

## LEGISLATIVE BARGAINING OVER TRADE POLICY

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*This paper analyzes trade policy formation in which three politicians with different preferences bargain over trade policy in a small open economy which has a fixed factor of production. I examine three cases which depend on the share of the factor of production and exogenous parameters in closed-rule one-round bargaining. Unlike the previous models in the public choice literature, this model illustrates that the preferences of the centrist party may not be strategically important. As a result, this party may not be a part of the coalition and it is possible that the extreme parties form a coalition.*

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### I. INTRODUCTION

A few previous authors have applied theories of bargaining to the determination of trade policy. Chan (1988) studies the trade negotiation outcomes in a two-country Nash-Shapley bargaining framework. Kim (2004) examines the optimal trade negotiation strategies in the trade negotiation involving multi-parties, considering bilateral and multilateral bargaining formula.

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Persson and Tabellini (2000), analyze the provision of a public good when three politicians with different partisan preferences bargain over the policy, using the Romer and Rosenthal (1978, 1979) model of agenda setting and the Baron and Ferejohn (1989) model of legislative bargaining. The main result from the latter model with closed-rule, one-round bargaining is that the location of the centrist party is strategically important so that it is a part of every coalition when an extreme party gets to make a proposal.<sup>1</sup>

In reality, it is often found that the passage of a tariff rate in the international agreement should be through Congress which consists of multiple parties with different interests. For example, three parties in Korea now have some bargaining process over tariffs in the trade agreement of some goods between Korea and the United States. This paper intends to show how two extreme parties can form a coalition in trade agreements. We consider the trade policy formation in which three politicians with different partisan preferences bargain over a trade policy 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 this factor of production.

I find that the location of the centrist party may not be strategically important in this model, unlike the related models in the public choice literature. Other models in the public choice literature use a concave that function representing policy preferences to predict that every citizen has a uniquely preferred policy. In this case, the location of the centrist party is important when one of the extreme parties is an agenda setter and its preferences matter for policy maker (see Persson and Tabellini (2000)). However, our model does not require a concave policy preference function even though it continues to predict a unique preferred policy. As a result, the centrist party does not need to be part of a coalition, which means that it is possible for only two extreme parties to form a coalition.

The organization of the paper is as follows. In the next section, I develop the model and set up a small open economy which has a fixed

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<sup>1</sup> While proposals cannot be amended in a closed rule, some other legislator can amend the initial proposal in an open rule.

factor of production. I then introduce an indirect utility of an individual in the economy. In section III; I derive the preferred policy of an individual party in the economy and investigate that the preferences of voters satisfy the single-crossing property. In section IV and its subsection, I consider trade policy formation in which three politicians with different partisan preferences bargain over trade policy. Section V conclusions.

## II. THE BASIC MODEL

Consider a small open economy populated by a large number of citizens, where the size of the population is  $n$ . These individuals consume a good and are of different types indexed by  $i$ . The good is manufactured from an industry-specific factor with constant returns to scale and inelastic supply.  $\Pi(p)$  represents the aggregate rent accruing to the specific factor used in producing the good,<sup>2</sup> and the slope of this function represents the industry supply curve

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

where  $p$  is the domestic price of the good.<sup>3</sup> The domestic price  $p$  of the good is the sum of the given international price  $p^*$  and the specific import tariff or import subsidy  $\tau$ .<sup>4</sup>

To make the arguments more clear, I use linear forms for the supply and demand functions. The supply function is given by

<sup>2</sup> 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 is available, there are fixed number of firms in the market though they try to enter.

<sup>3</sup> 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 competitive market will be whatever it takes to drive profits to zero;  $p^e x^e - z(x^e) - \Pi = 0$  or  $\Pi(p^e) = p^e \cdot x(p^e) - z(x(p^e))$ , where  $z$  is the variable cost of producing the good and the  $e$  superscript represents the equilibrium levels. Furthermore,  $\Pi'(p^e) = x(p^e) + p^e \cdot x'(p^e) - z'(x(p^e)) \cdot x'(p^e) = x(p^e) + (p^e - z'(x(p^e))) \cdot x'(p^e) = x(p^e)$  since  $p^e = z'(x(p^e))$  in a competitive market. Grossman and Helpman (2005) use this kind of setup with four goods, a numeraire good and three other goods.

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

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

where  $x^*$  is the quantity of the good produced at the free-trade price and  $\gamma$  is a non-negative weight attached to trade policy  $\tau$ ,<sup>5</sup> which 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 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  $\beta$  is a non-negative weight attached to trade policy  $\tau$ ,<sup>6</sup> which 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 import tariff, the smaller the domestic quantity of the good consumed and vice versa.

