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Political Asymmetry and Common External Tariffs in a Customs Union*

By

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Abstract

This paper examines the effect of political asymmetries in the formation of common external tariffs (CETs) in a customs union (CU). We do so by introducing cross-border lobbying and by endogenizing tariff formation in a political economic model for the determination of CETs. The latter allows us to consider asymmetries among the member nations in their susceptibilities to lobbying. We also consider asymmetries in the influence of the member nations in the CU-wide decisionmaking. A central finding of this paper is that the CET rises monotonically with the degree of asymmetry in country influences if the two countries are equally susceptible to lobbying. If influences are the same, the CET also rises monotonically with degree of asymmetry in susceptibilities. These results hold irrespective of whether the lobby groups in the two member countries work cooperatively or noncooperatively.

Keywords: Asymmetry, Customs union, Common external tariff, Politics.
JEL Classification: F13

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1 Introduction

The importance of lobbying in economic policymaking in general cannot be overstated. There are many alternative approaches in modeling such lobbying activities – see Rodrik (1995) for a survey – including the directly unproductive rent-seeking activities (DUPs) approach (Bhagwati, 1982), the tariff-formation function approach (Findlay and Wellisz, 1982), the political support function approach (Hillman, 1982), median voter approach (Mayer, 1984), the campaign contribution approach (Magee et al., 1989), and the political contributions approach (Grossman and Helpman, 1994).

In particular, the role of lobbying in formulating, and forming, a preferential trading area (PTA) and a customs union (CU) has been analyzed extensively.[1,2] Different researchers have used various approaches to model political economy. For example, Cadot et al. (1999) present a political economy model following the Grossman and Helpman (1994) approach. On the other hand, Panagariya and Findlay (1996), Richardson (1994) and Bandyopadhyay and Wall (1999), among others, follow the DUP approach, which also incorporates the tariff-formation approach of Findlay and Wellisz (1982) that assumes an exogenously specified tariff generating function. The first goal of our paper is to generalize the DUP approach by endogenizing tariff formation.

Analyzing lobbying introduces additional interesting issues when economic polices are made by a group of governments. One such example is the determination of common external tariffs (CETs) in a CU, which is decided by all the members of the CU together and applies

[1]There has been a proliferation of preferential trading agreements world wide. Prominent among them are the NAFTA and the EU. In the former arrangement, member nations trade freely among themselves, but set tariffs on non-members independently. This is an example of a FTA. On the other hand, the European Union (EU) is organized along the lines of a Customs Union (CU), where, in addition to intra-bloc free trade, the members set a common tariff on non-members (i.e., the common external tariff - CET). The CET is determined jointly by the member nations, with different members having different levels of influence on the decision making.

[2]The literature on the economics of CU and FTA is not new (see, for example, Viner, 1950). There has been a renewed interest in the subject (see, for example, Riezman, 1979; Krishna, 1998; Bond et al., 2004, Raimondos-Møller and Woodland, 2006; Abrego at al., 2006).

to all individual member nations. Some are concerned that the process of determination of CETs may lead to more inefficiencies by encouraging cooperation among country-specific lobby groups that may also become international in scope and engage in cross-border lobbying (see, for example, Schiff and Winters, 2003).[3] In fact, cross-border lobbying has become widespread, particularly in the EU. Organizations such as Eurocommerce, EuroBio (European Association for Bio-industries), and Friends of Europe are extremely active in EU-wide lobbying. Bandyopadhyay and Wall (1999) present a model of cross-border lobbying of the DUP type to compare FTA and CU tariffs. In their model, tariff formation is exogenous, as mentioned above. The second goal of our paper is to introduce cross-border lobbying for the determination of CETs in a CU, alongside endogenous tariff formation.

The third and final goal of our paper is to consider the effect of political asymmetries on CETs. We find different treatment of asymmetries in the literature: Saggi (2006) examines the effect of cost asymmetries among FTA and CU member nations; Bandyopadhyay and Wall (1999) examine how asymmetries in the influence that member countries have in CU decisionmaking affect the differences between FTA and CU tariffs. In this paper, we consider not only asymmetries in the influence of the member countries on CU decisionmaking on CET, but also the effect of asymmetries in the susceptibility of each member nation's government to cross-border and within-border lobbying on CET. The latter type of asymmetry is possible to consider here because of the endogenization of tariff formation. We consider two scenarios. First, we assume that the lobby groups in the two member countries act cooperatively and lobby jointly. Second, we assume that the lobby groups act noncooperatively and lobby individually.

The next section sets up the basic framework under cooperation between the lobby

[3] Cross-border lobbying is not uncommon even outside CUs. A recent contribution by Gawande et al. (2006) finds that foreign lobbies play an empirically significant role in the determination of U.S. tariffs. Allowing for cross-border lobbying, Grossman and Helpman (1995, Appendix) find that FTAs may be more difficult to implement, because now a lobby can block the agreement not only by lobbying its own government but also by approaching the other member governments as well.

groups. Sections 3 then examines the effect of political asymmetries on the CET. In section 4, we reexamine the issues when the lobby groups act noncooperatively. Some concluding remarks are made in section 5.

