

**Necessarily Welfare-Enhancing Customs Unions with
Industrialization Constraints: A Proof of the
Cooper-Massell-Johnson-Bhagwati Conjecture**

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JOHNSON-BHAGWATI CONJECTURE¹**

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The conventional "static", "benign government" theory of customs unions was pioneered by Jacob Viner's (1950) pathbreaking work². He essentially argued, counterintuitively to those who thought that even preferential tariff cuts would necessarily be welfare-improving, that a subset of countries reducing tariffs on one another to zero would not necessarily be improving their own, or world welfare. In short, such Free Trade Areas or Customs Unions (with common external tariffs) could be trade-diverting and harmful or trade-creating and beneficial.

Although there have been numerous important developments within this analytical framework, including by Lipsey (1957), Lipsey and Lancaster (1956), Johnson (1962) and Meade (1955), interesting developments in new directions have been made in two other contributions:

(i) Brecher and Bhagwati (1980) have considered a rather different type of problem : if a customs union with internal factor mobility and a common external tariff is already in place, how would parametric and policy changes (e.g. factor accumulation and tariff change, respectively) affect the welfare of individual members countries? This question is clearly of analytical importance for the European Union and indeed for a federal state like the United States, if the regional welfare effects of such changes are at issue.

² The Viner approach is "static" because it concerns only the welfare effects of a once-for-all FTA or CU formation instead of considering "time-path" questions. It is a "benign-government" approach because the formation of the FTA or CU is exogenously specified and the incentives to form them so that they are endogenously determined (as in Krishna (1993)) are not modelled. See Bhagwati (1993) for these analytical distinctions.

(ii) Kemp and Wan (1976) who have remained more properly within the Viner-Lipsey type of question, however, have restored the original intuition that any subset of countries could improve their welfare, while not lowering that of others by forming an appropriate customs union³.

But, to date, no one has proven an interesting conjecture attributable to Cooper and Massell (1965), Johnson (1965) and Bhagwati (1968) that:

Any subset of countries can always form a welfare-enhancing customs union, while ensuring that they still achieve the degree of industrialization that they had achieved through protective tariffs⁴.

In this short note, we prove the proposition. In doing so, we re-prove the Kemp-Wan proposition by using an optimization framework and then readily extend it, by adapting the Bhagwati-Srinivasan (1969) analysis of non-economic objectives or constraints, to the problem at hand⁵.

I. The Kemp-Wan Theorem

As in Kemp and Wan (1976), consider a competitive world trading system with any number of countries and with no restrictions whatever on the tariffs of individual countries and with costs of transportation fully recognized. Let any subset of countries form a customs union. To see how aggregate gains for the member countries can be achieved, we use the familiar Samuelson (1956) social indifference curves, which enable us to write a well-behaved social utility function. We

³ In doing so, they solved for the common external tariff, using it therefore as an endogenously-determined policy variable, unlike in the Viner-Lipsey approach.

⁴ For instance, Cooper and Massell (1965) ask "Why should a country be willing to give up its sheltered industries for the partial benefits of a Customs Union" and "Is there a tariff that would make both countries (in a CU) better off relative to optimal policies of non preferential tariff protection" and Bhagwati (1968) states that "If LDCs could be allowed to reduce tariff barriers among themselves, this could permit the given trade diversion (implicit in each LDCs decision to industrialize) to be carried out at a lower cost".

⁵ The logic used here in dealing with quantitative constraints in second-best conditions is a specific example of the 'generalized exceptions to the theory of second-best' as outlined in Krishna (1994).

allow for the use of lump sum transfers between the member countries⁶. This allows us to neglect distributional issues between the member countries and to assert that, as we move up to higher social indifference curves, Pareto-superior outcomes can be achieved. The formulation of the problem closely parallels that of Bhagwati and Srinivasan (1969).

Let

$i = 1, \dots, n$, index goods and

$j = 1, \dots, m$ index member countries.

Let the net import vector of the member countries from the rest of the world be denoted as

$$I = (I_1, \dots, I_n).$$

where, I_i would be positive if the i th good was a net import from the rest of the world and negative if it was a net export. Using the Kemp-Wan strategy, we freeze the net import vector of the union at the pre-union level and maximize the social utility function,

$$U = U(C_1, \dots, C_n)$$

subject to :

$$C_i = \sum_j X_i^j(L_i^j, K_i^j) + I_i \quad \forall i \quad (1)$$

$$\sum_i I_i = 0 \quad (2)$$

$$\sum_i L_i^j = L^j \quad \forall j \quad (3)$$

$$\sum_i K_i^j = K^j \quad \forall j \quad (4)$$

$$I_i = I_i^F \quad \forall i \quad (5)$$

⁶ Lump sum transfers to ensure Pareto superior outcomes are also used in the original Kemp-Wan framework. For an illuminating discussion of how such compensation schemes can be constructed, see Grinols (1981).

where C_i stands for aggregate availability of good i in the union, X_i^j stands for production in country j of good i using a factor combination of L_i^j and K_i^j respectively. L^j and K^j denote the total availability of these factors in country j . Although, we only choose two factors of production, it will become clear that the results generalize to any number of factors.

The maximization problem above simply recasts the Kemp-Wan (1976) problem⁷ in welfare maximization terms. Note that the vector, $I = (I_1, \dots, I_n)$, is 'given' and is the pre-union net import vector. We can normalize the pre-union foreign prices of all goods to unity. It is important to note that we are not assuming a fixed foreign price vector. Since, as in Kemp-Wan (1976), we freeze the net import vector at the pre union level, trade at the same foreign prices will obtain after the union is formed. (2) then is the balanced trade condition. (3) and (4) are the resource constraints. (5) fixes imports at the pre union level.

