

# **An empty proposition concerning the formation of free trade areas**

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## **Abstract**

This note considers the extension of the Kemp-Wan theorem on necessarily welfare-improving customs unions to free trade areas.

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## 1. Introduction

In 1976 Kemp and Wan (KW henceforth) published a very significant contribution to the theory of preferential trading areas (PTAs) in “An elementary proposition concerning the formation of customs unions.” They showed that, under certain weak conditions, any number of tariff-ridden countries could form a customs union (CU) with free trade amongst them and choose a common external tariff (CET) in a Pareto-improving fashion. Formally,

“Consider any competitive world trading equilibrium, with any number of countries and commodities and with no restrictions whatever on the tariffs and other commodity taxes of individual countries and with costs of transport fully recognized. Now let any subset of the countries form a customs union. Then there exists a common tariff vector and a system of lump-sum compensatory payments, involving only members of the union, such that each individual, whether a member of the union or not, is not worse off than before the formation of the union.” (KW, 1976 p. 95.)

The key to this result is that the CET is set at the so-called Vanek compensating tariff: the tariff that leaves all volumes of trade between the CU members and the rest of the world (ROW) unchanged from its pre-CU aggregate levels. Accordingly, ROW welfare is unaffected by the CU<sup>1</sup> and any gains from the internal trade liberalisation can be redistributed amongst the CU members in a Pareto-improving way through lump-sum redistribution instruments.

The importance of this result lies partly in its clarity – an unusual feature in this field of study in a second-best setting – but also in a number of further conclusions it implies. In particular, by repeated application of the theorem – suppose countries A and B form a KW CU then treat them as a single country and re-apply the theorem to show that they can form a KW CU with C and so on – KW have identified

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<sup>1</sup> In the context of the KW set-up, this conclusion requires either that the CU is infinitesimally small vis-à-vis the ROW or that the ROW is not behaving optimally – see Richardson (1995). For a rather different setting in which this condition is not required, see Kemp and Shimomura (2001).

a path to global free trade through a series of PTAs. In the debate that has raged for some decades concerning the impact of PTAs on multilateralism, this has been a cornerstone of the case suggesting that PTAs can be beneficial and need not undermine the goals of multilateral liberalisation.

It is important to note that the KW result, as the authors themselves stress, is an existence result only. No claims are made concerning the optimality of the KW CU, merely that all members can be made better off than in the CU's absence in terms of economists' usual measure of economic welfare. Nevertheless, one could certainly envisage countries taking a KW path to multilateralism through bilateralism, precisely because of its neutrality properties for non-members.

In recent years, a number of authors have noted that free trade areas (FTAs) are a more popular form of PTA than are CUs and have concluded that, therefore, it would be useful to have a result for FTAs that is analogous to KW's result for CUs. So Panagariya and Krishna (2002) write, for example, "...we still lack a parallel result [to KW] on FTAs where members could use member-specific external tariff vectors.... The purpose of the present paper is to fill this gap in the literature – a major gap, in our judgment, given the relative popularity of FTAs over CUs in practice" (Panagariya and Krishna, 2002 p.354.) In endorsement of this paper, Grinols and Silva (2003) suggest that, "Panagariya and Krishna (2002) have performed a great service to the economics profession, indeed to any country considering a FTA... Their contribution does for FTAs what Kemp and Wan (1976) did for CUs twenty-six years earlier." (Grinols and Silva, 2003, p.1). The Panagariya and Krishna paper demonstrates that a result for FTAs that is similar to the KW result for CUs can be established: a number of countries can from a FTA, set their external tariffs so as to freeze trade with the ROW on a member country-by-member country

basis and, with lump-sum transfers internal to the FTA and appropriate rules of origin, ensure a Pareto improvement.<sup>2</sup>

The purpose of the present note is to consider this result – which we shall refer to as the Ohyama-Panagariya-Krishna or OPK result – in a little more detail. In particular, we argue that the very rationale for the relative popularity of FTAs versus CUs undermines the usefulness of the OPK result. Furthermore, there are strong reasons to believe that the OPK tariff will be very similar to the corresponding KW tariff.

The remainder of the note is laid out as follows. In the next section we present a brief summary and proof of the OPK result before arguing that the OPK FTA will likely be unattractive to potential member countries. We then note that in any PTA the OPK and KW external tariffs will be identical for many goods but illustrate, in a partial equilibrium setting, a context in which there might be some difference between them. Nevertheless, our analysis suggests that there are reasons to expect some harmonisation of tariffs between member countries in an OPK FTA. A final section concludes.

