

TARIFF CHANGE, FOREIGN CAPITAL AND IMMISERIZATION

A Theoretical Analysis*

Jagdish N. BHAGWATI

M.I.T., Cambridge, MA 02139, USA

Ernesto TIRONI

CIEPLAN, Santiago, Chile

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This paper analyzes the possibility that tariff reductions in the presence of foreign capital may be immiserizing. Other impacts of tariff revisions in a Latin America-like context are also discussed.

1. Introduction

It is now fully appreciated that foreign capital inflow may be immiserizing in the presence of a distortionary tariff, as noted by Bhagwati (1973), Uzawa (1969), Hamada (1974), Minabe (1974) and most elegantly and definitively by Brecher and Alejandro (1977).

The concerns of Latin American policymakers with the implications of trade liberalization in the presence of private foreign investment suggest the obverse and novel analytical possibility: that tariff reduction, in the presence of foreign capital, may be immiserizing.

This paper is addressed to analyzing this immiserization possibility, as also more generally the welfare impact of tariff change, in the context of the traditional 2×2 model of trade theory. Section 2 develops briefly one case of immiserization in such a model, sufficing to prove the possibility of such immiserization. Section 3 then systematically traces the effects of continuously varying tariffs and trade subsidies, from autarky to complete specialization, on overall welfare change, gross and net of the 'redistribution

*The credit for noting the fact that foreign capital raises difficulties for trade liberalization belongs fully to Ernesto Tironi whose MIT dissertation (1976a) discussed this in relation to the Andean Common Market, using partial-equilibrium analytical tools. Also see Tironi (1976b, 1977). Thanks are due to the National Science Foundation, Grant No. SOC77-07188 and the Program of Research on the International Economic Order of the Ford Foundation for support of the research underlying this paper. We are grateful to Richard Brecher and T.N. Srinivasan for many helpful comments.

effect', under specified assumptions concerning the domestic and foreign ownership of primary factors of production, the distribution of tariff proceeds and the incidence of taxes to pay the trade subsidy (if the tariff is a subsidy), and the factor-intensity of traded goods. Section 4 extends the analysis briefly to tariff changes in the context of customs unions.

2. Immiserization: An example

Take two primary factors, K (capital) and L (labour) in fixed supply, and two traded goods, X and Y . Let all capital be foreign-owned. Assume the country is small in the Samuelson sense, i.e., the terms of trade are fixed. Let Y be the importable good and assume it to be L -intensive while good X is K -intensive. To avoid tariff-revenue problems, we will compare free trade with autarky.

Then starting from autarky, the move to free trade should unambiguously improve welfare if all factors were domestic. However, the decline in the relative price of the importable good Y , which is L -intensive, will lead (as per the well-known Stolper-Samuelson argument) to a decline in the real wage of labour and a rise in the real rental of capital. Since labour is in fixed supply, it is clear that it is unambiguously hurt and, since all capital is foreign-owned, this is tantamount to net welfare for the country having declined.

3. Welfare effects of continuous tariff variation in the presence of foreign capital

The preceding analysis is sufficient to establish how trade liberalization in the presence of foreign capital may yield immiseration. However, a complete categorization of the effect of continuous tariff variation on net welfare of a country with foreign capital can be made, as in the rest of this paper.

We will simplify our analysis in two critical respects, throughout this paper. First, we will assume that the country has no monopoly power in trade, i.e., its external terms of trade are fixed. Second, all labour is domestic and all capital is foreign. The latter assumption enables us to carry over here, without serious modification, the existing theoretical analysis of the impact of tariff change on the domestic rewards of different factors of production, as initiated by the celebrated Stolper-Samuelson analysis.

Note initially that the variation of the tariff from the prohibitive to the zero level, in the 2×2 model, will raise now the problem of deciding on the allocation of the tariff revenue between domestic and foreign factors of production. Equally, if we permit the tariff variation to negative values and thus to include trade subsidies, we will need to decide on the allocation of

the tax burden to pay these subsidies. Since the welfare implications depend critically on the assumptions made in these two respects, as also on whether the importable good is capital-intensive or labour-intensive, a taxonomic mapping of the welfare implications must be undertaken.

