THE GENERAL EQUILIBRIUM ANALYSIS OF CUSTOMS UNION

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Introduction

A number of possible outcomes may be envisaged when a country changes its trade policy with respect to another. The same is true when a number of countries change their trade policy with respect to another group of countries or the rest of the world. Of the many conceivable outcomes, this paper is involved only with a case where two countries form a so-called customs union and they abolish, wholly or partially, duties on their mutual trade in all goods and in addition adopt a common tariff policy on their trade with the rest of the world.

Assuming a complete absence of political considerations, countries that join a customs union do so in the expectation of economic benefit. The purpose of this paper is to investigate the circumstances under which such benefits might materialize. It also intends to investigate which group or factor owner within each country joining a customs union will benefit or sustain a loss due to economic integration.

In section 1, we will study the case of free trade where no country imposes any trade barriers on its imports or exports. The material in this section will serve as a scaffolding for the subsequent discussions. In section 11, we will investigate a case of customs union under the assumption of complete liberalization of trade between union members. Section 111 employs Stolper-Samuelson theorem to study the implications of customs union on the factor owners within each union member country. Section IV is devoted to the summa-

ries and conclusions.

1. General Equilibruim Analysis of Free Trade

By free trade we mean an ideal situation where there are no trade barriers of any kind to the process of exchange. To simplify the argument, in addition to two goods (X,Y) and two factors (land an labor) assumptions, we may further assume that:

1. Perfect competition prevails within each country;
2. There are no transportation or arbitration costs involved in the process of trade;
3. Both goods are normal goods;
4. Both factor endowment and productive capacity of the two countries are fixed.

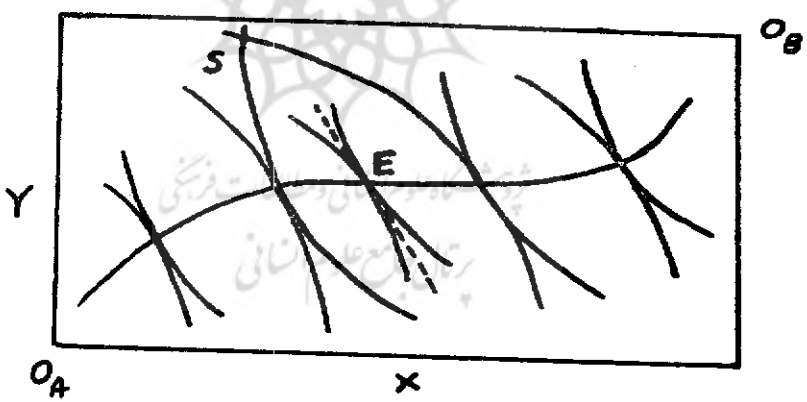

Fig. 1

Given the above assumptions we can conveniently employe the familiar Bowley-Edgeworth box diagram to illustrate that a point on the contract curve (a Pareto optimum) is more effcient than a point of no trade when the initial endowment lies off the contract curve. For example in Fig.1 a point such as E is preferred to S (the initial endowment point), as at E both A and B are on a higher indifference curve.

The benefits of trade can also be shown for each country individually. Without trade a country whose economy is operating under the conditions of perfect competition is bound to its production-possibility curve (i.e. points such as $p, s_1, s_2, \ldots$). However, when trade is undertaken, a country can move to a consumption point such as c which was an unattainable region prior to trade (Fig. 2.). To obtain consumption point c would require this country to export Dp of Y and import cD of X.

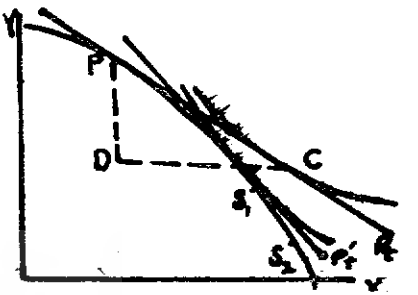

Fig.2

This diagram is preferred to Fig.1 as the effect of interference with free trade can be readily seen. Assume P_t to represent the international terms of trade and c is the consumption point if there are no interferences with trade. Now if the government of this country imposes a tariff (making the imported good relatively more expensive), the relevant price line for this country will then be P'_t which would obviously put the country on a lower consumption indifference curve as compared to that of complete free trade.

We may now make a different presentation of the free trade where the geometry used will be of further reference in our subsequent discussions. Fig. 3 on page 4 presents Professor Meade's geometry of free trade[2]. In this diagram also due to assumption of free trade, the international terms of trade is the same as the price ratio within each country ($\alpha_1\ \alpha_1$, $\alpha_2\ \alpha_2$). The consumption point in country A(B) is point E (K) where the slope of the price line $\alpha_2\ \alpha_2(\alpha_1\ \alpha_1)$ is equal to the slopes of A's (B's) consumption-indifference curve and production-possibility curve, while it is also equal to the international terms of trade αα. We notice that country A (B) produces DQ (JK) of X and ED (JQ) of Y, but consumes EF (KH) of X and CE (KL) of Y. Therefore the export (import) of A (B) just matches the import (export) of B (A).