## 2. The Ohyama-Panagariya-Krishna result

### 2.1. *The OPK Proposition*

Following Grinols and Silva (2003), consider two countries  $i=A,B$  forming a FTA in a world of  $n$  traded commodities. We can denote the change in welfare for country  $i$  by the compensating variation, where situation 0 is pre-FTA and situation 1 is post-FTA:

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<sup>2</sup> Grinols and Silva (2003) provide a tidier proof of this result. It should also be noted that Ohyama (2002) independently notes the same result. We return to the rules of origin issue below.

$$\Delta W^i = CV = e^i(p^1, u^{i1}) - e^i(p^1, u^{i0}) = \underbrace{p^1 y^{i1} + p^1 \omega^i + p^1 z^{i1}}_{e^i(p^1, u^{i1})} - e^i(p^1, u^{i0}) \quad (1)$$

where  $p^k$  is the  $1 \times n$  vector of consumer prices in situation  $k=0,1$ ,  $y^{ik}$  is the  $1 \times n$  vector of domestic production in country  $i=A,B$  in situation  $k=0,1$  (treating inputs as negative outputs),  $\omega^i$  is endowments and  $z^i$  denotes the vector of imports into country  $i$  (where exports are negative elements.) Thus we can write the change in welfare in country  $i$  as:

$$\Delta W^i = S_C^i + S_P^i + S_T^i \quad (2)$$

where

$$\begin{aligned} S_C^i &= p^1 x^{i0} - e^i(p^1, u^{i0}) \\ &= p^1 y^{i0} + p^1 \omega^i + p^1 z^{i0} - e^i(p^1, u^{i0}) \\ S_P^i &= p^1 (y^{i1} - y^{i0}) \\ S_T^i &= p^1 (z^{i1} - z^{i0}) \end{aligned} \quad (3)$$

and  $x^{ik}$  denotes the vector of consumption in country  $i=A,B$  in situation  $k=0,1$ . In moving to the OPK FTA, utility maximisation by consumers implies that  $S_C^i \geq 0$  so, if  $S_P^i \geq 0$ , then the change in the joint welfare of the FTA members is given by

$$\Delta W^A + \Delta W^B \geq S_T^A + S_T^B = p^1 [(z^{A1} - z^{A0}) + (z^{B1} - z^{B0})] = 0 \quad (4)$$

where the last equality follows from each country's trade with the ROW being unchanged and because any changes in A's trade with B are offset by changes in B's trade with A. Thus both countries gain jointly from this FTA if

$$S_P^i = p^1 (y^{i1} - y^{i0}) \geq 0.$$

Grinols and Silva (2003, p.5) write this as  $S_P^i = q^1 (y^{i1} - y^{i0})$  where  $q^1$  denotes the vector of producer prices within the FTA. In this case profit maximisation ensures that the expression is positive. Richardson (1995) shows that, regardless of

rules of origin, producer prices must be equated within a FTA but that consumers might face different prices for the same commodity. In particular, the producer price of some commodity initially imported from the ROW might exceed the consumer price if the country's FTA external tariff is less than that of its FTA partner, in which case it will export its entire production to its partner at the partner's internal price (the price received by its producers) and import its entire consumption from the ROW at, for consumers, the world price plus its tariff.<sup>3</sup> However, Grinols and Silva (2003) avoid this issue by differentiating goods by location and so defining consumer and producer prices to be equal for all goods<sup>4</sup>: while the NZ producer price of NZ cheese in Australia might be different to the NZ consumer price of NZ cheese in NZ, for example, it equals the fictitious NZ consumer price of NZ cheese in Australia (fictitious, as none is consumed in NZ, by definition.)

## 2.2. *An objection*

The rationale for wishing to extend KW to FTAs is that the latter are far more popular, in practice, than are CUs. But why? The obvious attraction of a FTA over a CU is economic sovereignty: countries are unwilling to cede to others the power to set their external tariffs. A simple application of the KW theorem tells us that a CU weakly welfare-dominates a FTA for member countries (as the latter is a set of tariff-ridden countries and so the KW theorem applies to it directly.) So if countries were willing to coordinate their tariff-setting we know that they should choose a CU *unless* they are motivated by an objective function other than our standard measure of economic welfare. "Free trade areas...are politically attractive compared to CUs which require members to agree to a CET" (Grinols and Silva, 2003 p.1.) But then

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<sup>3</sup> This is illustrated below.

