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Company Tax Coordination cum Tax Rate Competition in the European Union

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Abstract

This paper reviews the recent theoretical literature that analyses the European Union's policy to eliminate preferential corporate tax regimes and the proposal to introduce a consolidated EU tax base with formula apportionment for the taxation of multinational firms. Since neither proposal includes a harmonisation of corporate tax rates, a core issue is how tax competition between member states will be affected by these partial coordination measures. The conclusions from our review are supportive of the EU's ban on preferential tax regimes, but the economic incentive effects of a switch to formula apportionment are found to be ambiguous.

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1 Introduction

The two most recent attempts at corporate tax coordination in the European Union (EU) have been the Code of Conduct for business taxation (European Communities, 1998), which aims to ban discriminatory corporate tax policies by member states, and the proposal to introduce a consolidated company tax base and formula apportionment (European Commission, 2001). The first proposal, which is already being implemented, prevents countries from granting preferential tax regimes to only a subset of firms (typically, multinational enterprises) without according the same tax tax treatment to all firms within its tax jurisdiction. The second proposal, which is still being actively debated, aims at reducing the possibilities for multinational firms to shift profits between the different countries in which it operates. This shall be done by consolidating the EU-wide profits of the multinational group in a single tax base, which is then allocated among the different countries in which the group operates according to a pre-determined formula.

The common element in these two coordination measures is the absence of any plans to harmonise company tax rates in the EU. This differs markedly from earlier proposals, such as the Ruding Report (1992), which proposed a minimum EU-wide corporate tax rate of 30%. It is possible to speculate about the reasons for this new stance taken by the EU bodies in favour of national tax rate autonomy in corporate taxation. In particular, the changed approach could either be due to the adoption of public choice arguments that emphasise the virtues of international tax competition, or to the simple recognition that tax rate harmonisation is not a politically feasible option in the near future. But whatever the reasons, the fact that EU member states can adjust corporate tax rates in their own, best interest is clearly an important constraint for the coordination measures taken at the EU level.

¿From a theoretical perspective, this constraint leads to a fundamental second-best problem for tax coordination, as it is possible that tax rate competition becomes more distortive, or more severe, when partial coordination measures are introduced. Indeed, it has been shown that both the abolition of preferential tax regimes (Keen, 2001) and the switch to a formula apportionment rule for taxing the profits of multinational firm (Gordon and Wilson, 1986) can be welfare-*reducing* under specific circumstances. In recent years a body of theoretical literature has evolved that tries to assess, in various second-best settings, how robust these negative results for tax policy coordination are.

The aim of the present paper is to survey this recent literature and on that basis draw conclusions for the desirability of the two different coordination measures currently discussed in the EU. Our focus is primarily a theoretical one, discussing the economic incentive effects of the proposed coordination measures and in particular the non-cooperative adjustment of company tax rates. In this respect our approach is complementary to earlier work that has provided a thorough evaluation of the various aspects that are associated with a switch to formula apportionment (see, for example, Devereux, 2004 and Sørensen, 2004). We also do not attempt to provide a general overview of the recent tax competition literature, this latter task having been undertaken in Fuest, Huber and Mintz (2005).

The fact that the latest EU proposals in the area of company taxation abstain from any measures of tax rate harmonisation is all the more remarkable since statutory corporate tax rates have fallen significantly in recent years. This development is reinforced by the accession of the new EU member states, whose corporate tax rates are significantly below those in the former EU-15 countries. Moreover, EU-specific empirical evidence is accumulating that documents how firms' location and profit shifting decisions are affected by international tax rate differentials. For these reasons, Section 2 first takes stock of the existing tax differences in the enlarged EU, and briefly surveys the empirical evidence on companies' responses to these tax differentials. Section 3 then deals with the Code of Conduct for business taxation and its possible effects on tax rate competition between member states. Section 4 similarly discusses the incentives for the adjustment of national tax policies under a consolidated corporate tax base with formula apportionment. Section 5 summarises and concludes.

2 Corporate tax differentials in the EU

2.1 Measures of the corporate tax burden

Let us start by briefly summarising the differences in corporate income taxes (CIT) that presently exist in the European Union.[1] Special emphasis is placed on the new

[1] We do not report here on the changes in corporate income tax systems that have taken place in the last two decades. For this, see the detailed account in Devereux, Griffith and Klemm (2002). Also, our treatment does not incorporate the integration of corporate and personal income tax in the EU member countries. For the EU-15 this is documented, for example, in Genser and Haufler (1999).

EU member states, and on the issue of what enlargement implies for tax competition within the EU. Table 1 compares the corporate tax systems in all 25 member states by three different measures: (*i*) the statutory corporate tax rate; (*ii*) the average effective tax rate; (*iii*) the share of corporate tax revenues in total tax revenues collected.