Let individual  $i$  own a fraction of the factor of production denoted by  $\alpha^i$ . I assume that everyone has the same demand function. So that each individual has an indirect utility function

$$W^i = I^i + \frac{CS(p)}{n} = \alpha^i \Pi(p) + \frac{\tau \cdot m(p)}{n} + \frac{CS(p)}{n}, \quad (4)$$

where  $I^i$  is individual  $i$ 's income of rents and transfers,  $CS(p)$  is

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

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

total consumer surplus from consumption of the good, and  $m(p) = d(p) - x(p)$  is the quantity imported.<sup>7,8</sup> Note that  $-CS'(p) = d(p)$  represents the demand for the good. We assume that  $\alpha^i$  is distributed in the population according to a cumulative distribution function  $F(\cdot)$ . The expected value of  $\alpha^i$  is denoted by  $\bar{\alpha}$ . Finally, the median value of  $\alpha^i$ , denoted by  $\alpha^m$ , is implicitly defined by  $F(\alpha^m) = \frac{1}{2}$ .

### III. INDIVIDUAL'S PREFERRED POLICY AND SINGLE-CROSSING PROPERTY

In this section, we compute individual  $i$ 's preferred policy and verify that the preferences of voters satisfy the single-crossing property. This will be useful in the next section in which we analyze the equilibrium trade policy in the legislative bargaining.

Individual  $i$  maximizes his indirect utility;

$$\max_{\tau} W^i = \alpha^i \Pi(p^* + \tau) + \frac{\tau \cdot m(p^* + \tau)}{n} + \frac{CS(p^* + \tau)}{n} \quad (5)$$

Using expression (5), it is straightforward to obtain the first order condition (see Appendix A);

$$\tau^i = \frac{\left(\alpha^i - \frac{1}{n}\right)x^*}{\frac{\beta}{n} + \left(\frac{2}{n} - \alpha^i\right)\gamma}. \quad (6)$$

<sup>7</sup> A policymaker sets  $\tau$ , 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.

<sup>8</sup> Of course, we can also think about more general mechanism that differences in income level among consumers affect each individual's demand and thus each consumer has different consumer surplus. However, we here implicitly assume that income effect on demand curve is so small that we can ignore for our analysis of possibility that only extreme parties form a coalition.

Notice that each individual  $i$  has his bliss point when his demand responds to the change in  $\tau$  sufficiently large that  $\beta > 2(\alpha^i n - 1)\gamma$ . Since  $W(\tau; \alpha^i)$  has a quadratic form, that condition ensures that individual  $i$  has the maximum at his bliss point. If  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $\forall \alpha^i$ , we can find two interesting properties from this bliss point of individual  $i$ . First, individual  $i$  who has a bigger share of the factor of production prefers more protection because  $\tau(\alpha^i)$  is increasing in  $\alpha^i$ .<sup>9</sup> Second, the sign of  $\tau^i$  depends on the size of  $\alpha^i$ . On one hand, if  $\alpha^i > \frac{1}{n}$ ,  $\tau^i$  is positive, which means that individual  $i$  who has the share of the factor of production greater than  $\frac{1}{n}$  likes an import tariff. On the other hand, if  $\alpha^i < \frac{1}{n}$ ,  $\tau^i$  is negative, which means that individual  $i$  who has the share of the factor of production less than  $\frac{1}{n}$  likes an import subsidy. If, individual  $i$  has a share of the factor of production equal to  $\frac{1}{n}$ , then he prefers free trade.

Next, we investigate whether the preferences of voters satisfy the single-crossing property, which is also called Gans-Smart (1996) condition. The policy preferences are said to satisfy the single crossing property for voter  $i$  when the following statement is true: if  $\tau > \tau'$  and  $\alpha'' > \alpha^i$ , or  $\tau < \tau'$  and  $\alpha'' < \alpha^i$ , then  $W(\tau; \alpha^i) \geq W(\tau'; \alpha^i) \Rightarrow W(\tau; \alpha'') \geq W(\tau'; \alpha'')$ . Some calculations about whether this property is satisfied are in Appendix B. The result shows that the indirect utility function of individual  $i$  satisfy the statement above when  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $\forall \alpha^i$  or  $\beta < 2(\alpha^i n - 1)\gamma$ ,  $\forall \alpha^i$ .

**Lemma 1.** *The preferences of voters in a small open economy in this model satisfy the single-crossing property when  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $\forall \alpha^i$  or  $\beta < 2(\alpha^i n - 1)\gamma$ ,  $\forall \alpha^i$ .*

$${}^9 \frac{\partial \tau^i}{\partial \alpha^i} = \frac{x^* \left( \frac{\beta}{n} + \frac{2\gamma}{n} - \alpha^i \gamma \right) + \left( \alpha^i x^* - \frac{x^*}{n} \right) \gamma}{\left( \frac{\beta}{n} + \frac{2\gamma}{n} - \alpha^i \gamma \right)^2} = \frac{\frac{\beta}{n} x^* + \frac{\gamma}{n} x^*}{\left( \frac{\beta}{n} + \frac{2\gamma}{n} - \alpha^i \gamma \right)^2} > 0$$

Lemma 1 is useful to analyze a case that has this property. If the preferences of voters satisfy the single-crossing property, the median-voter theorem holds. Therefore, it is relatively easy to find equilibria. In particular, we will see a case that uses this property in section IV.1.

