

Does a Bilateral FTA Become a Building Bloc for Free Trade?*

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Abstract

This paper examines whether a formation of bilateral FTA becomes a building bloc for free trade in a three-country model, where each country has a local firm and a domestic market. We assume that these countries are different with respect to market scale. We construct a following three-stage game: In the first stage, the governments determine whether they form an FTA. In the second stage, if an FTA is formed, then the governments of member countries eliminate an internal tariff and impose an external tariff in order to maximize own national welfare. Otherwise, then the governments of all countries set an import tariff. In the third stage, given the tariff level, firms compete à la Cournot in all markets. To examine whether a bilateral FTA becomes a building bloc for free trade, we investigate the feasibility of an expansion of the bilateral FTA through acceptance of new member as well as a formation of overlapping FTAs. Our main conclusions are as follows: [i] A bilateral FTA can be formed unless the market scales of negotiating countries are quite different. [ii] An expansion of bilateral FTA through new membership cannot lead to multilateral free trade. [iii] Under some condition, a bilateral FTA can be a building bloc for free trade through a formation of overlapping FTAs.

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1 Introduction

Recently, many countries and regions have been tried to form preferential trade agreements (PTAs). The number of PTAs notified to GATT/WTO and in force is increasing from 81 in 1993 to 211 in as of 18 July 2008, that is, the number of PTAs is more than doubled in recent 15 years¹.

There are at least three features of recent formation of PTAs: (i) The majority of the concluding PTAs are bilateral agreements. Fiorentino, Verdeja, and Toqueboeuf (2007, p.8) stated that "bilateral agreements account for 80 per cent of all RTAs notified and in force; 94 per cent of those signed and under negotiations; and 100 per cent of those as a proposal stage"². For example, Japan has been formed or negotiating FTAs with Singapore, Mexico, Thai, Chili, Korea, as well as other countries. (ii) Most of the concluding PTAs are free trade agreements (FTAs). According to Fiorentino, Verdeja, and Toqueboeuf (2007), FTAs accounts for 84% of all RTAs notified and in force and 92% of the projected RTAs are intended to be FTAs. (iii) An increases in FTAs between dissimilar countries (i.e., between developed and developing countries), although many FTAs are formed between similar countries until recently. Fiorentino, Verdeja, and Toqueboeuf (2007) showed that the major clusters of PTAs are North-South PTAs³. As Bhagwati (1993) pointed out, one of the most important issues is whether these proliferations of PTAs will become "building blocs" or "stumbling blocs" for multilateral free trade (MFT). With these features of recent PTAs in mind, we investigate whether a formation of bilateral FTA becomes building bloc for free trade.

There are a number of previous literature examining some aspects of PTAs⁴. One strand of the literature investigates the feasibility of formation of PTAs. For example, Freund (2000) examined the interaction between PTAs and multilateral tariff reduction in a repeated game framework, and showed that tariff reduction can make a bilateral FTA feasible between symmetric countries. Das and Ghosh (2006) examined the endogenous formation of trading blocs in a four-country model with asymmetric market size, and showed that either there is global free trade or FTAs formed among similar countries in the coalition proof Nash equilibrium. We should note that Das and Ghosh (2006) keep the situations where the majority of PTAs are formed between similar countries in mind. However, these recognition does not fit in well with the recent features of PTAs as mentioned

¹These numbers include notifications made under GATT Article XXIV, GATS Article V, and the Enabling Clause. See http://www.wto.org/english/tratop_e/region_e/region_e.htm for details.

²Note that, in Fiorentino, Vereja, and Toqueboeuf (2007), bilateral agreements may include more than two countries when one of them is an RTA itself.

³See Table 1 in Fiorentino, Verdeja, and Toqueboeuf (2007, p.10) for details.

⁴See Bhagwati (1993) and Panagariya (2000) for survey.

above.

Another strand of the literature deals with the feasibility of expansion of PTAs, which is the most related studies with this paper. Yi (1996) showed that the formation of custom union (CU) makes member countries (non-member countries) better off (worse off) and that whether a formation of CU becomes stumbling bloc against free trade under the *unanimous regionalism* rule of CU formation because the original member countries might oppose the participation of non-member countries. Yi (2000) showed that, in contrast to CU case, a formation of FTA makes both member and non-member countries better off, and that the global free trade might not be stable outcome. Mukunoki (2005) compared non-discriminatory trade liberalization by a multilateral trade agreement (MTA) with sequential trade liberalization by a PTA employing a political economy approach, and showed that there is a case where only PTA-path attains MFT, though the opposite case also exists. In these analysis, an expansion of PTAs is considered as new membership of existing PTAs only.

