External Trade Liberalization and Economic Growth

in a Free Trade Area:

Cases of Endogenous and Exogenous FDI Policy

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Abstract

This paper investigates whether preferential trade agreements promote or hinder multilateral trade liberalization (MTL) when they induce economic growth due to dynamic economies of scale. In a static three-country model of free trade area (FTA), we find that whether the optimal external tariff rate rises or declines crucially depends on the types of economic growth, and that these properties will change drastically depending on whether foreign direct investment (FDI) policy is endogenous or exogenous. If home country endogenously determines FDI policy, the optimal external tariff rate rises by an expansion of the FTA market while it declines by the induced changes in home and inside firms’ productivity. If FDI cost is exogenously given and sufficiently small, the optimal external tariff rate declines by an expansion of FTA market and the induced reduction of home firm’s productivity, while it rises by the induced improvement of inside firm’s productivity. These properties remain unchanged even if technological spillovers from FDI are introduced. It is suggested that in order to promote MTL it may be important to impose international FDI rules over countries joining an FTA. We also discuss the optimal external tariff rate for a customs union.

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1. Introduction

The proliferation of preferential trade agreements (PTAs) has attracted considerable attention during the last 20 years because they can be either a “building block” or a “stumbling block” toward multilateral trade liberalization. The large theoretical literature has given ambiguous results, showing that regional agreements could provide incentives for and against unilateral trade liberalization toward nonmembers. Some studies find that countries are likely to reduce their external tariffs after forming a free trade area (FTA). This result has been derived both under the assumption that governments chooses tariffs to maximize economic welfare (Freund 2000; Bond, Riezman and Syropoulos 2004) and in political-economy settings (Richardson 1993; Ornelas 2005). However, Cabot, de Melo and Olarreaga (1999) pointed out that at least one member of an FTA could raise external tariffs if the general equilibrium effect on wage rate is sufficiently strong.

A natural way to go beyond this theoretical deadlock should be to empirically evaluate the consequences of PTA for external tariff liberalization. Although such empirical studies are still scarce, Estevadeordal, Freund and Ornelas (2008) find that preferential tariff reduction in a given sector leads to a reduction in the external tariff in that sector, using industry-level data of Latin American countries from 1990 to 2001. However, Limao (2006) provides the systematic evidence, based on detailed data of U.S. tariffs, that the direct effect of U.S. PTAs was to generate a stumbling block to its own multilateral liberalization. Thus this is still an open question both theoretically and empirically.

This paper provides new theoretical insight about whether PTAs promote or hinder unilateral trade liberalization toward nonmembers from two new viewpoints. First, we investigate whether the external tariff rate set by home government will increase or decrease when economic growth occurs after a formation of an FTA. Indeed, it is of fundamental importance to compare a pre-FTA (most favored nation: MFN) tariff rate and a post-FTA (external) tariff rate as in previous studies. However, for the last two decades, many FTAs have, not only been formed, but also been continued to exist. Then economic factors concerning these FTAs, such as a size of the market (demand) and productivities of inside and outside firms, must have probably changed during these periods (At least, it would be strange to suppose that they remain unchanged at all over time). We thus consider whether these factors reflecting economic growth will raise or lower the optimal external tariff rate.
of an FTA.

Second, while previous theoretical literature has focused on the determination of trade policy only, we take into account an endogenous determination of foreign direct investment (FDI) policy as well.\(^1\) Many previous studies assume that FDI cost is exogenous. Indeed some FDI costs cannot be controlled by governments, but others can. For example, information costs for gathering eligible workers in an FDI-recipient country can be reduced if the government of that country provides useful information to foreign firms. As another example, if the government simplifies the administrative procedures for getting permission for FDI, firms outside the FTA are more easily able to have production plants within the FTA. It would be rather natural to relax the assumption of exogenous FDI costs. In this paper, we assume that home government can choose a fixed cost, as an FDI policy, that an outside firm must incur to have production plants in the home country.

In this paper, we derive the optimal external tariff rates in a three-country model of an FTA, in which consumers are present only in the home country and each country has only one firm. An outside firm may supply, either by exporting or by FDI, homogeneous goods to the home market. We first investigate how the optimal external tariffs may change when the FTA market expands and the marginal productivity of firms changes in both cases of endogenous and exogenous FDI policy. Then we introduce technological spillovers concerning an FTA, showing that the qualitative results remain unchanged. Based on them, we discuss roles of international FDI rules concerning an FTA. Finally, the optimal external tariff rate for a customs union is also discussed.

An interesting finding is that whether the optimal external tariff rate rises or declines crucially depends on the types of economic growth, and that these properties will change drastically depending on whether foreign direct investment (FDI) policy is endogenous or exogenous. First, when FDI policy is *endogenously* determined, the optimal external tariff is the tariff rate at which home welfare is maximized when an outside firm chooses exporting. This tariff rate (i) *rises* by an expansion of home market demand while it (ii) *declines* by the induced reduction in home firm’s productivity and (iii) by the induced improvement of inside firm’s productivity (due to trade creation) and (iv) by the induced reduction in outside firm’s productivity (due to trade diversion).

\(^1\) Recent research on FTAs focuses on tariff revenue competition among countries within an FTA (Ikema (1992), Richardson (1995), Furusawa and Jinji (2007) and on the effects of the rules of origin (Ishikawa et al. (2007)). However, they do not take into account the relation to FDI policy.
These results imply that the market expansion type of growth will hinder external trade liberalization while productivity improvement type of growth will promote it.

Second, when FDI cost is *exogenously* given to home government and sufficiently small, the optimal external tariff is the critical tariff rate at which an outside firm switches their supply mode from exporting to FDI. This tariff rate, in contrast to the case of endogenous FDI policy, (i) *declines* by an expansion of FTA market and (ii) by the induced reduction of home firm’s productivity, while it (iii) *rises* by the induced improvement of inside firm’s productivity and (iv) by the induced reduction in an outside firm’s productivity. These results imply that (both market expansion and productivity improvement types of) economic growth in home country will promote external trade liberalization while (productivity improvement type of) growth in the other countries will promote it. These findings remain intact even if we incorporate technological spillovers from an outside firm’s FDI. It is also suggested that in order to promote external trade liberalization, there may be some case where an imposition of international FDI rules over countries joining an FTA is useful.