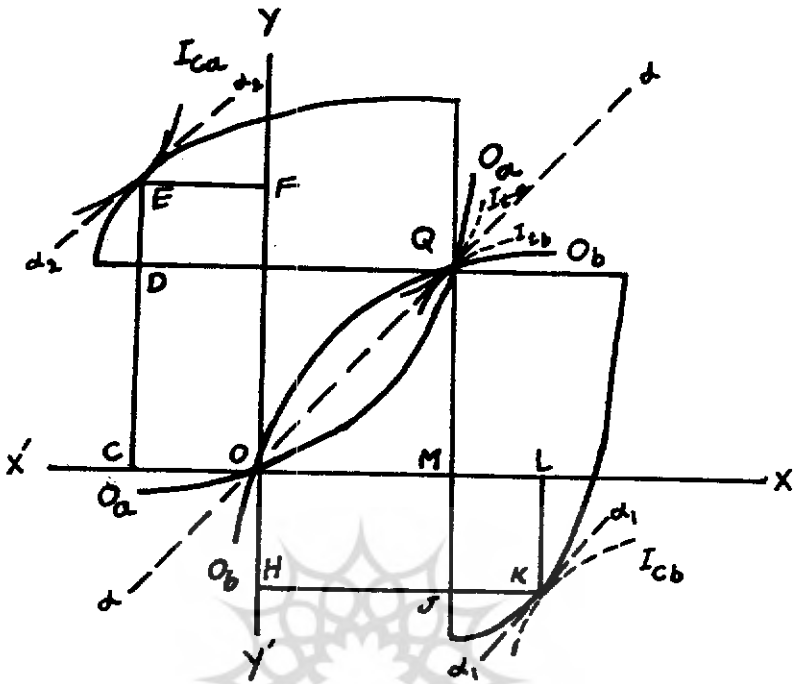

Fig.3

This diagram has a number of important properties. First, the international terms of trade passes through point Q where the offer curves of the two countries intersect indicating that there are no deficit or surpluses in either of the two countries. Also at point Q the trade indifference curves of the two countries I_{ta} and I_{tb} are tangent to one another and to the international terms of trade. The slope of each country's trade indifference curve at this point of tangency, as Professor Meade proves geometrically, is equal to the slope of the corresponding consumption indifference curve of that country at its consumption point[3]

If the trade indifference curves are tangental to one another and to the international terms of trade, it is clear that the two countries shown in the graph cannot be trading with a third country as the export of each country just matches the import requirement of the other. On the other hand if the trade indifference curves of these two countries are tangential to the international terms of trade at different

points, it is evident that these two countries taken together must be trading with a third country or groups of third countries.

For example in Fig. 4, point P represents a given output level of the two countries which is equivalent to the origin of Prof. Meade's diagram in Fig. 3. It is obvious that if points C_a and C_b do not coincide, then these two countries (say A and B) have to be trading with another country that we may call it country C or the rest of the world. The distance $C_a C_b$ (trading vector) then represents the trade of these two countries with outside world.

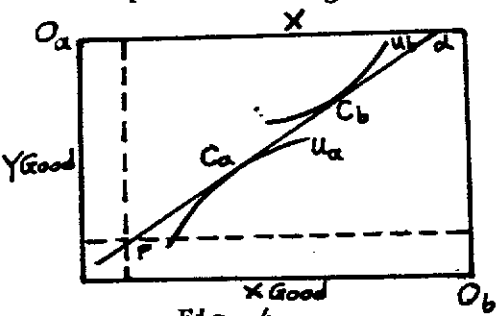

Fig. 4

Mathematical Presentation of Free Trade

Our geometric presentation of free trade in a two goods world can be presented better and more rigorously by a mathematical model. The following model shows a case where each country has a consuming sector K_i and a producing sector N_i, (i=1,2). We further assume that there are two commodities G_1 and G_2, and two factors F_1 and F_2. Through trade process, excess demand and excess supply for each good and factor would equal to zero at equilibruim position; this is shown by equating total consuming sectors with that of the total producing sectors. Now under the assumptions of competitive market, given taste, technology and factors of production, the optimum position at equilibruim is presented in the final equation of the following model:

		Commodities		Factors	
		G_1	G_2	F_1	F_2
Consuming sector	K_1	X^{11}	X^{21}	Y^{11}	Y^{21}
	K_2	X^{12}	X^{22}	Y^{12}	Y^{22}
Total		X	X	Y	Y
Producing sector	N_1	X_{11}	X_{21}	Y_{11}	Y_{21}
	N_2	X_{12}	X_{22}	Y_{12}	Y_{22}

We want to maximize the utility level of consuming sectors subject to a number of constraints as stated below:

Maximize $U^1 (x^{11}, x^{21}, y^{11}, y^{21})$ V_1

$U^2 (x^{12}, x^{22}, y^{12}, y^{22})$ V_2

Subject to :

$$x^{11} + x^{12} = x_{11} + x_{12} \qquad W_1$$

$$x^{21} + x^{22} = x_{21} + x_{22} \qquad W_2$$

$$y^{11} + y^{12} = y_{11} + y_{12} \qquad W_3$$

$$y^{21} + y^{22} = y_{21} + y_{22} \qquad W_4$$

$$f^1 (X_{11}, X_{21}, y_{11}, y_{21}) = 0 \qquad W_5$$

$$f^2 (X_{12}, X_{22}, y_{12}, y_{22}) = 0 \qquad W_6$$

To maximize the utility functions and simultaneously satisfy the constraints, we use the Lagrange multipliers:

$$L(X^{11},\ldots y_{22}, V_1, V_2, W_1, \ldots W_6) = V_1 U^1 (X^{11}, X^{21}, y^{11}, y^{21},) +$$

$$V_2 U^2 (X^{12}, X^{22}, y^{12}, y^{22}) + W_1 (X^{11}+X^{12}-X_{11}-X_{12}) + W_2 (X^{21}+X^{22}-X_{21}-X_{22})$$

$$+W_3 (y^{11}+y^{12}-y_{11}-y_{12}) + W_4 (y^{21}+y^{22}-y_{21}-y_{22}) + W_5 f^1 (X_{11}, X_{21}, y_{11}, y_{21})$$

$$+W_6 f^2 (X_{12}, X_{22}, y_{12}, y_{22})$$

Taking the partial derivatives and setting them equal to zero, we obtain:

$$L\,X^{11} = V_1\, U^1\, X^{11} + W_1 = 0$$

$$L\,X^{12} = V_2\, U^2\, X^{12} + W_1 = 0$$

$$L\,X^{21} = V_1\, U^1\, X^{21} + W_2 = 0$$

$$L\,X^{22} = V_2\, U^2\, X^{22} + W_2 = 0$$

$$L\ Y^{11} = V_1\ U'\ Y^{11} + W_3 = 0$$
$$L\ Y^{12} = V_2\ U^2\ Y^{12} + W_3 = 0$$
$$L\ Y^{21} = V_1\ U^{\bar{1}}\ Y^{21} + W_4 = 0$$
$$L\ Y^{22} = V_2\ U^2\ Y^{22} + W_4 = 0$$

$$L\ X_{11} = -W_1 + W_5 f^1\ X_{11} = 0$$
$$L\ Y_{12} = -W_1 + W_4 f^2\ X_{12} = 0$$
$$L\ X_{21} = -W_2 + W_5 f^1\ X_{21} = 0$$
$$L\ X_{22} = -W_2 + W_6 f^2\ X_{22} = 0$$

$$L\ Y_{11} = -W_3 + W_5 f^1\ Y_{11} = 0$$
$$L\ Y_{12} = -W_3 + W_6 f^2\ Y_{12} = 0$$
$$L\ Y_{21} = -W_4 + W_5 f^1\ Y_{21} = 0$$
$$L\ Y_{22} = -W_4 + W_6 f^2\ Y_{22} = 0$$

From the above we obtain the following equations:

$$V_1\ U^1\ X^{11} = V_2\ U^2\ X^{12} = -W_5\ f^1\ X_{11} = -W_6\ f^2\ X_{12}$$
$$V_1\ U^1\ X^{21} = V_2\ U^2\ X^{22} = -W_5\ f^1\ X_{21} = -W_6\ f^2\ X_{22}$$
$$V_1\ U^1\ Y^{11} = V_2\ U^2\ Y^{12} = -W_5\ f^1\ Y_{11} = -W_6\ f^2\ Y_{12}$$
$$V_1\ U^1\ Y^{21} = V_2\ U^2\ Y^{22} = -W_5\ f^1\ Y_{21} = -W_6\ f^2\ Y_{22}$$

Therefore:

$$V_1 \nabla\ U^1 = V_2\ \nabla\ U^2 = -W_5 \nabla\ f^1 = -W_6\ \nabla\ f^2$$

This model differs from our previous model in that it embodies producing as well as the consuming sectors. It demonstrates that at equilibrium position, the common rate of primary good substitution in the consuming sectors must equal to the common rate of primary goods substitution in the producing sectors. It also shows that the common rate of final good substitution by K_1 K_2 in the consuming sectors must equal the common rate of final good substitution by N_1 and N_2 in the producing sectors. This result, of course, is compatible to what we discussed earlier in our geometric presentations.

In summary, then, what we have discussed in this section is that countries (or individuals) can, through trade, increase the level of their satisfaction or economic welfare to higher levels than would have been attained when there is no trade. The optimum is obtained when there is a complete freedom of trade and the internal price ratio of each country is the same as the international price ratio. In the geometric presentations, it was shown that when the trade indifference curves of the two countries are tangent to one another then the export of one country matches exactly the import requirement of the other country and vice versa. Therefore there cannot be further trade between these two countries and another third country if the above condition prevails. However, if the trade indifference curves are tangential to the international terms of trade at different points, then there has to be trading with a third country (rest of the world) in order for each country to export and import the amounts desired.

We now proceed to section II where the case of preferential tariffs is discussed.

