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## Tax competition, tax coordination and tax harmonization: The effects of EMU

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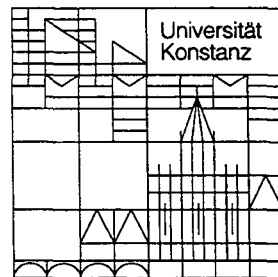
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**Sonderforschungsbereich 178**  
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Diskussionsbeiträge



Juristische  
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# Tax Competition, Tax Coordination and Tax Harmonization: The Effects of EMU

Bernd Genser and Andreas Haufler \*

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## Abstract

There is little doubt that the step towards a monetary union in Europe will increase both the distortionary effects of existing differences in national tax systems and the intensity of tax competition for internationally mobile commodity and factor tax bases. This paper discusses selected issues of commodity and capital tax coordination that are likely to be affected by monetary unification. Starting from the distortive present scheme of value-added taxation in Europe we first analyze the effects of a switch to a general origin-based VAT as a way to maintain national tax rate autonomy over this important tax base. While an origin-based VAT would neither distort trade flows - both within the EU and with third countries - nor investment decisions in the long run, its short-run effects are likely to be severe in the absence of exchange rate flexibility. In the field of capital taxation the focus switches to the feasibility of regional harmonization measures when there is no cooperation with the rest of the world. We argue that in a monetary union the mobility costs of capital will be significantly lower within the EU as compared to outside investments. This provides an efficiency argument for minimum source taxes on both interest income and corporate profits even if cooperation with third countries is infeasible.

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# 1 Introduction

The completion of the internal market in 1993 and the creation of the Economic and Monetary Union (EMU) by 1999 at the latest produce a new framework for fiscal policy in the European Union. The Commission and the Council have responded to the progress of European integration and proposed a bundle of measures which constrain national fiscal autonomy and aim at avoiding transnational externalities, which might jeopardize the welfare gains from integration. The measures adopted comprise the formulation of convergence criteria to improve fiscal discipline, the imposition of minimum tax rates for the value-added tax (VAT) and several excises, and a removal of income tax discrimination for EU multinationals.

Although the issues of fiscal policy coordination and tax harmonization are central topics on the policy agenda of the Commission and the Council, as well as on the economic research agenda, the future scope of fiscal competence of the supranational EU level is still a controversial and unsettled issue. There seems to be a consensus among a majority of the EU members' governments that the EMU and its budgetary implications are desirable and that commodity tax harmonization is an indispensable consequence of the completion of the internal market. But there are also doubts raised against this EU view and the agenda set by the Maastricht treaty.

In this paper we take the objective of monetary integration as given and do neither question the time schedule nor the convergence requirements. Rather, we ask which effects monetary integration is likely to have for the efficiency and sustainability of traditional national tax policy and public spending. The latter have already been partially undermined by the free movement of goods and factors in the European internal market. The introduction of a common currency, however, will further increase opportunities for tax arbitrage by reducing the transaction costs for transborder activities. Cross-border commodity purchases are likely to increase when the necessity of currency exchange vanishes and firms specializing in this field see their costs of doing business reduced. With respect to capital taxation the changes are likely to be even more important. In a monetary union, government and private bonds issued in different countries become virtually perfect substitutes and capital flows can be expected to react very sensitively to any change in national tax policy.

While the higher volatility of tax bases in a monetary union will make national tax policy more difficult it is also true that the need for independent fiscal instruments rises

under conditions of monetary integration. National “inflation taxes”, which have been regarded as an optimal government response to the existence of sizable black markets (Canzoneri and Rogers, 1990) cease to exist since the inflation rate and the revenue from seigniorage is determined by the monetary targets of the European Central Bank. A further pressure on national tax policy arises from the reduced set of policy instruments to react to country-specific shocks. When independent monetary policy is no longer viable, fiscal policy has to bear the burden of national stabilization goals (Kenen, 1969).

Quite naturally, these conflicting pressures are weighed differently by individual authors. While some emphasize the importance of national sovereignty in tax matters (Cnossen, 1990; Eichengreen, 1993) others believe that tax harmonization is inescapable in an increasingly integrated Europe (Sinn, 1994). In any case, it is clear that there will be an increased premium in a monetary union for tax schemes that are compatible with efficiency and distributional equity between EU member states while maintaining as much fiscal autonomy at the national level as possible. For this reason, one of the goals of the present paper is to explore the scope and the feasibility of tax schemes which neutralize the effects of tax differentials on international goods and factor flows. Such reforms in the tax system have been termed ‘tax coordination’ (e.g. Sørensen, 1990) in order to distinguish them from a harmonization of tax rates. Of course, this approach is also closely linked to the principle of subsidiarity emphasized in the Maastricht treaty.

This paper is not designed as a survey but rather focuses on selected issues in the fields of commodity and capital taxation that are likely to be affected by the step towards monetary union<sup>1</sup>. For this purpose we draw on existing transaction cost models for cross-border commodity purchases on the one hand and foreign investments on the other and analyze the effects of a reduction in these costs as a result of monetary unification. Space constraints dictate that we leave out a discussion of wage taxation and we will also largely ignore international labour mobility. While this issue will become increasingly important as European integration proceeds it still seems less pressing in comparison to the mobility of consumers and capital.

Two further limitations of our analysis should be mentioned at the outset. First, we leave out all aspects of political economy, in particular the possibility that tax competition

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<sup>1</sup>Excellent and comprehensive surveys are Sørensen (1990), Keen (1993) and Smith (1993). While the first two authors discuss both commodity and factor taxation, the survey by Smith focuses on indirect taxes and includes a section on environmental taxes.

acts as a beneficial constraint on “Leviathan-type” governments<sup>2</sup>. Second, the EMU will have implications for fiscal harmonization that work through channels other than increased tax base mobility. Sala-i-Martin and Sachs (1992) have argued that a monetary union should be accompanied by an extended system of intergovernmental transfers – and thus an increased central budget – in order to help member states cushion country-specific shocks. Huber (1995) shows that there is a general argument for fiscal harmonization in a monetary union when governments cannot precommit to future tax rates. These issues clearly have a bearing on the evaluation of fiscal harmonization measures in the EMU, but are beyond the scope of the present paper.

The paper is organized as follows. In section 2 we discuss commodity taxation in the absence of border controls. Section 2.1 focuses on the competition for cross-border shopping under the current commodity tax scheme and asks how the extent of this problem is affected by EMU. Section 2.2 discusses recent arguments for a fundamental alternative, the switch to a general origin-based value-added tax in Europe. In section 3 we turn to the taxation of capital. Section 3.1 asks whether EMU creates a case for a common source tax on portfolio income when coordination with the rest of the world is infeasible but mobility costs differ within and outside the Community. Finally, section 3.2 discusses whether cash-flow taxes allow for national tax rate diversity in a highly integrated Europe. Our conclusions are summarized in section 4.

## 2 Commodity Taxation

### 2.1 Cross-border Shopping under the Current System

The abolition of border controls in the European internal market has become one of the most important political signals for the new quality of European integration, emphasising the irreversibility of the four basic liberties in the internal market. It implies, however, a major change in the institutional framework of commodity taxation since, for direct consumer purchases, the traditional destination principle is replaced by the origin principle.

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<sup>2</sup>In a model where governments care about both the utility of a representative consumer and their own self-interest, Edwards and Keen (1995) have shown that the negative effects of tax competition can be quantified by the marginal excess burden of the tax system whereas the positive effects are given by the marginal propensity of national governments to waste. On the basis of this result the authors argue that the issue whether tax competition is harmful or beneficial should, in principle, be accessible to an empirical analysis.

On the other hand, the EU wants to retain the destination principle as the general norm to allocate tax competences and tax revenues among the national governments. The core problem with this mixed tax principle is that it provides an incentive for residents of high-tax countries to shop in neighbouring low-tax jurisdictions<sup>3</sup>. These individually rational arbitrage activities have at least three implications:

- they produce “pure waste” since, in the pursuit of tax savings, individuals incur increased transaction costs,
- they redistribute tax revenues from high-tax to low-tax jurisdictions,
- they may cause inefficiently low tax rates as countries engage in commodity tax competition.

