The Effects of EU Formula Apportionment on Corporate Tax Revenues

Michael P. Devereux
Simon Loretz

Oxford University Centre for Business Taxation
Saïd Business School, Park End Street
Oxford OX1 1HP

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(Revised Version)

Michael P. Devereux[2] and Simon Loretz,[3]

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Abstract

The European Commission proposes to replace the current system of taxing corporate income of separate accounting by a two-step 'consolidate and apportionment' procedure. This paper uses a large set of unconsolidated firm-level data to assess the likely impact on corporate tax revenues in each Member State. Taking pre-tax profit as given, overall tax revenues would be likely to drop by 2.5% if companies can choose whether to participate. By contrast, if they were forced to participate, total tax revenues would be likely to increase by more than 2%, leaving some European countries, and most notably Spain, Sweden and the United Kingdom better off. We investigate how sensitive these results are to the apportionment factors used.

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[2]Oxford University Centre for Business Taxation and Institute for Fiscal Studies. Michael.Devereux@sbs.ox.ac.uk

[3]Oxford University Centre for Business Taxation. Simon.Loretz@sbs.ox.ac.uk

It is clear that, although the ***concept of a common tax base for companies operating in the EU now seems to be well established*** *as a long-term goal for EU tax policy and generally widely supported, some parties in both business and tax administrations remain totally opposed to it as a matter of principle.*

'Bolkestein Report' (2003), p. 19

1 Introduction

This paper investigates the likely impact on corporation tax revenues in EU member states of the introduction of a Common Consolidated Corporate Tax Base (CCCTB). Such a reform has been under discussion by the European Commission and member states for several years: see, for example, Commission of the European Communities (2001, 2003, 2007a, 2007b) and Agúndez-García (2006). Specifically, we assess the impact of two elements of the CCCTB: the consolidation of taxable income within the EU, and the apportionment of that taxable income to member states. We do not model the introduction of a single definition of the tax base; instead we base our analysis on estimates of taxable income between 2000 and 2004.

We use a large dataset containing unconsolidated firm level accounting data and ownership data. We analyse the position of individual companies throughout the European Union, including companies which are members of multinational groups. We construct estimates of the tax liabilities which those companies would face under various hypothetical tax reforms, and examine the effect such changes would have on the tax revenues of each of the EU member states.

The tax reforms analysed in the paper are based on the design of the proposed common consolidated corporate tax base (CCCTB), as set out in Agúndez-García (2006) and Commission of the European Communities (2007). These documents build on the proposals contained in what is commonly known as the Bolkestein Report (2003), which clearly stated the EU's preference for a common consolidated tax base and formula apportionment. There have been attempts to instigate EU cooperation in corporate taxation for many decades, and various proposals for forms of harmonisation have been made. However, since the Ruding Committee report (1992), the European Commission appears to have been developing a strategy of gradually addressing specific problems, with only a long-run objective of full harmonisation. The 2001 report of the

European Commission (2001) stated this most clearly and led to the Bolkestein Report two years later.[1]

In analysing versions of the current proposals, we make one important simplifying assumption. We assume that corporations do not change their behaviour in response to the tax reform. This is clearly an extreme assumption, but provides a useful benchmark for analysis. In any case, it is less arbitrary than choosing specific behavioural responses. Given this assumption, we calculate the pre-tax profit from the tax payments declared in unconsolidated financial accounts as the measure of taxable profit in that company. We hold this fixed, but allow companies to offset losses within the group. The total group profits are then allocated to individual Member States, and are taxed at that country's tax rate - which we assume is unchanged. We use data on profits from 2000 to 2004. We consider the hypothetical case in which the tax reform occurred in beginning of the year 2000, and trace through the impact that the reform would have had in the succeeding five years.

The introduction of a new consolidation and apportionment system would have two effects. First, loss-making companies could benefit from international loss consolidation to the extent to which they could offset losses against contemporaneous profits made by other companies within the same group in other countries. However, assuming that losses can only be used once, the firm would only be better off to the extent that this immediate consolidation was of greater value than carrying forward the loss to set against its own profit in a subsequent period. Second, the effects of the apportionment of group taxable profit to specific Member States depends on where the profit is allocated and the set of tax rates consequently applied. Companies could be better or worse off, and if permitted could therefore choose whether or not to be taxed under the formula apportionment system.