<sup>4</sup> This interpretation also validates Ohyama's (2002) proof of the same proposition.

what is the attraction of the OPK FTA? It leaves member countries with no more degrees of freedom in setting their external tariffs than does the KW CU – there is a unique tariff vector for each member country that yields the OPK FTA just as there is a unique (but common) tariff vector that yields the KW CU – so its attraction cannot be that it leaves member countries less fettered in terms of external tariff policy. Nor does this literature tell us that there exists a path through PTAs to global free trade – we knew that already.

One case that might be made for the OPK FTA is that it yields a tariff vector that, while no less constrained than the Vanek compensating CET, is, nevertheless, different to the latter and perhaps more desirable given a country's trade policy preferences. That, of course, is quite possible but there are reasons to believe that, as a practical matter, the OPK tariff is unlikely to be very different to the KW CET and preserves less difference between members' external tariffs than prevailed before the FTA's formation.

To see this, consider a partial equilibrium analysis of two countries A and B contemplating a PTA excluding the rest of the world, country C. For goods that are not traded at all before the PTA the external tariffs of all countries are irrelevant in that they can be set at the highest of the tariffs in A and B that preserve zero trade (i.e. the OPK FTA tariff) with no consequence for the other partner (whose tariff might have water in it, of course.) Similarly, for goods traded only between A and B the external tariffs of the PTA are irrelevant and can be set equal with no effect. For any good traded only between C and a single PTA member the same reasoning applies: preserving the PTA's trade (*à la* KW) is the same as preserving the single trading country's trade and setting the other country's tariff equal has no consequence at all. This leaves the only goods of interest (i.e. where the KW and OPK tariffs might differ

to some effect) as those which C trades with both A and B. Consider, without loss of generality, some good exported by C to both A and B before the PTA is formed. And suppose, also without loss of generality, that the pre-PTA tariff in A,  $t^A$ , is less than that in B,  $t^B$ . We then have three generic cases to consider as illustrated in Fig. 1.

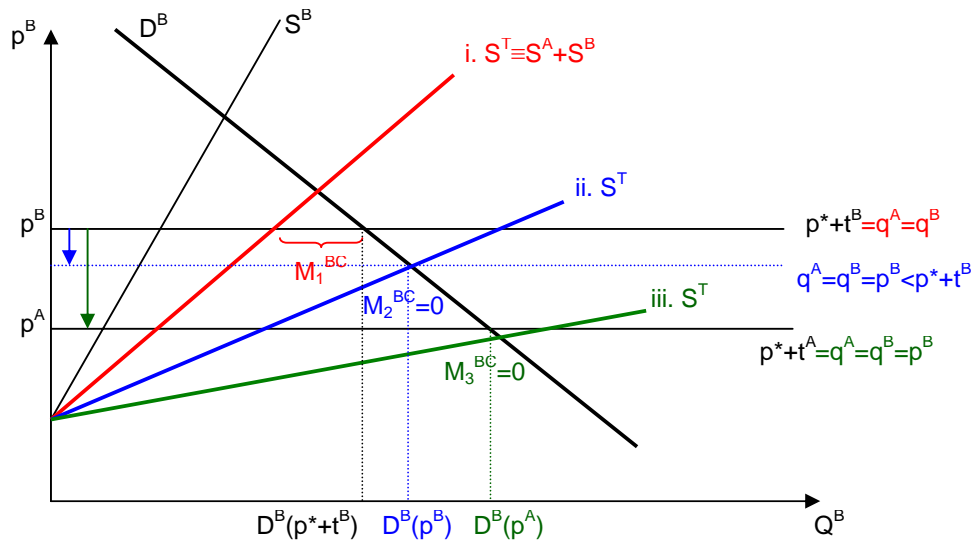


Figure One

First, it could be that total supply in A and B at  $p^*+t^B$  (i.e.  $S^T(p^*+t^B) \equiv S^A(p^*+t^B) + S^B(p^*+t^B)$  where  $S^i$  denotes supply of the good in country  $i=A,B$  and  $p^*$  denotes the world price) is less than consumer demand in B at  $p^B = p^*+t^B$ ,  $D^B(p^*+t^B)$  where  $D^i$  denotes demand for the good in country  $i=A,B$ . Second, total PTA supply might exceed demand in B at the pre-PTA price – i.e.  $S^T(p^*+t^B) > D^B(p^*+t^B)$  – but is less than consumer demand in B at A’s initial price, or  $S^T(p^*+t^A) < D^B(p^*+t^A)$ . Third, it could be that total PTA supply at A’s initial price exceeds demand in B at that price:  $S^T(p^*+t^A) > D^B(p^*+t^A)$ .

