

# A Note on Two Elementary Propositions on Customs Unions

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This paper reviews two important propositions on the formation of customs unions, viz. the Kemp-Wan proposition and its recent extension, the Kemp-Shimomura proposition. In doing so, we provide both a diagrammatic exposition and a proof of the Kemp-Wan proposition that gives rise to the following novel insight: a Kemp-Wan customs union needs not to liberalize its internal trade – harmonization of the internal tariffs, together with existence of internal transfers, is the only necessary and sufficient condition for welfare improvements. This insight holds also for the Kemp-Shimomura proposition that assures that a welfare improving customs union can be formed even if the rest of the world adjusts optimally its external tariff.

JEL : F15. K : customs unions, Kemp-Wan proposition, optimal tariffs.

## 1. I

Enthused by the recent proliferation of regional preferential trade arrangements, old questions concerning the normative implications of preferential trade arrangements have been re-surfaced.<sup>2</sup> The present paper focus on the following question: are we sure that customs unions (CU) can be formed without destroying the path for achieving worldwide free trade? Or, to put it in a different way, are we sure that customs unions can be enlarged continuously so as to encompass the whole world?

Similar questions were raised many years ago, when the Vinerian analysis of customs unions — with its picturesque concepts of trade creation and trade diversion — was the standard way of thinking about these issues. At that point, a greatly celebrated paper by Kemp and Wan (1976), entitled “An elementary proposition

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<sup>1</sup>This paper is a substantial revision of notes written by Alan Woodland in 1998 in response to a draft of the Kemp-Shimomura paper. We are grateful to Martin Richardson, who kindly provided his correspondence with Kemp on the Kemp-Shimomura paper and have benefited significantly from having access to it. This revision was undertaken while Raimondos-Møller was on leave at the University of Sydney in 1999/2000.

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<sup>2</sup>For an overview of the issues raised in the theory of preferential trade arrangements, see the recent and extensive survey of Panagariya (2000).

concerning the formation of customs unions”, distanced itself from that literature and answered the above questions in an affirmative, and ingenious, way.

The basic message in the Kemp-Wan proposition was that customs unions can be *designed* so as to ensure that the path to worldwide free trade is intact, and that the instrument for doing this was the choice of the common external tariff vector (CET).<sup>3</sup> Once seen and understood, the Kemp-Wan proposition is very intuitive and therefore, perhaps, elementary. However, the Kemp-Wan proposition was never intended as a positive approach to CU formation. As such, it can never be used to address issues concerning what countries — members of a CU or not — actually do. For example, when countries choose their tariff vector as a strategic instrument,<sup>4</sup> the Kemp-Wan proposition simply does not apply.

The recent interest in the above questions took off from exactly this point. It focused on what we know about the normative effects of customs unions formation when *all* countries behave optimally (while, to recapitulate, the Kemp-Wan proposition applies in the case where *no* country behaves optimally). Krugman (1991) presented a story that captured the attention of almost everybody: in short, the continuous enlargement of customs unions will stop when the world contains three trading blocks, at which point the world welfare is at its minimum. Even if future research showed that the Krugman analysis was too sensitive to particular functional forms and assumptions (see, e.g., Bond and Syropoulos, 1996), the point made was well taken: the normative effects of customs union formation with optimising countries are in general ambiguous.<sup>5</sup>

Having established that, one can then ask a simpler question: what are the normative effects of customs unions when *some* countries behave optimally? For our purpose, there are two cases: (i) union members optimally set their CET while non-members do not, and (ii) the opposite, viz. non-member behave optimally while members do not. Case (i) turns out to be straightforward. With no retaliation, each enlargement of a union will be beneficial to the members and harmful to the non-members. Each non-member will want to join the union and eventually worldwide free trade will prevail. Case (ii), however, turns out not to be straightforward. On top of that, we will argue that case (ii) is an interesting case from a policy perspective.

Richardson (1995) was first to examine case (ii). He presented an example where the adoption of the Kemp-Wan CET, together with optimal behaviour by non-members, proves to be detrimental to the CU member countries. In short, Richardson’s point was that allowing for retaliation destroys the nice features of the Kemp-Wan CET. However, and as we emphasized previously, the Kemp-Wan CET was not

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<sup>3</sup>The details of the argument will be presented below. Note, however, that Kemp and Wan (1976) were not the first to argue this. Kemp (1964), Vanek (1965) and Ohyama (1972) also discuss, what at that time was called, the tariff-compensating customs union.

<sup>4</sup>This is the view that we adopt in this paper, viz. that tariffs are chosen as to maximise the social welfare function. Of course, we do not want to argue that this is exactly what is happening in reality. Other, perhaps political economy, arguments for the choice of tariff policy may be more appropriate (see Panagaryia, 2000).

<sup>5</sup>The first paper that made exactly this point was Riezman (1985) in what turned out to be a pioneering article within the coalition theory of customs unions formation. Recently, Burbidge et al. (1997) develop such a model in more detail. They also present an example where worldwide free trade (the grand coalition) is not an equilibrium.

designed for a model where countries optimize. It seems then natural to consider the design of a new CET that takes into account that non-members optimize.

