

NBER WORKING PAPER SERIES

HUBS AND SPOKES,
AND FREE TRADE
IN THE AMERICAS

Carsten Kowalczyk

Ronald J. Wonnacott

Working Paper No. 4198

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
October 1992

This paper is part of NBER's research program in International Trade and Investment. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

NBER Working Paper #4198

October 1992

HUBS AND SPOKES,
AND FREE TRADE
IN THE AMERICAS

ABSTRACT

This paper compares two possible formats for free trade in the Americas: a system of spokes surrounding a U.S. hub, and a free trade area. The paper identifies the sources of welfare change, and it argues that a country's attitude towards a system depends on whether the arrangement is a complement or a substitute trading club. The paper argues also that rent-seeking activities, and costs of administration and transportation, are likely to be higher in a hub-and-spoke system than in a free trade area.

Carsten Kowalczyk
Department of Economics
Dartmouth College
Hanover, NH 03755
and NBER

Ronald J. Wonnacott
Department of Economics
Social Science Center
University of West Ontario
London, Ontario N6A-5C2
Canada

HUBS AND SPOKES, AND FREE TRADE IN THE AMERICAS

by Carsten Kowalczyk and Ronald J. Wonnacott*

In August, 1992, Canada, Mexico and the United States presented a free trade agreement (FTA) to cover a North American market with a combined GNP approaching \$7 trillion and an annual trade in goods and services among its members exceeding \$270 billion.

Although this agreement is essentially in a trilateral FTA format, full ratification by all three countries is not guaranteed. If Canada were not to ratify, the result could be a Mexico-U.S. bilateral FTA, creating a hub-and-spoke system in which the United States as the hub would have one bilateral spoke agreement with Canada (the 1989 Canada-U.S. FTA), and another with Mexico; in other words, two free trade areas overlapping on the United States.¹

*Dartmouth College and NBER, and University of Western Ontario, respectively. Without implicating them in the final result, we should like to thank Ron Jones, Anne Krueger and Jeffrey Schott along with participants in a workshop at the University of Rochester and a conference in Washington sponsored by the C.D. Howe Institute and the National Planning Association (Hill, 1991). This work has been supported in part by a Haney Research Grant and a Rockefeller Grant to Dartmouth College.

¹ To some extent a hub-and-spoke system has already developed given the free trade agreement between Israel and the U.S. There are other possible outcomes that would require the analysis of this paper. One is that the United States would fail to ratify an agreement with Mexico while a Canada-Mexico agreement succeeds. This time the hub would be Canada with a Mexican and a U.S. spoke. While this possibility is theoretically interesting, it is hardly of practical relevance as it would be a virtually certain non-starter in Canada. We focus, therefore, on the situation of a U.S. hub. Another outcome requiring this sort of analysis would be an agreement with bilateral hub-and-spoke provisions in certain sectors grafted onto a trilateral free trade core in all other sectors.

Moreover, the United States might go on to negotiate additional bilaterals with Chile and other countries in the hemisphere.

While there has been a great deal of analysis of the economics of a simple FTA, far less is known about the more complex economics when FTAs overlap in a hub-and-spoke system.² This paper examines the welfare effects on a nation that participates in the development of a hub-and-spoke system, and compares them to the effects from participating in a simple, expanding FTA. Using the now familiar North American case as our example, we show that the expectation for any spoke -- Canada or Mexico -- is that its welfare would be less in a hub-and-spoke system. At the same time, if the analysis is limited to the effects of preferential trading, then the preferred access by the U.S. hub to spoke markets likely will lead it to favor a hub-and-spoke system. However, this judgment by the U.S. will be tempered by broader influences, such as the effect of a hub-and-spoke system in generating smaller increases in income in the spoke markets, and hence a smaller increase in U.S. exports; and in generating higher administrative, transportation, and rent-seeking costs. These and other considerations can be expected to make a hub-and-spoke system less beneficial for all participants, thus leading each spoke country to favor an FTA more

² The overlapping FTA or hub-and-spoke concept is the same as the two-sided triangle examined in Wonnacott (1975 and 1982). It is also essentially the same problem as the U.S. star with partner countries at the points described by Yung C. Park and Jung Ho Yoo (1989). To our knowledge, it was first called the hub-and-spoke problem in independent studies by Richard Lipsey (1990, pp. 4-5) and Wonnacott (1990, pp. 3-4). Lipsey examined it again in 1991, and Wonnacott (1991) provided a detailed statement of some of the issues involved. The problem was considered further in Kowalczyk and Wonnacott (1991).

strongly, and arguably even leading the hub country to reverse its judgment and also favor an FTA.³

Potential applications of this analysis include not only the extension of free trade to other countries in the Western Hemisphere but also the creation of complex regional trading structures in Europe, for example among nations in Eastern and Western Europe or between the former republics of the old Soviet Union. Will some of these countries become spokes for the EC hub as Poland and Hungary now seem to be doing? Will Russia become an EC spoke, or will it become another hub with bilateral spoke agreements with previous Soviet Republics? Or will it do both? Before such a maze of new trading configurations is created -- indeed is even considered -- it is important to sort out the economics of hub-and-spoke systems, and how any such system would compare to the obvious, much simpler option: a plurilateral FTA covering the same countries.

Section I of the paper discusses the traditional approach to customs union theory. Section II presents the methodology used in our analysis. Section III analyzes the economic effects as a hub-and-spoke system develops and compares this system to a trilateral free trade agreement from the point of view of the initial spoke, Canada. Section IV compares the two systems from the

³ We recognize that the political fate of any negotiated agreement would depend on the distribution of any gains and losses across interest groups, on these groups' relative strengths, and on the political system's ability to transfer income among them. While political economy considerations of this sort are important, we believe that focussing on national welfare is useful, particularly at this early stage of inquiry, as it helps identify how much income there is to be distributed under each of the different trade regimes.

perspective of the hub, the United States. Section V considers additional costs related to the hub-and-spoke system such as those from rent-seeking activities. Section VI, finally, summarizes and presents concluding remarks.