If companies are permitted to choose whether or not to participate in the new system, they will do so only if they benefit from lower aggregate taxes. If they correctly anticipate their tax liabilities under the new system, this implies that total tax revenues must decline. However, two questions remain: how far do overall tax revenues decline, and what is the distribution of tax revenue effects across Member States? The base case results presented here indicate

[1] See Nicodeme (2007) for an overview of the harmonisation process of the direct taxation in the European Union.

that, under these circumstances, overall EU tax revenues would decline by only approximately 2.5%. Some new Member States - such as the Slovak Republic, Hungary and to a lesser extent the Czech Republic - would gain increased tax revenue. By contrast, Germany would see a significant reduction in its tax revenue.

However the position would be very different if companies were not given the opportunity to choose whether to participate. Our central estimate is that this would lead to an increase in overall tax revenues of 2%. While a number of countries would gain in this case, Spain would gain significant revenues while Finland would lose significant revenues.

The most recent document (Commission of the European Communities, 2007) propose four factors be used in apportionment, but does not state the precise weights to be used. We assess these apportionment factors individually to identify the distributive effects of each factor. Our results show that the design of the apportionment factor is important in affecting the overall level of revenues, and its distribution across Member States. One of the most significant differences is in the treatment of the factor based on labour. Given the large dispersion in wage rates across the EU, the allocation of taxable profit to Member States would be very different if it were based on the number of employees as opposed to total wage costs.

The rest of the paper is organised as follows. Section 2 provides a brief literature review. The data are presented in Section 3 and the methodology in Section 4. The results of the base case are given in Section 5, while Section 6 examines a number of alternative specifications. The last Section concludes.

However, it would be unrealistic to expect Member States to enter into negotiations on a new method without a comparison between the old (separate accounting) and the new (formula apportionment).
'Bolkestein Report' (2003) p. 23

2 Literature

In a early theoretical contribution Musgrave (1972) pointed out that formula apportionment could mitigate the problem of the internal pricing within multinational corporations and proposed that United States should consider to extend their system to international investment.[2] This was followed by the work of McLure (1980, 1981) and Gordon and Wilson (1986) which established the distortions arising from an allocation formula. Along these lines Goolsbee and Maydew (2000) argue that apportionment according to payroll exhibits the same effects as a labour tax. Anand and Sansing (2000) develop a theoretical model of tax competition in apportionment rules amongst the US states.[3]

The proposal of the EU Commission to apply a formula apportionment system for the European Union led to several contributions, including Devereux (2004), Sørensen (2004) and Mintz and Weiner (2003), who discuss the potential of alternative proposals. Weiner (2002) and Gerard and Weiner (2003) investigate the impact of introducing the formula apportionment system on the European Union Member States. The latter paper is the first theoretical model to account for international loss consolidation combined with the formula apportionment.[4]

However, empirical research in this topic is scarce, with just two studies investigating the effects of a move to formula apportionment. Shackelford and Slemrod (1998) consider the hypothetical reform of extending the US formula apportionment system to include income derived in other countries. Based on a sample of 46 US multinational companies, they concluded that formula apportionment would increase the tax payments by 38%. However, they did not allow for international loss consolidation.

[2] See also Weltzer (1995) for a discussion of this issue.

[3] A different strand of literature is concerned with the influence of the formula apportionment as compared to the separate accounting system on tax competition. See Eggert and Schjelderup (2003), Nielsen et al. (2001, 2003) Pethig and Wagener (2003) or Riedel and Runkel (2007) for the interaction of the two tax systems.

[4] See Martens-Weiner (2006) for a comprehensive overview.

More recently, in a study most similar to this one, Fuest et al. (2007) assess the impact of the EU proposals for international loss consolidation and formula apportionment using company level data on German inbound and outbound foreign direct investment. Their main conclusion is that international loss consolidation and formula apportionment would lead to an overall reduction in corporation tax revenue in the EU of approximately 20%. Larger countries would benefit at the expense of smaller low-tax countries.