2 The Theoretical Framework

For simplicity, we consider a CU with two members, labeled A and B. The rest of the world is labeled C. There is one good — we shall call this good "CU-importable" — that is imported from C by A and B and subject to a CET t, which is decided by the CU jointly. This decision is influenced by lobbying from the producers of this good in A and B. Given the prevalence of cross-border lobbying, as mentioned in the introduction, we first assume that the producers in the two countries cooperate with each other and lobby governments in both A and B jointly. In section 4, we relax this assumption and consider noncooperative lobbying.

We assume lobbying is of the DUP type. Domestic producers of the CU-importable in country i spend a total amount of h_i (in units of some scarce resources) on lobbying both governments. Since this lobbying is socially unproductive, it entails a social welfare loss of the amount h_i in country i ($i = A, B$). Consumers' surplus, domestic profits plus tariff revenue, in country i is affected by the level of CET t; we denote it by $S_i(t)$ with $S_i'' < 0$. We assume that country i's government cares about not only social welfare, given by $S_i(t) - h_i$, but also the net total income of the lobby group.

Net profits of producers from countries A and B are given by

$$\pi_i(t) - h_i, \quad i = A, B, \tag{1}$$

where $\pi_i(t)$ satisfied $\pi_i' > 0$ and $\pi_i'' \geq 0$.

Let h^j be the total amount of lobbying that country j government is subjected to. Since each government accepts lobbying from producers in both countries and the two producers act cooperatively and lobby jointly, the net income of the lobby group is

$$\pi_A(t) + \pi_B(t) - (h_A + h_B) = \pi_A(t) + \pi_B(t) - (h^A + h^B),$$

since $h_A + h_B = h^A + h^B$.

As for the effect of lobbying, we follow the political support function approach suggested by, for example, Hillman (1982). The key assumption underlying this function is that the weight attached to the income of the lobby group is larger than the weight attached to others. Thus, the objective function of the government in country i is given by

$$G^i = S_i(t) - h_i + \rho^i[\pi_A(t) + \pi_B(t) - (h^A + h^B)], \quad i = A, B, \tag{2}$$

where $\rho^i > 0$ is the extra weight attached to the net income of the lobby group by the government of country i. The first two terms represent social welfare, and the last term is the additional importance paid to the lobby group's income in the government's objective function. Since lobbying is done by the two firms cooperatively and jointly and each government cares to some extent about the income of the lobbyists, it is assumed that it cannot discriminate between the two individual lobbyists. As a result, foreign profit is assigned the same weight as domestic profit in each government's objective function. In section 4 we consider a situation where lobbying is noncooperative and each government can discriminate between the two lobby groups.

We endogenize the tariff-formation function by making the reasonable assumption that the weight ρ^i is an increasing function of the amount of lobbying country i government receives. In particular, we assume

$$\rho^A = (1 + \varepsilon)\rho(h^A), \text{ and } \rho^B = (1 - \varepsilon)\rho(h^B), \tag{3}$$

where the parameter $1 + \varepsilon$ $(1 - \varepsilon)$ represents country A (B) government's susceptibility to lobbying. That is, a higher value of ε implies a higher degree of asymmetry in their susceptibilities. Starting from $\varepsilon = 0$ (the case of symmetry), an increase in the value of ε implies that country A becomes more, and country B less, susceptible to lobbying. We assume that $\rho' > 0$ and $\rho'' < 0$. The assumptions made so far are formally stated as

Assumption 1 $S_j'' < 0$, $\pi_j'(t) > 0$, $\pi_j''(t) \geq 0$, $\rho'(h^j) > 0$, $\rho''(h^j) < 0$ $(j = A, B)$.

Having introduced most of the important variables and functions, we proceed to the solution of the optimal level of CETs. We consider a two-stage game. In stage one, domestic producers decide on their lobbying levels by maximizing their joint profits. In stage 2, the CU authority decides on the level of CET by maximizing a weighted sum of the two governments' objective functions. To obtain a sub-game perfect equilibrium we work with backward induction. We describe the two stages, starting with the second stage, in the following two subsections.

2.1 Tariff Determination by the Customs Union

We assume that the CU authority maximizes a weighted sum of the individual member governments' objective functions in order to find the optimal value of the CET t. That is, the problem facing the CU authority is

$$\max_t \quad G^{CU} \equiv \alpha\ G^A(t, h_A, h_B, h^A, h^B) + (1-\alpha)\ G^B(t, h_A, h_B, h^A, h^B),$$

where G^A and G^B are defined in (2) and α ($(1-\alpha)$) is the weight given to the objective function of country A (B). We take α to represent country A's relative influence in the CU decisionmaking process.

Using (2), the first-order condition for the above optimization problem can be written as

$$G_t^{CU} \equiv \alpha S_A'(t) + (1-\alpha) S_B'(t) + \alpha(1+\varepsilon)\pi_A'(t)\rho(h^A) + (1-\alpha)(1-\varepsilon)\pi_B'(t)\rho(h^B) = 0. \quad (4)$$

Differentiating (4) yields

$$\frac{\partial t}{\partial h^A} = -\frac{\alpha(1+\varepsilon)\pi_A'\rho'(h^A)}{\Delta}, \quad \frac{\partial t}{\partial h^B} = -\frac{(1-\alpha)(1-\varepsilon)\pi_B'\rho'(h^B)}{\Delta}, \tag{5}$$

where $\Delta = \alpha S_A'' + (1-\alpha)S_B'' + \alpha(1+\varepsilon)\pi_A''\rho(h^A) + (1-\alpha)(1-\varepsilon)\pi_B''\rho(h^B)$. For the second-order condition to be satisfied, Δ must be negative. Formally,

Assumption 2 $\qquad \Delta < 0.$

Since we assumed that $S_i'' < 0$ and $\pi_i'' \geq 0$ for $i = A, B$ (assumption 1), the above assumption puts an upper bound on the degree of convexity of the π functions.