### 2.1.1 A Simple Model

We illustrate these effects in a simple model where cross-border shopping is the only reason for trade (cf. Haufler, 1995). The representative consumer in the home country derives utility from the consumption of a private good  $c$  and a public good  $g$ ,

$$u(c, g). \tag{1}$$

Private goods purchased at home ( $c^H$ ) and abroad ( $c^F$ ) are perfect substitutes so that

$$c = c^H + c^F. \tag{2}$$

The single private good is simultaneously imported by the consumers of a high-tax (home) country and exported by its producers in order to balance trade (cross-hauling). Transaction costs for consumer purchases in the foreign country,  $\tau(c^F)$ , are assumed to be a convex function of the level of cross-border shopping. This specification can be rationalized in a number of ways: one may either think of a continuum of consumers which live at varying

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<sup>3</sup>Note that this problem is not confined to the present “transitional system”, which retains VAT rebates for exports and VAT collection on imports but bases these border tax adjustments on firm documents instead of customs checks. The EC Commission favours a switch to an international tax credit system cum clearing in 1997, a plan that is explicitly endorsed by Germany (Bundesministerium der Finanzen, 1994). However, due to the recouping effect of the international tax credit method it will still be true that imports by producers effectively bear the tax rate of the destination country while the origin principle applies for purchases by final consumers. Hence the incentive for cross-border shopping will be unaffected by this reform as long as VAT rates differ internationally.



Table 1: Marginal consumer prices under the current VAT regime  
(home country resident)

		country of purchase	
		H	F
country of production	H	$p^H(1+t^H)$	$p^H(1+t^F) + p^H \alpha c^F$
	F	$p^F(1+t^H)$	$p^F(1+t^F) + p^H \alpha c^F$

distances from the border (Kanbur and Keen, 1993) or of a continuum of goods, some of which are more easily transported, or purchased via mail orders, than others. In either case, only a convex transaction cost function avoids corner solutions and is compatible with the positive, but limited levels of cross-border shopping that are observed in reality. The simplest algebraic form is a quadratic transportation cost function of the type

$$\tau(c^F) = p^H \frac{\alpha}{2} (c^F)^2, \quad \alpha > 0, \quad (3)$$

which is measured in units of the domestic producer price  $p^H$ . If, on the other hand, goods are imported through commercial traders transportation costs will generally be lower and, for simplicity, are assumed here to be zero. Adding marginal transaction costs from (3) to the VAT rates of the country of purchase, the domestic resident thus faces the consumer prices summarized in Table 1.

Since commercial trade occurs under the destination principle producer prices are equalized across countries. Common producer prices can then be normalized with no loss of generality so that  $p^H = p^F \equiv 1$ . Arbitrage by domestic residents equates consumer prices and implies that the tax gain from shopping abroad equals the marginal transaction costs incurred. Equating consumer prices in the first row of table 1 also determines the equilibrium level of cross-border shopping:

$$c^F = \frac{t^H - t^F}{\alpha}. \quad (4)$$

As discussed above, transportation costs incurred by consumers represent a “pure waste”, reducing the consumption possibilities of the representative household. Denoting by  $x$  the fixed endowment of the home country, the *private* budget constraint is thus given by

$$(1+t^H)c^H + (1+t^F)c^F + \tau(c^F) = x. \quad (5)$$

Since only goods purchased in the home jurisdiction are part of the home country's tax base the *public* budget constraint is<sup>4</sup>

$$g = t^H c^H = t^H (c - c^F). \quad (6)$$

Combining (5) and (6) shows how trade redistributes tax revenues in this simple model

$$x - c^H - g - \tau(c^F) = (1 + t^F) c^F. \quad (7)$$

The left-hand side of this equation gives the home country's producer exports to the low-tax country F while consumer purchases by home residents are on the right-hand side. Trade is balanced but the home country's exports occur net of tax while its consumer imports are taxed in the foreign country. In essence, the representative consumer of the high-tax country buys the goods that have been produced in her home country but in doing so transfers tax revenues to the foreign treasury.

Substituting (2)–(6) in (1) gives

$$u = u \left\{ \frac{\beta}{(1 + t^H)}, t^H \left[ \frac{\beta}{(1 + t^H)} - \frac{(t^H - t^F)}{\alpha} \right] \right\}, \quad (8)$$

where

$$\beta = x + \frac{(t^H - t^F)^2}{2\alpha}.$$

Assuming that the benevolent home government maximizes the welfare of the representative citizen (8) with respect to the domestic tax rate, the first-order condition reads

$$\frac{t^H}{\alpha} = \frac{c^H}{(1 + t^H)} \left( 1 - \frac{\partial u / \partial c}{\partial u / \partial g} \right). \quad (9)$$

Since the left-hand side of equation (9) is positive, the marginal rate of substitution (of  $g$  for  $c$ ) must be less than one in equilibrium. In contrast, the marginal rate of transformation equals unity since the homogeneous good can either be used for private or for public consumption [cf. eq. (7)]. If the commodity tax is the only instrument available, this describes an undersupply of public goods in the non-cooperative equilibrium (e.g. Mintz/Tulkens, 1986). A more general interpretation that allows for the existence of multiple tax instruments is, however, straightforward: a tax that is an efficient revenue raiser in a closed economy (in the simple setting here, it is a lump-sum tax) is 'underused' as a result of inter-country competition for cross-border shopping.

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<sup>4</sup>Note the special case when the transportation cost parameter  $\alpha$  approaches zero in Table 1. All purchases are then made in the low-tax foreign country and the tax base in the home region shrinks to zero. This case has been discussed in the context of trade deflection under the restricted origin principle (Georgakopoulos and Hitiris, 1992).

### 2.1.2 The Effects of a Monetary Union

Monetary union is likely to lower the transaction cost parameter  $\alpha$  by eliminating both the costs and the risks associated with currency exchange. While these effects may not reduce transaction costs significantly for private consumers that physically cross the border, they are likely to be far more important for “firms” that specialize in tax arbitraging (both legal and illegal) and will find their costs of doing business decreased by a single European currency<sup>5</sup>.

To discuss this issue, we can distinguish between the effects of a change in transaction costs at fixed initial taxes, and the implications of a reduction in  $\alpha$  on the “strategic” choice of optimal tax rates. At unchanged tax rates at home and abroad, a reduction in  $\alpha$  will raise the level of cross-border shopping from (4) and this will increase the redistribution of tax revenues through trade from (7). A less obvious result is that the total amount of “wasted” transaction costs will also rise in response to the reduction on  $\alpha$ . This follows from the convexity of the transaction cost function and can be seen by substituting (4) in (3) and differentiating with respect to  $\alpha$ :

$$\left. \frac{\partial \tau}{\partial \alpha} \right|_{t^H, t^F = \text{const.}} = -\frac{(t^H - t^F)^2}{\alpha^2} < 0. \quad (10)$$

Finally, the reduction in transaction costs increases the RHS of equation (9) and must thus increase the undersupply of public goods (the LHS of the equation). Thus, at fixed tax rates, a reduction in the transportation cost parameter aggravates all the undesirable effects of intra-EU tax differentials that were listed earlier in this section.

How do these results change when tax rates are optimally adjusted by national governments? And, relatedly, do countries share a common interest in fighting cross-border shopping? These issues are addressed by Kanbur and Keen (1993) in a model of tax competition between countries of different size. A core assumption of their model is that private individuals care only about public good supply<sup>6</sup>. In this framework, a reduction

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<sup>5</sup>Sinn (1990), for example, warns of “commercial carriers” that illegally transport low-tax goods to high-tax countries. Another loophole are distance sales like mail-ordering or tele-shopping. While current EU law stipulates that the sales of larger firms must be taxed in the country of destination this requirement can be circumvented, for example, by splitting the firm into legally separate units that keep their sales below the threshold level of currently ECU 100,000 (Fehr/Rosenberg/Wiegard, 1995, pp. 58-61).

<sup>6</sup>Formally, this is equivalent to a model where the government behaves as a pure Leviathan. However, Kanbur and Keen (1993) *interpret* a rise in tax revenues as a Pareto improving increase in consumer welfare, implying that there is a perfect match between the wishes of the government and the representative individual.

in transportation costs will lower tax rates, and thus welfare, in both the (large) high-tax country and the (small) low-tax country. The tax reduction can be directly inferred from equation (9) by setting the marginal utility of private income equal to zero. The same symmetric interest appears with respect to tax harmonization measures as *both* countries gain from a binding minimum tax requirement imposed on the low-tax region. Intuitively, an exclusive preference for public goods ensures that this harmonization measure induces a tax increase in the high-tax region which is sufficiently large to benefit the low-tax country as well.