These results differ from the ones we present below. Apart from the different dataset, one reason we can identify is the treatment of the time dimension in the loss offset against taxable profit. Typically, a loss-making company can carry forward a loss into subsequent years to offset against future profit. But if the loss is used up by consolidation with profits elsewhere in a group of companies, it would no longer be available to carry forward. Consolidation in the current year therefore requires an adjustment to taxable profit declared in subsequent periods, which will imply higher tax revenues. Our results suggest that this is an important factor in determining the overall effect of the proposals on tax revenues in the medium to long term.[5]

We also consider a number of other factors not included in the Fuest et al (2007) study. The current EU proposal is that the new tax system will be voluntary - that is, multinational companies within the European Union can choose whether or not to be taxed in this way. While we are interested in the revenue effects of the voluntary character, van der Horst et al. (2007) stress the importance of the participation decision. Using a general equilibrium framework, they argue, that only full participation can mitigate an uneven level playing ground, hence a voluntary character of the proposal could lead to further distortions. For our research question the main implication of the voluntary participation is an increased downward pressure on the Member State tax revenues. Abstracting from compliance costs, we assume that multinationals will not choose to pay higher taxes. This should bound the resulting total tax revenues to be no higher the than the current one. Another aspect of the proposals which we investigate is the position of two EU companies (or groups of companies) which are owned by the same non-EU parent company. A system of consolidation of profits within the EU may or may not permit the losses of one of these companies to be offset against the profits of the other. We consider both possibilities and compare the outcomes.

[5]See Niemann and Treisch (2005) for a simulation model of the loss consolidation system introduced within Austria, accounting for the fact that losses can only be used once.

The current distribution of the tax base, at the individual company level, is not publicly available. Even if it were, the amount of work required in recalculating real company data to arrive at the new tax base distribution is daunting.

'Bolkestein Report (2003) p. 24

3 The Data

To assess the effects of the proposed apportionment rules we draw on the largest set of firm level data available: Orbis, provided by the Bureau van Dijk.[6] This dataset provides summary information from financial accounts as well as detailed data on ownership of companies. The ownership data are vital in this exercise, in order to trace out companies which are members of multinational groups. We include all companies registered in one of the 25 pre-2007 EU Member States which report total assets of at least 2 million Euros in at least two consecutive years between 2001 and 2005.[7] We include only companies which report enough data to undertake the analysis below. This procedure has some importance, as some countries - including Ireland and Greece - do not report the number of employees for all years and do not report the cost of employees at all. As Ireland is of particular interest for this study we simulate values of employees and the cost of employees for Irish companies.[8] Despite this procedure there are still some important Irish companies for which we can not generate a reliable estimate of employment data and which are therefore dropped. To test the importance of this, we repeat the whole exercise without apportioning according to employment factors and report the results where they differ substantially. Although the size of the sample varies from year to year and depending on the data requirements, as an example, we present in Table 1 descriptive statistics for the year 2003. This indicates that we use data on just over 400,000 companies in 2003.

[6]Note, that the data we use contains only financial accounts, which might differ substantially from tax return data, if countries operate a two book system. Unfortunately so far there is no comprehensive dataset with tax return data available. See Table A.1 and Table A.2 in the appendix for more detailed information on which data are included in ORBIS.

[7]Due to computational restrictions we restrict ourselves to these largest companies. Our total sample consists of 930,588 companies.

[8]First,where possible, we use information for sector specific labour costs from the Eurostat database to fill missing entries in the number of employees or the cost of employees respectively. Second, we assume a constant ratio of number of employees to total assets to fill missing entries for the number of employees. A detailed description of the used procedure is available from the authors on request.

Identifying corporate groups: We draw on the full sample to identify the group structures. We include a company as part of a corporate group if the database reports a majority corporate shareholder (more than 50 % direct or indirect shareholding) that is within our sample. Further a company is considered to be part of a group if the database reports a global corporate owner which itself has a BvD identification number.[9] In the case where the database reports no information about ownership we screen the dataset for a number of names of large corporate groups and are able to match additionally approximately 1400 companies with 257 different parents.

Our definition of being part of a group is likely to underestimate the absolute number of companies within corporate groups for two reasons. First we exclude very small companies altogether. Second, for a significant number of companies, the database does not report any information on ownership. While we are able to attribute the most well known firms to their global ultimate owner by name, we are likely to miss the less obvious firms. Nevertheless we are able to attribute just over 30% of the companies to corporate (global) owners and therefore identify them as being part of a group. Table 1 breaks down the sample according to the ownership. It can be seen that the largest group of companies are those that are independent - that is they are not owned by a corporate parent, neither do they own any subsidiaries.[10] Of course, these companies will be unaffected by the tax reforms analysed here: they cannot offset losses against profits of another company, and there is no need for formula allocation.[11]

The most interesting subsample consists of almost 50,000 companies that are part of an international group with companies in more than one EU Member State. This number includes the parents in column [4] and the subsidiaries in column [6] in Table 1, whereas the latter column also includes subsidiaries of non-European multinationals if they are operating in more than one EU Member State. The companies in columns [3] and [5] form domestic corporate

[9]This restriction to only global owners with a BvD identification number ensures that we do not identify companies owned by individuals or public bodies as groups.

