Bilateralism, multilateralism, and the quest for global free trade*

Kamal Saggi[y] and Halis Murat Yildiz[z]

Abstract

This paper develops an equilibrium theory of trade agreements and evaluates the relative merits of bilateralism and multilateralism. We derive coalition proof (stable) Nash equilibria of a three-country game in which each country is free to negotiate a trade agreement with only one of its trade partners, or both of them (i.e. practice free trade), or none of them (i.e. opt for the status quo under which all countries impose their optimal Nash tari¤s on each other). To determine whether and how bilateralism matters, we also analyze this game under the assumption that countries follow a purely mul- circumstances under which free trade is a stable equilibrium only if countries are free to pursue bilateral trade agreements. These results hold even when governments are po10(c)-13(u8n5a)-13(t)-7955T(e)-35213(n)13(t)--13(u8)7489ndes

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1 Introduction

Global trade liberalization occurs through a variety of channels, not all of which appear to be in harmony with one another. While every major nation is now a member of the World Trade Organization (WTO) and a participant in its complex process of multilateral trade liberalization, an average WTO member also belongs to six preferential trade agreements (PTAs) (World Bank, 2005). The schizophrenic nature of today's multilateral trading system is re‡ected in the somewhat con‡icting rules of the WTO's key multilateral trade agreement, i.e. the General Agreement for Tari¤s and Trade (GATT): while Article I of GATT requires member countries to undertake trade liberalization on a most-favored-nation (MFN) or non-discriminatory basis, Article XXIV of the very same agreement permits a subset of WTO members to pursue PTAs under which they can grant tari¤ (and other trade policy) concessions to each other that they do not have to extend to others.[1] This raises the following question: would GATT serve the cause of global free trade more e¤ectively if it did not include the exception to MFN provided by Article XXIV? In other words, would global free trade be easier to achieve if all WTO members were to pursue trade liberalization on only a multilateral basis? To address this issue, we develop an equilibrium theory of free trade agreements (FTAs) and use it to compare the pros and cons of bilateral and multilateral approaches to trade liberalization. To the best of our knowledge, our paper is the …rst to provide such a comparison in a model in which the number of trade agreements as well as the nature and the degree of trade liberalization are endogenously determined.

An important feature of our approach is that it allows countries to form multiple FTAs. Formally, we analyze the coalition proof (or stable) Nash equilibria of a game of trade liberalization between three countries that differ with respect to their endowment levels. The game (which we refer to as bilateralism) proceeds as follows. In the …rst stage, each country announces whether or not it wants to form an FTA with each of its trading partners. An

[1] While Article XXIV tries to limit the damage on non-member countries by requiring

FTA between two countries requires them to abolish tari¤s on each other and it arises i¤ they both announce each other's name. Similarly, global free trade emerges i¤ all countries call each other's names. Next, given the world trade regime, countries impose their optimally chosen tari¤s. Finally, international trade and consumption take place. After analyzing equilibrium trade agreements under bilateralism, we examine the stable equilibria of this game under the restriction that countries can liberalize trade on only a multilateral basis (we call this restricted game multilateralism). By comparing equilibrium outcomes under bilateralism with those under multilateralism, we are able to isolate the consequences of the exception to multilateral trade liberalization that is provided to WTO members by GATT Article XXIV.[2]

Consistent with actual WTO experience, under our multilateralism game two countries are free to undertake mutual trade liberalization so long as they extend any tari¤ reductions that they grant to each other also to the third country.[3] We …nd that the degree of trade liberalization undertaken by two countries (say and

tari¤s of member countries of the bilateral FTA $\langle\{\quad\}\rangle$ are lower than the optimal non-discriminatory tari¤s that they choose under the multilateral agreement $\langle\{\quad^{m}\}\rangle$, the discriminatory nature of the bilateral FTA $\langle\{\quad\}\rangle$ implies that the non-member country is worse o¤ under it relative to the multilateral agreement $\langle\{\quad^{m}\}\rangle$.[4]

Our analysis also shows that when countries are symmetric with respect to their endowment levels, global free trade is the only stable equilibrium both under bilateralism and multilateralism – i.e. under symmetry, the freedom to pursue purely bilateral agreements has no consequences at all. This irrelevance result points to the importance of allowing for heterogeneity across countries. To this end, we then consider a scenario where endowment levels are unequal across countries and show that global free trade is stable over a larger parameter space under bilateralism relative to multilateralism. This result has a powerful and surprising implication – i.e. there exist circumstances where global free trade is a stable equilibrium only if countries are free to form bilateral FTAs. Why? The logic is as follows. First note that, in our model, global free trade obtains i¤ all countries participate in the multilateral agreement. Further, a country (say) that is considering not to participate in global free trade has to take into account its welfare under the agreement that would emerge in the absence of its participation. Next, as noted above, country is worse o¤ if the other two countries sign the bilateral FTA $\langle\{\quad\}\rangle$ relative to when they sign the multilateral agreement $\langle\{\quad^{m}\}\rangle$. As a result, a country's incentive to opt for free trade is stronger when the alternative to free trade is a bilateral FTA between the

tion.[5]

maximizes global welfare.

Our paper shares some key elements with Goyal and Joshi (2006) and Furusawa and Konishi (2007), both of which employ the network formation

2 Underlying trade model

To endogenize the formation of trade agreements among asymmetric countries, we utilize an appropriately adapted version of the partial equilibrium framework developed by Bagwell and Staiger (1997 and 1998). There are three countries: and and three (non-numeraire) goods: , , and . Each country's market is served by two competing exporters and denotes the good that corresponds to the upper case value of . For example, if = then = . Country is endowed with zero units of good and $_i$ units of the other two goods where $_a \leq _b \leq _c$.[10]

The demand for good in country is given by

$$(\ ^z_i) = \ - \ ^z_i \text{ where } = \text{ or} \qquad (1)$$

As is well known, the above demand functions can be derived from a utility function of the form $(\ ^z) = (\ ^z) +$ where ^{z}denotes consumption of good ; denotes the numeraire good; and $(\ ^z)$ is quadratic and additively separable in each of the three goods. Since each country possesses only two goods while it demands all three, country must import good in order to consume it and it can import it from either trading partner. For example, country imports good from both countries and while it exports good to country and good to country .