I. THE NORTH AMERICAN EXAMPLE: A HUB-AND-SPOKE SYSTEM CENTERED ON THE UNITED STATES, VS. A TRILATERAL CANADA-MEXICO-U.S. FTA

Clearly, the interests of the U.S. hub will not be the same as those of Canada or Mexico; nor will the interest of these two U.S. partners necessarily be identical. This study uses terms-of-trade and volume-of-trade effects to examine the effect on one U.S. partner -- Canada -- were a hub-and-spoke system to develop.⁴ The result is then compared to the trilateral FTA alternative. These two regimes are then compared from the point of view of the U.S. hub.

Answering the question of what happens to a spoke -- Canada -- were a hub-and-spoke system to develop involves two steps: (1) an examination of the effect on Canada of its own bilateral with the United States; and (2) an analysis of the effect on Canada as the U.S. goes on to sign a bilateral with Mexico, thereby establishing a hub-and-spoke system.

To answer the question: "How would Canada compare this hub-and-spoke outcome to a trilateral FTA?" a final step is involved: (3) an analysis of

⁴ Terms of trade and volume of trade effects were introduced by Meade (1955). They were treated formally by Jones (1969), and Ohyama (1972) applied them in discrete form in an analysis of tax and tariff changes. Kowalczyk (1990) argued that they constitute an attractive alternative to Viner's trade diversion and trade creation effects and used them to derive new results.

the effect on Canada if it were then to negotiate its own bilateral with Mexico, thus approximately creating a trilateral FTA.⁵

The effects on the U.S. hub involve examining these same three steps from the U.S. point of view.

The traditional analysis of preferential trade dates back to Viner (1950) who introduced the concepts of trade diversion and creation. However, as Kowalczyk (1990) has argued, these concepts -- no matter how defined -- cannot provide an adequate framework for an assessment of even a simple customs union (CU), let alone a more complex preferential system like the one investigated in this paper.⁶ Among the difficulties is that trade diversion has two different definitions. Both include the terms-of-trade loss from switching away from a cheaper outside source of imports to a more expensive union partner. In addition, one of the definitions includes a volume of trade effect; indeed, using it, Gehrels (1956) and Lipsey (1957) showed that trade diversion could be welfare improving. A further deficiency is that Viner's terminology is not exhaustive, not even in very simple environments. For example, our analysis suggests that Canada could experience more trade with the United States if the latter were to sign a bilateral agreement with Mexico; neither of Viner's terms would capture this appropriately.

⁵ It will be shown later that creating a trilateral is, in several respects, more complicated than this; but this is a useful first approximation.

⁶ As elsewhere in the literature, CU is defined here as a generic term to include an FTA. We assume throughout the analysis that tariffs on non-member countries remain constant. We assume also that non-member countries leave their tariffs unchanged.

II. THE MODEL

Assume throughout that production possibility sets are convex and globally differentiable, and that each country has a welfare function that is also globally differentiable. To begin, assume only two goods, clothing (C) and food (F). The quantity of each consumed is D_C and D_f , while the quantity of each produced is X_C and X_f . At world price p^e , which is the price of a unit of food expressed in units of clothing, balanced trade implies that the value of the trading nation's consumption bundle is equal to the value of its production bundle; that is,

$$D_C + p^e D_f = X_C + p^e X_f$$

Differentiating this, along with appropriate manipulation, yields⁷

$$dy = -m dp^e + (p - p^e) dm$$

⁷ Differentiating (1) yields:

$$dD_C + p^e dD_f + D_f dp^e = dX_C + p^e dX_f + X_f dp^e$$

Letting p be the price of food in the domestic market, add and subtract $p dD_f$ from the left-hand side, and $p dX_f$ from the right-hand side. Then, noting that the import of food is $m = D_f - X_f$ and that $dX_C + p dX_f = 0$ because (X_C, X_f) is a point on the production possibility curve, (1) can be reduced to (2). This derivation is in Caves, Frankel and Jones (1990), pp. 747-749.

where p is the price of food in the domestic market, dy is the change in real income evaluated at the original p , and m is the quantity of food imports.

To generalize this, interpret m as a vector of imports (including exports with a negative sign). Vectors p and p^e are then the corresponding domestic and world prices of these tradeables. Finally, recognize that some of the effects of tariff elimination (or even a finite tariff reduction) may not be adequately captured by infinitesimal marginal changes, so (2) must be integrated:

$$\int_{y_1}^{y_2} dy = - \int_{p_1^e}^{p_2^e} m \cdot dp^e + \int_{m_1}^{m_2} (p - p^e) \cdot dm$$

where, for example, p_1^e and p_2^e are the values of p^e when tariffs are, respectively, at their initial value and at their final value.⁸

An example of an effect that just the differentiation in (2) would not capture would occur if one country were to begin importing from its partner rather than from a cheaper outside country that was initially its only source. In this case, the first infinitesimally small reduction in its tariff against its partner would have no effect. Indeed nothing would happen until its tariff reduction was sufficient to initiate this change in country of origin of its imports.

⁸ As an alternative to (3), finite changes may be evaluated using the difference equation:

$$\Delta y = - \bar{m} \cdot \Delta p^e + (\bar{p} - p^e) \cdot \Delta m$$

Hereafter we will, for the sake of the simplicity, be using equation (2), while recognizing that the inner product and integration notation in (3) have been dropped only for convenience, but are nonetheless implied throughout.

III. THE VIEW FROM A SPOKE: CANADA

Step One: The Canada-U.S. Bilateral

In a simple, hypothetical two-country world, the effects on Canadian real income of Canada-U.S. free trade would be given by:

$$dy^C = - \underset{\text{I}}{m^{C, US}} dp^e + \underset{\text{II}}{(p^c - p^e)} dm^{C, US}$$

where $m^{C, US}$ is the vector of Canadian tradables with the United States while p^c and p^e are, respectively, the vectors of domestic Canadian prices and world prices.

First, consider element I of this equation -- the terms-of-trade effect. Canada will pay higher prices for its imports from the United States because Canadian tariffs are eliminated; similarly, Canada will receive a higher price for its exports to the United States because of U.S. tariff elimination -- with the net effect of these two changes being ambiguous. (It will be shown later that, in view of specific conditions applying to Canada-U.S. trade, much of this ambiguity can be removed.)