#### IV. LEGISLATIVE BARGAINING

In this section, we consider trade policy formation in which several politicians with different partisan preferences bargain over trade policy. I model a legislature that consists of three distinct partisan politicians,  $J = L, M, H$ , representing the low, the middle, and the high share of the factor of production, respectively. Each politician's share of the factor of production has the ranking:  $\alpha^L < \alpha^M < \alpha^H$ . I make the following assumption.

**Assumption 1.**  $\alpha^L < \frac{1}{n}$ .

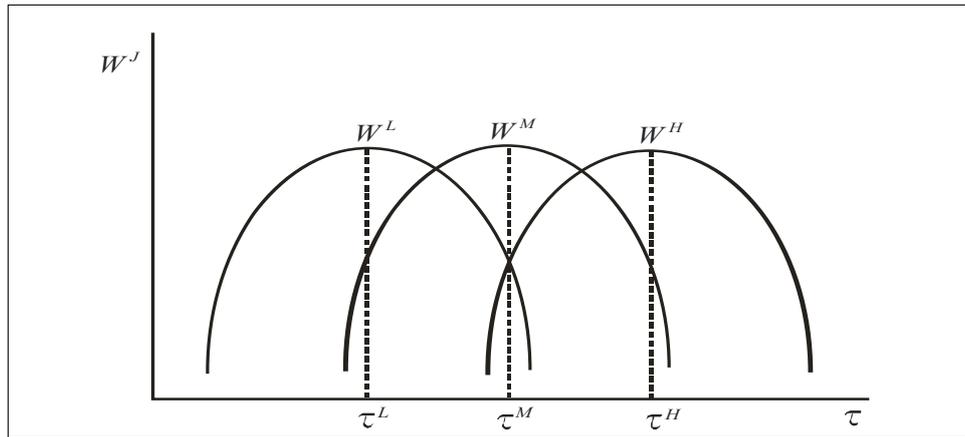
Since we assume that politician  $L$  is a representative of citizens with a low share of the factor of production, it seems reasonable that he has the share of the factor of production less than the mean.

Since the indirect utility function of individual  $i$  has a quadratic form, whether he has a maximum or minimum utility at his bliss point depends on the sign of  $\left(\frac{1}{n} - \alpha^i\right)\gamma + \frac{\beta}{2n}$ .<sup>10</sup> We denote  $\tau^J$  ( $\tau^{(J)}$ ),  $J = L, M, H$ , as a trade policy level when he has a maximum (minimum) utility there. We now can think of three possible cases, (i)  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $\forall \alpha^i$ :  $\tau^L < \tau^M < \tau^H$ , (ii)  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $i = L, M$  and  $\beta < 2(\alpha^i n - 1)\gamma$ ,  $i = H$ :  $\tau^L < \tau^M < \tau^{(H)}$ , and (iii)  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $i = L$  and  $\beta < 2(\alpha^i n - 1)\gamma$ ,  $i = M, H$ :  $\tau^L < \tau^{(M)} < \tau^{(H)}$ , which describe some (or all) Who have maximum utility at their  $\tau^J$  and some (or none) Who

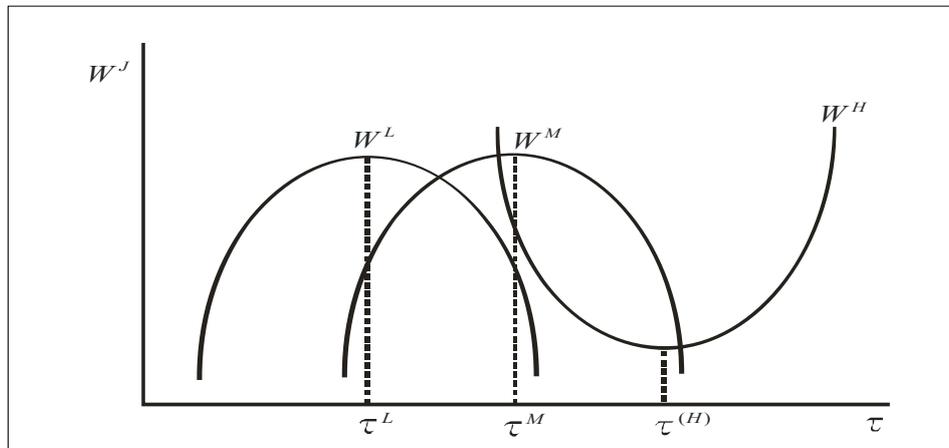
<sup>10</sup> See Appendix B:  $W(\tau, \alpha^i) = -\tau^2 \left\{ \left( \frac{1}{n} - \alpha^i \right) \gamma + \frac{\beta}{2n} \right\} - \tau \left\{ \left( \frac{1}{n} - \alpha^i \right) x^* - \alpha^i \gamma (p^* - c) \right\} + \alpha^i p^* x^* - \alpha^i c x^* + \frac{(d^*)^2}{2\beta n}$

have minimum utility at their  $\tau^{(j)}$ . Figure 1, 2, and 3 illustrate cases above, respectively.<sup>11</sup>