Kemp and Shimomura (2001) published “A second elementary proposition concerning the formation of customs unions” where they do exactly this: they show that there exists a CET *function* that allows customs unions to be formed without destroying the path towards worldwide free trade. The Kemp-Shimomura CET function is arguably less intuitive than the Kemp-Wan CET and therefore, perhaps, less “elementary”. Nevertheless, we believe that it establishes an important result in the theory of customs unions.

The scope of this paper is to pay tribute to both Kemp-Wan and Kemp-Shimomura propositions by: (1) presenting a novel diagrammatic explanation of the Kemp-Wan proposition, (2) by developing a rigorous proof of the Kemp-Wan proposition that uncovers some novel features of that proposition, and (3) by showing how the Kemp-Shimomura proposition can easily be proved.

As a basis to all this lies our belief that the Kemp-Shimomura proposition is potentially important for policy issues. The reason is the following. Formation of customs unions, and trade in general, does not occur in a vacuum. The GATT/WTO has for 50 years now been regulating all international trade issues with an overall considerable success.<sup>6</sup> Part of this regulation dictates that any customs union formation needs to be approved by the GATT/WTO. Here enters Article XXIV which imposes conditions on the behaviour of the member countries, and on the design of the CET. However, Article XXIV says nothing about the behaviour of the non-member countries, which, therefore, can continue to behave optimally. In other words, what Article XXIV imposes (assuming that it is enforced) is an asymmetry in countries’ behaviour that fits exactly case (ii) above. But that is exactly the case for which the Kemp-Shimomura proposition was made. Thus, if the Article XXIV was doing what the Kemp-Shimomura CET function describes, then any customs union formation would be beneficial to its members and not detrimental to non-members. Enlargements of this union would eventually lead to worldwide free trade.

The remaining of this paper is organised as follows. Section 2 sets up the framework that we use. Section 3 presents the Kemp-Wan proposition, a diagrammatic presentation of their argument, and a formal proof. Section 4 then goes on in presenting and proving the Kemp-Shimomura proposition. A discussion about the issues raised and the implications for a possible reform of the Article XXIV are to be found in section 5. The paper concludes in section 6.

## 2. T M W T

We consider a perfectly competitive general equilibrium model of the world, consisting of  $K$  nations trading in  $N$  internationally tradeable commodities. Following Turunen-Red and Woodland (1991), the model may be expressed as:

$$S_p^k(p^k, u^k) = 0 \quad (1)$$

$$p^T S_p^k(p^k, u^k) = b^k \quad k = K \quad (2)$$

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<sup>6</sup>Bagwell and Staiger (1999) show how important the GATT/WTO rules of reciprocity and non-discrimination are for achieving efficient outcomes in international trade relations.

$$\sum_{k \in K} b^k = 0 \tag{3}$$

in terms of the world price vector  $p$  ( $p^\top$  denotes the transpose of a vector) and the domestic price vectors  $p^k$  for each country  $k = 1 \dots K$ . In this specification,  $S^k(p^k, u^k) \equiv G^k(p^k) - E^k(p^k, u^k)$  is the net revenue function, being the difference between the gross domestic product function  $G^k$  and the consumer expenditure function  $E^k$ . Also,  $S_p^k(p^k, u^k) = {}_p S^k(p^k, u^k)$  denotes the gradient of the net revenue function with respect to prices and represents the vector of compensated net export functions for nation  $k$ .

These equations consist of the market equilibrium conditions, the budget constraints for each country and the world budget constraint. The market equilibrium conditions express the requirement that the net exports of countries,  $x^k \equiv S_p^k(p^k, u^k)$ , sum to the zero vector, meaning that world markets clear. The budget constraints state that the value (at world prices) of net exports (the balance of trade) must be matched by a transfer of income abroad,  $b^k$ . In our atemporal world, the national budget constraints are simply the requirements of zero current account balances. The world budget constraint require these transfers abroad to sum to zero over all countries.

It is implicit in this formulation of the model that there is just one consumer in each country, who receives a transfer from the government and has utility  $u^k$ . The model is expressed in terms of domestic and world prices. These are connected by tariffs, which may be expressed in specific or ad valorem terms.<sup>7</sup>

Let  $u = (u^U, u^N)$ ,  $t = (t^U, t^N)$ , and  $b = (b^U, b^N)$  be obvious partitions of the vectors  $u$ ,  $t$  and  $b$  into elements for union countries ( $U$ ) and non-union countries ( $N$ ). The set of countries that form the customs union is denoted by  $K^U$ , while  $K^N$  is the set of non-union countries.

The initial equilibrium, before the union is formed, is a Nash equilibrium with  $(p, u) = (p_n, u_n)$  and  $(t, b) = (t_n, 0)$ . The post-union equilibrium involves the union setting a common external tariff  $t^k = t^U, k \in K^U$ , coordination of internal tariffs, and a system of intra-union income transfers  $b^U$ . The non-union countries continue to act non-cooperatively and so set their tariffs in a Nash fashion.

