

# THE WELFARE EFFECTS OF THE DESTINATION AND THE ORIGIN PRINCIPLES WITHIN A NON-COMPLETE SPECIALISATION MODEL WITH WORLD PRICES VARIABLE

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This paper discusses the welfare effects of the destination and the origin principles within a non-complete specialisation model and compares the results with those obtained by previous works on this subject as well as with the results of customs union analysis. It is shown that the welfare effects of tax unions are generally different from the corresponding effects of customs unions and vary widely between the various tax changes considered.

## 1. Introduction

The allocative efficiency effects of tax harmonisation have become the subject of intensive investigation in the last thirty years, especially after the formation of the Common Market<sup>1</sup>. As a result, we have by now a quite well developed theory of tax unions, which uses the same tools as, but is in many respects different from the theory of customs unions<sup>2</sup>.

Much of the formal analysis of tax union theory however has been conducted under the simplifying constant-cost assumption, which, in the context of an otherwise optimal world, within which this theory has been developed, leads to complete specialisation, a model hardly satisfactory for the analysis of the welfare effects of tax-unions<sup>3</sup>. In this paper, we extend and generalise the theory of tax unions to a non-complete

1. See, in particular, *The Tinbergen Report* (1953), *The Neumark Report* (1963), Institut International des Finances Publiques (1963), Dosser (1964 and 1967), Carl Shoup (1967), R.A. Musgrave (1969) and T. Georgakopoulos (1974).

2. This approach to the welfare effects of tax changes has an important advantage over the traditional welfare theory of taxation, known as the excess burden theory: it allows a direct comparison between non-optimal situations, whilst in excess burden theory, the comparison is usually between the pre-tax optimal and the after-tax non-optimal situations. It is therefore a fruitful approach and brings-in new analytical tools for the Public Finance specialist.

3. For a detailed discussion of the problems encountered in the case of such models see T. Georgakopoulos (1974).

specialisation world, where all three countries can produce the taxed commodity(ies). We also extend the model to cover the large country case, where all prices are variables and can be affected by tax changes<sup>4</sup>.

To make our analysis comparable to the theory of customs unions as well as to the previous work on tax unions, we shall make the following assumptions:

a) There are three countries: the home country H, the partner country L and the outside world, country W.

b) All three countries produce (actually or potentially) and consume two commodities, X and Y. Country H has a comparative advantage on and exports X, while country W exports Y. Country L, is sometimes assumed to have a comparative advantage on X and sometimes on Y, so that situations of both competitiveness and complementarity in the economies of the member countries can obtain.

c) Both products are produced under increasing cost conditions, while demand schedules are negatively sloping, in all three countries.

d) The tax to be discussed each time is the only distortion in the member countries, while no distortions exist in the outside world.

e) The extra revenues raised, in the case of tax increases, are spent by the government in the same way as the individuals would have done had the proceeds been redistributed back to them neutrally; while in the case of tax reductions, the government raises the revenues lost in some neutral way.

f) The traditional assumptions of perfect competition in all markets, perfect factor mobility within each country and factor immobility between countries, absence of transport costs, flexible wages and prices and fixed exchange rates are also employed.

4. In the context of such a model, we are able to discuss not only the production and consumption effects, but also the terms of trade effects and evaluate the welfare effects of tax unions from an individual country's welfare view-point, after taking into account all three effects. Besides, such a model allows us to trace out the impact of tax changes in one member country on the welfare of the other member countries, because it is only within the non-complete specialisation large country model that a transmission mechanism exists (i.e. variations in the terms of trade) through which tax changes in one country can affect producer or consumer decisions, and consequently the welfare of another country. Finally, the non-complete specialisation model gives rise to situations where both member countries produce the taxed commodity(ies) and allows us to examine whether the criterion of competitiveness versus complementarity in the economies of the member countries can tell us anything about the nature of the production effects of tax unions, as it happens in the case of customs unions.

Our analysis will concentrate on product taxes. Both non-general and truly general product taxes will be considered. We shall first discuss the effects of tax changes in a situation wherein the destination principle is in force both before and after the formation of the tax union and analyse the impact of the introduction of various taxes by each of the member countries as well as the harmonisation of tax rates among the member countries. Then, we shall examine the impact of changing-over from the destination to the origin principle, as well as the harmonisation of tax rates under this principle. In every case, we shall first discuss the production and consumption effects and evaluate the tax change from the world's welfare point of view and then we shall bring in inter-country redistributive effects and appraise it from each member country's welfare view-point.

## 2. *The Welfare Effects of Taxes under the Destination Principle*

Assume, to begin with, a situation where the destination principle is in force both before and after the formation of the union. This means that each country taxes total domestic consumption including imports, and exempts exports.

### 2.1. *Special Product Taxes*

Assume that the member countries agree to introduce a special tax on Y, leaving X untaxed. Since the destination principle is in force, domestic production and imports of Y are treated alike and therefore tax changes will not distort the equality of relative prices between producers located in different countries. The after-tax relative price of Y to producers is, as shown in Table 1, different from the pre-tax one, but it is the same for all producers, irrespective of country of location. Hence, tax changes, taking place in a situation where the destination principle is in force, do not disrupt the equality of the marginal rate of transformation between firms locating in different countries and they do not therefore interfere with production maximisation. Therefore, such changes are free of production effects<sup>5</sup>.

Coming to the consumption effects, we see that special taxes affect

5. This conclusion is different from that obtained in the case of the complete specialisation model, where an excise tax union can cause trade diversion (Dossier 1967, p. 74), because in the complete specialisation model, a domestic tax on a product is equivalent to a tariff (since domestic consumption equals imports).



TABLE 1

The Price of the Taxed Product Y under the Destination Principle

	Country H	Country L	Country W
I. <i>The no-tax situation</i>			
Producer price	$P_o^*$	$P_o^*$	$P_o^*$
Consumer price	$P_o^*$	$P_o^*$	$P_o^*$
II. <i>A special tax on Y in country H</i>			
Producer price	$P_1^*$	$P_1^*$	$P_1^*$
Consumer price	$P_1^*(1 + t)$	$P_1^*$	$P_1^*$
III. <i>A special tax on Y in both member countries, at equal rates</i>			
Producer price	$P_2^*$	$P_2^*$	$P_2^*$
Consumer price	$P_2^*(1 + t)$	$P_2^*(1 + t)$	$P_2^*$

the conditions for production and exchange optimisation, and result in negative consumption effects. Consider the tax on Y in H. Under the specified conditions of supply and demand, the tax is partly shifted to consumers and increases the relative price of the taxed product to consumers, while it reduces its relative price to producers.

This disrupts the equality between the marginal rate of substitution and the marginal rate of transformation and inhibits production optimisation. In addition, since the tax is levied in one country only, it inhibits exchange optimisation. The special consumption tax therefore reduces world welfare. Further increases in the rate of such a tax reduce welfare further, while rate reductions have an opposite effect.

The situation does not necessarily improve, if country L also levies a tax, at the same rate, on Y. Production optimisation will not be restored in H, while it is now not achieved in L either. Further, since no tax is levied in W, the condition for exchange optimisation is not restored. Hence, in a situation where the destination principle is in force, rate equalisation of special taxes does not necessarily improve welfare.

Finally, the effects of tax changes on a country's international terms of trade, and therefore the inter-country redistribution of income depend, as we have shown elsewhere, upon whether the taxed product is the country's importable or its exportable commodity<sup>6</sup>. In the former case, the terms of trade of the taxing country improve, while in the latter case, they deteriorate. Further increases in the tax rate improve (worsen)

6. See T. Georgakopoulos (1972, pp. 542-544 and p. 547).

FIGURE 1a.

The Welfare Effects of Special Product Tax Unions under the Destination Principle.

Case I : A special tax on the importable commodity.

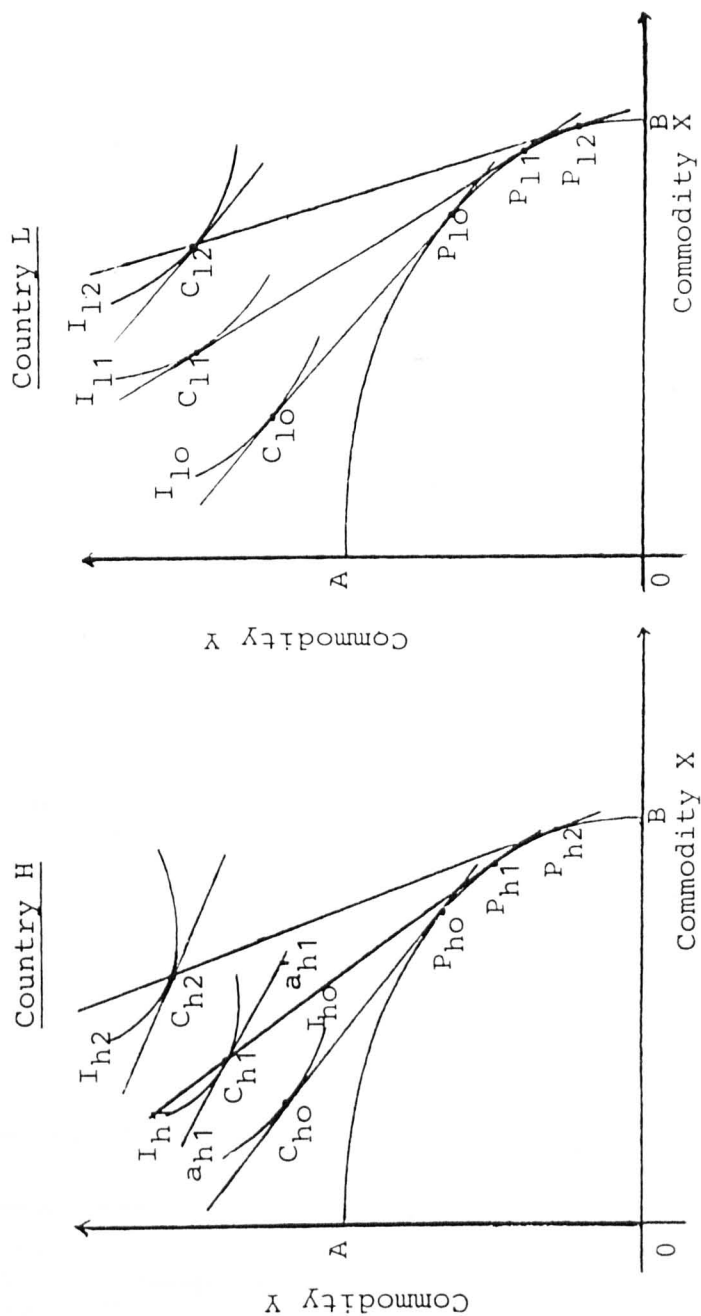
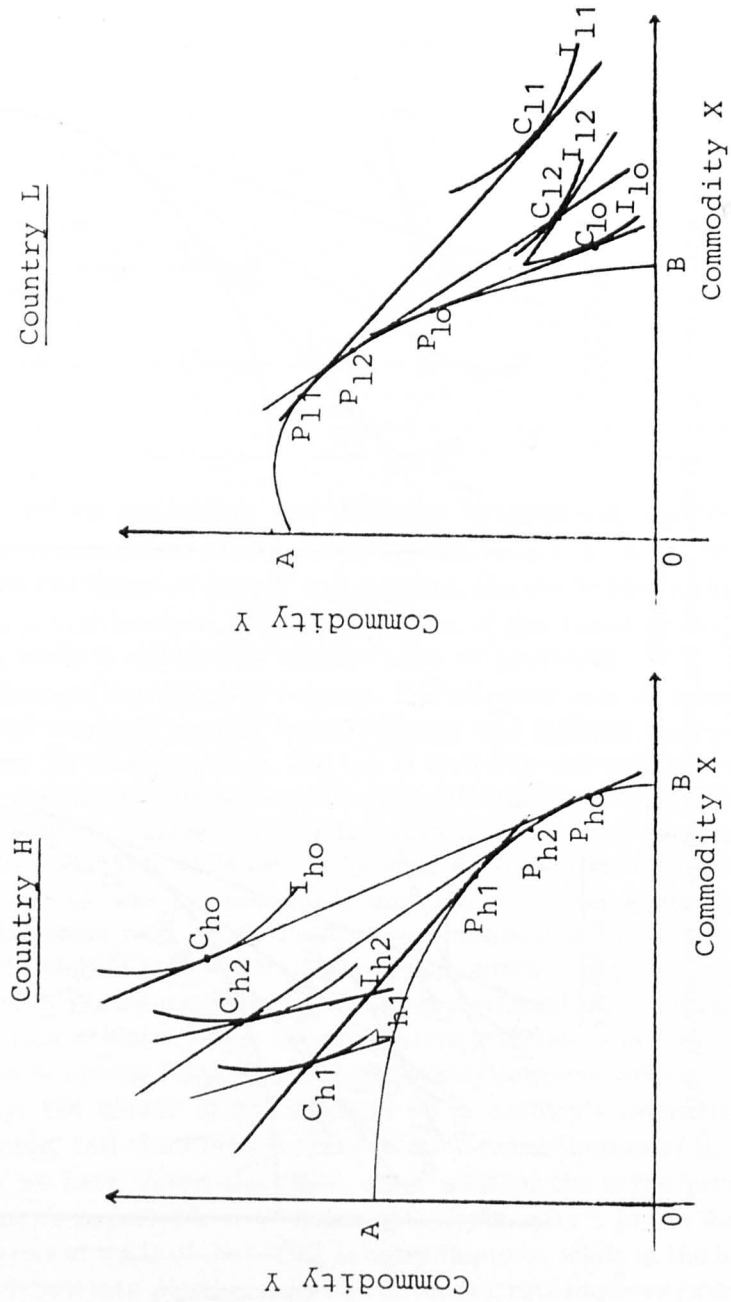


FIGURE 4b.

Case II : A special tax on the exportable commodity.



the country's terms of trade further, while rate reductions have an opposite effect.

When all three effects are taken into account, then a special tax on the consumption of the country's importable commodity may either increase or reduce its welfare, depending upon whether the favourable terms of trade effect does or not counterbalance the detrimental consumption effect; and, of course, the opposite holds true for the abolition or any rate reduction of such a tax. On the contrary, the introduction or any increase in the rate of a special consumption tax on the country's exportable commodity will unequivocally reduce its welfare, since both the consumption and the terms of trade effects are detrimental; and the opposite holds true for the abolition or any rate reduction of such a tax.

Coming to the effects of special taxes on the other member country's welfare, we observe that tax changes in one country will affect the welfare of the other country only if they alter her international terms of trade<sup>7</sup>. These terms of trade effects depend upon the nature of the economies of the union member countries. If the member countries trade in the same direction i.e. their economies are similar or competitive, their terms of trade move in the same direction, while if the countries trade in opposite directions, i.e. their economies are dissimilar or complementary, their terms of trade also move in opposite directions<sup>8</sup>. Consequently, if the member countries trade in the same direction, then a country's international terms of trade will improve and its welfare increase when the other country introduces or increases the rate of a tax on its importable commodity or when it abolishes or reduces the rate of a tax on its exportable commodity. On the contrary, when the taxing member country introduces or increases the rate of a tax on its exportable commodity, as well as when it abolishes or reduces the rate of a tax on its importable commodity, the other country's welfare will deteriorate. Opposite results hold true, if the member countries trade in opposite directions.

The preceding arguments are shown in Figure 1. Figure 1a shows a situation where the union member countries levy a tax on the consumption of their importable commodity, while Figure 1b shows a situation

7. Otherwise, such changes leave the relative prices to both producers and consumers in the country unaffected and they do not disrupt any of the conditions necessary for optimal allocation, nor do they cause inter-country income redistribution.

8. See T. Georgakopoulos (1972, p. 547).

where the domestic consumption of the exportable commodity is taxed. Besides, in Figure 1a, the economies of the union member countries are assumed to be competitive and the countries trade in the same direction, while in Figure 1b, the economies of the union member countries are complementary and the countries trade in opposite directions.

Take up first Figure 1a. Producers' equilibrium before any tax is given by points  $P_{h0}$  and  $P_{l0}$ , for each country H and L respectively, while consumers' equilibrium is given by points  $C_{h0}$  and  $C_{l0}$ . The pre-tax international price ratio is given by the common slope of the lines  $P_{h0}C_{h0}$  and  $P_{l0}C_{l0}$ , and equals the domestic terms of trade to both producers and consumers.

The introduction of a tax on the consumption of Y, in H, shifts producers' equilibrium to  $P_{h1}$  and  $P_{l1}$ , where the lines  $P_{h1}C_{h1}$  and  $P_{l1}C_{l1}$ , giving the new international terms of trade, which also coincide with the domestic terms of trade to producers, are tangent to the production possibility curves of the two countries. Since the new relative product prices faced by producers, though different from the pre-tax ones, are still the same in both countries (the two lines are parallel) and are also equal to the relative prices faced by producers in W, the introduction of the tax is free of production effects. The new consumers' equilibrium, on the other hand, is given by points  $C_{h1}$  and  $C_{l1}$ , where the lines  $a_{h1}$   $a'_{h1}$  and  $P_{l1}C_{l1}$ , which give the domestic terms of trade to consumers, are tangent to indifference curves  $I_{h1}$  and  $I_{l1}$ , for each country, respectively. Welfare in both countries has improved, due to the favourable terms of trade effects, which have counterbalanced the detrimental consumption effects in H and are a net benefit for L. Further increases in the rate of this tax could improve welfare in H further, until an optimal rate is reached<sup>9</sup>, beyond which the detrimental consumption effects counterbalance the beneficial terms of trade effects and H's welfare falls, while L's welfare continues to increase.

Suppose now that country L levies a tax on the consumption of Y. The new after-tax producers' equilibrium is given by points  $P_{h2}$  and  $P_{l2}$ , where the lines  $P_{h2}C_{h2}$  and  $P_{l2}C_{l2}$ , which give the new international and domestic terms of trade to producers, are tangent to the production possibility curves. Again, the tax is free of production effects, since the after-tax relative prices to producers are the same in both member countries and equal the relative prices faced by producers in W. The new

9. On optimal rates of domestic taxes see, A.F. Friendlaender and A. Vandendorpe (1968) and T. Georgakopoulos (1974b).



consumers' equilibrium is now given by points  $C_{h2}$ , and  $C_{l2}$ . Welfare has improved in both member countries, due again to the favourable terms of trade effects, which have here counterbalanced the detrimental consumption effects in L and are now a net benefit for H. Further increases in the rate of the tax in L could improve its welfare further, until again an optimal rate is reached, beyond which further increases would reduce its welfare, though they would still improve H's welfare.

The situation is different if either country taxes the consumption of its exportable rather than its importable commodity. As shown in Diagram 1b, the new producers' equilibrium is given by points  $P_{h1}$  and  $P_{l1}$ , after the tax in H, and by points  $P_{h2}$  and  $P_{l2}$ , after the tax in L, for each country, respectively. The new consumers' equilibrium, after the tax on X in country H, is given by points  $C_{h1}$  and  $C_{l1}$ , for H and L, respectively. The tax is again free of production effects, but it has worsened H's international terms of trade and has also caused detrimental consumption effects. As a result, it has reduced H's welfare. On the contrary, since L trades in opposite directions with H, its welfare has increased because this country experiences beneficial terms of trade effects. On the other hand, the new consumers' equilibrium, after the tax on  $Y^{10}$  in L, is given by points  $C_{h2}$  and  $C_{l2}$ . Welfare in the taxing country L has fallen because the tax has caused detrimental consumption and terms of trade effects, while welfare in H has increased because of the beneficial terms of trade effects.

## 2.2. General Product Taxes

Assume now that, instead of a special tax on either X or Y, the union member countries consider the introduction of a general tax covering both X and Y at the same ad-valorem rate. Since the tax is levied at the same rate on both products, it does not distort the relative product prices to either producers or consumers and does not therefore interfere with production optimisation like the partial taxes do. Further, under the assumptions set out here, the price mechanism will correct any distortions in product prices between consumers residing in different countries and will prevent any interference of the tax with exchange optimisation. As a result, a truly general product tax, under the destination principle, is free of both production and consumption effects and does not therefore affect world allocative efficiency. Besides,

10. Notice that Y is L's exportable commodity.

such a tax does not affect the international terms of trade and does not therefore bring about any redistribution of income between countries<sup>11</sup>. Consequently, a truly general product tax does not affect either the world's or any member country's welfare<sup>12</sup>.

### *3. The Welfare Effects of Taxes under the Origin Principle*

Suppose now that the member countries decide to abolish the destination principle and introduce the origin principle for the taxation of products traded internationally. Under this principle, each country taxes its domestic production rather than its domestic consumption of each product, which is the case with the destination principle. As a result, exports are not refunded and imports enter the member countries untaxed. We shall first examine the welfare effects of a pure change in the principle of taxation, with tax rates remaining unchanged, and then we shall consider the effects of rate harmonisation under the new principle.

#### *3.1. A Pure Change in the Principle of Taxation with Tax Rates Remaining Unchanged*

##### *a) Special Products Taxes.*

Let us begin with a situation where an excise tax is levied on the consumption of Y in both member countries, at different rates. Assume that H is the high-tax, while L is the low-tax member country. Now the member countries form the union and agree to abolish the destination principle and adopt the origin principle instead. Each country therefore levies the tax on the domestic production rather than the domestic consumption of Y. One can distinguish two alternative situations: i) the case where the product is produced by one member country before the change in principle and ii) the case where it is produced by both member countries<sup>13</sup>.

11. See T. Georgakopoulos (1972, p. 545 and 548-550).

12. Notice that the same result would obtain if, instead of a flexible price mechanism, flexible exchange rates are assumed.

13. The case where the product is not produced by any member country before the change in principle, which is discussed in customs union theory, is trivial here, because if the product is not produced before, it cannot be produced after the change in principle and consequently the formation of the union is free of production effects.

Assume first that the product was produced in only one member country prior to the formation of the union. The change to the origin principle will cause an over-taxation of the member country's product relative to the product coming from the outside world, which is not taxed at all. However, under the origin principle the product must be sold to consumers at the same cum-tax price, irrespective of the country of their location. Therefore, any tax differentials must, as shown in Table 2, be reflected in differentials of the net prices received by producers, with producers in the member country receiving a smaller price than producers in the outside world. This results in a switch in the locus of production from the producing member country to the outside world. Since production was maximised under the destination principle, this is a shift from a lower to a higher cost source of supply i.e. trade diversion<sup>14</sup>.

TABLE 2.

The Price of the Taxed Product Y under the Destination and the Origin Principle with Unequal Rates  $t_h > t_l$

	Country H	Country L	Country W
<i>I. Destination principle</i>			
Producer price	$P_1^*$	$P_1^*$	$P_1^*$
Consumer price	$P_1^*(1 + t_h)$	$P_1^*(1 + t_l)$	$P_1^*$
<i>II. Origin principle with only H producing the taxed product</i>			
Producer price	$P_2^*(1 - t_h)$	—	$P_2^*$
Consumer price	$P_2^*$	$P_2^*$	$P_2^*$
<i>III. Origin principle with both countries producing the taxed product and rates of taxation different between the two countries</i>			
Producer price	$P_3^*(1 - t_h)$	$P_3^*(1 - t_l)$	$P_3^*$
Consumer price	$P_3^*$	$P_3^*$	$P_3^*$
<i>IV. Origin principle with both countries producing the taxed product and rates of taxation equal in the two countries.</i>			
Producer price	$P_4^*(1 - t)$	$P_4^*(1 - t)$	$P_4^*$
Consumer price	$P_4^*$	$P_4^*$	$P_4^*$

If the product is produced by both member countries prior to the formation of the union, the change in principle will result in a penalisation of H's production relative to L's and W's production; and also

14. This result is similar to the one obtained in the case of customs unions, formed under parallel conditions. See R. Lipsey (1960, p. 498).

in a penalisation of L's production relative to W's production. This will result in producer price differentials between the countries, with net producer prices in H being lower than those in L which are also lower than producer prices in W (see Table 2). As a result, production will be shifted from both member countries to W, which is again trade diversion<sup>15</sup>. The situation does not change, if rates are equalised before the formation of the union. The change in principle will again switch production from the member countries to the outside world and this is trade diversion.

Coming now to the consumption effects of the change to the origin principle, we see that, under the new principle, the product must be sold to consumers at the same cum-tax price, the ratio of which gives now the international terms of trade. Where exactly this new cum-tax price ratio will be established is difficult to ascertain, because that depends upon the special conditions of supply and demand in all three countries. What can only be said is that it must lie somewhere between the consumer price ratio that was prevailing in the high-tax member country and the one prevailing in the outside world, before the change in principle. Consequently, the change in principle will, most probably, bring about beneficial consumption effects, in the high-tax member country, while these effects may be either beneficial or detrimental in the low-tax member country.

Finally, the change-over to the universal origin principle improves the terms of trade of the exporting country(ies) and worsens the terms of trade of the importing country(ies)<sup>16</sup>.

The general conclusion which is derived from the above analysis therefore is that while the change-over to the universal origin principle causes trade diversion and reduces world welfare, it may cause beneficial consumption and terms of trade effects which may partly or totally counterbalance the detrimental production effects. The consumption effects are most probably, beneficial for the high-tax member country and are higher in this country (where the detrimental production effects are also higher) than in the low-tax member country, where the consumption effects may be detrimental. Besides, the terms of trade effects

15. This result is different from that obtained in the case of customs unions, formed under parallel conditions, where we may have either trade creation or trade diversion, depending upon the nature of the economies of the member countries (competitive versus complementary), see R. Lispey (1960, p. 498).

16. See T. Georgakopoulos (1972, p. 547).

are beneficial for the exporting countries and detrimental for the importing countries and their size is again a function of the magnitude of the tax rate.

The preceding arguments are shown in the first part of Figure 2<sup>17</sup>. The pre-tax producers' equilibrium is given by points  $P_{ho}$  and  $P_{lo}$ , where the lines  $P_{ho}C_{ho}$  and  $P_{lo}C_{lo}$ , which give the international, as well as the domestic, terms of trade to both producers and consumers, are tangent to the production possibility curves. Consumers' equilibrium is given by points  $C_{ho}$  and  $C_{lo}$ , where the lines  $a_h a_h'$  and  $a_l a_l'$ , which give the domestic terms of trade to consumers, are tangent to indifference curves  $I_{ho}$  and  $I_{lo}$ , respectively.

After the change in principle, the domestic terms of trade to producers, in the member countries, are given by the lines  $b_h b_h'$  and  $b_l b_l'$  and the new producers' equilibrium is given by points  $P_{h1}$  and  $P_{l1}$  for H and L, respectively. Since the slope of these two lines is unequal (slope  $b_h b_h' > \text{slope } b_l b_l'$ ) and they are both different from the slope of  $P_{h1}C_{h1}$ , which give the new international and the domestic terms of trade to producers in W, it follows that the change in principle has caused production dislocation and has therefore resulted in trade diversion.

The new consumers' equilibrium is given by points  $C_{h1}$  and  $C_{l1}$ , where the lines  $P_{h1}C_{h1}$  and  $P_{l1}C_{l1}$ , which now give the international and the domestic terms of trade to consumers, in each member country, respectively, are tangent to indifference curves  $I_{h1}$  and  $I_{l1}$ . Since the new consumer price ratio differs from the old one, consumption effects have also followed the change in principle.

Finally, the terms of trade of the importing the taxed product country H have deteriorated, while those of the exporting country L have improved. As drawn in the diagram, welfare in H falls, because the negative production and terms of trade effects counterbalance the possible beneficial consumption effects. On the contrary, welfare in L increases, because the favourable terms of trade, and perhaps the consumption effects, exceed the detrimental production effects.

17. The assumption is here made that the countries trade in opposite directions, so that the impact of the tax change on both the importing and the exporting countries can be studied. The case where the countries trade in the same direction is left to the reader as an exercise.

FIGURE 2a.

## The Welfare Effects of the Origin Principle

Case I : The effects of a pure change in principle under unequal rates.

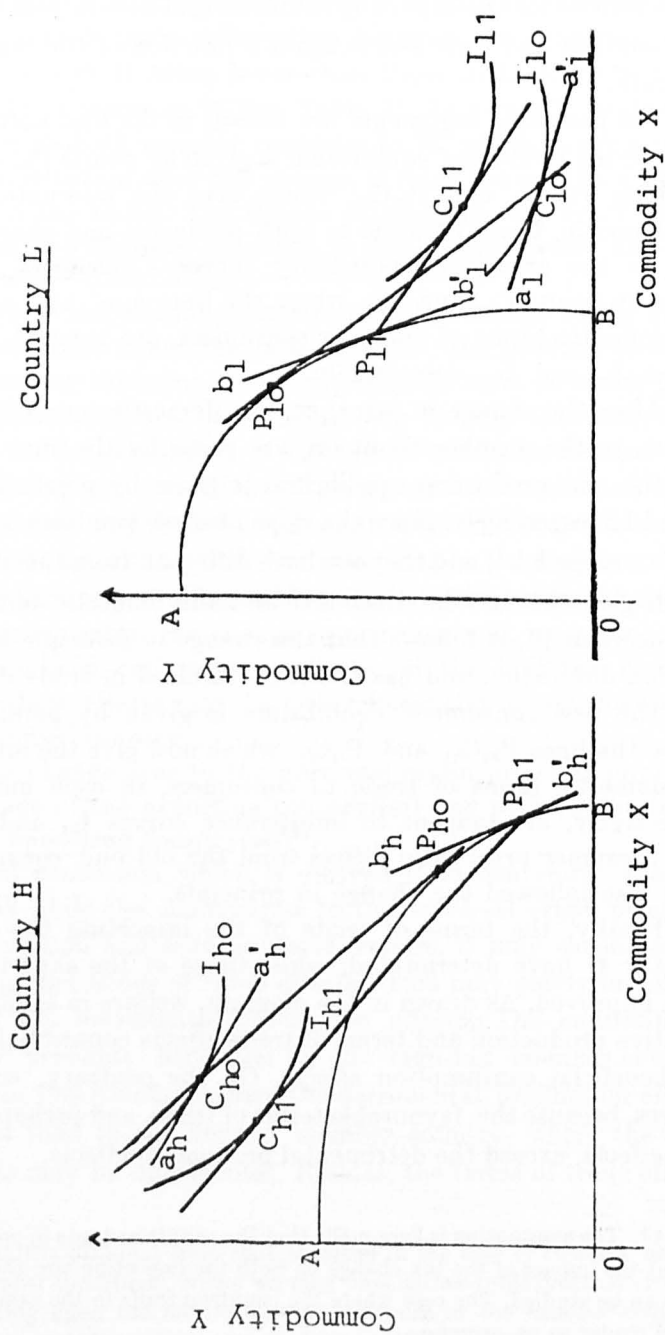
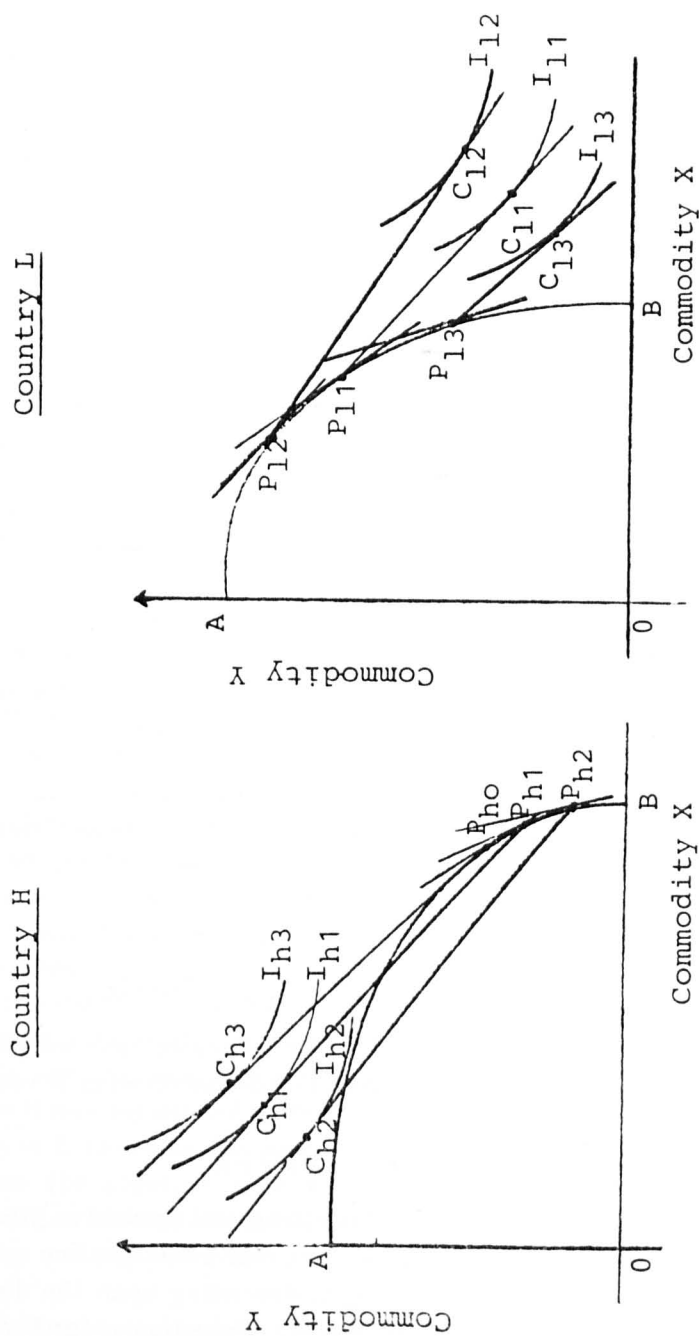


FIGURE 2b.

Case II : The effects of rate changes under the origin principle.



### b) General Product Taxes.

Let us now consider a general tax, levied on the consumption of the two products in both member countries at unequal rates between the countries, with country H levying again a high rate and country L levying a low rate. The change to the origin principle will result in a penalisation of domestic production of both products in H relative to production in L and W and also in a penalisation of domestic production in L relative to production in W. However, since the tax is general, the relative prices to both producers and consumers, after the change in principle, will be the same with those before the change in principle and therefore production will continue to take place on the basis of comparative cost. Any changes in the general price level will, under our assumption of wage and price flexibility, set in force opposite wage and price changes, so that the general level of economic activity will again be accommodated by the available supply of money. Hence, a general product tax union involving a change in the principle of taxation, does not cause production effects.

Coming now to the consumption effects, we see that, since the tax is general, it does not change the relative prices of the two products to consumers and does not therefore result in any consumption effects. Finally, the change-over to the origin principle does not affect the international terms of trade and does not bring about inter-country redistribution of income.

Therefore, the pure change in the principle of taxation, in the case of truly general product taxes, does not affect either the world or the individual member countries' welfare.

### 3.2. Rate Harmonisation under the Origin Principle

Suppose now that the member countries have adopted the origin principle with unequal rates and rate harmonisation is considered.

#### a) Special Product Taxes.

Consider first the case where the taxed product is produced in only one member country. In such a case, rate harmonisation can cause either trade creation or trade diversion, depending upon the direction of the change. Thus, if rates are increased, production is further shifted away from the producing member country to the outside world and this shift



is again trade diversion. On the contrary, if rates are reduced, production is shifted in the opposite direction and this is trade creation.

On the other hand, if the product is produced in both member countries, rate harmonisation may again cause either trade creation or trade diversion, but the result now does not only depend upon the direction of the rate change, but also upon which country makes the rate change. Thus, rate increases in the high-tax member country result in further shifts of production away from this country and this is trade diversion, while rate reductions result in opposite shifts, which is trade creation. The outcome is not so clear with respect to rate changes in the low-tax member country. Rate increases will now lead to both trade creation and trade diversion, because they switch production from the low-tax to the high-tax member country and to the outside world; the former shift is trade creation, while the latter shift is trade diversion. Similarly, rate reductions in the low-tax member country cause both trade creation (a switch of production from W to L) and trade diversion (a switch of production from H to L). Hence, the net outcome, in both cases, depends upon the relative magnitude of the two opposite effects.

Coming now to the consumption effects, we see that rate increases in either member country will cause detrimental consumption effects in both countries, while rate reductions in either country will cause beneficial consumption effects in both countries.

Finally, the terms of trade effects depend upon the direction of the rate change as well as the position of the member countries in trade. Rate increases cause beneficial terms of trade effects to the exporting country(ies) and detrimental effects to the importing country(ies), while the opposite holds true for rate reductions in either member country<sup>18</sup>.

The preceding arguments are shown in the second part of Figure 2. As shown in this diagram, an increase in the tax rate in H, which imports the taxed commodity, shifts producers' equilibrium from  $P_{h1}$  and  $P_{l1}$  to  $P_{h2}$  and  $P_{l2}$  and consumers' equilibrium from  $C_{h1}$  and  $C_{l1}$  to  $C_{h2}$  and  $C_{l2}$ . Welfare in H falls because all three effects are negative in this country, while welfare in L increases, because the positive terms of trade effects counterbalance the negative production and consumption effects. On the other hand, a reduction in the tax rate in H, shifts producers' equilibrium to  $P_{h3}$  and  $P_{l3}$  and consumers' equilibrium to  $C_{h3}$  and  $C_{l3}$  and

18. See T. Georgakopoulos (1972, p. 545 and p. 548).

results in opposite welfare changes for the member countries. Parallel considerations apply for rate changes in L.

#### b) General Product Taxes.

Like the pure change in principle, also rate changes under the new principle leave the relative product prices to both producers and consumers unaffected, while the flexible price mechanism corrects any inter-country price differentials caused by changes in tax rates. As a result, rate harmonisation of truly general product taxes is free of either production or consumption and terms of trade effects and does not therefore affect welfare.

#### 4. Conclusions

The preceding analysis leads to the following conclusions:

*First*, no tax change, taking place in a situation wherein the destination principle is in force, can cause production effects. The desirability of such a change therefore must be judged on account of its consumption and terms of trade effects. Such effects are present however only in the case of special product taxes, while general product taxes are free of both consumption and terms of trade effects. The nature of the consumption effects of special product tax changes depends upon the direction of the rate change. Rate increases in any country cause detrimental consumption effects, while rate reductions cause beneficial consumption effects. The nature of the terms of trade effects, on the other hand, depends upon whether a country is an importer or an exporter of the taxed product. In the former case, the terms of trade improve, when a new tax is introduced or tax rates are increased, while in the latter case the terms of trade deteriorate. And, of course, the opposite holds true for rate reductions or the complete abolition of a special tax.

*Second*, a change in the principle of taxation can cause production, consumption and terms of trade effects only in the case of special product taxes, while in the case of general product taxes, such a change does not cause any effects, provided the price mechanism is free to work, or alternatively if exchange rates are flexible. The production effects of special product tax unions, involving a change to the origin principle, are always detrimental, while the consumption effects are beneficial for the high-tax member country and may also be beneficial, for the low-tax member country. The terms of trade effects are beneficial for the exporting and detrimental for the importing country.

*Third*, rate changes of special product taxes, under the origin principle, can cause either beneficial or detrimental production effects. Rate increases in the high-tax member country cause trade diversion, while rate reductions cause trade creation. On the contrary, rate changes in the low-tax member country can cause either trade creation or trade diversion and no general result can be drawn, unless the particulars of the situation are specified. The consumption effects however can be specified because they only depend upon the direction of the rate change, irrespective of the country that makes the change. Rate increases in either country cause detrimental consumption effects, while rate reductions cause beneficial consumption effects. The terms of trade effects, on the other hand, depend upon the position of the country in trade and also upon the direction of the rate change. Rate increases by any member country improve the terms of trade of the exporter and worsen those of the importer and the opposite holds true for rate reductions.

*Fourth*, rate equalisation is not always desirable either from the world or from any individual member country's welfare view-point. When the world welfare is used as a yardstick, rate equalisation is desirable only if it is achieved through a reduction of the rate in the high-tax member country, but not necessarily when it is brought about through an increase of the rate in the low-tax member country. Thus, under the destination principle, rate equalisation brought about through reductions of the rate in the high-tax member country, cause beneficial consumption effects and it is therefore desirable, but when such equalisation is achieved through rate increases in the low-tax member country, it causes detrimental consumption effects and it is undesirable. Similarly, when the origin principle is in force, rate equalisation is again desirable only if it is achieved through rate reductions in the high-tax member country, because only then does it bring about beneficial production and consumption effects; but it may be undesirable if brought about through rate increases in the low-tax member country, because then both effects can be negative. Further, when the welfare of a member country is considered, then rate equalisation may even be more undesirable because of the detrimental terms of trade effects.

*Fifth*, unlike the theory of customs unions, where the nature of the production effects can be inferred from the nature of the economies of the member countries (competitive versus complementary) nothing can be said about the nature of the production effects of tax unions from such similar characteristics. These characteristics determine only the nature of the terms of trade effects. If the economies of the union

member countries are complementary, then the countries experience similar terms of trade effects, while if their economies are competitive, they experience opposite terms of trade effects.

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