Element II -- the volume of trade effect -- shows the benefits to Canada from an increase in its trade with the United States.⁹

In an n-country world, analyzing the effects of a bilateral Canada-U.S. FTA requires recognition of trade with the rest of the world (ROW). Thus equation (4), defining the increase in Canadian real income, must be expanded to include elements III and IV below covering Canadian trade with ROW:

$$\begin{aligned}
 dy^C = & \underbrace{- m^{C, US} dp^e}_{\text{I}} + \underbrace{(p^C - p^e) dm^{C, US}}_{\text{II}} \\
 & \underbrace{- m^{C, ROW} dp^e}_{\text{III}} + \underbrace{(p^C - p^e) dm^{C, ROW}}_{\text{IV}}
 \end{aligned}$$

⁹ On the import side, with a Canadian tariff creating a distortion between domestic and foreign prices, the definition of elements I and II as the terms-of-trade and volume-of-trade effects is straightforward. Some care, however, is involved in the interpretation of what is happening on the export side, where, in the absence of any Canadian export tax or subsidy, all export items in element II become zero since each $p^C - p^e = 0$. How is the benefit to Canada from increased exports to be captured? The answer is: through term I. Figure 1, where x denotes the Canadian export supply schedule and p^e is the relative price of x , illustrates this for one good. Suppose that Canada has no export tax or subsidy and that at the initial price p_0^e its exports to the U.S. are given by x_0 . After its free trade agreement with the U.S. the price rises to p_1^e and Canadian exports increase to x_1 . The benefit to Canada is given by area $a+b+c$, which can be expressed by the integral,

$$\int_{p_0^e}^{p_1^e} x^{C, US} dp^e .$$

Along with similar expressions for other exports this makes up the export side of term I in (4). We note that benefit $a+b+c$ can be approximated by area $a+b+d$, i.e. by $\bar{x} \Delta p^e$.

The effects on Canada of its FTA with the United States can now be evaluated as follows:

On the import side

- A. As Canada extends preferential treatment to the United States, Canada switches some of its import purchases from ROW to a higher-cost U.S. source. This results in a terms-of-trade loss (III). However,
- B. This preferential, zero-tariff treatment of imports from the United States lowers the Canadian domestic price. Under standard assumptions there is an increase in imports, i.e., new imports from the United States in II exceed the replaced imports from ROW in IV. Since the resulting volume-of-trade benefit depends on the difference in these two import flows, it is useful to think of II and IV together as:

$$(p^C - p^e)[dm^{C, US} + dm^{C, ROW}]$$

- C. There is an increase in Canadian imports from the United States in products in which the United States is the least-cost source. This provides a volume-of-trade benefit in element II. However,
- D. This increase in Canadian imports in C may also generate a terms-of-trade loss in element I since Canada would be giving up any previous terms-of-trade benefit from its own tariff on imports from the United States.

On the export side

- E. Canada gets a terms-of-trade gain -- also in element I -- because of removal of the U.S. tariff on Canadian exports.
- F. Following footnote 9 above, this terms-of-trade gain on exports in element I also includes the benefit from an increased volume of Canadian exports to the United States -- with this effect being augmented by the preference Canadian exporters receive in the U.S. market in competition with third countries (a benefit that, it will become evident, is very important in the Canadian case).

While the net effect of these six changes taken together is ambiguous in theory, in practice, for the specific Canada-U.S. FTA case examined here, they can be expected, on balance, to have a favorable effect on Canadian welfare. The reason is that positive effect E is likely to exceed negative effect D, while positive effects B, C and F are likely to exceed the only other negative effect A.

How can E be expected to dominate D when the tariffs the United States would be removing in E are often smaller than the tariffs Canada would be removing in D? The answer is that the prices of so many Canada-U.S. tradables in manufacturing are determined in the U.S. market; i.e., *in these products*, the United States is a classic large country, and Canada a small country. Because, in such tradables, Canada faces import prices fixed in the U.S. market, these prices are unaffected by Canadian tariff removal; thus, in such cases, the negative effect D disappears. On the other hand, on the large number of exports whose prices are determined in the U.S. market, Canadian exporters get relief (i.e., higher

post-duty prices) since they must no longer, directly or indirectly, pay a U.S. tariff.¹⁰ Thus benefit E may be substantial and Canada can expect an overall terms of trade improvement.¹¹

We propose, furthermore, that positive effects B, C and F are likely to more than offset negative effect A.¹² Specifically, the domain of A is Canada's pre-FTA imports from the ROW which represent only 30% of Canada's imports. The domain of welfare improving C is the remaining 70% of Canada's imports, while the domain of welfare-improving F is the roughly 70% of Canadian exports that go to the United States.

The resulting expectation that the Canada-U.S. FTA will, on balance, benefit Canada has been supported by Cox and Harris (1986), who estimated that an FTA with the United States would substantially increase Canadian real income.¹³ Indeed their study suggested an even stronger conclusion: just the

¹⁰ The relief would only be partial in the selected manufactured exports -- e.g., telecommunications and transport equipment -- where Canada does have some influence over price. Also, Canada has some influence over international prices in resource trade. It is difficult to argue, however, even in these limited sectors, that Canada would suffer a significant terms-of-trade loss since pre-FTA resource tariffs by both countries have typically been low or zero. Moreover, Canadian resource imports from the United States (on which price changes would damage Canada) are substantially less than its resource exports to the United States (on which price changes would benefit Canada). In short, the conclusion that Canada will get an overall terms-of-trade benefit from the FTA can be expected to stand.

¹¹ See Kowalczyk (1990) for an analysis of the first-best trade policy for a small country.

¹² It was exactly Gehrels' (op. cit.) and Lipsey's (op. cit.) point that even B alone could dominate A.