However, as Mukunoki and Tachi (2006) pointed out, there are another way of expansion of PTAs, that is, a formation of an overlapping FTAs⁵. When one of member countries of existing FTAs forms another FTA with non-member country, then hub-and spoke system arises⁶. Mukunoki and Tachi (2006) investigated whether the sequential negotiation of FTAs and hub-and-spoke systems produce MFT, and showed that even if an expansion of the bilateral FTA through new membership cannot achieve MFT, the formation of overlapping FTAs could generate free trade as a unique Markov-perfect equilibrium. While previous studies investigated the feasibility of formation and expansion of FTAs, it will be useful to notice that they assumed at least either symmetric countries or exogenous fixed tariff. As mentioned above, one of the features of recent FTAs is the increase in formation of FTAs between dissimilar countries. Thus, introducing the asymmetry of market scale as well as endogenous tariff determination into basic model of Mukunoki and Tachi (2006) and Freund (2000), we will examine the feasibility of FTAs and whether a formation of bilateral FTA will be a building bloc for free trade.

Consider a world economy with three countries. Each country has a local firm and a domestic market. We assume that these countries are different with respect to market scale. The following three-stage game is considered: In the first stage, governments determine whether they form a FTA. In the second stage, if the FTA

⁵We should note that overlapping agreements can be formed only when the existing PTA is FTA. If existing PTA is CU, then each member country cannot negotiate individually with non-member countries.

⁶For example, Chile is attaining a position as a hub-country forming or negotiating FTAs with New Zealand, Brunei, Singapore, China, India, Japan, and other countries. Singapore and Thailand have also become active in formation of bilateral FTAs in recent years.

is formed, then the government of member countries eliminate internal tariff and impose external tariff so as to maximize own national welfare. Otherwise, all governments determine import tariff level. In the third stage, given tariff level, the firms compete *à la* Cournot in all markets. Our main conclusions are as follows: [i] A bilateral FTA can be formed unless the market scale of negotiating countries are quite different. [ii] An expansion of FTA through an acceptance of new member is not feasible. [iii] Under some condition, a bilateral FTA can be a building bloc for free trade through a formation of overlapping FTAs.

2 The Model and Preliminary Results

2.1 Setup

Consider a world economy with three countries. Each country has a single local firm and a domestic market. From the viewpoint of market scale, we refer these countries as the large country L, the medium country M, and the small country S, respectively. We assume that markets are segmented. The demand functions of market i ($i = L, M, S$) are given by

$$P^i = 1 - d^i Q^i \quad (1)$$

, where $Q^i = q_L^i + q_M^i + q_S^i$ is total quantity supplied to market i and q_j^i is the quantity supplied by the firm in country j to market i . For easy calculation, we assume that $d^S \equiv 2 > d^M > d^L \equiv 1$. Each government i imposes the specific tariff t_j^i on imports from country j , where $t_j^i \geq 0$ if $i \neq j$ and $t_j^i = 0$ if $i = j$. Firms compete *à la* Cournot in all markets. For simplicity, we assume that firms are symmetric and normalize production costs to zero. There are no transportation costs. Profits of firm j in market i are given by

$$\pi_j^i = (P^i - t_j^i) q_j^i. \quad (2)$$

The welfare functions of country i are given by

$$W^i = \frac{(1 - P^i) Q^i}{2} + (\pi_i^L + \pi_i^M + \pi_i^S) + t_j^i q_j^i + t_k^i q_k^i. \quad (3)$$

We construct a following three-stage game: In the first stage, governments negotiate on an FTA. Each government involved in the negotiation decides its unilateral stance to the FTA. Only when all governments involved in the negotiation decide to agree it, the FTA is formed. In the second stage, the governments set an import tariff in order to maximize its social welfare. When an FTA is formed, then the governments of member countries eliminate the internal tariff and set the

external tariff only. In the third stage, firms compete *à la* Cournot in all market given tariff level set by the governments in the previous stage. We solve the game by backward induction.