In the first case, following Richardson (1995), the formation of a FTA will lead country A’s producers to sell their entire output in B at price  $p^B = p^*+t^B > p^A = p^*+t^A$  (which is fine, even if rules of origin require 100% local content, as it is all

domestically produced) and all consumption in A will be imported from C and sold to consumers at price  $p^A$ . In country B, consumers still pay  $p^B$  as they did before the PTA, but some of the imports previously sourced from C are now displaced by (duty-free) imports from A' leaving imports from C of  $M_1^{BC}$ , as shown. All up, producers in A receive  $p^B$  for all their production of this good while consumers in A pay the lower price  $p^A$ . Producers and consumers in B both face the same price  $p^B$ .

In the second case this trade displacement from A to B suffices to squeeze out all imports from C (so  $M_2^{BC}=0$ , as shown) and so reduces the price in B below the world price *cum* tariff.<sup>5</sup> Now producers in both A and B sell all their output in B at B's consumer price,  $p^B$ , which is something between  $p^*+t^A$  and  $p^*+t^B$ . Consumers in A still import their entire consumption from C and pay the lower price  $p^A=p^*+t^A < p^B$ . Finally, in the third case, the volume of production from A is sufficient to equate both countries' prices at the lower  $p^A=p^*+t^A$  in which case producers in A and B are indifferent about where they sell and all consumers and producers prices are equated within the FTA.

We now wish to consider each of these cases in turn and ask what will the tariffs in A and B have to be to preserve pre-PTA trade on a country-by-country basis in an OPK FTA and on aggregate in a KW CU.

In the first case, where induced trade from A does not displace all of B's imports from C, if a FTA were formed note that, at pre-PTA tariffs, B's trade with C is reduced by more (by  $S^A(p^*+t^B)$ ) than A's trade is increased (by  $S^A(p^*+t^A)$ ) so A and B's overall imports from C have risen. Fig. 2, adapted from Panagariya and Krishna (2002), illustrates this case.

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<sup>5</sup> Note this qualification to the suggestion in Grinols and Silva (2003 p.4) that the producer price of a good in a FTA will equal  $p^*+\text{Max}[t^A, t^B]$ . In fact, producer prices are equated but the highest tariff may have water in it, as in this second case.