**[Figure 1]** Indirect utilities of politicians when  $\beta > 2(\alpha^i n - 1)\gamma, \forall \alpha^i$

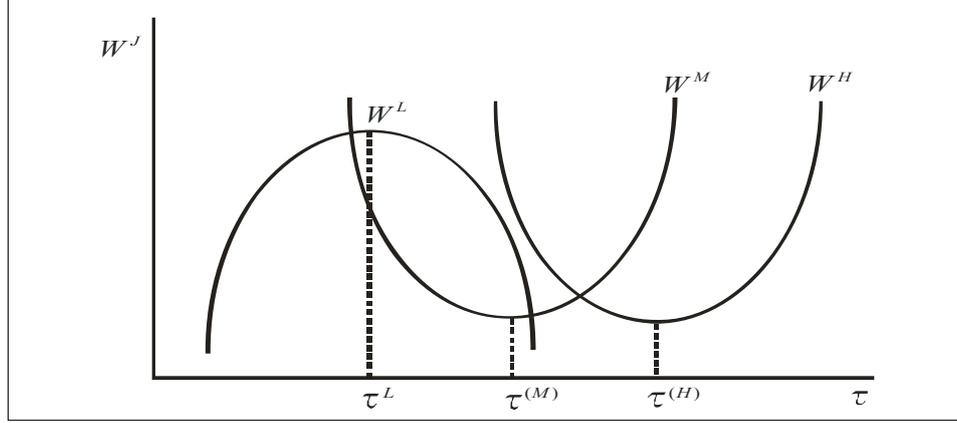


**[Figure 2]** Indirect utilities of politicians when  $\beta > 2(\alpha^i n - 1)\gamma, i = L, M$  and  $\beta < 2(\alpha^i n - 1)\gamma, i = H$



<sup>11</sup> To understand the shape of the indirect utility function, we differentiate its three parts, respectively:  $\frac{\partial(\alpha^i \Pi)}{\partial \tau} = \alpha^i 2\gamma\tau + \alpha^i x^* + \alpha^i \gamma p^* - \alpha^i \gamma c$ ,  $\frac{\partial\left(\frac{1}{n} \tau m\right)}{\partial \tau} = \frac{d^*}{n} - \frac{x^*}{n} - \frac{2(\beta + \gamma)}{n} \tau$ ,  $\frac{\partial\left(\frac{1}{n} CS\right)}{\partial \tau} = \frac{\beta}{n} \tau - \frac{d^*}{n}$ . If  $\alpha^i$  is greater than  $\frac{\beta}{n(2\gamma + 1)}$ , the change in individual  $i$ 's income of rents is sufficiently large so that the indirect utility function decreases from the period of  $\tau < 0$  to  $\tau^{(j)}$  and increases after  $\tau^{(j)}$ . In this case, it is a U-shaped function.

**[Figure 3]** Indirect utilities of politicians when  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $i = L$  and  $\beta < 2(\alpha^i n - 1)\gamma$ ,  $i = M, H$



We now consider the limit of an import tariff and an import subsidy. In this regard, I restrict the maximum level of an import tariff and the maximum level of an import subsidy. The maximum level of an import subsidy becomes the level that makes the domestic price zero and thus  $\tau^{cm} = -p^*$ , where the *cm* stands for complete import level of an import subsidy. The maximum level of an import tariff means that the quantity imported is zero and thus the domestic demand is satisfied with only the domestic supply.  $\tau^{ph} = \frac{d^* - x^*}{\beta + \gamma}$  is calculated from  $d(p) = x(p)$  ( $m(p) = 0$ ), where the *ph* denotes the prohibitive level of an import tariff.

What are the sizes of  $\tau^L$  (or  $\tau^{(L)}$ ) and  $\tau^H$  (or  $\tau^{(H)}$ )? I now make some assumptions to analyze this question.

**Assumption 2.**  $(\beta + 2\gamma)p^* - x^* > 0$ .

This assumption ensures that  $\tau^L$  (or  $\tau^{(L)}$ ) is always located in the right side of  $\tau^{cm}$ . Even though we assume that politician *L* has zero in the share of the factor,  $\alpha^L = 0$ ,  $\tau^L$  (or  $\tau^{(L)}$ ) is greater than  $\tau^{cm}$ .<sup>12</sup> Next, I

<sup>12</sup> If  $\alpha^L = 0$ ,  $\tau^L$  (or  $\tau^{(L)}$ ) -  $\tau^{cm} = \frac{(\beta + 2\gamma)p^* - x^*}{\beta + 2\gamma} > 0$  by assumption 2.

make the following assumption to compare  $\tau^H$  (or  $\tau^{(H)}$ ) with  $\tau^{ph}$ .