2.2 Cournot Outcome

In the third stage, given t_j^i , firms compete *à la* Cournot in all markets. Note that we can treat each market separately because of zero marginal costs. From equations (1) and (2), a quantity supplied of firm j in market i are given by

$$q_j^i = \frac{1}{4d^i} \left(1 + \sum_{h=L,M,S} t_h^i \right) - t_j^i. \quad (4)$$

2.3 Optimal Tariff

In this subsection, we solve the optimal tariff level when any FTA is not formed. From equations (1) through (4), social welfare of country i are given by

$$\begin{aligned} W^i = & \frac{1}{32d^i} (3 - t_j^i - t_k^i)^2 \\ & + \left[\frac{1}{16d^i} (1 + t_j^i + t_k^i)^2 + \frac{1}{16d^j} (1 - 3t_i^j + t_k^j)^2 + \frac{1}{16d^k} (1 - 3t_i^k + t_j^k)^2 \right] \\ & + t_j^i \left(\frac{1}{4d^i} (1 - 3t_j^i + t_k^i) \right) + t_k^i \left(\frac{1}{4d^i} (1 + t_j^i - 3t_k^i) \right). \end{aligned} \quad (5)$$

The first term represents consumer surplus, the terms within the square brackets represents producer surplus, and the sum of third and last terms represents tariff revenue in the country i . From equation (5), optimal tariff level is given by

$$t^* = \frac{3}{10}. \quad (6)$$

Equation (6) shows that the optimal tariff level does not depend on the tariff level set by other countries when any FTA is not formed. Substituting equation (6) into equation (5), we have social welfare as shown in Table 1.

	W^i
Country L	$\frac{2+81d}{200d}$
Country M	$\frac{3b+80}{200d}$
Country S	$\frac{1+21d}{100d}$

Table 1: Social Welfare without FTA

2.4 Free Trade

Substituting $t_i^j = 0$ into equation (5), we have the free trade outcome.

	W_{FT}^i
Country L	$\frac{(6d+1)}{16d}$
Country M	$\frac{(3d+11)}{32d}$
Country S	$\frac{15d+4}{64d}$

Table 2: Social Welfare under Free Trade

3 Analysis

In this section, we examine the feasibility of FTA such as a bilateral FTA (subsection 3.1), an expansion of the bilateral FTA (subsection 3.2), an overlapping FTAs (subsection 3.3), and the feasibility of MTA (subsection 3.4).

3.1 Bilateral FTA

3.1.1 Large-Medium FTA

Suppose that an FTA between country L and country M is formed. In this case, governments L and M eliminate their internal tariff ($t_L^M = t_M^L = 0$) and impose an external tariff so as to maximize own national welfare, while government S does not change the tariff level on import from countries L and M . Thus, a formation of L-M FTA does not affect the quantity supplied to market S ($t_L^S = t_M^S = t^*$). From here, the optimal external tariff under L-M FTA are calculated as follows.

$$t_S^L = t_S^M = \frac{1}{7} \equiv t_{LM}. \quad (7)$$

Substituting equation (7) into equation (5), social welfare under L-M FTA is calculated as follows.

	W_{LM}^i
Country L	$\frac{(3549d+800)}{9800d}$
Country M	$\frac{(849d+3500)}{9800d}$
Country S	$\frac{(54d+5)}{245d}$

Table 3: Social Welfare under L-M FTA

From Tables 1 and 3, the changes in welfare of each country from moving to L-M FTA are as follows:

$$\begin{aligned}
W_{LM}^L - W^L &= -\frac{3(70d - 117)}{4900d} > 0 \text{ if } d < \frac{117}{70} \equiv d_{LM} & (8) \\
W_{LM}^M - W^M &= \frac{3(117d - 70)}{4900d} > 0 \\
W_{LM}^S - W^S &= \frac{51(1 + d)}{4900d} > 0
\end{aligned}$$

From equation (8), we obtain the following results.

Lemma 1 (i) L-M FTA is formed if $d < d_{LM}$. (ii) L-M FTA also benefits non-member country S.