The most straightforward comparison is between statutory, or nominal, CIT rates. In 2004 these have varied between a minimum of 12.5% in Ireland and a maximum of roughly 39% in Germany when local business taxes and surcharges are included. While the new EU members do not underbid the very low Irish tax rate, all of them except Malta levy CIT rates between 15 and 28%.[2] The average of statutory tax rates in the accession countries is only 21.5%, which is 10 percentage points below the average for the old (EU-15) member states. This is a first indication that tax rate competition for mobile international capital may further increase in the enlarged European Union.[3]

A more comprehensive comparison of the CIT systems in different countries must also include the legal definition of the tax base. A measure that is now widely used is the *effective average tax rate* (EATR) developed by Devereux and Griffith (2003). The EATR can be seen as a weighted average of the statutory tax rate and the effective marginal tax rate (EMTR), where the latter is the tax rate on an investment that just earns a net rate of return equal to the going interest rate. The weight of the statutory tax rate in the EATR rises with the profitability that is assumed for the underlying investment project. By its construction the EATR incorporates in a single measure both the taxation of a small, additional investment in a given country, and the taxation of a large, and profitable, investment project. This measure has been used in an empirical study of the EU 15 countries that underlies the current proposals for corporate tax

[2] A special feature of the Estonian tax system is a CIT rate of zero for retained profits.

[3] International tax differentials are relevant only when it is the tax rate of the host country of the investment that matters from the perspective of firms. There is, however, a consensus in the literature that worldwide company taxation indeed follows closely the source principle of taxation (see e.g. Tanzi and Bovenberg, 1990). This principle applies directly, if countries avoid international double taxation by exempting foreign-earned income from domestic tax. Moreover, countries that use the alternative method of granting an international tax credit generally limit this credit to the amount of tax that would have been owed domestically. Hence taxation at source is again effective, if the tax rate in the source country of the investment exceeds the tax rate in the home country of the investor. Finally, foreign-earned profits are generally not taxed in the residence country of the investor until they are repatriated. This gives firms an incentive to defer repatriation if the home country employs the tax credit method and if its tax rate is higher than that in the source country. Source taxation will thus again be effective during this period.

Table 1 : Corporate tax rates and tax revenue in the EU 25

	statutory tax rate[a]	average effective tax rate[b]	corporate tax revenue[c]	
Austria	34	26	6.9	
Belgium	34	33	6.7	
Denmark	30	28	5.8	
Finland	29	25	9.3	
France	35.4	30	5.9	
Germany	38.7	33	1.5	
Greece	35	27	10.4	
Ireland	12.5	8	13.0	
Italy	37.3	28	6.3	
Luxembourg	30.4	32	20.5	
Netherlands	34.5	30	9.4	
Portugal	27.5	28	10.3	
Spain	35	32	9.5	
Sweden	28	23	5.1	
U. Kingdom	30	25	7.6	
∅ *EU 15*	31.4	27.2	5.9	
Cyprus	15	14.5	15.4	
Czech Republic	28	24.7	12.4	
Estonia	26[d]	22.5	3.8	
Hungary	17.7	18.1	6.1	
Latvia	15	14.4	6.9	
Lithuania	15	12.8	2.1	
Malta	35	32.8	13.1	
Poland	19	18.0	4.9	
Slovak Republic	19	16.7	8.3	
Slovenia	25	21.6	3.4	
∅ *new members*	21.5	19.6	6.6	

[a] 2004, including local taxes; [b] pre-tax financial return of 20%;

[c] as % of total tax revenue; 2002; [d] zero tax rate on retained earnings.

Statutory tax rates: European Commission and Eurostat (2004), Structures of the taxation systems in the European Union, Table II-5.1, Luxembourg.

Effective average tax rates: Devereux, Griffith and Klemm (2002, Figure 7) for EU 15; Jacobs et. al. (2004, Figure 5) for new members.

Corporate tax revenue: European Commission and Eurostat (2004), Structures of the taxation systems in the European Union, Table A.2.2, Luxembourg.

coordination (European Commission, 2001) and it has since been updated and applied to the new EU members in a recent study by Jacobs et al. (2004).

The picture that emerges from a comparison of average effective tax rates in the EU 25 is roughly similar to that observed for statutory CIT rates. For most countries EATR rates are several percentage points below the statutory tax rates, reflecting the reduced tax burden on marginal investment projects. In the new member states the average of EATRs is less than 20%, as compared to 27% for the old members. In sum, both the statutory and average effective tax rates show that the taxation of corporate income in the European Union is falling, on average, as a result of EU enlargement.

Finally, the last column in Table 1 gives the share of CIT revenues in total tax collections (including social security contributions). These figures shows that, despite their low tax rates, the new EU members rely somewhat more on corporate tax revenues in financing the government budget than the old members do. More generally, fiscal revenue needs are likely to ensure that a revenue-raising role for the corporate income tax will remain in all EU member states. However, some small, low-tax states – such as Cyprus and Ireland – are able to collect a relatively high share of tax revenues by attracting investment from other countries. This indicates that imposing a threshold on the level of tax *revenue* that must be collected from CIT - as has been suggested in the recent political debate - is not an adequate way of dealing with corporate tax competition in the European Union.