We need to distinguish between two primary possibilities determined by whether the importable is capital-intensive (Case I) or labour-intensive (Case II). In regard to tariff revenues, it makes little economic sense to consider the case where they are distributed to foreign capital. Therefore, all cases will assume that tariff revenue accrues to domestic factors through lump-sum redistribution à la Meade's analysis (1950). However, since we extend the analysis to trade subsidies, and taxes to pay the trade subsidies can well fall on foreign capital, we will explicitly consider this possibility as also the possibility that the incidence of such taxation is wholly on domestic labour. Moreover, we will assume that there is no repatriation of earnings of foreign capital, all such earnings being spent in the host country itself.

3.1. *Welfare change as tariff varies, with no foreign capital*

First, let us recall the welfare impact of continuous tariff variation in this small country on the assumption that all factors are domestically owned. We will then be able to contrast these results with the implications of the presence of foreign capital that we derive in the rest of this paper.

Denote overall, 'gross' welfare, as if all capital were domestic, by the ordinal index U^G and the national welfare (i.e., welfare of the domestic factors alone), by U^N , the standard assumptions being made in each case to make the implied social utility function valid.¹

Then, for a small country, in fig. 1, with production possibility curve QS and world prices fixed at EF , autarky production and consumption are at A and free trade production and consumption are at F and E respectively. The corresponding utility levels show that $U^G(A) < U^G(F)$, since free trade is superior to autarky.²

Now, it is known that,³ ruling out inferior goods (which we do, throughout here), continuous tariff variation leading from F to A in fig. 1 will yield a monotonically decreasing U^G . Any further shift beyond A towards Q however is impossible with only a tariff since any further increase in the prohibitive tariff at A would only be redundant.⁴ On the other hand,

¹The distinction between U^G and U^N in utility terms corresponds to the distinction between GDP and GNP in terms of income.

²Strictly speaking, $U^G(A) \leq U^G(F)$ since A may coincide with F ; and $U^G(F)$ is also the maximal utility obtainable under the assumptions made.

³Cf. Bhagwati (1968) and Kemp (1968). For the large-country tariff ranking by welfare impact, see Bhagwati and Kemp (1969).

⁴However, as Richard Brecher has pointed out to us, the simultaneous use beyond A of an export subsidy for good Y would make a move to Q feasible. This possibility is ignored below.

it is possible with a trade subsidy to move from F to S and the continuous increase in the trade subsidy until it leads to complete specialization at S will yield a monotonically declining social utility. The total plot of U^G , as the

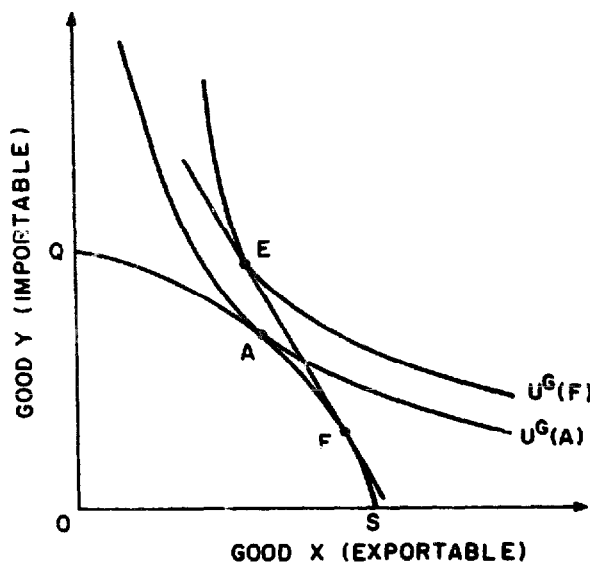


Fig. 1

tariff is therefore varied from the prohibitive level at A to the negative value that brings specialization at S , is then in fig. 2. Since $U^G(S) \cong U^G(A)$, the left-hand side subsidy quadrant shows these three alternative possibilities;⁵ on the other hand, $U^G(F) > U^G(A)$ and $U^G(F) > U^G(S)$.⁶

3.2. Case I: *Importable capital-intensive, tariff revenue accruing only to domestic factors, capital wholly foreign*

Consider now the effect on national welfare (U^N), accruing only to domestic factors, for the same range of tariff variation, when (homogeneous) capital is wholly foreign-owned and tariff revenue goes only to domestic factors. We consider here the case where the importable is capital-intensive.