Let $_{ij}$ be the tari¤ imposed by country on its imports of good from country . Ruling out prohibitive tari¤s yields the following no-arbitrage conditions for good :

$$^I_i = \ ^I_j + \ _{ij} = \ ^I_k + \ _{ik} \qquad (2)$$

where = and $\neq \neq$. Let ^I_i be country 's imports of good . Since country has no endowment of good , we have

$$^I_i = (\ ^I_i) = \ - \ ^I_i \qquad (3)$$

Each country's exports of a good must equal its endowment of that good minus its local consumption:

$$^I_j = \ _j - [\ - \ ^I_j] \qquad (4)$$

Market clearing for good requires that country 's imports equal the total exports of the other two countries:

$$I_i = \sum_{j \neq i} I_j \tag{5}$$

Equations (2) through (5) imply that the equilibrium price of good in country equals:

$$I_i = \frac{1}{3}\left(3 - \sum_{j \neq i} {}_j + \sum_{j \neq i} {}_{ij}\right) \tag{6}$$

Using these prices, the volume of trade is easily calculated. As is clear from equation (6), the price of good in country increases in its tari¤s and decreases in the endowment levels of the other two countries. The e¤ect of a country 's tari¤ on its terms of trade is evident from equation (6): only a third of a given increase in either of its tari¤s is passed on to domestic consumers with exactly two third of the tari¤ increase falling on the shoulders of foreign exporters.

By design the model examines country 's trade protection towards only good (i.e. the only non-numeraire good that it imports). Since countries have asymmetric endowments, under free trade country faces the largest volume of imports of protected goods (it imports ($_b + _c$) 3 units of good) whereas country faces the lowest volume of imports of such goods (it imports ($_a + _b$

@If 5.08 -1.636 Td[(e)]TJ/F15 18.909 Tf 6.041 1.636 Td[(+)]TJ/F65 18.909 Tf 9.531 0 Td[(e)]TJ/F35 7.97 Tf 5.079 -

de…ned as the sum of consumer surplus, producer surplus, and tari¤ revenue over all such goods:

$$_i = \sum_z {}^z_i + \sum_z {}^z_i + \quad _i \tag{7}$$

Using equations (2) through (6) one can easily obtain welfare of country as a function of endowment levels and tari¤s. Let aggregate world welfare be de…ned as the sum of each country's welfare

$$= \sum_i \quad _i \tag{8}$$

We proceed as follows. First, we consider a three stage game of trade liberalization under which each country is free to pursue either (a) no trade liberalization or (b) bilateral trade liberalization or (c) multilateral trade liberalization.[12] This game is meant to capture the various options regarding trade liberalization that are available to WTO members today – option (b) being made possible by GATT Article XXIV. After deriving Nash equilibria of this game and isolating those equilibria that are stable (more on this below), we next ask how equilibrium outcomes are a¤ected if countries can choose only between options (a) and (c). The objective of this exercise to isolate the consequences of the exception to MFN that is provided under GATT Article XXIV.

3 Endogenous trade agreements

We now describe our game of trade liberalization (which we refer to as bilateralism).[13] In the …rst stage, each country simultaneously announces whether or not it wants to sign a free trade agreement (FTA) with each of its trading partners (country 's announcement is denoted by $_i$). Country 's strategy set $_i$ consists of four possible announcements:

$$_i = \{\{ \quad \} \{ \quad \} \{ \quad \} \{ \quad \}\} \tag{9}$$

[12] Note that all countries have market power in the competing exporters model of Bagwell and Staiger (1997 and 1998) that we utilize. As a result, allowing for unilateral liberalization is not necessary (no country will choose to pursue it in this model).

[13] It is worth emphasizing that in the bilateralism game, countries are free to pursue both bilateral and multilateral trade agreements.

where the announcement { } by country is in favor of the status quo (or no trade liberalization); { } is in favor of an FTA with only country ; { } is in favor of an FTA with only country ; and { } is in favor of FTAs with both of them (which is equivalent to country announcing in favor of multilateral free trade). This stage determines the underlying policy regime. Next, given the policy regime, countries impose their optimal

3.1 Equilibrium analysis under symmetry

Throughout the remainder of this section as well as section 4, we maintain the following assumption:[15]

Assumption 1:

$$_i = \quad \text{for all} \quad = \qquad \text{(symmetry)}$$

Let country 's welfare as a function of trade regime be denoted by $_i(\ )$ where $\{\langle\{\ \}\rangle\ \langle\{\ \}\rangle\ \langle\{\ \}\rangle\ \langle\{\ \}\rangle\ \langle\{\ \}\rangle$ or $\langle\{\ \}\rangle\}$ and $=$. Also, let $_i(\ -\ )$ denote the di¤erence between country 's welfare under trade regimes and :

$$_i(\ -\ ) \equiv \ _i(\ ) - \ _i(\ ) \qquad (10)$$

3.1.1 Optimal tari¤s

Since Article I of GATT forbids tari¤ discrimination, we assume that under the status quo, each country imposes a non-discriminatory tari¤ on its trading partners: $_{ij} = _{ik} = _i$ for all $=$. Country 's optimal MFN tari¤ is easily calculated:

$$_i \equiv \quad \max \ _i(\ ) = \frac{}{4} \qquad (11)$$

If two countries form an FTA, they remove their tari¤s on each other and impose their optimal external tari¤s on the non-member country: under $\langle\{\ \}\rangle$ we have $_{ij} = _{ji} = 0$, $_{ik} = ^{f}_{i}$ and $_{jk} = ^{f}_{j}$. The optimal external tari¤ of country on the non-member country is given by:

$$^{f}_{i} \equiv \quad \max \ _i(\ ) = \frac{}{11} \qquad (12)$$

Note that under symmetry, we have $_i = _j =$ and that $^{f}_{i} = ^{f}_{j} = ^{f}$. As in Bagwell and Staiger (1997), we …nd that the formation of a bilateral FTA induces each member to lower its tari¤ on the non-member country relative to the status quo (i.e. the model exhibits tari¤ complementarity): ^{f} .[16]

[15] Calculations supporting the results reported in the rest of the paper are contained in the appendix.