Let us mention that an endogenous determination of FDI policy in this paper is a new attempt in the strand of research on PTAs, even though a simultaneous determination of trade and FDI policies has been extensively studied in the literature on strategic trade policy under imperfect competition (e.g., Brander and Spencer (1987)). In the context of FTAs, however, only a small number of studies have considered how external tariffs may be related to FDI. Heinrich and Konan (2000) examined how preferential trade agreements might affect outside firms’ incentive for FDI into the preferential trading area in a three-country partial equilibrium model. They showed that the amount of investment depends on the initial trade barriers. Because their model is of monopolistic competition with a zero-profit equilibrium, they ignore strategic interdependence among firms and the profit-shifting effect from the outside country. Taking strategic interdependence among firms into account, Donnenfeld (2003) analyzed a Cournot model with *n* countries. He showed that when two trading blocks are formed, if outside firms can supply goods not only by exporting but also by FDI, all interblock trade may cease (complete trade diversion) and be replaced by interblock FDI (investment creation), thus shrinking world output. He also showed that a tariff war among regional blocks would be avoided and world welfare could be improved. Montout and Zitouna (2005) considered how economic integration of north and south countries with wage differentials may
affect the behaviors of inside and outside firms of an FTA in a three-country model. They analyzed what factors would affect the tariff-jumping motive and the export-platform motive, and examined how the strategies of inside firms of an FTA might affect outsiders’ strategies, and vice versa. These three studies all assumed FDI costs are exogenous and cannot be controlled by government or firms. They did not consider the determination of FDI policy.

In contrast, Hoekman and Saggi (2003) introduced the possibility of endogenous determination of FDI policy and trade policy. Although they used a model not of FTA but of strategic trade policy in which home and foreign firms compete à la Cournot in the home market, they assumed that zero import tariffs were imposed by the WTO or by an FTA. They found that foreign firms would choose the efficient mode of supply (exports or FDI) even if the domestic government is constrained only in its ability to use trade (FDI) policy, and is free to set its FDI (trade) policy. The main focus of Hoekman and Saggi (2003) was on whether outside firms’ choice of supply mode could be inefficient. They did not consider what kind of trade policy would be implemented and combined with FDI policy.

2. The Model

We consider a three-country model, in which home country (H) forms an FTA with partner country (P) and she impose an external tariff rate \( t \) on the rest of the world (country W). Consumers are present only in country H.\(^2\) The inverse demand function in the home market is assumed to be

\[
p = A - [Y_H + Y_P + Y_W],
\]

where \( p \) is a market price, \( A \) is a positive constant representing a size of market demand and \( Y_i \) is firm \( i \)’s output \( (i = H, P, W) \). Each country has only one firm. Three firms can supply homogeneous goods to the home market either by exporting or by FDI, and compete à la Cournot. Each firm’s marginal cost \( C_H, C_P \) and \( C_W \), respectively, is constant and satisfies the next assumption:

\(^2\) If we introduced consumers in Country P as well, we would have to consider tariff revenue competition as in Richardson (1995) and Furusawa and Jinji (2007). Because this would make the point of our analysis obscure, we make use of this assumption.
Assumption 1: \( A > C_H > C_P > C_W \) and \( A - C_H > (C_H - C_P) + (C_H - C_W) \) hold.\(^3\)

We assume \( C_H > C_P > C_W \) in order to induce a triopoly equilibrium where outside firm W exports goods under external tariffs. The assumption \( A - C_H > (C_H - C_P) + (C_H - C_W) \) ensures that the home market demand \( A \) is large enough for home firm H to produce a positive output in equilibrium.

The model is a three-stage game. In the first stage, home government can choose trade and FDI policies. We first consider the case in which home government endogenously determines \( F \) as an FDI policy as well as an external tariff rate \( t \), and then proceed to the case of an exogenous FDI cost \( F \). In the latter case, home government chooses an external tariff rate \( t \) only.\(^4\) In the second stage, after observing the home government’s choice in the first stage, firm W chooses exporting or FDI. In the third stage, firms H, P and W engage in Cournot competition. We derive the sub-game perfect Nash equilibrium.\(^5\)

Now let us derive the Cournot–Nash equilibrium in the third stage, separating the cases of exporting and FDI.

2.1 Exporting Equilibrium

We derive the Nash equilibrium when firm W exports to the home market. Firm \( j \)’s profit function is \( \pi_j = \{ A - \left[ Y_H + Y_P + Y_W \right] - C_j \} Y_j \) \((j=H,P)\), while that of firm W is \( \pi_W = \{ A - \left[ Y_H + Y_P + Y_W \right] - (C_W + t) \} Y_W \). Thus the reaction functions of firm H, P and W are, respectively:

\(^3\) We obtain the latter inequality by rewriting the condition for \( Y_H^T > 0 \), because \( Y_W^T > 0 \) always holds when \( t = 0 \) (these values are derived later).

\(^4\) It is assumed that the rules of origin apply strictly: firm W cannot be exempted from an external tariff through “detour trade” by which they export to country P and then supply to the home market.

\(^5\) When \( t \) and/or \( F \) are high, the duopoly equilibrium with firm H and P can exist in the home market. However, it is meaningless to consider FTAs in this equilibrium because outside firm W plays no role.
\[ A - 2Y_H - Y_P - Y_W = C_H \]  
\[(1)\]

\[ A - Y_H - 2Y_P - Y_W = C_P \]  
\[(2)\]

\[ A - Y_H - Y_P - 2Y_W = C_W + t \]  
\[(3)\]

We obtain the exporting equilibrium values as follows (\(T\) means “tariff” or “trade”).

\[ Y^T_{H} = \frac{A - 3C_H + C_P + (C_W + t)}{4} \]
\[ Y^T_{P} = \frac{A + C_H - 3C_P + (C_W + t)}{4} \]
\[ Y^T_{W} = \frac{A + C_H + C_P - 3(C_W + t)}{4} \]
\[ T^T = \frac{A + C_H + C_P + (C_W + t)}{4}, \]

\[ \pi_H^T = \left[ Y^T_{H} \right]^2, \quad \pi_P^T = \left[ Y^T_{P} \right]^2, \quad \pi_W^T = \left[ Y^T_{W} \right]^2 \]  
\[(4)\]

Under Assumption 1, the equilibrium outputs of firms P and W under free trade are positive. Let us derive the condition under which their equilibrium outputs are positive under a positive tariff \(t\). By solving \(Y^T_W > 0\) for \(t\), we get:

\[ t < \left( \frac{4a}{3} \right) \]  
\[(T)\]

where:

\[ a = \frac{A + C_H + C_P - 3C_W}{4}. \]

Note that a large value of \(a\) means that, other things being equal, the market demand \(A\) is large, the marginal costs of home firm H and inside firm P are large, or the marginal cost of outside firm W is small.

