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Electoral Rules and Trade Policy*

ILSEOK YANG**

This paper analyzes the trade policies in the voting equilibria under different electoral rules in a small open economy with a fixed factor of production. Specifically, we consider an economy in which economic rents exist in the long run due to a fixed supply of the factor of production. In this economy, each voter has its own share of the factor of production. We find that the equilibrium trade policy under proportional elections depends on the sum of the product of each group's density and the group's share of the factor, and is also affected by parameters under some conditions. However, under majoritarian elections, trade policy in equilibrium depends only on the middle group's fraction of the specific factor if the middle-share group is dominant in one of the districts.

Keywords: Trade Policy, Elections, Voting

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** Department of Economics, Sungkyunkwan University, Seoul 110-745, Korea; Tel: +82-2-760-0941; Fax: +82-2-744-5717; E-mail: isyang@skku.edu

I. INTRODUCTION

The literature on the comparative politics of economic policy is a literature that links political institutions to economic policy outcomes. Persson, Roland, and Tabellini (2000) compare redistributive politics in presidential versus parliamentary systems, while Lizzeri and Persico (2001) compare the provision of public goods in a winner-take-all system versus a proportional system. Austen-Smith (2000) explains how variations in the political system per se influence equilibrium redistributive tax rates and income distributions. Chari, Jones, and Marimon (1997) study overall government spending under different electoral systems. Milesi-Ferretti, Perotti, and Rostagno (2002) study the effects of electoral institutions on the size and composition of public expenditure in OECD and Latin American countries.

This paper supports the literature on the comparative politics of trade policy, which usually focuses on the equilibrium trade policies derived from the differences in political institutions, such as between presidential and parliamentary regimes, and between systems with majoritarian elections versus some form of proportional representation. For example, Persson and Tabellini (1999) take the view that proportional representation leads to an election in which there is only one voting district, because their election is not tied to particular geographic or economic interests. On the other hand, winning elections in majoritarian elections requires winning at least half of the districts. In this paper, we follow their line of thought and analyze a Downsian model of electoral competition and forward-looking voting, which indicates that majoritarian - as opposed to proportional - elections increase competition between parties by focusing it into some key marginal districts.¹

The purpose of this paper is to consider the trade policies of the voting equilibria under different electoral rules in a small open economy which has a fixed factor of production. Specifically, we consider the economy in which the economic rents exist in the long run because of a fixed factor of production and each voter has a different share of a specific factor which is used in producing a good. The reason why we assume a fixed factor of production and a different share of the factor is the introduction of different economic interests among voters. In fact, this model is the simplified version of Grossman and Helpman's (2005) model, which has three distinct goods and a numeraire good. However, we build the model of one good because we want to focus on the comparative politics of trade policy. Also, we employ the assumption of a small open economy because it is the most basic in analyzing the equilibrium trade policies and can be easily extended to the large open economy.

We find that the equilibrium trade policy under proportional elections depends on the sum of the product of each group's density and the share of the factor, and is also affected by parameters only under certain conditions in a small

open economy with this setting. However, that under majoritarian elections depends only on the fraction of the specific factor if the middle-share group is dominant in one of the districts under the same circumstances.

The organization of the paper is as follows. In the next section, we develop the model and set up a small open economy which has a fixed factor of production. We then introduce the indirect utility of a group in the economy. In section III and its subsections, we consider the outcomes of a Downsian electoral competition under proportional and majoritarian elections. Specifically, we derive the trade policies of the voting equilibria under two different electoral rules and compare them. Section IV offers our conclusions.

