respect to income taxation takes the following form:

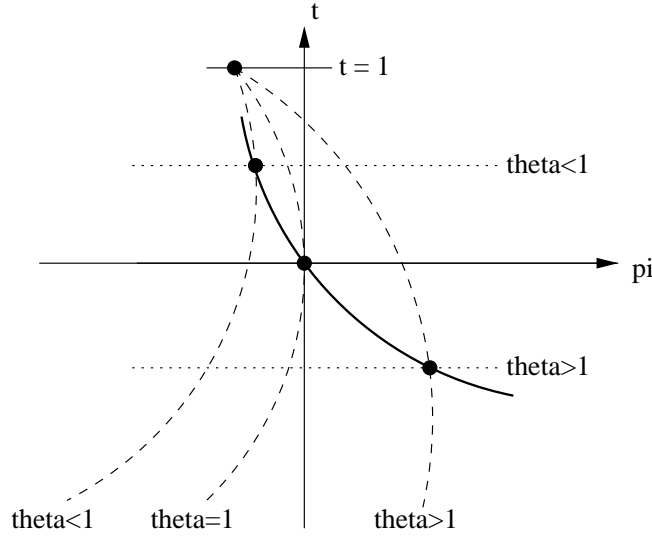


Figure 1: Optimal policy mix

$$\left(1 + \frac{1}{n} \sum_i \theta_i^{rep} \pi_i(p_i)\right) = \left(1 + \frac{1}{n} \sum_i \pi_i(p_i)\right) g'.$$

On the LHS of this equation we see the average gross income of a legislator, whereas on the right hand side we have the average pre-tax income of the population at large, multiplied by the derivative of the distortion function. Suppose the representatives earn less income than their average constituent because of a lower endowment of the sector specific factor. They then vote for positive income taxation — giving rise to a derivative of less than one — that redistributes income in favor of low income earners. This plausible relationship is depicted by the dotted lines in Figure 1 where we abstract from the effects of the particular price or tariff because it is negligible as  $n$  grows large. Clearly, if the distortion function  $g(\cdot)$  were linear with  $g' = 1$  everywhere, i.e., if there were no distortion, then we

would obtain corner solutions.

Combining these first order conditions reveals the optimal policy mix of tariffs and income taxation. The solid curve in Figure 1 shows this optimal combination. Tariffs and income taxation turn out to be substitutes in our model because one instrument benefits, while the other harms those at the tails of the wealth distribution. More importantly, though, we see that any policy mix is a combination of both policy instruments. Without explicitly solving both stages of the political process, we can therefore conclude that the more efficient instrument does not obliterate the use of tariffs, as is the case in other models. It does not because, in our model, it matters that the more efficient instrument is less targetable. We have thus established the trade-off we set out to show.

## **8 Conclusion**

In this paper, we advance a new political economy explanation of tariff protection. Our starting point is the geographical correlation that exists between representatives voting for protection and the specific industries located in their electoral districts. We account for these regional influences on trade policy by giving a geographical interpretation to the specific factors model of trade. On the political side, we augment this standard trade model with a political process that features two stages. First, in regional elections, voters select one of their own to represent each district. Subsequently, at the national stage, the representatives thus elected form the legislature that sets trade policy. The consensual decision making process at this stage forces legislators to take into account the effects a tariff for their pet industry will have on other districts. In regional elections, on the other hand,

voters ignore these externalities and prefer a positive tariff because most of the cost is borne by other districts. Anticipating the internalization of these costs at the national stage, they vote strategically for someone who is more protectionist than themselves. The representatives thus elected are more protectionist than their respective median voter and set tariffs that are strictly positive. It is the regional structure as well as the interplay between the two stages of the political process that bring about tariff protection in our model.