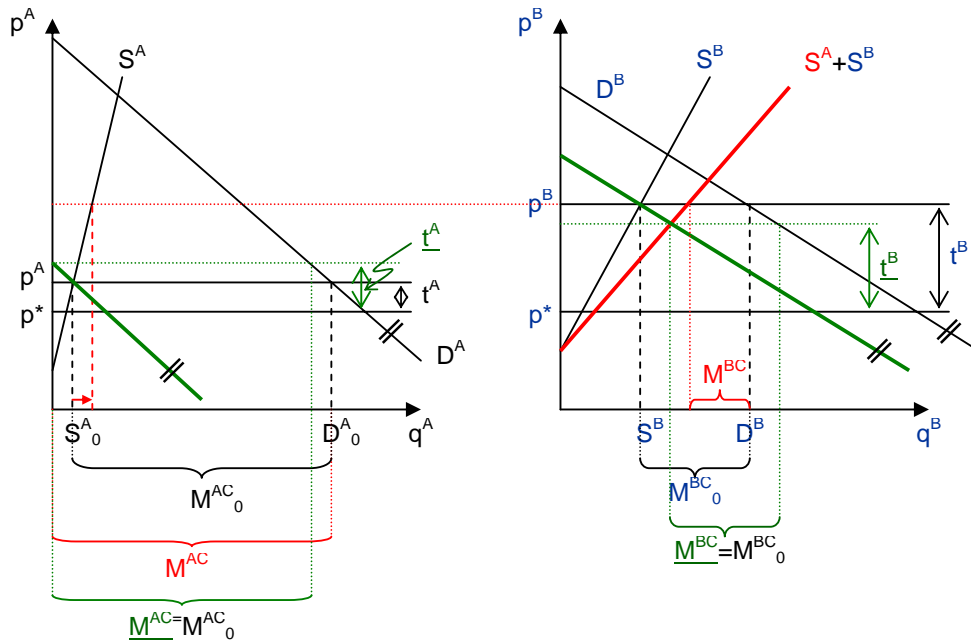


Figure Two

Here we start with  $t^A$  and  $t^B$  as the tariffs in A and B respectively and the formation of a FTA displaces A's production to be sold in B. Accordingly, imports from C rise in A (from  $M^{AC}_0$  to  $M^{AC}$ ) and fall in B (from  $M^{BC}_0$  to  $M^{BC}$ ) as shown. As all demand in A is met by imports in C, to find the tariff that restores imports from C to their previous level, we simply find the tariff  $\underline{t}^A$  at which  $D^A(p^* + \underline{t}^A) = D^A(p^* + t^A) - S^A(p^* + t^A) = M^{AC}_0$ , as shown in the Figure. Note that it must be true that  $\underline{t}^A > t^A$ . In country B, to find the tariff that restores imports from C to their pre-FTA levels we need to find the tariff  $\underline{t}^B$  such that  $D^B(p^* + \underline{t}^B) - S^A(p^* + \underline{t}^B) - S^B(p^* + \underline{t}^B) = D^B(p^* + t^B) - S^A(p^* + t^B) = M^{BC}_0$ . Note that it must be true that  $\underline{t}^B < t^B$ .

So the OPK FTA ends with some tariff harmonisation here. If A and B formed a CU in this case then the KW CET will lie somewhere between  $t^A$  and  $t^B$ , clearly, at a level where the increase in B's imports from C exactly equal the decrease



course, is fully equivalent to the Vanek compensating tariff in the KW CU although it is accompanied by some internal trade between A and B where none occurred before.

Similar analysis reveals that in the second of the cases discussed earlier we also get tariff convergence in the OPK FTA, in the sense just discussed and, again, it can be partial or complete. In the third case, however, it is always complete: the OPK tariff is the same as the KW CET. In the first two of these cases the existence of incomplete convergence is more likely the greater is the initial divergence between tariffs and the less significant is domestic production in the lower-tariff country relative to imports in its partner.

The conclusion we can draw from this discussion is that while the tariff vectors that support the OPK FTA will generally differ across member countries, they will not differ as much as the initial pre-FTA tariffs – there will be some convergence and they may, in many cases, converge to the KW CET. What does this do to the case for the OPK FTA in comparison to a KW CU? While it is quite possible that the OPK tariff is preferred to the KW CET by a particular country on political economy grounds, it seems to us that there is no presumption in favour of this over the alternative that a country is worse off under the OPK tariff. Furthermore, the leeway that the FTA allows for tariffs to differ across countries – the purported advantage of an FTA over a CU – is unlikely to be great.

### 3. Conclusion

This note has looked at recent arguments extending Kemp and Wan's seminal theorem on necessarily welfare-improving customs unions to free trade areas. We note that the very rationale for the relative popularity of FTAs versus CUs – the degrees of freedom left to a policymaker in terms of setting external tariffs –

undermines the usefulness of this extension. Furthermore, we suggest that the OPK tariff might be very similar to the corresponding KW tariff. Future work involves running a numerical general equilibrium simulation to assess this in practice.

## References

- Grinols, Earl L., and Peri Silva. "An Enhancement of Modern Free Trade Area Theory." In *Office of Research Working Paper Series*, 8. Urbana-Champaign: University of Illinois at Urbana-Champaign, 2003.
- Kemp, Murray C., and Koji Shimomura. "A Second Elementary Proposition Concerning the Formation of Customs Unions." *Japanese Economic Review* 52, no. 1 (2001): 64-69.
- Kemp, Murray C., and Henry Y. Jr. Wan. "An Elementary Proposition Concerning the Formation of Customs Unions." *Journal of International Economics* 6 (1976): 95-97.
- Ohyama, Michihiro. "The Economic Significance of the Gatt/Wto Rules." In *Economic Theory and International Trade: Essays in Honour of Murray C. Kemp*, edited by Alan D. Woodland, 71-85. Cheltenham, U.K.: Edward Elgar, 2002.
- Panagariya, Arvind, and Pravin Krishna. "On Necessarily Welfare-Enhancing Free Trade Areas." *Journal of International Economics* 57 (2002): 353-67.
- Richardson, Martin. "On the Interpretation of the Kemp/Wan Theorem." *Oxford Economic Papers* 47, no. 4 (1995): 696-703.
- . "Tariff Revenue Competition in a Free Trade Area." *European Economic Review* 39, no. 7 (1995): 1429-37.