II. THE BASIC MODEL

Consider a small open economy with three distinct groups of voters, denoted by $i = 1, 2, 3$. Each group has a continuum of voters with unit mass. These individuals consume a good. The good is manufactured from an industry-specific factor with constant returns to scale. The specific input is available in inelastic supply. We let $\Pi(p)$ represent the aggregate rent accruing to the specific factor used in producing the good.² Then the slope of this function gives the industry supply curve

$$x(p) = \Pi'(p), \quad (1)$$

where p is the domestic price of the good.³ The domestic price p of the good is the sum of the given international price p^* and the specific import tariff or import subsidy τ .⁴

To make the arguments clearer, we adopt linear forms for the supply and demand functions. The supply function is given by

$$x(p) = x^* + \gamma(p - p^*) = x^* + \gamma\tau, \quad (2)$$

where x^* is the quantity of the good produced at the free-trade price and γ is the non-negative parameter.⁵ It reflects the fact that the domestic quantity of the good produced when the domestic price is equal to the international price is the same as the quantity of the good produced at the free-trade price. Furthermore, the higher the import tariff, the greater the domestic quantity of the good produced and vice versa. The demand function is given by

$$d(p) = d^* - \beta(p - p^*) = d^* - \beta\tau, \quad (3)$$

where d^* is the quantity of the good consumed at the free-trade price and β is the non-negative parameter.⁶ It also reflects the fact that the domestic

quantity of the good consumed when the domestic price is equal to the international price is the same as the quantity of the good consumed at the free-trade price. Furthermore, the higher the import tariff, the smaller the domestic quantity of the good consumed and vice versa.

Let group i own a different fraction of the specific factor denoted by α^i : $\alpha^1 + \alpha^2 + \alpha^3 = 1$. In addition to that, we assume that member j of group i has the same fraction of the specific factor. We also assume that everyone has the same demand function. Then, it implies that the preferences over trade policy are identical for every member of group i and given by

$$U^i = I^i + \frac{1}{3} CS(p) = \alpha^i \Pi(p) + \frac{1}{3} \tau \cdot m(p) + \frac{1}{3} CS(p) \quad (4)$$

where I^i is group i 's income of rents and transfers, $CS(p)$ is total consumer surplus from consumption of the good, and $m(p) = d(p) - x(p)$ is the quantity imported.⁷ Note that $-CS'(p) = d(p)$ is the demand for the good. We assume that α^i is distributed in the population according to a cumulative distribution function $F(\cdot)$. The expected value of α^i is denoted by $\bar{\alpha}$. Finally, the median value of α^i , denoted by α^m , is implicitly defined by $F(\alpha^m) = \frac{1}{2}$.

III. THE VOTING MODEL UNDER DIFFERENT ELECTORAL RULES

In this section, we consider the outcomes of Downsian electoral competition under proportional elections and majoritarian elections.⁸ Specifically, we seek trade policies of the voting equilibria under different electoral rules in order to compare them. We first explain how we set up the model. Then, we derive the trade policies of the voting equilibria under proportional elections and majoritarian elections. Finally, we analyze the model and suggest the levels of trade policy in the voting equilibria.

We postulate two candidates or parties indexed by $P = A, B$. Each of these maximizes the expected value of some exogenous ego rents, R . Candidate p sets his policy so as to maximize $q^p \cdot R$, where q^p is the probability of winning the election, given the other candidate's policy. The timing of events is as follows.

- (1) The two candidates, simultaneously and non-cooperatively, announce their electoral platforms: τ^A, τ^B . At this stage, they know the voters' policy preferences and the distributions for σ^A and δ .
- (2) The actual value of δ is realized and all uncertainty is resolved.
- (3) Elections are held.
- (4) The elected candidate implements his announced policy platform.