¹³ In their study, Cox and Harris estimated an increase in Canadian welfare in the order of 9%. While this was subsequently revised downward to reflect, among other things, trade liberalization that had already taken place, their estimate of gains still remained substantial and positive. Cox and Harris took account of economies of scale, a major source of benefit to Canadian exporters

benefit from acquiring preference in the U.S. market in a bilateral deal is so important for Canada that it may make the FTA with the United States more beneficial for Canada than even multilateral free trade would be. In other words, the preferential FTA benefit for Canada (just part of F) could alone, roughly speaking, exceed not only any costs -- in particular in A -- specific to the FTA, but also any foregone benefits from free trade with the ROW that would be available only from multilateral free trade.¹⁴

Step Two: A Mexico-U.S. Bilateral FTA

If the United States were to negotiate an FTA with Mexico alone, the result would be a hub-and-spoke system in which the U.S. hub would have a bilateral spoke agreement with Canada on the one hand, and with Mexico on the other. The effect on Canada would be:

$$\begin{aligned}
 dy^C = & \underbrace{-m^{C, US}}_I dp^e + \underbrace{(p^C - p^e)}_II dm^{C, US} \\
 & \underbrace{-m^{C, M}}_III dp^e + \underbrace{(p^C - p^e)}_IV dm^{C, M} \\
 & \underbrace{-m^{C, ROW}}_V dp^e + \underbrace{(p^C - p^e)}_VI dm^{C, ROW}
 \end{aligned}$$

not included in the analysis of this paper. Other investigators have also estimated net gains, although usually with smaller numerical values; some of these have also excluded scale economies.

¹⁴ There seem to be two intuitive and related explanations for this surprising conclusion for Canada. The heavy concentration of its trade with the United States rather than with the ROW keeps the Canadian FTA loss A and the potential benefit from free trade with the ROW under the GATT relatively low; and the large size of the U.S. market makes the benefits of preferential access there relatively high. It should be emphasized that this is simply the view from Canada. The effects on world welfare of these two regimes -- a Canada-U.S. bilateral vs. multilateral free trade -- would of course be quite different.

This is the same as equation (5) except that the earlier ROW is now decomposed into Mexico M, and the remaining ROW.

A key issue now is whether, from Canada's viewpoint, the Mexico-U.S. FTA is a *complement* or a *substitute* trade agreement.¹⁵ An FTA is a complement if it increases imports by its members from outsiders; it is substitute if it decreases those imports. To illustrate, an FTA will be a complement if, for example, outsiders produce resources not available within the FTA, and if increased trade between FTA members increases their demand for such products from outsiders. On the other hand, an FTA will be a substitute if outsiders produce goods that are substitutes for those produced within the FTA, with purchases of these goods by FTA members from outsiders therefore being reduced. For an FTA to be substitute it is important that this effect not be offset by increased demand for outsiders' goods by the FTA members due to their increased income generated by the formation of the FTA. This income effect is potentially very important since, if it is strong enough, it can -- under standard assumptions -- make a union complementary even if outsiders produce only products that would otherwise be substitutes. It is, of course, possible that an agreement may be a complement to one outside country, but a substitute to another.¹⁶

¹⁵ These concepts have been introduced in more detail in Kowalczyk and Wonnacott (1991).

¹⁶ See Kowalczyk and Wonnacott, *op. cit.*

If the Mexico-U.S. FTA is a substitute agreement from the point of view of outsider Canada, with the exports of Canada to the United States and Mexico falling as a consequence, then, noting footnote 9 above, there will be damage to Canada in elements I and/or III. This substitutability may reflect several factors, such as the Canadian loss of export sales to Mexico and the United States because (1) each of the two countries becomes a more competitive supplier because of its falling costs under free trade (due, for example, to its industries' free access to inexpensive imports from the other); (2) Mexico would switch some of its purchases from Canada to the higher-cost United States; and (3) the United States would reverse the switching of imports towards Canada from lower-cost source Mexico that happened when the United States signed its FTA with Canada.¹⁷

On the other hand, if the Mexico-U.S. FTA is a complement rather than a substitute agreement from Canada's point of view, then effects I and III on outsider Canada will on balance be positive. While it would, in our view, be overly optimistic to count on this outcome, there are two reasons why it might occur. One is that resource products -- an important component of Canadian exports -- are more likely than manufactured goods to complement the growing Mexican-U.S. trade. However, although resources remain a significant part of Canadian exports, they no longer dominate, as more than half of Canadian exports are now manufactured goods, with their higher degree of substitutability.

¹⁷ In Viner's terminology, (2) would be trade diversion and (3) the reversal of previous trade diversion.

Accordingly, one has to look to the second reason for the major hope for complementarity: the increase in income induced by the FTA in the United States and especially in Mexico,¹⁸ with the resulting increase in their demand for Canadian exports.

The conclusion so far may be extended and generalized as follows:

PROPOSITION: As a hub-and-spoke system develops around the U.S. hub, a spoke like Canada can expect to benefit from its own bilateral spoke agreement with the United States. However, as the United States then goes on to add new spokes, each substitute agreement will hurt the existing spoke (Canada) while each complementary agreement will provide further benefit to the existing spoke (Canada). One important hope for complementarity lies in the expanding income in the hub (U.S.) and in any new spoke (e.g., Mexico) as a result of their bilateral.

Further Observations on the Development of a Hub-and-Spoke System in Steps 1 and 2

If the United States signs a sequence of spoke agreements that are complements from the Canadian point of view, then Canada will likely benefit from the expanding prosperity of the hemisphere. On the other hand, suppose that, for Canada, these new spoke agreements are substitutes. As the United

¹⁸ To illustrate: If, over a period of, say, 10-15 years, the Mexicans were able to cut their productivity gap with the United States by just a quarter, their income could rise by more than a hundred percent.

States adds each new spoke, Canada loses and sees its benefit from its own original FTA with the United States erode. But even in this case, it will still paradoxically be in Canada's interest to participate as a spoke in this U.S. centered system rather than to decline. Indeed, the same will remain true even if, as the United States continues to add spoke agreements throughout the hemisphere, the Canadian losses come to exceed its gains from its original FTA with the United States. The same is true for any other spoke: It may lose from this whole process and therefore wish that it had never taken place; but it will still have an incentive to participate. The reason for this paradoxical conclusion is that all a spoke is able to decide is whether it will get the benefits of free trade with the U.S. hub. If it signs a bilateral with the United States, it gets those benefits; if it says no, it does not. Its decision has little influence over the U.S. hub as the United States adds new bilaterals that discriminate against the spoke. The spoke cannot escape from this problem, whether or not it decides to join the hub-and-spoke system.