[16] See Bagwell and Staiger (1997) for a detailed discussion of the tari¤ complementarity e¤ect and Estevadeordal et. al. (2007) for empirical evidence in its support. It is worth

We are now ready to derive equilibrium trade agreements under bilateralism.

Is a bilateral FTA $\langle\{\quad\}\rangle$ a Nash equilibrium? It is easy to show that

$$_i(\quad -\quad) = \quad _j(\quad -\quad) \quad 0 \tag{14}$$

i.e. a member country of a bilateral FTA has no unilateral incentive to break the agreement and this implies that a bilateral FTA is a Nash equilibrium. It is also worth noting here that the tari¤ complementarity e¤ect is large enough to make the non-member country better o¤ under a bilateral FTA relative to the status quo:

$$_k(\quad -\quad) \quad 0 \tag{15}$$

The only remaining candidate for a Nash equilibrium is free trade $\langle\{\quad\}\rangle$. For $\langle\{\quad\}\rangle$ to be a Nash equilibrium, we need to rule out the following two (representative) deviations of country :

(UF1): From $\langle\{\quad\}\rangle$ to $\langle\{\quad\}\rangle$ (or $\langle\{$

3.1.3 Stable equilibria

Which, if any, of the Nash equilibrium agreements described in Proposition 1a are stable? We begin by considering the stability of free trade $\langle\{\quad\}\rangle$. To this end, we need to rule out three distinct joint deviations:

(JF1): Deviation of and/or from $\langle\{\quad\}\rangle$ to $\langle\{\quad\}\rangle$.

(JF2): Deviation of and from $\langle\{\quad\}\rangle$ to $\langle\{\quad\}\rangle$.

We now analyze a scenario where countries follow a multilateral approach to trade liberalization. The motivating question is: What, if anything, is lost if countries can pursue only multilateral trade liberalization?

4 Endogenous agreements under multilateralism

Under a multilateral approach to trade liberalization (or simply multilateralism), the strategy set of country is $_i = \{ \quad \}$, $\neq \quad \neq$. In other words, each country can announce either in favor of or against multilateralism. If all three countries announce in favor, they choose the jointly optimal set of tari¤s which, in our model, are equal to zero – i.e. all countries practice free trade. If only countries and announce in favor of multilateralism, they jointly choose their optimal tari¤s subject to the constraint that they cannot discriminate against country – i.e. in accordance with the MFN clause of the WTO, the tari¤s that they impose on each other must be equal to their respective tari¤s on country . Formally, countries and sign the multilateral agreement $\langle\{ \ ^m\}\rangle$ when individual country announcements are as follows: $_i = \ , \ _j = \ , \ _k = \ .$ Finally, we should note that if two (or more) countries announce against multilateralism, the status quo $\langle\{ \ \}\rangle$ prevails under which each country imposes its optimal MFN tari¤ on every other country.

4.1 Equilibrium analysis under symmetry

As in the previous section, we maintain our assumption that countries are symmetric: $_j = \ $ for all $= \ $. As noted above, if countries and agree to sign the multilateral agreement $\langle\{ \ ^m\}\rangle$ they choose the pair $(\ _i^m,$ $\ _j^m)$ to solve

$$(\ _i^m \ \ _j^m) \equiv \quad \max[\ _i(\ ^m) + \ _j(\ ^m)] \tag{18}$$

As is clear, under symmetry, we must have $\ _i^m = \ _j^m = \ ^m$ and this jointly optimal MFN tari¤ is given by:

$$^m = \frac{}{7} \qquad = \frac{}{4} \tag{19}$$

Since ^{m} , it is immediate that countries that sign the multilateral

agreement $\langle\{ \quad {}^{m}\}\rangle$ lower their tari¤s on each other as well as on the non-participating country (i.e.). Furthermore, it is worth emphasizing that country faces lower tari¤s in export markets when the other two countries implement the bilateral FTA $\langle\{ \quad \}\rangle$ relative to when they sign the multilateral agreement $\langle\{ \quad {}^{m}\}\rangle$, i.e., ${}^{f} \quad {}^{m}$. The inequality ${}^{f} \quad {}^{m}$ captures the free-riding problem inherent to multilateral trade liberalization when it does not involve all three countries – under $\langle\{ \quad {}^{m}\}\rangle$ country bene…ts from the multilateral trade liberalization undertaken by the other two countries without having to o¤er any liberalization in return since it retains its optimal Nash tari¤ on countries and . As a result, the degree of trade liberalization

(UM2): Deviation of from $\langle\{ \ ^m\}\rangle$ to $\langle\{ \ \}\rangle$.

It is easy to show that while a member country has no incentive to break the multilateral agreement $\langle\{ \ ^m\}\rangle$:

$$_i(\ ^m - \ ) \quad 0 \tag{20}$$

the outside country ( ) actually bene...ts from joining the agreement $\langle\{ \ ^m\}\rangle$ thereby converting it to $\langle\{ \ \}\rangle$:

$$_k(\ - \ ^m) \quad 0 \tag{21}$$

Thus, under symmetry the multilateral agreement $\langle\{ \ ^m\}\rangle$ fails to be a Nash equilibrium because the country that does not sign the agreement is worse-o¤ relative to free trade and by signing the agreement it can ensure that free trade obtains.[19]

4.1.2 Stable agreements under multilateralism

It is clear that the status quo $\langle \{ \quad \} \rangle$

We next derive optimal tari¤s under each regime under asymmetry.

5.1 Optimal tari¤s under asymmetry

If a country is not a member of any trade agreement, it chooses a non-discriminatory (or MFN) tari¤ to maximize its own welfare and this tari¤ is given by:

$$_{i} \equiv \quad \max \ _{i}(\ ) = \frac{_{j} + \ _{k}}{8} \tag{22}$$

Note that a country's MFN tari¤ increases with the endowments of its trading partners. Similar to (12), when countries and form a bilateral FTA $\langle\{\ \ \}\rangle$, they abolish tari¤s on each other and choose their external tari¤s independently. We have[21]

$$^{f}_{i} \equiv \quad \max \ _{i}(\ ) = \frac{5\ _{k} - 4\ _{j}}{11} \text{ and } \ ^{f}_{j} \equiv \quad \max \ _{j}(\ ) = \frac{5\ _{k} - 4\ _{i}}{11} \tag{23}$$

It is easy to see that the external tari¤ of an FTA member increases with the endowment of the non-member whereas it decreases with that of its FTA partner.[22] Similarly, a comparison of $_{i}$ and $^{f}_{i}$ implies that the magnitude of the tari¤ complementarity e¤ect increases with the size of partner country's endowment whereas it decreases with the endowment of the non-member country. To guarantee that all tari¤s are positive and non-prohibitive, given (23) we assume that $\min\{\ _{i}\ \ _{j}\ \ _{k}\} \geq \frac{4}{5}\max\{\ _{i}\ \ _{j}\ \ _{k}\}$.