Consider first the variation in the tariff from A to F , from autarky to free trade. As the domestic relative price of the importable falls, so does the real rental of capital a la Stolper-Samuelson. With no tariff revenue assumed to be going to foreign capital, foreign capital therefore unambiguously and

⁵ $U^G(S^1) = U^G(A)$, $U^G(S^2) > U^G(A)$, and $U^G(S^3) < U^G(A)$.

⁶Again, strictly speaking, $U^G(F) \geq U^G(A)$ as A and F may coincide, and $U^G(F) > U^G(S)$ as F and S may coincide, although figs. 1 and 2 are drawn to exclude the equality signs and our arguments in the text consistently exclude them.

continuously loses. On the other hand, the fact that U^G would unambiguously increase as the tariff is reduced for this small country means also that, with all tariff revenue being redistributed to domestic factors

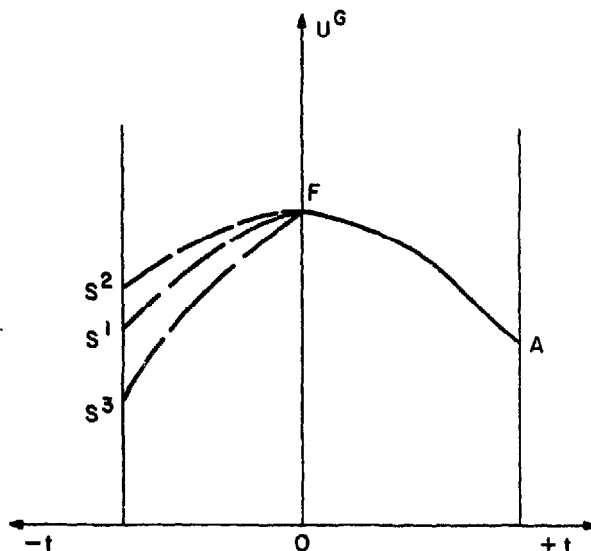


Fig. 2

(labour) by assumption, the real income of labour in terms of either good must increase with successive tariff reductions.⁷ It follows of course that national welfare would correspondingly improve since it must reflect labour's welfare in our model. The plot of the changes in U^N , as the tariff is varied from the autarkic level to zero, is therefore monotonically welfare-improving for U^N (as it was for U^G), as seen in the right-hand side quadrant of fig. 3.

As the tariff goes from zero to negative values with a trade subsidy, the 'redistribution effect' à la Stolper-Samuelson real wage argument continues to operate against capital. However, the tariff revenue is now replaced by the trade subsidy which must be paid for by lump-sum taxation on the factors. If the incidence of the taxation is on domestic factors as well, then the fact that U^G is declining from F to S (instead of rising, as from A to F) will imply that the improved real wage of domestic labour may well be accompanied by a decline in its real income (i.e., wage net of taxes) and hence by reduced U^N .

Thus, in principle, trade subsidy variation in the presence of foreign capital may result in specialization with a range of welfare outcomes regarding the

⁷For a similar argument in the context of the Stolper-Samuelson theorem, see Bhagwati (1959). This paper introduced for the first time the distinction, relevant here, between real wage and real income, the latter defined as real wage plus redistributed tariff revenue. For a brilliant subsequent analysis of the extension of the Stolper-Samuelson theorem on real wages to real incomes, see Rao (1971).

free trade and the autarkic levels of national welfare: $U^N(S) \cong U^N(F)$ and $U^N(S) \cong U^N(A)$, as illustrated in fig. 3.⁸ Moreover, unlike the the right-hand side quadrant, there will be lack of monotonicity in the left-hand side quadrant in fig. 3.