II. The Case of Preferential Tariffs

Assumptions:

In this section we will discuse a case where two countries with dissimilar economies form a customs union. By "dissimilar economies" it is meant that each country export the commodity that the other country imports. We will assume only two goods (X,Y), two factors (land and labor), flexible prices, perfect competition within ea-

ch country. Moreover, money and monetary phenomena such as problems of balance of payments adjustment are not considered, and the analysis is of a short-term nature therefore technology, supply of productive factors and demand conditions are assumed to be invariant. It is also assumed that combined output of the two countries is fixed.

The analysis is carried out within the context of general equlibruim and exclusive use of ordianl preference functions. It is assumed that preferences of each country can be reflected by a single indifference map that is non-intersecting and has also all the other properties of individual preferences. This should not create a problem as" to derive propositions in social welfare it is legitimat to use single and nonintersecting social indifference functions, whatever the individual preferences."

Since competitive conditions are assumed within each country, therefore differences between internal prices and international terms of trade will be due to ad valorem subsidies or duties. Following Professor Meade, we further assume that tariff revenues are redistributed to private sector on a lump sum basis.[6]

The Pre-Union General Equilibruim

Let us assume that country A is an exporter of Y and importer of product X. Country B, on the other hand, exports X and imports Y, and together A and B export X and import Y in their trade with country C (the rest of the world). We further assume that countries A and B each impose an ad valorem tariff on their import. Thus contrary to our analysis of the preceding section, the internal prices differ from the international terms of trade. The general equilibruim solution of this situation is presented in Fig.5.

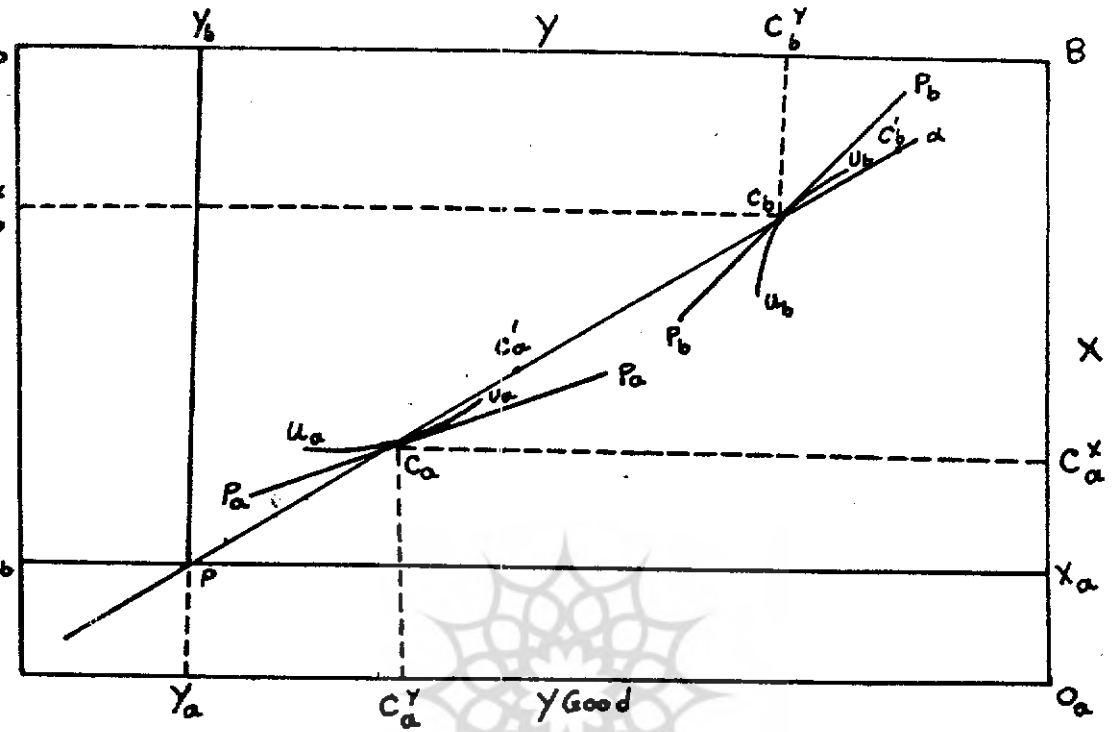

Fig. 5

The rectangle $AO_b\ BO_a$ represents total supply of X and Y available to countries A and B taken together. Point P indicates the allocation of those outputs between the two countries. P_aP_a, P_bP_b are the internal price ratios in countries A and B respectively and α represents the international terms of trade. Point P again corresponds here to the origin of Professor Meade's diagram as presented in Fig. 3, and U_aU_a, U_bU_b correspond to his trade indifference curve. Both consumption and production of the two products by A and B are measured from the origins O_a and O_b respectively, therefore as Fig. 5 is drawn, country A is producing O_aX_a of X and O_aY_a of Y but consuming $O_aC_a^X$ of X and $O_aC_a^Y$ of Y. Country B, on the other hand, produces O_bX_b of X and O_bY_b of Y, but consumes $O_bC_b^X$ of X and $O_bC_b^Y$ of Y. Thus country A as we had assumed is shown to an exporter of Y, $(Y_aC_a^Y)$ and importer of X, $(X_aC_a^X)$ and country B an exporter of X, $(X_bC_b^X)$ and importer of Y, $(Y_bC_b^Y)$. Now when we consider production and consumption of both A and B together, it is quite clear that the two countries combined import Y from and export X to a third country (which we have called it C or the rest of the world). The magnitude of this trade with outside world .

is shown by the trading vector $C_a C_b$.

