

Indirect Taxation in an Integrated Europe: Is There a Way of Avoiding Trade Distortions without Sacrificing National Tax Autonomy?

Bernd Genser and Andreas Haufler
University of Konstanz

Peter Birch Sørensen
Copenhagen Business School

Abstract

The paper discusses the main arguments for destination- versus origin-based commodity taxation in the European Community's Internal Market. Destination-based solutions distort commodity trade in the Community because cross-border purchases by final consumers can only be taxed in the origin country. On the other hand, an origin-based general consumption tax is neutral in a European context and it can be combined with destination-based taxation in third countries in a non-distortionary way. Furthermore, it is shown that the introduction of capital mobility does not affect the neutrality of an origin-based consumption tax. Finally, the paper addresses the administrative and political implications of a switch to the origin principle in the European Community.

I. Introduction

In the literature on international taxation there has been a long standing

* Bernd Genser and Andreas Haufler: Fakultät für Wirtschaftswissenschaften, Universität Konstanz, Postfach 5560 D133, 78434 Konstanz, Germany. Peter B. Sørensen: Institute of Economics, Copenhagen Business School, Nansengade 19/5, 1366 Copenhagen K, Denmark. A prior version of this paper was presented at the Tel Aviv – Konstanz Conference in International Economics, 14-15 October 1993. We thank Sijbren Cnossen, Michael Keen, Friedrich Schneider and two anonymous referees for helpful comments.

debate on the relative merits of the origin principle and the destination principle of commodity taxation.¹ Under the origin principle, goods are taxed in the country where they are produced, whereas the destination principle implies taxation in the country of final consumption.

While the origin principle has found several supporters in academic circles, the destination principle has so far won out in practice and is also the commodity tax principle codified by the GATT. However, because administration of the destination principle has traditionally relied on so-called border tax adjustments, the recent years have witnessed a renewed interest in the origin principle. The debate has focused on the European Community where internal border controls have been abolished in 1993. However, with the recent or planned introduction of value-added taxes in countries as diverse as Canada, Argentina, India, and Vietnam – many of them federal economies – the appropriate method of taxing goods that cross fiscal jurisdictions seems to be of increasing relevance in other parts of the world as well.

Against this background, the present paper discusses the possibilities of accommodating cross-country differentials in indirect tax rates without distorting international resource allocation in a world without economic borders. In discussing this issue, we attempt to provide a brief and non-technical overview of the existing knowledge of the allocative effects of alternative commodity tax principles, and to analyze within a simple framework whether conventional neutrality results based on pure trade models will carry over to a world with international capital mobility.²

We start out in section II.A by briefly considering why the neutrality

1. Some of the classical references on this topic are the Tinbergen Committee [1953], the Neumark Committee [1963], Shibata [1967], and Biehl [1969]. More recent contributions include, among others, Whalley [1979 and 1981], Berglas [1981], Pefekoven [1983], Andel [1986], Cnossen and Shoup [1987], Siebert [1990], Sinn [1990], Krause-Junk [1990 and 1992], Haufler [1992], Bovenberg [1994] and Lockwood, de Meza and Myles [1994]. The close links that exist to the taxation of international factor flows are stressed, for example, by Sørensen [1990], Frenkel, Razin and Sadka [1991, Ch. 2], Genser [1992], and Keen [1993].

2. Throughout this paper, we will distinguish sharply between “allocative neutrality” which implies the absence of relative price distortions, and “distributional neutrality” which refers to the absence of income effects. Most of the discussion will focus on issues of allocative neutrality.

properties of the destination principle cease to hold under the conditions of the Internal Market where direct cross-border consumer trade will effectively be taxed under the origin principle. Sections II.B and II.C then present the argument that a switch to a suitable variant of an origin-based VAT in Europe is able to eliminate the distortions to international trade in a single market without border controls. Section II.D proceeds to discuss how domestic tax wedges such as differentiated tax rates on different commodities may cause international trade distortions and how such distortions might be neutralized under an origin-based commodity tax regime.

In section III the standard framework of most of the existing literature on international commodity taxation is extended by switching from pure trade models to models with international factor mobility. A simple intertemporal model is developed to investigate whether a general single-rate VAT remains non-distortionary in the presence of international capital flows. We find that an origin-based consumption tax will indeed lead to an efficient international resource allocation even with mobile capital, provided prices or exchange rates are flexible.

While our theoretical analysis thus poses the origin principle in a rather favorable light, section IV briefly considers some practical and administrative arguments which tend to favour the destination principle over the origin principle. Finally, we sum up our main conclusions in section V.

II. Commodity Taxes in Standard Trade Models

A. Destination Principle

To discuss the effects of alternative tax principles in models with commodity trade only, we initially assume an “idealized” value-added tax, which is levied at a uniform rate on all produced goods and services while factors of production, notably labor, are in fixed supply.³ With fixed factor supplies it is intuitive that a general commodity tax is equivalent to a lump sum tax in a closed economy. Furthermore, the lump sum character of the tax is main-

3. These assumptions will be relaxed in section II.D.

tained in an open economy when all internationally traded goods are taxed under the destination principle. Let p_i^k be the producer prices of an arbitrary number of final consumer goods i , in countries $k \in [A, B]$ and let t^k be the general commodity tax rate in country k . Under the destination principle, the tax rate of the importing country applies equally to domestic and foreign products so that, from the perspective of country A 's consumers, the following arbitrage condition must hold:

$$(1 + t^A)p_i^A = (1 + t^A)p_i^B \Rightarrow p_i^A = p_i^B \quad \forall i \quad (1)$$

Thus, in the absence of transportation costs, consumer arbitrage will equalize producer prices across countries, and relative producer prices will be left undistorted, coinciding with relative consumer prices. Furthermore, changes in the national VAT rate will not shift tax revenues between countries because the tax base under the destination principle is the value of domestic consumption. Together, these constitute the well-known neutrality properties of the destination principle.