**Assumption 3.**  $n$  is sufficiently large so that  $\beta + 2\gamma - n\gamma < 0$ .

Since the economy is populated by a large number of citizens, the conditions above seem reasonable. If so,  $\tau^H$  (or  $\tau^{(H)}$ ) is always greater than  $\tau^{ph}$ . Although politician  $H$  has all the share of the factor,  $\alpha^H = 1$ ,  $\tau^{ph}$  is always located at the right side of  $\tau^H$  (or  $\tau^{(H)}$ ).<sup>13</sup>

### 1. One-Round Bargaining

I consider the simplest possible closed-rule bargaining over policy.<sup>14</sup> The sequence of events is as follows: (1) One of the three parties is appointed agenda setter, labeled  $a$ . (2) The agenda-setting party  $a$  makes a policy proposal,  $\tau_a$ . (3) The legislature votes on the proposal; if at least two parties are in favor,  $\tau = \tau_a$ , otherwise a default policy,  $\tau = \bar{\tau}$ , is implemented. The default policy  $\bar{\tau}$  will be a key determinant of the equilibrium. I think of  $\bar{\tau}$  as “the status quo”.

We first consider the case (i)  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $\forall \alpha^i: \tau^L < \tau^M < \tau^H$ . The outcome of this game depends on which party has the right to make the proposal. We first assume that, at stage (1), the centrist party gets to make the proposal:  $a = M$ . Then the result is simple, namely party  $M$  proposes its own preferred policy at stage (2), which is accepted at stage (3):  $\tau = \tau_M = \tau^M$ . This is, of course, nothing but an application of the median-voter theorem.<sup>15</sup> Policy  $\tau^M$  is a Condorcet winner in the legislature, so at least one other party prefers  $\tau^M$  to  $\bar{\tau}$ . Generally, at stage (3) a party always votes yes to a proposal that gives a payoff at least

<sup>13</sup> If  $\alpha^H = 1$ ,  $\tau^{ph} - \tau^H$  (or  $\tau^{(H)}$ ) =  $\frac{(\beta + 2\gamma - n\gamma)d^* - (\beta n + \gamma)x^*}{(\beta + \gamma)(\beta + 2\gamma - n\gamma)} > 0$  by assumption 3.

<sup>14</sup> Under a closed rule the motion is voted on immediately against the status quo; and if it is approved, the legislative adjourns. If the motion fails, the status quo prevails with the benefits remaining unallocated. Under an open rule amendments can be offered to the motion on the floor, where an amendment is in the nature of a substitute.

<sup>15</sup> If the preferences of voters in the set of voter types,  $V$  satisfy the single-crossing property, a Condorcet winner always exists and coincides with the bliss point of the voter with the median value of  $\alpha^i$ . A Condorcet winner is a policy  $\tau^*$  that beats any other feasible policy in a pairwise vote.

as high as the default policy.

I now assume instead that one of the extreme parties gets to make the proposal, say the left party:  $a = L$ . We observe first that  $L$  actively seeks the support only of party  $M$ . Seeking support from other parties involves departing further from party  $L$ 's bliss point, and two votes are enough to implement policy. It follows that party  $L$  seeks only a minimum winning coalition with the centrist party, the party with a bliss point closest to its own. To characterize the solution, define  $\tilde{\tau}^M$ , the default equivalent policy for  $M$ , as the policy leaving  $M$  indifferent between  $\tilde{\tau}^M$  and the status quo:

$$W^M(\tilde{\tau}^M) = W^M(\bar{\tau}). \quad (7)$$

The equilibrium proposal is then

$$\tau_L = \begin{cases} \tau^L & \text{if } \tau^{cm} \leq \bar{\tau} \leq \tau^L \\ \bar{\tau} & \text{if } \tau^L < \bar{\tau} \leq \tau^M \\ \text{Max}(\tilde{\tau}^M, \tau^L) & \text{if } \tau^M < \bar{\tau} \leq \tau^{ph} \end{cases} \quad (8)$$

The reason why this outcome results out is as follows. First of all,  $L$  would never vote for an import tariff or an import subsidy above its own bliss point, for which it gets unanimous support when  $\tau^{cm} \leq \bar{\tau} \leq \tau^L$ . This explains the first row in (8). When seeking support from  $M$ ,  $L$  is never obliged to bring  $\tau$  above  $\tau^M$ . If  $\tau^L < \bar{\tau} \leq \tau^M$ ,  $M$  finds it optimal to vote no to any  $\tau < \bar{\tau}$ , and thus  $L$  optimally proposes  $\bar{\tau}$ . This explains the second row. Finally, if  $\tau^M < \bar{\tau} \leq \tau^{ph}$ ,  $L$  proposes the default equivalent policy  $\tilde{\tau}^M$  when  $\tau^L < \tilde{\tau}^M < \tau^M$  or he proposes  $\tau^L$  when  $\tau^L \geq \tilde{\tau}^M \geq \tau^{cm}$ .