If this is the only way that a spoke can get free trade with the United States, it will have not only the incentive of benefiting from the expansion of its trade with the United States as described above, but also the incentive of avoiding damage to its present trade. For example, Mexico has viewed a bilateral free trade agreement with the United States as a way of reducing the risk of being the target of Super-301 or some other form of U.S. unilateral trade remedy action. This raises the question: Could aggressive U.S. unilateral policies like Super-301 be used by the United States to put pressure on its

trading partners to participate in a new, highly discriminatory form of U.S. bilateralism, namely the development of a U.S.-centered hub-and-spoke system? In our judgment, this is not why these unilateral U.S. policies were introduced; nonetheless, they could be used in this way, either by inadvertence or design.

Now consider the alternative way for countries in the hemisphere to liberalize their trade with the United States -- that is, through an expanding plurilateral FTA. In the simple, three-country North American case that we have been analyzing, it will now be shown why a U.S. partner -- Canada -- can be expected to prefer such a trilateral FTA to a hub-and-spoke system.

Step Three: A Canada-Mexico Bilateral FTA, Essentially Transforming the Hub-and-Spoke System in Step Two into a Trilateral FTA. Or, How Does a Trilateral FTA Compare to a Hub-and-Spoke System?

The effects on Canada of this bilateral with Mexico can be shown in equation (7), as follows:

On the import side, the elimination of the Canadian tariff on Mexican goods will have three possible effects:

1. Canada will switch some of its import purchases away from lower-cost sources in the ROW to Mexico. (The Canadian import of clothing from Mexico rather than the Pacific Rim is one expected example.) As the Canadian domestic price falls there will, following the reasoning leading to equation (6), be a volume-of-trade benefit based on the degree to which increased imports from Mexico in IV exceed decreased imports from the ROW in VI.

There will also be a Canadian terms-of-trade loss in V to the degree that Mexico is a more expensive source than the ROW.

2. Canada will restore its imports from Mexico that were switched earlier to the high-cost United States due to the Canada-U.S. FTA, yielding Canada a terms-of-trade benefit through I. (In that earlier FTA, the United States alone got preference in the Canadian market; now Mexico also gets it.) Since these imports from Mexico will now come into Canada duty free, the Canadian domestic price will fall and Canadian imports will accordingly increase.

Therefore there will also be a volume-of-trade benefit for Canada whose size will depend on how much the increase in imports from Mexico in IV exceeds the reduction in imports from the United States in II.¹⁹

3. Finally, Canadian tariff reduction will induce more import purchases from Mexico in products where Mexico is the least-cost source. This will cause an additional volume-of-trade benefit for Canada in IV, but an unfavorable terms-of-trade change in III as Canada gives up any favorable terms-of-trade effect from its previous tariff against Mexico.

It is not clear how the three conflicting influences on Canada's terms of trade cited in the three cases above would compare. It would be difficult to argue

¹⁹ Formally, as in equation (6), the volume-of-trade effect taking into account both IV and II will be:

$$(p^c - p^e) [dm^{C, M} + dm^{C, US}]$$

where the world price p^e is the price at which Canada now purchases from Mexico.

that the total effect on Canadian welfare of increased imports from Mexico would be negative, however, since in each of the three cases the volume-of-trade effects are positive.

Although some ambiguity remains, it is substantially reduced when the effect on Canadian exports is considered.

On the export side, the effects on Canada would be unambiguously positive. Canada would both receive a higher price for its exports to Mexico and sell more as a result of the elimination of the Mexican tariffs. (Notice that the Mexican tariff removal eliminates the previous discrimination against Canada that Mexico established when signing an FTA with the United States.²⁰) Moreover, there would be another favorable effect: Canada-Mexico free trade would guarantee Canadian industry access to duty-free Mexican inputs that would keep it globally more competitive -- in particular, in expanding its exports to the ROW and in allowing it to compete more effectively with U.S. industry in the United States, Canada and elsewhere. Because of the dominance of the United States in the Canadian trading picture, restoring Canada's competitive position vis-a-vis the United States in the U.S. market may paradoxically be where much of the effect on Canada of its trade liberalization with Mexico would be played out.

To sum up: the effects on Canada from its bilateral with Mexico point to an expectation of net gain. Since this third bilateral would, to a substantial

²⁰ Again, following footnote 9, the effects of both the increase in exports and the higher price received for them would appear in element III.

degree, transform a hub-and-spoke into an FTA,²¹ this implies that for a spoke such as Canada, a trilateral FTA is preferred to a hub-and-spoke system -- with key reasons being that an FTA alone provides Canadian firms with duty-free access to inexpensive Mexican inputs and the expanding Mexican market, along with full escape from discrimination there in competition with U.S. firms.

This conclusion can very simply be illustrated by considering the limiting case in which all countries in the hemisphere are included in an FTA. Then Canada would look out on a hemisphere in which it would enjoy tariff-free trade in all directions, with the expected gains from trade this implies. Compare this to a hemisphere-wide hub-and-spoke system, in which Canada would see free trade as it looks to the United States, but face a Byzantine maze of discriminatory trade restrictions as it looks towards other hemispheric countries.

²¹ This is not a precise transformation, since the creation of a full trilateral FTA would still require an agreement by all three countries on certain issues -- in particular the reformulation of trilateral rules of origin. Moreover, once the United States has more than 2 or 3 spoke agreements, transforming such a hub-and-spoke system into a plurilateral FTA by bilateral agreements among spokes becomes essentially impossible because of the large number of such agreements that would be required.