The problem in the European Community's Internal Market is, however, that the destination principle cannot be administered for all consumer goods. In the absence of border controls, cross-border purchases by final consumers can only be taxed in the country of origin.⁴ While, *e.g.*, Cnossen [1990, p. 477] holds that "(...) the abolition of frontier controls may have less effect on revenue and resource allocation than is generally thought", others consider these effects to be more severe. They argue that if the destination principle is maintained for trade between registered traders, as is the case under both the transitional deferred payment system adopted by the Community until (at least) the end of 1996, and the international tax credit system envisaged for the period thereafter, a mixed tax principle emerges

4. The Community has, however, taken several measures to reduce the scope of origin taxation in the Internal Market: (a) purchases by tax-exempt entities in excess of ECU 35,000 are taxable as self supplies in the member state of destination, (b) mail-order firms with intra-Community exports exceeding 1 million ECU per annum are legally required to charge and remit the VAT of the member state of destination, (c) cars not purchased through registered dealers are taxed in the destination country upon registration.

which does not have the desirable neutrality properties of the destination principle (Sinn [1990]; Krause-Junk [1990]).⁵ Similar effects can be expected from the increasing volume of intra-Community trade in services, which in many cases must be taxed in the country of origin. To show these effects let good 1 be a good (or service) purchased directly by final consumers whereas good 2 denotes a good purchased by VAT-registered traders. In the absence of transportation costs, arbitrage yields

$$(1 + t^A)p_1^A = (1 + t^B)p_1^B, \quad (2)$$

$$p_2^A = p_2^B$$

so that for $t^A \neq t^B$ relative producer prices in the two countries differ and trade is distorted under the tax regime chosen by the Community.

Tax bases in each country also differ from the case with border controls, redistributing tax revenues from the importer to the exporter of the good which is purchased through cross-border shopping and is thus taxed in the country of origin. This issue is most serious when the possibility of (legal and illegal) tax avoidance schemes is taken into account.⁶ If the effect on tax revenues induced by this kind of arbitrage activities is sufficiently strong, policymakers in each country have an incentive to lower the domestic tax rate in order to attract foreign cross-border shopping and increase the national tax base (cf. Sinn [1990]).

5. Under the deferred payment system, border tax adjustments are maintained despite the abolition of border controls and the zero-rating of exports is based on the proof that goods have been sold to a trader registered in another member state. Under the international tax credit system, the tax liability for imports is based on the origin country's tax rate but the recouping effect of the tax credit at subsequent processing stages ensures that the effective tax rate is that of the destination country. The economic effects of the deferred payment and the international tax credit system are thus equivalent if, under the latter scheme, a clearing mechanism restores the allocation of tax revenues according to the countries' final consumption (cf. Cnossen [1983], and Haufler [1992], pp. 251-253).

6. This may occur through commercial "carriers" providing re-import services or through mail order firms which are split into separate legal entities, thus avoiding the requirement to charge the VAT rate of the destination country (cf. Sinn [1990] and Krause-Junk [1990], pp. 258-261).

B. The General Origin Principle

Given the difficulties of administering a general destination principle in the European Internal Market, there has been a renewed interest in the question whether the Community should switch to the origin principle for taxing its internal trade. Under the origin principle, goods bear the tax rate of the producer country, and for any good i , arbitrage thus yields

$$(1 + t^A)p_i^A = (1 + t^B)p_i^B \quad \forall i \quad (3)$$

Clearly, it is crucial for the allocative neutrality of a general origin-based consumption tax that condition (3) holds for *all* categories of goods. While this is fairly obvious for final consumer goods it is less obvious for internationally traded intermediate goods and capital inputs since these purchases are deductible from the base of a value-added tax of the consumption type. To ensure that (3) is indeed enforced by arbitrage for inputs as well as outputs the origin-based VAT must be administered by an international subtraction method or by a notional tax credit method (*cf.* Cnossen and Shoup [1987], p. 71 and Krause-Junk [1990], pp. 262-264). The exposition here will focus on the latter scheme.

Under the notional tax credit method, for a producer in country A purchasing intermediate inputs from a domestic supplier there is no difference from the conventional tax credit method. If he buys inputs I at a producer price of p_I^A and sells final output C at a producer price of p_C^A he would have a VAT bill of

$$VAT = t^A p_C^A C - t^A p_I^A I, \quad (4)$$

and would earn a net cash flow of

$$p_C^A(1 + t^A)C - p_I^A(1 + t^A)I - VAT = p_C^A C - p_I^A I. \quad (5)$$

However, if the producer were to purchase his intermediate inputs from a supplier in country B at a tax-inclusive price of $p_I^B(1 + t^B)$, the notional credit method requires that this purchase be treated for VAT-purposes as if it had borne the domestic rate t^A rather than the foreign rate (hence the term "notional"). The tax credit is calculated by applying the domestic tax rate to

the gross-of-tax import expenditure $p_I^B(1+t^B)I$, deflated by the domestic tax factor $(1+t^A)$, and the domestic VAT liability becomes

$$VAT = t^A p_C^A C - t^A p_I^B \frac{(1+t^B)}{(1+t^A)} I. \quad (6)$$

implying that the producer's net cash flow is equal to

$$p_C^A(1+t^A)C - p_I^B(1+t^B)I - VAT = p_C^A C - p_I^B \frac{(1+t^B)}{(1+t^A)} I. \quad (7)$$

Comparing equations (5) and (7), we see that producers will not be indifferent between purchasing their inputs at home or abroad, unless the condition $p_I^A(1+t^A) = p_I^B(1+t^B)$ holds for all intermediates and capital goods. Thus, under the notional credit method, condition (3) will indeed be enforced for all goods by international arbitrage.⁷ Therefore, *relative* producer and consumer prices are unaffected by international differences in tax rates and the international pattern of production will be efficient under a general origin-based consumption tax. In each country, producer prices and thus factor returns fall by the level of the domestic tax, implying a real devaluation in the high-tax country. Consumers are compensated for the lower factor incomes through the lump sum government transfers financed by the consumption tax. Therefore, no income effects arise and the general origin principle is equivalent to the destination principle in a setting with commodity trade only. The sensitivity of these results to the opening of international factor markets will be analyzed in section III.

7. Alternatively, an origin-based value-added tax can be administered through the international subtraction method (e.g. Sinn [1990], p. 496). Under this method gross-of-tax imports would be deducted from the tax base and the VAT liability would be calculated as

$$VAT = \frac{t^A}{(1+t^A)} [p_C^A(1+t^A)C - p_I^B(1+t^B)I],$$

where the tax rate is discounted by the domestic tax factor to express it as a percentage of consumer prices. This reduces to equation (6), demonstrating that the notional tax credit and the international subtraction method lead to identical arbitrage conditions. A brief discussion of the administrative differences between these two schemes of origin taxation is given in section IV.

