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CENTER DISCUSSION PAPER NO. 755

THE COMMON EXTERNAL TARIFF OF A CUSTOMS UNION: ALTERNATIVE APPROACHES

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Abstract

The most prominent exception to the cardinal 'most favoured nation' principle of the General Agreement on Tariffs and Trade (GATT) of 1947 is in its Article XXIV relating to Customs Unions (CU's) and Free Trade Areas (FTA's). This article required, first, the general incidence of the duties and regulations of commerce imposed by members of the CU with respect to trade with non-members shall not on the whole be higher or more restrictive than those that were applicable prior to the formation of CU or FTA, and, second, that substantially all the trade among members be free. Neither requirement was very operational, with the phrases 'general incidence' and 'substantially all' being difficult legal concepts to apply. The agreement of 1994 establishing the World Trade Organization (WTO) has made "general incidence" precise by defining it import-weighted average of height of barriers but without offering any rationale for the definition. Now that preferential trading arrangements such as FTA's are proliferating, reform of Article XXIV is of importance. This paper describes alternative approaches to the central question of common external tariffs of a CU. Taking off from the work of Kemp and Wan who showed the existence of a common external tariff of CU that keeps the welfare of non-members unchanged while revising that of the CU as compared to the situation prior to the formation of CU, it characterizes such a tariff structure for two leading benchmark examples as consumption-weighted average of pre-union tariffs and subsidies in the member countries.

KEY WORDS: Customs Union, Free Trade Area, Common External Tariff, GATT, WTO

1. Introduction

The most favoured nation principle (or MFN principle as it is usually called) is enshrined in Article I of the General Agreement on Tariffs and Trade (GATT) concluded in 1947 and is considered by all to be the foundation of the agreement.[1] Yet GATT has allowed several exceptions to MFN principle such as, for example, its "grandfathering" of pre-existing preferential trade arrangements, the notorious regime of discriminatory quantitative restrictions on trade in textiles called the multi-fibre arrangement, and the waiver granted to developing countries under the "enabling clause" of the Tokyo Round Agreement of 1979 for providing preferential access to other developing countries to their markets. However, the most prominent exception is in its Article XXIV relating to the Customs Unions (CU's) and Free Trade Areas (FTA's), since by their very definition both clearly involve preferential treatment of the trade among members of such arrangements as compared to their trade with non-members. Two essential features of the article as it relates to a Customs Union are:

> " (i) ... with respect to a customs union, or an interim agreement leading to a formation of a customs union, the duties and other regulations of commerce imposed at the institution of any such union or interim agreement in respect of trade with contracting parties not parties to such union or agreement shall not on the whole be higher or more restrictive than the general incidence of the duties and regulations of commerce applicable in the constituent territories prior to the formation of such union or the adoption of such interim agreement'
>
> (ii) duties and other restrictive regulations of commerce (except, where necessary, those permitted under Articles XI, XII, XIII, XIV, XV and XX) are eliminated with respect to substantially all the trade between the constituent territories of the union or at least with respect to substantially all the trade in

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[1]Ironically, from a strictly economic perspective there is nothing to recommend non-discrimination among trade partners, as Harry Johnson (1976) pointed out long ago!

> products originating in such territories ..." [GATT (1994), pp. 523-524, emphasis added]

The article made it clear that any contracting party of the GATT deciding to enter into a CU or FTA or an interim agreement towards that end shall promptly notify the other contracting parties of their intentions to do so and, presumably, to agree to abide by the requirements of the article XXIV.

It has been suggested that by insisting that the departure from MFN be extreme with respect to trade among members in that substantially all of it had to be free and also requiring that the general incidence of barriers on trade with non-members is not raised, the intention of the drafters of GATT was to make it very difficult to form a CU or FTA. Yet the history of consideration of notifications of such arrangements and actions on them by the contracting parties is one of evasion, rather than strict enforcement, of the provisions of Article XXIV. For example, in the case of the most celebrated such agreement, namely the Rome Treaty of the European Economic Community, the GATT 'blinked', according to Finger (1993, p. 137). He quotes from a report of a GATT (1959, p. 70) committee that considered the issue:

> "[T]he Committee felt that it would be more fruitful if attention could be directed to specific and practical problems, leaving aside for the time being questions of law and debates about the compatibility of the Rome Treaty with Article XXIV of the General Agreement."

It is clear that even if the contracting parties wished to enforce Article XXIV they would have run into difficulties. As Jackson (1989, p. 141) points out, the requirements that substantially all trade among members be free and the common external tariff

> "be not "on the whole" more restrictive than the "general incidence of" duties and regulations before the CU was formed...however, [are] difficult legal concepts to apply, and have caused much controversy in

> the GATT. In addition, the GATT exception allows an "interim agreement"--one which leads to a CU or FTA within a reasonable time--to depart from MFN. This has opened a loophole of considerable size, since almost any type of preferential agreement can be claimed to fall within the exception for "interim agreement," and "reasonable time" is exceedingly imprecise."

The agreement concluding the Uruguay Round of multilateral trade negotiations signed in April 1994 at Marrakesh included an understanding with respect to the interpretation of Article XXIV. It clarified that for purposes of comparison,

> "... the general incidence of the duties and other regulations of commerce applicable before and after the formation of a customs union shall in respect of duties and charges be based upon an overall assessment of weighted average tariff rates and of customs duties collected. This assessment shall be based on import statistics for a previous representative period to be supplied by the customs union, on a tariff-line basis and in values and quantities, broken down by WTO country of origin. For this purpose, the duties and charges to be taken into consideration shall be the applied rates of duty."

The substitution of the vague phrase "general incidence" by a much more precise criterion for comparison of pre- and post-union tariff structures is to be welcomed. However no rationale for proposed criterion is offered. Nor is it established that one can infer how the interests of non-members are affected by the formation of CU by using the suggested comparison.

The reform of Article XXIV began to attract scholarly attention largely because of a revived interest since the late eighties in free trade areas and other preferential trading arrangements (PTA's).[2] Between the initiation of

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[2]Among recent contributors to the literature related to Article XXIV are Bhagwati (1991, 1993), Bond et al. (1995), Finger (1993), Ju and Krishna (1996), McMillan (1993), Roessler (1993), Snape (1993), Syropoulos (1995a, 1995b) and Winters (1996).

the Uruguay Round in 1986 and the establishment of the World Trade Organization (WTO) on January 1, 1995 as many as 30 agreements were notified as compared to 68 agreements notified in the previous four decades (WTO (1995a), Appendix Table I;A). The belief that such a revival was a passing phenomenon reflecting primarily a gloomy assessment (at the time of its mid-term review in December 1988) of the prospect of successfully concluding the Uruguay Round negotiations, and the fear that the global trading system will break up into warring trade blocs, turned out to be mistaken. The interest in PTA's gathered further steam, rather than wane, even after the successful conclusion of the UR negotiations. In fact, since the establishment of WTO, 12 more agreements have been notified (WTO (1995b), p. 12). As such, the reform of Article XXIV continues to be a matter of concern. Among the issues currently being raised is the central question of the common external tariffs of a customs union. What should be the structure of such tariffs?