[10]Unfortunately ORBIS contains no information about foreign branches. Therefore parts of the activities might fall under a different tax jurisdiction, but are attributed to a single corporate identity.

[11]Malta, Slovenia and Cyprus are not reported, because there are insufficient companies in the sample to draw meaningful conclusions. However throughout the whole analysis all consolidation and apportioning includes companies resident in these countries.

Table 1: **Sample (in 2003) split according to ownership information**

Country	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**
Austria	2,053	1,246	38	41	241	428	59
Belgium	18,339	12,611	512	245	2,164	2,753	54
Czech Republic	7,576	6,707	32	8	47	743	39
Denmark	12,172	8,677	322	114	1,351	1,351	357
Estonia	1,534	1,016	62	13	150	248	45
Finland	7,405	4,660	505	125	1,003	1,093	19
France	75,700	39,849	3,678	413	13,598	13,509	4,653
Germany	15,966	9,826	556	306	2,403	2,676	199
Greece	9,857	8,341	375	24	501	493	123
Hungary	4,053	3,665	12	2	19	342	13
Ireland	2,676	2,306	18	5	60	260	27
Italy	89,468	79,091	1,816	466	3,968	3,740	387
Latvia	841	646	24	2	38	115	16
Lithuania	956	769	30	5	43	83	26
Luxembourg	449	338	6	7	9	85	4
Netherlands	3,771	1,593	38	23	989	1,064	64
Poland	9,726	6,977	314	16	699	1,481	239
Portugal	7,854	6,031	269	25	939	569	21
Slovak Republic	1,751	1,610	3	2	3	130	3
Spain	83,387	64,476	3,366	266	9,460	5,406	413
Sweden	16,757	7,279	817	265	5,254	3,084	58
United Kingdom	40,367	19,957	566	15	7,515	7,598	4,716
Total	**412,658**	**287,671**	**13,359**	**2,388**	**50,454**	**47,251**	**11,535**

Notes: [1] Total number of observations; [2] Companies not part of a group;
[3] Parents of domestic groups; [4] Parents of EU groups;
[5] Subsidiaries in domestic groups; [6] Subsidiaries in EU groups;
[7] EU subsidiaries of international groups;

groups; they might be affected by a new loss consolidation system since some countries do not currently permit group relief for domestic groups. This holds especially true for the companies in column [7] which are operating in only one European country but are headquartered in a different country.[12]

Corporate Tax Revenues: Data on corporate tax revenues are taken from the revenue statistics published by the OECD each year. For non-OECD countries we use the information about the share of Corporate Tax Revenues in GDP published in a study by Eurostat (2006). Combined with data about the

[12]The identified corporate owner is either outside of the European Union or if it is within the EU is not in our sample.

nominal GDP from the World Development Indicators we infer the Corporate Tax Revenues. All values are converted into US dollars at the exchange rate of the last day of the year.

Tax Data: The information about corporate tax rates and the treatment of losses stems primarily from the authors' own research, complemented with information from PricewaterhouseCoopers, and is summarized in Table A.3 in the appendix. Apart from the well-known fact that there is a wide dispersion in statutory corporate tax rates - currently from 10% in Cyprus to 38.3% (including local taxes) in Germany - the most important features of the current tax systems for our purposes are the treatment of losses and the possibility of group taxation. Whereas all countries allow loss carry forward for at least 5 years only France, Germany, The Netherlands and the United Kingdom allow some form of loss carry back. Loss offset within a (domestic) group is not allowed in most of the new Member States and some of the old Member States, most notably Belgium.[13] At the other extreme Denmark and very recently Austria allow consolidation with non-resident companies.