### 3. T K -W P

To set the stage, we discuss Kemp and Wan's (1976) elementary proposition on customs unions. This is done for three reasons. First, a discussion of this proposition is needed to lead into the subsequent discussion of the Kemp and Shimomura proposition on customs unions. Second, there is a perception in the literature that the Kemp-Wan proposition has not been formally proved (see footnote 17, Haveman, 1996).<sup>8</sup> Thirdly, there is also the perception that the Kemp-Wan proposition is not

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<sup>7</sup>In the above, specific tariffs are used whence we may write  $p^k = p^k(p, t^k) \equiv p + t^k$ . The model may also be specified in terms of ad valorem tariff rates rather than specific (unit) tariff rates. This equivalence, however, would not hold if tariff wars were allowed, see Lockwood and Wong (2000) on this point.

<sup>8</sup>A proof of the Kemp-Wan proposition can be found in Kemp and Wan (1986). Grinols (1981) and Ohyama (1972) contain also a proof of the basic proposition. The proof contained in the present paper differs substantially from the existent proofs.

as well understood as it might be (see footnote 1, Kemp and Shimomura, 2001). For these reasons, we provide an exposition and a proof of the Kemp-Wan proposition.

The Kemp-Wan proposition is that any subset of countries can form a customs union agreement comprising internal free trade, a common external tariff and a set of internal income transfers to provide a weak Pareto improvement in welfare for all the countries of the world. If the initial equilibrium has sufficient distortions, the countries in the union will obtain strict welfare improvements. In either case, the Kemp-Wan customs union leaves the non-member countries as well off as before the formation of the union. As Richardson (1995) points out, an implicit assumption is that the non-member countries retain their pre-union tariff schedules and so do not react strategically to the formation of the customs union.

The crux of the Kemp-Wan argument is that the union can choose its common external tariff to ensure that the world price vector (and hence the vector of net trades of the union with the rest of the world) is unchanged as a result of the formation of the union. Accordingly, non-members face exactly the same trading environment as before the formation of the union and so behave exactly as before. They therefore do not experience any change in welfare. The remainder of the argument is to show that union members can gain from the union. This is established from the observations that the vector of net trades of the union with the rest of the world is unchanged, that domestic price vectors for members before the formation of the union are (presumably) different (making the equilibrium Pareto sub-optimal) and that the domestic price vectors for members after the union are identical (because of the common external tariff). As a result the intra-union equilibrium is Pareto optimal given the external trade and price vectors. Efficiency gains accrue from equalizing domestic prices<sup>9</sup> and lump sum transfers allow these efficiency gains to be redistributed to achieve a Pareto improvement.

**3.1. Diagrammatic Illustration.** The Kemp-Wan construction may be simply illustrated for the case of two goods and two union members in Figure 1. The axes measure the amounts of the two goods. The point  $y$  is the union's aggregate production vector (assumed fixed for simplicity) while point  $c$  is its aggregate consumption vector before and after the formation of the union. The difference is the net import vector for the union, again both before and after the formation of the union. Thus, the figure reflects the Kemp-Wan approach whereby the union ensures that the world price vector and, hence, the aggregate union trade vector with the rest of the world are the same before and after the formation of the union.

Figure 1: (about here)

The rectangular box formed by the origin and point  $y$  shows the allocation of production between the union members. Thus, point  $Y$  denotes the production points for the members (with origin for the production box at  $y$  for member 2).

The rectangular box formed by the origin and the point  $c$  is the Edgeworth-Bowley box for the analysis of intra-union exchange between the two union members. Thus

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<sup>9</sup>Notice that freeing internal trade is not a necessary condition for achieving these gains. The formal proof below will make this point more clear.

$O^1$  denotes the origin for member 1 while  $c$  (labelled  $O^2$ ) becomes the origin for member 2. Point  $C$  is the initial Nash consumption point (showing vector  $c^1$  from origin  $O^1$  and vector  $c^2$  from origin  $O^2$ ). Clearly, this point is Pareto sub-optimal since the slopes of the indifference curves through this point (hence initial domestic prices) are different. Pareto optimal points that are weakly preferred to  $C$  occur on the curve labelled  $PO$ . Any point on this curve, such as point  $Q$ , is Pareto superior to point  $C$ . Moreover, any such point can be supported as an equilibrium by an appropriate choice of common external tariff (equal to the difference between the world price  $p$  and the domestic price  $p^U$ ) and internal lump sum transfers, as is now demonstrated geometrically.

It is now shown that the Pareto optimal point  $Q$  may be attained by a suitable choice of common external tariff for the union and a suitable transfer of income between union members. In Figure 1 there are two lines passing through point  $Q$ . The line passing through point  $Q$  and point  $Y$  is a supporting budget line with the post-union price vector  $p^U$  since it is tangent to both indifferent curves at point  $Q$ . The second line passing through point  $Q$  corresponds to price vector  $p = p_n$  (the world price vector before and after the formation of the union in accordance with the Kemp-Wan approach). However, since this line does not pass through point  $Y$ , the post-union consumption point  $Q$  does not satisfy the balance of trade conditions  $p_n^T S_p^k(p^U - u^k) = 0 \quad k = K^U$ . Without internal income transfers, point  $Q$  cannot, therefore, be an equilibrium consumption point.