Under condition (T), home welfare \(V^T_H\) is the sum of consumers’ surplus, firm H’s profit and the tariff revenue from firm W:
\[ V_{HH}^F = \frac{1}{2} \left[ \frac{3A - C_H - C_P - (C_W + t)}{4} \right]^2 + \left[ \frac{A - 3C_H + C_P + (C_W + t)}{4} \right]^2 + \left[ \frac{A + C_H + C_P - 3(C_W + t)}{4} \right] \text{t}. \]  

(5)

2.2. FDI Equilibrium

Next, we derive the Nash equilibrium when firm W engages in FDI. The profit function of firm W is

\[ \pi_W = \{A - [Y_H + Y_P + Y_W] - C_W\}Y_W - F. \]

Firm W’s reaction function is

\[ A - Y_H - Y_P - 2Y_W = C_W. \]

We obtain the FDI equilibrium as follows (F means “FDI”):

\[ Y_{HH}^F = \frac{A - 3C_H + C_P + C_W}{4}, \]

\[ Y_{HP}^F = \frac{A + C_H - 3C_P + C_W}{4}, \]

\[ Y_{WH}^F = \frac{A + C_H + C_P - 3C_W}{4}, \]

\[ p^F = \frac{A + C_H + C_P + C_W}{4}, \]

\[ \pi_{HH}^F = \left[ Y_{HH}^F \right]^2, \quad \pi_{HP}^F = \left[ Y_{HP}^F \right]^2, \quad \pi_{WH}^F = \left[ Y_{WH}^F \right]^2 - F. \]  

(6)

Because there are no tariff revenues, country H’s welfare \( V_{HH}^F \) is the sum of consumers’ surplus \( S_{HH}^F \) and the firm H’s profit:

\[ V_{HH}^F = S_{HH}^F + \pi_{HH}^F = \frac{1}{2} \left[ \frac{3A - C_H - C_P - C_W}{4} \right]^2 + \left[ \frac{A - 3C_H + C_P + C_W}{4} \right]^2. \]  

(7)

6 In general, the marginal cost for exporting can be different from that for FDI. To concentrate on the effect of endogenous determination of FDI policy, we assume away this possibility in our model. However, we will incorporate the possibility of technology spillovers from an outside firm’s FDI in section 5.
The necessary and sufficient condition for firm W to produce positive outputs is:
\[ a^2 \geq F. \]  
(F)

Condition (F) means that firm W’s equilibrium profit of \( \pi^F_W = a^2 - F \) is nonnegative.

### 2.3 Outside Firm’s Choice between Exporting and FDI

Let us consider firm W’s choice between exporting and FDI in the second stage. Given the Cournot–Nash equilibrium in the third stage, we derive the necessary and sufficient condition for firm W’s profit under exporting to be larger than its profit under FDI. The difference in profit between the two cases is:

\[ \Delta \pi = \pi^T_W - \pi^F_W = \left( \frac{3}{4} \right)^2 \left[ t - \frac{4a}{3} \right] - \left( a^2 - F \right). \]

The graph of \( \Delta \pi_w \) as a function of \( t \) is represented by a parabola in Figure 1, taking the minimum value \( -\left( a^2 - F \right) \) at \( t = \left( \frac{4a}{3} \right) \). By condition (F), this minimum value is negative. This curve passes through point \( F > 0 \) on the vertical axis at \( t = 0 \).

Given condition (T), this graph is effective only in the area below \( t = \left( \frac{4}{3} \right) a \). We denote by \( t_w \) the critical tariff rate at which firm W switches from exporting to FDI. From \( \pi^T_W = \pi^F_W \), we obtain:

\[ t_w = \left( \frac{4}{3} \right) \left[ a - \sqrt{a^2 - F} \right]. \]  
(8)
Lemma 1 (Outside Firm W’s Choice): Suppose that conditions (T) and (F) are satisfied. Firm W chooses exporting when the external tariff rate \( t \) satisfies \( 0 < t < t_w \), while it chooses FDI when the tariff rate \( t \) satisfies \( t_w < t \), where \( t_w \) is given by (8).

The higher the FDI cost \( F \), the higher the critical tariff rate \( t_w \). Intuitively, when investment cost \( F \) is high, firm W’s gain from choosing exporting is large, because he can avoid incurring the heavy fixed cost. Thus the area \( (0, t_w) \) in which firm W has more profit under exporting than under FDI is wider. (We discuss the relations to the other parameters later.)

3. Optimal External Tariffs under Endogenous FDI Policy

Let us proceed to home government’s policy choice in the first stage. In this section, we suppose that home government can endogenously determine a value of \( F \) as an FDI policy, and thus she chooses the optimal combination of external tariff rate \( t \) and FDI cost \( F \) which maximizes home...
welfare.