At the time of elections, voters base their voting decision both on the economic policy announcements and on the two candidates' ideologies. Specifically, voter j in group i prefers votes for candidate A if

$$W^i(\tau^A) > W^i(\tau^B) + \delta + \sigma^{ij}, \quad (5)$$

where δ is the general popularity of party B and can be positive or negative. We assume that this parameter has a uniform distribution on $\left[-\frac{1}{2b}, \frac{1}{2b}\right]$. The parameter σ^{ij} is the individual ideology of voter j in group i . The distribution of σ^{ij} differs across groups. These distributions are uniform on $\left[-\frac{1}{2s^i} + \bar{\sigma}^i, \frac{1}{2s^i} + \bar{\sigma}^i\right]$, $i = 1, 2, 3$. They are fully characterized by two parameters, $\bar{\sigma}^i$ and s^i , and groups differ over both. In other words, groups differ in their average ideology, captured by the group-specific means $\bar{\sigma}^i$. But they also differ in their ideological homogeneity, a higher density s^i being associated with a more narrow distribution of σ^{ij} . We make four specific assumptions about these differences in distribution. First, we label the three groups according to their average ideology $\bar{\sigma}^i$: $\bar{\sigma}^1 < \bar{\sigma}^2 < \bar{\sigma}^3$. Second, we assume that group 2 has the highest density: $s^2 > s^1, s^3$. Third, we assume that group 2 has zero group-specific mean: $\bar{\sigma}^2 = 0$. Finally, we assume that $\bar{\sigma}^1 s^1 + \bar{\sigma}^3 s^3 = 0$. The first and second assumptions are important when we analyze the model, while the third and fourth assumptions are made for convenient calculations.

What these assumptions mean is illustrated in Figure 1, where we have drawn the distribution for σ^{ij} in the three groups. Each of the three groups has an ideologically neutral voter with $\sigma^{ij} = 0$, and the further to the left we go in the figure, the more likely we are to find a voter who will vote for party A . As the figure illustrates, our assumptions imply that the group, which on average is ideologically neutral, also has the largest number of ideologically neutral voters.

FIGURE 1. DISTRIBUTIONS OF VOTERS' IDEOLOGICAL PREFERENCES

To formally study the candidates' decisions at stage (2), let us identify the swing voter in group i , a voter whose ideological bias, given the candidates'

platforms, makes him indifferent between the two parties:

$$\sigma^i = W^i(\tau^A) - W^i(\tau^B) - \delta. \quad (6)$$

All voters j in group i with $\sigma^j \leq \sigma^i$ prefer party A . Hence, given our distributional assumptions, candidate A 's actual vote share is

$$\pi^{A,i} + s^i [W^i(\tau^A) - W^i(\tau^B) - \delta - \bar{\sigma}^i] + \frac{1}{2}, \quad (7)$$

where we define $\pi^{A,i}$ the vote share of party A in group i and $\pi^{B,i}$, the vote share of party B in group i , is given by $1 - \pi^{A,i}$.

1. Proportional Elections

We first consider policy outcomes under an electoral rule corresponding to proportional representation. Specifically, we study a very stylized case where there is only one voting district, comprising all the voters in the population. Winning the election thus corresponds to obtaining more than the half of the total vote. Under this electoral rule, q^A is given by

$$q^A = \text{Prob} \left[\frac{1}{3} \sum_i \pi^{A,i} \geq \frac{1}{2} \right], \quad (8)$$

where the probability refers to the random variable δ . By Eq. (7) and our previous assumption that δ has a uniform distribution, we have

$$q^A = \frac{b}{3s} \sum_i [s^i (W^i(\tau^A) - W^i(\tau^B))] + \frac{1}{2}, \quad (9)$$

where $s \equiv \sum_i s^i / 3$ is the average density across groups (see Appendix A). By symmetry, party B 's probability of winning is $1 - q^A$.

Given our distributional assumptions, a unique equilibrium exists. One immediate feature of this equilibrium is that both A and B choose the same policy. Formally, they face the same maximization problems, as $q^B = 1 - q^A$ and as τ^A and τ^B enter Eq. (9) symmetrically, but with opposite signs. Intuitively, they have the same selfish preferences and possess the same technology for converting policy promises into expected votes. To characterize the equilibrium trade policy, we maximize party A 's objective function $q^A \cdot R$ with regard to τ^A , taking τ^B as given. Exploiting Eqs. (4) and (9), and evaluating the resulting first-order conditions at the point $\tau^A = \tau^B$, we obtain the conditions which must hold at an equilibrium. Therefore, we have

$$\tau^{pe} = \frac{x^* \left(\sum_i s^i \alpha^i - s \right)}{\beta s = \gamma \left(2s - \sum_i s^i \alpha^i \right)}, \quad (10)$$

where the *pe* superscript stands for proportional elections equilibrium (see Appendix B).