The equilibrium tariffs we derive are partly driven by economic forces that are not unique to our model. Thus a low import demand elasticity leads to a higher tariff as does a low import share. More innovatively, our contribution shows that tariffs depend positively on the number of districts. As the number of districts increases, the cost of protection is borne on more and more shoulders. Individual districts therefore desire higher tariffs and obtain them by means of strategic delegation. This result conforms well to the differing degrees of protectionism exhibited by U.S. government institutions. The other major innovation of our approach is that it explains the use of tariffs even when other, more efficient instruments are available. Whereas other approaches flounder as soon as another instrument that is more efficient at redistributing income is introduced, we stress a second dimension of policy, namely its regional targetability. As long as the additional, more efficient policy instrument is less targetable — as, for example, income taxation — our approach predicts a policy mix that involves tariffs. That is, the additional instrument does not obliterate the use of tariffs.

Despite the theoretical nature of this contribution, let us reflect on how our predictions could potentially be tested. The most direct test would be to squarely compare the stance of legislators on matters of protection to the beliefs of their

voters. Closest in spirit would be an analysis along the lines of Baldwin and Magee (2000), but with additional regressors such as regional concentration that would capture the workings of our approach. Alternatively, one could extend the sectoral “protection for sale” regressions by including such regressors.<sup>30</sup> A third way that was already mentioned would be to explore the cross-country correlation of protection with a measure of the proportionality of the political system.

As for further theoretical work, some of the extensions that have been developed in the context of lobbying could be applied to our model as well. The interaction between two large economies, for example, would add terms-of-trade effects as in Grossman and Helpman (1995). Our analysis could also be applied to international factor mobility as do Facchini and Willmann (2001) within the “protection for sale” framework. In addition, developing an intertemporal version of our model along the lines of Besley and Coate (1998) would allow us to address dynamic issues, such as the time consistency of trade policy or the possibility of prior commitment to free trade analyzed by Maggi and Rodríguez-Clare (1998). Finally, it would be interesting to integrate lobbying into the political process of our model as do Besley and Coate (2001) in a public finance context.<sup>31</sup>

Beyond the trade context, the general principle that we apply in this paper could clearly be brought to bear on other issues as well. One promising direction, in our view, will be to treat the degree of regionalism itself as the decision variable and thereby endogenize it. The allocation of decision making powers in federal structures is a fascinating topic that has so far been subjected mainly to normative

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<sup>30</sup>Goldberg and Maggi (1999) do include geographic concentration but only in the lobbying equation.

<sup>31</sup>Their examples suggest that the political process we use tends to be robust to the introduction of lobbying.

analysis. Its relevance reaches back to trade policy, especially in the E.U. context, an issue we have not touched upon in this paper.

## Appendix 1: Single crossing property

As shown by Gans and Smart (1996), a sufficient condition for invoking the median voter result is that the voters' objective function satisfies the single crossing property. Recall the voters' objective function in our case:

$$V_i(p_1(\theta_1^{rep}), \dots, p_n(\theta_n^{rep}); \theta_i) = 1 + \theta_i \pi_i(p_i(\theta_i^{rep})) + R(p(\theta^{rep})) + CS(p(\theta^{rep})).$$

We want to check whether this function satisfies single crossing. Gans and Smart (1996) use the following definition, which we restate using our notation:

$$\begin{aligned} \forall \theta_i^{rep'} > \theta_i^{rep} \text{ and } \forall \theta'_i > \theta_i : \\ \theta_i^{rep'} \succeq_{\theta_i} \theta_i^{rep} \Rightarrow \theta_i^{rep'} \succeq_{\theta'_i} \theta_i^{rep} \text{ and } \theta_i^{rep'} \succ_{\theta_i} \theta_i^{rep} \Rightarrow \theta_i^{rep'} \succ_{\theta'_i} \theta_i^{rep}. \end{aligned}$$