Formation of Customs Union By Countries A and B

In Fig. 5 we showed the equilibruim position of countries A and B prior to formation of customs union. Both countries were assumed to have imposed a tariff as a result of which the internal price ratio differed from the international terms of trade. The position of country C was not made clear, however; we may now assume that country C is a free trader with no tariffs or subisdies on its imports of exports. This is an important assumption for our purposes and we will retain it throughout the rest of our discussions.

Now let us assume that countries A and B form a union, and eliminate completely any tariffs among themselves (i.e. both countries in their trade with each other adhere to the international terms of trade). If the elimination of tariff was also extended to country C, then we would have had a case of completely free trade which would have resulted in Pareto optimum as discussed in section 1.

Assuming that the international terms of trade is unaltered , then in Fig. 5, α would be also the internal price ratio within both A and B, and as a result both $U_a U_a$ and $U_b U_b$ would be tangent to α at consumption points. These new consumption points, will be at points such as C'_a and C'_b in Fig. 5. Since both A and B are moved to a higher indifference curve, it is obvious that the welfare of both countries would increase. We cannot, however, be so sure about country C; the welfare of country C depends on the length and slope of $C'_a C'_b$ as compared to $C_a C_b$ (the pre-union tading vector). Assuming no change in slope, then there will be no change in welfare of C if $C_a C_b = C'_a C'_b$. If the slope remains unchanged, the welfare of C will decrease in case $C'_a C'_b < C_a C_b$ and increase if $C'_a C'_b > C_a C_b$. The former which we may call it a case of trade contration is more likely to happen the lower the income elasticties of Y commodity in the two countries A and B, and the latter case which we may call it the case of trade expansion is more likely the lower the income elasticity of X commodity .[7]

We may then conclude that in case of nondiscriminatory and complete trade liberalization between A and B, the combined

welfare of the union will increase. But whether or not country C will benefit depends on the likelihood of expansion or contraction of the trading vector. Bothe professors Viner[8] and Meade[9] are of the opinion that some trade contraction will take place with C as against trade expansion within the union.

We may now turn to a more interesting case and assume that the tariff elimination is not extended to country C and that pre-union tariff with C is maintained. We again assume that the formation of union by A and B does not affect the international terms of trade and to simplify the analysis we further assume that no trade expansion or contration takes place with respect to C. Thus due to these two simplifying assumptions the slope and length of the trading vector will be unaltered. We have then in effect kept C's level of satisfaction intact which would allow us to study the effect of customs union on the welfare of countries A and B.

Our previous assumptions concerning countries A and B, and commodities that they imported and exported also hold here. Specifically we assume that country A exports Y and imports X, country B exports X and imports Y, and together the two countries export X and import Y. We also assume that C is a free trader both before and after union, but A and B both had an ad valorem tariff rates prior to union which differed in magnitude from one another.

It is clear from Fig. 5 that prior to union formation country B traded with outside world and country A traded with B only. This relation between A and B is assumed to continue after union.

Now when A and B form a union, they completely eliminate trade barriers with respect to C. Both countries A and B adopt a uniform tariff policy with respect to C. We assume that A -dopts the pre-union B's internal price ratios; thus B's pre-union internal price becomes the entire union's price and the difference between this union price and the international price represents the duty imposed by country B on its imports from C.

The above situation is depicted in Fig. 6 which is basically the same as that shown in Fig. 5, but in order to avoid cluttering the diagram, some of the unnecessary lines have been omitted. The origin O in this diagram corresponds to

point P in Fig. 5. OT is the international terms of trade and T_a, T_b are the pre-union internal prices in A and B respectively. The consumption points C_a and C_b indicate that, prior to union, in each country the marginal rate of substitution was equal to the domestic price ratio.

When the union is established and country A adopted the pre-union internal price of B, its MRS will then be equal to the price ratio in B country. Thus the consumption point for A moves from C_a to $\acute{C}_a$ which puts A in a better position than it was prior to union. Since A trades only with B, then $\acute{C}_a$ become the origin of country B and the new consumption point for B is, therefore, $\acute{C}_b$. Thus we notice that as a result of union, country A has become better off whereas B has become worse off. And since $C_a C_b = \acute{C}_a \acute{C}_b$ and there has been no change in the international terms of trade (slope of trading vector), then country C is neither better nor worse off.

The reason for improvement of A's position is that through union it obtains a shelter against competition by the C in the markets of its union partner B. That is to say A exports Y to B without facing any tariff whereas any import from C faces the pre-union tariff in country B. Moreover for the consumers in A, the imports from B is now cheaper due to elimination of tariff within the union. We also notice from Fig. 6 that for country A who specializes in the production of Y good and exports the excess supply to B, a movement from OT_a (the pre-union domestic price ratio) to OT_b (the pre-union domestic price ratio in B and the common price adopted by A and B after union) is an improvement in the terms of trade. Therefore due to the above reasons it is not a surprise to see that country A moves to a higher indifference curve.