In what follows, I first briefly describe alternative approaches to this central question, in particular, whether the relevant issue should be one of the height of the post-union barriers on trade with non-members or one of post-union <u>welfare</u> of non-members (Section 2). Kemp and Wan (1976) in their celebrated article take the latter approach and showed the existence of a post-union tariff structure for a customs union (of any arbitrary collection of members of a global trading system) that is global welfare improving, as long as lump sum income transfers among members of the union are feasible.[3] Such a tariff structure, in comparison to the pre-union world equilibrium, maintains the welfare of each resident of non-union members while increasing

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[3]For comparing alternative trading equilibria from a global welfare perspective, Pareto ranking is used.

the welfare of at least one resident of a member of the union. The Kemp-Wan proposition is of importance in that it shows the existence of a dynamic path to global free trade through successive enlargements of customs unions, each enlargement being Pareto-improving over its predecessor. Along such a path, the regional approach towards trade liberalization through the formation of customs unions becomes a "building-block" rather than a "stumbling block," to use Bhagwati's (1991) apt phrases, in the march towards global free trade. I go beyond the Kemp-Wan proof of the existence of such a common tariff structure by characterizing it for two benchmark examples in terms of an appropriately defined average of different pre-union tariffs of members. Such an average is not only as well-defined as the average specified in the Uruguay Round version of Article XXIV, but unlike the latter it has a welfare content in addition. I show this using a Ricardian model of a three-country trading world in Section 3. In Section 4, I show analogous results hold in a model with a more complex production technology as long as all countries all countries have identical Samuelson social utility functions of the Cobb Douglas type. I also address the issue of the intra-union transfers associated with the Kemp-Wan tariff, an issue which is elegantly illustrated for a special case in Donald Davis's discussion of this paper.

2. Alternative Approaches to Common External Tariffs

Jacob Viner (1950), in his justly celebrated analysis of Customs Unions (CU), distinguished between trade-creating and trade-diverting unions and implied that the former enhance, and the latter lessen, global welfare. Although such a welfare implication was shown not to hold in general, the idea that the formation of a customs union should be judged in terms of its impact

on global welfare is widely accepted. The GATT was negotiated and entered into in 1947 well before Viner's analysis (and long before that of Kemp and Wan) was published. It is therefore hard to say whether the negotiators of the GATT had, without using the Viner's terminology, the same concerns about trade diversion as Viner or indeed whether like Kemp and Wan they had global welfare in mind, in insisting that the common tariffs of a CU be no higher than the general incidence of tariffs of the member countries in the pre-union situation. Indeed, if they did, they (and as some, including economists still do) failed to appreciate that the height of barriers in a CU on its trade with non-members need not necessarily indicate how global welfare would be affected by the formation of the CU.

Two of the proposals for reform of Article XXIV are by Bhagwati (1991) and McMillan (1993). Bhagwati proposed that a CU should be approved only when its common external tariff is set at the minimum of the pre-union import tariffs of the member countries. An implication of this is that the CU will engage in free trade with <u>all</u> non-members, if at least one member had a zero pre-union tariff for each of the traded commodities! Even if this were not the case, as I show in Section 3, the Bhagwati proposal could <u>lower</u> welfare of some members of the CU and <u>raise</u> that of non-members.[4] Since such a

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[4]The analysis of Syropoulos (1995a) of Nash equilibria of tariff games (in a symmetric three-country-three commodity world in which two countries form a CU while still maintaining some tariffs on internal trade) is of interest in this context. Internal liberalization (i.e. reduction of internal tariffs) could result in trade deflection and, as such, even if the CU sets its common tariffs a la Bhagwati's proposal so that there is <u>external</u> trade liberalization, nonetheless non-members could lose if the adverse trade deflection effect of internal trade liberalization outweighs the beneficial effects of external liberalization. Ju and Krishna (1996) analyze free trade areas without rules of origin. Since this is in effect equivalent to the adoption of the Bhagwati proposal, their analysis is also relevant. In a FTA formed by a developing country which (prior to the formation of the FTA) has higher tariffs on all imports (especially on final goods, they show that

possibility could deter the formation of a union, the Bhagwati proposal may still be treated as a desirable reform which in effect sets a price or hurdle on WTO members who wish to enter a customs union and thus compromise the MFN principle.

McMillan (1993) also points out that Article XXIV of GATT 1947

> "...nowhere is it specified how the 'general incidence' of a set of tariffs is to be measured. Are before and after tariffs to be compared item by item, or are average tariffs to be compared? If the latter, is it a simple average, or a weighted average with trade volumes as weights?" (p. 299)

He suggests that

> "Article XXIV could be made more workable by phrasing its requirements not in terms of the height of tariffs but in terms of trade volumes; that is, by looking at the trade consequences of the restrictions rather than trying to measure their effect on domestic prices...A proposed RIA [Regional Integration Agreement], in order to get GATT's imprimatur, would have to promise not to introduce policies that result in external trade volumes being lowered. And, if after some years the RIA is seen to have reduced its imports from the rest of the world, it would be required to adjust its trade restrictions so as to reverse their fall in imports." (p. 300)

Measuring trade volumes is certainly more workable. But changes in aggregate volumes of trade with non-members need not necessarily indicate changes in global welfare. Besides, by substituting outcome variables (viz. trade

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welfare of FTA countries is likely to rise, and that of the rest of the world fall, if the FTA imposes no rules of origin. Bond et al. (1995) consider a three-country-multi-commodity endowment model with countries having identical preferences with a constant elasticity of substitution. Two of the countries form a CU while still maintaining some barriers on internal trade. They ask whether, in the context of internal trade liberalization in the two countries forming a CU, adjustments in their common external tariff to keep unchanged the terms of trade faced by the outside countries (which they call Kemp-Wan adjustments) are incentive-compatible for member and non-member countries. They show that they are not, if the elasticity of substitution between member and non-member goods in consumer preferences exceeds unity.

volumes for instrument variables, viz. tariff rates), the McMillan proposal sanctifies the malodorous "managed-trade" approach to trade policy.[5] On the other hand the Kemp-Wan approach is based on tariffs that maintain the terms of trade of unchanged. As such each non-member, as long as it maintains its trade barriers unchanged, will maintain its welfare at the same level as it was prior to the formation of the CU. Thus, global welfare has to increase, since at least one member can be made better off with the formation of the union without hurting others. Strictly speaking, the adoption of Kemp-Wan structure (which is in general not unique) keeps the prices faced by non-members unchanged.[6] This in turn ensures that no one in any non-member country is adversely affected by the formation of the CU as long as each such country does not alter its tariffs. As such, adoption of a Kemp-Wan tariff structure by a CU is sufficient to ensure that the welfare of non-members is not adversely affected by its formation. It is certainly not necessary--after all, one cannot rule out the possibility that in spite of the change in the prices faced by non-members incidental to the adoption by a CU of a tariff structure that differs from a Kemp-Wan structure, welfare of non-members is not adversely affected. Also, as Winters (1996) rightly cautions, the Kemp-Wan approach cannot be used as a benchmark to evaluate any proposed tariff

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[5]I thank Alan Winters for chiding me for not recognizing this feature of the McMillan proposal.