Finally, under the multilateral agreement $\langle\{\ \ ^{m}\}\rangle$ countries and choose the pair ($^{m}_{i}$, $^{m}_{j}$) to maximize $_{i}(\ _{t}$

form a bilateral FTA with the smaller of its two trading partners:

$$_i(\ ) \geq \ _i(\ ) \text{ i¤ } \ _k \geq \ _j \qquad (25)$$

How does the endowment level of a competing exporter, denoted by , a¤ect the incentive of country to form a bilateral FTA with country ?

Lemma 2b: Let country be an FTA partner of country under regime but not under regime and let the status of country be the same under both regimes (i.e. either it is a partner of country under both regimes or not). Then,

(i) $\frac{@\ w_i(r\ v)}{@e_k} \leq 0$ if country is an FTA partner of country under regimes and ; whereas

(ii) $\frac{@\ w_i(r\ v)}{@e_k} \geq 0$ if country is not an FTA partner of country under regimes and .

The …rst part of the above lemma captures the idea that when country is already an FTA partner of country , country 's welfare gain from bilateral trade liberalization with country decreases with the endowment of country . Why is this true? Recall that both countries and export the same good to country (i.e. they are competing exporters). When country already enjoys free access to country 's market, the larger is country 's endowment the smaller the increase in country 's export surplus that results from the trade liberalization undertaken by country . The intuition behind part ( ) of the lemma is analogous – when its rival exporter (i.e. country) is not an FTA partner of country , the strategic advantage gained by country in country 's market from signing the bilateral FTA $\langle\{\ \}\rangle$ increases in country $\rangle\square$

To avoid redundancy, we focus directly on stable agreements under bilateralism (i.e. we skip the discussion of Nash equilibria). First consider the perspective of the two large countries. We know from Lemma 1 that spoke countries are worse o¤ relative to free trade under symmetry. Similarly, Lemma 2a and Lemma 2b imply that $\frac{@\ w_l(F\ \ l'h)}{@e_s} \leq 0$ and $\frac{@\ w_l(F\ \ sh)}{@e_s} \leq 0$. Thus, a large country (say) under free trade has no incentive to revoke one of its FTAs and become a spoke:

$$_l(\quad -\quad) \quad 0 \text{ and } \quad _l(\quad -\ ^0\ ) \quad 0 \text{ for all} \tag{27}$$

Similarly, we know from (16) that under symmetry, starting from global free trade a country has no incentive to unilaterally revoke its two FTAs. Lemma 2a and Lemma 2b reinforce this result for the large countries under asymmetry. We have:

$$\frac{_l(\quad -\ ^0)}{_s} = \underbrace{\frac{_l(\quad -\quad)}{_s}}_{\leq 0} + \underbrace{\frac{_l(\quad -\ ^0)}{_s}}_{\leq 0} \leq 0 \tag{28}$$

Therefore, a large country (say) prefers $\langle\{\ \ \}\rangle$ to $\langle\{\ \ ^0\}\rangle$:

$$_l(\quad -\ ^0) \quad 0 \text{ for all} \tag{29}$$

Thus, inequalities (27) and (29) show that a large country has no unilateral incentive to defect from free trade.

Next, consider incentives of the two large countries to jointly defect from free trade. There are …ve possible joint defections:

(JF1): Joint deviation of and from $\langle\{\ \ \}\rangle$ to $\langle\{\ ^0\ \}\rangle$.

(JF2): Joint deviation of and ^{0} from $\langle\{\ \ \}\rangle$ to $\langle\{\ \ \}\rangle$.

(JF3): Joint deviation of and from $\langle\{\ \ \}\rangle$ to $\langle\{\ \ \}\rangle$.

(JF4): Joint deviation of and ^{0} from $\langle\{\ \ \}\rangle$ to $\langle\{\ ^0\}\rangle$.

(JF5): Joint deviation of and or and ^{0} or all countries from $\langle\{\ \ \}\rangle$ to $\langle\{\ \ \}\rangle$.

It is immediate from (27) that a joint defection from free trade to any hub and spoke regime does not occur. Thus, JF1 and JF2 are ruled out. We know from inequality (17) that under symmetry (= 1) no two countries

bene…t from excluding the third country from free trade. Furthermore, we show in the appendix that $_I(\ -\ )$ is monotonically decreasing in :

$$\frac{\quad _I(\ -\ )}{\quad} \quad 0 \tag{30}$$

and $_I(\ -\ ) \quad 0$ at the smallest possible endowment (when $= \frac{5}{4}$) of country . This implies that joint deviation JF3 cannot occur:

$$_I(\ -\ ) \quad 0 \text{ for all} \tag{31}$$

It is immediate from inequalities in (25) and (31) that the two large countries

such an approach, there are four possible Nash equilibria: $\langle\{\ \}\rangle$, $\langle\{\ ^{m}\}\rangle$, $\{\ ^{0m}\}$ and $\langle\{\ \}\rangle$. Using arguments analogous to those under symmetry, it is straightforward to establish that $\langle\{\ \}\rangle$ and $\langle\{\ ^{m}\}\rangle$ are not stable multilateral agreements. To see when and why the other two agreements are stable, …rst note that (33) implies that no deviation can occur from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$. Furthermore, Lemma 4 implies that the large country ^{0} has no incentive to unilaterally deviate from $\langle\{\ \}\rangle$ to $\langle\{\ ^{m}\}\rangle$. This implies that $\langle\{\ ^{m}\}\rangle$ is not stable. In fact, the only deviation from free trade that we need to consider is the unilateral deviation of the small country from $\langle\{\ \}\rangle$ to $\{\ ^{0m}\}$. It turns out that this deviation does not occur if the degree of endowment asymmetry is small enough:

$$_{s}(\ -\ ^{0m}) \geq 0 \text{ i¤ } \leq\ _{s}(\ -\ ^{0F}$$

(ii) over the parameter range $_s(\ -\ ^{0m}) \quad \leq\ _s(\ -\ ^{0})$ the unique stable agreement under bilateralism is $\langle\{\ \}\rangle$ whereas under multilateralism it is $\{\ ^{0m}\}$.