From assumptions 1 and 2, it follows that $\partial t/\partial h^A > 0$ and $\partial t/\partial h^B > 0$. In other words, in (4) we have endogenously determined the tariff-formation function, which is typically imposed exogenously in the literature.

Having described the second stage of the game, we now explain the first stage, which determines the levels of lobbying activities.

2.2 Determination of Lobbying Levels

As mentioned earlier, we assume that the producers of the CU-importables in the two countries maximize their joint net profits in determining the levels of lobbying activities. Formally, the optimizing problem facing them is

$$\max_{h^A, h^B} \quad \pi^{CU} \equiv \pi_A(t) + \pi_B(t) - (h^A + h^B),$$

subject to the reaction function given by (4).

The first-order conditions for the above problem are given by

$$\pi_{h^i}^{CU} \equiv (\pi_A'(t) + \pi_B'(t)) \cdot \partial t/\partial h^i - 1 = 0, \quad i = A, B. \tag{6}$$

The two equations in (6) and (4) together determine the endogenous variables h^A, h^B, and t. This completes the description of the theoretical framework, and we next derive some properties of the equilibrium.

3 Political Asymmetry and CET

In this section we examine the effect of political asymmetries — i.e., changes in the parameters α and ε on the equilibrium level of the CET t. In order to focus on political asymmetry we make assumptions that eliminate asymmetries elsewhere; in particular, we assume that $\pi_A(t) = \pi_B(t) = \pi(t)$ and $S_A(t) = S_B(t) = S(t)$. Because of this assumption, note that from (3), (5), and (6), we determine that

$$\alpha(1+\varepsilon)\rho'(h^A) = (1-\alpha)(1-\varepsilon)\rho'(h^B). \tag{7}$$

From (7), we obtain the following result:

Lemma 1 *When $\varepsilon = 0$, we have*

$$h^A \gtreqless h^B \qquad \textit{according as} \qquad \alpha \gtreqless 1/2,$$

and when $\alpha = 1/2$

$$h^A \gtreqless h^B \qquad \textit{according as} \qquad \varepsilon \gtreqless 0.$$

The proof follows directly from (7) and the assumption that $\rho'' < 0$ (assumption 1).

Differentiating (4) and using (7), yields

$$\begin{aligned}\frac{\Delta}{\pi'(t)} \cdot dt &= -(1-\alpha)(1-\varepsilon)\rho'(h^B)[dh^A + dh^B] + [(1-\varepsilon)\rho(h^B) - (1+\varepsilon)\rho(h^A)]\ d\alpha \\ &\quad + [(1-\alpha)\rho(h^B) - \alpha\rho(h^A)]\ d\varepsilon. \end{aligned} \tag{8}$$

If the initial equilibrium is symmetric, i.e., $\alpha = 1/2$ and $\varepsilon = 0$ so that $h^A = h^B$, an increase in α or ε will increase t if and only if it also increases the total amount of lobbying. If the initial equilibrium is not symmetric, and in particular if $h^A > h^B$ (or, because of lemma 1, equivalently, $\alpha > 1/2$), an increase in α or ε has a direct effect given by the second and the third terms in (8), which is to increase t. The indirect effect as a result of changes in the total amount of lobbying, as mentioned, is positively related to the size of changes in the total amount of lobbying.

Finally, differentiating (6) and using (6), (7), and (8) we obtain changes in h^A, h^B, and $h^A + h^B$. Derivations of these expressions are given in Appendix I.

From equations (I.1)-(I.6) and assumption 3 in Appendix I, we find that

$$\left.\frac{dh^A}{d\alpha}\right|_{\substack{\alpha=1/2 \\ \varepsilon=0}} > 0, \quad \left.\frac{dh^B}{d\alpha}\right|_{\substack{\alpha=1/2 \\ \varepsilon=0}} < 0,$$

$$\left.\frac{dh^A}{d\varepsilon}\right|_{\substack{\alpha=1/2 \\ \varepsilon=0}} > 0, \quad \left.\frac{dh^B}{d\varepsilon}\right|_{\substack{\alpha=1/2 \\ \varepsilon=0}} < 0.$$

That is, starting with complete symmetry, an increase in either α or ε unambiguously increases h^A and decreases h^B. An increase in a country's influence in CU-wide decision-making, or in that country's susceptibility to lobbying, increases lobbying received by that country and reduces lobbying received by the other country. This is expected. However, in the presence of initial asymmetry, this result may not hold. This is because of the diminishing returns from lobbying activities. If one country has much more influence in the CU than the other, that country will receive more lobbying to start with. However, if it becomes even more influential, then the return to lobbying this country will be minimal and the lobby groups will be better off lobbying the other country. Thus, it is possible that an increase in α can reduce h^A under asymmetry. Similar arguments apply for changes in ε. However, this possibility will disappear if, for example, $\pi'' \simeq 0$.[4] When $\pi'' \simeq 0$, it can be verified that

$$\begin{aligned}\Phi \cdot \frac{dh^A}{d\alpha} &= 4(1+\varepsilon)(1-\varepsilon)(1-\alpha)(\pi')^4\rho'(h^A)\rho''(h^B) > 0,\\ \Phi \cdot \frac{dh^B}{d\alpha} &= 4(1+\varepsilon)(1-\varepsilon)\alpha(\pi')^4\rho'(h^B)\rho''(h^A) < 0,\end{aligned}$$

for all values of $\alpha \in (0,1)$.