The solution to this problem is as follows :

First we form the Lagrangean :

$$\mathcal{L} = U - (\sum_i \lambda_i [C_i - (\sum_j X_i^j(L_i^j, K_i^j)) + I_i]) - (\sum_j \omega_j [\sum_i L_i^j - L^j]) - (\sum_j \rho_j [\sum_i K_i^j - K^j]) - (\gamma (\sum_i I_i)) - (\sum_i \eta_i (I_i - I^F))$$

Maximization of the Lagrangean subject to the import vector constraint yields the necessary conditions for a constrained optimum. These are:

$$U_i = \lambda_i \quad \forall i \quad (6)$$

⁷ Kemp and Wan (1976) are not explicit about their need for completely indexing goods and factor endowments by their location and it is not immediately obvious if their argument applies to customs unions (where there is a common external tariff) or only to common markets (where additionally factors are mobile across countries). However, the framework that is used in this paper resolves this ambiguity by indexing only up to a necessary and sufficient level (as is evident in the constraints (1) through (5) imposed on the maximization problem).

$$\lambda_i = \gamma + \eta_i \quad \forall i \quad (7)$$

$$\lambda_i X_{i1}^j = \omega_j \text{ or } L_i^j = 0 \quad \forall i, j \quad (8)$$

$$\lambda_i X_{i2}^j = \rho_j \text{ or } K_i^j = 0 \quad \forall i, j \quad (9)$$

From (6), we know that $\lambda_i > 0, \forall i$. We could conveniently choose $\lambda_1 = 1$. From (7), we then know that,

$$\gamma = 1 + \eta_1 \quad \text{implying that}$$

$$\lambda_i/\lambda_1 = 1 + \eta_1 - \eta_i \quad \forall i$$

i.e.; the marginal rate of substitution in consumption as well as production is different from the foreign price-ratio. This implies a tariff imposed against the rest of the world on imports of good i . Note that at an optimum all other first-order conditions are to be met. In other words, given the import constraint, the second-best optimum is obtained by the use of suitable tariffs on imports from the rest of the world and with all other Paretian conditions being met. Since the optimal way to achieve the net import vector 'I' is as is described above, we can obviously conclude that any other way of achieving 'I' can be improved upon. Since 'I' was actually achieved pre-union, the pre-union situation can be improved upon by the removal of all intra-union tariffs and by the use of a common external tariff (as is implied by the solution to the maximization problem above). This is simply the Kemp-Wan (1976) result⁸.

II. The Cooper-Massell-Johnson-Bhagwati Theorem

We now take a non-economic production objective into account. Thus, for instance, let us

⁸ The original proof of the theorem considers a fictitious economy composed of the member countries but with a net endowment equal to the sum of the member countries endowment plus the equilibrium preunion net excess supply of the rest of the world. The economy then possesses an optimum and any optimum can be supported by at least one internal price vector. If the pre union equilibrium of the member countries is a pareto optimal equilibrium of the fictitious economy or it is not; in the latter case, a preferred pareto-optimal equilibrium can be attained by means of lump sum transfers among individuals of the fictitious economy.

assume that each country J within the union wants the level of its production of good i to be maintained at the pre union level. This would imply additional constraints in the maximization exercise of the type,

$$X_i^j = X_i^{j-} \quad \forall j$$

where X_i^{j-} is the pre union level of production of good i in country J.

It is then easy to show that this production objective is best achieved by a production subsidy, exactly as in Bhagwati and Srinivasan (1969).

The inclusion of this additional constraint alters the first-order conditions corresponding to L_i^j and K_i^j . The new first-order conditions are,

$$\begin{aligned} (\lambda_i + \delta)X_{i1}^j &= \omega_j & \forall j & \quad \text{and} \\ (\lambda_i + \delta)X_{i2}^j &= \rho_j & \forall j, \end{aligned}$$

implying that a tax-cum-subsidy policy in each country is optimal. Importantly, all other Paretian conditions should still be met for a constrained optimum, implying that the intra-union tariffs should be kept at zero. Any other way of achieving $X_i^j = X_i^{j-}$ can be improved upon. Since $X_i^j = X_i^{j-}$ was actually achieved pre-union, the pre-union situation can be improved upon and a Pareto-superior outcome can be achieved. Thus we have proven the Cooper-Massell-Johnson-Bhagwati proposition.

Equally, it follows that the feasible welfare level of this union would be even greater if the constraint $X_i^j = X_i^{j-} \quad \forall j$ was weakened and rewritten as

$$\sum_j X_i^j = \sum_j X_i^{j-},$$

so that the constraint is only an aggregate union-wide constraint (as originally in Cooper and Massell (1965)).

This result can also be readily extended to other "non-economic" constraints. A welfare-enhancing customs union which does not harm or benefit nonmembers can be formed even if each member requires, for instance, that its manufacturing employment not fall. The "supporting policy", complementing the common external tariff, then will be an employment-tax-cum subsidy (exactly as in Bhagwati and Srinivasan (1969)).

Conclusions

This paper demonstrates that welfare-improving customs unions can be guaranteed even if we are constrained by specific non-economic government objectives, thus proving the Cooper-Massell-Bhagwati-Johnson conjecture. We consider a "production" objective here, where a member country requires the output of a particular sector (e.g. a target level of industrialization) to be maintained at the pre-union level, and show that welfare-improving customs unions can still be achieved. It is straightforward to show that this result can be extended to other non-economic objectives as well.

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