However, there exists a lump sum transfer of income between the union members that allows consumption point  $Q$  to be an equilibrium consumption point. The required lump sum transfer of income ( $T$ ) from nation 1 to nation 2 is indicated by the shift in the balance of trade line  $p_n^T(c^k - y^k) = 0 \quad k = K^U$  passing through points  $Y$ ,  $C$  and  $R$  to the new line  $p_n^T(c^{ku} - y^k) = b^{ku} \quad k = K^U$ , passing through  $Q$  and to the south-east of  $Y$ . Thus, country 2 gets a transfer of income  $b^{2u} = p_n^T(c^{2u} - y^2) > 0$  where  $c^{2u}$  is consumption by nation 2 at the point  $Q$ , while country 1 contributes this amount ( $b^{1u} = -b^{2u} < 0$ ).

Thus, the transfer allows the union members to consume at point  $Q$ , which is Pareto superior to the pre-union consumption point  $C$ . The union has clearly gained. Since the rest of the world faces the same world prices it chooses to trade the same amount of each good with the union and so the rest of the world welfare is unchanged. From a world point of view there is a (weak) Pareto improvement in welfare; from the union's point of view there is a strict Pareto gain (provided member prices are different pre-union).

Transfers may not be necessary, of course. For example, the balance of trade line passing through  $Y$  also passes through the Pareto optimal point  $R$ . This consumption point can therefore be supported by a common external tariff yielding a domestic price vector passing through  $R$  and tangent to both indifference curves at  $R$  without any transfers. Like  $Q$ , point  $R$  is Pareto superior to the initial Nash consumption point  $C$ <sup>10</sup>

It has therefore been established that any point on the curve  $PO$  can be supported

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<sup>10</sup>Of course, a point such as  $R$  need not exist in general. That is, it may be necessary to use internal transfers to obtain a strict Pareto improvement in welfare.

by a suitable common external tariff and set of internal transfers. Each such point (with the exception of the end points  $P$  and  $O$ ) is Pareto superior to the pre-union consumption point  $C$ . This is the essence of the Kemp-Wan proposition.

**3.2. The Argument in More Detail.** The above discussions indicate that Pareto improvements arise from the removal of differences in pre-union domestic prices. This (well known) idea is now treated more formally. Let  $X^N(p, t^N)$  be the aggregate vector of net export functions for non-members and let  $x_n^U = -X^N(p_n, t_n^N)$  be the aggregate trade vector for union members before the union, that is at the initial Nash equilibrium. For the union to offer this same trade vector after the union is formed and for each member to gain in welfare, it has to choose a common external tariff and internal transfers such that

$$S_p^k(p^U, u^k) = x_n^U \quad (4)$$

$$p_n^T S_p^k(p^U, u^k) = b^k \quad k \in K^U \quad (5)$$

$$b^k = 0 \quad k \in K^U \quad (6)$$

with  $u^U \gg u_n^U$ . That is, the union is to choose a common domestic price vector  $p^U$ , a vector of transfers  $b^U$  and a vector of utilities  $u^U$  that generate the same external trade vector as before, satisfy the aggregate balance of trade restriction at the same world prices as before and provide greater utility for all union members. Since the union's balance of trade restriction automatically holds ( $p_n^T x_n^U = -p_n^T X^N(p_n, t_n^N) \equiv 0$ ) and transfers are available, only the internal market equilibrium conditions (4) are constraining.

Clearly, a particular choice of internal transfers will yield a particular competitive equilibrium solution for utilities and the domestic price vector  $p^U$ . This implies a particular common external tariff  $t^U = p^U - p_n$ . By varying the transfers, therefore, utilities, domestic prices and the common external tariff also vary.

The particular solution chosen by the customs union depends upon its social welfare function (or upon the bargaining rule in a bargaining context). Extending Chipman and Moore (1972), we express the social welfare function as

$$W(u^U) \equiv \min (u^k - u_n^k) a^k \quad k \in K^U \quad (7)$$

where  $u_n^k$  is the Nash level of utility for nation  $k$  and  $a^k > 0$  is a parameter. If we let  $w$  be the level of social welfare, the levels of member utilities are related to it by  $u^k = wa^k + u_n^k$ . Thus, vector  $a$  can be thought of as the direction of movement from the Nash utility vector  $u_n^U$ .

By varying  $a$ , around the unit sphere for example, and solving the social welfare problem

$$\max W(u^U) : S_p^k(p^U, u^k) = x_n^U \quad k \in K^U \quad (8)$$

for the socially optimal utilities and the domestic price vector, the complete utility possibility surface for the union members may be traced out. By choosing a particular direction vector  $a$ , a particular set of transfers yielding a particular equilibrium solution is established with union members' utilities on the utility possibility surface.

**3.3. Formal Proof of Pareto Gains.** Consider the initial pre-union equilibrium, which satisfies the following equations:

$$S_p^k(p^k, u^k) = x_n^U \quad (9)$$

We now consider whether it is possible to alter the domestic prices and utilities so that this system of equations remains satisfied and every member country experiences a strict gain in utility. If so, a strict Pareto improvement has been established. If not, the initial equilibrium must be Pareto efficient in the sense that not all countries can gain (some might). It will be shown, under certain assumptions, that a strict Pareto improvement is possible if and only if there are price differentials.