However, when the utility function of the representative consumer contains private along with public consumption then this optimistic scenario will no longer hold, in general. In particular, when revenue needs differ but are inflexible in each country then the interests of high-tax and low-tax countries will be in direct conflict (Haufler, 1995). Intuitively, at unchanged tax rates, cross-border shopping increases as a result of reduced transaction costs and the tax base of the home country accordingly shrinks. To maintain largely fixed revenue requirements the high-tax country then has to further increase its tax rate<sup>7</sup> while the low-tax country will optimally adjust its tax rate downward. Thus the tax differential, the shifting of tax revenues, and the aggregate level of wasted transaction costs will all increase further as a result of the induced tax rate changes. Furthermore, with reduced transaction costs and an increased tax rate  $t^H$  it is obvious that the low-tax country will gain from increased tax competition while the high-tax country will unambiguously lose. The unanimous consent required in passing measures to reduce cross-border shopping can then no longer be expected<sup>8</sup>.

Therefore, neither a general reduction in VAT rates nor a “spontaneous” approximation of tax rates as a result of market forces is a necessary outcome of increased commodity tax competition. Denmark, for example, raised its VAT rate from 22 % to 25 % in 1993 in order to compensate for the revenue losses incurred by a reform of its income tax system. Thus VAT differentials have actually increased since the abolition of border controls (cf. Table A.1 in the appendix). In general, depending on the flexibility of public expenditures on the one hand and alternative revenue sources on the other, high-tax countries must

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<sup>7</sup>This is seen in equation (9) by noting that a small initial reduction in  $g$  induces a large reduction in the marginal rate of substitution of  $g$  for  $c$ . Therefore, the RHS of the equation rises by more than the LHS, and the home country’s tax rate must increase to maintain the equality.

<sup>8</sup>This conflict of interests, and the resulting difficulties to enact measures that improve global welfare are known from the analysis of tariff wars between countries of different size (Kennan and Riezman, 1988). The same issue arises in the context of capital tax competition (section 3.1).

either accept increased waste and revenue transfer to low-tax regions, or an inefficient mix of domestic tax and expenditure choices.

It follows from these theoretical considerations that observed “equilibrium” levels of cross-border shopping are not the only indicator of the distortions created by the current commodity tax system since they reveal no information about the efficiency costs in the tax and expenditure systems of EU member states. Furthermore, the existing empirical evidence on cross-border shopping is quite limited. Fitz Gerald, Johnston and Williams (1995) summarize a number of surveys collected at various EC borders and conclude that the problem of cross-border shopping is largely confined to the retail sector in the proximity of the border. However, all the data reported have been collected *before* the opening of internal borders in 1992 and most of the surveys do not include estimates for fraud or evasion by commercial operators. Evidence from the post-1992 period is still preliminary and subject to the general argument that price elasticities may gradually increase over time as both consumers and firms discover new and cheaper ways of tax arbitrage. This process is likely to be strengthened and speeded up by monetary integration.

To summarize, there will certainly remain different views on the magnitude of the effects caused by cross-border shopping in the European internal market. However, it is uncontroversial that the current commodity tax system suffers from the inherent problem that consumer and producer transactions are taxed under different tax regimes. As economic integration proceeds the concern about socially unproductive arbitrage activities and undesirable revenue shifts caused by this mixed system is unlikely to go away as long as tax rates differ across countries<sup>9</sup>. This has motivated renewed interest in an old alternative – dating back to the Neumark Report (1963) – the switch to a general origin principle in Europe. Although renounced by the EC in 1967, we will see that there are a number of new arguments in favour of this switch, but there are also problems that remain.

## 2.2 Switching to an Origin-based VAT?

In this section we analyze the effects of applying the origin principle to producer transactions as well. To make the argument in the strongest possible way we neglect the retail margin in the following and assume that traders can import goods from abroad at no

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<sup>9</sup>Another disadvantage of the present system are the costs necessary to administer the destination principle for VAT-registered traders. If the EU actually switches to an international tax credit system these administrative costs would be replaced by the costs of an international clearing system (cf. footnote 3).

Table 2: Marginal consumer prices under an origin-based VAT regime  
(home country residents)

		country of purchase	
		H	F
country of production	H	$p^H (1 + t^H)$	$p^H (1 + t^H) + p^H \alpha c^F$
	F	$p^F (1 + t^F)$	$p^F (1 + t^F) + p^H \alpha c^F$

transportation costs and sell them to consumers in the destination country without any extra charge<sup>10</sup>. The marginal consumer prices faced by the resident of a high-tax country are then as given in table 2. It is immediately seen from this table that it is always cheaper to buy goods (either foreign or domestic) from the domestic dealer rather than to engage in costly direct imports. The reason is, of course, that producer price arbitrage under the origin principle already equalizes consumer prices

$$p^H (1 + t^H) = p^F (1 + t^F), \quad (11)$$

so that there are no additional arbitrage opportunities for consumers. Furthermore, in the simple model above the equilibrium under the origin-based VAT is fully equivalent to the equilibrium under a purely destination-based VAT with border controls (at the same VAT rates  $t^H \neq t^F$ ). Starting out from the latter, the change in VAT regimes will lead to an adjustment of producer prices equal to the tax factor ratio, which will leave all the quantity decisions unchanged. While this result is obtained here in an extremely simple setting it has been shown that the equivalence property carries over to more general multi-good models with endogenous factor supplies, producer transportation costs, and imperfect competition (Lockwood, de Meza and Myles, 1994a).

Nevertheless, there remain a number of arguments which are frequently raised against a switch to an origin-based VAT in Europe. These include (1) the taxation of trade with third countries, (2) the administration of the tax, (3) the possibility of transfer pricing, (4) the existence of multiple tax rates, (5) international factor mobility and (6) short-run imbalances. In the following, we will briefly discuss each of these arguments.

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<sup>10</sup>More generally, there will be a positive value added at the retail stage and this part of the total producer price must always be taxed in the country of destination. Therefore, diverging tax rates in the trading countries will lead to some difference in consumer prices even under the origin principle but this wedge will always be lower than under the current (impure) destination principle.

### 2.2.1 Third Countries

Shibata (1967) correctly embedded the issue of EU commodity taxation in a three-country world, emphasising that a switch to an origin-based VAT within the common market will not change the tax relations with non-EU countries, where border tax adjustment will be maintained following the recommendations of GATT. Thus the outcome will be a “restricted origin principle” (ROP) with EU-internal trade taxed according to the origin principle and EU-external trade with the rest of the world according to the destination principle. This mixed VAT pattern can be shown to trigger trade deflection through tax arbitrage and it leads to a process of tax competition that is quite similar to the problem of cross-border shopping discussed above (Shibata 1967, Whalley 1979, Berglas 1981, Haufler 1994). These distortionary effects can be removed, however, by giving up the condition of bilateral reciprocity (i.e., two trading countries apply either the origin principle, if both are EC members or the destination principle, if one or both of them are not EC members).

One alternative is that the EU countries apply a worldwide origin principle whereas countries in the rest of the world apply a worldwide destination principle for all their trade (Lockwood, de Meza and Myles, 1994b, 1995). This scheme has been labelled a “non-reciprocal restricted origin principle” (NROP). It implies that EU exports to the rest of the world are double-taxed whereas exports from the rest of the world to the EU remain tax free. More generally, any tax scheme where the EU countries apply a unified border tax rate  $t^U$ , irrespective of their domestic VAT rates, can be shown to be equivalent to a general destination-based VAT (Genser, 1995). The NROP can be seen as a special case of this “unified restricted origin principle” (UROP) with a common border tax rate of zero. Arbitrage under the UROP equalizes

$$p^H (1 + t^H) = p^F (1 + t^F) = p^R (1 + t^U), \quad (12)$$

and producer prices in the EU countries adjust by suitable tax factors after the switch from destination to origin-based taxation. Again, producer trade equalizes consumer prices across the union, eliminating any incentive for cross-border shopping.

The remaining issue is whether the unified EU border tax rate  $t^U$  should be set to zero or at a positive level. With a positive external border tax, VAT revenue consists of two components, VAT on domestic production and VAT from the border adjustment. To ensure that the revenue distribution under this scheme equals the distribution under the destination principle it is important that only the former goes to the domestic fisc, whereas VAT from external border adjustment remains with the EU customs authority.

Since the net trade surplus of all EU countries sums up to zero, net revenue from EU border adjustment is also zero and there is no need for further redistribution. At the national level, origin-based VAT on domestic production yields the same revenue as destination-based VAT on domestic consumption in the long run equilibrium of balanced trade. Nevertheless, a positive level of  $t^U$  implies some extra administrative costs in comparison to a zero rate, where no VAT collection occurs at the EU borders. On the other hand, the UROP offers a degree of freedom in the selection of the external border tax rate  $t^U$ . This parameter may become quite important as it allows to mitigate political opposition against the allegedly discriminatory features of the NROP, and as an instrument to reduce the required price adjustment following the switch to the origin principle in the EU [cf. eq. (12)].