The position of country B is less clear, however. The greater the gains of country A, the less likely for country B to realize a gain. The greater the improvement in A's external terms of trade, the more will the intra-union terms of trade will deteriorate for country B.10

In Fig. 6 we show that country B has moved to a lower indifference curve (i.e. from consumption point C_b to $\acute{C}_b$). It is evident from our diagram that if the international terms of trade stays unaltered (i.e. $\acute{C}_a T$ being parallel to OT), country B is bound to lose from the union. On the other hand, if the international terms of trade shifts in favor of union (the

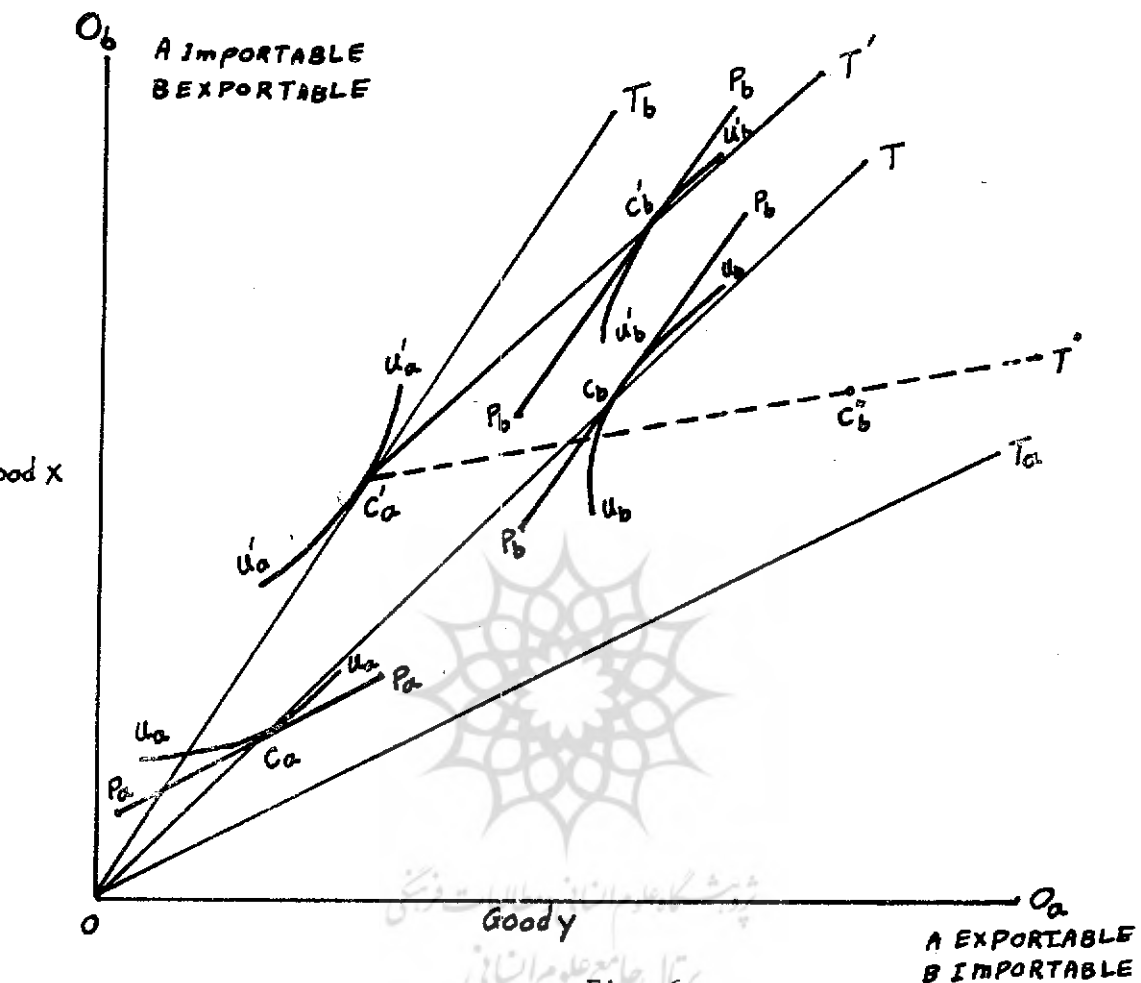

Fig. 6

export commodity of the union becoming more expensive relative to the union's imported commodity), then there is a possibility for country B also to benefit. In that case the consumption point of country A would have moved up from C_a to C'_a and of country B to a point such as C''_b. It is clear, however, that this would make country C worse off. To put it differently A and B will gain at the expense of the rest of the world.

The important conclusion that we draw from this section is that if two countries A and B form a union and eliminate tariff and other barriers within the union but maintain the pre-union tariff with respect to C, country C will be neither better nor worse off if the slope and thelength of the trading vec-

tor stays unchanged. However under the conditions of unchanged international terms of trade, the country who trades with outside world (country B in our example) will always lose and the country who competes in the markets of its partner with the rest of the world (country A in our example) will always benefit, provided that the pre-union internal price of the country trading with outside world is adopted as the internal price with the union.