### 3.1 Endogenous Determination of External Tariff and FDI Policy

In order to find the optimal combination of \( t \) and \( F \), we first look at the graph of home welfare \( V_{ht}^T \) under exporting, which is represented by (5). It is the parabola in Figure 2. The optimal tariff rate that maximizes \( V_{ht}^T \) is:

\[
t_E = \frac{3A - C_H + 7C_P - 9C_W}{21}.
\]

The maximized home welfare \( V_{ht}^{T*} \) can be derived by substituting (9) into (5):

\[
V_{ht}^{T*} = \frac{1}{32} \left[ \frac{(3A - C_H + 7C_P - 9C_W)^2}{21} + (3A - C_H - C_P - C_W)^2 + 2(A - 3C_H + C_P + C_W)^2 \right]
\]

This parabola is effective only for \( t \) lower than \( t_W \), because firm \( W \) switches from exporting to FDI at \( t_W \). The level of home welfare actually attained jumps to the horizontal level \( V_{ht}^F \) represented by (7). We denote by \( t_f \) the critical external tariff rate at which home welfare is equal between exporting and FDI cases (\( V_{ht}^T = V_{ht}^F \)). In the case of endogenous FDI policy, home government is free to choose a value of \( t_W \) by manipulating the FDI cost \( F \). Then home welfare is maximized when home government sets \( F \) so as to make \( t_W \) equal to \( t_E \).
Even when she chooses any value of $F$ above $F^*$ at which $t_w = t_E$ holds, home government can keep choosing $t_E$ and thus the maximized home welfare $V_H^{*,T}$ remains, as shown in Figure 3.

Therefore we obtain the next proposition.
Proposition 1 (Optimal Combination of External Tariff Rate and FDI Policy): Suppose that home government can control FDI cost $F$. The optimal policy is the combination of the external tariff rate $t_E$ given by (9) and any value of FDI cost $F$ above $F^*$ defined by $t_E = t_W$.

3.2 Economic Growth and External Trade Liberalization

Now, based on the result above, we will investigate how the optimal external tariff rate $t_E$ changes by economic growth: an expansion of home market demand and a change in firms’ marginal costs. We interpret these growth effects as being caused by dynamic economies of scale that a formation of an FTA has induced. In Appendix 2, we compare a pre-FTA equilibrium and an FTA equilibrium. If the three countries move from a pre-FTA regime to an FTA regime, we could consider that in a realistically relevant situation where an external tariff $t_E$ is lower than the optimal (MFN) tariff rate $t_B$ in the pre-FTA regime, dynamic economies of scale induces an expansion of home market demand, a rise in home firm H’s marginal cost, and a reduction in inside and outside firms’ marginal costs (note that outside firm W’s equilibrium output may decrease and
then its marginal cost will rise). If we interpret a reduction in the optimal external tariff rate as a proxy for external (unilateral) trade liberalization, implications of economic growth for external trade liberalization depends on the types of growth and are somewhat complicated. From (9), we obtain the next proposition.

**Proposition 2 (Economic Growth and External Trade Liberalization under Endogenous FDI Policy):** When home government can choose FDI policy $F$ endogenously, whether the optimal external tariff rate $t_E$ rises or declines depends on types of economic growth as follows:

(i) An expansion of the FTA market (an increase in $A$) leads to a rise in $t_E$.

(ii) A reduction of home firm $H$'s productivity (a rise in $C_H$) leads to a decline in $t_E$.

(iii) An improvement of inside firm $P$'s productivity (a reduction in $C_P$) reduces $t_E$.

(iv) A reduction in outside firm $W$'s productivity (a rise in $C_W$) reduces $t_E$.

Result (i) implies that economic growth in terms of an expansion of the FTA market will hinder external trade liberalization. From result (ii), economic growth in terms of an improvement of *home* firm’s productivity will also hinder it. In our model, however, when $t_E < t_B$ holds, home firm $H$’s equilibrium output *decreases* by forming an FTA. Thus we suppose that home firm’s marginal productivity declines by dynamic economies of scale. Therefore a rise in $C_H$ after a formation of an FTA will *promote* external trade liberalization ($t_E$ declines). Result (iii) implies that economic growth in terms of an improvement of *inside* firm’s productivity because of trade creation (and dynamic economies of scale) will promote external trade liberalization. Finally, a reduction in *outside* firm’s productivity which can happen by trade diversion (and by dynamic economies of scale) will promote external trade liberalization. To sum up, when FDI policy is endogenously determined, external trade liberalization will be hindered by market expansion type of growth while it will be promoted by productivity improvement type of growth.

Let us make intuitive explanations for the results above by focusing on the case of an increase in
the optimal tariff rate $t_E$. When the home market demand $A$ and the marginal cost $C_P$ of inside firm are large or the marginal cost $C_W$ of outside firms is small, firm W’s output and thus its tariff payment is large in the initial equilibrium. Because this tends to enhance the welfare-improving effect of tariff revenues, home government has an incentive to increase the tariff rate. When home firm H’s marginal cost is small, his output and profit are large in the initial equilibrium. In this situation, firm H’s profit plays a relatively important role in home welfare. Because a rise in tariff rate increases firm H’s profit, home government will increase an external tariff rate.

Finally, we explore the properties of the optimal FDI policy. The optimal FDI policy $F^*$ is positively correlated with $t_W$. Because the value of $t_W$ should be equal to the tariff rate $t_E$, the value of $F^*$ should increase whenever $t_E$ increases. Therefore, the optimal FDI cost $F^*$ increases when the home market demand $A$ increases and home firm H’s marginal cost decreases. When inside firm P’s marginal cost decreases and when outside firm W’s marginal cost increases, the optimal FDI cost $F^*$ decreases.

3.3 Which country will be home country’s FTA partner?

Before proceeding, we will discuss which country will be home country’s FTA partner. If home country forms an FTA, the partner will be country P. To see why, we should pay attention to the fact that when forming an FTA, eliminating the pre-FTA tariff from one of the two countries (country P or W) has the same effect on consumers’ surplus. Thus we focus on changes in home firm’s profit and tariff revenues. First, firm H’s profit will be larger when a tariff over a rival firm with higher marginal cost (firm P) is eliminated than when a tariff over a rival firm with lower marginal cost (firm W) is eliminated. Second, country H loses less tariff revenues when forming an FTA with country P. This is because firm P’s tariff payment is smaller than firm W’s due to his higher marginal cost (equilibrium output is smaller). Therefore country H will form an FTA with country P rather than with country W.