2.2 The effects of tax differentials: Empirical evidence

There are by now a large number of econometric studies that measure the effects of corporate income taxation on the decisions of international investors. Hines (1999) surveys the earlier empirical evidence, which is almost exclusively based on investment from or into the United States. He distinguishes between studies that focus on foreign investment decisions and those that focus on various tax avoidance strategies. In general, the studies included in his survey point to a statistically significant impact of taxes on both the pattern of foreign direct investment (FDI) and on the extent of international profit shifting activities.

The survey by de Mooij and Ederveen (2003) is confined to the effects of taxes on real investment decisions, but it includes several recent studies that are based on data for intra-European FDI flows. The authors compare the quantitative results of 25 empir-

ical studies on the effects of taxes on FDI by transforming all results into tax rate elasticities. In their sample, the median estimate is that a 1 percentage point decrease in the host country's tax rate raises foreign direct investment into that country by 3.3 per cent. They also carry out a meta-analysis of the studies in their sample by regressing tax rate elasticities on several characteristics of the underlying studies. This analysis suggests, for example, that there are no statistically significant differences in tax rate elasticities when investors reside in a country that applies an international tax credit scheme (residence principle), or in a country that exempts foreign-earned capital income from tax (source principle; cf. footnote 3).

It is argued in Devereux and Griffith (2002), however, that many of these empirical studies raise some fundamental conceptual issues. One important caveat is that financial FDI flows need not imply that an addition to the capital stock in the host country is actually taking place. In particular, a large part of what is classified as FDI (60%, according to a recent OECD estimate) reflects mergers and acquisitions (M&A) that change the ownership structure of firms, but do not increase the receiving country's aggregate capital stock. Swenson (2001) shows that the distinction between new (greenfield) investment and mergers and acquisitions (brownfield investment) is critical when it comes to the effects of taxes on measured FDI. Studying international investments in different U.S. states, she finds that while an increase in the statutory tax rate does indeed tend to reduce new investment, it instead has a *positive* effect on M&A activity.

Another point raised by Devereux and Griffith (2002) is that aggregating financial FDI flows for a given country lumps together a discrete choice to locate in a particular country and the volume of the investment. According to economic theory, effective average tax rates, as shown in Table 1, should govern the discrete location choice, whereas effective marginal tax rates should determine the optimal size of the investment. If these two measures are sufficiently different, as they often are, the econometric results represent a mixture of two distinct effects.

The conclusions that emerge from these critical observations is that econometric evidence on the relationship between taxes and FDI should look at firm-level data on new investment, and focus either on the discrete choice of a particular location, or on the volume of the investment, conditional on the location choice having already been made. This procedure is followed by Devereux and Griffith (1998), who isolate the choice of U.S.-based multinationals to set up a subsidiary in Germany, France, or the UK, using firm-level data on FDI. In this setting they find that an increase in the

effective average tax rate of 10 percentage points reduces the probability of the U.S. firm to set up a subsidiary in this country by 5 to 13 percentage points. In contrast, the effective marginal tax rate is generally not a significant determinant for the choice to locate a new plant in a particular country.

Büttner and Ruf (2004) have recently carried out a similar analysis using firm-specific data for a panel of German multinationals investing in 15 different host countries. In their analysis, changes in the effective marginal tax rate again do not significantly affect the location decision of the multinational firm. An increase in the effective average tax rate of the receiving country by 10 percentage point reduces the likelihood to locate a new plant in that country by 3 percentage points, whereas a 10 percentage point increase in the statutory tax rate reduces the odds of attracting a new plant by 5 percentage points. Therefore, even though the quantitative responses to tax differentials are somewhat below those found by Devereux and Griffith (1998) the qualitative results are similar.

Another relevant way to disaggregate the data is to consider sector-specific responses to international tax differentials. Stöwhase (2005) derives separate tax elasticities for the primary, secondary and tertiary sectors, using data for bilateral FDI flows from Germany, Holland and the United Kingdom into eight European target countries. He finds that effective tax rates play no significant role in the primary sector, but are significant in both manufacturing and services. According to his results, a tax elasticity that is derived as an average from all sectors of production will underestimate the tax sensitivity of foreign direct investment in the manufacturing sector by about 20 per cent and in certain sub-sectors of the service industry by as much as 40 per cent.

A further issue is whether investment in low-tax regions occurs primarily for purposes of real production, or instead is done mainly to benefit from profit-shifting activities. It is inherently difficult to distinguish between these two motivations by means of econometric analyses, but some attempts in this direction have been made. A well-known example is the analysis of Grubert and Slemrod (1998) who use a structural econometric model to determine the motivations for the investment of U.S. corporations in Puerto Rico. This paper produces rather strong econometric evidence that U.S. FDI in Puerto Rico is primarily driven by tax-shifting motivations. It is not entirely clear, however, how easily this finding can be generalised, due to the special tax status accorded to Puerto Rico by the United States.

Grubert (2003) analyzes which forms of income shifting are empirically the most impor-

tant. He finds that intra-company financial transactions and the allocation of overhead costs for research and development (R&D) are the principal ways how profit shifting occurs within U.S.-based multinationals. As a result, income shifting is more likely to occur in R&D intensive industries. Moreover, Grubert finds that subsidiaries in locations with either very high or very low tax rates undertake a significantly larger volume of intercompany transactions. This is consistent with the theoretical expectations that very high (very low) tax rates offer substantial incentives to shift income out of (into) the country.

Some direct evidence for profit shifting by means of traditional transfer pricing strategies is obtained by Clausing (2003). She is able to exploit a data set that contains intra-firm import and export prices of U.S.-based multinationals, differentiated by the country in which the subsidiary is located. Her econometric analysis shows that, other things being equal, the U.S. parent charges lower export prices, and pays higher import prices, if the subsidiary is located in a low-tax country. This pattern is consistent with a strategy that minimises the global tax payments of the multinational firm.

In sum, despite the conceptual problems discussed above, the existing empirical literature gives rather clear evidence that cross-country differences in effective and statutory tax rates affect the investment decisions of multinational firms. In view of the sizable gap between the differences in statutory and effective average tax rates between EU member states (Table 1), this points to potentially important tax-induced distortions in the allocation of capital across Europe. Moreover several studies find evidence that international differences in statutory tax rates are exploited by multinational firms in order to shift profits out of high-tax countries. These findings underlie the different measures of corporate tax coordination in the European Union to which we turn now.

3 Eliminating preferential tax regimes

3.1 The measures

A first manifestation of the new approach to corporate tax coordination in the European Union has been the adoption of the Code of Conduct for business taxation in December 1997 (European Communities, 1998). This measure does not attempt to harmonise either tax bases or corporate tax rates, both of which had been proposed in the Ruding Report (1992). Instead it is targeted at the long-standing practices of several

EU members to tax-discriminate between firms that are deemed to be more mobile internationally (typically, multinational enterprises) and those that are considered to be less mobile across borders.[4]

A prime example of preferential tax regimes has been the split corporate tax rate in Ireland, which persisted until 2002. Under this scheme, manufacturing firms (primarily multinationals) paid a reduced tax rate of 10%, whereas other firms (mostly domestic) faced a CIT rate of 40%. Another example is the taxation of coordination centers in Belgium, which has been in effect continuously since 1983. This special tax regime is explicitly confined to multinational groups which have their headquarters outside Belgium. While the normal statutory tax rate is applied, it is levied on a notional tax base that is far narrower than that of non-favoured firms, leading to effective profit tax rates that are close to zero for most of the multinational groups.[5]

Under the Code of Conduct, EU member states have committed themselves to refrain from the following measures of either explicit or implicit tax discrimination: (1) tax preferences which are accorded only to non-residents, or are ring-fenced from the domestic market; (2) tax advantages granted to firms with no real economic activity in the country; (3) rules for profit determination that depart from internationally accepted principles; (4) non-transparent administrative practices in enforcing tax measures.

To enforce these provisions, a Code of Conduct group on business taxation was set up. Their report (Primarolo Report; European Communities, 1999) identified a total of 66 measures taken by EU member states and associated territories which were regarded as violating the Code of Conduct. The listed measures, including the reduced tax rate on manufacturing firms in Ireland and the Belgian coordination centers, have been or are required to be phased out. The same also applies to similar discriminatory measures introduced by the new EU member states. In particular, the Estonian practice of exempting retained profits entirely from corporation tax (cf. footnote 2) must be discontinued as of 2008.

The idea behind the Code of Conduct is to ensure that tax breaks, if introduced, apply to the entire corporate sector, thus making it more 'costly' for a host country to grant

[4]A parallel initiative to prevent discriminatory corporate tax policies worldwide has been undertaken by the OECD (1998).

[5]See Weichenrieder (1996) for an account of the response of German multinationals to these tax breaks, and of the changes in the German foreign tax law that were enacted to protect the corporate tax base in Germany.

highly favourable tax conditions for business. However, in the absence of any formal measures of tax rate coordination – in particular, in the absence of minimum statutory tax rates – countries may respond by setting very low *general* tax rates for corporate profits that arise within their jurisdiction. This is just what happened in Ireland, which moved (in 2003) from a two-tier corporation tax with rates of 10% and 40% to a general CIT rate of 12.5%. The Irish example thus shows very clearly that enforcing a single tax rate on all corporate profits may lead to a reduction in the average level of business taxation.

3.2 Economic analysis

There is a small set of theoretical studies that explicitly compares inter-jurisdictional tax competition under discriminatory vs. non-discriminatory tax regimes. The first paper in this area is Janeba and Peters (1999), who consider a setting where two (asymmetric) countries compete for a tax base that is perfectly mobile internationally, but at the same time are able to tax a completely inelastic domestic tax base. In the first stage the two countries decide on whether to choose discriminatory or non-discriminatory tax policies; whereas in the second stage they decide on the optimal, non-cooperative tax rate(s). Janeba and Peters show that in the absence of any coordination, each country chooses discriminatory tax policies in the first stage of the game. In the second stage, revenue-maximising governments levy the maximum tax on the immobile domestic tax base, but a zero tax on the internationally mobile base. This corresponds to a prisoner's dilemma situation, as the mobile tax base escapes taxation altogether. When the countries are constrained to set non-discriminatory tax policies, the country with the smaller domestic tax base will set the lower tax rate in the Nash equilibrium and attract the mobile tax base. This country's tax revenues increase whereas tax revenues for the other country are unchanged, relative to the benchmark case of tax discrimination. Imposing a non-discrimination constraint is thus a (weakly) Pareto improving measure in this analysis.

The analysis of Keen (2001) reaches just the opposite conclusion, however. He sets up a model of two symmetric countries which compete over two tax bases that are both internationally mobile, albeit to a different degree, and assumes that the aggregate size of each tax base is fixed. The core difference to the analysis of Janeba and Peters is that the two countries now compete over *both* tax bases and constraining the competition for the more mobile base will lead to more aggressive competition for the less mobile

base. In the Nash equilibrium with binding non-discrimination standards in place, Keen shows that the revenue losses from a lower tax rate on the less mobile base outweigh the revenue gains that result from the higher equilibrium tax rate on the more mobile base. Hence a strict non-discrimination policy reduces tax revenues in each country, relative to the non-cooperative outcome in the absence of any constraints.[6]

Janeba and Smart (2003) have further explored these contrasting conclusions and have generalised Keen's model by endogenising the size of the aggregate tax bases in the two countries. A straightforward interpretation of this setting is that there are two (union) countries which are competing against each other, but also interact with an outside country. A ban on tax discrimination that leads union countries to compete more aggressively for the less mobile base will now increase the aggregate tax base in the two countries taken together, by attracting capital inflows from the rest of the world. In this sense, extending the model of discriminatory tax competition to allow for interactions with third countries strengthens the policy case in favour of restrictions on preferential tax regimes.

A different extension of the discriminatory tax competition model is explored by Haupt and Peters (2005). In their model investors have a home bias and the tax base of each government is composed of the less mobile investment of domestic residents, and the more mobile investments of foreigners. In the non-cooperative equilibrium, tax discrimination then takes the form of each country levying a higher tax rate on domestic investment. The main difference to the setting of Keen (2001) is that each government considers a different tax base as being more mobile. The main finding of Haupt and Peters is that a home bias of investors makes it more likely, relative to the benchmark analysis of Keen (2001), that a restriction on the tax preferences granted to foreign investors reduces the intensity of tax competition and raises tax revenues in each country.

Bucovetsky and Haufler (2005) model a sequential game of two symmetric countries where governments make long-run decisions on the degree of tax discrimination, and short-run decisions on the level of tax rates. As tax discrimination regimes are of a

[6]In the case of non-discrimination, there is no symmetric equilibrium in pure strategies when one of the tax bases is perfectly elastic. Wilson (2005) therefore considers mixed strategy equilibria in a symmetric tax competition game with one perfectly mobile base. He shows that discriminatory and non-discriminatory tax policies raise the same expected revenue when the second tax base is completely immobile, but discriminatory tax policies raise higher expected revenue when the second base is imperfectly mobile. The last result thus generalises Keen's (2001) finding.

long-term nature, firms will endogenously respond to tax preferences by investing in a mobile (multinational) organisational form. In this model an increase in tax preferences allows each country to levy a higher effective tax on *both* mobile and immobile capital, because the average elasticity of the tax base is reduced when there are more tax loopholes for mobile firms. However, the *mix* between the mobile and the immobile tax base changes, as more firms will choose the multinational structure in response to increased tax savings from mobility. In this setting a coordinated reduction in tax preferences will then be welfare improving, if the elasticity with which firms change their organisational form in response to tax incentives is sufficiently low. Each country will then choose a high degree of tax discrimination in the first stage of the game, and maximum taxation of immobile firms in the last. In this case, the model of Bucovetsky and Haufler thus approaches that of Janeba and Peters (1999) and accordingly yields similar results.

The models surveyed in this section are sufficiently homogeneous so that a common conclusion can be drawn from them. Whether non-cooperative tax discrimination policies are mutually self-defeating or not seems to depend critically on the opportunity costs that each country has in granting tax privileges to mobile firms. If these opportunity costs are sufficiently low, then countries will choose excessive tax preferences for mobile, multinational firms, and a coordinated policy to reduce these preferences will be welfare improving. This is the case in the model of Janeba and Peters (1999) and also in that of Bucovetsky and Haufler (2005), if the firms' choice of a multinational organisational form responds inelastically to tax incentives. Similarly, the opportunity costs of discriminatory tax policies are reduced in the framework of Haupt and Peters (2005) through the assumption that investors are home-biased.