To proceed further, we differentiate these equations totally to get

$$S_{pp}^k(p^k, u^k)dp^k + S_{pu}^k(p^k, u^k)du^k = 0 \quad (10)$$

We consider whether a solution to this system exists with  $du^k > 0 \quad k \in K^U$

**Axiom 1.** (i) The union member countries' substitution matrices  $S_{pp}^k \equiv \frac{\partial^2 S(p, u^k)}{\partial p^2}$  have maximal rank  $N - 1$ . (ii) Preferences are normal in every member country.

**Theorem 1.** Let Axiom 1 hold at the initial pre-union equilibrium. A strict Pareto improvement in union welfare exists if, and only if, domestic price vectors are not all the same (up to a factor of proportionality), i.e.  $p^k = \alpha p^j$  for some  $j$  and  $k$ .

**Proof.** We are concerned with whether a solution to system (10) exists with  $du^k > 0 \quad k \in K^U$ . By Motzkin's Lemma a solution exists if and only if there does not exist a solution  $\lambda$  to the dual system

$$\lambda^\top [S_{pu}^k(k \in K^U)] < 0 \quad \lambda^\top [S_{pp}^k(k \in K^U)] = 0 \quad (11)$$

(i) Let  $p^k = \alpha p^j$  for some  $j$  and  $k$ . Since Axiom 1 holds the equation system  $\lambda^\top S_{pp}^k = 0$  only has nontrivial solution  $\alpha^k p^k$  ( $\alpha^k = 0$ ) and the equation system  $\lambda^\top S_{pp}^j = 0$  only has nontrivial solution  $\alpha^j p^j$  ( $\alpha^j = 0$ ). For both systems to hold, as in the second part of (11), we need  $\alpha^k p^k = \alpha^j p^j$  whence  $p^k = (\alpha^j / \alpha^k) p^j$ , which contradicts the assumption that  $p^k = \alpha p^j$ . Thus, (11) has no solution and so, by Motzkin's Lemma, a strict Pareto improvement in union welfare exists.

(ii) Let all domestic prices be equal up to a factor of proportionality, that is  $p^k = \alpha^k p^0$  where  $p^0$  is the common price vector. Thus,  $\lambda = p^0$  solves the equations  $\lambda^\top S_{pp}^k = 0$  for all  $k \in K^U$ . Also,  $\lambda^\top S_{pu}^k = p^{0\top} S_{pu}^k = (1 \ \alpha^k) p^{k\top} S_{pu}^k = (1 \ \alpha^k) S_u^k < 0$  for all  $k \in K^U$  due to the normality assumption. Thus, there is a solution  $\lambda$  to (11) and hence, by Motzkin's Lemma, there does not exist a strict Pareto improvement in union welfare. ■



**Remark 1.** *Axiom 1 is very strict and can be easily relaxed. It ensures that distortions are equated with price differences. It can be relaxed by recognizing that distortions depend on price differences in combination with price responses. Thus, we could simply assume that there is a pair of union members such that the system  $\lambda^\top [S_{pp}^k \ S_{pp}^j] = 0$  has no solution.*

How does this theorem relate to the customs union issue? Prior to the formation of the customs union each nation is assumed to be setting optimal tariffs, so the pre-union equilibrium is a unilateral tariff setting Nash equilibrium. If the resulting domestic prices for the members forming the union are different, the above theorem implies that the initial situation is Pareto sub-optimal from the point of view of the union members. Under the Kemp-Wan construction, whereby the pre-union net export vector for the union as a whole is to be retained, a strict Pareto improvement for the union can occur by small finite changes in domestic prices. Such strict Pareto improvements exist while ever the domestic prices are not all equal and vanish once they are equal. Accordingly, under the assumptions of the theorem, a common external tariff exists such that the union experiences a strict Pareto improvement relative to the pre-union utilities.

It is worth emphasizing that nowhere in the above proof was demanded that the union's internal trade should face zero tariffs. We demanded something more general, viz. that the domestic (union's internal) prices were equal. Thus, the Kemp-Wan construction allows for non-zero internal tariffs as far as they are harmonised. This insight can not be drawn from the existing proofs of the Kemp-Wan theorem.<sup>11</sup>

#### 4. T K -S P

The Kemp-Wan proposition thus establishes that any subset of countries forming a Kemp-Wan customs union experiences a strict Pareto improvement in welfare while the rest of the world is totally unaffected. Thus there is a weak Pareto improvement from the point of view of the world. As Richardson (1995) demonstrates via an example, this result may break down if the rest of the world does not react passively to the formation of the union but alters its tariffs. To counter this observation Kemp and Shimomura (2001) have provided a second "elementary proposition on customs unions" whereby the union chooses, not a common external tariff vector, but a common external *tariff function* that ensures a strict Pareto improvement for the union irrespective of the response by the rest of the world.

This argument may be simply presented as follows. As demonstrated above, the Kemp-Wan proposition establishes that the union can set the common external tariff and the internal transfers to ensure a strict Pareto improvement in welfare if it continues to trade the pre-union external trade vector at the pre-union world price

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<sup>11</sup>This property of the Kemp-Wan customs union provides no justification for the requirement embodied in GATT/WTO's Article XXIV, where:

"(ii) duties and other restrictive regulations of commerce ..... 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 products originating in such territories...." (GATT, 1994, pp.523-524)

vector. This may be done by maximizing a social welfare function of the form (7). The resulting common external tariff vector for the union can then be written as

$$t^u = T(x; u_n^U \ a) \quad (12)$$

where  $x = x_n^U$  is the pre- and post-union trade vector for the union.