From the equilibrium trade policy under proportional elections derived above, we can see that it depends on voters' ideological preferences, their different fraction of the specific factor, and parameters, B , γ , in a small open economy with this setting. In fact, there are four possible cases.

Case 1. $\sum_i s^i \alpha^i > 2s$

This can happen only when the densities in group 1 and group 3 are small enough relative to the density in group 2 (s^2 is sufficiently high relative to s^1 and s^3), who has the most of the specific factor (α^2 is at least greater than $\frac{2}{3}$).⁹ In this case, the equilibrium trade policy in proportional elections is an import tariff or an import subsidy, depending on the size of β and γ .

Case 2. $\sum_i s^i \alpha^i < s$

This case implies that the sum of a product in any combination of s^i and α^i is less than the average density across groups under the condition that group 2's share of the factor, α^2 , is at most less than $\frac{2}{3}$.¹⁰ In this case, the equilibrium trade policy in proportional elections is an import subsidy.

Case 3. $\sum_i s^i \alpha^i = s$

It means that the sum of product in any combination of s^i and α^i is equal to the average density across groups. One possibility of holding this case is when the condition, $\alpha^1 = \alpha^2 = \alpha^3 = \frac{1}{3}$, is satisfied. When everyone has the average level of the factor, it is true regardless of the density in each group. In this case, the equilibrium trade policy in proportional elections is free trade.

Case 4. $s < \sum_i s^i \alpha^i < 2s$

This condition is satisfied in any combination of s^i and α^i in the sum of the product except cases above. In this case, the equilibrium trade policy in proportional elections is an import tariff.

Proposition 1. *In a small open economy with positive rents from a production factor, the equilibrium trade policy under proportional elections depends on*

the sum of the product of s^i and α^i , and is also affected by parameters, β and γ , only when $\sum_i s^i \alpha^i > 2s$.

Proposition 1 summarizes the results of four cases above and can be explained as follows. When there are different economic interests about rents from a factor of production among voters in a small open economy, the sum of the product of s^i and α^i generally decides the equilibrium trade policy in proportional elections. However, β and γ can have a role in deciding the equilibrium trade policy in some case.

2. Majoritarian Elections

Now, we consider elections conducted under plurality rule in single-candidate electoral districts. Specifically, as Persson and Tabellini (1999) specified, we assume that there are three electoral districts and consider the electoral rule that winning the elections and setting policy requires winning at least two districts. The implicit assumption behind this consideration is that the party who wins in two districts has a majority in the assembly and can thus implement its pre-announced policy.

We start with a simplifying assumption that the three electoral districts coincide with the three groups in the population. We later show that generalizations can easily be made in all comparative politics results if groups and districts do not completely overlap. Under majoritarian elections, existence of equilibrium is not guaranteed without further assumptions.¹¹ Basically, we must assume that the ideological bias towards party A in group 1 and towards party B in group 3 are large enough that the group-specific means $\bar{\sigma}^1$ and $\bar{\sigma}^3$ are sufficiently distant from zero. If this is the case, an equilibrium exists where A and B announce equal policies and where the entire competition takes place in the marginal district made up of the middle class (group 2) voters. Party A wins district 1 with large enough a probability and loses district 3 with large enough a probability, so that neither candidate finds it optimal to seek voters outside the marginal district.

Under these assumptions, the relevant expression for party A 's probability of winning can be written as

$$q^A = \text{prob} \left[\pi^{A,2} \geq \frac{1}{2} \right], \quad (11)$$

where the probability refers to the random variable δ . By Eq. (7) and our previous assumption that δ has a uniform distribution, we have

$$q^A = b[W^2(\tau^A) - W^2(\tau^B)] + \frac{1}{2} \quad (12)$$

(see Appendix C). Compared to Eq. (9), the expression in Eq. (12) depends only on what happens in the marginal district, district 2.