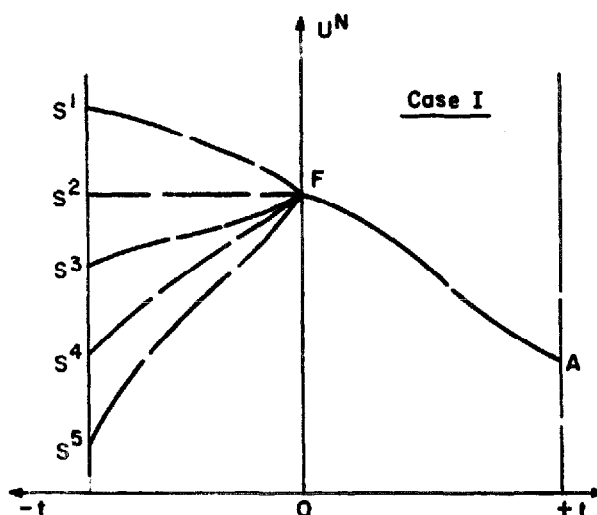


Fig. 3

3.3. Case II: Importable labour-intensive, tariff revenue accruing only to domestic factors, capital wholly foreign

For the alternative case where the importable good is labour-intensive, the redistribution of earned income is now in favour of capital.

As the economy moves from autarky to free trade, the falling price of the importable will then imply a falling real wage of labour and a rising real rental of capital. We have already noted, in section 1, that $U^N(A) > U^N(F)$ because the real wage of labour, which alone constitutes domestic factors, is lower under free trade than under autarky. However, for tariff rates in the interval of A and F , tariff revenue arises and will be redistributed to domestic factors, i.e. to labour. Therefore, there *could* be welfare-improving tariff-reduction, between A and F and the decline of U^N from $U^N(A)$ to $U^N(F)$ need not be monotonic: as indicated by the two alternative schedules drawn in the right-hand side quadrants of fig. 4.

If we extend the argument now to trade subsidies, increasing trade subsidy from free trade (F) to complete specialization (S) will keep increasing the real rental of capital and lowering the real wage of labour. However, if part of all of the incidence of taxation to pay the subsidy falls on labour, its real income

⁸In fig. 3, $U^N(S^4) = U^N(A)$, $U^N(S^2) = U^N(F)$, $U^N(S^1) > U^N(F)$, $U^N(S^5) < U^N(A)$ and $U^N(S^3) > U^N(A)$. $U^N(F) > U^N(A)$, always.

will collapse even more. Therefore, assuming that the subsidy payments rise monotonically with the rate of trade subsidy, $U^N(F)$ will decline monotonically to $U^N(S)$ with increasing trade subsidy rate, as illustrated in the left-hand side quadrant of fig. 4. It follows moreover that $U^N(A) > U^N(F) > U^N(S)$, as drawn in fig. 4.

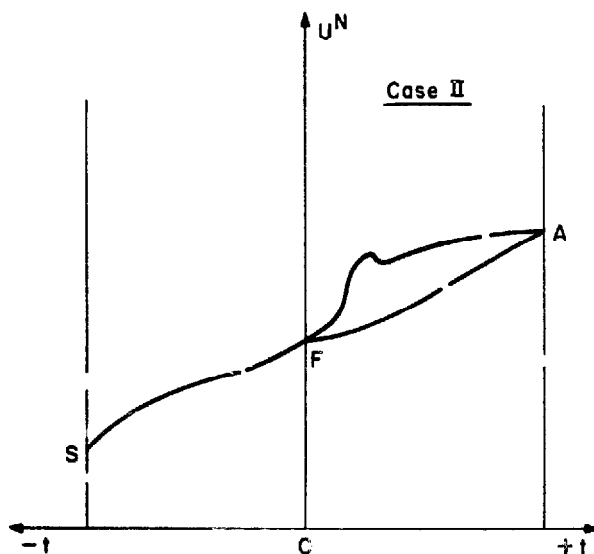


Fig. 4

3.4. Summary of welfare rankings of zero tariff, prohibitive tariff and trade subsidy (just) producing complete specialization

The results of welfare rankings, by U^G and U^N , for the tariff rate producing autarky, for free trade with zero tariff, and for the trade subsidy just producing complete specialization on the exportable good, can then be summarized, as in table 1. Evidently, the presence of foreign capital affects the welfare impact of tariff variation critically.