C. The Restricted Origin Principle

The above discussion has been restricted to a two-country setting, which has ignored trade relations with non-member states. It is obvious that the neutrality of the origin principle carries over to a many-country world when the origin principle is applied worldwide. In current practice, however, the destination principle is the general scheme of international commodity taxation, which is also implicitly codified by GATT rules. Since non-EC countries have no motive to move away from the destination principle, a worldwide switch to the origin principle is beyond the reach of the European Community and is therefore hardly a realistic alternative. In the policy debate and in the academic literature it has therefore traditionally been assumed that the feasible alternative from an EC perspective is the *restricted origin principle* where intra-Community trade is taxed in the country of production but all trade between EC members and the rest of the world is taxed in the destination country.

To discuss the role of intra-Community tax differentials under the restricted origin principle, assume a trade structure where A and B are the members of a tax union while country C represents the rest of the world. Country A exports good 1 to both other countries, country B exports good 2, and country C exports good 3. Arbitrage equalizes consumer prices in the trading countries if an international transaction is taxed under the origin principle. If the destination principle is applied instead, international differences in tax rates are irrelevant for the choice between imported and domestically produced goods and producer prices are equalized between the trading nations. The following set of arbitrage conditions must then hold in equilibrium:

$$p_1^A = \frac{(1+t^B)}{(1+t^A)} p_1^B = p_1^C$$

$$\frac{(1+t^A)}{(1+t^B)} p_2^A = p_2^B = p_2^C,$$

$$p_3^A = p_3^B = p_3^C.$$

Forming relative prices, these equations imply that

$$\frac{p_1^A}{p_3^A} = \frac{(1+t^B)}{(1+t^A)} \frac{p_1^B}{p_3^B} = \frac{p_1^C}{p_3^C},$$

$$\frac{(1+t^A)}{(1+t^B)} \frac{p_2^A}{p_3^A} = \frac{p_2^B}{p_3^B} = \frac{p_2^C}{p_3^C}. \quad (8)$$

Thus, unless tax rates are harmonized within the union, relative producer (and consumer) prices will differ both within the union and between union countries and the rest of the world, and international trade will therefore be distorted (*cf.* Berglas [1981], p. 382).

Furthermore, two routes of trade deflection arise under the restricted origin principle when tax rates differ between union countries: consumers in the high-tax country have an incentive to channel their imports from the rest of the world through the low-tax union partner whereas producers in the low-tax country receive higher tax rebates if they export to the rest of the world via a subsidiary in the high-tax union country (Shibata [1967], p. 212). When transaction costs for deflected trade are negligible (or linear but lower than the intra-Community tax differential) trade is fully deflected and tax collections in the high-tax country will be zero (Georgakopoulos and Hitiris [1992], pp. 119-121).

Even if trade deflection can be controlled by tax authorities, tax revenues are redistributed from the country which runs a deficit in its bilateral trade balance with the union partner to the country with an intra-union trade surplus (Berglas [1981], pp. 383-385). By lowering its tax rate, each of the union countries can systematically improve its intra-union trade balance and expand the domestic tax base. Therefore, a process of downward tax competition becomes a possible scenario under the traditional version of the restricted origin principle, which has been discussed so far (*cf.* Haufler [1994]).

However, as recently demonstrated by Lockwood, de Meza and Myles [1994], it is possible to combine the destination principle and the origin principle in a non-distortionary way: EC members could apply an origin-based VAT for trade with *all* their trading partners (*i.e.*, tax all exports and exempt all imports) whereas non-EC countries employ a destination-based VAT (*i.e.*, exempt exports to and tax imports from both EC and non-EC countries). A general tax principle is then applied from the perspective of each

country and the neutrality properties of the worldwide destination and origin principles carry over to this international tax scheme.⁸

Since EC countries levy no tax on imports, this solution implies that exports from the rest of the world to each of the union countries remain tax-free. Arbitrage conditions are thus given by

$$(1 + t^A)p_i^A = (1 + t^B)p_i^B = p_i^C \quad \forall i \in [1, 2, 3]. \quad (9)$$

On the other hand, exports from EC member states to the rest of the world are taxed in *both* the exporting and the importing country since the rest of the world applies a uniform tax on both imported and domestically produced goods. Consumer prices in country C are thus given by

$$(1 + t^C)p_i^C = (1 + t^C)[(1 + t^A)p_i^A] = (1 + t^C)[(1 + t^B)p_i^B] \quad \forall i \in [1, 2, 3] \quad (10)$$

which reduces to (9) because the tax factor $(1 + t^C)$ cancels out. Hence, relative producer (and consumer) prices will be unaffected by taxes in all parts of the world.

While the neutrality property of this scheme may not be intuitive at first sight, its economic rationale is fully in line with our earlier discussion: the double taxation of EC exports to the rests of the world ensures that factor returns in each member state fall by the full amount of the domestic tax so that border prices are equalized worldwide.⁹ Since country C levies VAT on both domestic and foreign goods, consumer prices remain unchanged and the import decision is not distorted after a switch to the new tax scheme. The same is true in EC countries where the fall in factor prices equalizes the consumer prices of domestically produced goods on the one hand and of untaxed imports from EC partners and the rest of the world on the other. Real income effects also do not arise because the tax base for each union

8. Lockwood, de Meza and Myles [1994, p. 315] label this tax scheme “non-reciprocal restricted origin principle” in contrast to the “reciprocal restricted origin principle” pioneered by Shibata [1967]. The crucial difference is that union countries tax-exempt their exports to, and tax their imports from, third countries under Shibata’s version of the restricted origin principle whereas these border tax adjustments are not made under the tax principle proposed by Lockwood, de Meza and Myles.

9. Border prices refer to the price of a good when it enters the destination country, prior to the imposition of VAT or other duties.

country is the value of domestic production, which equals the value of domestic consumption by the condition of multilaterally balanced trade.

D. The Role of Domestic Distortions

The above discussion has abstracted from existing domestic distortions which clearly play an important role in the indirect tax systems of EC member states. Two types of distortions have to be distinguished: if factor supplies – notably labor – are endogenous, a general commodity tax distorts the individual's trade-off between the consumption of goods and leisure. Under both the general destination and the general origin principle the disposable real wage rate (*i.e.*, the price of leisure relative to the aggregate consumption good) falls as a result of the general commodity tax, and this tax wedge is larger in the high-tax country. International tax differentials will thus lead to cross-country differences in the marginal rate of substitution between leisure and commodity consumption, but they will *not* prevent the cross-country equalization of relative commodity prices and thus will not distort import and export decisions at the margin (*cf.* Frenkel, Razin, and Sadka [1991], p. 39).