We may then follow the same steps as in the previous subsection to characterize the policies in a convergent electoral equilibrium. Given our distributional assumptions, a unique equilibrium exists. One immediate feature of this equilibrium is that both A and B choose the same policy. Formally, they face the same maximization problems, as $q^B = 1 - q^A$ and as τ^A and τ^B enter Eq. (12) symmetrically, but with opposite signs. To characterize the equilibrium trade policy, we maximize party A 's objective function $q^A \cdot R$ with regard to τ^A , taking τ^B as given. Exploiting Eqs. (4) and (12), and evaluating the resulting first-order conditions at the point $\tau^A = \tau^B$, we obtain the conditions which must hold at an equilibrium. Therefore, we get

$$\tau^{me} = \frac{x^* \left(\alpha^2 - \frac{1}{3} \right)}{\frac{1}{3} \beta + \gamma \left(\frac{2}{3} - \alpha^2 \right)}, \quad (13)$$

where the me superscript stands for majoritarian elections equilibrium (see Appendix D).

From the equilibrium trade policy under majoritarian elections derived above, we can think of three possible cases, noting that τ^{me} is increasing in α^2 .¹²

Case 1. $\alpha^2 > \frac{1}{3}$

When group 2 has more than the average share of the factor, the equilibrium trade policy in majoritarian elections is an import tariff.

Case 2. $\alpha^2 < \frac{1}{3}$

When group 2 has less than the average share of the factor, the equilibrium trade policy in majoritarian elections is an import subsidy.

Case 3. $\alpha^2 = \frac{1}{3}$

When group 2 has the average share of the factor, the equilibrium trade policy in majoritarian elections is free trade.

Persson and Tabellini (1999) analyze what happens to these comparative politics results, if we relax the extreme assumption about perfect overlap between groups

and districts. The answer is the same as the one studied previously, provided that the middle-share group 2 is a dominant group in one of the districts. Let the population share of group i in district k be denoted by $n^{i,k}$. Then group 2 is a dominant group in one of the districts if $n^{2,k} > \frac{1}{3}$ and $n^{1,k}, n^{3,k} < \frac{1}{3}$ in some k . If the middle class dominates district 2, in this sense, electoral competition will take place only in district 2.

Proposition 2. *In a small open economy with positive rents from a production factor, if the middle-share group is dominant in one of the districts, the equilibrium trade policy under majoritarian elections depends only on its fraction of the specific factor.*

Proposition 2 can be explained as follows. While proportional elections focus on more than half the total vote in all districts, majoritarian elections concentrate electoral competition in some key marginal districts. The result is that the equilibrium trade policy depends on voters' ideological preferences and their different fraction of the specific factor among different groups under proportional elections, but the fraction of the specific factor held by key marginal district under majoritarian elections.

IV. CONCLUSION

We have considered the trade policies of the voting equilibria under different electoral rules in the small open economy which has a fixed factor of production. Rents exist in this economy because there is a factor of production that is available in fixed supply in the long run. Individuals are heterogeneous in the share of the specific factor, and rents from each individual's share of the specific factor are a part of his income.

We have found that the equilibrium trade policy under proportional elections depends on the sum of the product of each group's density and the share of the factor, and is also affected by parameters only under certain conditions in a small open economy with this setting, while that under majoritarian elections depends only on its fraction of the specific factor if the middle-share group is dominant in one of the districts under the same circumstances.