### 2.2.2 Administrative concerns

Widespread opposition against the origin principle is based on the conjecture that an origin-based VAT requires a switch in VAT administration from the current credit method to the subtraction method. If this were the case, implementation costs would be high, in particular due to required changes in VAT compliance. But it can be shown that the subtraction method is equivalent to a “notional credit method”, which allows to maintain the traditional credit method for national transactions (Krause-Junk, 1990). The notional tax credit (NTC) is the VAT rebate for a registered trader who buys a commodity or service from a supplier in another EU country

$$NTC = \frac{t^H}{(1+t^H)} (1+t^F) p^F. \quad (13)$$

Instead of crediting the amount of VAT actually paid in the foreign country ( $t^F p^F$ ), an imputed amount of VAT is credited, which corresponds to the VAT burden levied if the domestic VAT rate  $t^H$  were applied. If we denote the components of value added in the home and in the foreign country by  $p^H$  and  $p^F$ , respectively, the gross of VAT price of that commodity in the home country is

$$\begin{aligned} q^H &= (1+t^H)[p^H + (1+t^F)p^F - NTC] \\ &= (1+t^H)[p^H + (1+t^F)/(1+t^H) p^F] \\ &= (1+t^H) p^H + (1+t^F) p^F. \end{aligned} \quad (14)$$

Thus the notional credit method perfectly replicates the overall tax burden under the subtraction method, when the share of value added in each country is taxed at the going VAT rate of that country.



### 2.2.3 Transfer Pricing

It is often argued that an origin-based VAT system offers incentives for tax arbitrage by shifting value-added to low-tax countries through transfer pricing (Cnossen and Shoup, 1987; Lockwood, de Meza and Myles, 1995). But this incentive must be weighed against the income tax effects, which are triggered simultaneously by transnational shifts of value-added (Genser and Schulze, 1995). The effect of manipulating the price of an intermediate good on the net of tax profits of a multinational firm then consists of two components, a corporate income tax (CIT) effect and a VAT effect. The sign of each effect is determined by the difference in tax rates between the home and the foreign country. In principle, the two tax rate effects can thus be reinforcing (if both CIT and VAT rates are lower in one country) or mutually offsetting. The EU tax patterns in the early 1990's give evidence that the countervailing effects dominate and that VAT differentials tend to be lower than CIT differentials (cf. Table A.1 in the appendix). Thus the transfer pricing incentive is primarily directed towards a lower CIT burden and remains unaffected under a destination-based commodity tax, but it is likely to be mitigated if the same VAT rates are applied under the origin principle<sup>11</sup>.

### 2.2.4 Multiple Tax Rates and Incomplete Coverage

The standard equivalence result between a destination and an origin-based VAT relies on the assumption of one single national VAT rate for each country and breaks down if countries apply multiple VAT rates for traded goods. It has been shown, however, that exchange rates are able to adjust national prices if the ratio of VAT rates is chosen appropriately in the relevant countries (Fратиanni and Christie, 1981). For a switch to the UROP in the EU countries the required price change  $e^i$  is the same if regular and reduced VAT rates ( $t_r$ ) are related by

$$e^i = \frac{(1 + t^U)}{(1 + t^i)} = \frac{(1 + t_r^U)}{(1 + t_r^i)}, \quad i = H, F. \quad (15)$$

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<sup>11</sup>Note that this argument remains valid even if there are other vehicles for profit shifting (e.g. royalty payments, interest payments due to thin capitalization). For any given level of these independent operations, the expected benefits from VAT arbitrage through transfer pricing will, on average, be more than offset by a higher CIT burden.

This implies that the ratio of regular and reduced tax rates must be equal across EU member countries and for the EU border adjustment

$$\frac{(1 + t_r^i)}{(1 + t^i)} = \mu, \quad i = H, F, U. \quad (16)$$

Equation (16) summarizes the harmonization requirement to maintain equivalence between a destination-based and an origin-based VAT. Whereas the regular VAT rate in each country can be chosen autonomously the reduced rate is then determined by the common VAT structure in the EU. Although harmonizing the rate structure entails a far larger degree of fiscal autonomy than restrictions on rate levels, it must be noted that traditional VAT patterns like zero-rates or semi-rates are not compatible with condition (15) if national VAT rates vary<sup>12</sup>.

Related problems are posed by excise taxes and by an incomplete coverage of the value-added tax, which at present excludes a number of services (banking, insurance, health care) from the tax base. In each of these cases, relative prices of traded goods and services are affected by the non-general commodity tax. Under the origin principle these distortions fall on factor markets whereas under the destination principle they fall on consumer markets. By the production efficiency theorem (Diamond and Mirrlees, 1971), which states that the welfare loss from production distortions exceeds the loss from distorting consumption, this constitutes a clear argument against the origin principle.

There is, however, a counterargument when there is imperfect competition in product markets. In this case, origin-based commodity taxes can actually improve global welfare by lowering the mark-up that producers charge over marginal costs (Trandel, 1992). A similar case arises when monopolists located in different countries have different marginal costs in the no-tax equilibrium. In contrast to the destination principle, the origin principle will enforce competition between national monopolies and improve global welfare by shifting production from less efficient to more efficient firms (Keen and Lahiri, 1994).

### 2.2.5 Factor Mobility

The effects of an origin-based VAT in the presence of factor mobility are less obvious than may appear at first sight. While it seems that internationally mobile capital will flee the high-VAT country under the origin principle, it can be shown that under a consumption-type VAT, which allows for a full tax credit on investments goods, the investment decision

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<sup>12</sup>It is worth noting, however, that equivalence is not affected if reduced VAT rates or special excise rates are applied to non-tradables.

Table 3a: Prices for consumer and investment goods  
under a pure destination-based VAT

		consumer goods	investment goods	
		in H	in H	in F
country of production	H	$p^H(1+t^H)$	$p^H$	$p^H$
	F	$p^F(1+t^H)$	$p^F$	$p^F$

Table 3b: Prices for consumer and investment goods  
under an origin-based VAT

		consumer goods	investment goods	
		in H and F	in H	in F
country of production	H	$p^H(1+t^H)$	$p^H$	$p^H \frac{(1+t^H)}{(1+t^F)}$
	F	$p^F(1+t^F)$	$p^F \frac{(1+t^F)}{(1+t^H)}$	$p^F$

is not affected by an origin for destination switch in commodity taxation (Krause-Junk, 1992; Bovenberg, 1994; Genser, Hauffer and Sørensen, 1995). We first provide an intuition for this result, demonstrating that the relative price of capital goods is not affected by the switch to the origin principle. In a second step, we use a simple two-period model that confirms the investment neutrality of an origin-based VAT but also serves as the basis to discuss a number of differences between the origin and the destination principle in more general models of factor mobility.

The intuition for the investment neutrality of a general origin-based VAT is straightforward if it is compared with a pure destination-based tax. Under the latter, we know that producer prices for both consumer and capital goods must be equal in H and F in the arbitrage equilibrium, since domestic and imported consumer goods bear the same domestic VAT rate whereas investment goods are tax free in both countries (Table 3a). In contrast, under an origin-based VAT consumer goods carry the VAT rate of their country of production and equilibrium producer prices in H and F deviate by the tax factor (Table 3b). But since foreign investment goods allow for a notional tax credit [cf. eq. (13)], producer prices for traded investment goods must differ by just the same tax factor. Since relative prices are equal under a destination- and an origin-based VAT the investment neutrality of the first scheme must also hold for the second.

We now introduce a simple two-period model of a small open economy (cf. Genser, Hauffer and Sørensen, 1995). Let us first concentrate on efficiency issues and assume for simplicity that the representative individual owns the entire initial capital stock  $k_1$ , which is non-depreciable. She also exogenously supplies one unit of labour in each period  $i \in [1, 2]$ . Suppressing the fixed labour supply as an explicit argument, production in the two periods is  $f(k_i)$  and the return to capital equals its marginal product,  $r_i = \partial f / \partial k_i$ . The return to labour is thus  $w_i \equiv f(k_i) - r_i k_i$ . First-period production can either be consumed ( $c_1$ ) or saved. Savings can in turn be used either to increase the domestic capital stock ( $k_2 - k_1$ ) or to purchase an international asset  $s$ , which earns a fixed return  $r^F$  in the international capital market.