Part (i) of proposition 4 says that free trade is stable over a larger parameter space when countries are free to sign bilateral FTAs relative to when they cannot. Part (ii) demonstrates that there exist circumstances where the freedom to pursue bilateral FTAs is necessary for achieving global free

$_s(\quad - \quad^0)$, we need to consider two possible scenarios: (1) $\langle\{\quad^0\}\rangle$ is stable or (2) $\langle\{\quad\}\rangle$ is stable. First, consider scenario (1) and note that lower internal and external tari¤s (thus freer trade) obtain under $\langle\{\quad^0\}\rangle$ relative to $\{\quad^{0m}\}$:

$$\begin{matrix} m \\ l \end{matrix} \qquad \begin{matrix} f \\ l \end{matrix} \tag{38}$$

Thus, larger trade volumes and higher aggregate world welfare obtain under $\langle\{\quad^0\}\rangle$ relative to $\{\quad^{0m}\}$:

$$(\quad^0 - \quad^{0m}) \quad 0 \tag{39}$$

Now consider scenario (2) where $\langle\{\quad\}\rangle$ is the stable bilateral agreement. We show the following in the appendix

$$(\quad - \quad^{0m}) \quad 0 \text{ when } \quad _s(\quad - \quad^0) \qquad \quad _{l'}(\quad - \quad) \tag{40}$$

i.e. over the relevant parameter range, global welfare is higher under the bilateral agreement $\langle\{\quad\}\rangle$ relative to the multilateral agreement $\{\quad^{0m}\}$. Thus, when free trade is out of reach, the option to pursue bilateral FTAs can yield deeper (and welfare-improving) trade liberalization that is foregone under the multilateral approach. Figure 3 illustrates the bene..cial e¤ects of bilateralism.

–Figure 3 here–

Of course, aggregate world welfare does not necessarily speak to the fate of individual countries. In this regard, we can state the following:

Proposition 5: Suppose Assumption 2a holds. Then, the relative welfare e¤ects of bilateralism and multilateralism on individual countries are as follows:

(i) when $\quad _s(\quad - \quad^{0m})$

5.5 One large and two small countries

We now consider the case where two countries have smaller endowments than the third:

Assumption 2b: $_s = _{s'} = \underline{e}$ $_l =$ and $\frac{5}{4} \geq$ 1.

5.5.1 Stable agreements

We …rst derive conditions under which free trade is a stable equilibrium. Similar to the previous case, we consider the perspective of the large country …rst. It is immediate from Lemma 1, (16) and Lemma 2a that the large country has no incentive to unilaterally deviate from $\langle\{ \ \}\rangle$ to $\langle\{ \ ^0\}\rangle$ or $\langle\{ \ \}\rangle$ ($\langle\{ \ ^0 \ \}\rangle$):

$$_l(\ - \ ) \quad 0 \text{ for all} \tag{43}$$

and

$$_l(\ - \ ) = \ _l(\ - \ ^0) \geq 0 \text{ for all} \tag{44}$$

Moreover, it is easy to show that $\frac{@ \ w_l(F \ sl)}{@}$ 0. Then, combining this with inequality (17), we argue that country has no incentive to jointly deviate with one of the smaller countries (say) from $\langle\{ \ \}\rangle$ to $\langle\{ \ \}\rangle$:

$$_l(\ - \ ) \quad 0 \text{ for all} \tag{45}$$

Finally, since $_l(\ - \ )$ 0 always holds, the above inequality implies that the large country has no incentive to deviate coalitionally from free trade to the status quo: $_l(\ - \ )$ 0.

We have shown the following:

Lemma 5b Suppose Assumption 2b holds. Then, there exist no unilateral or coalitional deviation from free trade that involve the large country.

The above lemma con…rms our earlier result that the stability of global free trade depends critically upon the preferences of the small countries. To derive stable agreements, is useful to focus on the perspective of the two small countries (i.e. and ^{0}). First note that the small countries have no incentives to jointly deviate from free trade to no agreement:

$$_s(\ - \ ) \quad 0 \text{ for all} \tag{46}$$

On the other hand, if is su¢ ciently large, the small countries indeed have an incentive to jointly deviate from $\langle\{ \ \}\rangle$ to $\langle\{ \ ^0\}\rangle$:

$$_s(\ - \ ^0) \leq 0 \text{ i¤ } \geq _s(\ - \ ^0) \tag{47}$$

However, it is immediate from Lemma 3 that one of the smaller countries (say) has an incentive to further deviate from $\langle\{ \ ^0\}\rangle$ to $\langle\{ \ \}\rangle$. Therefore,the initial joint deviation of the two small countries from $\langle\{ \ \}\rangle$ to $\langle\{ \ ^0\}\rangle$ is not self-enforcing.

Further note that country has an incentive to unilaterally deviate from $\langle\{ \ \}\rangle$ to $\langle\{ \ ^0 \}\rangle$ if country 's endowment is su¢ ciently large:

$$_s(\ - \ ^0) \leq 0 \text{ i¤ } \geq _s(\ - \ ^0) \tag{48}$$

Next we consider unilateral deviation of a small country (say) from $\langle\{ \ \}\rangle$ to a pair of bilateral FTAs where the other small country is a hub ($\langle\{ \ ^0 \ \}\rangle$. We have:

$$_s(\ - \ ^0) \leq 0 \text{ i¤ } \geq _s(\ - \ ^0) \tag{49}$$

Since $_s(\ - \ ^0) \geq _s(\ - \ ^0)$, it is not a binding deviation for the stability of $\langle\{ \ \}\rangle$. Finally note from Lemma 2a that neither small country has an incentive to deviate from $\langle\{ \ \}\rangle$ to $\langle\{ \ \}\rangle$ where the large country is the hub:

$$_l(\ - \ ) \quad 0 \text{ for all} \tag{50}$$

We can now state:[24]

Proposition 6: Suppose Assumption 2b holds. Then, the following hold under bilateralism:

(i) $\langle\{ \ \}\rangle$ is stable when $\leq _s(\ - \ ^0)$;

(ii) $\langle\{ \ \}\rangle$ (or $\langle\{ \ ^0 \}\rangle$) is uniquely stable when $_s(\ - \ ^0) \leq \leq _s(\ ^0 -)$; and

(iii) there exists no stable equilibrium if [illegible]

arises. However, the set of stable equilibria is now empty when the large country has a su¢ ciently big endowment relative to the small countries (i.e. when $_s(\ ^0 - \ ))$.