I will show that this conclusion remain unchanged even if home country chooses external tariff
rates optimally. To see this, we first derive equilibrium values under the FTA regime where home
country forms an FTA with country W.

\[
Y^w_H = \frac{A - 3C_H + (C_P + t) + C_W}{4},
\]

\[
Y^w_P = \frac{A + C_H - 3(C_P + t) + C_W}{4},
\]

\[
Y^w_W = \frac{A + C_H + (C_P + t) - 3C_W}{4},
\]

\[
p^w_W = \frac{A + C_H + (C_P + t) + C_W}{4},
\] (11)

The home government maximizes her welfare \( V^w_H \), which is the sum of consumers’ surplus, firm
H’s profit and the tariff revenue from firm P:

\[
V^w_H = \frac{1}{2} \left[ \frac{3A - C_H - C_P - C_W - t}{4} \right]^2 + \left[ \frac{A - 3C_H + (C_P + t) + C_W}{4} \right]^2
\]

\[
+ t \left[ \frac{A + C_H - C_P + C_W - 3t}{4} \right].
\] (12)

The optimal tariff rate under the FTA regime with country W is:

\[
t^w_W = \frac{3A - C_H - 9C_P + 7C_W}{21}
\] (13)

The maximized home welfare under the FTA regime with country W is:

\[
V^{w*}_H = \frac{1}{32} \left[ \frac{(3A - C_H - 9C_P + 7C_W)^2}{21} + (A - 3C_H - C_P - C_W)^2 + 2(A - 3C_H + C_P + C_W)^2 \right]
\] (14)

This welfare level is lower than (10). Therefore home country will form an FTA with country P with
higher marginal cost even if she chooses an external tariff rate optimally. In other words, the
“natural trading partner” hypothesis does not hold in a three-country imperfect competition trade
mode, which seems typical for considering a formation of an FTA.
Proposition 3 (Choice of FTA Partner): Home country forms an FTA with a country with less efficient firm (country P).

4. Exogenous FDI Cost and External Trade Liberalization
In this section, we assume that the FDI cost is exogenous for home government and derive the tariff rate at which home welfare is maximized.

4.1. Optimal External Tariff Rates
Let us derive the optimal external tariff rate, taking into account that the parabola of home welfare is effective only below $t_{w}$. We consider three cases. First, consider the case in Figure 4 when $F$ is large (thus $t_{w}$ is high), that is, $t_{e} \leq t_{w}$ holds. Home welfare moves along the bold parabola as far as $t$ lies below $t_{w}$. When $t$ exceeds $t_{w}$, firm W switches from exporting to FDI and thus home welfare jumps to the horizontal line $V_{w}^{F}$. Therefore the optimal tariff rate is $t_{k}$ and the maximized welfare $V_{H}^{T*}$ is actually attained.
Second, consider the case in Figure 5 when $F$ (thus $t_w$) lies in an intermediate range, that is, $t_E \leq t_w < t_I$ holds. Because $t_E \leq t_w$ holds, firm W keeps choosing exporting at $t_E$. Therefore, the optimal tariff rate is $t_E$. 

Figure 4. Case of $t_I \leq t_w$
Third, consider the case in Figure 6 when \( F \) (thus \( t_H \)) is so small that \( t_H \leq t_E < t_I \) holds. In this case, if the home government tries to set the welfare-maximizing tariff rate \( t_E \), firm W switches to FDI. Thus \( V_H^{r*} \) cannot be attained. Therefore the optimal tariff rate is \( t_H \). We obtain the next proposition.
Figure 6. Case of \( 0 < t_w < t_E \)

Proposition 4 (Optimal External Tariff Rate under Exogenous FDI cost): Suppose that the FDI cost \( F \) is exogenous. (i) When \( F \) is so small that \( 0 < t_w < t_E \) holds, the optimal external tariff rate for the home country is \( t_w \), which corresponds to the value of \( F \). (ii) When \( F \) is so large that \( t_E \leq t_w \) holds, the optimal external tariff rate is \( t_E \), regardless of the value of \( F \).

In the proceeding analysis, we focus on case (i) with a low FDI cost, where the optimal tariff rate is \( t_w \). The reason is two folds. First, FDI costs in real world have been declining because of a dramatic reduction in transport and communication costs in recent years. Second, by comparing \( t_w \) to the optimal tariff rate \( t_E \) under endogenous FDI policy, we obtain results that are in sharp contrast to each other.

4.2. Economic Growth and External Trade Liberalization

Now we discuss how the optimal external tariff rate \( t_w \) may change by economic growth.
concerning the FTA. In order to investigate the effects of a change in the home market demand and in the marginal costs of firm H, P and W, we show that a larger value of parameter $a$ leads to a lower value of the optimal tariff rate $t_W$:

\[
\frac{\partial t_W}{\partial a} = \left( \frac{4}{3} \right) \left[ 1 - \frac{a}{\sqrt{a^2 - F}} \right] < 0.
\]

(15)

The intuitive reason can be understood if we focus on the fact that firm W chooses a supply mode by comparing the tariff burden and the FDI cost. When the home market demand $A$ increases and/or marginal costs of firm H ($C_H$) and firm P ($C_P$) rises, firm W’s equilibrium output $Y_w$ increases. Thus firm W’s tariff burden $tY_w$ increases. The tariff rate $t_w$ that balances the fixed cost $F$ should be lower. The same logic holds when the marginal cost ($C_w$) of outside firm W is low.

**Proposition 5 (Economic Growth and External Trade Liberalization under Exogenous FDI Cost):** Suppose that exogenous FDI cost is so small that the optimal external tariff rate is $t_W$.

(i) An expansion of the FTA market (an increase in $A$) leads to a decline in $t_W$.

(ii) A reduction in home firm H’s productivity (a rise in $C_H$) leads to a decline in $t_w$.

(iii) An improvement of inside firm P’s productivity (a reduction in $C_P$) raises $t_w$.

(iv) A reduction in outside firm W’s productivity (a rise in $C_w$) raises $t_w$.