3.1.2 Medium-Small FTA

Next, we consider the feasibility of M-S FTA. In the same way as L-M FTA, the optimal external tariff under M-S FTA are

$$t_L^M = t_L^S = \frac{1}{7} \equiv t_{MS}. \quad (9)$$

Substituting equation (9) into equation (5), we can calculate social welfare under M-S FTA as follows:

	W_{MS}^i
Country L	$\frac{(201d+10)}{490d}$
Country M	$\frac{(249d+1750)}{4900d}$
Country S	$\frac{(231d+100)}{1225d}$

Table 4: Social Welfare under M-S FTA

From Tables 1 and 4, the changes in welfare of each country from moving to M-S FTA are as follows:

$$\begin{aligned}
W_{MS}^L - W^L &= \frac{51(2 + d)}{9800d} > 0 & (10) \\
W_{MS}^M - W^M &= \frac{3(117d - 140)}{9800d} > 0 \text{ if } d > \frac{140}{117} \equiv d_{MS} \\
W_{MS}^S - W^S &= -\frac{3(35d - 117)}{4900d} > 0
\end{aligned}$$

From equation (10), the following results is derived.

Lemma 2 (i) *M-S FTA is formed if $d > d_{MS}$. (ii) M-S FTA also benefits non-member country L.*

3.1.3 Large-Small FTA

Finally, let us examine whether L-S FTA is formed. The optimal external tariff under L-S FTA are calculated as follows:

$$t_M^L = t_M^S = \frac{1}{7} \equiv t_{LS}. \quad (11)$$

Substituting (11) into (5), social welfare under L-S FTA is as follows:

	W_{LS}^i
Country L	$\frac{(1950d+49)}{4900d}$
Country M	$\frac{(15d+196)}{490d}$
Country S	$\frac{(1275d+49)}{4900d}$

Table 5: Social Welfare under L-S FTA

From Tables (1) and (5), the changes in welfare of each country from moving to L-S FTA are as follows:

$$\begin{aligned} W_{LS}^L - W^L &= -\frac{69}{9800} < 0 \\ W_{LS}^M - W^M &= \frac{153}{9800} > 0 \\ W_{LS}^S - W^S &= \frac{123}{2450} > 0 \end{aligned} \quad (12)$$

From equation (12), we have.

Lemma 3 *L-S FTA is not formed.*

From Lemmas 1 through 3, we obtain the following results.

Proposition 1 (i) *A bilateral FTA is formed unless the negotiating countries' market scale are quite different. (ii) If a bilateral FTA is formed, then it benefits non-member country and increases world welfare.*

Intuition behind Proposition 1 is as follows: A formation of bilateral FTA eliminates internal tariff and induces a reduction of external tariff as shown in equations (6), (7), (9), and (11). Equation (5) shows that these effects of bilateral FTA increase consumer surplus and decrease tariff revenue clearly. But, effects on producer surplus is ambiguous. The profits of home firm i in market i is decreased, that in market of partner country is increased, and that in market of non-member country is not changed. If the scale of home market is greater than that of partner country's market, then the decreases in profits in home market outweigh the increases in profits in partner's market. In this case, the formation of bilateral FTA may decrease home country's welfare although it increases partner country's welfare. When the differences in market scale between negotiating countries are quite large, then the negotiation fails because larger country has no incentive to agree it. Therefore, L-M and M-S FTAs may be formed, although L-S FTA is not formed.

3.2 Expansion of FTA through New Membership

In this subsection, we consider an expansion of the bilateral FTA through new membership, in order to investigate whether a bilateral FTA leads to MFT, or serves as a building bloc for free trade.

Firstly, we examine an expansion of L-M FTA. Given the existence of L-M FTA, all governments negotiate the expansion of L-M FTA, that is a realization of MFT. In the same way as a bilateral FTA, each government decides its unilateral stance for the expansion, and the FTA expands only when all governments agree the negotiation. From Tables 2 and 3, the changes in welfare from an expansion of L-M FTA are as follows:

$$\begin{aligned}
 W_{FT}^L - W_{LM}^L &= \frac{3(84d - 125)}{19600d} > 0 \text{ if } d > \frac{125}{84} \\
 W_{FT}^M - W_{LM}^M &= \frac{3(93d - 175)}{39200d} > 0 \text{ if } d > \frac{175}{93} \\
 W_{FT}^S - W_{LM}^S &= \frac{3(220 + 73d)}{15680d} > 0
 \end{aligned} \tag{13}$$

Equation (13) shows that an expansion of L-M FTA is not realized because $d_{LM} < 175/93$.