Furthermore, two things could come from a trilateral negotiation that would not come from U.S.-Mexico and Canada-Mexico bilaterals: First, there could be a large potential benefit to Canada from a trilateral negotiation, insofar as Canada would get the same favorable non-tariff access to the U.S. market as Mexico -- for example, in U.S. government procurement contracts. On the other hand, a trilateral might increase the likelihood of a reopening of the Canada-U.S. FTA, which is far more important to Canada than any free trade arrangement with Mexico. This has been expressed as a concern by Gordon Ritchie, the former deputy Canadian trade negotiator in the Canada-U.S. FTA (Hill and Wonnacott, 1991, p. 11). While there is a serious potential problem, it is not guaranteed that Canada would lose from such a reopening; it is possible that it might benefit.

Moreover, what is true for Canada is also true for Mexico or any other potential U.S. spoke partner down the road, regardless of when it may be included in the sequence. Each such partner could expect net benefits from its own bilateral with the United States, but might well be damaged by U.S. spoke bilaterals with other countries. But whether or not a partner is damaged, it can be expected to prefer an expanding plurilateral free trade area to a hub-and-spoke system.²²

This preference by each U. S. partner for an FTA will be strengthened in the last section when we go beyond this theory of preferential trading to consider some of the other effects of a hub-and-spoke system on the participating countries. But first, consider the view from the U.S. hub.

IV. THE VIEW FROM THE HUB

For the U.S. hub, the analysis yields fewer clear expectations at each stage than it did for a spoke. Rather than attempting to carefully catalog often conflicting details of benefits and costs, we will sketch the argument.

A Hub-and-Spoke System

In its existing bilateral FTA with Canada, a key question for the United States is how its likely terms-of-trade loss as a relatively large country from giving up its own tariff -- i.e., the flip side of the terms-of-trade benefit acquired

²² One important reason that other countries can be expected to take much the same view as Canada is because, like Canada, they are relatively small when compared with the United States. Indeed, because they are economically even smaller than Canada, this role is in fact clearer in their case.

by Canada -- will compare with its gains from increased trade, including the benefits it gets from free access to the Canadian market and from the preferences it acquires there.

Moreover, for the "large" United States, this continues to be the key trade-off every time it adds a bilateral with Mexico or any other country in the hemisphere, all of which are relatively small: How does its terms-of-trade loss compare to its benefits from increased trade, including those resulting from the preference it acquires in each spoke market not only in competition with countries outside the hemisphere but also in competition with its other spoke partners within.²³

A Hub-and-Spoke System Compared to an FTA

Does the United States prefer a hub-and-spoke system to an FTA?

Unlike its partners, it could look out over a hub-and-spoke hemisphere and see free trade in all directions with all the benefits of an FTA including (1) free market access to all its hemispheric partners and (2) the preference it would get in each hemispheric market in competition with all countries outside the hemisphere. In addition, a hub-and-spoke would provide the United States with an advantage not available in an FTA -- namely, the preference it would get in each spoke market (e.g. Mexico) in competition with all other spokes such as Canada. Moreover, the fact that it would be the only country in the hemisphere

²³ Of course, at each stage the United States faces other costs (e.g., from switching its import purchases from a lower-cost outside source to its new spoke partner) and other benefits (e.g., from reversing some of the switching that occurred previously when it signed on earlier spokes).

to get free-trade access to all spoke markets would give it a location advantage over other spokes, with potential tax and other benefits this could imply.

However, other factors would tend to make a plurilateral FTA relatively more attractive for the United States than a hub-and-spoke system. To illustrate: because U.S. partners Canada and Mexico would likely acquire higher real income under a plurilateral FTA, U.S. exports and hence U.S. real income would tend to be greater.²⁴ There is no clear answer as to which regime the United States would prefer. Also, there are factors, such as economies of scale, that are not discussed here that the United States (and its partners) would have to take into account in comparing the two systems.

V. FURTHER PROBLEMS IN A HUB-AND-SPOKE SYSTEM

There are several reasons why total hemispheric income would likely be less in a hub-and-spoke system than in a plurilateral FTA -- reasons that will reinforce the preference of each U.S. partner for an FTA, and that may even lead the U.S. hub, the country most likely to prefer a hub-and-spoke system, to also judge an FTA superior.

²⁴ The effects on the United States of moving from a hub-and spoke system to an FTA could be dealt with more formally by examining a U.S. equation similar to (7), except of course that the roles of Canada and the United States would be reversed. It is now the United States -- the outsider to the third-stage Canada-Mexico bilateral -- that would have to address the question of whether that bilateral would be a substitute or a complement. Higher real income in Canada and Mexico would make it more likely that the United States would view this bilateral as a complement and hence prefer an FTA. On the other hand, the U.S. loss of preference in the markets of Canada and Mexico would make it more likely that the United States would view the Canada-Mexico bilateral as a substitute and hence prefer a hub and spoke.

The Waste of Real Resources in a Hub-and-Spoke System Due to Higher Administrative and Transport Costs

The analysis so far applies to a hub-and-spoke system in which the U.S. hub has consistent bilaterals with all the spokes (i.e., its tariffs and NTBs are the same in its trade with each spoke -- not, say, a tariff of zero in trade with one spoke, and 2% with another). Since even such a consistent system would be a more complex trading network than an FTA, there would be a waste of the extra time and effort that management, economists, lawyers, and accountants would have to devote to determining the least expensive trade and investment patterns throughout this maze. To illustrate, should some direct Brazil-Mexico trade be re-routed through the only duty-free path available, i.e., through the United States? While the extra time required to answer such questions would provide a private payoff to lawyers, economists, and accountants, from a broader point of view it would be an unnecessary waste of these resources. Moreover when such a re-routing does take place, it implies a further waste due to higher transport costs.

All these wastes may escalate if it is no longer assumed that all bilaterals are consistent.