As for the effects on the total amount of lobbying, i.e., $h^A + h^B$, of an increase in α (the analysis for ε is similar), equation (I.5) simplifies to

$$\begin{aligned}\left(-\frac{\Phi}{\Delta}\right) \cdot \frac{d(h^A+h^B)}{d\alpha} &= -3\pi''\{(1+\varepsilon)\rho(h^A) - (1-\varepsilon)\rho(h^B)\}\left[\frac{\rho''(h^A)}{\rho'(h^B)} + \frac{\rho''(h^A)}{\rho'(h^B)}\right]\\ &\quad -\Delta\left[\frac{\rho''(h^A)}{(1-\alpha)\rho'(h^A)} - \frac{\rho''(h^B)}{\alpha\rho'(h^B)}\right],\end{aligned}$$

from which it follows that

$$\left.\frac{d(h^A+h^B)}{d\alpha}\right|_{\substack{\alpha=1/2\\ \varepsilon=0}} = 0,$$

and then from (8) that

$$\left.\frac{dt}{d\alpha}\right|_{\substack{\alpha=1/2\\ \varepsilon=0}} = 0.$$

That is, starting with a symmetric equilibrium, an increase in α has no effect on the total amount of lobbying and thus on the CET. However, if the initial equilibrium is not symmetric — in particular, if $\alpha > 1/2$ — it follows from assumption 1 and lemma 1 that the first effect on the right-hand side of the above equation is positive. This is because the increase in h^A dominates the decrease in h^B when the initial level of h^A is higher. The second effect, which takes into account the diminishing returns to lobbying, can be either positive or negative depending on the degree of concavity of the lobbying function and on the initial level of α.

[4] In an earlier version of the paper in which we assumed the production technologies to be of the Leontief type with sector-specific capital stocks, π'' was equal to zero (see Bandyopadhyay et al., 2007).

Turning now to the effect on CET, substituting (I.5) and (I.6) into (8) and using (6) and (7), yields

$$\begin{aligned} \frac{-\Delta\Phi}{\pi'} \cdot dt &= 4(\pi')^4\alpha(1-\alpha)(1-\varepsilon)(1+\varepsilon)\rho''(h^A)\rho''(h^B)\{(1+\varepsilon)\rho(h^A)-(1-\varepsilon)\rho(h^B)\}\ d\alpha \\ &+\frac{\alpha(1+\varepsilon)\rho''(h^B)\Delta^2}{1-\alpha}\cdot\left[\frac{\rho''(h^A)}{\rho''(h^B)}-\left(\frac{1-\alpha}{\alpha}\right)^2\cdot\frac{1-\varepsilon}{1+\varepsilon}\right]\ d\alpha \\ &+4(\pi')^4\alpha(1-\alpha)(1-\varepsilon)(1+\varepsilon)\rho''(h^A)\rho''(h^B)\{\alpha\rho(h^A)-(1-\alpha)\rho(h^B)\}\ d\varepsilon \\ &+\frac{\alpha(1+\varepsilon)\rho''(h^B)\Delta^2}{1-\varepsilon}\cdot\left[\frac{\rho''(h^A)}{\rho''(h^B)}-\left(\frac{1-\varepsilon}{1+\varepsilon}\right)^2\cdot\frac{1-\alpha}{\alpha}\right]\ d\varepsilon. \end{aligned}$$

Focusing on the effect of α, and assuming *pro tempore* $\varepsilon = 0$, it follows from lemma 1 that the first effect of an increase in α is positive (negative) if and only if $\alpha > 1/2$ ($\alpha < 1/2$). For the second term, if, for example, $\rho(h) = h^\eta$ where $0 < \eta < 1$, we can derive from (7) that

$$\frac{h^B}{h^A} = \left(\frac{1-\alpha}{\alpha}\right)^{\frac{1}{1-\eta}}. \tag{9}$$

With this functional form of ρ, it can be verified that the second effect is positive (negative) if $\alpha > 1/2$ ($\alpha < 1/2$). That is, when $\rho(h) = h^\eta$ with $\eta \in (0,1)$, the equilibrium value of CET is a U-shaped function of α and it takes the minimum value for $\alpha = 1/2$. Formally:

Proposition 1 *When $\rho(h) = h^\eta$ with $\eta \in (0,1)$ and $\varepsilon = 0$, an increase in asymmetry in political influences of the two member countries, i.e., either an increase in α from $\alpha > 1/2$ or a decrease in α from $\alpha < 1/2$, will unambiguously increase the equilibrium value of the common external tariff.*

Similar conclusions can be drawn in much the same way for asymmetry with respect to the susceptibility parameter ε when $\alpha = 1/2$.