As in the previous section, we could derive implications of economic growth after a formation of an FTA for external trade liberalization. Result (i) implies that, contrary to the case of endogenous FDI costs, economic growth in terms of an expansion of the FTA market will promote external trade liberalization. However, result (ii) implies that a reduction in home firm’s (marginal) productivity will promote it. From result (iii), economic growth in terms of an improvement of inside firm’s productivity because of trade creation (and dynamic economies of scale) will hinder it. Finally, a reduction in outside firm’s productivity, which can happen by trade diversion (and by dynamic economies of scale) will hinder external trade liberalization.
5. FDI with Technology Spillovers and Optimal External Tariffs

In this section, we will explain that our results do not change even when introducing technological spillovers from outside firm W’s FDI on home or inside firm in an FTA. We assume that when firm W supplies from country H (resp. P), home (resp. inside) firm’s marginal cost $C_H$ (resp. $C_P$) decreases by a positive constant $s_H$ (resp. by $s_P$). On the other hand, if firm P engages in FDI into country H, firm H’s marginal cost decreases. This only reduces firm P’s market share and profit. Thus firm P will not engage in FDI into country H.

We obtain an FDI equilibrium with technological spillovers as follows. Although we should consider the two cases above separately, we write them in a unified form:

$$
\begin{align*}
\tilde{\gamma}_H^F &= \frac{A - 3(C_H - s_H) + (C_P - s_P) + C_W}{4} \\
\tilde{\gamma}_P^F &= \frac{A + (C_H - s_H) - 3(C_P - s_P) + C_W}{4} \\
\tilde{\gamma}_W^F &= \frac{A + (C_H - s_H) + (C_P - s_P) - 3C_W}{4} \\
\tilde{p}_W^F &= \frac{A + (C_H - s_H) + (C_P - s_P) + C_W}{4} \\
\tilde{\pi}_H^F &= \left[\tilde{\gamma}_H^F\right]^2, \quad \tilde{\pi}_P^F = \left[\tilde{\gamma}_P^F\right]^2, \quad \tilde{\pi}_W^F = \left[\tilde{\gamma}_W^F\right]^2 - F.
\end{align*}
$$

The necessary and sufficient condition for firm W to produce a positive output is:

$$
[a - (s_H + s_P)]^2 \geq F. \quad \text{(F')}\n$$

Country H’s welfare $\tilde{V}_H^F$ is the sum of consumers’ surplus $\tilde{S}_H^F$ and the firm H’s profit $\tilde{\pi}_H^F$:

$$
\tilde{V}_H^F = \tilde{S}_H^F + \tilde{\pi}_H^F = \frac{1}{2} \left[\frac{3A - C_H - C_P - C_W + (s_H + s_P)}{4}\right]^2 + \left[\frac{A - 3C_H + C_P + C_W + (3s_H - s_P)}{4}\right]^2.
$$

It is not surprising that consumers’ surplus and thus home welfare tends to be larger when technological spillovers are larger. Note, however, that the effects of $s_H$ and $s_P$ on consumers’

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7 We implicitly assume that firm W conveys a stock of knowledge on efficient production methods. If it produced new knowledge about efficient production, technology spillover effects would depend on output level.
surplus are the same. It is also a natural result that firm H’s profit increases by a rise in $s_H$ but decreases by a rise in $s_P$.

First, consider the case where firm W’s FDI decreases $C_{H} (s_H>0$ and $s_P=0)$. Then

$$\tilde{V}_{H}^F = \frac{1}{32} \left[ (3A - C_{H} - C_{P} - C_{W})^2 + 2(A - 3C_{H} + C_{P} + C_{W})^2 \right]^2$$

$$+ \frac{1}{32} \left[ (s_H)^2 + 2(3s_H)^2 + 2(3A - C_{H} - C_{P} - C_{W})s_H + 4(A - 3C_{H} + C_{P} + C_{W})(3s_H) \right]$$

Second, consider the case where firm W’s FDI decreases $C_{P} (s_{H}=0$ and $s_{P}>0)$. Then

$$\tilde{V}_{H}^F = \frac{1}{32} \left[ (3A - C_{H} - C_{P} - C_{W})^2 + 2(A - 3C_{H} + C_{P} + C_{W})^2 \right]^2$$

$$+ \frac{1}{32} \left[ 3(s_P)^2 + 2\{ (A - C_{H} + 3(C_{H} - C_{P}) + 3(C_{H} - C_{W}) \} s_P \right]$$

In both cases, the first term represents home welfare $V_{H}^T$ in free trade ($t=0$). Under Assumption 1, the second term is positive. Therefore, the home welfare under FDI with technological spillovers is higher than that without technological spillovers.

When we incorporate technological spillovers concerning outside firm W’s FDI, the home government’s choice of optimal external tariff rate remains qualitatively unchanged. That is, under endogenous FDI policy, the optimal external tariff rate is $t_E$ while it is $t_W$ for low levels of $F$ under exogenous FDI costs. To see this, we will use Figure 7. Suppose that the value of $\tilde{V}_{H}^F$ lies between $V_{H}^T$ in free trade ($t=0$) and the maximized home welfare $V_{H}^{T*}$. First, we look at the case of endogenous FDI cost. The home government can choose the welfare-maximizing tariff rate $t_E$ under exporting by selecting $t_W$ equal to $t_E$. Thus $V_{H}^{T*}$ is attained. Next, consider the case of exogenous FDI cost. When $F$ (thus $t_W$) is so small that $t_W \leq t_E$ holds, home government induces

---

8 The value of $\tilde{V}_{H}^F$ can exceed the maximized home welfare $V_{H}^{T*}$ under exporting. Then, under exogenous FDI cost, the optimal external tariff rate for low levels of $F$ will be (a tariff rate slightly above) $t_W$ which induces firm W to engage in FDI. Under endogenous FDI policy, the optimal FDI policy will be $F^{*}=0$. 23
firm W to choose FDI and can attain the highest welfare $\tilde{V}_H^F$ by setting an external tariff rate slightly above $t_w$. In this sense, the optimal tariff rate is $t_w$.

Figure 7. Case of $0 < t_w < t_E$

![Graph showing home welfare and optimal tariff rates]

**Proposition 6 (Optimal External Tariff Rates under Technology Spillovers):** In the case where the FDI cost $F$ is endogenous, the optimal external tariff rate is $t_E$. In the case where the FDI cost $F$ is exogenous, if $F$ is so small that $0 < t_w < t_E$ holds, the optimal external tariff rate for home country is $t_w$. Therefore, the properties of external tariff rates remain the same as in the case without technology spillovers.