The government levies an origin-based consumption tax, giving a full tax credit for all investment expenditures. Therefore, the costs of capital are always given by the domestic *producer* price  $p^H$  of the homogeneous good whereas the relevant price for consumption is  $p^H (1 + t^H)$ . Normalizing the foreign tax-inclusive price level to unity and introducing the arbitrage condition under the origin principle gives  $p^H (1 + t^H) = 1$ . Expressed in world prices the first-period budget constraint of the representative individual is

$$c_1 + s = \frac{1}{(1 + t^H)} [w_1 + r_1 k_1 - (k_2 - k_1)].$$

In the second period the capital stock is liquidated (since there is no depreciation) and foreign assets are paid back gross of interest. Thus

$$c_2 = \frac{1}{(1 + t^H)} [w_2 + r_2 k_2 + k_2 + (1 + r^F)s].$$

Eliminating  $s$  gives the intertemporal budget constraint

$$c_1 + \frac{c_2}{(1 + r^F)} = \frac{1}{(1 + t^H)} \left[ w_1 + (1 + r_1) k_1 - k_2 + \frac{w_2 + (1 + r_2) k_2}{(1 + r^F)} \right]. \quad (17)$$

From (17) it is immediately seen that the present value of consumption on the left-hand side is maximized with respect to  $k_2$  when

$$r_2 = \frac{\partial f}{\partial k_2} = r^F, \quad (18)$$

which is the efficient outcome and shows that the investment decision is not distorted by the origin-based VAT. We can substitute this result back into (17) to simplify the intertemporal budget constraint

$$c_1 + \frac{c_2}{(1 + r^F)} = \frac{1}{(1 + t^H)} \left[ w_1 + (1 + r_1) k_1 + \frac{w_2}{(1 + r^F)} \right]. \quad (19)$$

Equation (19) shows that an origin-based consumption tax is equivalent to a tax on labour income and on the *initial* capital stock. The return to new capital remains untaxed in present value terms since the deductibility of investment expenses in period 1 just compensates for the taxation of the returns to this investment in period 2.

Turning to the distributive effects of an origin-based VAT, suppose now that foreigners own a fraction  $\gamma$  of the initial capital stock  $k_1$ . We also assume, as a shortcut, that tax revenues are redistributed lump-sum to the representative consumer in the home country. In this case, an origin-based VAT falls partly on foreigners whereas the proceeds of the tax go exclusively to the domestic consumer. As a consequence, an amount  $t^H \gamma k_1$  is redistributed from the foreign to the home country. In comparison, arbitrage under a destination-based VAT ties the domestic producer price to the exogenous world price and  $p^H = 1$  so that (19) must be multiplied through by  $(1 + t^H)$ . Thus the tax falls on domestic consumption and foreign-owned assets do not give rise to redistributive effects across countries.

Note the implicit assumption in the above analysis that the switch in the tax regime is unexpected so that the capital installed in the ‘initial’ period cannot escape the tax. Given the complex process of EU decision-making this condition is unlikely to be met in reality. Announcement effects will thus occur and both domestic and foreign investors will shift part their capital abroad in order to avoid capital losses at the time of the switch. These responses limit the redistributive effects of an origin-based VAT but they also introduce dynamic inefficiencies from temporary investment distortions. These effects could only be avoided if the government provides a subsidy to all owners of the domestic capital stock, thus compensating for the effects of the tax (Bovenberg, 1994, p. 264). If this is done, however, then the origin-based consumption tax effectively reduces to a tax on labour and other internationally immobile factors of production. This implies not only that the government forgoes a substantial source of tax revenue but it also changes the character of the tax, which would no longer be a general tax on consumption<sup>13</sup>.

Finally, going back once again to equation (19) reveals some further potential distortions of an origin-based commodity tax in the presence of factor mobility that have been neglected in the simple model used here. First, our analysis has assumed that the

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<sup>13</sup>Frenkel, Razin and Sadka (1991, p. 76) have emphasized that the revenue derived from taxing the initial capital stock is substantial under realistic assumptions about capital-output ratios and it is therefore misleading to classify the distinction between a general consumption tax and a wage tax as a “transition” issue.

production function exhibits constant returns to scale with respect to labour and capital only. In contrast, if pure profits are earned they will also be taxed under an origin-based VAT. Therefore, profit-making firms will have an incentive to settle in low-tax countries, and tax competition for the location of internationally mobile firms will be induced, even if tax rates play no role for investment decisions (Richter, 1994). Second, since wage income is part of the tax base under an origin-type VAT, international differences in tax rates will induce distortions in the presence of labour mobility. In fact it has been shown that if both capital and labour are perfectly mobile internationally then production will cease entirely in the high-tax country as all factors of production migrate to the low-tax region (Krause-Junk, 1992). In summary, international mobility of labour and firms, but not international capital mobility, causes the equivalence between general production and consumption taxes to break down from a viewpoint of allocative efficiency.

### **2.2.6 Short-run Effects**

Finally, we relax the assumption of price flexibility that has been maintained so far. In principle, the producer price adjustment required by a switch to the origin principle can be brought about either by an exchange rate adjustment or by an adjustment of factor prices. In a monetary union, however, the first instrument is no longer available and the burden of adjustment rests on factor markets, in particular the labour market. Given a considerable degree of nominal wage rigidity in this market, the downward adjustment of producer prices will occur only gradually. Thus high-tax countries will suffer a temporary but general decline in competitiveness and short-run trade imbalances will be caused under conditions of the EMU.

This issue is most relevant for the switch from a destination- to an origin-based VAT. Ideally, the switch should therefore be enacted before or in conjunction with the introduction of EMU. Such a sequence of events, however, seems no longer possible in the present situation. Moreover, it must be recognized that producer price flexibility is also required whenever one country changes its tax rate after the origin principle has been introduced. Therefore, the tax rate autonomy that the origin principle allows member states from a long-run perspective may be severely constrained through short-run considerations.

Summarizing the arguments presented here, the main advantage of a switch to the origin principle is that it would reduce the distortions associated with the differential tax treatment of traders vs. final consumers under the present commodity tax system.

Recent contributions have shown that such a switch would be administratively feasible and would neither distort trade with third countries nor investment decisions in the long run. Nevertheless, some distortions are likely to arise under the origin principle both in a domestic setting (as a result of incomplete coverage and multiple tax rates) and in an international environment (due to the mobility of workers and firms). Since these distortions will fall on factor rather than consumer markets the (long-run) efficiency case for an origin-based VAT remains ambiguous. Under these circumstances the additional short-run imbalances that tax adjustments create under the origin principle in a monetary union carry increased weight, and may turn the balance against this alternative.

### 3 Capital Taxation

While the importance of value-added taxation in Europe lies in the large revenue base involved, capital taxation is an even more pressing problem in today's Europe with respect to the scope of tax arbitrage opportunities it offers. Despite its relevance, first harmonization steps have only recently been taken and have focused exclusively on eliminating several forms of tax discrimination for EU multinationals. These concern the merging and splitting of multinational enterprises, the repatriation of profits via dividends from a subsidiary to its parent, and an arbitration convention that coordinates arm's length pricing rules employed by national tax authorities (Vanheukelen, 1991). However, in contrast to the field of indirect taxation, no measures of tax rate harmonization have so far been adopted. In particular, the Commission's 1989 initiative to introduce a 15 percent withholding tax on interest income failed to receive the required unanimous support in the Council of Ministers. This negative experience is probably one reason why none of the proposals on tax rate harmonization recommended in the 1992 report of the Ruding committee has so far been taken up by the Commission. Among these proposals are a uniform 30 percent withholding tax on dividends paid out by EU enterprises (other than to a parent company) and an approximation of statutory corporate tax rates in members states within a range of 30-40 percent (EC-Commission, 1992)<sup>14</sup>.

International factor taxation is thus largely determined by a heterogeneous net of bilateral double taxation treaties. Nevertheless, some common features emerge for the current practice of capital taxation in Europe. In particular, most commentators agree

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<sup>14</sup>Cf. Devereux (1992), Genser, Schaden and Steinhart (1993) and Cnossen and Bovenberg (1994) for commentaries of the Ruding committee's proposals.

that the source principle is far more important than the residence principle in practice, and this applies to both corporate and capital income taxation (Sørensen, 1990; Tanzi and Bovenberg, 1990; Keen, 1993). Corporate profits are generally taxed in the source country whereas residence countries use either the exemption or the credit method to avoid double taxation. In the first case source taxation is obvious but it is also frequently effective in the latter because EU countries generally do not credit source-based taxes in excess of their own, and they defer taxation until profits are repatriated.