Finally, we assume that the right-side party gets to make the proposal:  $a = H$ . We follow the same steps suggested above.  $H$  actively seeks the support only of party  $M$  because seeking support from other parties involves departing further from party  $H$ 's bliss point, and two votes are enough to implement policy. The equilibrium proposal is then

$$\tau_H = \begin{cases} \tau^H & \text{if } \tau^H \leq \bar{\tau} \leq \tau^{ph} \\ \bar{\tau} & \text{if } \tau^M \leq \bar{\tau} < \tau^H \\ \text{Min}(\tilde{\tau}^M, \tau^H) & \text{if } \tau^{cm} \leq \bar{\tau} < \tau^M \end{cases} \quad (9)$$

The reason why this outcome results is as follows. First of all,  $H$  would never vote for an import tariff or an import subsidy below its bliss point, for which it gets unanimous support when  $\tau^H \leq \bar{\tau} \leq \tau^{ph}$ . This explains the first row in (9). When seeking support from  $M$ ,  $H$  is never obliged to bring  $\tau$  below  $\tau^M$ . If  $\tau^M \leq \bar{\tau} < \tau^H$ ,  $M$  finds it optimal to vote no to any  $\tau > \bar{\tau}$ , and thus  $H$  optimally proposes  $\bar{\tau}$ . This explains the second row. Finally, if  $\tau^{cm} \leq \bar{\tau} < \tau^M$ ,  $H$  proposes the default equivalent policy  $\tilde{\tau}^M$  when  $\tau^M < \tilde{\tau}^M < \tau^H$  or he proposes  $\tau^H$  when  $\tau^H \leq \tilde{\tau}^M \leq \tau^{ph}$ . Figure 1 illustrates this case.

**Proposition 1.** *In case of  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $\forall \alpha^i$ , in closed-rule one-round bargaining, if the centrist party  $M$  is the agenda setter,  $\tau^M$  is a Condorcet winner. If  $L$  ( $H$ ) is the agenda setter, the equilibrium proposal can be  $\tau^L$  ( $\tau^H$ ) or the default equivalent policy  $\tilde{\tau}^M$ , depending on the location of default policy  $\bar{\tau}$ .*

Proposition 1 can be explained as follows. Even though the outcome depends on which party has the right to make the proposal, party  $M$  is always a part of coalition in case of  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $\forall \alpha^i$ . Therefore, when party  $L$  or  $H$  is a agenda setter, it should make a proposal, considering the preference of party  $M$ .

Next, we consider the cases (ii)  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $i = L, M$  and  $\beta < 2(\alpha^i n - 1)\gamma$ ,  $i = H$ :  $\tau^L < \tau^M < \tau^{(H)}$  and (iii)  $\beta > 2(\alpha^i n - 1)\gamma$ ,  $i = L$  and  $\beta < 2(\alpha^i n - 1)\gamma$ ,  $i = M, H$ :  $\tau^L < \tau^{(M)} < \tau^{(H)}$ . In these cases, the outcome of the game also depends on which party has the right to make the proposal and how many possible coalitions come up in the equilibrium proposals. However, the important difference from case (i) is that there is the possibility that  $H$  ( $L$ ) is only coalition partner for agenda setter  $L$  ( $H$ ) in the equilibrium proposals. In case (i), when politician  $L$  or  $H$  is a agenda setter, he seeks only a minimum