Secondly, we consider an expansion of M-S FTA. From Tables 2 and 4, the

changes in welfare from an expansion of M-S FTA are as follows:

$$\begin{aligned}
W_{FT}^L - W_{MS}^L &= \frac{3(55 - 46d)}{3920d} > 0 \text{ if } d < \frac{55}{46} \\
W_{FT}^M - W_{MS}^M &= \frac{3(561d - 175)}{39200d} > 0 \\
W_{FT}^S - W_{MS}^S &= \frac{3(1197d - 500)}{78400d} > 0
\end{aligned} \tag{14}$$

Equation (14) shows that an expansion of M-S FTA is not realized because $d_{MS} > 55/46$. It can be summarized as follows:

Proposition 2 *An expansion of bilateral FTA through new membership is not feasible.*

Let us consider the intuition behind Proposition 2. If a bilateral FTA is expanded, an elimination of external tariff increases consumer surplus and vanishes tariff revenue in all countries. The changes in profits of original FTA member countries' firms in both home and partner's markets decrease while that in new member's market increases. On the other hand, new member country firm can earn more profits in both original members' markets although less profit in home market as compared with non-member position.

Suppose that L-M FTA is expanded. Although new member country S loses tariff revenue and decreases profits of home firm in home market, these welfare losses are not so much because of the small market size. On the other hand, original member countries L and M also lose tariff revenue and decrease profits in each other's markets L and M . These welfare losses outweigh the increases in consumer surplus unless the market scale of medium country is small. Therefore, an expansion of L-M FTA is not feasible.

Next, we consider an expansion of M-S FTA. In this case, new member L has no incentive to join the FTA when the market scale between countries L and M is similar. The reduction of tariff by country L is larger than that by original member countries. This means that firm L loses its effective cost advantage in home market drastically although it improves effective cost disadvantages in both foreign markets. We should note that losses in competitive advantage in home market is larger than improvement of competitive disadvantage in two foreign markets. As a result, these decreases in producer surplus in home market together with elimination of tariff revenue exceeds the increase in consumer surplus as well as profits in both two foreign markets when the differences in market scale between country L and other two countries are large.

3.3 Overlapping FTAs

In this subsection, we investigate the feasibility of overlapping FTAs. If non-member country forms a bilateral FTA with only one of two member countries, then hub-and-spoke system arises. Under hub-and-spoke system, if spoke-countries conclude a spoke-spoke FTA, then MFT is realized.

3.3.1 Hub-and-Spoke System

Under existence of L-M FTA, both countries L and M can be hub-country by forming a bilateral FTA with country S . From equations (5), (6), (7), and (9), welfare of each country under hub-and-spoke system are as follows:

	W_{LM-LS}^i	W_{LM-MS}^i
Country L	$\frac{(603d+128)}{1568d}$	$\frac{(288d+49)}{784d}$
Country M	$\frac{(57d+280)}{784d}$	$\frac{(192d+539)}{1568d}$
Country S	$\frac{(189d+16)}{784d}$	$\frac{(156d+49)}{784d}$

Table 6: Social Welfare under Overlapping FTAs [1]

From Tables 3 and 6, the changes in welfare by formation of overlapping FTAs under L-M FTA are as follows:

$$W_{LM-LS}^L - W_{LM}^L = \frac{879}{39200} > 0 \quad (15)$$

$$W_{LM-LS}^M - W_{LM}^M = -\frac{39}{2800} < 0$$

$$W_{LM-LS}^S - W_{LM}^S = \frac{81}{3920} > 0$$

$$W_{LM-MS}^L - W_{LM}^L = \frac{3(34d - 125)}{19600d} < 0 \quad (16)$$

$$W_{LM-MS}^M - W_{LM}^M = \frac{3(468d - 175)}{39200d} > 0$$

$$W_{LM-MS}^S - W_{LM}^S = \frac{3(55 - 28d)}{3920d} > 0 \text{ if } d < \frac{55}{28}$$

Noting that $d_{LM} < 55/28$, equations (15) and (16) indicate the following results.