It is worth mentioning at this point that for the sake of simplicity and limited space we have deliberately avoided the discussion of other possible outcomes when a customs union is established. We also have not involved ourselves with the question of overall welfare of the union as it would require the discussion of compensation within the union by the country who gains to the country who loses.

At this point we turn our attention to another important question and that is which factor in the gaining country is more likely to gain and which factor is more likely to lose. The same kind of question can also be asked about the country who loses as a result of joining the union. The discussion undertaken in the next section intends to answer these questions.

III. The Stolper-Samuelson Model

As discussed in previous sections, countries A and B each produced both commodities X and Y. But country A was exporting commodity Y and importing commodity X, whereas country B was exporting X and importing Y. Based on Hecksher-Ohlin theorem, a country exports that commodity which is produced with relatively large quantities of the country's relatively abundant factor.[11] Now if we assume that commodity X is a land (or capital) intensive and commodity Y is a labor intensive in production, then in view of our information about countries A and B export and the above theorem, it follows that Country A is relatively more endowed with labor and B is relatively more endowed with land. As it will be noticed later, this factor endowment and factor intensity have a number of important implications.

In their article of 1941, Stolper and Samuelson maintained that "international trade necessarily lowers the ....[re-

turn].... of the scarce factor".[12] In other words, in a two-commodity, two-factor country, an increase in the relative price of the labor-intensive commodity results in an increase in the real wage rate which, of course, is not so surprising, but it also follows from their theorem that this increase in the real wages has a counterpart and that is the return to the other factor (the scarce factor) will decrease. Later in a similar argument Ryhczynski established the proposition that (in a two-good, two-factor country) an increase in the labor force with constant aggregate endowment of the other productive factor results in a greater than proportionate increase in the output of the labor-intensive commodity and an actual decline in the total output of the other good if the relative price between the two goods are held constant.[13]

We will not develop the Rybczynski theorem here as the case in which we are interested invloves change in the relative prices of the commodities rather than variations in the amount of factors. Moreover, these two theorems are very much related to one another and as shown by Jones, there is a dual relationship between the two.[14]

The Stelper-Samuelson model considers two goods, wheat (capital intensive) and watches (labor intensive) and gives the following account as a reason for the preposition of the theorem:

> The introduction of trade will shift production in the direction of the good with "comparative advantage"... Its production will expand, and part of it will be exported, while watch production will contract, and part of the watch consumption will be satisfied by imports. This shift in production will be accompanied by a transfer of both labour and capital from the watch industry to the wheat industry. But by a reduction in the production of watches more labour will be set free than can be re-employed at the same rates in the production of wheat. This is because, the amount of capital released, while sufficient to employ a worker in watch production, is insufficient to employ him in wheat growing at the old wage rate. Hence wage rates have to go down in wheat growing, and it follows from the changed factor proportions that the real wages must also decline.[15]

The above proposition can be shown more clearly by a mathematical model. The following model is based on Jones's model employed in his article "The structure of Simple General Equilibruim Models"[16]

The Model

We may again assume two goods, M and F, where M is labor intensive and F is capital intensive: and two factors, L and T. We further assume a technology of constant return to scale and perfect competition. Under these conditions a state of full employment would require that:

$$a_{LM} M + a_{LF} F = L \quad (1)$$

$$a_{TM} M + a_{TF} F = T \quad (2)$$

where a_{ij} denotes the quantity of factor i required to produce a unit of commodity j. Also since in a competitive economy unit costs must reflect market prices, we may write:

$$a_{LM} W + a_{TM} r = P_m \quad (3)$$

$$a_{LF} W + a_{TF} r = P_f \quad (4)$$

where W and r are the return to labor (L) and capital (T) respectively.

With a given technology, the parameters of the model are L, T, P_m and P_f. Since our interest is in the changes in P_m and P_f, we therefore will be concerned with equations (3) and (4). Thus change in price may be shown as:

$$\theta_{LM}\, dw + \theta_{TM}\, dr = dp_m \quad (5)$$

$$\theta_{LF}\, dw + \theta_{TF}\, dr = dp_f \quad (6)$$

where $\theta = \begin{matrix} \theta_{LM} & \theta_{TM} \\ \theta_{LF} & \theta_{TF} \end{matrix}$ is a matrix of θ's which are the transform of the a_{ij}'s when relative chances are shown[17] By θ_{ij} we mean ith factor's share in jth industry. Since the sum of each row is unity, then the determinat is:[18]

$$| \theta | = \theta_{LM} - \theta_{LF} > 0$$

Equations (5) and (6) expressed in matrix format will give:

$$\begin{bmatrix} \theta_{LM} & \theta_{TM} \\ \theta_{LF} & \theta_{TF} \end{bmatrix} \begin{bmatrix} dw \\ dr \end{bmatrix} = \begin{bmatrix} dP_m \\ dP_f \end{bmatrix} \tag{7}$$