The Costs of Rent-Seeking in a Hub-and-Spoke System

As a hub-and-spoke system develops, the question arises: which country will be the next spoke? There is then the possibility of lobbying pressure by rent-seeking firms in the hub to influence the selection of the next

country or sequence of countries and the form of the bilateral agreement with each so as to provide these firms with the best configuration of special preferences. The argument here is parallel to the traditional one in which rent-seeking firms seek to establish special benefits from the creation of, say, a monopoly position. Both preference in a foreign market and a domestic monopoly position are created by restricting the entry of competitors; in the case of trade preference described here, the restricted entry is into spoke markets by competitors from other spokes (and from outside the hemisphere).²⁵ In either case, rent seeking represents a social waste, though, of course, it may provide a benefit to the firms that engage in this activity. Moreover, it need not be limited to firms in the hub; firms in spoke countries and prospective spoke countries may also engage in rent-seeking attempts to influence the sequencing of bilaterals.

This means that one oft-cited advantage of a bilateral FTA -- it allows the two countries to tailor an agreement to their own special needs -- must be reconsidered. True, this ability to tailor remains an advantage (though not necessarily a decisive one) of a bilateral over a multilateral negotiation in which the agenda may be set or even heavily influenced by third countries with other problems. But it is a disadvantage of a bilateral if it is one of the spoke

²⁵ An FTA, like a hub-and-spoke system, also restricts entry by competitors from outside the hemisphere. The difference is that an FTA does not restrict entry by competitors from within the hemisphere and one would expect, therefore, less intense rent-seeking in an FTA. One would also expect less administrative and transport cost waste in an FTA because it would be less complex. It goes without saying that, in comparing the two systems, it is the difference in any of these wastes that is relevant.

agreements in a hub-and-spoke system, since the ability to tailor means an increase in the incentives for rent seeking, and a greater risk of inconsistencies in the bilaterals.

Problems of Managed Trade: Greater in a Hub-and-Spoke?

Negotiators may have an incentive to include elements of managed trade in any FTA, since this may allow them to satisfy two constituencies at once: (1) the free trade provisions required by the FTA generate support from free traders, while (2) the managed trade provisions, with their cartel-like, market-sharing provisions, protect employment and generate support from protectionists. If a country is comparing a bilateral spoke agreement to joining an existing FTA, can anything be said about the likelihood of negotiating free trade provisions versus managed trade provisions?

It is possible for a spoke bilateral to include more free trade provisions than could be achieved in the expansion of an FTA. Indeed, as already noted, one of the traditionally cited advantages of a bilateral is that greater progress in liberalizing trade may be possible for two countries than for more than two. Nonetheless, conceding this, we still, on balance, have a concern that there may be a greater risk that two countries, in the relative freedom of negotiating a bilateral, may cartelize markets in managed trade configurations. This risk may also be greater, the fewer the industries covered. In either respect, the fewer the players, the easier it may be for cartel-like arrangements to be set up by negotiators who, recognizing the political resistance to their trade agreement that

must be overcome, may have an incentive to neutralize some opposition groups by providing them with managed trade provisions. True, by protecting existing producers, managed trade reduces short-run adjustment cost; however, in the long run, the protection these producers receive may leave them less able to meet foreign competition, and the whole process of reallocating resources to capture benefits from freer trade will be deterred.

VI. CONCLUDING REMARKS

In either a North American or Western Hemisphere context in which the U.S. is, in many goods, the "large country" and other countries are small, the development of a hub-and-spoke system centered on the United States can be expected to provide each spoke with real income benefits on signing its own bilateral agreement with the United States, but gains or losses as the United States signs bilateral agreements with other spokes, depending on whether each new agreement is a complement or substitute. However, in either case a spoke can be expected to prefer an expanding FTA.²⁶

²⁶ There are a number of alternatives besides the polar hub-and-spoke and trilateral FTA outcomes considered here. For example, there might be a trilateral core agreement covering issues on which the three countries could agree, plus a U.S. bilateral on other more contentious issues with one or each of the other two countries. In this case the resulting agreement would be a combination of core (FTA) characteristics and bilateral (hub-and-spoke) characteristics -- unless all the bilaterals are on exclusively bilateral issues. An example would be low-wage service trade along the Mexican-U.S. border, where a U.S.-Mexico bilateral would not affect Canada in any way and would therefore not have any discriminatory hub-and-spoke implications. Compare this to a Mexican-U.S. bilateral agreement on, say, government procurement which clearly could create discrimination against Canada.

For the U.S. hub, each spoke agreement will generate a net benefit or loss, depending heavily on how its terms-of-trade losses as a "large country" compare to the benefits it receives from its increased volume of trade and preferred location. Will the United States prefer a hub-and-spoke to an expanding FTA? If the analysis is limited to the effects of preferential trading -- that is, preferred access by the U.S. hub to spoke markets -- then the conclusion is that the U.S. will prefer a hub-and-spoke system. However, that judgment will be eroded and perhaps reversed by broader considerations, such as the effect of a hub-and-spoke system in generating smaller increases in income in spoke markets -- and hence a smaller increase in U.S. exports to these markets; and the expectation that higher administrative, transportation and rent-seeking wastes in a hub-and-spoke system will have a depressing effect on the real income of all participating countries including the U.S. hub -- especially if, as is almost certain, the spoke bilaterals are inconsistent.

As a final note, one might cast the net even wider into somewhat more speculative territory. Would a hub-and-spoke system encourage a new form of U.S. "domestic-export protectionism" aimed at protecting U.S. firms against foreign competition, not just in the domestic market as always, but also in the markets of spoke countries where U.S. exporters would be protected by preferential treatment? The problem with such protectionism is that it could block initiatives by the U.S. administration to further liberalize trade, either in the GATT or by transforming the hub-and-spoke system into a plurilateral FTA. "Protectionist" U.S. exporters might resist either type of liberalization because it

would strip them of their special preference in spoke markets. Moreover, this protectionism might effectively be disguised as support for free trade, since its proponents could claim that all they would be doing would be to defend an existing set of U.S. bilateral free trade agreements. The U.S. administration, traditionally under fire from protectionism in any case, might find it even more difficult to resist this new and more subtle form. An additional question to consider is whether, in the development of a hub-and-spoke system, the U.S. might be perceived as attempting to enlarge its already dominant role in the hemisphere through a trading structure that would leave hemispheric markets carved up into a patchwork of what the United States would view as preferences, but that its partner countries would view as damaging discrimination. Indeed, such a preferential system could prove not to be sustainable over any significant period of time.