Lemma 4 *Under L-M FTA, both countries L and M can be formed overlapping FTAs with country S .*

Under the existence of M-S FTA, both countries M and S can be hub-country by forming a bilateral FTA with country L . From equations (5), (6), (7), and (9), welfare of each country under hub-and spoke system are as follows:

	W_{MS-LM}^i	W_{MS-LS}^i
Country L	$\frac{(288d+49)}{784d}$	$\frac{(609d+32)}{1568d}$
Country M	$\frac{(192d+539)}{1568d}$	$\frac{(81d+560)}{1568d}$
Country S	$\frac{(156d+49)}{784d}$	$\frac{(795d+256)}{3136d}$

Table 7: Social Welfare under Overlapping FTAs [2]

From Tables 4 and 7, the changes in welfare by formation of overlapping FTAs under M-S FTA are as follows:

$$\begin{aligned}
W_{MS-LM}^L - W_{MS}^L &= \frac{3(55 - 56d)}{3920d} < 0 & (17) \\
W_{MS-LM}^M - W_{MS}^M &= \frac{(936d - 175)}{39200d} > 0 \\
W_{MS-LM}^S - W_{MS}^S &= \frac{3(68d - 125)}{19600d} > 0 \text{ if } d > \frac{125}{68}
\end{aligned}$$

$$\begin{aligned}
W_{MS-LS}^L - W_{MS}^L &= -\frac{171}{7840} < 0 & (18) \\
W_{MS-LS}^M - W_{MS}^M &= \frac{33}{39200} > 0 \\
W_{MS-LS}^S - W_{MS}^S &= \frac{5091}{78400} > 0
\end{aligned}$$

Equations (17) and (18) state that non-member country L has no incentive to form a bilateral FTA with either countries M or S under M-S FTA. We have

Lemma 5 *Under M-S FTA, any overlapping FTAs cannot be formed.*

From Lemmas 4 and 5, we obtain the following results.

Proposition 3 *Overlapping FTAs can be formed under L-M FTA only .*

Let us consider intuition behind Proposition 3. Being hub-country is always beneficial than remaining member country of original bilateral FTA. Because of zero internal tariff and lower external tariff, losses of tariff revenue and decreases in

home firm's profit in home market by being hub-country are small. On the other hand, home firm can earn more profit in new-member country's market through tariff elimination. As a result, producer surplus is increased by being hub-country. Consumer surplus is increased clearly. That's why being hub-country is always beneficial. However, whether being spoke-country is beneficial is ambiguous. By being spoke-country, increases in consumer surplus and decreases in both tariff revenue and domestic profits are independent of with which country a non-member country forms a bilateral FTA because of assumption of symmetric firms. Increases in profits in partner country's markets depend on it because of assumption of asymmetric market scale. As the partner country's market is large, being spoke-country tends to be beneficial. Therefore, given L-M FTA (M-S FTA), being spoke-country always benefits (hurts) country S (country L). That is why L-M FTA can lead to a formation of overlapping FTAs although M-S FTA cannot. We should note that, given L-M FTA, a formation of overlapping FTAs always hurts another spoke-country, which is one of member countries of original L-M FTA.

3.3.2 Spoke-Spoke FTA

Now, let us consider whether spoke-countries have an incentive to form a bilateral FTA between them under hub-and-spoke system. Under hub-and-spoke system, hub-country imposes no tariff on both spoke-countries, while spoke-countries impose an external tariff on another spoke-country, which tariff level is the same as shown in equations (7) and (11). If they form a bilateral spoke-spoke FTA, then MFT arises. From equations (2) and (6), the changes in welfare of each country by formation of spoke-spoke FTA are as follows:

$$\begin{aligned}
W_{FT}^L - W_{LM-LS}^L &= -\frac{15(d+2)}{1568d} < 0 \\
W_{FT}^M - W_{LM-LS}^M &= \frac{3(11d-7)}{1568d} > 0 \\
W_{FT}^S - W_{LM-LS}^S &= \frac{3(44-7d)}{3136d} > 0
\end{aligned} \tag{19}$$

$$\begin{aligned}
W_{FT}^L - W_{LM-MS}^L &= \frac{3}{392} > 0 \\
W_{FT}^M - W_{LM-MS}^M &= -\frac{45}{1568} < 0 \\
W_{FT}^S - W_{LM-MS}^S &= \frac{111}{3136} > 0
\end{aligned} \tag{20}$$

From above equations, we obtain the following results.

Proposition 4 (i) Under overlapping FTAs, a formation of spoke-spoke FTA is feasible, which leads to MFT. (ii) Spoke-spoke FTA hurts hub-country.