6. Discussion on International FDI Rules concerning an FTA

Based on the results above, we could derive some implications about roles of international FDI rules concerning an FTA. If we want a formation of FTAs to promote external trade liberalization in the long run, we should focus on the types of economic growth that we expect will occur in the corresponding FTA.
First, when we expect economic growth in terms of an expansion of FTA market, external trade liberalization will be promoted if $t_w$ is chosen as an optimal external tariff. Then home government should not be free to choose FDI policy, because she would have an incentive to impose high FDI costs on outside firm $W$. If, for example, WTO sets an international rule that FTA member countries must not impose high FDI costs on nonmember countries, home government will choose $t_w$ and the external tariff will decline during the growth process after a formation of the FTA.

Second, when we expect home firm’s productivity to decrease by forming an FTA, home government should choose either $t_w$ or $t_e$ as an optimal external tariff. In either case, the external trade liberalization will be promoted during the growth process that follows. International FDI rules may not always be necessary.

Third, when we expect inside firm’s productivity to improve or outside firm’s productivity to decrease by forming an FTA, home government should choose $t_e$ as an optimal external tariff. In these situations, a role of FDI rules seems more complicated. If home government can freely choose FDI policy as well as external tariff rate, she will choose $t_e$. In this situation, international FDI rules are unnecessary. However, if FDI cost is exogenous (home government is not perfectly free to choose FDI policy) and it is so low that home government choose $t_w$, international FDI rules may be useful that induces or even forces an outside firm to keep exporting.

7. Optimal External Tariff for Customs Union

We consider the maximization of home welfare when deriving an optimal tariff rate. We can instead maximize the sum of the welfare of country H and P. This means that the optimal external tariff is for a customs union.

The external tariff rate that maximizes $V_{CU} = V_H^T + V_P^T = V_H^T + \pi_P^T$ is:

$$t_{CU} = \frac{5A + C_H + C_P - 7C_W}{19}.$$

The maximized welfare of customs union is:

$$V_{CU}^* = \frac{1}{32} \left[ \left( \frac{5A + C_H + C_P - 7C_W}{19} \right)^2 + (3A - C_H - C_P - C_W)^2 + 2(3A - 3C_H + C_P + C_W)^2 \right]$$
The optimal external tariff rate $t_{CU}$ has different properties from $t_{E}$. Comparing this to (9), we find the sign before $C_H$ is opposite to the corresponding term in $t_{E}$. If a PTA (customs union) maximizes total welfare of countries H and P, a reduction in home firm’s productivity increases $t_{CU}$.

**Proposition 7 (Economic Growth and External Trade Liberalization for Customs Union):**

Suppose that a PTA is a customs union of countries H and P. Then the optimal external tariff rate $t_{CU}$ changes by economic growth concerning the CU as follows.

(i) An expansion of the FTA market (an increase in $A$) leads to a rise in $t_{CU}$.

(ii) A reduction in home firm H’s productivity (a rise in $C_H$) leads to a rise in $t_{CU}$.

(iii) An improvement of inside firm P’s productivity (a reduction in $C_P$) leads to a rise in $t_{CU}$.

(iv) A reduction in outside firm W’s productivity (a rise in $C_W$) leads to a rise in $t_{CU}$.

The only difference between $t_{CU}$ and $t_{E}$ lies in result (ii). A reduction in home firm H’s productivity (a rise in $C_H$), which promotes external trade liberalization for an FTA, will hinder the trade liberalization for a customs union.

**8. Concluding Remarks**

This paper provides new theoretical insight about whether PTAs promote or hinder unilateral trade liberalization toward nonmembers from the two viewpoints. First we have investigated whether the external tariff rate set by home government will increase or decrease when economic growth occurs after a formation of an FTA. Second, we consider an endogenous determination not only of trade policy but also of foreign direct investment (FDI) policy.

An interesting finding is that whether the optimal external tariff rate rises or declines crucially depends on the types of economic growth, and that these properties will change drastically depending on whether foreign direct investment (FDI) policy is endogenous or exogenous. First, when FDI policy is *endogenously* determined, the optimal external tariff is the tariff rate at which home welfare is maximized when an outside firm chooses exporting. This tariff rate (i) *rises* by an
expansion of home market demand while it (ii) declines by the induced reduction in home firm’s productivity and (iii) by the induced improvement of inside firm’s productivity (due to trade creation) and (iv) by the induced reduction in outside firm’s productivity (due to trade diversion). These results imply that the market expansion type of growth will hinder external trade liberalization while productivity improvement type of growth will promote it.

Second, when FDI cost is exogenously given to home government and sufficiently small, the optimal external tariff is the critical tariff rate at which an outside firm switches their supply mode from exporting to FDI. This tariff rate, in contrast to the case of endogenous FDI policy, (i) declines by an expansion of FTA market and (ii) by the induced reduction of home firm’s productivity, while it (iii) rises by the induced improvement of inside firm’s productivity and (iv) by the induced reduction in an outside firm’s productivity. These results imply that economic growth in home country will promote external trade liberalization while (productivity improvement type of) growth in the other countries will hinder it. These findings remain intact even if we incorporate technological spillovers from an outside firm’s FDI. It is also suggested that in order to promote external trade liberalization, there may be some case where an imposition of international FDI rules over countries joining an FTA is useful.

In closing, we provide qualifications of this paper. First, we interpreted a fixed FDI cost as an FDI policy. However, FDI policy should be a wider concept and can directly affect welfare of home country. If we allowed the possibility of FDI subsidies, we should take into account the welfare effect of the associated tax collections (see e.g., Ishii (2006)). Second, we have not evaluated the world welfare. It must be interesting to find the optimal external tariff rate which maximizes total welfare of the three countries, and compare it with those in the present paper. Third, we may be able to extend the analysis by considering the number of firms. These problems are left for future research.