[6]Kemp and Wan (1993) note that their proposed tariff structure is not necessarily unique. This can be seen by noting that a Kemp-Wan tariff on a commodity, being the difference between its domestic price in the CU and its unchanged world price, will in general depend on which of the many possible post-union Pareto Optimal allocations within the union is to be sustained as a competitive equilibrium through intra-union lump sum transfers. Of course if all consumers have identical homothetic tastes, within union lump sum transfers will not affect aggregate demand. In such a case we can treat the union as if it is populated by a single consumer, and provided its competitive equilibrium is unique, so will be its Kemp-Wan tariff structure.

structure. There is no way in general of determining how a deviation from a Kemp-Wan tariff structure by a CU affects welfare of consumers in any non-member country relative to its level prior to the formation of the Union.

3. Customs Unions in a Ricardian World: Two Examples

I now turn to the characterization of Kemp-Wan tariffs. Let labour be the single factor of production with the labour endowment (inelastically supplied) of country i being $\bar{L}^i$ (i=1,2,3). Let a_j^i be the unit labour requirement of commodity j in country i (i=1,2,3; j=1,2) so that the maximum possible output $\bar{Q}_j^i$ of good j in country i is $\bar{L}^i/a_j^i$. Let the Samuelson social utility function be α Log C_1 + (1-α) Log C_2 (with $0 < \alpha < 1$) in all three countries. In autarky the domestic relative price of good 2 (with good 1 as numeraire) in country i is $\pi^i(A) = a_2^i/a_1^i$. Let the ranking of comparative advantage be $\pi^1(A) < \pi^2(A) < \pi^3(A)$.

Suppose that, in the initial trading equilibrium, country 1 is specialized in and exports good 2 to the other two countries which are both specialized in good 1. Let the world relative price of good 2 with good 1 as numeraire be $\pi(T)$. Let t^i be the rate of ad valorem import tariff in country i so that the prices are as follows:

		Good 1	Good 2
World Price		1	$\pi(T)$
Domestic Price:	Country 1	$1+t^1$	$\pi(T)$
	Country 2	1	$(1+t^2)\pi(T)$
	Country 3	1	$(1+t^3)\pi(T)$

Let tariff revenues be returned to consumers in a lump sum fashion. Let $E^i(T)$ be the total expenditure in country i in <u>domestic</u> prices. Then country 1 spends $\alpha E^1(T)$ on imports of good 1 from the other two and country i (i=2,3) spends $(1-\alpha)E^i(T)$ on imports of good 2 from country 1. As such, the tariff revenue $R^i(T)$ in country i is given by

$$R^1(T) = \frac{\alpha E^1(T)}{1+t^1} t^1 \qquad R^i(T) = \frac{(1-\alpha)E^i(T)}{\pi(T)(1+t^i)} t^i \pi(T)$$

Expenditure $E^i(T)$ = Value of Production + Tariff Revenue. Hence

$$E^1(T) = \pi(T)\bar{Q}_2^1 + R^1(T) \Rightarrow E^1(T) = \frac{(1+t^1)\pi(T)\bar{Q}_1^1}{[1+(1-\alpha)t^1]}$$

$$E^i(T) = \bar{Q}_1^2 + R^i(T) \Rightarrow E^i(T) = \frac{(1+t^i)}{(1+\alpha t^i)} \bar{Q}_1^i \quad \text{for } i = 1,2$$

Market clearance for good 2 (by Walras' law market for good 1 clears if the market for good 2 clears) implies that exports from country 1 equals the sum of imports of countries 2 and 3. Now

$$\text{Exports of good 2 from country 1} \equiv \left[\frac{\alpha \bar{Q}_2^1}{1+(1-\alpha)t^1}\right]$$

$$\text{Imports of good 2 by country i} = \frac{(1-\alpha)\bar{Q}_1^i}{\pi(T)(1+\alpha t^i)}$$

Thus, market clearance requires

$$\frac{\alpha \bar{Q}_2^1}{1+(1-\alpha)t^1} = \frac{1-\alpha}{\pi(T)} \sum_{i=2}^{3} \left[\frac{\bar{Q}_1^i}{1+\alpha t^i}\right] \quad or$$

$$\pi(T) = \left(\frac{1-\alpha}{\alpha}\right)\frac{[1+(1-\alpha)t^1]}{\bar{Q}_2^1}\sum_{i=2}^{3}\left(\frac{\bar{Q}_1^i}{1+\alpha t^i}\right) \qquad (1)$$

For the assumed pattern of specialization and trade to be consistent, we must have $\pi^1(A) < \frac{\pi(T)}{1+t^1}$ *and* $\pi(T)(1+t^i) < \pi^i(A)$ for i=2,3.

Having characterized the initial trading equilibrium, the first example I consider is a CU of countries 2 and 3. I assume that the outside country, namely country 1, leaves its tariff unchanged at the same level as it was prior to the formation of a CU by the other two countries. The objective is to derive the Kemp-Wan post-union common tariff and characterize it as a function of pre-union tariffs. By definition, such a tariff will leave country 1's welfare unchanged at its pre-union level while improving the welfare of at least one of the members without reducing that of the other. Since the tariff of country 1 is unchanged, for its welfare to be unchanged, its terms of trade <u>after</u> the formation of the CU should be the same as before. With its terms of trade and tariff remaining unchanged, the net exports of country 1, which in a balanced-trade equilibrium equals the net imports of the CU, also remains unchanged. Given the net import vector, the CU countries can choose a production vector that ensures that at least one gains without the other losing or both gain as compared to the pre-union equilibrium. Thus the essential step in deriving the Kemp-Wan tariff is to look for a tariff that leaves post-union terms of trade at their pre-union level.

Suppose the pattern of specialization and trade is unaffected by the formation of CU. Any <u>common external</u> tariff t to be consistent with the vague

provisions article XXIV of GATT 1947, presumably has to satisfy $t \leq \text{Max } (t^2, t^3) = t^3$ (say). Let the new world relative price of good 2 be $\pi(CU)$. It is easy now to see that, with a common external tariff t, and identical tastes in the two-member countries, imports of good 2 into the union will be $\frac{(1-\alpha)E(CU)}{\pi(CU)(1+t)}$ where E(CU) is total expenditure of the union. Hence, tariff revenue will be $\frac{t(1-\alpha)E(CU)}{(1+t)}$. By definition E(CU) ≡ value of production + tariff revenue, or $E(CU) = \sum_{i=2}^{3} \bar{Q}_1^i + \frac{t(1-\alpha)E(CU)}{1+t}$ so that $E(CU) = \frac{1+t}{(1+\alpha t)} \sum_{i=2}^{3} \bar{Q}_1^i$.