winning coalition with the centrist party  $M$ , the party with a bliss point closest to its own. However, politician  $L$  or  $H$  doesn't have to seek a minimum winning coalition with centrist party  $M$  in cases (ii) and (iii). We look at some equilibrium proposals to see this point. First, when politician  $L$  is a agenda setter in case (ii) with  $\tau^L < \bar{\tau} \leq \tau^M$ , he proposes his bliss point  $\tau^L$ , since  $\tau^L$  gives a higher utility to politician  $L$  and  $H$ , but not to  $M$ . Thus, the only minimum winning coalition partner for agenda setter  $L$  is politician  $H$ . Second, when politician  $H$  is a agenda setter in case (ii) with  $\tau^{(H)} \leq \bar{\tau} \leq \tau^{ph}$ ,  $W^H(\tau^L) > W^H(\tau^{ph})$ , and  $W^M(\bar{\tau}) > W^M(\tau^L)$ , he proposes politician  $L$ 's bliss point  $\tau^L$ , since  $\tau^L$  gives a higher utility to politician  $H$  and  $L$ , but not to  $M$ . Thus, the only minimum winning coalition partner for agenda setter  $H$  is politician  $L$ . Third, when politician  $L$  is a agenda setter in case (iii) with  $\tau^{(H)} \leq \bar{\tau} \leq \tau^{ph}$ ,  $W^H(\tau^L) > W^H(\tau^{ph})$ , and  $W^M(\bar{\tau}) > W^M(\tau^L)$ , he proposes his bliss point  $\tau^L$ , since  $\tau^L$  gives a higher utility to politician  $L$  and  $H$ , but not to  $M$ . Thus, the only minimum winning coalition partner for agenda setter  $L$  is politician  $H$ . Fourth, when politician  $H$  is a agenda setter in case (iii) with  $\tau^{(M)} \leq \bar{\tau} < \tau^{(H)}$ ,  $W^H(\tau^{cm}) > W^H(\tau^{ph})$ ,  $W^M(\bar{\tau}) > W^M(\tau^{cm})$ , and  $W^L(\tau^{cm}) > W^L(\bar{\tau})$ , he proposes  $\tau^{cm}$ , since  $\tau^{cm}$  gives a higher utility to politician  $H$  and  $L$ , but not to  $M$ . Thus, the only minimum winning coalition partner for agenda setter  $H$  is politician  $L$ .

**Proposition 2.** *In cases of  $\beta < 2(\alpha^i n - 1)\gamma$  for some  $i$  in closed-rule one-round bargaining, there is the possibility that  $H(L)$  is the only coalition partner for agenda setter  $L(H)$  in the equilibrium proposals.*

Proposition 2 can be explained as follows. In cases of  $\beta < 2(\alpha^i n - 1)\gamma$  for some  $i$ , at least one party among party  $M$  and  $H$  has different preferences. Unlike the case that all three parties have same preferences, it is possible that two extreme parties form a coalition in these cases.

In previous models in the public choice literature, the location of party  $M$  is strategically important because the function of policy preferences for voter  $i$  is concave in policy and thus every voter has a unique preferred policy. This prediction is qualitatively similar as the first case in

our model.<sup>16</sup> As a result, this party is a part of every coalition and its preferences carry a lot of weight in the solution. However, since our model includes cases in which the policy preferences function is not concave, it is possible for only two extreme parties to form a coalition in the equilibrium proposals. Figure 2 and 3 illustrate these cases.

## V. CONCLUSION

I have considered trade policy formation in which three politicians with different preferences bargain over trade policy in a small open economy which has a fixed factor of production. Rents exist in this economy because the factor of production has a fixed supply. Individuals have different endowments of the factor of production and rents from each individual's share of the factor are a part of his income.

I have found that the preferences of voters satisfy the single-crossing property and thus the median-voter theorem holds. This result is used when the centrist party is an agenda setter. I have also shown that the policy preference function does not need to be concave. Therefore, the centrist party may not be a part of coalition in closed-rule, one-round bargaining. This result is different from previous models.

An extension of this paper is a model that incorporates multi-round bargaining, which could show how the rules for continued bargaining after a rejected proposal influence the incentives in the first round. Another extension of the paper is a model that allows an open rule in legislative bargaining.<sup>17</sup> A final extension would be to test the predictions

<sup>16</sup> For example, in a simple model of public finance, policy preferences of citizen  $i$  is given as  $W^i(g) = (y-g)\frac{y^i}{y} + H(g)$ , where  $g$  is publicly provided good,  $y^i$  individual  $i$ 's income,  $y$  average income, and  $H(\cdot)$  a concave and increasing function. These preferences are concave in policy, implying that every citizen has a uniquely preferred policy. In this model related to legislative bargaining with three politicians, the politicians' policy preferences are given by  $W^j(g)$ , with associated bliss points  $g^j = H_g^{-1}\left(\frac{y^j}{y}\right)$ , such that  $g^L > g^M > g^R$ .

<sup>17</sup> In an open rule, some other legislator can amend the initial proposal and the amendment right allows the amender to tilt the proposal in his own favor, despite of the cost of legislative delay. Baron and Ferejohn (1989) and Baron (1993) demonstrate that equilibrium policy generally entails more equally distributed benefits under open rule than under closed rule and that in an open rule may, in some cases, come close to implementing the efficient solution even though the precise

of the model using data.

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results depend on the details of the amendment procedure.