Why political asymmetry increases CET is best explained by looking at the condition that determines it, viz., equation (4). This equation can be rewritten as

$$\begin{aligned} G_t^{CU} &= \alpha G_t^A + (1-\alpha)G_t^B = G_t^B + \alpha(G_t^A - G_t^B) \\ &= G_t^B + \alpha\pi'\{\alpha(1+\varepsilon)\rho(h^A) - (1-\alpha)(1-\varepsilon)\rho(h^B)\}. \end{aligned} \tag{10}$$

Clearly, an increase in α will increase the equilibrium value of t if it also increases G_t^{CU}. One of the components of the effect of an increase in α on G_t^{CU} is $\pi'\{\alpha(1+\varepsilon)\rho(h^A) - (1-\alpha)(1-\varepsilon)\rho(h^B)\}\ d\alpha$. From lemma 1 it follows that this component is always positive for all $\alpha \neq 1/2$, and this in part explains why asymmetry increases the equilibrium value of α.

We conclude this section by noting a property of the equilibrium CET. We have already shown that $G_t^A - G_t^B = \pi'\{\alpha(1+\varepsilon)\rho(h^A) - (1-\alpha)(1-\varepsilon)\rho(h^B)\}$. Therefore, if $\alpha > 1/2$, using lemma 1 we can say that $G_t^A - G_t^B > 0$. Furthermore, at the equilibrium $G_t^{CU} = 0$, and thus from (10) we have $G_t^B + \alpha(G_t^A - G_t^B) = 0$. Thus, if $\alpha > 1/2$, we must have $G_t^B < 0$. Then, since $\alpha G_t^A + (1-\alpha)G_t^B$ is also equal to zero at the equilibrium (see (10)), G_t^A must be positive. Combining these observations and assuming both G^A and G^B to be concave in t, we can conclude that when $\alpha > 1/2$, the equilibrium value of t is lower (higher) than what country A (B) would desire.

4 Non-cooperative lobbying

In the previous section, we assumed that the lobby groups in the two member countries act cooperatively and lobby jointly. In contrast, in this section we consider a situation where the two lobby groups act noncooperatively and lobby individually. The economic intuitions between the various results are very similar to the ones in the previous section; therefore, in this section we simply present the formal results without explaining them intuitively. For brevity, we also consider only one type of asymmetry and assume $\varepsilon = 0$.

Let h_{ij} $(i = j = A, B)$ be the amount of lobbying done by the firm in country i on the government of country j. Net profits of the firm in country i is given by

$$\tilde{\pi}_i = \pi_i(t) - h_{iA} - h_{iB}, \quad i = A, B. \tag{11}$$

Since lobbying now is done by the two firms individually and noncooperatively, the objective functions of the two governments and the CU authority are

$$G^A = S_A(t) - h_{AA} - h_{AB} + \rho(h_{AA})\tilde{\pi}_A + \rho(h_{BA})\tilde{\pi}_B, \tag{12}$$

$$G^B = S_B(t) - h_{BA} - h_{BB} + \rho(h_{AB})\tilde{\pi}_A + \rho(h_{BB})\tilde{\pi}_B, \tag{13}$$

$$G^{CU} = \alpha G^A + (1-\alpha)G^B. \tag{14}$$

In stage 2 of the game, the CU authority maximizes G^{CU} with respect to t, giving rise to the first-order condition:

$$\begin{aligned} \frac{\partial G^{CU}}{\partial t} &= \alpha S'_A + (1-\alpha)S'_B + \alpha\rho(h_{AA})\pi'_A + \alpha\rho(h_{BA})\pi'_B + (1-\alpha)\rho(h_{AB})\pi'_A \\ &\quad +(1-\alpha)\rho(h_{BB})\pi'_B = 0. \end{aligned} \tag{15}$$

From (15), we find

$$\begin{aligned} \frac{\partial t}{\partial h_{AA}} &= -\frac{\alpha\pi'_A\rho'(h_{AA})}{\Delta}, \quad \frac{\partial t}{\partial h_{BA}} = -\frac{\alpha\pi'_B\rho'(h_{BA})}{\Delta}, \\ \frac{\partial t}{\partial h_{AB}} &= -\frac{(1-\alpha)\pi'_A\rho'(h_{AB})}{\Delta}, \quad \frac{\partial t}{\partial h_{BB}} = -\frac{(1-\alpha)\pi'_B\rho'(h_{BB})}{\Delta}, \end{aligned}$$

where

$$\tilde{\Delta} = \alpha S''_A + (1-\alpha)S''_B + \alpha\rho(h_{AA})\pi''_A + \alpha\rho(h_{BA})\pi''_B + (1-\alpha)\rho(h_{AB})\pi''_A + (1-\alpha)\rho(h_{BB})\pi''_B < 0.$$

The levels of lobbying are determined in the first stage by the two lobby groups noncooperatively in a Nash equilibrium as

$$\begin{aligned} \frac{\partial\tilde{\pi}_A}{\partial h_{AA}} &= \pi'_A \cdot \frac{\partial t}{\partial h_{AA}} - 1 = 0, \quad \frac{\partial\tilde{\pi}_A}{\partial h_{AB}} = \pi'_A \cdot \frac{\partial t}{\partial h_{AB}} - 1 = 0, \\ \frac{\partial\tilde{\pi}_B}{\partial h_{BA}} &= \pi'_B \cdot \frac{\partial t}{\partial h_{BA}} - 1 = 0, \quad \frac{\partial\tilde{\pi}_B}{\partial h_{BB}} = \pi'_B \cdot \frac{\partial t}{\partial h_{BB}} - 1 = 0, \end{aligned}$$

which can be written as

$$\alpha\left(\pi_A'\right)^2\rho(h_{AA}) = -\tilde{\Delta}, \quad (1-\alpha)\left(\pi_A'\right)^2\rho(h_{AB}) = -\tilde{\Delta}, \tag{16}$$

$$\alpha\left(\pi_B'\right)^2\rho(h_{BA}) = -\tilde{\Delta}, \quad (1-\alpha)\left(\pi_B'\right)^2\rho(h_{BB}) = -\tilde{\Delta}. \tag{17}$$

As before, we focus on political asymmetry — i.e., $\alpha \neq 1/2$ — and assume symmetry elsewhere — i.e., in particular, we assume that $\pi_A(t) = \pi_B(t) = \pi(t)$ and $S_A(t) = S_B(t) = S(t)$.