Substituting this in the expression for imports of good 2, and equating it to the exports of good 2 from country 1, i.e. $\frac{\alpha \bar{Q}_2^1}{1+(1-\alpha)t^1}$, we get

$$\bar{Q}_2^1 \pi(CU) = \left[\frac{1-\alpha}{\alpha}\right][1+(1-\alpha)t^1]\left(\frac{1}{1+\alpha t}\right) \sum_{1=2}^{3} \bar{Q}_1^i \qquad (2)$$

From (1) and (2), we get the critical relationship between the post-CU terms of trade $\pi(CU)$ and the pre-CU terms of trade $\pi(T)$:

$$\frac{\pi(CU)}{\pi(T)} = \frac{1}{(1+\alpha t)}\left(\sum_{i=2}^{3} \bar{Q}_1^i\right) \Big/ \left(\sum_{i-2}^{3} \frac{\bar{Q}_1^i}{1+\alpha t^1}\right) \qquad (3)$$

Now clearly the common tariff t will not be set below Min $(t^2, t^3) = t^2$ so that $(1+\alpha t^2) \leq (1+\alpha t^3)$. If the weighted harmonic mean of $(1+\alpha t^i)$ with weights $\bar{Q}_1^i$, i.e. $(\Sigma \bar{Q}_1^i)/\Sigma \left(\frac{\bar{Q}_1^i}{1+\alpha t^i}\right)$, is greater than (resp. equal to or less

than) $(1+\alpha t)$, then $\pi(CU)$ will be greater than (resp. equal to or less than) $\pi(T)$.

Compare, more intuitively, the import-weighted average $\bar{t}$ of t^2, t^3 in the pre-union situation with the post-union common tariff t. Now

$$\bar{t} = \left[\Sigma \frac{t^i \bar{Q}_1^i}{1+\alpha t^i}\right] / \Sigma \left[\frac{\bar{Q}_1^i}{1+\alpha t^i}\right] \tag{4}$$

so that

$$(1+\alpha\bar{t}) = \left[\frac{\Sigma \bar{Q}_1^i}{\Sigma\, \bar{Q}_1^i/(1+\alpha t^i)}\right] \tag{5}$$

In fact, since there is no domestic production of good 2 in either country, $\bar{t}$ is also a <u>domestic consumption</u> weighted average of t^1 and t^2. Put differently, the tariffs t^i are simply consumption taxes. It is appropriate then that consumption weights are used to average them.

Comparison of (3) and (5) shows that $\pi(CU) \begin{matrix} > \\ = \\ < \end{matrix} \pi(T)$ according as $\bar{t} \begin{matrix} > \\ = \\ < \end{matrix} t$.

Of course, if $\pi(CU) > \pi(T)$ the country 1 outside the union gains from the formation of the union since its terms of trade $\pi(CU)$ are better compared to the pre-union situation and its tariff t^1 is unchanged.

Now, I am in a position to analyse the implications, for the welfare of nonmembers, of the common external tariffs proposed by Bhagwati and Kemp and Wan.

(1) The Kemp-Wan tariff, of course, has no impact on the nonmember

country's (i.e. country 1) welfare by assumption. For this to happen $\pi(CU)$ has to equal $\pi(T)$. The common tariff that brings this about is clearly $\bar{t}$ which is unique in this example; the reason being that all consumers within the union have identical homothetic tastes so that lump-sum income transfers within the union have no effect on aggregate demand in the union and, for the assumed tastes, competitive equilibrium is unique. Being a positive weighted average of t^2 and t^3, $\bar{t}$ lies between the two.

(2) The Bhagwati-tariff, which would be at t^2 (the lower of the two member tariffs in the pre-CU situation), will lead on the other hand to welfare gain for the country outside the CU. If there are no internal transfers within the union, country 2 will lose since the terms of trade worsen and its tariff post union is the same as the tariff pre-union. Country 3 experiences two effects relative to its pre-union situation--a terms of trade loss but a lowering of import tariff. This means that if there are no transfers, it may gain or lose. Thus, without transfers, the union will not come about since country 2 will lose from the union.

(3) It was noted earlier that Article XXIV of GATT 1947 was vague in specifying how the general incidence of tariffs on trade with non-members in the pre-CU situation is to be assessed. The Uruguay Round version does require that it should be based on an import weighted average of applied tariffs. In the present model, $\bar{t}$ is the weighted average of the applied tariffs t^2 and t^3 before the CU, using the imports (or equivalently consumption, since there is no production of the imported good) as weights. It was shown that as long as the post union common external tariff does not exceed $\bar{t}$, the welfare of the outside country does not go down. Thus in the

present model the test proposed in the Uruguay Round version of Article XXIV applies exactly.

Consider now the issue of internal transfers within the CU. With a Kemp-Wan tariff in place, the terms-of-trade of the union is the same as that in the pre-union situation, viz. $\pi(T)$. Also, the trade-vector of the union is the unchanged trade-vector of the country outside the union. Thus, given that the aggregate production vector of the union is unchanged, it follows that the aggregate consumption vector of the union is unchanged as compared to the pre-union situation. Hence, the feasible allocation of post-union aggregate consumption between the two members can be shown in an Edgeworth Box as in Figure 1. The length of the horizontal (resp. vertical) side of the box equals the aggregate consumption of good 2 (resp. good 1) in the pre-union situation. Given identical homothetic preferences, the Pareto optimal allocations of the aggregate consumption between the two countries lie on the diagonal O^2O^3 with O^i representing the origin for measuring consumption of country i (i=2,3). The pre-union allocation is at point T, with the indifference curves $U^i(T)$ (i=2,3) passing through that point. The slope of the tangent TT^i to $U^i(T)$ at T represents the pre-union domestic price $\pi(T)(1+t^i)$ in country i (i=1,2). The terms of trade $\pi(T)$ is represented by the slope of TF. The Pareto optimal allocations that are not inferior to T for either country lie between A^2 and A^3. Of course, along any point on the diagonal O^2O^3 including the stretch A^2A^3, the indifference curves of the countries not only are tangent to each other, but also have the same common slope, i.e. the slope of A^2A^4 or A^3A^5. The difference between the slope of the terms of trade TF and that of A^2A^4 or A^2A^5 equals the Kemp-Wan tariff $\bar{t}$ times the terms of trade $\pi(CU)$ and this does not depend on the post-union allocation

of consumption. Since T lies to the left of A^i on $U^i(T)$, i = 2,3, it follows that $t^2 < \bar{t} < t^3$. If the post-union allocation is at A^2, the welfare of country i (i=2,3) remains at its pre-union situation while the other member of the union gains. If the post-union allocation is at some point A between A^2 and A^3 both countries gain from the union. The consumption expenditure of country i is the value of its consumption bundle at the post-union tariff inclusive price A, i.e. the slope of A^2A^4 (or A^2A^5). This is financed by its income at factor cost (i.e. the value of its production at the same price), the tariff revenue from its imports and any transfer it receives from the other country.

The second example relates to a CU between countries 1 and 2 instead of between countries 2 and 3. This case is interesting to analyze since, in the pre-union situation, the two countries are specialized in, and importing, <u>different</u> commodities. This is a situation typical of many real world CU's in which the pre-union trade patterns of members often are very different with some members exporting commodities which others import. For concreteness, let the common external tariff of the CU be the Kemp-Wan tariff. By definition it keeps the trade vector of the non-member country 3 unchanged. Since country 3 is assumed not to change its tariff t^3, this means its pattern, volume and terms of trade have to remain unchanged. In particular it will continue to export (resp. import) good 1 (resp. good 2). Thus post-union world relative price of good 2 has to be $\pi(T)$, i.e. $\pi(CU) = \pi(T)$ and the union will export good 2 and import good 1. The interesting issue is its post-union pattern of production. Clearly country 1 will continue to produce good 2. What about country 2 and what would be the domestic relative price good 2 in terms of good 1 in the union?