Therefore if only the P_m changes while P_f is held constant, we get:

$$\frac{\omega}{P_m} = \frac{\begin{bmatrix} 1 & \theta_{TM} \\ 0 & \theta_{TF} \end{bmatrix}}{|\theta|} = \frac{\theta_{TF}}{|\theta|} > 0 \tag{8}$$

The partial derivative in (8) states that a relative increase in price of manufactured good (labor intensive) will cause an increase in wages as stated earlier in the Stolper-Samuelson model. Also:

$$\frac{r}{P_m} = \frac{\begin{bmatrix} \theta_{Lm} & 1 \\ \theta_{LF} & 0 \end{bmatrix}}{|\theta|} = -\frac{\theta_{LF}}{|\theta|} < 0 \tag{9}$$

The partial derivative in (9) states that a relative increase in price of manufactured good will also cause a decrease in the return to capital as stated earlier in the Stolper-Samuelson model. Thus the above model demonstrates the validity of the Stolper-Samuelson theorem. But how does this relate to our earlier discussions on the customs union?

We draw two important conclusions from our discussions in this section. First in the Heckscher-Ohlin theorem that a country exports that commodity which is produced with relatively large quantities of the Country's relatively abundant factor. Second is the Stolper-Samuelson theorem stating that an increase in the relative price of the good in whose production a country has a comparative advantage will cause an increase to the return to that factor used intensively and a decrease to the return to the factor that is not used intensively in the production of the good in question.

Now in view of these theorems and the general equilibruim analysis of preferential tariff as discussed in Section II, we may draw the following conclusions:

When the union was established between the countries A and B, we assumed that country A adopted the internal price ratio of country B. This resulted in a relative increase in price of y with respect to X for country A (Fig. 6). Since country A was exporting commodity Y (a labor-intensive good according to our assumption), then according to Heckscher-Ohlin theorem, this country must have been relatively more endowed with labor than with capital. Moreover, using Stolper-Samuelson model, the increase in price of Y relative to X should benefit the factor used intensively in Y production (i.e. labor). Therefore, we may conclude that in country A who benefited from the formation of customs union, the later factor (i.e. the abundant factor) benefited as against the scarce factor (capital) which has actually sustained a lose due to the integration. We may also go one step further and claim that since the overallindifference curve of country A was moved to a higher position as a result of customs union, the gain by the abundant factor must have outweighted the loss by the scarce factor.

In country B, on the other hand, trade continued with both C and A, where its terms of trade with C remained unchnaged, but deteriorated with respect to A. This was so because as we discussed country A increased its production of its exported good (Y) and decreased production of commodity X as it mainly imported from B. This increase in production of Y resulted in higher cost and consequently higher price due to an upward sloping supply curve in industry Y in country A. But country A would be able to sell commodity Y in B's market at this new high price (even at higher price than charged by C before custom duties are added). Indeed as long as country A's price is below country C's price plus the duties imposed on import of Y good from C by B, coumtry A can easily sell all of its export to B due to the fact that its export to B are exempted from import duty in B, This is, of course, the kind of "trade diversion" that Professor Viner had in mind when he spoke of possible disadvantages of customs union.10

Now we notice that in case of country B, the country who sustained a loss due to integration, the price of imported

good (rather than exported good as in case of A) has gone up. Again applying the theorems of Heckscher-Ohlin and Stolper-Samuelson, this would mean that the return to the abundant factor (capital in this case) has decreased. Moreover, since as a whole the indifference curve of country B has moved backward, we may claim that the loss by the abundant factor has outweighted the gain by the scarce factor.

IV. Summary And Conclusions

We have shown that a Pareto optimum is established when there are no barriers to trade. This optimum is efficient in the sense that for each initial endowment (distribution), the individuals, or countries, may increase the level of their satisfaction through trade until they reach this optimum position; any movement from this position will make one party better off only at the expense of making the other party worse off.

In a world where complete freedom of trade does not prevail, two countries may form a customs union, adopt the internal price of one of the two countries and abolish partially or wholly all the tariffs among themselves while still maintaining a common tariff against C (the rest of the world). In such a case as we discussed, it is possible to show that if country A traded only with B both prior and after union and if A and B formed a union, adopted the internal price of B, then A will always benefit, while country B (the country trading with outside world) will always lose if the international terms of trade were invariant.

Applying the theorems of Heckscher-Ohlin, and Stolper-Samuelson (in a two-good, two-factor world) we showed that within the gaining country the abundant factor gains while the scarce factor loses; but overall the gains outweight the losses, thus resulting in a net gain for the country as a whole. In case of country sustaining a lose from joining customs union, we showed that the abundant factor would lose while the scarce factor would gain resulting in anoverall loss for the country.

This conclusion, if valid, has a number of important applications. First a country contemplating on joining a customs union can foresee as whether the integration would

be to its advantage or disadvantage. Second, if the country is expected to benefit in an overall basis, yet a partial loss to a group of its citizens is unavoidable, then necessary measures may be undertaken to make sufficient compensatory transfers from gainers to the losers so that everyone in the gaining country is better off while none is any worse off.

FOOTNOTES

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7. J.Vanek, *Op. cit.* P. 28.
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