Given these assumptions, from (16) and (17), it immediately follows that for all values of $\alpha \in (0,1)$ the equilibrium must satisfy

$$h_{AA} = h_{BA}, \quad h_{AB} = h_{BB}.$$

Using the above property, equations (15), (16) and (17) can be reduced to the following three equations

$$S'(t) + 2\alpha\rho(h_{AA})\pi'(t) + 2(1-\alpha)\rho(h_{BB})\pi'(t) = 0, \tag{18}$$

$$\alpha(\pi'(t))^2\rho'(h_{AA}) = -\tilde{\Delta}, \tag{19}$$

$$(1-\alpha)(\pi'(t))^2\rho'(h_{BB}) = -\tilde{\Delta}, \tag{20}$$

in three unknowns t, h_{AA} and h_{BB} where $\tilde{\Delta}$ also simplifies to

$$\tilde{\Delta} = S''(t) + 2\alpha\rho(h_{AA})\pi''(t) + 2(1-\alpha)\rho(h_{BB})\pi''(t).$$

Note that from (19) and (20), we derive

$$\alpha\rho'(h_{AA}) = (1-\alpha)\rho'(h_{BB}). \tag{21}$$

Differentiating (18) and using (21), we find

$$\frac{\tilde{\Delta}}{2\pi'} \cdot dt = -[\rho(h_{AA}) - \rho(h_{BB})]\ d\alpha - \alpha\rho'(h_{AA})\ d(h_{AA} + h_{BB}). \tag{22}$$

Now, differentiating (19) and (20) and using (21) and (22), we obtain changes in h_{AA}, h_{BB} and $h_{AA} + h_{BB}$. These are given in Appendix II.

From equations (II.1)-(II.5) and assumption 4 in Appendix II and (22) it follows that

$$\left.\frac{dh_{AA}}{d\alpha}\right|_{\alpha=1/2} > 0, \quad \left.\frac{dh_{BB}}{d\alpha}\right|_{\alpha=1/2} < 0, \quad \left.\frac{d(h_{AA} + h_{BB})}{d\alpha}\right|_{\alpha=1/2} = 0, \text{ and } \left.\frac{dt}{d\alpha}\right|_{\alpha=1/2} = 0, \quad (23)$$

and then all the results derived in the previous section also holds here.

We conclude the analysis by noting that the main common element between the models of section 3 and 4 is the existence of cross-border lobbying. The difference between the two models is that in section 3 the firms in the two countries lobby jointly and behave cooperatively, whereas in section 4 the firms are assumed to act independently and non-cooperatively. Since the qualitative results are the same in the two sections, we can conclude that the existence of cross-border lobbying is the main reason for the primary result that political asymmetry increases the equilibrium value of the CET.

5 Conclusion

In a customs union (CU), a decision on common external tariffs (CETs) affects interest groups in all member countries. In addition, since decisions on the CET are typically made jointly by governments of the member countries, cross-border lobbying becomes a real possibility. Furthermore, cross-border cooperation in lobbying activities also becomes tempting. Clearly, the effect of lobbying — domestic and cross-border — depends on two factors: (i) the more easily a government may be convinced through lobbying (say, susceptibility of a government), the greater is the effect; and (ii) the greater the power/influence of a government (and its representative) on the central tariff-making body, the higher is the effect of lobbying that government. The differences between the member governments in these two factors are at the heart of this paper. We examine the effect of asymmetries between the member governments in the effects of lobbying on the equilibrium level of the CET.

We find that there is a positive monotonic relationship between the degrees of asymmetry and the level of the CET. For equal susceptibilities, a greater relative power of a member nation's government monotonically raises the CET. On the other hand, for equal power, a rise in the spread of the susceptibilities must also monotonically raise the tariff. This is true irrespective of whether the lobby groups in the member countries cooperate in their lobbying activities or act noncooperatively.

These results have the interesting policy implication that more heterogeneous customs unions are likely to be more protectionist with respect to non-members. They also imply that when considering expansion of a CU, free trade–oriented members should be less sympathetic to bringing in dissimilar fresh entrants.