3.5. Illustrating with the Johnson technique

The results derived above can be readily illustrated with the aid of the general-equilibrium diagrammatic technique introduced by Johnson (1959, 1960) to deal with income distribution in the 2×2 model. This technique, as adapted from Tironi (1976b), brings out well the role of the Stolper-Samuelson theorem in determining the behaviour of real wages, while also permitting the reader to see clearly the role that tariff revenue (or subsidy payment) plays in determining the impact on real income (i.e., earned wages plus redistributed tariff revenue or minus lump-sum taxation to pay the trade

Table 1

Welfare rankings of autarky (using tariff), free trade and complete specialization (using trade subsidy), by U^G and U^N .

Utility index	Case	Comparisons of autarky (A), free trade (F) and complete specialization (S)
U^G (on assumption of no foreign capital)	All cases	$U^G(A) < U^G(F)$ $U^G(S) < U^G(F)$ $U^G(S) \geq U^G(A)$
U^N (national welfare on assumption of wholly foreign capital and wholly domestic labour)	Case I (importable capital-intensive)	$U^N(A) < U^N(F)$ $U^N(S) \geq U^N(F)$ $U^N(S) \geq U^N(A)$
	Case II (importable labour-intensive)	$U^N(A) > U^N(F) > U^N(S)$

subsidy) and hence on national welfare. To economise on space, we illustrate only the following, using Case II where the importable is labour-intensive, capital is wholly foreign and the welfare comparison involves no tariff revenue effect: (i) in fig. 5, that going from autarky to free trade will *worsen* U^N , i.e., $U^N(F) < U^N(A)$, and (ii) in fig. 6, that a tariff reduction from autarky to a non-zero *non-prohibitive* level could however *raise* U^N because the tariff revenue in the new situation, when redistributed to domestic labour, could more than offset the effect of the reduced real wage.

Thus, in fig. 5, QS is the production possibility curve, with good X capital-intensive and good Y , the importable, labour-intensive. As the price-ratio faced by producers shifts in favour of the exportable good, i.e., from Q through A , F and S , the Stolper-Samuelson argument implies that the real wage of labour keeps going down. $Q_L S_L$ is then the well-known 'income distribution' locus for labour, as derived by Johnson (1959): for each point on it, draw the ray from the origin to QS , and the ratio of labour's factor income to total income then is the ratio of the ray's length to $Q_L S_L$ to its entire length to QS . Thus, for end-points Q and S , the labour share in income is OQ_L/OQ and OS_L/OS respectively. The decline in the absolute and relative share of labour in total income implies that $OQ_L/OQ > OM/OA > ON/OF > OS_L/OS$.

The budget line for labour is correspondingly given, for each equilibrium production point on QS , by drawing a line parallel to the price-line tangent to that production point and at the same time going through the intersection of the ray from the intersection of the ray from the origin to that production point with the $Q_L S_L$ locus. Thus, for example, corresponding to autarkic production at A , labour's budget line is $A'MA''$, for production at F , it is

$F'NF''$, and for production at S , it is $S'S_L$. Moreover, given the real wage behaviour a la Stolper-Samuelson, it is clear that $A'MA''$ lies uniformly outside $F'NF''$ and the latter in turn uniformly outside $S'S_L$.

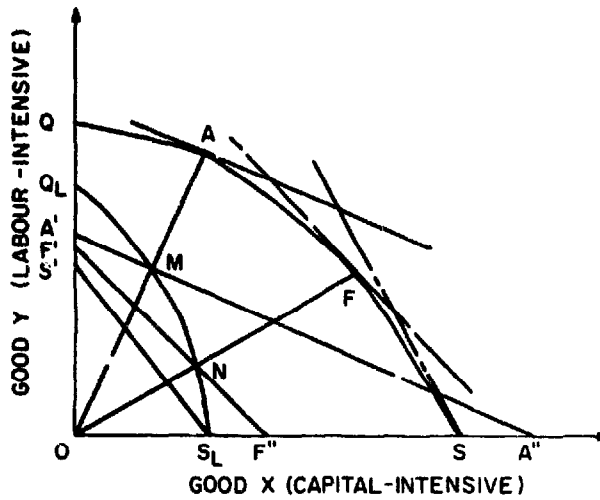


Fig. 5

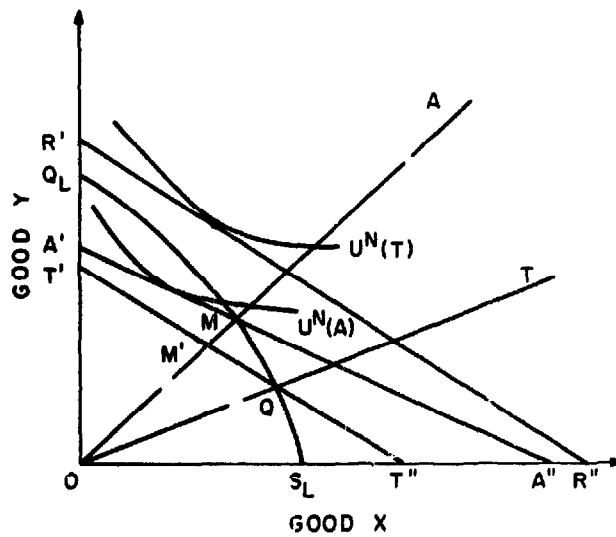


Fig. 6

It is then evident that, when the economy shifts from autarky at A to free trade at F , the relevant budget line for labour shifts from $A'JA''$ to $F'NF''$. With all capital foreign-owned, it follows therefore that the shift to free trade will result in immiserization: $U^N(F)$, tangent to $F'NF''$, will be less than $U^N(A)$, tangent to $A'JA''$.

Consider next fig. 6 where we have shifted to comparison of the autarkic equilibrium with a non-prohibitive tariff which must be characterised by

tariff revenue. We eliminate QS from fig. 6, while indicating production equilibria at A and T for autarky and non-prohibitive tariff and concentrate on $Q_L S_L$. For the autarkic equilibrium, labour's budget line – relevant for U^N – will remain $A'MA''$, as in fig. 5. But, for the non-prohibitive tariff equilibrium, the real-wage-determined budget line $T'M'T''$ (at tariff-inclusive price-ratio) must be augmented by redistributed tariff revenue which could take it, if tariff revenue were $T''R''$, to the real-income-determined budget line $R'R''$. The result would be to make $U^N(T) > U^N(A)$. The real-wage effect works to worsen U^N as the economy shifts from autarky but the tariff-revenue-distribution effect works to improve U^N , and the net effect in the case illustrated in fig. 6 is to improve U^N , i.e., $U^N(T) > U^N(A)$.

4. Customs unions in the presence of foreign capital

Since the difficulties raised by the presence of foreign capital were originally considered in the context of regional trade liberalization in the format of common markets and free trade areas, it would be relevant to show that our analysis can be readily applied to tariff change in the context of customs union. Thus, consider Viner's trade creating and trade diverting customs unions, in turn. We will consider only the 'basic' Viner-Lipsey models where offer curves from the partner and the non-union countries are perfectly elastic and only two goods are produced, consumed and traded.

4.1. Trade creating union

If we consider the 'pure' trade creating customs union in the well-known Lipsey (1957) model where the home country is essentially reducing its fully-protected importable production in favour of imports from the partner country, and the non-union country is therefore not in the picture at all, the model reduces basically to our 2×2 model and the necessary comparison is between $U^N(A)$, prior to the union, and $U^N(F)$, subsequent to the union.⁹ Therefore, our analysis in section 3 applies *fully* to the analysis of a trade creating union: table 1 comparisons of $U^N(F)$ and $U^N(A)$ for Cases I and II are fully applicable. Evidently therefore, in Case II, a trade creating customs union *can* be immiserizing in the presence of foreign capital.

4.2. Trade diverting union

Where, however, the customs union diverts imports from the non-union to the partner country – Viner's trade diverting union – we may consider two

⁹The free trade position, however, is with the partner country, *not* with the world at large. Overall free trade, F^* , would lead to $U^N(F^*)$, which is not relevant here.

sub-cases: (i) where, as in Lipsey's (1957) classic paper on how the consumption gain can offset the terms of trade loss to make such a trade diverting union beneficial, we assume domestic production to be always specialized on the exportable; and (ii) where we allow home production to change with the union.

(i) In the former case, there is clearly no redistributive effect in production from the union as the importable price domestically falls within the union. However, the tariff revenue is lost as imports are switched from the non-union country before the union to the partner country after the union. If the tariff revenue was entirely redistributed to domestic labour, and capital is wholly foreign, we then can get a redistributive effect *against* domestic factors. Thus, even a 'large' consumption gain and 'small' terms of trade loss may be compatible with welfare loss (i.e., lower U^N) if this 'redistributive' effect from the tariff revenue is large enough in a pure trade diverting union. And, if we were to assume that some or all revenue goes to foreign factors – an unrealistic assumption, not made in section 3 – then clearly a trade diverting union, with no substitution in consumption and hence no consumption gain, may still result in improved U^N because of the 'redistributive' effect related to the tariff revenue.

Fig. 7 illustrates the case where such improvement in U^N takes place in a pure trade diverting union with zero consumption gain. Assume there that consumption takes place in the fixed proportion along the ray $OC_1C_2C_3$. Let

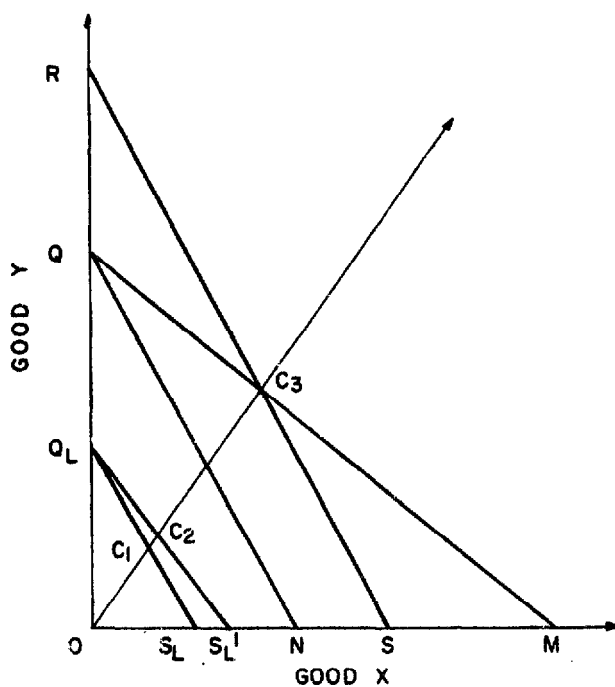


Fig. 7

Q be the endowment of Y -goods, with these being divided between foreign capital and domestic labour in the ratio $QQ_L/Q_L O$. Prior to the customs union, trade takes place from Q to C_3 at non-union country foreign price-ratio QM and domestic price-ratio is RS . The tariff revenue generated is NS and is redistributed to foreign capital. The tariff-revenue-inclusive income of foreign capital is therefore $Q_L R(QQ_L$ of earnings plus QR of revenue) whereas the income of labour is $Q_L O$. With consumption of each factor group lying along the same ray $OC_1 C_2 C_3$, the pre-union consumption point for labour is C_1 on its budget line $Q_L S_L$ whereas the difference between C_3 and C_1 constitutes the bundle consumed by foreign capital. The union then eliminates trade with the outside country and diverts it to the partner country at its price-line $Q_L S_L^1$. Since $Q_L S_L^1$ is steeper than QM , the country's terms of trade have deteriorated. However, the loss and more is absorbed by foreign capital; and domestic labour improves its welfare because its new budget line is $Q_L S_L^1$ and therefore, the shift from C_1 to C_2 implies a corresponding *improvement* in U^N , i.e., national welfare. The trade diverting union has clearly been beneficial, therefore, even though there is no consumption gain (nor production gain, i.e., decline in domestic production of protected importable in favour of imports from the partner country, or Viner's 'trade creation' in production): an outcome attributable solely to the assumption made regarding the distribution of tariff revenue to foreign capital alone.

(ii) In the case where production will also vary, the trade diverting union will also involve changes in income distribution à la Stolper-Samuelson with the production change and the net welfare impact of the union will be correspondingly complicated, exactly as in section 3. The details of this Case can be left for the interested reader to work out, in the manner set out in section 3.

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