A further extension of this paper is a model that incorporates different electoral systems that are not shown in this paper. While we investigate the trade policies of the voting equilibria simply under majoritarian and proportional elections, there are many countries that have many different electoral systems. Furthermore, besides the electoral systems, there are some papers (Persson, Roland, and Tabellini 1997; 2000) that study political equilibria under the different regimes. It would be interesting to apply their theories to the determination of a trade policy

and see how the trade policies determined under these different regimes are different. Another extension of the paper is checking out whether the evidence or data, if available, support the key qualitative prediction of the model. It would be another contribution to the literature related to electoral systems and regimes.

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APPENDIX

A. Candidate A's probability of winning in proportional elections

$$\begin{aligned}
 q^A &= \text{prob} \left[\frac{1}{3} \sum_i \pi^{A,i} \geq \frac{1}{2} \right] \\
 &= \text{prob} \left[\frac{1}{3} \sum_i \left\{ s^i (W^A(\tau^A) - W^A(\tau^B) - \delta - \bar{\sigma}^i) + \frac{1}{2} \right\} \geq \frac{1}{2} \right] \\
 &= \text{prob} \left[\frac{1}{3} \sum_i \{ s^i (W^A(\tau^A) - W^A(\tau^B) - \bar{\sigma}^i) \} - \delta \frac{1}{3} \sum_i s^i + \frac{1}{2} \geq \frac{1}{2} \right] \\
 &= \text{prob} \left[\delta \leq \frac{1}{3s} \sum_i \{ s^i (W^A(\tau^A) - W^A(\tau^B) - \bar{\sigma}^i) \} \right]
 \end{aligned}$$

where $s \equiv \sum_i s^i / 3$ is the average density across groups

$$\begin{aligned}
 &= \left[\frac{1}{3s} \sum_i \{ s^i (W^A(\tau^A) - W^A(\tau^B) - \bar{\sigma}^i) \} + \frac{1}{2b} \right] b \\
 &= \frac{b}{3s} \sum_i [s^i (W^A(\tau^A) - W^A(\tau^B))] + \frac{1}{2}
 \end{aligned}$$

where $\sum_i s^i \bar{\sigma}^i = s^1 \bar{\sigma}^1 + s^2 \bar{\sigma}^2 + s^3 \bar{\sigma}^3 = 0$ by assumption

B. The equilibrium trade policy in proportional elections

$$\begin{aligned}
 \frac{\partial q^A}{\partial \tau^A} &= \frac{b}{3s} \sum_i \left[s^i \frac{\partial W^A(\tau^A)}{\partial \tau^A} \right] = 0 \\
 \sum_i \left[s^i \left\{ \tau(\alpha^i \tau - \frac{1}{3}\beta - \frac{2}{3}\tau) + \alpha^i x^* - \frac{1}{3}x^* \right\} \right] &= 0 \\
 \tau(\beta s + 2\tau s - \gamma \sum_i s^i \alpha^i) &= x^* \sum_i s^i \alpha^i - x^* s \\
 \tau^{pe} &= \frac{x^* (\sum_i s^i \alpha^i - s)}{\beta s + \gamma (2s - \sum_i s^i \alpha^i)}
 \end{aligned}$$

C. Candidate A's probability of winning in majoritarian elections

$$\begin{aligned}
 q^A &= \text{prob} \left[\pi^{A,2} \geq \frac{1}{2} \right] \\
 &= \text{prob} \left[s^2 (W^A(\tau^A) - W^A(\tau^B) - \delta - \bar{\sigma}^2) + \frac{1}{2} \geq \frac{1}{2} \right] \\
 &= \text{prob} [\delta \leq W^A(\tau^A) - W^A(\tau^B)]
 \end{aligned}$$

where $\bar{\sigma}^2 = 0$ by assumption

$$\begin{aligned} &= \left[W^2(\tau^A) - W^2(\tau^B) + \frac{1}{2b} \right] b \\ &= b \left[W^2(\tau^A) - W^2(\tau^B) \right] + \frac{1}{2} \end{aligned}$$

D. The equilibrium trade policy in majoritarian elections

$$\begin{aligned} \frac{\partial q^A}{\partial \tau^A} &= b \left[\frac{\partial W^2(\tau^A)}{\partial \tau^A} \right] = 0 \\ \tau \left(\alpha' \gamma - \frac{1}{3} \beta - \frac{2}{3} \gamma \right) + \alpha' x^* - \frac{1}{3} x^* &= 0 \\ \tau^{mor} &= \frac{x^* \left(\alpha^2 - \frac{1}{3} \right)}{\frac{1}{3} \beta + \gamma \left(\frac{2}{3} - \alpha^2 \right)} \end{aligned}$$

ENDNOTES

¹ This is labeled as pre-election politics, because all the action takes place before the elections.