Appendix I

Differentiating (6) and using (6), (7) and (8) and ignoring third-order derivatives of f and S, we get:

$$\begin{aligned}
\pi^{CU}_{h^A h^A}\ dh^A + \pi^{CU}_{h^A h^B}\ dh^B &= -\pi^{CU}_{h^A \alpha}\ d\alpha - \pi^{CU}_{h^A \varepsilon}\ d\varepsilon, \\
\pi^{CU}_{h^B h^A}\ dh^A + \pi^{CU}_{h^B h^B}\ dh^B &= -\pi^{CU}_{h^B \alpha}\ d\alpha - \pi^{CU}_{h^B \varepsilon}\ d\varepsilon,
\end{aligned}$$

where

$$\begin{aligned}
\pi^{CU}_{h^A h^A} &= 2(\pi')^2\alpha(1+\varepsilon)\rho''(h^A) + 3\alpha(1+\varepsilon)\rho'(h^A)\pi'', \\
\pi^{CU}_{h^A h^B} &= \pi^{CU}_{h^B h^A} = 3\alpha(1+\varepsilon)\rho'(h^A)\pi'', \\
\pi^{CU}_{h^B h^B} &= 2(\pi')^2(1-\alpha)(1-\varepsilon)\rho''(h^B) + 3\alpha(1+\varepsilon)\rho'(h^A)\pi'', \\
\pi^{CU}_{h^A \alpha} &= 3\pi''\{(1+\varepsilon)\rho(h^A) - (1-\varepsilon)\rho(h^B)\} + 2(1+\varepsilon)(\pi')^2\rho'(h^A), \\
\pi^{CU}_{h^B \alpha} &= 3\pi''\{(1+\varepsilon)\rho(h^A) - (1-\varepsilon)\rho(h^B)\} - 2(1-\varepsilon)(\pi')^2\rho'(h^B), \\
\pi^{CU}_{h^A \varepsilon} &= 3\pi''\{\alpha\rho(h^A) - (1-\alpha)\rho(h^B)\} + 2\alpha(\pi')^2\rho'(h^A), \\
\pi^{CU}_{h^B \varepsilon} &= 3\pi''\{\alpha\rho(h^A) - (1-\alpha)\rho(h^B)\} - 2(1-\alpha)(\pi')^2\rho'(h^B).
\end{aligned}$$

Solving the above two equations we find

$$\begin{aligned}
\Phi \cdot \frac{dh^A}{d\alpha} &= -\pi^{CU}_{h^A \alpha}\pi^{CU}_{h^B h^B} + \pi^{CU}_{h^B \alpha}\pi^{CU}_{h^A h^B} \\
&= -6\pi''(\pi')^2(1-\alpha)(1-\varepsilon)\rho''(h^B)\{(1+\varepsilon)\rho(h^A) - (1-\varepsilon)\rho(h^B)\} \qquad \text{(I.1)} \\
&- \ 2(\pi')^2(1+\varepsilon)(1-\varepsilon)\rho'(h^A)\left[2(\pi')^2(1-\alpha)\rho''(h^B) + \frac{3\rho'(h^A)\pi''\alpha(1+\varepsilon)}{(1-\alpha)(1+\varepsilon)}\right] \\
\Phi \cdot \frac{dh^B}{d\alpha} &= -\pi^{CU}_{h^B \alpha}\pi^{CU}_{h^A h^A} + \pi^{CU}_{h^A \alpha}\pi^{CU}_{h^A h^B} \\
&= -6(\pi')^2\pi''\alpha(1+\varepsilon)\rho''(h^A)\{(1+\varepsilon)\rho(h^A) - (1-\varepsilon)\rho(h^B)\} \qquad \text{(I.2)} \\
&+ \ 2(\pi')^2(1-\varepsilon)\rho'(h^B)[2(\pi')^2\alpha(1+\varepsilon)\rho''(h^A) + 3(1+\varepsilon)\rho'(h^A)\pi''],
\end{aligned}$$

$$\Phi \cdot \frac{dh^A}{d\varepsilon} = -\pi^{CU}_{h^B\varepsilon}\pi^{CU}_{h^Ah^A} + \pi^{CU}_{h^A\varepsilon}\pi^{CU}_{h^Ah^B}$$

$$= -6\pi''(\pi')^2(1-\varepsilon)(1-\alpha)\rho''(h^B)\{\alpha\rho(h^A) - (1-\alpha)\rho(h^B)\} \quad (I.3)$$

$$-2(\pi')^2\alpha(1-\alpha)\rho'(h^A)\left[2(\pi')^2(1-\varepsilon)\rho''(h^B) + \frac{3\rho'(h^A)\pi''(1+\varepsilon)\alpha}{(1-\varepsilon)\alpha}\right],$$

$$\Phi \cdot \frac{dh^B}{d\varepsilon} = -\pi^{CU}_{h^B\varepsilon}\pi^{CU}_{h^Ah^A} + \pi^{CU}_{h^A\varepsilon}\pi^{CU}_{h^Ah^B}$$

$$= -6(\pi')^2\pi''\alpha(1+\varepsilon)\rho''(h^A)\{\alpha\rho(h^A) - (1-\alpha)\rho(h^B)\} \quad (I.4)$$

$$+ \quad 2(\pi')^2(1-\alpha)\rho'(h^B)[2(\pi')^2\alpha(1+\varepsilon)\rho''(h^A) + 3\alpha\rho'(h^A)\pi''],$$

and thus

$$\Phi \cdot \frac{d\left(h^A + h^B\right)}{d\alpha} = \pi^{CU}_{h^A\alpha}\left(\pi^{CU}_{h^Ah^B} - \pi^{CU}_{h^Bh^B}\right) + \pi^{CU}_{h^B\alpha}\left(\pi^{CU}_{h^Ah^B} - \pi^{CU}_{h^Ah^A}\right)$$