Applying these results to evaluate the EU's Code of Conduct, it is important to emphasise that preferential tax regimes are typically tailored at foreign-based firms, without granting domestic firms – even domestic multinationals – the same benefits. With this 'ring-fencing' of tax bases, countries need not fear that domestic firms can take advantage of the special tax breaks granted; hence the opportunity costs of providing generous tax preferences are indeed small. Therefore - despite the counterexample provided by Keen (2001) - the general conclusion from the recent literature is that a coordinated ban on tax preferences, as currently enforced in the European Union and worldwide, is likely to raise overall tax revenues in the countries involved.

4 Common tax base and formula apportionment

4.1 Proposed measures

The second major policy initiative in the area of corporate tax coordination is the proposal of the European Commission (2001) to move away from the current scheme of separate accounting when determining the corporate tax liabilities of multinational firms operating in several EU member states.[7] The main drawback of this scheme is that it offers multinationals ample opportunities to shift profits from high-tax to low-tax states (see Section 2.2). The report stresses that "there is undoubtedly evidence for aggressive transfer pricing by companies" (European Commission, 2001, p. 262). However, it also emphasises the high compliance costs that arise under separate accounting, due to the need to deal with a different set of tax rules in each EU member state. Hence, according to the report, a consolidated tax base would simultaneously reduce firms' compliance costs and it could be designed so as to curb profit shifting by European multinationals.

The report introduces four alternatives ways of consolidating profits across member states. The central proposal is, however, to introduce a common, consolidated tax base under which the total income of a group of interconnected companies would be determined, and to allocate the tax base among the involved jurisdictions according to a pre-determined mechanism (formula apportionment). Each EU member state would then apply its national tax rate to the share of the overall tax base that is allocated to it under the agreed-upon allocation mechanism. This procedure closely follows the example of federal states with sub-national tax autonomy, such as the United States, Canada or Switzerland.

The fact that the common consolidated tax base would not require EU member states to harmonise corporate income tax rates is stressed throughout the European Commission's (2001) report. Arguably, this position is owed to repeated previous attempts of the European Commission to introduce minimum corporate income taxes, or bands for CIT rates, all of which have been unsuccessful. For this reason, issues of tax rate harmonisation are largely omitted, even though a simulation analysis incorporated in the

[7] This proposal, is embedded in a review of the current state of corporate taxation in the EU, and it is the most important of a set of proposals made to reduce tax-induced distortions in the area of company taxation in Europe. For more general reviews and analyses of the European Commission's (2001) report, see e.g. Devereux (2004) and Sørensen (2004).

report shows that the harmonisation of statutory tax rates would significantly reduce the dispersion of effective average and marginal tax rates across EU member states.

In the following, our review of the literature will focus on the basic question whether a switch to a consolidated corporate tax base and formula apportionment can be expected to improve the efficiency of capital income taxation in Europe, provided that this reform will not be accompanied by a coordination of CIT rates in the EU. To be sure, the specific proposals made in the European Commission's (2001) report raise a number of further important issues, which have already received some discussion in the literature. Among them are whether the consolidated tax base should be compulsory or optional (Mintz, 2004), whether only the EU-wide or the worldwide profits of EU-based multinational firms should be consolidated (Sørensen, 2004), or the fundamental issue of defining the appropriate group whose income is to be consolidated (Hellerstein and McLure, 2004). These issues, however, will only become relevant if the basic question of whether formula apportionment is likely to improve the efficiency of corporate income taxation in Europe has been answered in the affirmative.

4.2 Economic analysis

Several recent contributions compare the outcome of corporate tax competition under separate accounting and formula apportionment systems of company taxation. This literature departs from McLure's (1980) basic insight that a corporation tax with formula apportionment equals a source-based tax on all factors that are present in the apportionment formula. In an influential paper Gordon and Wilson (1986) rigorously analyse these various distortions of formula apportionment. They show, for example, that formula apportionment gives an incentive to a firm in a high-tax country to merge with a firm in a low-tax country when capital is used to apportion taxable income. The reason is that competition drives after-tax profits to zero in their analysis, implying that before-tax profits will be higher in high-tax states. Hence a merger will reduce the average tax rate that the corporation faces on its profits, whereas the same incentive to merge does not exist under separate accounting. Moreover, a tax increase in one jurisdiction will increase before-tax profits in all jurisdictions under formula apportionment, whereas an increase in the rate of source taxation under separate accounting increases before-tax profits in the taxing country only. This implies that under formula apportionment a tax increase in one jurisdiction causes a positive externality on corporate tax revenue in other jurisdictions which is not present under separate accounting. In

a setting where the corporate tax base includes pure profits and a share of the costs of capital, this spillover is added to the fundamental tax base externality from capital relocations, which arises under both tax schemes. Accordingly, Gordon and Wilson (1986) can show that a switch from separate accounting to formula apportionment reduces the tax incentives in each jurisdiction and leads to lower equilibrium levels of corporate tax revenue and welfare. However, their model does not allow for international profit shifting and in this sense the comparison between separate accounting and formula apportionment is stacked against the latter scheme.

A systematic comparison between separate accounting and formula apportionment regimes is undertaken by Nielsen et a. (2001). They consider a symmetric model where each of two countries is the host of a profitable multinational firm which owns a subsidiary in the other country. The parent and the subsidiary can engage in transfer pricing for an internal input exchanged within the multinational enterprise (MNE), but convex detection costs limit the deviation from the true price of the input. Corporate taxes are modelled as source-based taxes on capital. In this setting, international tax differentials under the separate accounting rule give an incentive to the MNE to engage in transfer pricing and simultaneously distort investment decisions. In contrast, under a formula apportionment rule where only capital employment enters the sharing formula, tax differentials solely distort the firms' investment towards the low-tax country. This effect arises because firms can use their capital investment to manipulate the weight in the apportionment formula towards the low-tax country, thus causing a reduction of their overall tax burden. In the symmetric, decentralized equilibrium tax rates will be closer to the efficient level under formula apportionment as compared to separate accounting, if and only if the profits earned by the MNEs and the detection costs of profit shifting are both low. Intuitively, in this case the distortions caused by formula apportionment - and accordingly the incentive for countries to lower tax rates strategically - are moderate, whereas aggressive transfer pricing and a severe competition for paper profits occurs under separate accounting. In general, however, neither scheme dominates the other in the analysis of Nielsen et al. (2001).

Eggert and Schjelderup (2005) extend this model by allowing countries to choose the tax base along with the tax rate. In their model capital and labour are in the apportionment formula and the base of the corporate income tax in each country is the value of output less a share of the true cost of capital. If the deductible share of capital costs is less than unity, the model reproduces the standard result that an increase in

the tax rate raises the costs of capital, thus implying lower investment in the taxing country. If, however, the share equals one then the corporation tax turns into a tax on comprehensive business income only. Eggert and Schjelderup show that, with transfer pricing incentives eliminated by formula apportionment, countries will allow for a full deduction of the costs of capital in the non-cooperative equilibrium. This is in contrast to the results under separate accounting where competing countries have an incentive to broaden the tax base and thus accept a distortion of investment decisions, in order to keep tax rates low and reduce profit-shifting to the other jurisdiction (Haufler and Schjelderup, 2000). Hence, in this framework a non-distortive cash-flow tax is a possible outcome of decentralised corporate taxation under formula apportionment, but not under separate accounting.

Another argument in favour of formula apportionment is advanced by Mintz and Smart (2004). They consider a firm which is able to affect the taxable income reported in its books through a strategy of borrowing and lending among affiliates incorporated in different jurisdictions.[8] Profit shifting through borrowing causes convex deadweight costs, but in contrast to Nielsen et al. (2001) these costs depend on the level of investment in the low-tax country. Hence a separate accounting scheme gives rise to profit shifting and to a distortion of real investment decisions. In this model Mintz and Smart show that a corporation tax causes a higher excess burden under separate accounting than under formula apportionment. The reason is that a marginal tax differential between countries affects investment in similar ways, but separate accounting causes an additional incentive for profit shifting via internal borrowing.

The case for formula apportionment is weakened, however, when oligopolistic interaction in output markets is taken into account. Nielsen et. al. (2003) consider a two-stage game where the multinational faces oligopolistic competition in local markets and delegates decisions about quantities to its subsidiaries, whereas the transfer price is set at the central level. In this setting the transfer price has both a tax saving and a strategic effect. The latter arises because the transfer price chosen by the central level affects quantity competition in the final stage of the game and hence overall profits earned by the MNE. Importantly, this strategic effect is independent of the corporate tax system. Hence the incentives for transfer pricing may be equally large, or even larger, under formula apportionment as compared to a separate accounting scheme.

Most of the literature we reviewed so far assumes that countries compete in tax rates

[8]For the empirical relevance of this tax avoidance strategy, see Section 2.2.

only and that a consensus between them can be achieved concerning the relative weights of the factors that enter the apportionment formula. Wellisch (2004) instead considers a model where countries non-cooperatively choose both the corporation tax rate and the weights used in the allocation formula.[9] In this setting he shows that it is in the best interest of each country to choose a zero weight on the employment of internationally mobile capital and place full weight on internationally immobile labour. This effectively converts the corporation tax into a tax on labour and eliminates tax competition. As stressed by Wellisch, this result effectively restates the general finding in the tax competition literature that small countries do not tax internationally mobile capital. However, if employment is the only factor in an apportionment formula, then the corporation could be abolished altogether and replaced by a direct tax on wages.

To escape this dilemma, several authors (Sørensen, 2004; Wellisch, 2004; Gérard, 2005) have discussed the use of macroeconomic or industry weights in the apportionment formula, instead of firm-specific indicators. This would eliminate the incentives of MNEs to shift activity internationally in response to differences in tax rates. This proposal has a number of drawbacks, however. First, the corporate tax base might be allocated to a country which has almost no economic nexus to the multinational firm. This distribution of corporate tax revenues might well be considered as 'unfair', making the proposal politically infeasible. Moreover, in this case countries might have the opposite incentive to *raise* tax rates on foreign activity, as they would not have to fear any adverse effects on economic activity within their own borders (see Kind et al., 2005).

Summarising the conclusions from this rather heterogeneous literature is far more difficult than in the case of the EU's ban on preferential tax regimes (Section 3). Our review has shown that formula apportionment maintains, in most cases, the desirable property that it reduces the incentives for international profit shifting. This advantage must, however, be weighed against the often highly complicated real distortions caused by the capital component in the allocation formula. Therefore, the theoretical case for formula apportionment is by no means clear-cut. Given this theoretical ambiguity, other aspects of the switch from separate accounting to formula apportionment gain increased weight. In particular, the experience in both the United States and Canada

[9]Non-cooperative decision-making on these weights is a relevant issue in the United States. Federal rules stipulate that the apportionment formula must include property, payroll and sales, but the precise weights on each factor are not harmonised across U.S. states. Anand and Sansing (2000) argue that U.S. states choose weights strategically, depending on whether they are net importers or net exporters in inter-state trade and provide empirical evidence for the relevance of the model results.

shows that the introduction of a formula apportionment system poses a number of administrative problems and requires a consensus on sensitive issues that have only been briefly touched upon here (see Hellerstein and McLure, 2004 and Mintz, 2004 for more detailed discussions).

Finally, it is important to keep in mind that if formula apportionment is introduced in the European Union only, a mixed system would emerge where the EU-wide profits of a globally operating firm are taxed under a formula apportionment scheme, but intra-firm transactions with affiliates in the rest of the world would still be taxed under separate accounting. Such a setting, with symmetric union countries, is analysed by Riedel and Runkel (2005). For given tax rates, they show that a switch from separate accounting to formula apportionment unambiguously reduces profit shifting – not only within the union, but also between the union and the third country. When countries can optimally adjust their tax rates, a symmetric Nash equilibrium under a separate accounting scheme will always feature inefficiently low tax rates in all countries, whereas under a formula apportionment scheme the tax rates in the two union countries may either be too low or too high. In this case the welfare comparison between the (worldwide) separate accounting scheme and the (geographically restricted) formula apportionment scheme is thus once again ambiguous.

5 Summary and Conclusions

In this paper we have discussed and surveyed two current areas for the coordination of corporate tax policies in the European Union, the elimination of preferential tax regimes and the proposal to switch to a formula apportionment rule in taxing the profits of multinational firms. The common underlying issue is whether these partial coordination measures can be effective and successful, in the sense of yielding a potential Pareto improvement, even if countries maintain the right to set corporate tax rates independently.

While the fundamental second-best settings are similar for the two policies analysed, the conclusions that emerge from our review are different. A detailed discussion of the proposal to eliminate preferential tax regimes has given a number of arguments why this coordination measure can be expected to have beneficial effects, despite the inherent danger of making general corporate tax competition in the EU more aggressive. Most importantly, the theoretical analyses have shown that countries are likely to offer

excessively generous tax breaks to multinational firms, if their opportunity costs of doing so are sufficiently low. In this case a coordinated ban on these tax preferences will be mutually welfare-enhancing. Since most of the preferential tax regimes enacted by individual countries are narrowly tailored at foreign-owned firms while keeping the domestic tax base ring-fenced, this scenario seems to be the most relevant one under current conditions in the EU. Moreover, taking the tax interactions with third countries into account tends to strengthen the case for abolishing preferential tax regimes, as any movement towards a lower general level of corporation taxes has some added benefits to the union in attracting investment from outside the EU.

In contrast, our review of the theoretical literature on the switch from separate accounting to formula apportionment has not brought forth a robust case in favour of the latter scheme. While it is true that profit shifting is an empirically relevant concern, and that it can be curbed by formula apportionment, any formula that includes a capital base distorts investment decisions, as the multinational has an incentive to increase the weight of its activities in the low-tax country in the apportionment formula. In a world where profit shifting can be at least partially controlled by ruling principles of arm's-length taxation, it is then very difficult to establish that replacing existing profit shifting motives by new investment distortions yields a Pareto improvement. If formula apportionment is introduced only in a union of countries, whereas the rest of the world maintains a separate accounting scheme, further ambiguities arise. Some income shifting will then remain between the subsidiaries located in the union and the subsidiaries located outside it. Moreover, union countries have an incentive to set their tax rates either above or below the efficient level, depending on which of several counteracting externalities is the dominant one.

In sum, the abolition of preferential tax regimes currently pursued by the EU is likely to reduce the distortions caused by highly aggressive forms of tax competition. But this measure alone cannot eliminate the tax arbitrage opportunities that exist for multinational firms, which direct both their investment and their taxable profits to the member states with the lowest rates of corporation tax. Any comprehensive solution to this general problem is exceedingly difficult, and perhaps impossible to achieve when countries are free to choose corporate tax rates independently. Given that tax avoidance opportunities are even increased through the accession of new, low-tax members, our prediction is that the calls for some form of corporate tax rate harmonisation in the European Union will soon reappear.

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