² Varian (2003) describes economic rent as those payments to a factor of production that are in excess of the minimum payment necessary to have that factor supplied. One of the examples he suggests is oil. The reason why oil sells for more than its cost of production and firms don't enter this industry is the limited supply. Since there is only a certain amount of oil that is available, there are a fixed number of firms in the market though other actors may try to enter.

³ The number of firms in the industry is fixed because there is a factor of production that is available in fixed supply. In this case, the equilibrium rent in a competitive market will be whatever it takes to drive profits to zero: $p^*x^* - z(x^*) - \Pi = 0$ or $\Pi(p^*) = p^* \cdot x(p^*) - z(x(p^*))$, where z is the variable cost of producing the good and the e superscript represents the equilibrium levels. Furthermore, $\Pi'(p^*) = x(p^*) + p^* \cdot x'(p^*) - z'(x(p^*)) \cdot x'(p^*) = x(p^*) + (p^* - z'(x(p^*))) \cdot x'(p^*) = x(p^*)$ since $p^* = z'(x(p^*))$ in a competitive market. Grossman and Helpman (2005) use this kind of setup with four goods, a numeraire good and three distinct goods.

⁴ If $\tau > 0$, we call it an import tariff; if $\tau < 0$, we call it an import subsidy.

⁵ Since $\varepsilon_p^x = \frac{dx}{dp} = \frac{p}{x} \frac{dx}{dp} = \frac{p}{x}(\gamma) = \frac{\gamma p}{x^* + \gamma(p - p^*)}$, ε_p^x rises as γ increases in both $p - p^* > 0$ and $p - p^* < 0$ cases.

⁶ Since $\varepsilon_p^d = \frac{d(d)}{d(p)} = \frac{p}{d} \frac{d(d)}{d(p)} = \frac{p}{d}(-\beta) = \frac{-\beta p}{d - \beta(p - p^*)}$, $|\varepsilon_p^d|$ rises as β increases in the case of $p - p^* > 0$, and ε_p^d rises as β increases in the case of $p - p^* < 0$.

⁷ A policymaker sets τ , taking into account the market-determined value of p and some further constraints, such as a balanced government budget constraint or a resource constraint. Typically, the constraints will be binding; that is, the market outcomes depend on policy variable and parameters.

⁸ By doing so, we apply the method that Persson and Tabellini (1999) use in their paper.

$$^9 \sum_i s^i \alpha^i - 2s = \frac{(3\alpha^1 - 2)s^1 + (3\alpha^2 - 2)s^2 + (3\alpha^3 - 2)s^3}{3} > 0$$

$$^{10} \sum_i s^i \alpha^i - s = \frac{(3\alpha^1 - 1)s^1 + (3\alpha^2 - 1)s^2 + (3\alpha^3 - 1)s^3}{3} < 0$$

¹¹ When both groups' ideological biases are not large enough, we have the same analysis as the one with further assumptions or some party wins easily the election with only its large one-side ideological bias. That is not very interesting here because we are trying to compare the equilibrium trade policies in two electoral systems, considering both ideologies and economic interests.

$$^{12} \frac{\partial \tau^{mor}}{\partial \alpha^2} = \frac{\frac{1}{3}x^*(\beta + \gamma)}{\left\{\frac{1}{3}\beta + \gamma\left(\frac{2}{3} - \alpha^2\right)\right\}^2} > 0$$