This definition is clearly satisfied in our application if

$$V_i(\theta_i^{rep'}; \theta_i) \geq V_i(\theta_i^{rep}; \theta_i) \Rightarrow V_i(\theta_i^{rep'}; \theta'_i) > V_i(\theta_i^{rep}; \theta'_i),$$

where we have suppressed all but the relevant arguments. Now suppose the first inequality holds. Rewriting it gives

$$\begin{aligned} \theta_i(\pi_i(p_i(\theta_i^{rep'})) - \pi_i(p_i(\theta_i^{rep}))) \geq R(p(\theta^{rep})) + CS(p(\theta^{rep})) - \\ (R(p(\theta^{rep'})) + CS(p(\theta^{rep'}))). \end{aligned}$$

Note that the difference in parentheses on the LHS is positive because  $\theta_i^{rep'} > \theta_i^{rep}$  and  $p_i(\cdot)$  as well as  $\pi_i(\cdot)$  are both increasing, the former strictly so. Because  $\theta_i' > \theta_i$ , it follows that

$$\theta_i'(\pi_i(p_i(\theta_i^{rep'})) - \pi_i(p_i(\theta_i^{rep}))) > R(p(\theta^{rep})) + CS(p(\theta^{rep})) - (R(p(\theta^{rep'})) + CS(p(\theta^{rep'}))).$$

But this can be rewritten as the second inequality above:

$$V_i(\theta_i^{rep'}; \theta_i') > V_i(\theta_i^{rep}; \theta_i).$$

This shows that the voters' objective function satisfies the single crossing property which is sufficient to apply the median voter result.

## Appendix 2: Production subsidies

Let us demonstrate the familiar obliteration of tariffs which occurs in our model only if the more efficient instrument, sector specific production subsidies for current purposes, is equally targetable. There are thus two policy instruments: tariffs  $\tau_i = p_i - p_i^w$  as well as production subsidies  $s_i = p_i^{prod} - p_i$ . The latter drive a wedge between the prices faced by consumers,  $p_i = p_i^w + \tau_i$ , and those paid to producers,  $p_i^{prod} = p_i^w + \tau_i + s_i$ . This gives rise to the following modified indirect utility function:

$$V_i(\tau, s; \theta_i) = 1 + \theta_i \pi_i (p_i^w + \tau_i + s_i) + R(\tau, s) + CS(\tau) - C(\tau, s),$$

where  $C(\tau, s)$  is the per capita cost  $\sum_i s_i y_i (p_i^w + \tau_i + s_i)/n$  of the subsidies that have to be financed, after all. Individuals' — and *a fortiori* representatives' — preferences with regards to policy are determined by the following first order conditions:

$$\begin{aligned} \text{wrt } \tau_i : \quad \theta_i - 1/n &= -\tau_i \frac{d'_i}{y_i} + \tau_i \frac{y'_i}{ny_i} + s_i \frac{y'_i}{ny_i} \quad \forall i = 1, \dots, n, \\ \text{wrt } s_i : \quad \theta_i - 1/n &= \tau_i \frac{y'_i}{ny_i} + s_i \frac{y'_i}{ny_i} \quad \forall i = 1, \dots, n. \end{aligned}$$

The first order conditions for tariffs are the same as before, except for the third term on the RHS. This term represents the effect a tariff has on the cost of the subsidies via its effect on output. The first order conditions for production subsidies are similar, only the first term on the right hand side is missing. This is due to the fact that the production subsidies have no direct effect on demand. We see that for both (sets of) equations to be satisfied, the tariffs have to be zero. This is because only  $\tau = 0$  eliminates the first term on the right hand side of the tariff equations which constitute the only difference between the two sets of equations. So individuals would choose to use production subsidies instead of the less efficient tariffs. Since politicians are citizen-candidates, they have the same preferences. We conclude that, in equilibrium, the more efficient and equally targetable production subsidies obliterate the use of tariffs as we had expected.



Note an additional insight: Compare the level of the production subsidies to the level of tariffs chosen when subsidies are not available. That is, compare the first two terms on the RHS of the tariff equations to the last term of the subsidy equations. We see that agents choose higher rates of the more efficient instrument (subsidies) than of the less efficient tariffs.

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