5.5.2 Bilateralism versus multilateralism

What light does our model shed on the relative merits of bilateralism and multilateralism when two countries are small relative to the third? To avoid redundancy, we directly state our main result:

Proposition 7: Suppose Assumption 2b holds. Then,

(i) $_s(\ - \ ^{0\,m})\quad _s(\ - \ ^0)$

(ii) over the parameter range $_s(\ - \ ^{0\,m})\quad \leq\ _s(\ - \ ^0)$, bilateralism yields $\langle\{\ \ \}\rangle$ as the stable equilibrium whereas multilateralism yields $\langle\{\ \ ^m\}\rangle$; and

(iii) when $\quad _s(\ - \ ^0))$, $\langle\{\ \ ^m\}\rangle$ is stable under multilateralism if $\ \leq\ _s(\ ^m - \ )$ while $\langle\{\ \ \}\rangle$ is stable under bilateralism if $\ \leq\ _s(\ - \ )$, where $_s(\ - \ )\quad _s(\ ^m - \ )$.[25]

– Figure 4 here –

The interpretation of Proposition 7 is quite analogous to that of Proposition 4 and there is little need to repeat it here. We next brie‡y examine whether and how the presence of political economy considerations a¤ects our main results.

6 Political economy considerations

In order to determine whether the presence of political economy concerns a¤ect our results, suppose countries put additional weight on producer surplus and tari¤ revenue relative to consumer surplus and that endowments are symmetric across countries. Let

[25] We obtain emptiness of stable Nash equilibria under bilateralism when $\ > \ _s(\mathrm{sl}\ \ )$ and under multilateralism when $\ > \ _s(\mathrm{sl}^m\ \ )$. In both cases, country s has an incentive to deviate from the relevant two country agreement – i.e. $\mathrm{sl}\ \ $ or $\mathrm{sl}^{am}\ \ $ – to $\ $ when $\ $ is su¢ ciently large.

$$_i = \sum_z {}^z_i + (1 + {}_i)[\sum_z {}^z_i + {}_i] \qquad (51)$$

First suppose that the degree of political economy pressure is the same across countries: $_i =$ for all . It is easy to calculate optimal tari¤s under each trade regime:[26]

$$_i = \frac{(3 + 1)}{2(3 + 2)}; \ {}^f_i = \frac{(3 + 1)}{12 + 11} \text{ and } {}^m_i = \frac{(3 + 1)}{12 + 7} \qquad (52)$$

where, as expected, optimal tari¤s rise with .[27] Moreover, like in Ornelas

Now suppose countries face unequal political pressures. To this end, we analyze a simple scenario where two countries (and) maximize their welfare with equal weights on consumer surplus, producer surplus and tari¤ revenue ($_b$ = $_c$ = 0) while the third country (country) puts additional weight, denoted by , on producer surplus and tari¤ revenue. Under such a scenario, country 's tari¤s under each trade regime increase with the degree of political pressure :

$$_a = _i;$$

7 Conclusion

One of the striking features of today's global policy landscape is the widespread prevalence of preferential trade agreements. Only a handful of countries are not involved in one and most simultaneously participate in several such agreements. Jagdish Bhagwati (1991) famously raised concern about the potential adverse e¤ects of the pursuit of preferential trade agreements on the prospects of multilateral trade liberalization. His work led to a rich body of research that has illuminated various aspects of the multi-faceted relationship between preferential and multilateral trade liberalization. However, this literature has often tended to treat bilateral trade agreements as exogenous or only considered an endogenous trade agreement between a pair of countries while treating the third country as a silent observer. By contrast, we present a model in which all countries are free to pursue both bilateral and multilateral agreements. To determine whether bilateralism hampers or facilitates the obtainment of global free trade, we also derive stable equilibria under a purely multilateral approach to trade agreements. This analysis helps shed light on the pros and cons of bilateralism and multilateralism.

A central result of this paper is that bilateralism can actually provide an impetus to multilateral trade liberalization. The point is that a country that is choosing whether or not to participate in global free trade must consider its fate under the agreement that would emerge in the absence of its participation. Due to the fact that a bilateral trade agreement discriminates against the outsider whereas a multilateral agreement does not, a non participating country is worse o¤ under the former relative to the latter. As a result, a country's incentive to opt for free trade is stronger when the alternative to free trade is a bilateral agreement between the other two countries as opposed to a multilateral one. An important implication of our analysis is that to properly account for the role of bilateralism, we need to better understand why countries choose to enter into bilateral agreements when multilateral trade liberalization is an option. To this end, the model suggests that the debate regarding preferential versus multilateral liberalization is moot in the absence of some type of asymmetry across countries.