Now consider the complete pre-union net export function for the union (sum of pre-union member's net export functions), which we write as  $X^U(p \ t^U)$ <sup>12</sup> Now let the union choose its common external tariff by solving the social welfare maximization problem

$$\max_k W(u^U) : S_p^k(p^U \ u^k) = X^U(p \ t_n^U) \quad (13)$$

When the world price vector is chosen to be  $p_n$  this problem reduces to problem (8) discussed above. Now, however, we extend this argument by allowing  $p$  to vary parametrically (due to ROW tariff changes possibly, but not necessarily). Thus, the union solves the maximum social welfare problem (13) for all possible world price vectors  $p$ . This yields a *common external tariff function*

$$t^u = T(p; u_n^U \ a) \quad (14)$$

which expresses the common external tariff as a function of the world price vector  $p$ . The resulting net export function for the union is denoted as  $x^u = X(p; u_n^U \ a)$ . The union is able to exactly reproduce its pre-union net export function  $X^U(p \ t_n^U)$  as a function of world prices, since by this construction  $X(p; u_n^U \ a) = X^U(p \ t_n^U)$ .

Thus, the union is able to preserve its aggregate pre-union net export function or offer curve. The rest of the world faces exactly the same economic environment as before the union was formed; in particular, it faces the same aggregate offer curve from the union members. Accordingly, the rest of the world will behave exactly as before the union was formed and so choose the same tariffs, trade the same amounts of goods and have the same utility levels.

Will the union members gain? The answer remains "Yes", just as for the Kemp-Wan construction, because the new Kemp-Shimomura construction presents the same offer curve to the rest of the world and so induces the rest of the world to trade at exactly the pre-union trade point, just as under Kemp-Wan. The union members gain, not from any expansion of external trade (there is none) but from the removal of domestic price differentials and the subsequent efficiency gains (possibly associated with greater internal trade). In short, the Kemp-Shimomura common external tariff function or schedule, in conjunction with internal transfers, enables any subset of countries to gain from the formation of a customs union. The Kemp-Wan proposition is thus extended to the case where the rest of the world is allowed to react strategically to the formation of the union; while the rest of the world is *allowed* to react strategically to the formation of the union, the union induces the rest of the world *not to react*.

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<sup>12</sup>This assumes that there are no transfers in the pre-union equilibrium for simplicity.

## 5. D

The argument is that the customs union can present a common tariff function to the rest of the world such that the resulting equilibrium has exactly the same utility levels for all countries, the same world price vector and the same tariff vectors for all non-member countries. Thus, the non-members of the union optimally choose their post-union tariffs to be exactly the same as their optimally chosen pre-union tariffs. In this way, the union of any subset of countries is no worse off than in the initial Nash equilibrium.

Some pertinent clarifying remarks about this result are as follows.

1. It is important to note, however, that Kemp and Shimomura introduce a behavioural asymmetry into the model. The union is able to set a *tariff function*, to which the rest of the world reacts. On the other hand, each of the countries in the rest of the world is assumed to present its *tariff vector* to the world. That is, of crucial importance is the assumption that the rules of the tariff game have changed. The game was initially a Nash equilibrium where each country chose its tariff conditional upon the tariff vectors chosen by all other countries. Now the union presents a tariff function conditional upon the non-members' tariff vectors, while the non-members choose tariff vectors conditional on this tariff function and the tariff vectors of the other non-members. This is a different game. It is akin to the union playing a Stackelberg strategy as leader but not quite: the difference is that the offered tariff function is carefully chosen and does not necessarily coincide with the union's reaction function.<sup>13</sup>
2. Given that behavioral asymmetry, the result has implications for tariff policy. In the Kemp-Wan framework, the Kemp-Wan result may be used to demonstrate the existence of a sequence of customs unions that leads to free trade. Imagine starting from a unilateral tariff setting equilibrium and then consider the formation of a Kemp-Wan customs union. By the Kemp-Wan proposition, this customs union gains with no cost to the rest of the world. The same argument applies to any enlargement to that union. Thus, if the rest of the world remains passive, there is a sequence of Kemp-Wan customs unions that eventually encompass all countries in free trade with internal transfers to ensure that all countries gain. The same argument applies if the customs unions are formed in the Kemp-Shimomura fashion. At each stage the union members gain, while the non-union members are induced to retain their previous trade policies and so are unaffected. Again, the outcome is free trade with internal transfers.<sup>14</sup>
3. The final point that we discuss here is the reason why the union behaves as assumed when it can do better. WTO's Article XXIV provides one possible

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<sup>13</sup>Having said that, one should notice that an asymmetry also exists in the Kemp-Wan proposition where the customs union chooses a particular common external tariff policy while the rest of the world remains passive.