Proposition 4 together with Proposition 2 indicates that a bilateral FTA can lead to MFT through a formation of overlapping FTAs although it cannot through an expansion of it. Let us consider intuition behind Proposition 4. Formation of spoke-spoke FTA eliminates external tariff on each firm in non-member country of existing two FTAs just the same. Although MFT arises as a result, from the viewpoint of spoke-country firm, tariff elimination by home government worsens its effective cost advantage in home market indirectly, but tariff reduction by another spoke-country government improves its effective cost disadvantages in that market directly. Because direct effect dominates indirect effect, producer surplus increases. Noting that increases in consumer surplus outweigh decreases in tariff revenue, spoke-spoke FTA always benefits spoke-countries. For original hub-country, a formation of spoke-spoke FTA eliminates an effective cost advantage in both spoke-countries' markets, and then decreases profits of hub-country firm in both markets. Because tariff revenue remains zero and consumer surplus is unchanged, a formation of spoke-spoke FTA hurts hub-country.

3.4 Multilateral Trade Agreement

Finally, let us consider the feasibility of MTA, that is negotiation on MFT by three countries. From Tables 1 and 2, we have the changes in welfare from moving to MTA are as follows:

$$\begin{aligned} W_{FT}^L - W^L &= \frac{3(7-4d)}{400d} > 0 \text{ if } d < \frac{7}{4} \equiv d_{MTA} & (21) \\ W_{FT}^M - W^M &= \frac{9(7d-5)}{800d} > 0 \\ W_{FT}^L - W^L &= \frac{3(28+13d)}{1600d} > 0 \end{aligned}$$

Proposition 5 MTA is concluded if $d < d_{MTA}$.

Eliminating all tariff, MTA increases each firm's profits in both foreign markets and decreases that in home market. Therefore, MTA increases producer surplus of country S , may increase that of country M , and decreases that of country L because of difference in market scale. Since increases in consumer surplus outweigh decreases in tariff revenue in all countries, MTA always benefits country S . Country M also receives benefits from MTA even if producer surplus decreases, because MTA benefits the country unless decreases in firm's profits in

home market is much larger than sum of that in two foreign markets. Therefore, MTA brings benefits to country L unless market scale of country M is quite small.

Propositions 3, 4, and 5 indicate the followings: (i) If $d_{MS} < d$, then a bilateral FTA can be a building bloc for MFT. (ii) $d_{LM} > d \geq d_{MS}$, then it may be both building bloc and stumbling bloc for MFT. (iii) It turns to a stumbling bloc for MFT if $d_{MTA} \geq d > d_{LM}$. (iv) When $d > d_{MTA}$, then a formation of bilateral FTA brings a partial trade liberalization although MFT is not feasible in any FTA. Figure 1 summarizes these results.

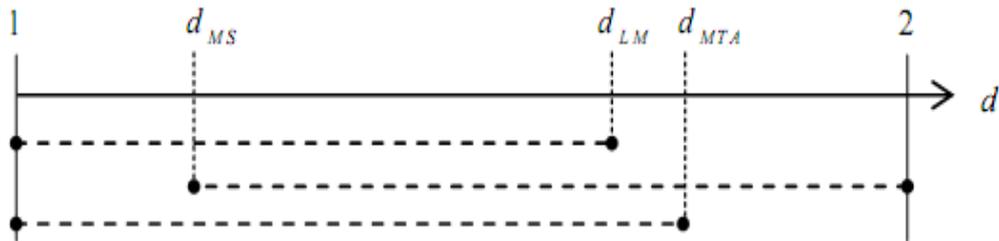


Figure 1: Feasibility of FTAs

4 Concluding Remarks

This paper examines the feasibility of bilateral FTA and whether the bilateral FTA leads to MFT in a three-country model, where each country has a local firm and a domestic market. Our main conclusions are as follows: [i] A bilateral FTA can be formed unless the market scale between the negotiating countries are quite different. [ii] The resulting bilateral FTA is not expanded through the acceptance of new member. [iii] Under some condition, a bilateral FTA can be a building bloc for free trade through a formation of overlapping FTAs. Introducing the asymmetry of market scale and endogenous tariff determination, we show that whether a bilateral FTA can leads to MTA depends on the differences in market scale of the negotiating countries. This paper also indicates that the effects of a formation of a bilateral FTA on non-member country's welfare depends on the existence of other FTA(s). If no FTA exists, it then hurts non-member country; otherwise it then benefits non-member country.

There are several directions for future research. In this paper, we do not concern with lobbying activities, which is one of potential extension of the model⁷. It

⁷For example, Krishna (1998), Mukunoki (2005), and Ornelas (2005) considered the effect of

would be interesting to introduce the cost differences among firms as well as the larger number of firms and/or countries.

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lobbying activities on PTAs.