In contrast, international portfolio income is subject to tax under the residence principle in most EU countries, following the principle of comprehensive income taxation. However, residence-based taxes can be easily evaded as home countries are unable to monitor the foreign interest earnings of their residents. In the absence of cooperation between national tax authorities, source taxes are then the only feasible way to tax international portfolio income. Several small European countries, in particular the Nordic states and Austria, have already responded to these pressures and introduced a dual income tax where capital income is taxed at a flat rate far below the maximum tax rate on wage income (Sørensen, 1994).

If only source taxes are feasible, the existence of positive taxes on capital income seems to contradict the production efficiency theorem of second-best tax theory (Diamond and Mirrlees, 1971). Applied to the present context it states that a small open economy should not use source-based taxes on capital if other – distortive – taxes exist (e.g. a wage tax) and if there are no pure profits. Intuitively, with perfect international capital mobility a source-based tax on capital must entirely fall on internationally immobile factors of production. Therefore, a direct tax on these factors dominates the capital tax by avoiding a misallocation of world investment. As a straightforward extension of this result, Frenkel, Razin and Sadka (1991, Ch. 11) show that the zero taxation of capital income is still optimal, given the set of available tax instruments, when two small countries can coordinate their tax policies but capital can flow costlessly to tax havens in the rest of the world and escape residence taxation.

Nevertheless, both corporate taxes and withholding taxes on interest income continue to exist. An obvious argument for corporate taxation arises when there are pure profits (or location-specific rents) so that the conditions of the Diamond-Mirrlees theorem are violated (Huizinga and Nielsen, 1995). Alternatively, positive corporate tax rates may be needed as a backstop to prevent the conversion of labour income into otherwise untaxed capital income (Gordon and MacKie-Mason, 1994). Finally, there is substantial empirical evidence,



cited in Gordon and Bovenberg (1994), that both investment and portfolio capital are actually quite immobile internationally. The authors explain relatively low levels of foreign direct investment by information asymmetries between foreign and domestic investors. Instead, our focus here is on exchange rate risk, which is clearly among the factors that account for low degrees of international portfolio diversification. Bhandari and Mayer (1990) have shown for the period 1975-1987 that cross-border portfolio investments have been more common within the EU than in other regions of the world, and have linked this result to reduced exchange rate variations in the European Monetary System.

Imperfect mobility of portfolio capital may also explain why few EU countries levy withholding taxes on the interest income earned by foreigners, even if there is a withholding tax on such income for domestic residents (as is the case, for example, in Germany since 1993). It can be shown that this discriminatory tax treatment is rational from the perspective of each country as it allows to tax the interest income of a risk-averse segment of the domestic population while at the same time competing for internationally mobile financial capital (Janeba and Peters, 1995). But if exchange rate risk is an important factor determining the mobility of portfolio capital, then the EMU will have profound effects as the bonds of different European countries become very close substitutes. In particular, this change will have important implications for the necessity and the feasibility of EU-wide – but not worldwide – coordination efforts to tax portfolio income.

### 3.1 The Case for a Coordinated Source Tax on Portfolio Income

As in the case of commodity taxation, we illustrate the argument in a simple transaction cost model as in Persson and Tabellini (1992), thus allowing for imperfect capital mobility. This is combined here with models of optimal international taxation in the presence of multiple tax instruments (e.g. Bucovetsky and Wilson, 1991). Consider then a small capital exporting country with a single representative consumer that has the separable utility function

$$u[v(c, n), g], \tag{20}$$

where  $c$  is consumption of a private good,  $n$  is endogenous labour supply and  $g$  is a public good. The consumer has a total capital endowment normalized to unity, which can either be invested at home ( $k^H$ ) or abroad ( $k^F = 1 - k^H$ ). Foreign investment is subject to convex

transaction costs<sup>15</sup> and we again choose the simple quadratic specification

$$\tau = \frac{\beta}{2} (k^F)^2. \quad (21)$$

It is assumed that a source tax on capital  $t^k$  is the only feasible way for the government to tax the capital income of the domestic resident. The second instrument available to the government is a wage tax  $t^n$ . For simplicity both taxes are modelled as unit taxes so that the government budget constraint is

$$g = t^k k^H + t^n n. \quad (22)$$

For the individual, private consumption expenditures must equal the sum of all after-tax factor returns, less the amount of transaction costs incurred. If  $r$  is the gross interest rate at home,  $r^F$  is the foreign interest rate (net of any source taxes) and  $w$  is the gross wage the household budget constraint is given by

$$c = (r - t^k) k^H + r^F (1 - k^H) - \tau(k^F) + (w - t^n) n. \quad (23)$$

The domestic interest rate is determined by the international arbitrage condition for capital. In equilibrium, the foreign interest rate will exceed the net domestic interest rate by the marginal transaction costs derived from (21)

$$r - t^k = r^F - \beta k^F. \quad (24)$$

Finally, under the assumption of constant returns to scale the zero-profit condition in the production of the domestic consumption good determines the gross wage

$$w(r) n(r) + k^H(r) r = F[k^H(r), n(r)].$$

Differentiating with respect to  $r$  and using the condition that factor prices equal their marginal products gives the factor price frontier

$$\frac{\partial w}{\partial r} = -\frac{k^H}{n} < 0. \quad (25)$$

The optimal tax problem for the government is to maximize (20) subject to the constraints (21)–(25). We are only interested in the condition for the optimal tax rate on

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<sup>15</sup>These mobility costs can be rationalized in a number of ways: they may alternatively represent aversion towards exchange rate and other risk, information costs, or transaction costs in a more conventional sense. In either case, marginal costs must be increasing in order to ‘explain’ that some, but not all, investment is made abroad.

capital income. This condition is derived in the appendix and reads

$$t^k \left[ 1 + \beta \left( \frac{\partial w}{\partial r} \right)^2 \frac{\partial n}{\partial \omega} \right] = -\beta \frac{\partial w}{\partial r} \left( t^n + t^k \frac{k^H}{n} \right) \frac{\partial n}{\partial \omega}. \quad (26)$$

We assume a normal response of labour supply to its net wage  $\omega \equiv w - t^n$ , an assumption that is motivated below. Then the right-hand side of (26) must be positive if  $\beta$  is strictly greater than zero and a positive amount of tax revenue (the term in round brackets) must be collected. The left-hand side has the same sign as  $t^k$  which must, therefore, also be positive in the optimum. Note that the case of perfect capital mobility is included here as a special case: for  $\beta = 0$  the RHS of the equation is zero and only  $t^k = 0$  solves the equation. Other things unchanged, a rise in  $\beta$  supports a higher capital tax rate in the optimum since the RHS increases in proportion to the transaction cost parameter whereas the bracketed term on the LHS rises less than proportionately.

This is, of course, a standard Ramsey tax result. When the capital tax base is less than perfectly elastic then capital will bear some of the tax burden in the optimum along with labour. Note that  $\partial n / \partial \omega$  denotes here an uncompensated change in the labour supply, which may be backward bending in a closed economy. In this case, a tax on wages increases its own tax base and the optimal capital tax rate would be negative. It is obvious, however, that incorporating some degree of labour mobility into the model increases the substitution effect and makes this case rather unlikely in a European context. More generally, the labour supply elasticity can be seen as a proxy for the efficiency costs of using alternative tax instruments. As long as these costs are positive, the case for capital taxation remains.

The implications for optimal capital taxation in Europe are then straightforward. We first interpret (26) for a single EU country in the European capital market. If transaction costs, in particular exchange rate risk, are an important reason for the relatively low degree of capital mobility in Europe at present then monetary union should greatly intensify capital tax competition in Europe by lowering the transaction cost parameter  $\beta$ . This implies that the optimal tax rate on interest income falls in each member country. If  $\beta$  approaches zero, implying that the purchase of foreign bonds entails no extra cost relative to domestic bonds, then it is optimal for a small EU member to tax neither foreigners nor domestic residents on their interest income.

Alternatively, the same model can be used to describe the EU countries as a single (small) player in the world capital market<sup>16</sup>. It then becomes clear that an optimal *common*

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<sup>16</sup>If the EU as a whole can affect the world interest rate then optimal tax theory predicts that it will

capital tax in Europe is certainly positive since transaction costs and exchange rate risk vis-a-vis third countries will remain largely unaffected by the EMU. This calls for a coordinated source tax on capital in a financially integrated Europe even if coordination with the rest of the world is impossible. While any EU-wide source tax on capital income will cause some capital outflow to the rest of the world, a (small) capital tax will reduce the excess burden of taxation as compared to an exclusive reliance on wage taxation<sup>17</sup>. The optimal level of a common withholding tax will generally depend on the elasticity of the European capital base (represented by the parameter  $\beta$ ) vis-a-vis the elasticity of alternative tax bases. There is a clear need for empirical work in this area to determine the nature and the size of mobility costs that European investors face in world capital markets.

The coordination of national policies to tax portfolio income may proceed in two steps. First, it has been suggested that all EU members switch to a system of dual income taxation, applying a final flat-rate tax on capital income (Cnossen, 1995). In a second step, countries would have to agree on a common rate of capital taxation, or at least on an EU-wide minimum tax rate. Here, an important caveat to the above argument must be mentioned. By aggregating over EU member states we have implicitly assumed that all EU countries are identical, a condition that is clearly not met in reality. In fact the debate on the common withholding tax in 1989 has clearly demonstrated the diverging interests between EU member states, with Luxembourg, for example, being vigorously opposed to this measure. Theoretical analysis has shown that small countries may gain from capital tax competition and may therefore reject globally welfare improving harmonization measures unless they are compensated for giving up their competitive advantage (Wilson, 1991). The strategic issues involved here are quite similar to those discussed in the context of commodity tax competition and should therefore need no further elaboration.

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use the capital tax to manipulate the intertemporal terms of trade. There is, however, little evidence that (changes in) capital tax rates are systematically linked to the position of a country as a net debtor or a net creditor in world capital markets (Gordon and Bovenberg, 1994).

<sup>17</sup>As noted by Gordon (1992, p. 1162) it is less clear whether there are any equity gains from this coordination measure. While capital is taxed as an aggregate it may be precisely the large and wealthy investors that have the lowest transaction costs (for example because they can more effectively diversify their foreign-asset portfolios), and thus escape capital taxation.

### 3.2 Cash-flow Taxation vs. Minimum Corporate Tax Rates

In principle, the same argument that was made above for a common source tax on interest income can also be applied to corporation taxes. While monetary integration will not abolish all extra costs of investing in other EU countries as opposed to domestic investments, it is still likely that mobility costs within Europe are smaller than they are between Europe and the rest of the world. As we have seen, this is sufficient to make a general case for a minimum corporate tax in Europe even if there is also competition for direct investment between the EU and the rest of the world.

The question is, however, whether a (partial) harmonization of corporate tax rates is also necessary. Even though revenues from the corporation tax are far less important for national treasuries than, for example, the receipts from VAT, tax rate flexibility may be important since EU members seem to have widely diverging views on the optimal tax rate on corporate profits (cf. Table A.1). Therefore, a cash-flow tax has been proposed as a way to ensure investment neutrality without requiring the harmonization of national tax rates (e.g. Sinn, 1987).

To show the similarities between a cash-flow tax and an origin-based consumption tax in the presence of capital mobility we use the same framework and notation as in section 2.2.5 above but assume that  $w_i$  now denotes profits (or the return to a ‘hidden’ factor) rather than a return to labour. In this case, they will be included in the tax base of a cash-flow tax. The producer price of the consumption good (which equals the consumer price since there are no commodity taxes) is normalized to one. With  $t^k$  denoting the corporate tax rate the first-period budget constraint of the representative consumer in the home country is

$$c_1 + s = (1 - t^k)[w_1 + r_1 k_1 - (k_2 - k_1)].$$

Thus the possibility to immediately write off capital goods ensures that the cost of a unit of newly installed capital is only  $(1 - t^k)$ , irrespective of the rate of true economic depreciation. In the second period the returns to domestic capital are taxed whereas interest income from foreign assets remains tax-free in the *home* country. This can either be achieved by not taxing interest income at all or by applying the source principle of capital income taxation (Sinn, 1987, Ch. 11). In the latter case,  $r^F$  is simply interpreted as the net-of-tax return to savings in the foreign country. This gives the second-period budget constraint

$$c_2 = (1 - t^k)[w_2 + (1 + r_2) k_2] + (1 + r^F)s.$$

Eliminating  $s$  gives the intertemporal budget constraint

$$c_1 + \frac{c_2}{(1+r^F)} = (1-t^k) \left[ w_1 + (1+r_1)k_1 - k_2 + \frac{w_2 + (1+r_2)k_2}{(1+r^F)} \right]. \quad (27)$$

Maximizing the net present value of consumption with respect to  $k_2$  shows that a cash-flow tax does not distort the investment decision, i.e.,  $r_2 = \partial f / \partial k_2 = r^F$ . Substituting this result back into (27) simplifies the intertemporal budget constraint

$$c_1 + \frac{c_2}{(1+r^F)} = (1-t^k) \left[ w_1 + \frac{w_2}{(1+r^F)} + (1+r_1)k_1 \right]. \quad (28)$$

Thus a cash-flow tax reduces pure profits and the return to the initial capital stock but it does not effectively tax the return to capital formed after the tax has been introduced. It is immediately seen that (28) is equivalent to (19), up to a scaling factor, demonstrating that an origin-based consumption tax and a cash-flow tax on capital income are equivalent when capital is the only factor of production<sup>18</sup>. The core feature of both instruments is the taxation of ‘old’, and thus immobile, capital while mobile ‘new’ capital is exempted from tax.

At the same time, this equivalence suggests that the introduction of a cash-flow tax shares many of the drawbacks of an origin-based consumption tax. First of all, interpreting  $w_i$  as pure profits in equation (28) makes explicit that international tax differences distort the location decision of profit-making firms (cf. Richter, 1994). Furthermore, temporary investment distortions occur in the transition and redistributive income effects arise from foreign asset holdings. These effects will be more marked when tax rates increase under a cash-flow tax in order to compensate for a reduced tax base<sup>19</sup>. High and widely diverging tax rates also provide formidable incentives for transfer-pricing strategies, which are based on statutory rather than marginal effective tax rates.

Transfer pricing is often considered as one of the core problems for national autonomy over the level of corporate income taxes. In principle, the EU could follow the North American example and switch to a system of unitary income taxation, which allocates the total profits of a multinational enterprise across jurisdictions according to a predetermined apportionment formula. These formulae generally include turnover, payroll and the capital

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<sup>18</sup>If a second factor of production (labour) is added then this strict equivalence will, of course, no longer hold because wage income is deductible from the base of a cash-flow tax. An equal-rate wage tax would thus have to be imposed in addition to the cash-flow tax in order to duplicate the uniform commodity tax.

<sup>19</sup>Budgetary effects may be less important here than political considerations. Sørensen (1994, p. 60) suggests from the Danish experience that mutually offsetting changes in the base and the rate of capital taxation may be caused by the need to maintain a political equilibrium in this rather sensitive policy area.

stock in each jurisdiction as a share of the firm's total – economic magnitudes that are much more difficult for the firm to manipulate than country-specific profits. However, this possibility has neither been taken up by the Ruding committee nor by the Commission and the arbitration convention signed by EU member states also points towards maintaining the principle of arm's length pricing.

Finally, we have assumed up to now that the rents taxed by a cash-flow tax are *national* rents, which cannot be appropriated by the firm if it shifts its operations to another member state. While these country-specific rents (natural resources, public infrastructure) will remain relevant in the future, continuing integration in Europe may create a second source of rents, namely access to the European market (Keen, 1993). When location rents in *Europe* become an important element in the tax base of the corporation tax, then each country will try to appropriate some of these common rents and cash-flow taxation at the national level cannot prevent a process of downward tax competition.

Taken together, these arguments support the proposal in the Ruding report to set a Community-wide minimum tax rate on corporate profits. They also indicate why cash-flow taxation of corporate profits does not seem to play a dominant role in practice. To be sure, there are special cases where the combined effects of accelerated depreciation rules and special investment incentives have led to zero or even negative effective marginal tax rates on newly installed capital. Among these are the “accelerated cost recovery system” introduced in the United States in 1981 (Sinn, 1987, pp. 224-231) and the tax treatment of investments in Eastern Germany after the German unification in 1990 (Sinn, 1995). In general, however, tax reforms in the 1980s and the early 1990s seem to have followed the opposite approach, broadening the tax base and reducing the corporate tax rate. This is also true in the European Union where effective marginal tax rates in member states have fallen by much less than statutory tax rates (e.g. Schaden, 1995).

## 4 Conclusions

There is little doubt that further integration in Europe – and the creation of the Economic and Monetary Union as one important element in this process – will increase both the distortionary effects of existing differences in national tax systems and the intensity of tax competition for internationally mobile commodity and factor tax bases. Taking a position, as we have done here, that the harmful effects of tax competition outweigh the potential gains from less wasteful government behaviour, a systematic response to this development

has to proceed in two stages. The first step of tax coordination comprises all measures that align national tax systems while maintaining national tax rate autonomy. Only if such coordination measures prove to be infeasible or insufficient will tax rate harmonization become a necessary second step.

Based on this hierarchy of policy responses the present paper has tried to evaluate the scope for national tax rate autonomy in a European monetary union. Turning first to capital taxation our conclusion is that some degree of tax rate harmonization can probably not be avoided. Tax coordination can establish the source principle as the general scheme of capital income taxation, thereby acknowledging that source taxation is already prevalent in practice and enforcement of the residence principle is infeasible. This implies a formal departure from the traditional Schanz-Haig-Simons standard of comprehensive income taxation, a step that has already been taken by several EU member states. However, in a financially integrated Europe widely diverging tax rates on capital income do not seem to be sustainable. We have shown that an EU-wide minimum source tax on interest income will be efficiency improving even if no cooperation with non-member states is feasible, provided that exchange rate risk and transaction costs are systematically lower within the EU as compared to outside investments.

Similarly, there are arguments for a minimum level of corporate income taxation in Europe. In principle, national cash-flow taxes could prevent distortions in the international allocation of capital while maintaining national tax rate autonomy. However, diverging statutory tax rates still pose the problem of transfer-pricing and cash-flow taxation will not prevent a process of tax competition when national governments try to appropriate part of the rents that can be gained from access to the European internal market.

Given the relatively low share of capital tax revenues in most EU member states, one may argue that the efficiency gains from these coordination and (partial) harmonization steps will only be small and may not be worth the substantial political effort that is likely to be involved. However, to the extent that the remuneration of employees can be shifted from wages to capital income, this argument underestimates the role of capital taxation as a backstop for the entire income tax system. On the other hand, the relatively low share of corporate income tax revenue in most member states does imply that the budgetary consequences of harmonizing corporate income tax rates will be rather limited. The same is true for the taxation of capital income earned by individuals, where revenues may actually increase through reduced tax evasion.



In contrast, national tax rate autonomy over the value-added tax is crucial for the ability of member states to adjust to different – and changing – budgetary needs. This role of the VAT will become even more important when wage taxation ceases to be a purely national tax instrument due to increased labour mobility in Europe. The current VAT system is based on a strategy to minimize the departures from the traditional destination principle. The drawbacks of this scheme are that it limits national tax rate autonomy and creates incentives for wasteful arbitrage activities. The distortions that can arise from cross-border shopping, and the corresponding pressure on national VAT rate autonomy, are very likely to increase in a monetary union.

The fundamental alternative would be a switch to the origin principle. We have argued that an origin-based VAT in Europe could be designed in a way that ensures long-run trade and investment neutrality, and that would be compatible with both the current administration of the VAT and the taxation of trade with non-members under the going destination principle. Nevertheless, there are a number of strong arguments against the origin principle. First, it is unlikely that an origin-based VAT would be completely free of distortions, either in a domestic or in an international setting, and these distortions would fall on producer rather than consumer markets. A second argument against the origin principle arises from the interaction with source-based capital taxes<sup>20</sup>. Our analysis has shown that these taxes affect the same margins, implying that the two instruments would effectively reduce to one. This violates a general principle in optimal tax theory that tax receipts should be collected from as many independent sources as possible in order to avoid high (effective) tax rates. Finally, any change in national tax rates causes short-run trade imbalances under a regime of permanently fixed exchange rates if factor prices (in particular wages) adjust slowly. Since these short-run effects are highly visible, and thus tend to play a large role in the political process, the decision in favour of the monetary union may well have closed the door for a switch to origin-based commodity taxation in Europe.

In summary, our conclusion is that ‘neutral’ taxes will not be feasible under the constraints imposed by the continuing process of European integration, implying that the need for tax harmonization measures (in the form of minimum tax requirements) will increase as barriers to international goods and factor mobility fall. The reduced scope for national fiscal autonomy that this development entails must then be seen as an inevitable cost of European integration, and in particular of a European monetary union.

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<sup>20</sup>We owe this point to Lans Bovenberg.

## Appendix

Table A.1: Tax Rates in the European Union (1994)

Country	Corporation Tax (top rate) <sup>a</sup>	Value Added Tax (regular rate)
Austria	34	20
Belgium	42	20.5
Denmark	34	25
Finland	25	22
France	33.3	18.6
Germany	45/30	15
Greece	35	18
Ireland	40(10)	21
Italy	52.2/36	19
Luxembourg	33.3	15
Netherlands	35 <sup>b</sup>	17.5
Portugal	36	16
Spain	35	15
Sweden	28	25
United Kingdom	35	17.5

<sup>a</sup> Left value for retained profits, right value for distributed profits, in brackets special rate for the manufacturing sector.

<sup>b</sup> For the lowest part of corporate income 40 %.

*Source:* International Bureau of Fiscal Documentation (1994), European Tax Handbook 1994, Amsterdam: IBFD Publications BV.

**Derivation of Equation (26):**

Substituting (23) and (22) in (20) and using (25) the maximand can be written as

$$u \left\{ v \left[ (r - t^k) k^H + (1 - k^H) r^F - \tau(k^F) + (w - t^n) n, n \right], n \left[ t^n - t^k \frac{\partial w}{\partial r} \right] \right\}. \quad (\text{A.1})$$

Equation (A.1) is differentiated with respect to the two tax instruments. From the optimization of private utility we have the condition (where  $\omega = w - t^n$ )

$$\frac{\partial v}{\partial n} = -\omega \frac{\partial v}{\partial c} \quad (\text{A.2})$$

Furthermore, since the arbitrage condition (24) holds initially, a tax-induced change in the level of foreign investment has no first-order welfare effect at the margin. Thus the optimal tax rates  $t^n, t^k$  are implicitly defined by

$$\frac{\partial u}{\partial t^k} = \frac{\partial u}{\partial c} n \frac{\partial w}{\partial r} + \frac{\partial u}{\partial g} \left[ -n \left( \frac{\partial w}{\partial r} + t^k \frac{\partial^2 w}{\partial r^2} \frac{\partial r}{\partial t^k} \right) + \left( t^n - t^k \frac{\partial w}{\partial r} \right) \frac{\partial n}{\partial \omega} \frac{\partial w}{\partial r} \frac{\partial r}{\partial t^k} \right] = 0, \quad (\text{A.3})$$

$$\frac{\partial u}{\partial t^n} = \frac{\partial u}{\partial c} (-n) + \frac{\partial u}{\partial g} \left[ n \left( 1 - t \frac{\partial^2 w}{\partial r^2} \frac{\partial r}{\partial t^n} \right) + \left( t^n - t^k \frac{\partial w}{\partial r} \right) \frac{\partial n}{\partial \omega} \left( \frac{\partial w}{\partial r} \frac{\partial r}{\partial t^n} - 1 \right) \right] = 0. \quad (\text{A.4})$$

Forming

$$\frac{\partial u}{\partial t^k} + \frac{\partial w}{\partial r} \frac{\partial u}{\partial t^n}$$

gives

$$-n t^k \frac{\partial^2 w}{\partial r^2} \left( \frac{\partial r}{\partial t^k} + \frac{\partial w}{\partial r} \frac{\partial r}{\partial t^n} \right) + \left( t^n - t^k \frac{\partial w}{\partial r} \right) \frac{\partial n}{\partial \omega} \frac{\partial w}{\partial r} \left( \frac{\partial r}{\partial t^k} + \frac{\partial w}{\partial r} \frac{\partial r}{\partial t^n} - 1 \right) = 0. \quad (\text{A.5})$$

The final step is to substitute out for  $\partial r / \partial t^k$  and  $\partial r / \partial t^n$ . Differentiating (24) with respect to the two tax rates gives

$$\frac{\partial r}{\partial t^k} (1 + \beta \varepsilon) = 1, \quad \frac{\partial r}{\partial t^n} (1 + \beta \varepsilon) = \beta \frac{\partial w}{\partial r} \frac{\partial n}{\partial \omega}, \quad (\text{A.6})$$

where

$$\varepsilon = n \frac{\partial^2 w}{\partial r^2} + \left( \frac{\partial w}{\partial r} \right)^2 \frac{\partial n}{\partial \omega}.$$

Substituting (A.6) in (A.5), multiplying through by  $(1 + \beta \varepsilon)$  and cancelling terms gives equation (26) in the main text.

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