<sup>14</sup>Of course, there is an implicit assumption in this extension of the argument that the rest of the world does not form a customs union of its own or break up into several such customs unions. If this is allowed to happen, the asymmetry in tariff policies implicit in the Kemp-Shimomura framework is lost. The problem becomes more complex (as the tariff function of one union will depend on the tariff function of another union) and the solution needs to be worked out.

answer: any customs union needs to be approved by the WTO, which, by its Article XXIV, imposes restrictions on the common external tariff policy of the union. Thus, customs unions do not freely choose their common external tariff policy. Admittedly, the current specification of Article XXIV focuses more on operational rather than welfare-based considerations of the type discussed here.<sup>15</sup> However, this lack of welfare considerations, together with the apparent imprecision of it, has provoked many scholars to ask for a revision of the Article XXIV (see Bhagwati, 1991; McMillan, 1993; Sampson, 1996; Srinivasan, 1997; Syropoulos, 1999; Zissimos and Vines, 2000.) Srinivasan (1997) proposes a revision that is consistent with the Kemp-Wan proposition. One should go a step further and propose a revision that is consistent with the Kemp-Shimomura proposition.

## 6. C

The aim of this paper was to emphasize the importance of two normative propositions in the theory of customs unions, viz. the Kemp-Wan proposition and, its recent extension, the Kemp-Shimomura proposition. These are propositions that can answer complicated questions concerning regionalism and multilateralism in a very simple and general way. They both advocate, under different assumptions,<sup>16</sup> the *existence* of a customs union that does not harm the rest-of-the-world (ROW) and that improves the welfare of the member countries. As such, they provide a mechanism under which world-wide free trade can be achieved through a sequential enlargement of a particularly designed customs union.

In reviewing these propositions we provided a diagrammatic exposition and a rigorous proof of the Kemp-Wan proposition that uncovered a novel feature of the Kemp-Wan construction: free internal trade is not a necessary condition for achieving welfare improvements in the member countries; harmonization of domestic prices is enough.

Having established this, it is then easy to show how the Kemp-Wan proposition can be extended to the case where the ROW behaves optimally in setting their tariffs,

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<sup>15</sup>The Article XXIV writes (see GATT, 1994, pp. 523-524):

“(i)... 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 a union...”

The “general incidence” has been clarified as follows:

“... 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 unions 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.”

<sup>16</sup>While the Kemp-Wan proposition holds when the ROW does not behave optimally, the Kemp-Shimomura proposition holds when the ROW does behave optimally.

viz. the Kemp-Shimomura proposition.

In general, normative results as the above should be used as inspiration to policy prescriptions. With the existence of WTO's Article XXIV, and with the apparent dissatisfaction of its influence, we believe that a revision of it should pay attention to these two important propositions on the formation of customs unions.

## R

- [1] Bagwell, K. and R.W. Staiger, 1999, An economic theory of the GATT, *American Economic Review* 89, 215-248.
- [2] Bhagwati, J., 1991, *The World Trade System at Risk*, Princeton University Press, Princeton, NJ.
- [3] Bond, E.W. and C. Syropoulos, 1996, The size of trading blocks: market power and world welfare effects, *Journal of International Economics* 40, 411-438.
- [4] Burbidge, J., J. DePater, G. Myles. and A. Sengupta, 1997, A coalition-formation approach to equilibrium federations and trading blocks, *American Economic Review* 87, 940-956.
- [5] Chipman, J.S. and J.C. Moore, 1972, Social utility and the gains from trade, *Journal of International Economics* 2, 157-172.
- [6] General Agreement on Tariffs and Trade (GATT), 1994, The Results of the Uruguay Round of Multilateral Trade Negotiation – The Legal Texts, GATT Secretariat, Geneva.
- [7] Grinols, E.L., 1981, An extension of the Kemp-Wan theorem on the formation of customs unions, *Journal of International Economics* 11, 259-266.
- [8] Haveman, J.D., 1996, Some welfare effects of sequential customs unions formation, *Canadian Journal of Economics* 29, 941-958.
- [9] Kemp, M.C., 1964, *The Pure Theory of International Trade*, Prentice Hall, Englewood Cliffs, N.J.
- [10] ——— and K. Shimomura, 2001, A second elementary proposition concerning the formation of customs unions, *Japanese Economic Review* 52, 64-69.
- [11] ——— and H.Y. Wan Jr., 1976, An elementary proposition concerning the formation of customs unions, *Journal of International Economics* 6, 95-97.
- [12] ——— and ———, 1986, The comparison of second-best equilibria: the case of customs unions, in D. Bös and S. Seidl (eds.), *The Welfare Economics of the Second Best*, Supplementum 5 to the *Zeitschrift für Nationalökonomie*, 161-167, Vienna: Springer-Verlag.
- [13] Krugman, P., 1991, Is bilateralism bad?, in E. Helpman and A. Razin (eds.), *International Trade and Trade Policy*, MIT Press, Cambridge, MA.
- [14] Lockwood, B. and K-Y. Wong, 2000, Specific and ad volorem tariffs are not equivalent in trade wars, *Journal of International Economics* 52, 183-195.
- [15] McMillan, J., 1993, Does regional integration foster open trade? Economic theory and GATT's Article XXIV, in K. Anderson and R. Blackhurst (eds.), *Regional Integration and the Global Trading System*, Harvester Wheatsheaf, Hempel Hempstead.