Given a common post-union Kemp-Wan import tariff t on good 1, its domestic price in the union (in units of world numeraire) will be (1+t). The domestic price in the union of its export good 2 is its world price (in units of world numeraire) $\pi(T)$. Since $\pi(T)(1+t^2) < \pi^2(A)$ (the autarky price), a fortiori $\pi(T)/1+t < \pi^2(A)$ so that country 2 continues to be specialized in good 1 after its joining a customs union with country 1. Thus the post-union production pattern of the union is the same as its pre-union pattern: country 1 specializes in and produces $\bar{Q}_2^1$ units of good 2 and country 2 specializes in and produces $\bar{Q}_1^2$ units of good 1.

Let E(CU) be the aggregate expenditure of the union (in world numeraire units). Then its demand for its import good, i.e. good 1, is $\alpha E(CU)/(1+t)$, given identical Cobb-Douglas tastes in the union countries (with α as the share of expenditure on good 1) and (1+t) being the domestic price of good 1. The domestic supply of good 1 in the union is $\bar{Q}_1^2$ so that imports are $\alpha E(CU)/(1+t) - \bar{Q}_1^2$. Tariff revenue on these imports is $t[\ \alpha E(U)/(1+t) - \bar{Q}_1^2\ ]$. The value of domestic production $(\bar{Q}_1^2, \bar{Q}_2^1)$ at domestic prices is $(1+t)\bar{Q}_1^2 + \pi(T)\bar{Q}_2^1$. Hence by definition $E(CU) = (1+t)\bar{Q}_1^2 + \pi(T)\bar{Q}_2^1 + t\left[\frac{\alpha E(CU)}{(1+t)} - \bar{Q}_1^2\right]$

or

$$E(CU) = \left[\frac{1+t}{1+(1-\alpha)t}\right][\bar{Q}_1^2+\pi(T)\bar{Q}_2^1] \qquad (6)$$

This in turn implies imports of $\left[\frac{\alpha}{1+(1-\alpha)t^3}\right][\bar{Q}_1^2+\pi(T)\bar{Q}_2^1] - \bar{Q}_1^2$ units of good 1.

Equating this with exports $\frac{(1-\alpha)}{1-\alpha t^3}\bar{Q}_1^3$ units of good 1 from country 3, yields

$$\left[\frac{\alpha}{1+(1-\alpha)t}\right][\bar{Q}_1^2+\pi(T)\bar{Q}_2^1]-\bar{Q}_1^2 = \frac{(1-\alpha)\bar{Q}_1^3}{(1+\alpha t^3)} \quad \text{or}$$

$$t = \frac{1}{1-\alpha}\frac{[-(1-\alpha)Q_1^2+\alpha\pi(T)\bar{Q}_2^1-\left(\frac{1-\alpha}{1+\alpha t^3}\right)\bar{Q}_1^3]}{\bar{Q}_1^2+\left(\frac{1-\alpha}{1+\alpha t^3}\right)\bar{Q}_1^3} \tag{7}$$

Once again the Kemp-Wan tariff t turns out to be unique in this example for the same reason as mentioned earlier. Now

$\alpha\pi(T)\bar{Q}_2^1 = (1-\alpha)[1+(1-\alpha)t^1]\left[\sum_{i=2}^{3}\bar{Q}_1^i/(1+\alpha t^i)\right]$. Hence

$$\left[\bar{Q}_1^2+\left(\frac{1-\alpha}{1+\alpha t^3}\right)\bar{Q}_1^3\right]t = \left[-\bar{Q}_1^2+\frac{[1+(1-\alpha)t^1]}{(1+\alpha t^2)}\bar{Q}_1^2+\frac{[1+(1-\alpha)t^1]}{(1+\alpha t^3)}\bar{Q}_1^3-\frac{1}{(1+\alpha t^3)}\bar{Q}_1^3\right]$$

$$= \frac{[-\alpha t^3+(1-\alpha)t^1]}{(1+\alpha t^2)}\bar{Q}_1^2+\frac{(1-\alpha)t^1}{(1+\alpha t^3)}\bar{Q}_1^3$$

$$= \frac{-\alpha t^2}{1+\alpha t^2}\bar{Q}_1^2+(1-\alpha)t^1\sum_{i=2}^{3}\bar{Q}_1^2/(1+\alpha t^i)$$

Thus,

$$t = \frac{\frac{-\alpha t^2}{1+\alpha t^2}\bar{Q}_1^2+t^1(1-\alpha)\sum_{i=2}^{3}\frac{\bar{Q}_1^i}{(1+\alpha t^i)}}{\frac{\alpha(1+t^2)}{1+\alpha t^2}\bar{Q}_1^2+(1-\alpha)\sum_{i=2}^{3}\frac{Q_1^i}{(1+\alpha t^i)}} \tag{8}$$

$$t-t^1 = \frac{-\left[\frac{\alpha Q_1^2}{1+\alpha t^2}\right](t^2+t^1)}{\frac{\alpha(1+t^2)Q_1^2}{1+\alpha t^2} + (1-\alpha)\sum_{i=2}^{3}\frac{\bar{Q}^i}{(1+\alpha t^i)}} < 0 \qquad (9)$$

Now since country 1 does not produce good 1, it imports it from the other two countries both of whom export it. Thus the pre-union consumption of good 1 in country 1 equals the sum of exports of good 1 by countries 2 and 3, viz $(1-\alpha)\sum_{i=2}^{3}\frac{\bar{Q}_1^i}{(1+\alpha t^i)}$. Country 2 produces only good 2 and exports $\frac{(1-\alpha)\bar{Q}_1^2}{1+\alpha t^2}$ units of it. Hence, it consumes $\frac{\alpha(1+t^2)}{1+\alpha t^2}$ units of it. Now a tariff at the rate t^2 on imports of good 2 is equivalent to a tax $\frac{t^2}{1+t^2}$ on exports of good 1 or a <u>subsidy</u> on its domestic consumption. As such it is seen from (7) that the Kemp-Wan tariff (or equivalently tax on consumption) of good 1 in the post-union situation is the <u>consumption-weighted</u> average of the <u>tax</u> of $-\frac{t^2}{1+t^2}$ (or (<u>subsidy</u> of $\frac{t^2}{1+t^2}$) on its consumption in country 2 and tax t^1 on its consumption in country 1 in the pre-union situation.

It should be noted that since the two countries forming the CU (countries 1 and 2) were taxing and importing <u>two different</u> commodities in the pre-union equilibrium, and in the post-union equilibrium the union imports

only one of the two (namely good 1), the union's tariff (i.e. the Kemp-Wan tariff) cannot be expressed as an average with pre-union import weights of pre-union tariffs on good 1. By contrast, in a CU of countries 2 and 3, since both countries did not produce and imported the same good (namely good 2) in the pre-union equilibrium and continue to do so after they form a union, the Kemp-Wan tariff could be equivalently expressed as consumption-weighted as well as an import-weighted average of pre-union tariffs on good 2.

Figure 2 illustrates the algebra. As in Figure 1, O^1O^2 with O^i representing the origin for measuring country i (i=1,2), is the locus of Pareto Optimal allocations of aggregate consumption between the two members. The pre-union allocation is at T. The slope TT^1 of $U^1(T)$ at T is the pre-union domestic relative price of good 2 $\pi(T)/1+t^1$ in country 1. Slope TT^2 of $U^2(T)$ at T is the pre-union domestic price $\pi(T)(1+t^2)$ in country 2. The terms of trade $\pi(T)$ is the slope of TF. The post-union Pareto optimal allocations not inferior to T for either country are between A^1A^2. At any of these allocations the domestic relative price of good 2 (i.e. $\pi(T)/(1+t)$ is the slope of $U^1(T)$ at A^1, i.e. the slope of A^1A^4 which is also the slope of $U^2(T)$ at A^2, i.e. the slope of A^2A^5. From the diagram it is obvious that $t<t^1$ and $1+t^2 > 1/1+t$ since T lies to the left of A^i on $U^i(T)$, i=1,2. If the post-union allocation is at A^i (i=1,2), the welfare of country i remains as in the pre-union situation and that of the other country increases. At any point in between, such as A, both gain whatever be the chosen allocation between A^1 and A^2, the net transfer received by country i is the difference between the cost of its consumption (valued at post-union domestic prices) and the sum of the value of its production at the same prices and the tariff revenue from its imports. The sum of the net transfers of the two countries equals zero by

definition.

The message from the two examples is that the common post CU Kemp-Wan tariff is the pre-union-consumption weighted average of the pre-union taxes (or subsidies) on the commodity imported in the post-union equilibrium. In the case where this commodity is imported and not produced in the pre-union equilibrium by both countries forming the union, the Kemp-Wan tariff is also the pre-union-import-weighted average of pre-union import tariffs. It is shown below that a version of the consumption-weighted average characterization of Kemp-Wan tariffs emerges when we generalize the Ricardian model.

4. A General Production Model

The Ricardian Model of production in Section 3 together with identical Cobb-Douglas social utility functions in the three countries enabled the explicit computation of pre- and post-union equilibria algebraically. Since the Ricardian production technology is very special, it is worth examining the robustness of the characterization of the Kemp-Wan tariff as the consumption-weighted average of pre-union consumption taxes to changes in production technology. In this section a general production technology (possibly different in different countries) involving the production of n ($n \geq 1$) commodities in each country from an inelastically supplied factor endowment of that country is implicitly assumed. However, all countries are assumed to have the same Cobb-Douglas social utility function.

Let $Q^i(T)$ and $Q^i(CU)$ denote the output vectors of the ith member of the union (i-1,2,...I) in the pre- and post-union equilibria respectively. Let $\pi(T)$ be the equilibrium world prices and M(T) the net imports of the union in

the pre-union equilibrium. Let t^i be the vector of ad valorem tariffs in country i in the pre-union equilibrium so that the domestic price $\pi_j^i(T)$ of good j in country i is $\pi_j(T)(1+t_j^i)$. Clearly if commodity j is imported (resp. exported) by country i, a positive t_j^i is to be viewed as an import tax (resp. export subsidy). A negative t_j^i (which cannot be less than minus one) is an import subsidy (resp. export tax) by the same token. Let tariff revenue be returned to consumers in a lump sum fashion. Given identical Cobb-Douglas tastes, aggregate demand in each country depends only on prices and aggregate expenditure $E^i(T)$. Now $E^i(T)$ is the sum of the value of production at domestic prices and tariff revenues. The net imports $M_j^i(T)$ of commodity j in country i is by definition the difference between domestic consumption $C_j^i(T)$ and output $Q_j^i(T)$. With α_j denoting the share of expenditure on commodity j in each country,

$$C_j^i(T) = [\alpha_j E^i(T)/\pi_j(T)(1+t_j^i)] \tag{10}$$

Hence tariff revenue $R^i(T)$ is given by

$$R^i(T) = \sum_{j=1}^{n} t_j^i \pi_j(T) M_j^i(T) \tag{11}$$

$$= \sum_{j=1}^{n} t_j^i \pi_j(T) \left[\frac{\alpha_j E^i(T)}{\pi_j(T)(1+t_j^i)} - Q_j^i(T) \right] \tag{12}$$

$$\text{Now } E^i(T) = \sum_{j=1}^{n} Q_j^i(T)\pi_j(T)(1+t_j^i) + R^i(T) \tag{13}$$

Substituting (11) into (12) and solving for $E^i(T)$,

$$E^i(T) = (1+\bar{t}^i)V^i(T) \tag{14}$$

where

$$\frac{1}{1+\bar{t}^i} = \sum_{j=1}^{n} \frac{\alpha_j}{1+t_j^i} \tag{15}$$

$$V^i(T) = \sum_{j=1}^{n} \pi_j(T)Q_j^i(T) \tag{16}$$

Using (15), $M_j^i(T) = \frac{\alpha_j(1+\bar{t}^i)V^i(T)}{\pi_j(T)(1+t_j^i)} - Q_j^i(T)$ so that aggregate imports of union members is

$$M_j(T) = \sum_{i=1}^{I} M_j^i(T) = \frac{\alpha_j}{\pi_j(T)} \sum_{i=1}^{I} \left[\frac{1+\bar{t}^i}{1+t_j^i}\right] V^i(T) - Q_j(T) \tag{17}$$

where $Q_j(T) = \sum_{i=1}^{I} Q_j^i(T)$.

With the formation of the union, let the Kemp-Wan common external tariff on commodity j be t_j. Given identical Cobb-Douglas tastes and common domestic prices in all members of the union, domestic demand of the union depends only on the aggregate expenditure of E(CU) of the union as a whole. As earlier, aggregate expenditure is the sum of the value of production in the union at domestic prices and tariff revenues. With unchanged terms of trade π(T) and common tariffs t_j, imports $M_j(CU)$ of the union will be $\frac{\alpha_j E(CU)}{\pi_j(T)(1+t_j)} - Q_j(CU)$

where $Q_j(CU)$ is the sum $\sum_{i=1}^{I} Q_j^i(CU)$. Using the analogue of (12) now for the CU, it is easy to show that

$$E(CU) = (1+\bar{t})V(CU) \tag{18}$$

where
$$V(CU) = \sum_{i=1}^{I} V^i(CU) = \sum_{i=1}^{I}\sum_{j=1}^{n} \pi_j(T)Q_j^i(CU) \tag{19}$$

and
$$\frac{1}{1+\bar{t}} = \sum_{j=1}^{n} \frac{\alpha_j}{1+t_j} \tag{20}$$

Substituting for E(CU) in $M_j(CU)$, $M_j(CU) = \dfrac{\alpha_j(1+\bar{t})}{\pi_j(T)(1+t_j)} \cdot V(CU) - Q_j(CU)$.

By definition of Kemp-Wan tariffs t_j, net imports $M_j(CU)$ of the union is the same as its pre-union imports $M_j(T)$. Hence,

$$\frac{\alpha_j(1+\bar{t})\sum_{i=1}^{I} V^i(CU)}{\pi_j(T)(1+t_j)} - Q_j(CU) = \frac{\alpha_j}{\pi_j(T)} \sum_{i=1}^{I} \left[\frac{1+\bar{t}^i}{1+t_j^i}\right] V^i(T) - Q_j(T) \tag{21}$$

Let $\Delta_j^i \equiv Q_j^i(CU) - Q_j^i(T)$ *and* $\Delta_j = \sum_{i=1}^{I} \Delta_j^i$. Then

$$\sum_{i=1}^{I} V^i(CU) = \sum_{i=1}^{I} V^i(T) + \sum_{k=1}^{n} \pi_k(T)\Delta_k \tag{22}$$

Substituting (21) in (22) and rearranging

$$\frac{\alpha_j(1+\bar{t})}{(1+t_j)} = \frac{\sum_{i=1}^{I} \alpha_j \left[\frac{1+\bar{t}^i}{1+t_j^i}\right] V^i(T) + \pi_j(T)\Delta_j}{\sum_{i=1}^{I} V^i(T) + \sum_{k=1}^{n} \pi_k(T)\Delta_k} \qquad (23)$$

From (14) and (19) it is seen that

$$\tau_j \equiv \alpha_j \frac{(1+\bar{t})}{1+t_j} = \frac{(\alpha_j/1+t_j)}{\sum_{k=1}^{n}(\alpha_k/1+t_k)} \quad \text{and} \quad \tau_j^i \equiv \frac{\alpha_j(1+\bar{t}^i)}{1+t_j^i} = \frac{(\alpha_j/1+t_j^i)}{\sum_{k=1}^{n}\left[\frac{\alpha_k}{1+t_k^i}\right]}$$

Since $\sum_{j=1}^{n} \tau_j = \sum_{j=1}^{n} \tau_j^i = 1$, τ_j, τ_j^i represent appropriately weighted and

normalized tariff structures, respectively of the union and of country i in the pre-union situation. In fact it can be shown using (10) and (14) that τ_j and τ_j^i equal respectively the share of the value (at unchanged world prices) of <u>consumption</u> of commodity j in the total value of consumption in the union and country i (prior to the union).

Let $w^i(T) = \frac{V^i(T)}{\sum_{i=1}^{I} V^i(T)}$ $w_j = \frac{\pi_j(T)\Delta_j}{\sum_{k=1}^{n} \pi_k(T)\Delta_k}$. Thus $w^i(T)$ is the share of

country i in the value at unchanged world prices of the output of the union in the pre-union equilibrium and w^j is the share of the change in value (at unchanged world prices) of output of commodity j in the change in the value of output of all commodities brought about by the formation of the union and the

induced change in domestic price structure in each of the countries. Substituting these in (14),

$$\tau_j = \frac{V(T) \sum_{i=1}^{I} w^i \tau_j^i + \Delta V \cdot w_j}{V(T)+\Delta V} \tag{24}$$

or

$$\tau_j - \bar{\tau}_j = \frac{\Delta V \cdot [w_j - \bar{\tau}_j]}{V(T)+\Delta V} \tag{25}$$

where $\bar{\tau}_j = \sum_{i=1}^{I} w^i \tau_j^i$, $V(T) = \sum_{i=1}^{I} V^i(T)$, $\Delta V = \sum_{k=1}^{n} \pi_k(T)\Delta_k$. $\bar{\tau}_j$ is the weighted average of pre-union τ_j^i. Now $V(T) + \Delta V = \sum_{i=1}^{I} V^i(CU) > 0$. If $\Delta > 0$, $\tau_j \gtreqless \bar{\tau}_j$ according as $w_j \gtreqless \bar{\tau}_j$. Thus, if after the formation of the union, the value of output of the union at unchanged world prices is higher than in the pre-union equilibrium, then the Kemp-Wan normalized tariff factor τ_j will exceed (resp. fall short of) the weighted average $\bar{\tau}_j$ of the normalized tariff factors τ_j^i on commodity j in the union countries prior to the formation of the union, if the share w_j exceeds (resp. falls short of) the same weighted average $\bar{\tau}_j^i$. In particular, if $w_j < 0$, i.e. the value of output of commodity j is lower in the post-union situation, then $\tau_j < \bar{\tau}_j^i$.

If $\Delta V < 0$, then $\tau_j \lessgtr \bar{\tau}_j$ according as $w_j \lessgtr \bar{\tau}_j$. In particular, if $w_j < 0$,

then $\tau_j > \bar{\tau}_j$. Of course $\Delta V < 0$ does not necessarily imply $w_j < 0$.

It is clear from (23) that in the case of a world of pure exchange economies in which by definition $Q_j^i(T) = Q_j^i(CU)$, ΔV will be zero and hence $\tau_j = \bar{\tau}_j$. Although one cannot compute Kemp-Wan τ_j from the pre-union data of τ_j^i and $V^i(T)$ for general production economies, if there are reasons to suggest that changes in output following the formation of the union are unlikely to make $\left| \frac{\Delta V}{V(T)+\Delta V} \right|$ large, as a first order of approximation $\tau_j = \bar{\tau}_j$.

An alternative, but equivalent, approach to characterizing τ_j is to note that under assumption of balanced trade $V^i(T) = \sum_{j=1}^{n} \pi_j(T) C_j^i(T)$ where $C_j^i(T)$ is

consumption of good j in country i in the pre-union situation. Also with unchanged net imports of good j in the union compared to the sum of net imports of member countries in the pre-union situation, the change in value of output Δ_j = change in value of consumption. Thus the weights w^i is also the share of the value of consumption in country i to the sum of the value of consumption in the member countries (both valued at unchanged world prices) in the pre-union situation. Similarly, w_j is the share of the change in value of consumption of commodity j in the sum of the changes in the value of consumption of all commodities, again at unchanged world prices, between the post- and pre-union situation. One can therefore interpret (24) using 'consumption' weights for averaging. Thus the Kemp-Wan normalized tariff factor τ_j on commodity j will exceed, equal or fall short of the consumption weighted average $\bar{\tau}_j$ of the normalized tariff factors τ_j^i on the same commodities in the union countries in the pre-union situation according as w_j

(the share of the change in value of consumption of commodity j in the sum of changes in the value of all commodities between the post- and pre-union equilibria) exceeds, equals or falls short of the same $\bar{\tau}_j$. In other words, if the formation of the union does not lead to a significant change in the value of consumption of all commodities, the Kemp-Wan normalized tariff factor τ_j on <u>each</u> commodity j will equal the <u>consumption weighted</u> average $\bar{\tau}_j$. While this is the exact analogue of the characterization of Kemp-Wan tariffs in the simple Ricardian model, in a more complex model the analogy holds only locally, i.e. for small changes in consumption.