REFERENCES:

- Caves, Richard E., Jeffrey A. Frankel and Ronald W. Jones (1990), *World Trade and Payments*, 5th edition (Glenview, IL: Scott, Foresman/Little, Brown).
- Cox, David and Richard G. Harris (1986), "A Quantitative Assessment of the Economic Impact on Canada of Sectoral Free Trade with the United States," *Canadian Journal of Economics* XIX, 377-394.
- Gehrels, Franz (1956), "Customs Union from a Single Country Viewpoint," *Review of Economic Studies* 24, 61-64.
- Hill, Roderick and Ronald J. Wonnacott (1991), *Free Trade with Mexico: What Form Should It Take?* (Toronto: C.D. Howe Institute Commentary #28).
- Jones, Ronald W. (1969), "Tariffs and Trade in General Equilibrium: Comment," *American Economic Review* 59, 418-424.
- Kowalczyk, Carsten (1990), "Welfare and Customs Unions," NBER Working Paper No. 3476.
- Kowalczyk, Carsten and Ronald Wonnacott (1991), "Substitute and Complement Trading Clubs," Dartmouth College, Department of Economics Working Paper No. 91-16.
- Lipsey, Richard G. (1957), "The Theory of Customs Unions: Trade Diversion and Welfare," *Economica* 24, 40-46.

- Lipsey, Richard G. (1990), *Canada and the U.S.-Mexico Free Trade Dance: Wallflower or Partner?* (Toronto: C.D. Howe Institute Commentary #20).
- Lipsey, Richard G. (1991), "The Case for Trilateralism" in Steven Globerman, *Continental Accord: North American Economic Integration* (Vancouver: The Fraser Institute), 89-124.
- Meade, James (1955), *Trade and Welfare* (London: Oxford University Press).
- Ohyama, Michihiro (1972), "Trade and Welfare in General Equilibrium," *Keio Economic Studies* 9, 37-73.
- Park, Yung C. and Yoo, Jung Ho (1989), "More Free Trade Areas: A Korean Perspective," in Jeffrey J. Schott, ed., *Free Trade Areas and U.S. Trade Policy* (Washington, DC: Institute for International Economics), 141-158.
- Viner, Jacob (1956), *The Customs Union Issue* (New York: The Carnegie Endowment for International Peace).
- Wonnacott, Ronald J. (1975), "Canada's Future in a World of Trade Blocks: A Proposal," *Canadian Public Policy* 1, 118-130.
- Wonnacott, Ronald J. (1982), "Controlling Trade and Foreign Investment in the Canadian Economy: Some Proposals," *Canadian Journal of Economics* XV, 567-585.
- Wonnacott, Ronald J. (1990), *Canada and the U.S.-Mexico Free Trade Negotiations* (Toronto: C.D. Howe Institute Commentary #21).

Wonnacott, Ronald J. (1991), *The Economics of Overlapping Free Trade Areas and the Mexican Challenge* (Toronto and Washington: C.D. Howe Institute and National Planning Association).

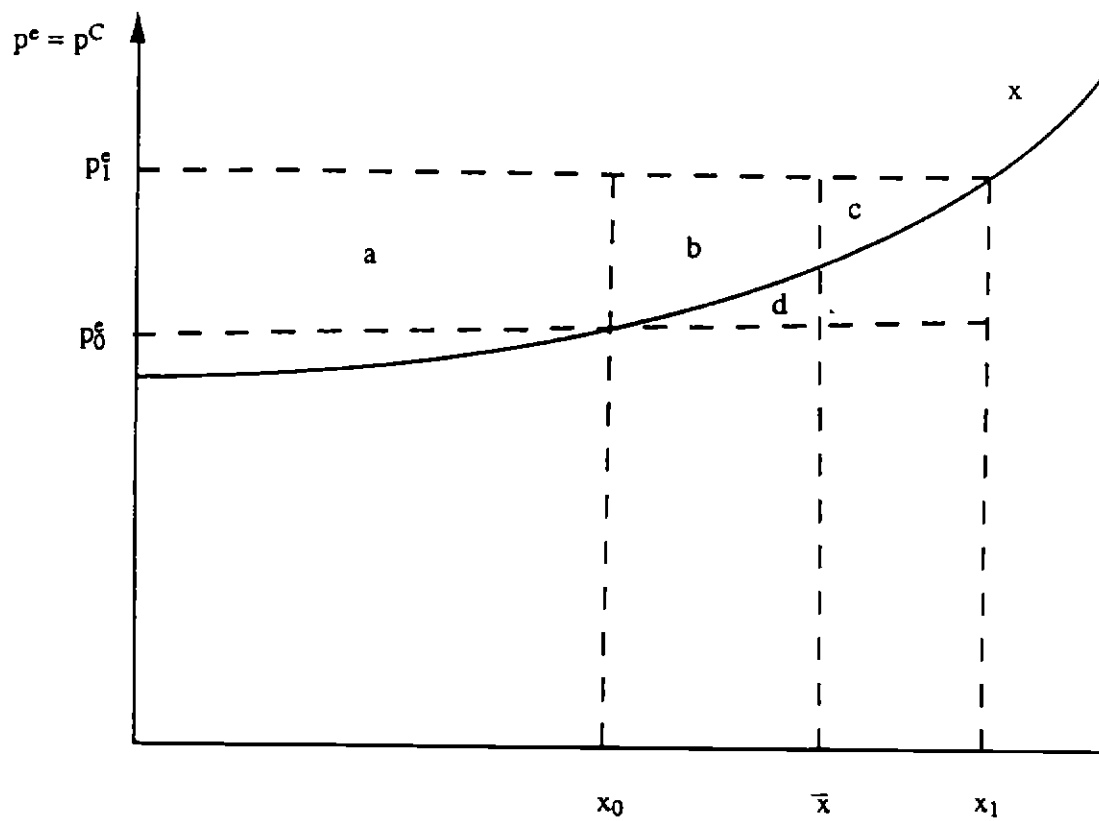


Figure 1