- [16] Ohyama, M., 1972, Trade and welfare in general equilibrium, *Keio Economic Studies* 9, 37-73.
- [17] Panagariya, A., 2000, Preferential trade liberalization: the traditional theory and new developments, *Journal of Economic Literature* 38, 287-331.
- [18] Richardson, M., 1995, On the interpretation of the Kemp-Wan theorem, *Oxford Economic Papers* 33, 135-153.
- [19] Riezman, R., 1985, Customs unions and the core, *Journal of International Economics* 19, 355-366.
- [20] Sampson, G.P., 1996, Compatibility of regional and multilateral trading agreements: reforming the WTO process, *American Economic Association Papers and Proceedings* 86, 88-92.
- [21] Srinivasan, T.N., 1997, The common external tariff of a customs union: alternative approaches, *Japan and the World Economy* 9, 447-465.
- [22] Syropoulos, C., 1999, Customs unions and comparative advantage, *Oxford Economic Papers* 51, 239-266.
- [23] Turunen-Red, A. and A.D. Woodland, 1991, Strict Pareto-improving multilateral reforms of tariffs, *Econometrica* 59, 1127-1152.
- [24] Vanek, J., 1965, *General Equilibrium of International Discrimination: The Case of Customs Unions*, Harvard university Press, Cambridge, MA.
- [25] Woodland, A.D, 1982, *International Trade and Resource Allocation*, North Holland, Amsterdam.
- [26] Zissimos, B. and D. Vines, 2000, Is the WTO's Article XXIV a free trade barrier?, CSGR WP 49/00, University of Warwick.

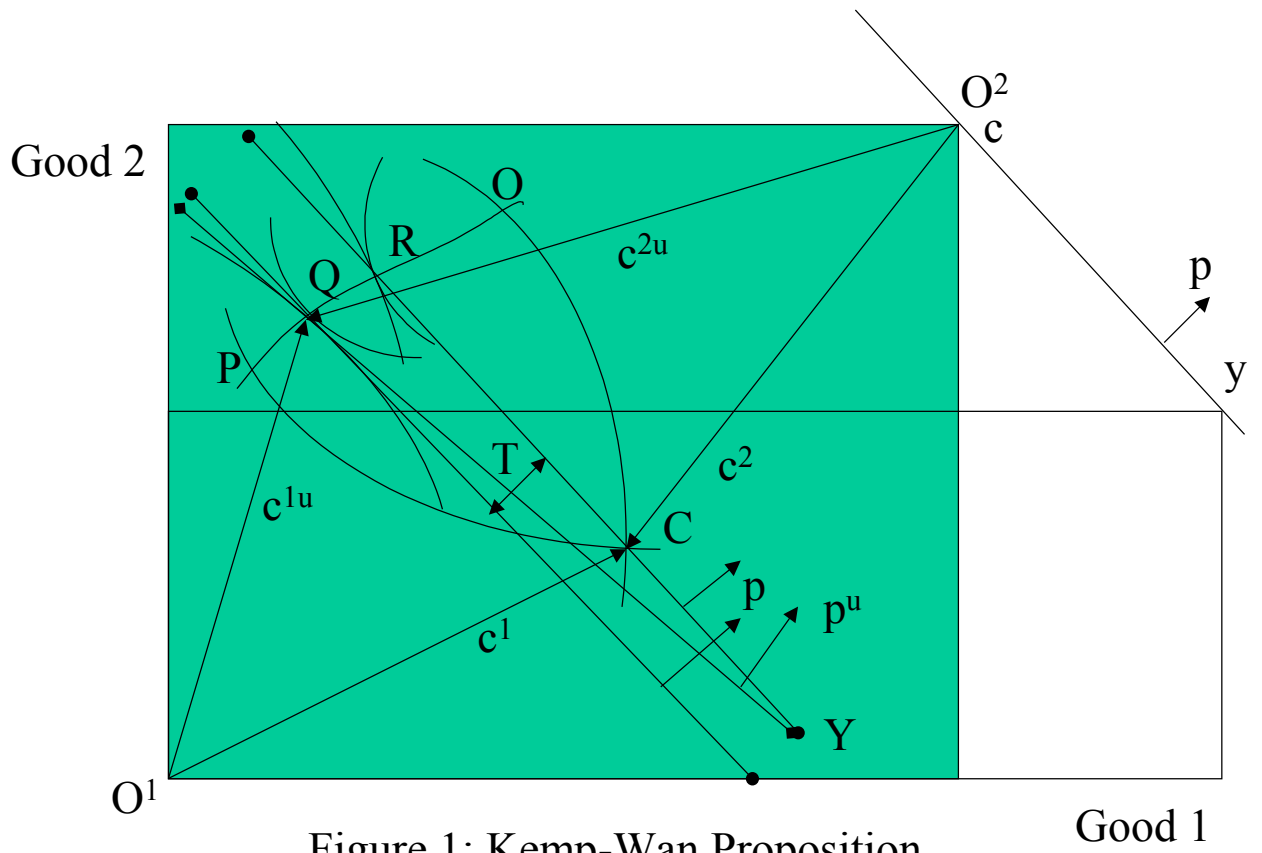


Figure 1: Kemp-Wan Proposition

Figure 1: