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Border Tax Adjustments on Commodities and Income

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I. INTRODUCTION

Many of the major propositions in the literature on border tax adjustments have come to be widely known.[1/] What is not generally recognized, however, is that the border tax adjustment concept is as relevant to income taxation as it is to commodity taxation.[2/] Income border tax adjustments, as distinct from commodity border tax adjustments, are not relevant unless there is international factor mobility. Most of the analysis of the border tax adjustment issue has been based on economic models in which factors of production are assumed to be immobile.

The general theme of this paper is the nature of border tax adjustments in an open economy which permits not only the free exchange of goods, but also the free movement of factors between countries. Several topics will be investigated. The first is the role played by commodity border tax adjustments in determining the impact of taxation in an open economy. The second topic concerns alternative principles of income border tax adjustments. Third, the relationships between commodity border tax adjustments and income border tax adjustments are considered. Finally, the implications for fiscal sovereignty are examined.

II. THE GENERAL EQUILIBRIUM APPROACH

The general equilibrium approach to public finance emphasizes the dual role of households in economic life: on the one hand, households buy goods and services from business firms in commodity markets; on the other, they sell or rent their services to business firms in factor markets. This is known as the "circular flow of income" relationship.

The fundamental insight provided by the circular flow of income concept is that taxation can affect households in two separate ways: either as consumers of products or as suppliers of factor services. Richard Musgrave, a pioneer in the application of general equilibrium analysis to questions of public finance, recognized this distinction and pointed out the two different economic flows upon which taxes can be imposed -- the "uses of income" flow and the "sources of income" flow.[3/] Taxes imposed upon the "uses of income" affect the household in its role as a consumer, while taxes imposed upon the "sources of income" affect the household in its role as a supplier of factor services.

Both "uses of income" and "sources of income" refer to the economic position of the household. Whether taxes are imposed on "uses" or "sources", general equilibrium theory

assumes that households ultimately bear the burden of taxation, not business firms.

The distinction between taxes on the "sources of income" and taxes on the "uses of income" leads to another important distinction -- that between direct taxes and indirect taxes. The taxing authority can decide not only which flow to tax ("uses" or "sources") but also how to impose the tax. The tax can be imposed directly on the household, or indirectly on the household via the intermediation of the business firm. If, for example, the government desires to tax the "sources of income" flow, it can levy either a direct income tax on households, or an indirect production tax that lowers the price offered by firms to households for their factor services. Similarly, if the government desires to tax the "uses of income" flow, it can impose either a direct expenditure tax on households, or an indirect consumption tax that raises the prices paid by households for commodities they consume.

III. COMMODITY BORDER TAX ADJUSTMENTS: A REVIEW

Commodity border tax adjustments (BTAs) are relevant whenever there is international trade and indirect taxes are imposed. If an indirect tax is designed to reach the uses of income flow, destination principle BTAs are necessary. Destination principle BTAs consist of import taxes and export rebates at a rate equal to the internal tax. On the other hand, if an indirect tax is designed to tax the sources of income flow, origin principle BTAs are required. Origin principle BTAs consist of the exemption of imports and the taxation of exports at a rate equal to the domestic tax. If an indirect tax is designed to reach both the uses of income and the sources of income flow, dual principle BTAs may be applied. Under the dual principle, the domestic tax would be imposed on imports, but not remitted on exports. In practice the dual principle is rarely, if ever, used.[4/]

A major proposition to emerge from the border tax adjustment literature is that, if the indirect tax is a truly general tax levied at the same rate on all final goods, there is no basic difference between destination principle BTAs and origin principle BTAs. But when the indirect tax varies between commodities, there is indeed a difference between the two principles. Destination principle BTAs

ensure that domestic taxation does not disturb the structure of world prices facing producers -- all the distortion is shifted to consumption. Conversely, origin principle BTAs ensure that domestic taxation does not disturb the structure of world prices facing consumers -- all the distortion is shifted to production. Finally, dual principle BTAs cause domestic taxation to distort both consumption and production.

Thus destination and origin principle BTAs can exert dramatically different effects on the composition of commodity trade. For example:[5/]

-- A shift from the origin to the destination principle will reduce consumption and increase production of heavily taxed goods. Correspondingly, imports of these goods will fall, and exports rise.

-- A shift from the origin to the destination principle will increase consumption and decrease production of lightly taxed goods. Correspondingly, imports of these goods will rise and exports decline. [6/]

IV. INCOME BORDER TAX ADJUSTMENTS

In a world in which factors of production are immobile between countries, the distinction between a tax on the consumption of income (an expenditure tax) and a tax on the production of income (an income tax) is almost meaningless.[7/] The location of the consumption of income is the same as the location of the production of income and the two taxes are, more or less, the same. This is analogous to the closed-economy analysis of commodity taxation where a tax on the consumption of goods is identical to a tax on the production of goods, since the location of consumption is necessarily the same as the location of production.

The distinction between a tax on the consumption of income and a tax on the production of income has relevance only if the location of consumption differs from the location of production. This is only possible when there is international factor mobility. If, for example, a country wants to tax only the consumption of income, then income produced abroad but consumed at home by residents must be taxed, while income produced at home but consumed abroad by nonresidents must be tax-free. Taxation imposed on the consumption of income would require border tax adjustments to tax the foreign source income of residents and exempt the domestic source income of nonresidents. On the other hand,

if a country wants to tax only the domestic production of income, then the foreign source income of residents must be tax-free, while the domestic source income of nonresidents must bear the tax.

Thus, there are three types of income border tax adjustments for direct taxes that correspond exactly to the three types of commodity border tax adjustments for indirect taxes. The combination of taxes on "imported" foreign source income plus exemptions for "exported" domestic source income can be called residence principle BTAs. The combination of exemptions for "imported" foreign source income plus taxes on "exported" domestic source income can be called source principle BTAs. The combination of taxes on both "imported" foreign source income and on "exported" domestic source income can be called worldwide BTAs.

Both destination and residence principle border tax adjustments implement taxes on the uses of income flow -- the destination principle with respect to indirect commodity taxes, the residence principle with respect to direct income taxes. Both origin and source principle border tax adjustments implement taxes on the sources of income flow -- the origin principle with respect to indirect taxes, the source

principle with respect to direct taxes. Dual and worldwide border tax adjustments reach both the uses of income flow and the sources of income flow.

In the real world, a mixture of residence and source principle BTAs are used in connection with the direct taxation of income. Some countries, such as France and the Netherlands, impose their income taxes on a territorial basis by domestic statute, while other countries, such as West Germany, reach much the same result by tax treaty, using the so-called "exemption" method to relieve double taxation. Under a pure territorial or exemption system, income imported by residents from foreign sources is exempt from domestic taxation while income exported to nonresidents from domestic sources is subject to domestic taxation. The territorial or exemption system of taxation, if applied on a multilateral basis, would explicitly result in source principle border tax adjustments.

Residence principle border tax adjustments are not applied in the same explicit way. However, worldwide border tax adjustments, coupled with the foreign tax credit, will sometimes implement the residence principle.

A. Worldwide Border Tax Adjustments. Worldwide BTAs consist of taxes on domestically-produced income sent abroad by nonresidents plus taxes on foreign-produced income

repatriated by residents. When supported by worldwide BTAs, the income tax imposes a burden both on the uses of income and on the sources of income.

Multilateral use of worldwide BTAs leads to the problem of international double taxation. The foreign tax credit is often used to deal with this problem. Among other countries, the United States, the United Kingdom, and Japan presently use the foreign tax credit to avoid international double taxation. If country A gives an unlimited [8/] foreign tax credit for income taxes paid to foreign countries on income arising there, income produced in foreign countries but consumed in A will not be subject to double taxation. Instead, such income will be taxed only once, at the same rate applied to domestically-produced income. If country B also gives an unlimited foreign tax credit, then income produced in country A but repatriated by residents of country B will bear no net income tax burden in country A, since the government of B will provide a credit to its own residents for those taxes paid to the government of A. Hence, the effect of worldwide border tax adjustments with unlimited foreign tax credits given by the governments of both countries is equivalent to residence principle border tax adjustments: There is a domestic tax in each country on domestically-consumed income produced abroad, and there is no domestic tax on domestically-produced income consumed abroad. It should be stressed, however, that

this equivalence applies not with respect to the tax revenue that accrues to each government but rather with respect to the domestic tax rates levied on residents who receive income from foreign sources.

Figure 1 illustrates the relationship between "true" residence principle border tax adjustments and "equivalent" residence principle border tax adjustments (that is, worldwide border tax adjustments combined with unlimited foreign tax credits). TT represents the domestic transformation curve between goods X and Y. The international price ratio is given by the slope of LP and the production point is P. The value of the production bundle P at prices LP is OL in terms of good Y, the numeraire good. OL, therefore, represents gross domestic product or domestically-produced income.

The world portrayed in Figure 1 is a world of international factor mobility. Some of the domestically-produced income is owned by foreigners while some of the income produced abroad is owned by residents. In Figure 1, it is assumed that an amount LM of domestically-produced income is exported to its foreign owners, to be consumed abroad, while an amount MN of foreign-produced income is imported by its domestic owners to be consumed at home. Hence, domestically-consumed income equals ON (OL minus LM plus MN).

Let R equal the domestic tax rate and F equal the foreign tax rate. If the domestic income tax at rate R is applied

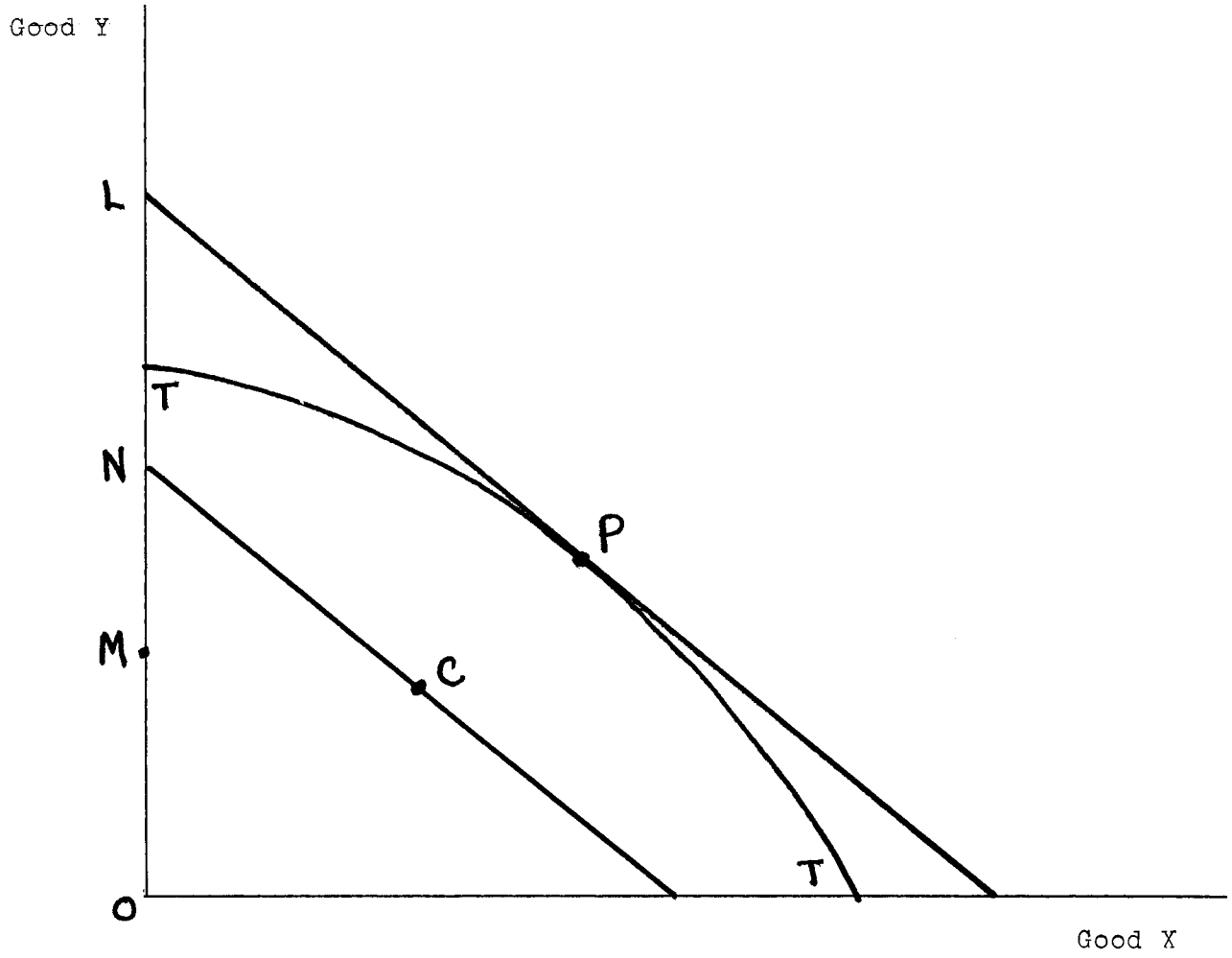

Figure 1

only to the consumption of income, then the total tax paid by resident consumers would be T_c:

$$T_c = R(OL) - R(LM) + R(MN) = R(ON) \qquad (1)$$

Note that "true" residence principle border tax adjustments are R(MN) - R(LM). R(LM) of tax is rebated on domestically-produced income repatriated for foreigners, while R(MN) of tax is imposed on foreign-produced income repatriated to residents.

On the other hand, an income tax at rate R imposed only on the domestic production of income would result in a total tax of T_p:

$$T_p = R(OL) = R\ (OM) + R(LM) \qquad (2)$$

A tax on the domestic production of income implies source principle border tax adjustments, since R(LM) is included within R(OL) and no tax is imposed on MN. As explained earlier, the territorial or exemption system of taxation implements the source principle.

With respect to domestically-consumed income, equation (1) specifies only the domestic taxes on the relevant income flows. To represent total taxation by both countries on these flows, equation (1) must be modified to take into account F(LN), the foreign tax on net income exported from the home country (LM less MN). It is assumed that the foreign country also applies its income tax as a consumption tax and employs "true" residence principle border tax adjustments. The total taxation imposed by both countries is given by $T_c + T_c^*$:

$$T_c + T_c^* = R(ON) + F(LN) \qquad (3)$$

The domestic country would collect net tax revenue of R(ON) and the foreign country would collect net tax revenue of F(LN) on domestically-produced income.

These consequences of a "true" residence principle may be contrasted with the consequences of an "equivalent" residence principle. An income tax supported by worldwide border tax adjustments and an unlimited foreign tax credit in both foreign and domestic countries would lead to a total tax of $T_{ww} + T_{ww}^*$ on income produced or consumed in the home country:

$$T_{ww} + T_{ww}^* = [R(OL) + R(MN) - F(MN)] + [F(LM) - R(LM)]$$
$$= R(ON) + F(LN) \qquad (4)$$

The foreign tax credit in the domestic country is represented by - F(MN), while the foreign tax credit allowed by the foreign country is shown by - R(LM). The domestic country would collect net tax revenue of [R(OL) + R(MN) - F(MN)] while the foreign country would collect net tax revenue of [F(LM) - R(LM)] on domestically-produced income.

Equation (4) is identical to equation (3) with respect to the overall tax burden. In other words, the total tax paid by consumers in both countries is the same if both countries follow a residence principle or if both adopt a system of worldwide border tax adjustments and an unlimited foreign tax credit. Thus, if each country in the world economy

supports its income tax with worldwide border tax adjustments and offers an unlimited foreign tax credit, the result, so far as taxpayers are concerned, is equivalent to each country imposing a tax solely on the consumption of income.

There is, however, a significant difference between "true" and "equivalent" residence principle border tax adjustments. This difference relates to the distribution of the tax revenues. Under a true residence principle, the domestic government collects the revenues on imported income and rebates the revenues on exported income. Under an "equivalent" residence principle (worldwide border adjustments with unlimited foreign tax credits), the foreign government collects the revenues on income imported by the domestic country and rebates the revenues on income exported from the domestic country. In terms of Figure 1 and equation (4), the home government loses F(MN) but gains R(LM) with "equivalent" residence principle border tax adjustments by comparison with "true" residence principle adjustments. Whether a given country would gain or lose tax revenues upon switching from "equivalent" to "true" residence principle border tax adjustments depends on the quantitative difference between R and F on the one hand, and MN and LM on the other.

Any shift of tax revenue between governments attending a change from "equivalent" to "true" residence principle border tax adjustments can be expected to have economic effects

over and above the intergovernmental shift of purchasing power. The additional effect reflects the so-called "transfer problem". If the domestic and foreign governments have different spending patterns as between domestic and foreign goods, a transfer of real resources from one to the other, measured at constant terms of trade, will change the pattern of world demand, and thus the equilibrium of the world economy. The terms of trade of the domestic country will improve if the shift of tax revenue increases the world demand for its products, and vice versa.

A country which loses tax revenue can possibly gain from a terms of trade improvement, but the more likely outcome is that a country which loses tax revenue will also experience an adverse terms of trade effect. Governments tend to concentrate their expenditures on nontraded goods and services, and when they purchase traded goods, they tend to discriminate in favor of domestic firms. Ordinarily, then, one country will experience a double dose of welfare loss, and the other country a double dose of welfare gain, as a result of changing from "equivalent" to "true" residence principle border tax adjustments. For this reason, such a shift is unlikely in the real world.

B. Foreign Tax Credit Limits. The correspondence, from the taxpayer's view, between the "equivalent" residence principle and the "true" residence principle holds so long

as foreign tax credits are not subject to a limit. This is not the usual case in the real world; instead foreign tax credits are often subject to a limit set with reference to the domestic tax rate.

Consider the consequences of a foreign tax credit limit when the domestic tax rate is greater than the foreign tax rate. In this case, with "equivalent" residence principle border tax adjustments and a foreign tax credit limited by the domestic tax rate, imported income will bear the same tax rate as domestically-produced income. But domestic taxes on exported income will not be fully compensated by the foreign government. An analogous distortion occurs when the domestic tax rate is less than the foreign tax rate. Here, imported income will not be fully compensated by the domestic government, so that imported income will be taxed at a higher rate than domestically-produced income.

A foreign tax credit limit thus ensures that income flows from the high-tax country to the low-tax country are taxed under the source principle rather than the residence principle. If $R > F$, there will be a "source tax" on exported income equal to $(R-F)$. If $R < F$, there will be "source tax" on imported income equal to $(F-R)$. A "source tax" on exported income is equivalent to a tax on factor inflows. The result will be lower factor inflows than would have occurred without

the foreign tax credit limit. Similarly, a "source tax" on imported income is equivalent to a tax on factor outflows. The result will be lower factor outflows than otherwise would have occurred.[9/]

V. COMMODITY BTAs AND INCOME BTAs

A. Heckscher-Ohlin-Samuelson model. The Heckscher-Ohlin-Samuelson model may be used to illustrate the relationship between commodity BTAs and income BTAs. This model assumes two goods each produced by two different and fully-employed productive factors, labor and capital, under perfectly competitive conditions. The production functions exhibit constant returns to scale; technology is identical in the two countries; and one of the goods is unambiguously capital-intensive while the other is unambiguously labor-intensive. In addition, assume that factor services but not factor owners are mobile between countries, and to simplify matters even further, that only capital moves across international borders. The home country is assumed to be small so that it has a negligible impact on world prices of goods and factors. Finally, to keep the analysis simple, assume that taxes are spent on defense and other public goods in a way that does not directly affect the productivity of factors or their after-tax incomes.

The initial situation of the economy is illustrated in Figure 2. At the world price ratio for goods, indicated by the slope of LP, home production is at point P and home consumption is at point C. The trade triangle is PBC. Commodity

price equalization leads to factor price equalization in the model and initially there is no incentive for factor movement.

Starting from this position, the home country imposes a tax, levied under the source principle, only on capital in the corporate sector. One way corporate capital can escape the tax is to flee abroad. In the frictionless Heckscher-Ohlin-Samuelson world, the flight of corporate capital into foreign investment must eventually result in a shutdown of the domestic corporate sector. With goods and factor prices given, a corporate income tax, no matter how small, is inconsistent with positive corporate sector output. Domestic production of the corporate good ceases because, with the price ratio for goods fixed by world markets, the corporate sector cannot afford to match the after-tax returns to capital available from foreign sources.

This result is illustrated in Figure 2. The corporate good is assumed to be capital-intensive.[10/] The production point moves along the Rybczynski line MR which depicts the change in production, at constant commodity prices, as capital enters or leaves the domestic economy. Capital leaves until the production point M on the vertical axis is reached. This implies complete product specialization of the noncorporate good. OM represents gross domestic product

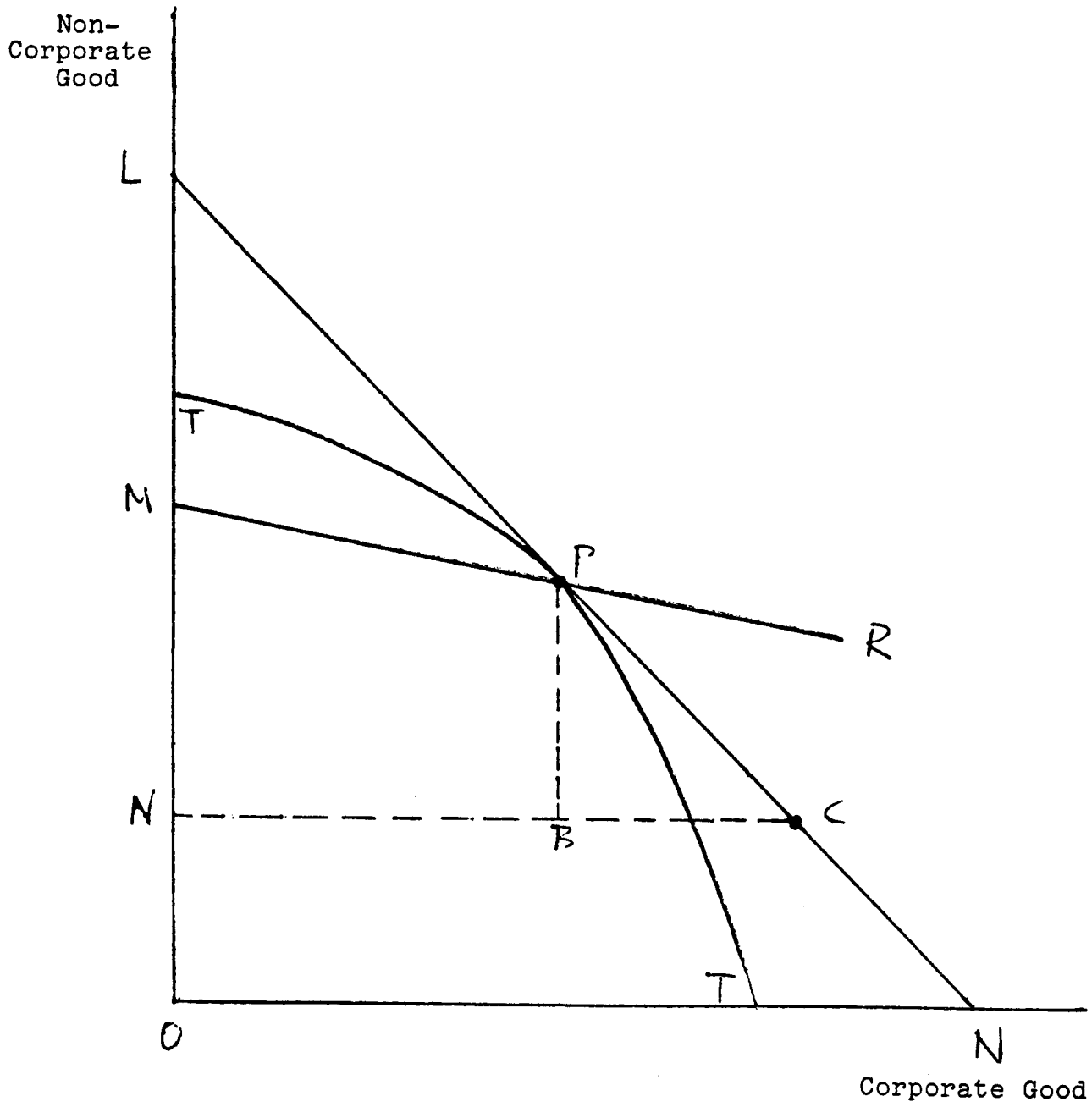

Figure 2

in terms of the noncorporate good, but national income remains at OL, since interest and dividend receipts from the exported capital services equal LM under factor-price equalization assumptions. With constant national income, unchanged commodity prices, and no alteration in consumer preferences, consumption is unaffected by the tax and remains at point C. LM of income from capital plus MN of the noncorporate good are traded for NC of the corporate good. The only effect of the tax has been to change international exchange from a pattern of "goods for goods" to a welfare-equivalent pattern of "capital services (plus goods) for goods".

A combination of residence and destination principle BTAs could prevent the dislocation implied by the shift in production from P to M. If the corporate tax is imposed according to the residence of the corporation, there is no tax reason for corporate capital to flee to the foreign country. The location of corporate production is irrelevant for corporate tax purposes. But domestic shareholders will shift their capital from the corporate sector to the domestic noncorporate sector so as to equalize net of tax returns. Equalization of net of tax returns between the two sectors of the economy requires a higher before-tax return on capital in the corporate sector than in the noncorporate sector. This in turn requires a destination principle adjustment for trade in corporate goods so that the corporate tax can be

passed forward as a consumption tax. With a combination of residence and destination principle BTAs, the tax raises revenue and the exchange pattern of "goods for goods" persists.

On the other hand, if origin principle BTAs were applied to goods trade, corporate sector output would disappear. Under the origin principle, the corporate tax cannot be passed forward to consumers. The equalization of net of tax factor prices would lead to capital inflow or outflow, depending upon whether the shrinking corporate sector was labor-intensive or capital intensive in comparison to the noncorporate sector.

This is the essential symmetry between source principle income BTAs and origin principle commodity BTAs in the Heckscher-Ohlin-Samuelson model with capital mobility. Under either border tax adjustment principle, the corporate tax has no effect other than to switch the pattern of international exchange from that of "goods for goods" to a welfare-equivalent pattern of "capital services (plus goods) for goods."[11/] A corollary of this symmetry is that, in a world of factor price equalization and capital mobility, the corporate income tax will be effective in the sense of raising tax revenue only if it is supported by <u>both</u> destination principle commodity BTAs and residence principle income BTAs. Neither principle of border tax adjustment, by itself, is sufficient for this purpose.

The same analysis can be extended to any income tax that is imposed at a differentially higher rate on particular uses of a factor. Consider an equal ad valorem tax on labor and capital in one sector only, say sector X. Assume that X is capital-intensive and that capital services are mobile. Under both source principle income and origin principle goods BTAs, capital leaves the country until sector X closes down.[12/] This outcome is illustrated in Figure 3 which portrays factor endowments on the axes and commodity output by isoquants (deleted to simplify the illustration). At the world factor-price ratio of α and the initial factor endowment E, the corresponding factor-intensity ratios are OR_x and OR_y, and the factor allocation points are P_x and P_y. If capital alone is mobile, capital leaves the country until the factor endowment point becomes P_y'. Output of X falls from P_x to zero and output of Y rises from P_y to P_y'. Some capital migrates from sector X to sector Y, and some capital leaves the country. With the disappearance of sector X, no tax is collected on either internationally mobile capital or internationally immobile labor. The situation, similar to that in Figure 2, is that an exchange pattern of "factor services (plus goods) for goods" replaces a welfare-equivalent pattern of "goods for goods." For the tax on labor and

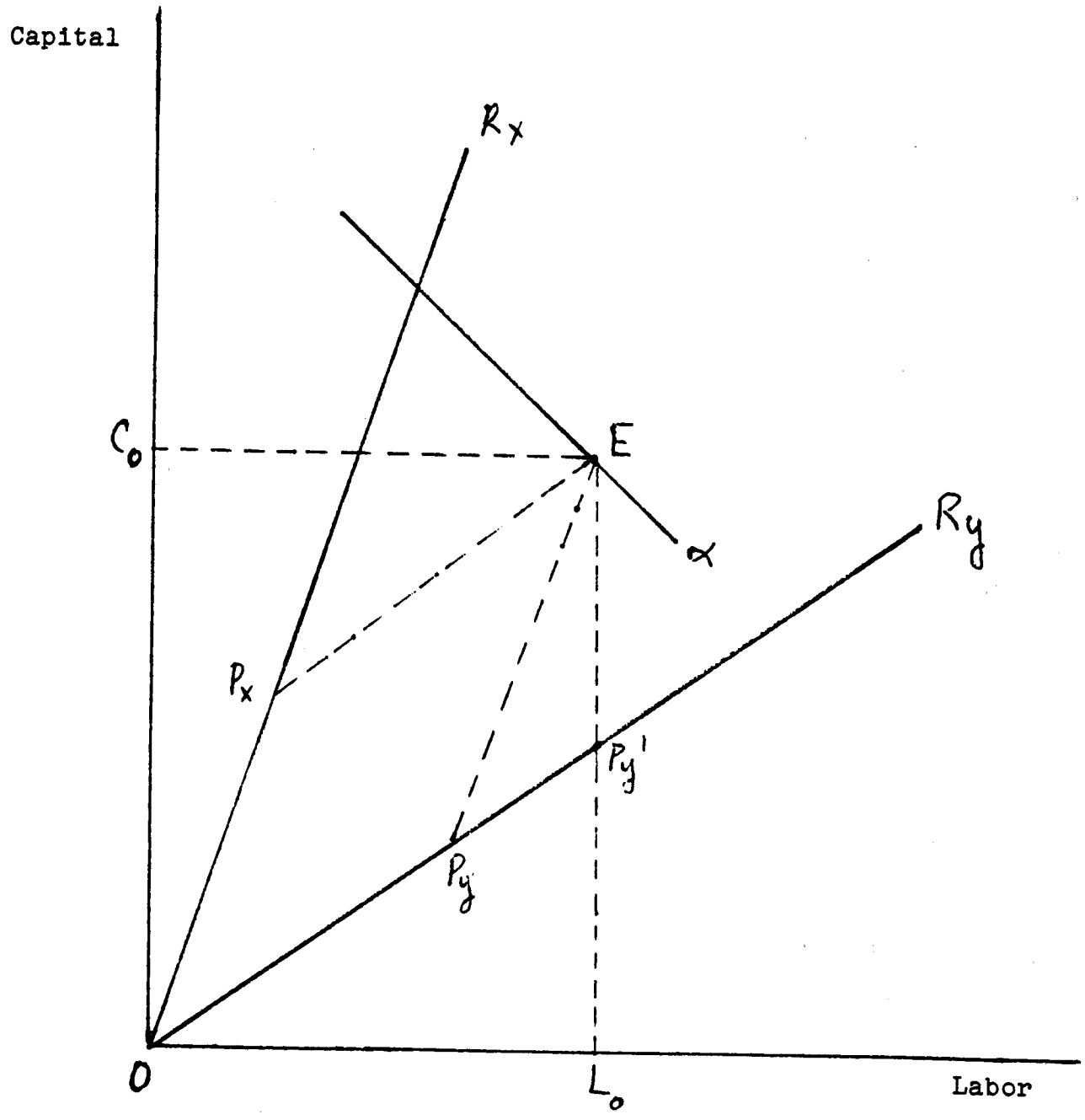

Figure 3

capital in X to be effective, it too must be supported by both residence principle and destination principle BTAs.

Finally, consider an equal ad valorem tax on capital in both sectors. With residence principle BTAs, capital will have no reason to leave the country; nor will it have any reason to shift from one sector to another. Hence, with a uniform tax on capital, residence principle income BTAs alone are sufficient to ensure that neither industry shuts down and that the tax base does not disappear. The tax, in fact, does not disturb the economy's initial equilibrium. With source principle BTAs, however, capital does have an incentive to leave the country. If labor is internationally immobile, the ensuing unemployment will drive down the relative wage until the after-tax return on capital is restored to the world level. This implies an increase in the pre-tax return on capital in both industries which requires an increase in the relative price of the capital-intensive good. But given fixed world commodity prices, the required price change is impossible, and hence the capital-intensive sector must close down. Full employment is thus inconsistent with positive output of the capital intensive industry when capital is internationally mobile. In this way, the burden of the income tax on capital is transferred to labor.

B. Specific Factor Model. It seems extreme that a corporate income tax, however small, would shut down the corporate sector when applied under either source principle income BTAs or origin principle goods BTAs, as asserted in the Heckscher-Ohlin-Samuelson model. The corporate income tax is widely applied by various nations under these same principles and the corporate sector persists in spite of substantial international capital mobility. This may be explained by the presence of specific factors.

Consider a neo-Ricardian model with two goods, corporate and noncorporate, and with labor specific to the corporate good and land specific to the noncorporate good. A third factor, capital, is used in the production of both goods and can move freely between the two sectors. The economy in question is small and open to both commodity trade and capital mobility.

The initial supply of domestic capital is given by OO' in Figure 4. The value of the marginal product of capital schedule in the corporate sector is shown by AB, and the value of the marginal product of capital schedule in the noncorporate sector is shown by DC. The initial equilibrium is at point E, with OT capital employed in the noncorporate sector and O'T capital employed in the corporate sector. The equilibrium return to capital is equalized at OK in both sectors.

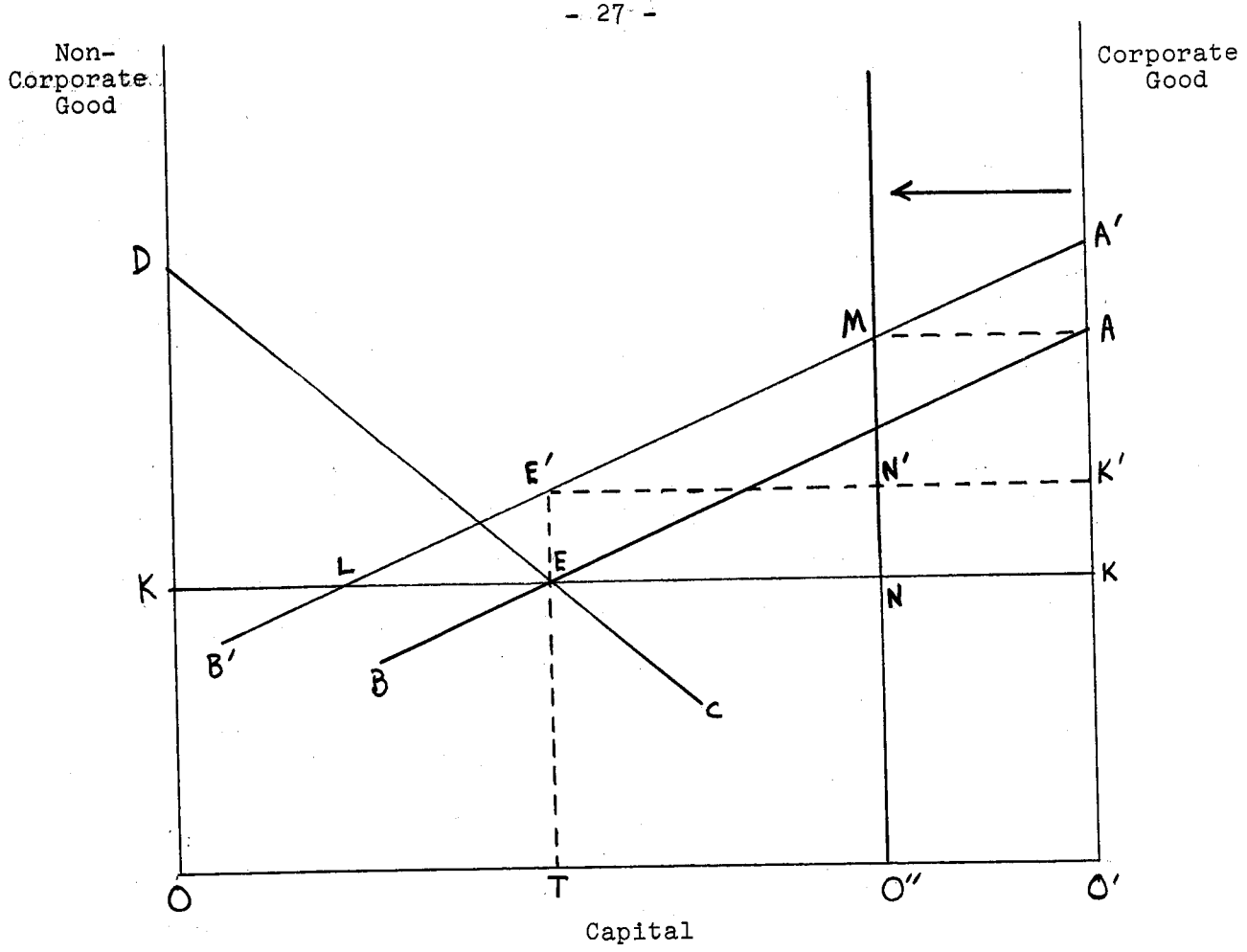
Non-
Corporate
Good
Corporate
Good
D
A′
M
A
E′
N′
K′
L
E
K
K
N
B′
B
C
O
T
O″
O′
Capital

Figure 4

The home country now imposes a tax at an ad valorem rate of K'K/O'K on capital in the corporate sector only. If source principle BTAs apply to this corporate tax, corporate capital will flee the taxing country. Capital goes abroad until the net of tax price of capital in the corporate sector again is restored to OK. This implies that the gross of tax price of capital is O'K' in the corporate sector, and to achieve this result, O'O" units of capital must leave the home country. As a result, OT units of capital are employed in the noncorporate sector at a net (equal to gross) return of OK; and O"T units of capital are employed in the domestic corporate sector at a net of tax price of OK and a gross of tax return of O'K'.

Given international capital mobility, the corporate income tax has reduced the size of the corporate sector but it has not completely eliminated it. Only at the tax rate AK/O'K would the corporate sector close down. Corporate tax revenues are E'N'NE, which is clearly less than E'K'KE--the initial tax base times the tax rate. Who pays this tax? Clearly corporate capital does not, since the net of tax price of corporate capital has not changed. Instead the tax is paid by labor, the specific factor in the corporate sector, out of its Ricardian rent, MNL, which is reduced to a post-tax level of MN'E'. Indeed, because of the existence of this rent, the tax affects neither the price received by

producers nor the price paid by consumers for the corporate good. It is borne fully by the specific factor of production in the corporate sector.

The same result emerges if instead of source principle BTAs, the corporate tax is levied with residence principle income BTAs. The equilibrium conditions that the net of tax return of capital be OK in both sectors and the gross of tax return of corporate capital be OK' imply that O'O" units of corporate capital are sent abroad, presumably by erstwhile domestic shareholders. Labor pays the full tax in this case as with source principle BTAs. Indeed the general conclusion that emerges from the specific factor model is that all taxes imposed on a given sector will be borne by the factor of production specific to that sector as if the tax had been placed directly on the rent of the specific factor.

C. Tradables and Home Goods. So far the discussion has concerned models in which both goods are tradables. Another outcome is reached when the country specializes in the production of one tradable and produces a home or nontraded good as well. The assumption of a nontraded good prohibits "goods for goods" trade, and instead compels a pattern of "factor services for goods" trade. Consider the situation illustrated in Figure 5. The commodity price ratio MN corresponds to equalized factor prices, the production point is P on the transformation curve TT, and the consumption point is C on the national income budget constraint line M'N'.

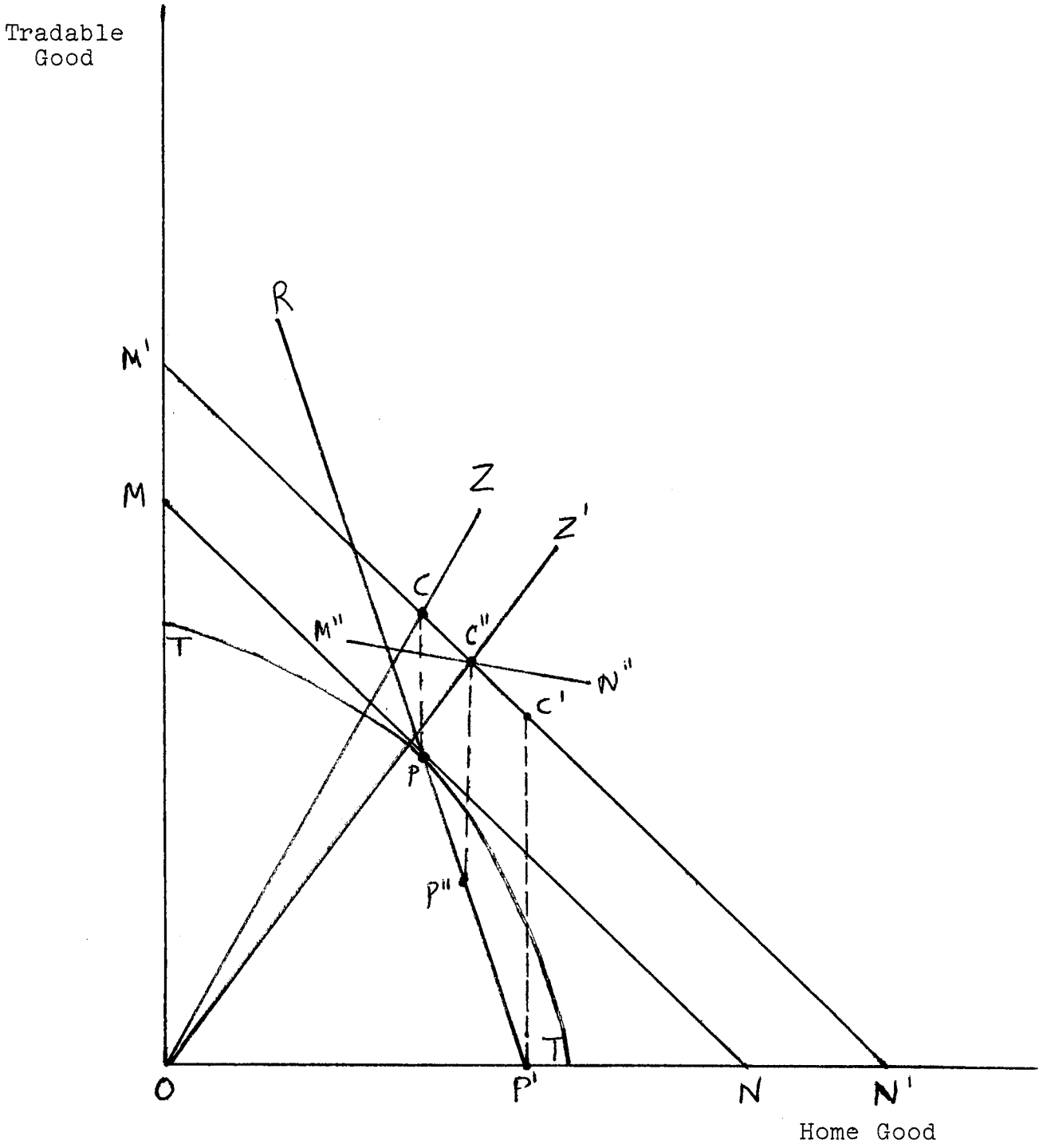

Figure 5

Consumption is sustained by an outflow of capital services that reconciles the production and consumption points by producing an inflow of interest payments equal to CP in terms of the tradable good.

From this initial equilibrium position, the government imposes an equal ad valorem tax on labor and capital employed in producing the tradable good only. With source principle BTAs, capital flees the home country to the extent necessary to shut down the tradable good industry. The production points from P to P' on the Rybczynski line RP' and interest payments equal C'P'. But this cannot be a position of final equilibrium since at the commodity prices given by the slope of M'N', the desired consumption point is C, not C'. The shut down of the tradable sector by capital flight implies an excess demand for the tradable good (excess supply of the home good) at prices M'N'. The consequent increase in the output of the tradable good and decrease in the output of the home good raises the after-tax price of capital, so that capital returns until the after-tax price of capital is equalized in both countries. Such equalization implies that the tax is passed forward to consumers through a higher relative price for the tradable good. With a higher price of the tradable, the homothetic consumption vector shifts from OZ to OZ' indicating C'' as the equilibrium consumption point. Interest receipts are C''P'' in terms of the tradable,

and the increase in the capital stock employed abroad by comparison with the initial equilibrium is measured by PP" along the Rybczynski line.

In terms of its implications for border tax adjustment policy, the analysis of a tradable and nontradable in a two-sector general equilibrium model gives the result that neither the principle of commodity nor income border tax adjustments is important.[13/] There is only one general equilibrium outcome possible, and this outcome is consistent only with the taxation of the uses of income stream. By contrast, there are two different general equilibrium outcomes possible in the Heckscher-Ohlin-Samuelson model with two tradables, and which result emerges depends upon whether the uses of income or the sources of income stream is taxed.

VI. FISCAL SOVEREIGNTY

"Fiscal Sovereignty" implies national control over budget size. Fiscal sovereignty problems are most likely to appear in a Heckscher-Ohlin-Samuelson world of traded goods and mobile goods. If factor services but not factor owners are mobile, a country can exercise control over the size of its budget only if it taxes the uses of income flow. A tax on the sources of income would be frustrated by the exportation of factor services and the consequent importation of factor income from abroad. But since the location of production is irrelevant if the tax base is income owned by residents, a "uses" tax can be avoided only if the factor owners themselves move. Assuming that movement is precluded by the national allegiance of factor owners, fiscal sovereignty over budget size requires either a tax on residents' income (a direct tax coupled with residence principle BTAs) or a tax on their consumption of goods (an indirect tax coupled with destination principle BTAs).

The conclusion that source taxation at different rates in different countries is not possible when factor services are mobile depends on the assumption that the marginal productivity of mobile factors is the same everywhere. This may not be the case for three reasons: first, technology may not be the same everywhere; second, even if technology is identical, full factor price equalization may not occur;[14/] and third, high-productivity may be a result of high taxation

(this can happen if the government spends the revenue in a way to increase factor productivity). High-productivity countries can exploit their advantage by charging higher source taxes than low-productivity countries without necessarily prompting factor service movement.[15/]

We have already noted that fiscal sovereignty is consistent with taxing the uses of income. This consistency rests upon the assumption that factor owners are immobile; however, if factor owners are mobile, border tax adjustments will have little effect in preserving a country's fiscal sovereignty. Unless the level of taxes is associated with a comparable level of fiscal benefits, taxpayers will be encouraged to seek a more hospitable fiscal environment. The only border "solution" to this problem involves restrictions on the mobility of capital and labor. A better solution would involve reexamination and modification of the domestic fiscal regime. The emigration of factor owners should be regarded as a symptom not a cause, of economic illness.

The potential mobility of factor owners is, of course, an empirical question that can only be settled by empirical analysis. But some speculation may be worthwhile. Suppose that most individuals have a special affinity for a particular culture, usually the culture of their birth, but perhaps another culture as well. If this "cultural affinity" is not an inferior good, the demand for it should be greater in richer countries than in poorer ones. This in turn implies

that factor owners in rich countries are likely to be less mobile in response to an inhospitable fiscal climate - an implication consistent with the combination of exceedingly high tax rates in certain wealthy countries, such as Sweden and the Netherlands, without the significant emigration of factor owners. This speculation suggests that redistributive tax policies can be most successfully pursued by a wealthy country with a specific cultural experience, and least successfully pursued (unless reinforced by strict capital controls and repressive emigration policies) by a poor country with a cultural experience that can be duplicated elsewhere.

FOOTNOTES

The authors are associated, respectively, with New York University and the U.S. Treasury Department. The views expressed are the opinions of the authors, and do not reflect the views of the associated institutions.

1/ See, for example, Harry Johnson and Mel Krauss, "Border Taxes, Border Tax Adjustments, Comparative Advantage and the Balance of Payments," Canadian Journal of Economics, v. 3, n. 4, November 1970; and James E. Meade, "A Note on Border-Tax Adjustments," Journal of Political Economy, v. 82, n. 6, September/October 1974.

2/ Income and commodity border tax adjustment principles are also examined by Carl S. Shoup, Public Finance, Chicago, Aldine Publishing Co., 1969, and Dieter Biehl, Ausfuhrland-Prinzip Einfuhrland-Prinzip und Gemeinsamer-Markt-Prinzip, Koln, Carl Heymanns Verlag, 1969.

3/ Richard A. Musgrave, The Theory of Public Finance, New York, McGraw-Hill, 1958.

4/ In fact, the dual principle amounts to the origin principle plus an import tariff, or the destination principle plus an export tax. A reverse dual principle, conceptually bizarre because it extends an open invitation to fiscal evasion, would exempt both imports and exports from domestic taxation.

5/ Associated with the differing trade effects of border tax policies are differing consequences for national welfare. The choice between destination and origin principles is the choice between departing from an optimum consumption pattern and departing from an optimum production pattern.

6/ These results reflect the shift in relative prices facing producers and consumers. A shift from the origin to the destination principle increases the relative price received by producers and paid by consumers for heavily taxed goods by comparison with lightly taxed goods.

7/ For present purposes, consumption of income is broadly defined to encompass any disposition of income by residents of the state, including the purchase of both consumption and investment goods.

8/ In fact, countries generally impose a limit on the foreign tax credit which is related to the domestic tax rate. The effect of these limitations is discussed later.

9/ A tax on capital inflows or outflows does not necessarily reduce potential welfare in the taxing country. Indeed, as R.W. Jones has demonstrated, such interference with factor service flows, when combined with an optimal tariff, can be a necessary condition for potential welfare maximization. This consideration, however, does not amount to a convincing argument for the limitation of foreign tax credits. The limitation of foreign tax credits may not correspond with the needs of an optimal interference policy, and, even if it does, the whole policy can only be supported on beggar-my-neighbor principles. R.W. Jones, "International Capital Movements and the Theory of Tariffs and Trade", Quarterly Journal of Economics, v. 81, n. 1, February 1967.

10/ If the corporate good was instead labor-intensive, the Rybczynski line would intersect TT from above, and a tax on capital in the corporate sector would paradoxically cause an inflow of capital from abroad to work in the noncorporate sector.

11/ The pioneering work of Robert Mundell should be mentioned at this point. Mundell demonstrated that, under the assumption of full factor price equalization and the mobility of capital services, a tax on commodity imports (a tariff) can have no effect on potential welfare in the tariff imposing country because imports completely dry up and the tax base disappears. By extension, though Mundell did not consider this case, a production tax on a given sector, or a partial factor tax in a given sector, closes down that sector but does not affect potential welfare in the tax-imposing country. See Robert Mundell, "International Trade and Factor Mobility," American Economic Review, v. 47, n. 3, June 1957.

12/ If good X were labor-intensive, capital would have to flow into the taxing country for sector X to shut down. This seemingly paradoxical result can be understood by noticing that capital would flow into production of untaxed good Y.

13/ The result is the same, but the reason is different in the specific factor model. There, the tax falls on the immobile resource under either the source or the origin principle.

14/ This has been the consistent position of Bertil Ohlin. See Bertil Ohlin, "Some Aspects of the Relationship Between International Movement of Commodities, Factors or Production and Technology," Nobel Symposium, The International Allocation of Economic Activity, Stockholm, June 1976.

15/ Conversely, low-productivity countries may be able to tax payments for the use of "atmospheric" factor services, such as technical expertise and patents imported from abroad, without chasing the indefinitely extensible "atmosphere" to another country.