This is because, in our model, whether or not countries are free to pursue bilateral trade agreements, global free trade is the only stable equilibrium under symmetry. This result demonstrates that heterogeneity across countries with respect to the bene…ts that they enjoy from global free trade may be a critical determinant of the success of a purely multilateral approach to trade liberalization. In our view, such heterogeneity has received insu¢ cient

$$_i(\quad) = \frac{1}{2}\,4[\frac{(\ _j + \ _k)}{3}]^2 + \sum_{j\neq i}[\frac{(2\ _j + 5\ _i)}{11}]^2 5 + \ _i(2\ - \frac{10\ _i + \sum_{j\neq i} 2\ _j}{11})$$

whereas that of the spoke by

$$_i(\quad) = \frac{(\frac{e_i+e_k}{3})^2 + (\frac{7e_i+e_j}{11})^2}{2} + \frac{(4\ _k^2 + 3\ _j^2 - 2\ _j\ _k)}{22} + \ _i(2\ - \frac{32\ _i + 11\ _k + 3\ _j}{33})$$

Under the multilateral agreement the welfare of a participating country equals

$$_i(\quad^m) = 2\quad_i + \frac{3(\ _i + \ _j)(3\ _j - 13\ _i)}{128} + \frac{(2\ _i + 3\ _k)(3\ _k - 12\ _i) + (3\ _j + \ _k)(\ _j + 5\ _k)}{98}$$

while that of the non-participating country equals

$$_i(\quad^m) = 2\quad_i + (\frac{\ _j + \ _k}{4})^2 + \frac{(3\ _i + 2\ _j)(2\ _j - 11\ _i) + (3\ _i + 2\ _k)(2\ _k - 11\ _i)}{98}$$

Welfare levels under symmetry can be calculated by setting each country's endowment to in the formulae above. The relevant comparisons under symmetry are as follows:

$$_i(\quad -\quad) = \frac{47}{2}(\frac{}{44})^2\quad 0; \qquad _k(\quad -\quad) = 23(\frac{}{44})^2\quad 0$$

and

$$_i(\quad -\quad) = 23(\frac{}{33})^2\quad 0; \qquad _j(\quad -\quad) = \frac{29}{2}(\frac{}{33})^2\quad 0;$$

$$_i(\quad -\quad) = \frac{1039}{2}(\frac{}{132})^2\quad 0; \qquad _j(\quad -\quad) = \frac{161}{2}(\frac{}{132})^2\quad 0$$

Also

$$_i(\quad -\quad) = \frac{13}{3}(\frac{}{22})^2\quad 0; \qquad _i(\quad -\quad) = \frac{101}{6}(\frac{}{22})^2\quad 0$$

Furthermore

$$_i(\quad^m -\quad) = \frac{1}{14}(\frac{}{4})^2\quad 0; \qquad _k(\quad -\quad^m) = \frac{1}{3}(\frac{}{14})^2\quad 0$$

8.2 Proof of Lemma 3

First consider part ( ). We know from Lemma 1 that $_i(\ -\ )$ 0 under symmetry. One can easily show that $\frac{@\ w_i(ih\ F)}{@e_i} = \frac{134(e_j + e_k)\ \ 320e_i}{33^2}$ 0, $\frac{@\ w_i(ih\ F)}{@e_j} = \frac{134e_i\ \ 85e_j}{33^2}$ 0 and $\frac{@\ w_i(ih\ F)}{@ek} = \frac{134e_i\ \ 85e_k}{33^2}$ 0. At $_i = \frac{4e}{5}$ and $_j = \ _k = \ $, we have $_i(\ -\ ) = 3(\frac{e}{}$

We next examine whether hub and spoke agreements are stable. It is immediate from (27) that two large countries always have incentives to jointly defect from $\langle\{\quad\}\rangle$ to $\langle\{\quad\}\rangle$ and this defection is self-enforcing since a large country has no incentive to further defect (Lemma 5a). Thus, $\langle\{\quad\}\rangle$ is not stable. Now consider $\langle\{\quad\}\rangle$.[28] Lemma 2a and inequality (13) together imply that the small country always defects unilaterally from $\langle\{\quad\}\rangle$ to $\langle\{\quad^{0}\}\rangle$ so that $\langle\{\quad\}\rangle$ is never stable.

Are $\langle\{\quad\}\rangle$ or $\langle\{\quad^{0}\}\rangle$ stable? We know from (56) and (57) that unilateral

(JLL1): Deviation of and from $\langle\{\ ^0\}\rangle$ to $\langle\{\ \}\rangle$.
(JLL2): Deviation of and from $\langle\{\ ^0\}\rangle$ to $\langle\{\ \}\rangle$.

Thus, when $\leq {}_{I'}(\quad -\quad)$, country ^{0} always prefers $\quad$ to ^{0m}. This completes the proof.

8.8 Other calculations

$$ {}_{s}(\ ^{0} - \ ^{0m}) = -\frac{^{2}(15\ -16)(29\ -72)}{(77\ )^{2}} \leq 0 \text{ i¤ } \leq {}_{-} = \frac{16}{15} $$

$$ {}_{I}(\ ^{0} - \ ^{0m}) = -\frac{^{2}(\ ^{2} + 80\ -94)}{14(11\ )^{2}} \leq 0 \text{ i¤ } \geq {}^{-} = 11\sqrt{14} - 40 $$

$$ {}_{s}(\quad -\quad) = (\frac{}{24})^{2}\frac{51 - 25\ ^{2} - 2}{2} \quad 0 \text{ for all} $$

$$ {}_{s}(\quad -\ ^{0}) \leq 0 \text{ i¤ } \geq {}_{s}(\quad -\ ^{0}) = 1\ 0845 $$

$$ {}_{s}(\quad -\ ^{0}) \leq 0 \text{ i¤ } \geq (\quad -\ ^{0})_{s} = 1\ 0810 $$

$$ {}_{s}(\quad -\ ^{0}) \leq 0 \text{ i¤ } \geq (\quad -\ ^{0})_{s} = 1\ 1814 $$

8.9 Proof of Proposition 6

Part (ii-iii): Country

Finally, it is immediate from (48) that all countries deviate from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$ i¤ $(\ -\ ^{0})_{s}$ and that this is a self-enforcing deviation.

It is immediate from (60) and (61) that $\langle\{\ \}\rangle$ and $\langle\{\ \}\rangle$ are not stable. Similarly, two small bene…t from deviating from $\langle\{\ \}\rangle$ to $\langle\{\ ^{0}\}\rangle$ (which is a self enforcing deviation):

$$_{s}(\ ^{0}-\ ) = (\frac{}{88})^{2}\frac{(2094\ -1185\ ^{2}-721)}{2}\quad 0 \text{ for all} \qquad (62)$$

Thus, $\langle\{\ \}\rangle$ is not stable. Combining these results with the …rst two parts, we examine the stability of $\langle\{\ ^{0}\}\rangle$ to complete our proof. Consider the following joint deviations:

(JSS1): Deviation of and from $\langle\{\ ^{0}\}\rangle$ to $\langle\{\ \}\rangle$.