The second type of distortions concerns non-uniform commodity taxation, implying that different groups of commodities are taxed at different rates. A split VAT rate structure can be observed in most EC countries and a reduced rate is still permitted on a specified list of goods in the Internal Market, just as excise taxes continue to play an important role in the tax structure of EC member states. Again, a domestic distortion is introduced but the distortion now applies to traded goods as well if tax rates differ between countries. Under the destination principle, relative producer prices in equation (1) are still equalized across countries, even if country A levies different tax rates on goods 1 and 2. Therefore, even though marginal rates of substitution differ across countries, world output is still efficiently produced if the destination principle is applied. In contrast, it can be inferred from the arbitrage conditions (3) that relative producer prices are distorted by non-uniform national VAT structures if tax rates differ across countries and the origin principle is applied (Frenkel, Razin and Sadka [1991], pp. 35-39).

By the aggregate production efficiency theorem (Diamond and Mirrlees

[1971]), the equalization of marginal rates of transformation across countries is a necessary condition for a second-best optimum so that the destination principle is to be preferred over the origin principle in this second-best framework.¹⁰ Furthermore, the destination and the origin principle will provide different incentives for strategic tax setting if taxation is non-uniform (Lockwood [1993]).

It can be shown, however, that harmonizing the *relation* between the tax-inclusive prices of the goods bearing the standard and the reduced VAT rates, respectively, is sufficient to restore aggregate production efficiency under the origin principle (Fратиanni and Christie [1981], pp. 414-419). Let t^A and t^B be the standard VAT rates in the two countries, which are applied to good 2. The tax-inclusive price of good 1, which bears the reduced tax rate, should then be $h(1 + t^k)p_1^k$ in each country where the fraction h must be identical across countries. Arbitrage conditions are then given by

$$\begin{aligned} h(1 + t^A)p_1^A &= h(1 + t^B)p_1^B, \\ (1 + t^A)p_2^A &= (1 + t^B)p_2^B, \end{aligned} \tag{11}$$

and it is obvious that relative producer prices are equalized internationally when these conditions are met.¹¹

Our discussion of international commodity tax principles in a setting with international factor immobility may therefore be summarized as follows: under the current mixed tax principle, intra-European trade will be distorted unless EC members are willing to harmonize both the level and structure of indirect tax rates. On the other hand, if European countries unilaterally adopt a consistent origin principle in their trade with both EC members and non-members, and if they are still willing to harmonize their *structures* of indirect taxation (a rather strong requirement indeed), each country can choose its tax *level* independently without interfering with free trade.

10. The same argument applies to the choice between the residence principle and the source principle of factor taxation; see Frenkel, Razin, and Sadka [1991, pp. 100-105].

11. The illustrative example used by Frатиanni and Christie [1981, p. 415] assumes that commodity tax rates in country *A* are 8% and 20%, respectively, as compared to 5.3% and 17% in country *B*. This implies a common value for h equal to 0.9 in both countries.

One limitation of the literature surveyed above is that it tends to abstract from international factor mobility despite the fact that factors (in particular capital) are becoming increasingly mobile internationally. The following section will therefore investigate whether the neutrality of the origin principle carries over to a more realistic setting with international capital mobility.

III. Introducing International Capital Mobility

A. A Simple Two-Period Model with Commodity Taxes

We consider a small open economy producing a single internationally traded good which is used for consumption as well as investment.¹²

This domestic good is a perfect substitute for foreign goods, so under the origin principle commodity price arbitrage implies that the domestic producer price p will be governed by

$$p(1+t) = Ep^*(1+t^*) \equiv 1, \quad (12)$$

where t and t^* are the domestic and the foreign commodity tax rates, p^* is the foreign-currency price of foreign goods, E is the exchange rate, and we have normalized the foreign tax-inclusive price level at unity. Recall from our discussion of equation (3) above that this arbitrage condition holds for both consumer and capital goods if either the notional credit method or the international subtraction method are applied under an origin-based consumption tax.

The representative domestic consumer lives for two periods and maximizes a well-behaved utility function of the form

$$U = U(C_1, C_2), \quad (13)$$

where C_1 is consumption during the first period of his life, and C_2 is consumption during the second period. The consumer is the owner-manager of a domestic competitive firm. At the beginning of period 1, this firm is

12. Note that the one-good assumption made here is not incompatible with international trade in commodities. Rather, the one-good assumption implies that commodity trade nets out in the aggregate when international capital flows are absent.

endowed with a pre-determined, non-depreciable initial stock of capital K_1 , but during period 1 the consumer can spend part of his earnings on physical investment (or sell part of his initial capital stock) so that he may enter period 2 with a different capital stock K_2 .

On the other hand, since the consumer's life ends after period 2, he may finance part of his consumption during this period by the proceeds from the sale of his capital stock at the end of the period. Production in any period is a function of the physical capital stock existing at the beginning of the period and of the consumer's fixed labor supply, which is subsumed in the production function $f(\cdot)$. In addition to his earnings from the firm, the consumer receives a lump sum government transfer T in each period. In the *absence* of international capital mobility, the consumer must thus maximize (13) subject to the two budget constraints

$$p(1+t)C_1 = [p f(K_1) - p(K_2 - K_1)] + T_1, \quad (14)$$

$$p(1+t)C_2 = [p f(K_2) + pK_2] + T_2, \quad (15)$$

where the terms in square brackets represent the net cash flows from the firm after payment of commodity taxes. The term $p(K_2 - K_1)$ in (14) indicates expenditure on physical investment during period 1. This is valued at producer prices because investment expenditure is deductible from the base of a general origin tax of the consumption type [*cf.* equation (5)]. Similarly, the term pK_2 in equation (15) is the revenue from the sale of the capital stock at the end of period 2. Since this revenue is taxable, the net cash flow to the consumer is again determined by the producer price p . Note that even though only the domestic producer price enters the budget constraint (14), the arbitrage condition (12) ensures that (14) will in fact hold regardless of whether the firm purchases its capital goods from domestic or foreign suppliers, given that VAT liabilities are calculated according to the notional credit method or the international subtraction method described in section II.B.

To complete the description of our simple model, we must specify the lump sum government transfers which are financed by the commodity tax. As mentioned in section II.B, an origin-based commodity tax of the consumption type will exempt investment expenditure but tax the proceeds of the sales of all goods, including investment goods, so the tax revenue and

hence the transfer payments in the two periods will be given by

$$\begin{aligned} T_1 &= t[p f(K_1) - p(K_2 - K_1)], \\ T_2 &= t[p f(K_2) + pK_2]. \end{aligned} \quad (16)$$

Let us first employ the model to reproduce the conventional neutrality properties of an origin-based general commodity tax in the absence of capital mobility. Maximizing the utility function (13) with respect to C_1 , C_2 , and K_2 , subject to the two budget constraints (14) and (15), and using (16) to eliminate T_1 and T_2 from the resulting first-order conditions,¹³ one finds that the consumer's optimum conditions in the absence of capital mobility can be written as

$$\frac{\partial U/\partial C_1}{\partial U/\partial C_2} = 1 + f'(K_2), \quad (17)$$

$$C_1 = f(K_1) - (K_2 - K_1), \quad C_2 = f(K_2) + K_2. \quad (18)$$

Since the tax rate does not appear anywhere in these equations, it follows that the tax is completely neutral, having neither substitution nor income effects on resource allocation. Equation (17) reproduces the standard Pareto condition for a first best optimum that the marginal rate of substitution between consumption in the two periods must equal the marginal rate of transformation, while equations (18) simply restate the economy's overall resource constraints for the two periods.

We turn now to the case where an international capital market exists. In the *presence* of international capital mobility, the consumer may use part of his cash inflow in period 1 to purchase an internationally traded financial asset S which pays the exogenous world interest rate r^* in period 2. Allowing for the resale of this asset at the end of period 2, the consumer then faces the constraints

$$p(1 + t)C_1 + S = [p f(K_1) - p(K_2 - K_1)] + T_1$$

13. Note that the transfer payments in each period are exogenous from the viewpoint of the representative consumer so that their values must be inserted only *after* the optimization problem has been solved.

$$p(1+t)C_2 = [pf(K_2) + pK_2] + T_2 + (1+r^*)S.$$

Eliminating S yields

$$p(1+t) \left[C_1 + \frac{C_2}{(1+r^*)} \right] = pf(K_1) - p(K_2 - K_1) + T_1 + \frac{[pf(K_2) + pK_2 + T_2]}{(1+r^*)}. \quad (19)$$

When he has access to an international capital market, the consumer may reallocate his consumption over time along the international capital market line, and his budget equations collapse into a single intertemporal constraint stating that the present value of his (tax-inclusive) consumption expenditure must equal the present value of the payments received from the firm and from the government.

The consumer now maximizes the utility function (13) with respect to C_1 , C_2 , and K_2 , subject to the intertemporal budget constraint (19), recalling from (12) that $p(1+t)=1$. Again, we may use (16) to eliminate T_1 and T_2 from the first-order conditions, and we then find that the equilibrium of our market economy will be characterized by the optimum conditions

$$\frac{\partial U / \partial C_1}{\partial U / \partial C_2} = 1 + r^*, \quad f'(K_2) = r^*, \quad (20)$$

$$C_1 + \frac{C_2}{(1+r^*)} = f(K_1) - (K_2 - K_1) + \frac{[f(K_2) + K_2]}{(1+r^*)}. \quad (21)$$

Again we see that the tax rate has dropped out from the equilibrium conditions, implying complete neutrality of the origin principle under international capital mobility as well. According to (20) the consumer will reallocate consumption over time until his marginal rate of substitution between present and future consumption equals the (constant) marginal rate of transformation $(1+r^*)$ offered by the international capital market, and the firm will carry physical investment to the point where the marginal product of capital equals the exogenous return on international financial assets. Equation (21) shows that the value of consumption equals the value of output, net of investment, in present value terms. Therefore, it is intuitive that a switch to the origin principle has no effects on the international distribution of income.

We emphasize, however, that the neutrality of the origin principle depends crucially on the assumption that the general commodity tax is of the consumption type. In contrast, if the commodity tax is of the *income* type, investment expenditure is not deductible from the tax base and the sale of investment goods is not included in the base. The price of capital goods is then given by the *consumer* price of output, and the consumer's budget constraints (14) and (15) change to

$$p(1+t)C_1 = [p f(K_1) - p(1+t)(K_2 - K_1)] + T_1 \quad (22)$$

$$p(1+t)C_2 = [p f(K_2) + p(1+t)K_2] + T_2. \quad (23)$$

Tax revenues are altered accordingly and (16) changes to

$$T_1 = t p f(K_1),$$

$$T_2 = t p f(K_2). \quad (24)$$

In the absence of capital mobility, maximizing (13) subject to the budget constraints (22) and (23) yields the following first-order condition for K_2 :

$$\frac{\partial U / \partial C_1}{\partial U / \partial C_2} = 1 + \frac{f'(K_2)}{(1+t)}. \quad (25)$$

In contrast to equation (17), the commodity tax rate enters the first-order condition (25), demonstrating that intertemporal resource allocation is distorted by a commodity tax of the income type. This result is familiar from the analysis of an income tax: since savings (investment) cannot be deducted from the tax base in period 1 while the return to savings (investment) is taxed in period 2, future consumption is discriminated by the tax and the marginal rate of substitution (of C_2 for C_1) will fall below the marginal rate of transformation. It is easy to show that this distortion is also present under an origin-based commodity tax of the income type when international capital mobility is introduced.

Of course, our model can also be utilized to investigate the effects of a destination-based general consumption tax. In that case, goods arbitrage will imply that

$$p(1+t) = E p^*(1+t) \Rightarrow p = E p^* \equiv 1, \quad (26)$$

where we may now set the foreign producer price at unity. Both the temporal budget constraints (14)–(15) and the intertemporal constraint (19) will remain unaffected by the switch from an origin-based to a destination-based consumption tax, but tax revenues and hence transfer payments will be given by

$$T_1 = t C_1, \quad T_2 = t C_2. \quad (27)$$

Following an optimization procedure similar to the one indicated above, the reader may easily convince herself that a destination-based general consumption tax likewise implies complete neutrality, whether capital is mobile or not. As in the case of pure commodity trade, uniform consumption taxes levied under the destination and the origin principle are equivalent in this two-period setting with capital mobility.

B. Discussion of Long Run Efficiency

At a closer look, it is not really surprising that the neutrality of an origin-based consumption tax survives the introduction of capital mobility. International capital mobility simply allows an intertemporal reallocation of consumption, but when the general consumption tax rate is constant over time, it will not affect the relative price of present versus future consumption and hence will not influence the economy's saving-investment balance. To put it differently, consumption in different periods may be seen as separate commodities which are taxed at a uniform rate when the commodity tax rate is time-invariant, and the consumer's intertemporal budget constraint is then equivalent to a static budget constraint linking the consumption of the two commodities 'present consumption' and 'future consumption'. With this translation of the consumer's intertemporal problem, it should be intuitively clear that the neutrality of the origin principle derived in a static many-commodity setting without capital mobility will carry over to the intertemporal setting with international borrowing and lending.

Notice that the validity of this result does not hinge on our small-economy assumption. In a general equilibrium model of two large, interdependent open economies, the optimum conditions derived above would still characterize the equilibrium of each individual country, and one would only have to add the overall resource constraint for the world economy as a whole

(which would obviously not include any taxes) to close such a model. Notice also that our aggregation of all goods into a single commodity is quite innocent, as long as trade in all categories of goods (including intermediates and capital goods) enforces the general arbitrage condition (3). In that case all producer prices of inputs and outputs will adjust proportionally to a change in the general commodity tax rate. As we have seen, fulfilment of (3) for all types of goods requires that a multi-stage tax like the value-added tax be administered according to either the notional credit method or the international subtraction method.

Some further insights can be obtained by looking at the results derived from the above two-period model in an alternative way: in long run equilibrium, no capital flows occur and the current account of each country must be balanced. If the value of net foreign assets measured in domestic currency is denoted by V , and if one assumes that the physical quantities of exports X and imports M depend on the relative price of domestic goods (thereby allowing for imperfect substitutability of traded goods), the current account equation for the domestic economy under the origin principle will read

$$p(1+t)X\left(\frac{p(1+t)}{Ep^*(1+t^*)}\right) - Ep^*(1+t^*)M\left(\frac{p(1+t)}{Ep^*(1+t^*)}\right) + r^*V = 0.$$

Division by $Ep^*(1+t^*)$ yields

$$\frac{p(1+t)}{Ep^*(1+t^*)}X\left(\frac{p(1+t)}{Ep^*(1+t^*)}\right) - M\left(\frac{p(1+t)}{Ep^*(1+t^*)}\right) + \frac{r^*V}{Ep^*(1+t^*)} = 0, \quad (28)$$

In the absence of capital mobility we have $V = 0$. It is then obvious that if relative producer prices p/Ep^* flexibly adjust by the factor $(1+t^*)/(1+t)$, relative consumer prices and hence trade flows will be unaffected by taxes, and trade will still be balanced despite international differences in the origin-based commodity tax rate.

With capital mobility, where V generally differs from zero, the proportional adjustment of the prices of all goods is still the key to the allocative neutrality of the origin principle.¹⁴ In particular, the general adjustment of all

14. This long-run equilibrium setting also underlies Krause-Junk's [1992, pp. 149-151] discussion of the efficiency of the origin principle in a model with international trade in capital goods, but without savings and capital accumulation.

prices (including the prices of capital goods) explains why the deflated net foreign asset term in equation (28) will be unaffected – so that the current account will remain in equilibrium – even though producer prices adjust to the imposition of an origin tax. To illustrate, consider a net debtor country where foreign investors own a fraction α of the domestic capital stock K . In long run equilibrium, the market value of the physical capital stock must equal its replacement value. With p_k denoting the producer price of domestic capital goods, foreigners will therefore have to inject a capital inflow of $\alpha p_k(1+t)K$ into the domestic economy in order to acquire a fraction α of the domestic capital stock.¹⁵ In the current account equation (28) we then have $V = -\alpha p_k(1+t)K$, and the equation may therefore be written as

$$\frac{p(1+t)}{E p^*(1+t^*)} X \left(\frac{p(1+t)}{E p^*(1+t^*)} \right) - M \left(\frac{p(1+t)}{E p^*(1+t^*)} \right) - r^* \alpha \frac{p_k(1+t)}{E p^*(1+t^*)} K = 0, \quad (29)$$

where p^* should now be interpreted as the foreign price of consumer goods. This equation makes clear that if domestic producer prices of capital goods (p_k) as well as the producer prices of consumer goods (p) adjust by the factor $1/(1+t)$, or if the exchange rate E adjusts by the factor $(1+t)$, there is no need for trade and capital flows to adjust to a change in the tax rate, and the current account will remain in balance.

Alternatively, we may say that even though a higher origin-based domestic commodity tax rate implies a higher tax burden on output produced by means of domestically located capital, there is no incentive to shift part of this capital abroad, because investors attempting to liquidate domestic capital goods for the purpose of capital exports would end up with a correspondingly lower after-tax revenue from the liquidation and hence would face a higher relative price of foreign (physical) assets which would eliminate the incentive for additional capital exports.

Thus, under the origin principle, cross-country tax differentials are capi-

15. Note that even though a business investor may deduct the VAT paid on his purchase of investment goods from the total VAT liability *in his home country* and will therefore base his calculations of profitability on the net-of-tax price of capital goods p_k , the amount of foreign exchange injected into the domestic economy by a foreign investor will of course still be equal to the tax-inclusive price $p_k(1+t)$ at which capital goods are traded in the domestic market.

talized in the after-tax prices of physical assets and give rise to asset-price differentials which are proportional to the differentials in net-of-tax output prices. Hence, with the ratio of input (asset) to output prices being unaffected by the tax differentials, there is no tax incentive to shift production and investment from one country to another.

C. Short Run Effects and Income Distribution

As already suggested, the allocative neutrality of the origin base should be interpreted as a long run equilibrium phenomenon. In the short run and perhaps also in the medium term, the capitalization effects and the price adjustments just described can be expected to work imperfectly, due to the existence of nominal rigidities, including contracts fixed in nominal terms. In particular, if nominal exchange rates are fixed, so that the neutralization of a domestic tax increase requires a downward adjustment of nominal wages and prices, there may be considerable real effects of the tax increase for quite a long time.

Furthermore, even though neither a general origin-based consumption tax nor a general destination-based tax will distort relative prices in the long run, the two types of taxes differ in their distributional effects, including the distribution across different generations and the distribution between domestic and foreign citizens. As to the international effects, if foreigners own part of the domestic capital stock initially, a switch to the origin principle will reduce the real rate of return to investment from the perspective of foreigners. If tax proceeds are distributed entirely to residents of the home country this will cause an international redistribution of real income which is absent under the destination principle (*cf.* Bovenberg [1994]).

The same point can be stated in an alternative way by observing that the home country will run a trade surplus in long-run equilibrium under this scenario. Therefore, a switch from the destination to the origin base increases the tax base of the home country. Note that this effect did not appear in the two-period model of section III.A because it was assumed there that trade was balanced in present value terms for the home country.

In an overlapping generations framework, additional redistributive effects occur across different generations in the home country under both the ori-

gin and the destination base. These distributional effects – which have recently been thoroughly analyzed by Bovenberg [1994] – are in the nature of income effects, and via their impact on savings, they will tend to affect the long run equilibrium magnitude of the net foreign asset term as well as the trade flows in equation (28). Thus, in so far as intergenerational and international distribution effects are of quantitative importance, the general commodity taxes analyzed here will have real effects and hence will be neutral only in the sense that they will not interfere with international efficiency.

IV. Administrative and Political Aspects

The above discussion has focused on the allocative neutrality of a general consumption tax levied under the origin principle in a simple macroeconomic model. On the other hand, administrative and political arguments have always figured prominently in the discussion of alternative tax principles and, in view of the immediate policy relevance of the topic, a brief review of the most relevant arguments will be included here.

Our discussion in section II.B has shown that a *notional* tax credit for imports is compatible in principle with the tax credit scheme that is currently implemented for domestic transactions in all EC member states [cf. equation (6)]. If the foreign tax rate is lower (higher) than the domestic one, this implies that imports are subsidized (taxed) in the destination country in anticipation of the recouping effect which occurs at subsequent production stages (cf. Krause-Junk [1990], pp. 262-264).

Alternatively, the subtraction method could be used to exclude intermediate goods from the commodity tax base. Two variants of this tax scheme can be distinguished: one option would be to apply the subtraction method exclusively to international transactions while domestic transactions would still be taxed according to the tax credit method (cf. Sinn [1990], p. 496, fn. 13). The problem with this solution is that the recouping effect would simply be postponed by one stage and imported goods would not effectively bear the tax rate of the origin country if there are two or more further processing stages in the destination country. Therefore, to preserve the origin taxation of imported goods it would be necessary to distinguish between imported and domestic value added throughout the further chain of pro-

cessing in the destination country. The substantial practical difficulties of this procedure have been stressed by Andel [1986].

The second option would be the consistent use of the subtraction method for international as well as domestic purchases. The drawback is here that the tax laws of the Community and each of its member states would have to be changed in order to reverse the decision in favour of the tax credit method, which has been made by EC member states in the Second VAT Directive of 1967. Given the difficulties of applying either the one or the other variant of the subtraction method, the notional tax credit seems to be the preferred choice of implementing the origin principle.

It should also be stressed that no additional administrative complications arise for the taxation of trade with third countries if EC members systematically exempt all imports from tax while third countries levy VAT on all their imports (*cf.* section II.C). Trade flows from the rest of the world to the Community would be tax-exempt in the origin country but EC members still grant a notional tax credit based on their domestic tax rates in order to neutralize the recouping effect which occurs at later stages of production.

In contrast, EC exports to the rest of the world would leave the origin country at their tax-inclusive prices but no tax credit would be granted in the country of destination, which simply adds the domestic tax rate on the (tax-inclusive) price of imported goods.

Nevertheless, a number of problems remain under each of the alternatives of implementing the origin principle in the European Community. Perhaps the most serious one, put forward by Cnossen and Shoup [1987, p. 73], is that both the notional tax credit and the subtraction method give rise to transfer-pricing when tax rates differ between EC members.

Since tax credits or deductions from the tax base are based on the *value of imports* and the effective tax rate on the final product is a weighted average of the statutory tax rates in the exporting and importing countries, there is an incentive for internationally integrated firms to overstate (understate) the import value if the tax rate in the destination country is higher (lower) than the rate of the origin country. Given the worldwide experience with transfer pricing in the field of capital income taxation and the increasing importance of multinational firms operating in the Community, this form of commodity tax evasion must be considered as a serious practical disad-

vantage of the origin principle.¹⁶

Another point which has long been emphasized in the discussion of alternative tax principles is that the neutrality of the origin principle must also be *perceived* by economic agents. It is often argued that producers in high-tax member states are unlikely to be convinced by the analysis of exchange rate adjustments that they are *not* put at a disadvantage in comparison to producers in low-tax countries (*e.g.* Cnossen and Shoup [1987], p. 71). This argument becomes even stronger if the Community's exports to the rest of the world are subject to double taxation whereas trade in the other direction remains untaxed. This will most likely be perceived as non-neutral by producers throughout the Community and even if this tax scheme were adopted by policymakers, it may be challenged before the European Court of Justice on the grounds that it violates fundamental rules of reciprocity.

V. Conclusions

The purpose of this paper was to provide an overview of the main arguments for destination- versus origin-based commodity taxation in the European Internal Market. One option is to maintain the destination principle for trade between VAT-registered traders while allowing final consumer purchases to be taxed in the country of origin. This system inevitably distorts intra-Community trade although the distortion need not weigh heavily from a macroeconomic perspective when the volumes of tax-induced cross-border shopping are low. Alternatively, a tax scheme can be implemented where EC members adopt the origin principle for their internal *and* external trade whereas non-members consistently use the destination principle. In a setting with commodity trade only, the latter tax scheme is neutral if the commodity tax is completely general. With a split VAT structure, however, the origin principle violates production efficiency unless indirect tax structures are harmonized between countries.

The paper has further shown that the introduction of international capital

16. Note that with non-uniform VAT rates within individual EC countries, the same transfer pricing argument applies equally to *domestic* transactions if a consistent subtraction method were to be implemented in the Community.

mobility does not affect the allocative neutrality of a general consumption tax levied under the origin principle. The intuition for this result is that a general consumption tax affects neither aggregate savings nor – through the deductibility of investment expenditures from the tax base – the real return to domestic investment. Therefore, no international capital movements are induced by tax rate changes and commodity trade will thus be undistorted. Finally, it has been argued that a notional tax credit scheme allows to switch to the origin principle while maintaining the convenient tax credit method for domestic transactions in the Community. Implementation problems remain, however, because this method may lead to tax evasion through transfer-pricing, and it is likely to stir political opposition because its neutrality is not perceived by EC producers.

A switch to the origin principle also requires that either prices or exchange rates are flexible. Because of the serious short-run difficulties involved in a process of domestic wage and price deflation, the only practicable way for the EC countries to switch to the origin principle would be to adjust exchange rate parities. Thus, each member country would have to adjust its exchange rate in proportion to the level of its indirect tax rates (*cf.*, *e.g.*, Siebert [1990], pp. 60-62). Since the planned transition to a common currency offers an opportunity to undertake a final exchange rate realignment, it might seem natural to consider a switch to the origin principle at that time. This timing could also be motivated by the fact that the transition to a monetary union will reduce the transaction costs of direct consumer purchases across intra-European borders, thereby exacerbating the distortions associated with the current EC system. On the other hand, the anticipation of an exchange rate realignment prior to the transition to monetary union could induce speculative capital flows which might create some short run instability in financial markets.

Summing up these arguments, no clear-cut choice emerges between the different commodity tax regimes which are feasible and desirable under the conditions of the European Community's Internal market. Given the present fairly limited amount of distortionary direct cross-border consumer trade, maintaining the destination principle for purchases by registered traders may be preferable on practical and political grounds. However, if direct consumer trade assumes increasing importance as economic integration pro-

ceeds, the option of switching to the origin principle and the notional tax credit scheme seems to deserve serious attention by policy makers.

References

- Andel, N. [1986], "Sollte Man in der EG im Rahmen der Mehrwertsteuer zum Ursprungslandprinzip Übergehen?," *Finanzarchiv* 44; pp. 484-488.
- Berglas, E. [1981], "Harmonization of Commodity Taxes," *Journal of Public Economics* 16; pp. 377-387.
- Biehl, D. [1969], *Ausfuhrland-Prinzip, Einfuhrland-Prinzip und Gemeinsamer-Markt-Prinzip. Ein Beitrag zur Theorie der Steuerharmonisierung*, Heymanns, Köln.
- Bovenberg, L.A. [1994], "Destination- and Origin-based Taxation under International Capital Mobility," *International Tax and Finance*; pp. 247-273.
- Cnossen, S. [1983], "Harmonization of Indirect Taxes in the EEC," *British Tax Review* 4; pp. 232-253.
- Cnossen, S. [1990], "The Case for Tax Diversity in the European Community," *European Economic Review* 34; pp. 471-479.
- Cnossen, S. and C.S. Shoup [1987], "Coordination of Value-added Taxes," in: S. Cnossen (ed.), *Tax Coordination in the European Community* (Kluwer, Deventer); pp. 59-84.
- Diamond, P. A. and J. A. Mirrlees [1971], "Optimal Taxation and Public Production I: Production Efficiency," *American Economic Review* 61; pp. 8-27.
- Europäische Gemeinschaft für Kohle und Stahl-Hohe Behörde [1953], (Tinbergen Report), *Bericht über die durch die Umsatzsteuer Aufgeworfenen Probleme auf dem Gemeinsamen Markt*.
- European Communities-Commission [1963] (Neumark-Report), *The EEC Reports on Tax Harmonization, The Report of the Fiscal and Financial Committee and the Reports of the Sub-groups A, B and C*, Unofficial Translation by H. Thurston (International Bureau of Fiscal Documentation, Amsterdam).
- Fратиanni, M. and H. Christie [1981], "Abolishing Fiscal Frontiers within the EEC," *Public Finance* 36; pp. 411-429.

- Frenkel, J., A. Razin and E. Sadka [1991], *International Taxation in an Integrated World*, MIT Press, Cambridge/Mass.
- Genser, B. [1992], "Tax Competition and Tax Harmonization in Federal Economies," in: H.J. Vosgerau (ed.), *European Integration in the World Economy* (Springer, Heidelberg); pp. 200-237.
- Georgakopoulos, T. and T. Hitiris [1992], "On the Superiority of the Destination over the Origin Principle of Taxation for Intra-union Trade," *The Economic Journal* 102; pp. 117-126.
- Haufler, A. [1992], "Indirect Tax Policy in the European Community: An Economic Analysis," in: H.J. Vosgerau (ed.), *European Integration in the World Economy*, Springer Verlag, Heidelberg; pp. 243-270.
- Haufler, A. [1994], "Unilateral Tax Reform under the Restricted Origin Principle," *European Journal of Political Economy* 10; pp. 511-527.
- Keen, M. [1993], "The Welfare Economics of Tax Co-ordination in the European Community: a Survey," *Fiscal Studies* 14, No. 2; pp. 15-36.
- Krause-Junk, G. [1990], "Ein Plädoyer für das Ursprungslandprinzip," in: F.X. Bea und W. Kitterer (Hrsg.), *Finanzwissenschaft im Dienste der Wirtschaftspolitik*, Mohr, Tübingen; pp. 253-265.
- Krause-Junk, G. [1992], "Die Europäische Mehrwertsteuer und das Ursprungslandprinzip," *Finanzarchiv* 49; pp. 141-153.
- Lockwood, B. [1993], "Commodity Tax Competition under Destination and Origin Principles," *Journal of Public Economics* 52; pp. 141-162.
- Lockwood, B., D. de Meza and G. Myles [1994], "The Equivalence between Destination and Non-reciprocal Restricted Origin Tax Regimes," *Scandinavian Journal of Economics* 96; pp. 311-328.
- Peffekoven, R. [1983], "Probleme der Internationalen Finanzordnung," in: F. Neumark (Hrsg.), *Handbuch der Finanzwissenschaft*, Bd. 4, 3. Aufl.; pp. 219-268.
- Shibata, H. [1967], "The Theory of Economic Unions: A Comparative Analysis of Customs Unions, Free Trade Areas and Tax Unions," in: C.S. Shoup (ed.), *Fiscal Harmonization in Common Markets*, Columbia University Press, New York; pp. 145-264
- Siebert, H. [1990], "The Harmonization Issue in Europe: Prior Agreement or a Competitive Process?," in: H. Siebert (ed.), *The Completion of the Internal Market*, Mohr, Tübingen; pp. 53-75.

- Sinn, H.W. [1990], "Tax Harmonization and Tax Competition in Europe," *European Economic Review* 34; pp. 489-504
- Sørensen, P. B. [1990], "Tax Harmonization in the European Community: Problems and Prospects," *Bank of Finland Discussion Papers No. 3/90*.
- Whalley, J. [1979], "Uniform Domestic Tax Rates, Trade Distortions and Economic Integration," *Journal of Public Economics* 11; pp. 213-221.
- Whalley, J. [1981], "Border Adjustment and Tax Harmonization: Comment on Berglas," *Journal of Public Economics* 16; pp. 389-390.