$$= \Delta\left[\frac{\rho''(h^B)\pi^{CU}_{h^A\alpha}}{\rho'(h^B)} + \frac{\rho''(h^A)\pi^{CU}_{h^B\alpha}}{\rho'(h^A)}\right], \quad (I.5)$$

$$\Phi \cdot \frac{d\left(h^A + h^B\right)}{d\varepsilon} = \pi^{CU}_{h^A\varepsilon}\left(\pi^{CU}_{h^Ah^B} - \pi^{CU}_{h^Bh^B}\right) + \pi^{CU}_{h^B\varepsilon}\left(\pi^{CU}_{h^Ah^B} - \pi^{CU}_{h^Ah^A}\right)$$

$$= \Delta\left[\frac{\rho''(h^B)\pi^{CU}_{h^A\varepsilon}}{\rho'(h^B)} + \frac{\rho''(h^A)\pi^{CU}_{h^B\varepsilon}}{\rho'(h^A)}\right], \quad (I.6)$$

where

$$\Phi = \pi^{CU}_{h^Ah^A}\pi^{CU}_{h^Bh^B} - \left[\pi^{CU}_{h^Ah^B}\right]^2$$

$$= 4(\pi')^4\alpha(1-\alpha)(1-\varepsilon)(1+\varepsilon)\rho''(h^A)\rho''(h^B)$$

$$-3\pi''\Delta\left[\alpha(1+\varepsilon)\rho''(h^A) + (1-\alpha)(1-\varepsilon)\rho''(h^B)\right].$$

We assume the second-order condition for the lobby group's optimization problem to be satisfied. That is,

Assumption 3 $\pi^{CU}_{h^Ah^A} < 0$, $\pi^{CU}_{h^Bh^B} < 0$ *and* $\Phi > 0$.

Appendix II

Differentiating (19) and (20) and using (21) and (22), we find

$$
\begin{aligned}
&[6\alpha\pi''\rho'(h_{AA}) + \alpha(\pi')^2\rho''(h_{AA})]\ dh_{AA} + 6\alpha\pi''\rho'(h_{AA})\ dh_{BB} \\
&= \left[-6\pi''\{\rho(h_{AA}) - \rho(h_{BB})\} + \tilde{\Delta}/\alpha\right]\ d\alpha \\
&6\alpha\pi''\rho'(h_{AA})\ dh_{AA} + [6\alpha\pi''\rho'(h_{AA}) + (1-\alpha)(\pi')^2\rho''(h_{BB})]\ dh_{BB} \\
&= \left[-6\pi''\{\rho(h_{AA}) - \rho(h_{BB})\} - \tilde{\Delta}/(1-\alpha)\right]\ d\alpha.
\end{aligned}
$$

Solving the above two equations, yields

$$
\frac{\tilde{\Phi}}{(-\tilde{\Delta})} \cdot \frac{dh_{AA}}{d\alpha} = -\frac{6\pi''\rho'(h_{AA})}{1-\alpha} - \frac{(1-\alpha)(\pi')^2\rho''(h_{BB})}{\alpha} \tag{II.1}
$$

$$
+\frac{6(1-\alpha)(\pi')^2\pi''\rho''(h_{BB})\{\rho(h_{AA}) - \rho(h_{BB})\}}{\tilde{\Delta}}, \tag{II.2}
$$

$$
\frac{\tilde{\Phi}}{(-\tilde{\Delta})} \cdot \frac{dh_{BB}}{d\alpha} = \frac{6\pi''\rho'(h_{AA})}{1-\alpha} + \frac{(\alpha(\pi')^2\rho''(h_{BB})}{1-\alpha} \tag{II.3}
$$

$$
+\frac{6\alpha(\pi')^2\pi''\rho''(h_{AA})\{\rho(h_{AA}) - \rho(h_{BB})\}}{\tilde{\Delta}}, \tag{II.4}
$$

$$
\frac{\tilde{\Phi}}{(-\tilde{\Delta})} \cdot \frac{(dh_{AA} + h_{BB})}{d\alpha} = 6\pi''\tilde{\Delta}\{\rho(h_{AA}) - \rho(h_{BB})\}\left[\frac{\rho''(h_{AA})}{\rho'(h_{AA})} + \frac{\rho''(h_{BB})}{\rho'(h_{BB})}\right] \tag{II.5}
$$

$$
+(\tilde{\Delta})^2\left[\frac{\rho''(h_{AA})}{(1-\alpha)\rho'(h_{AA})} - \frac{\rho''(h_{BB})}{\alpha\rho'(h_{BB})}\right], \tag{II.6}
$$

$$
\begin{aligned}
\text{where}\qquad \tilde{\Phi} &= 6\alpha(1-\alpha)\rho'(h_{AA})(\pi')^2\pi''\rho''(h_{BB}) + 6\alpha^2\rho'(h_{AA})(\pi')^2\pi''\rho''(h_{AA}) \\
&\quad +\alpha(1-\alpha)(\pi')^4\rho''(h_{BB})\rho''(h_{AA}).
\end{aligned}
$$

The second-order conditions and the stability of the first-stage Nash equilibrium are assumed to be satisfied:

Assumption 4 $6\alpha\pi''\rho'(h_{AA}) + \alpha(\pi')^2\rho''(h_{AA}) < 0$, $6\alpha\pi''\rho'(h_{AA}) + (1-\alpha)(\pi')^2\rho''(h_{BB}) < 0$, *and* $\tilde{\Phi} > 0$.

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