(JSS2): Deviation of all countries from $\langle\{\ ^{0}\}\rangle$ to $\langle\{\ \}\rangle$.

We know from Lemma 3 that country has an incentive to deviate from $\langle\{\ ^{0}\}\rangle$ to $\langle\{\ \}\rangle$ while country deviates only if $(\ -\ ^{0})_{l} = \frac{206\ 3\sqrt{2354}}{340} \cong 1\ 0340$. Thus JSS1 occurs if $(\ -\ ^{0})_{l}$ and it is a self-enforcing deviation (due to Lemma 3). Now consider JSS2. It is immediate from (47) that JSS2 happens if

$\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$. We have: $\ _b(\ -\ ) = (\frac{e}{22})^2\frac{(6744\ ^2+8976\ +1573)}{3(12\ +11)^2}\ \ 0$; $\ _b(\ -\ ) = (\frac{e}{33})^2\frac{(29)}{2}\ \ 0$ and $\ _b(\ -\ ) = (\frac{e}{22})^2\frac{e^2(1044\ ^2+1452\ +319)}{198(12\ +11)^2}\ \ 0$. This implies that countries and always deviate from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$ and this deviation is self-enforcing. Thus $\langle\{\ \}\rangle$ is never stable. While country has no incentive to unilaterally deviate from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$, it does so from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$ when $\ _a(\ -\ ) \cong 0\ 44$. Next note that $\ _b(\ -\ ) = (\frac{e}{22})^2\frac{(681\ ^2+666\ +101)}{6(3\ +2)^2}\ \ 0$. Finally, note that country has no incentive to jointly deviate with country from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$: $\ _b(\ -\ ) = (\frac{e}{44})^2\frac{(4820\ ^2+1584\ +1111)}{6(12\ +11)^2}\ \ 0$. As a result, $\langle\{\ \}\rangle$ is stable when $\ \leq\ _a(\ -\ )$.

Note that $\langle\{\ \}\rangle$ is never stable since $\ _b(\ -\ ) = (\frac{e}{44})^2\frac{47}{2}\ \ 0$. Moreover, $\langle\{\ \}\rangle$ is not stable since $\ _c(\ -\ ) = -19(\frac{e}{66})^2\ \ 0$. Now consider the stability of $\langle\{\ \}\rangle$. Countries and have incentives to jointly deviate from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$ when $\ _c(\ -\ ) \cong 0\ 1688$ and this deviation is self-enforcing. We also know that joint deviation of all countries from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$ is self-enforcing when $\ \leq\ _a(\ -\ ) \cong 0\ 44$. Therefore, $\langle\{\ \}\rangle$ is not stable. Finally consider the stability of $\langle\{\ \}\rangle$. We know that countries and have no incentives to deviate from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$. Even if the joint deviation from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$ occurs, it is not self-enforcing since country always has an incentive to further deviate to $\langle\{\ \}\rangle$. Similarly, the joint deviation of all countries from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$ can be ruled out as well. Finally, country has no incentive to deviate jointly with country from $\langle\{\ \}\rangle$ to $\langle\{\ \}\rangle$. As a result, $\langle\{\ \}\rangle$ is stable i¤ $\ \geq\ _a(\ -\ )$.

For the last part of the proposition, note that $\ _a(\ -\ ^m)\ \ 0$ i¤ $\ _a(\ -\ ^m)$. To complete the proof, simply note that:

$$\begin{aligned}
_b(\ -\ ^m) &= \frac{^2(51\ ^2+54\ +51)}{168(3\ +2)^2}\ \ 0;\\
_b(\ -\ ^m) &= (\frac{}{11})^2(\frac{13}{14})\ \ 0 \text{ and}\\
_a(\ -\ ^m) &= -(\frac{}{77})^2(154\ +43)\ \ 0
\end{aligned}$$

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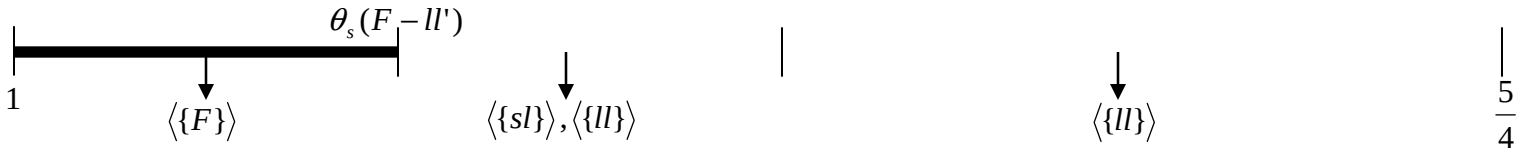
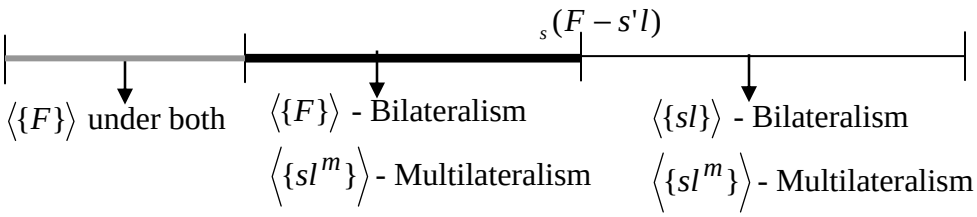
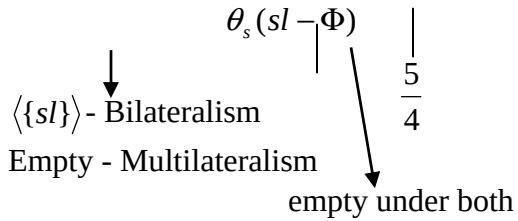


Figure 1: Stable agreements under bilateralism: two large and one small country


$_s(F - s'l)$
$\langle\{F\}\rangle$ under both
$\langle\{F\}\rangle$ - Bilateralism
$\langle\{sl^m\}\rangle$ - Multilateralism
$\langle\{sl\}\rangle$ - Bilateralism
$\langle\{sl^m\}\rangle$ - Multilateralism


$\theta_s(sl - \Phi)$
$\frac{5}{4}$
$\langle\{sl\}\rangle$ - Bilateralism
Empty - Multilateralism
empty under both