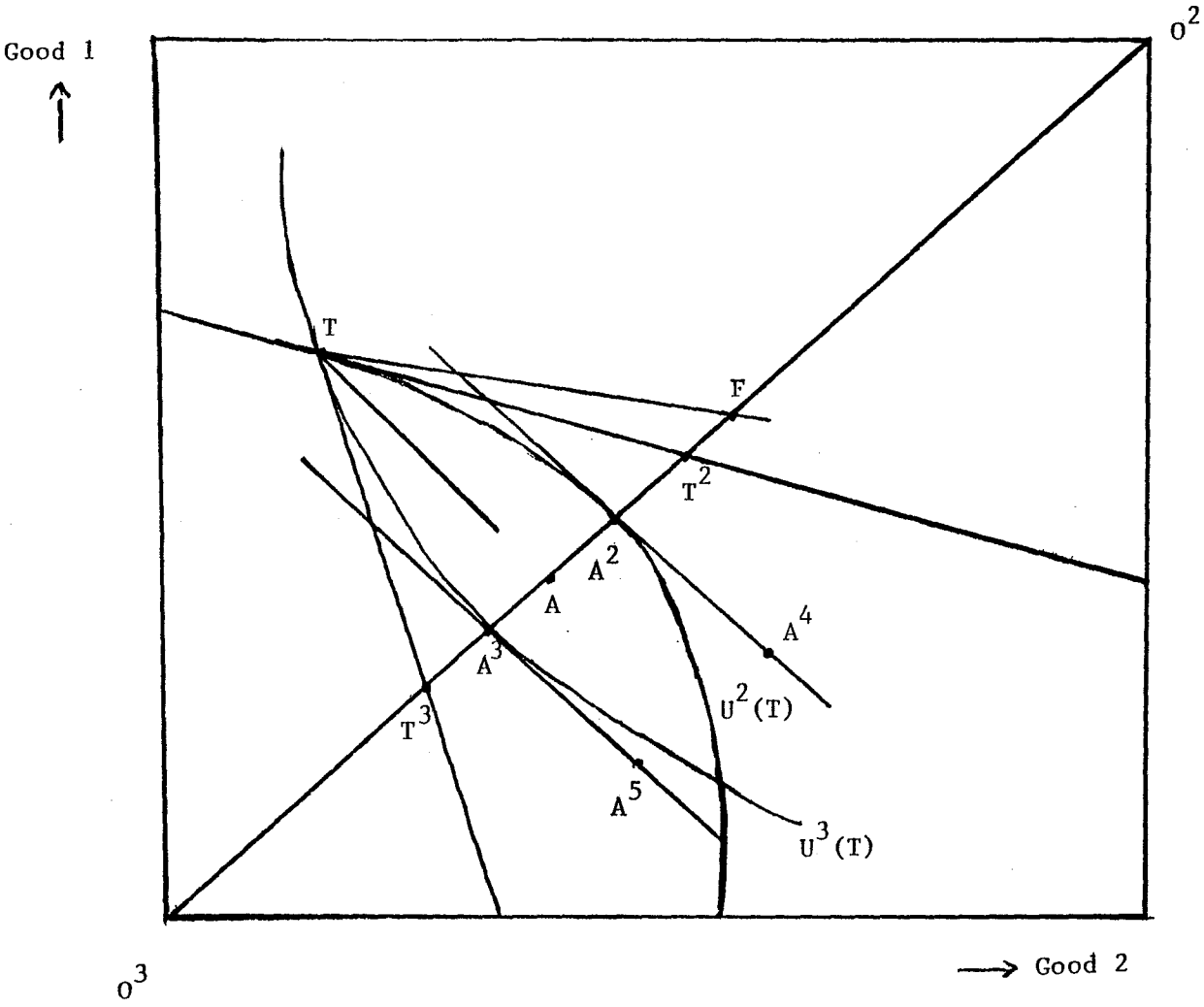

Figure 1

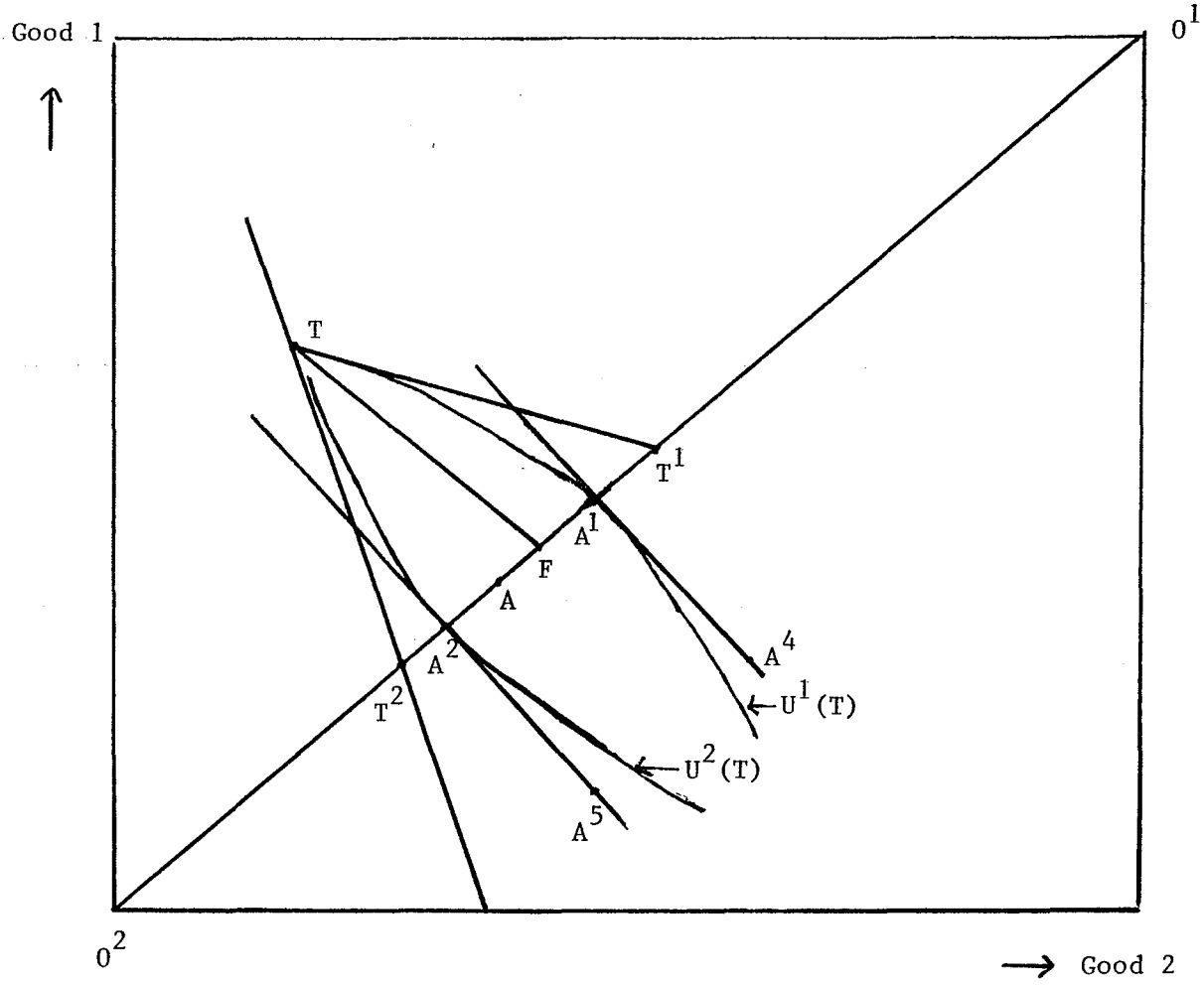

Figure 2

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