**Appendix 1: Pre-FTA Regime**

In order to justify the setting of our FTA model, we implicitly suppose that three countries initially lie under a trading regime without an FTA. Before a formation of an FTA, the home government sets a common tariff rate $t_B$ to countries P and W.
We derive an equilibrium under a pre-FTA regime. Firm H’s profit function is
\[ \pi_H = \{ A - \left[ Y_H + Y_P + Y_W \right] - C_H \} Y_H, \]
while firm k’s profit functions are
\[ \pi_k = \{ A - \left[ Y_H + Y_P + Y_W \right] - (C_k + t_B) \} Y_k \] (k=P,W). Thus the reaction functions of firm H, P and W are, respectively:
\[ A - 2Y_H - Y_P - Y_W = C_H \]
\[ A - Y_H - 2Y_P - Y_W = C_P + t_a \]
\[ A - Y_H - Y_P - 2Y_W = C_W + t_B \]

We obtain equilibrium values under the pre-FTA regime as follows (B means “before” FTA).
\[ Y_H^B = \frac{A - 3C_H + (C_P + t_B) + (C_W + t_B)}{4} \]
\[ Y_P^B = \frac{A + C_H - 3(C_P + t_B) + (C_W + t_B)}{4} \]
\[ Y_W^B = \frac{A + C_H + (C_P + t_B) - 3(C_W + t_B)}{4} \]
\[ P^B = \frac{A + C_H + (C_P + t_B) + (C_W + t_B)}{4} \]
\[ \pi_H^B = \left[Y_H^B\right]^2, \quad \pi_P^B = \left[Y_P^B\right]^2, \quad \pi_W^B = \left[Y_W^B\right]^2 \]
(A.1)

Under Assumption 1, all the three firms’ equilibrium outputs under free trade are positive. Let us derive the condition under which their equilibrium outputs are positive under a positive tariff rate \( t_B \):
\[ t_B < \frac{A + C_H - 3C_P + C_W}{2}, \]  
(B)

Under (B), home government maximizes her welfare \( V_H^B \), which is the sum of consumers’ surplus, firm H’s profit and the tariff revenue from firms P and W:
\[ V_H^B = \frac{1}{2} \left[ \frac{3A - C_H - C_P - C_W - 2t_B}{4} \right]^2 + \left[ \frac{A - 3C_H + C_P + C_W + 2t_B}{4} \right]^2 \]
The optimal tariff rate under the pre-FTA regime is:

\[ t_B = \frac{3A - C_H - C_p - C_w}{10} \]  

(A.3)

The maximized home welfare under the pre-FTA regime is:

\[ V_{H}^{H^*} = \frac{1}{32} \left[ \frac{(3A - C_H - C_p - C_w)^2}{5} + (3A - C_H - C_p - C_w)^2 + 2(A - 3C_H + C_p + C_w)^2 \right] \]

(A.4)

Does Home Country have an Incentive to form an FTA?

Let us next consider whether country H has an incentive for forming an FTA. We immediately see that country H has higher welfare when forming an FTA and choosing the optimal external tariff rate than when it stays in the pre-FTA regime:

\[ V_{H}^{H^*} - V_{H}^{H} = \frac{1}{32} \left[ \frac{(3A - C_H - 7C_p - 9C_w)^2}{21} - \frac{(3A - C_H - C_p - C_w)^2}{5} \right] > 0 \]

(A.5)

We can show that country H chooses to form an FTA than to stay in the pre-FTA regime if the market demand \( A \) is small enough (The proof is available on request).

Is the optimal external tariff rate lower than the pre-FTA optimal tariff rate?

Finally, we examine whether the optimal external tariff rate under an FTA is lower than that under the pre-FTA regime. From \( t_B > t_E \), we obtain

\[ 33\alpha + 91\beta > 69\gamma \]

(A.6)

where

\[ \alpha = A - C_H, \quad \beta = C_H - C_p, \quad \gamma = C_H - C_w. \]

Given \( \gamma \), we draw a line representing the relation between \( \alpha \) and \( \beta \). Combining it with Assumption 1 (\( \beta < \gamma \) and \( \alpha > \beta + \gamma \)), we find the (shaded) area of \( (\alpha, \beta) \) that ensures \( t_B > t_E \).
Given marginal costs of firms, the optimal external tariff rate under an FTA is lower than that under the pre-FTA regime if the home market demand $A$ is large enough. Note that there exists a range of $A$ that satisfies both $V^{*}_H > V^{*}_H$ and $t_B > t_E$, though we do not show it here explicitly.

**Appendix 2: Interpretation of Economic Growth due to Dynamic Economies of Scale**

In the text, we consider changes in market demand $A$ and firms’ marginal costs. Let us give some justification for the direction of change of these variables by regarding them as being caused by dynamic economies of scale. For this purpose, we examine how each firm’s equilibrium output changes when moving from a pre-FTA regime to an FTA regime. First, a change in home firm H’s output is

$$Y^*_H - Y^*_H = t_E - \frac{2t_B}{4}$$  \hspace{1cm} (A.7)

Since we consider the case when $t_E < t_B$ holds, this is negative. Thus home firm H decreases its equilibrium output. If we suppose dynamic economies of scale over firms, home firm will decrease its marginal productivity ($C_H$ increases) after home government forms an FTA. Second, a change in
inside firm P’s output is
\[ Y_P^T - Y_P^\beta = \frac{t_k + 2t_{\beta_k}}{4} > 0 \] (A.8)

Inside firm P increases its equilibrium output and thus its marginal productivity \( C_P \) decreases after home government forms an FTA. Third, a change in outside firm W’s output is
\[ Y_W^T - Y_W^\beta = \frac{2t_{\beta_k} - 3t_k}{4} \] (A.9)

Outside firm W can either increase or decrease its equilibrium output and thus its marginal cost \( C_W \) can increase or decrease after home government forms an FTA. If \( t_k < (2/3)t_{\beta_k} \) holds, firm W’s output increases and thus we should focus on the case where \( C_W \) decreases. When \( (2/3)t_{\beta_k} < t_k < t_{\beta_k} \) holds, firm W’s output decreases and thus we should focus on the case where \( C_W \) increases.

Finally, suppose that home welfare is a proxy for aggregate income, which is a source of market demand. We have already mentioned above that home welfare under an FTA regime exceeds that under the pre-FTA regime if FTA market demand \( A \) is small. Thus we could suppose that the home market demand \( A \) will increase after a formation of an FTA.

To Be Revised. Comments are welcome.

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