## APPENDIX

### A. An individual $i$ 's bliss point

$$\max_{\tau} W^i = \alpha^i \Pi(p^* + \tau) + \frac{\tau \cdot m(p^* + \tau)}{n} + \frac{CS(p^* + \tau)}{n}$$

$$\text{F.O.C.: } \alpha^i \Pi'(p) + \frac{1}{n} m(p) + \frac{1}{n} \tau \cdot m'(p) + \frac{1}{n} CS'(p) = 0$$

$$\alpha^i x(p) + \frac{1}{n} [d^* - x^* - (\beta + \gamma)\tau + \{-(\beta + \gamma)\} \tau - d^* + \beta\tau] = 0$$

where  $CS'(p) = -d(p) = -d^* + \beta\tau$  and

$$m(p) = d(p) - x(p) = d^* - x^* - (\beta + \gamma)p + (\beta + \gamma)p^* = d^* - x^* - (\beta + \gamma)\tau$$

$$\alpha^i (x^* + \gamma\tau) + \frac{1}{n} [-\beta\tau - 2\gamma\tau - x^*] = 0$$

$$\tau \left( \frac{\beta}{n} + \frac{2\gamma}{n} - \alpha^i \gamma \right) = \alpha^i x^* - \frac{1}{n} x^*$$

$$\tau^i = \frac{\left( \alpha^i - \frac{1}{n} \right) x^*}{\frac{\beta}{n} + \left( \frac{2}{n} - \alpha^i \right) \gamma}$$

### B. Single crossing property

$$\begin{aligned} W(\tau; \alpha^i) &= \alpha^i \Pi(p^* + \tau) + \frac{1}{n} \tau \cdot m(p^* + \tau) + \frac{1}{n} CS(p^* + \tau) \\ &= \alpha^i (p^* + \tau - c)(x^* + \gamma\tau) + \frac{1}{n} \{ \tau d^* - \tau x^* - (\beta + \gamma)\tau^2 \} \\ &\quad + \frac{1}{2n} \left( \frac{d^*}{\beta} - \tau \right) (d^* - \beta\tau) \end{aligned}$$

where  $c$  is the constant marginal cost of producing the good and

$$CS(p) = \frac{1}{2} \left( \frac{d^*}{\beta} + p^* - p \right) (d^* - \beta\tau) = \frac{1}{2} \left( \frac{d^*}{\beta} - \tau \right) (d^* - \beta\tau)$$

$$\begin{aligned}
&= \alpha^i p^* x^* + \alpha^i p^* \gamma \tau + \alpha^i x^* \tau + \alpha^i \gamma \tau^2 - \alpha^i c x^* - \alpha^i c \gamma \tau + \frac{d^*}{n} \tau \\
&\quad - \frac{x^*}{n} \tau - \frac{(\beta + \gamma)}{n} \tau^2 + \frac{(d^*)^2}{2n\beta} - \frac{d^*}{2n} \tau - \frac{d^*}{2n} \tau + \frac{\beta}{2n} \tau^2 \\
&= \tau^2 \left( \alpha^i \gamma - \frac{\beta}{n} - \frac{\gamma}{n} + \frac{\beta}{2n} \right) + \tau \left( \alpha^i p^* \gamma + \alpha^i x^* - \alpha^i c \gamma + \frac{d^*}{n} - \frac{x^*}{n} - \frac{d^*}{n} \right) \\
&\quad + \alpha^i p^* x^* - \alpha^i c x^* + \frac{(d^*)^2}{2\beta n} \\
&= -\tau^2 \left\{ \left( \frac{1}{n} - \alpha^i \right) \gamma + \frac{\beta}{2n} \right\} - \tau \left\{ \left( \frac{1}{n} - \alpha^i \right) x^* - \alpha^i \gamma (p^* - c) \right\} + \alpha^i p^* x^* \\
&\quad - \alpha^i c x^* + \frac{(d^*)^2}{2\beta n}
\end{aligned}$$

(Case 1)  $\frac{1}{n} > \alpha^i$

If  $\tau < \tau'$  and  $\alpha^{i'} < \alpha^i$ ,  $W(\tau; \alpha^i) \geq W(\tau'; \alpha^i)$  implies

$$\left| (\tau' + \tau) \left\{ \left( \frac{1}{n} - \alpha^i \right) \gamma + \frac{\beta}{2n} \right\} \right| \geq \left| \left\{ \left( \frac{1}{n} - \alpha^i \right) x^* - \alpha^i \gamma (p^* - c) \right\} \right|, \text{ which also}$$

satisfy

$$W(\tau; \alpha^{i'}) \geq W(\tau'; \alpha^{i'}).$$

(Case 2)  $\frac{1}{n} < \alpha^i$

If  $\tau < \tau'$  and  $\alpha^{i'} < \alpha^i$ ,  $W(\tau; \alpha^i) \geq W(\tau'; \alpha^i)$  implies  $\left| \frac{\beta}{2n} \right| > \left| \left( \frac{1}{n} - \alpha^i \right) \gamma \right|$

and  $\left| (\tau' + \tau) \left\{ \left( \frac{1}{n} - \alpha^i \right) \gamma + \frac{\beta}{2n} \right\} \right| \geq \left| \left\{ \left( \frac{1}{n} - \alpha^i \right) x^* - \alpha^i \gamma (p^* - c) \right\} \right|$ , which

also satisfy

$$W(\tau; \alpha^{i'}) \geq W(\tau'; \alpha^{i'}).$$

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