The impact of the choice of apportionment factors: As indicated below, the choice of apportionment factors can alter the distribution of the tax base substantially. This is especially true if the distribution of the factors differs widely from the current distribution of the taxable profits. If a member state has a disproportionately large share of the factor used for the apportionment relative to its share of the taxable profits it is likely to gain from a formula apportionment system. To begin to identify the likely effects of the different possible apportionment factors, Figure 1 displays the shares of the apportionment factors relative to the share of the taxable profits. Thus, for example, if a member state's share of the apportionment factor were equal to its share of existing taxable income, Figure 1 would indicate a value of 100%.

It is clear that there is considerable variation in these relative shares, both between countries and between apportionment factors. Countries with high taxable income under the existing system relative to the other measures of economic activity have low shares: these countries include Denmark, Finland, Ireland, Luxembourg and the Netherlands. This might be due to some profit shifting into their countries or the existence of headquarters with little eco-

[13]The group taxation system in Latvia and the United Kingdom are somewhat more generous as they allow for loss offset within the domestic part of an international group.

Figure 1: **Country shares in the factors used for apportionment in % of country shares in taxable profits**

nomic activity compared to the reported profits. Other things being equal, we might therefore expect these countries to have a lower allocation of total taxable income under the proposed system than under the current system. On the other hand some of the new Member States have relatively large shares of property and employees. Within countries, there can also be significant differences according to the apportionment factor. Most notably, the differences in the relative shares of the number of employees compared to the relative shares of the cost of employees are particularly pronounced for the new member states, reflecting the fact that average wages across the EU vary widely. However, there is also significant variation in the relative shares of other factors.

A programme of total harmonization
is not justified at this stage. None the less
the Committee believes that the adoption
by all Member States of a common system
of corporation tax is a desirable long-term objective.
'Ruding Report' (1992) p. 11

4 Methodology

The current system: We assume the firms currently optimise their tax payments i.e. that loss consolidation, loss carry back and forward is exploited where it is possible and beneficial for a corporate group. As a benchmark case, we therefore use the reported tax payments in the balance sheet (TAX_{it}) to model the current system.[14] The tax liabilities of a corporate group under the current separate accounting system in period t are given through

$$T_t^{SA} = \sum_{i=1}^{n} TAX_{it} \tag{1}$$

where i denotes each of the n individual companies in the corporate group.

A formula apportionment system: We do not observe taxable profit directly. Instead we use the reported tax payment and divide it by the statutory tax rate (τ_{it}) to approximate the taxable profit. However, countries do not typically allow companies to pay negative taxes, so a non-negligible number of companies reporting zero tax payments might have taxable losses. We account for this if the reported tax payment is not positive, by replacing our measure of the taxable profit with the accounting measure of earnings before interest and taxation, $EBIT_{it}$, if the accounting measure is lower.[15] That is, our basic measure of taxable profit, π_{it}, is derived as

[14] Unfortunately it is not clear how far reported tax payments reflect the actual tax payments, as they might as well include deferred tax payments. However, although we have attempted to model actual tax payments with various methods, we are not aware of any method which can convincingly improve on the simple assumption that the tax liability in the accounting data is a reasonable estimate of the actual tax liability.

[15] In addition to the use of $EBIT_{it}$ one should take into account interest payments and receipts, as they will influence the tax base. However, as it is not possible to correctly disentangle net from gross interests from our data, we exclude financial profits and losses from our calculation in order to avoid misleading results.

$$\pi_{it} = \begin{cases} \frac{TAX_{it}}{\tau_{it}} & \text{if } TAX_{it} > 0 \\ min\left[\frac{TAX_{it}}{\tau_{it}}, EBIT_{it}\right] & \text{if } TAX_{it} \leq 0 \end{cases} \tag{2}$$

We assume that the reported tax payment is the result of tax-optimising behaviour of the corporate group, i.e. that the reported tax payment includes the loss carried forward from the previous period. The loss carry forward out of period t is the part of the taxable loss that does not lead to a negative tax payment. If the company reports a positive tax payment we assume that no losses have been carried forward. Therefore the loss carry forward (LCF_t) can be written as

$$LCF_{it} = \begin{cases} 0 & \text{if } \quad TAX_{it} > 0 \\ max\left[-EBIT_{it} + \frac{TAX_{it}}{\tau_t} + LCF_{it-1}, 0\right] & \text{if } \quad TAX_{it} \leq 0 \end{cases} \tag{3}$$

Suppose that under the hypothetical allocation system, a company has a loss which is offset against the contemporaneous profit of another member of the group. In this case, the loss is not available to be carried forward to subsequent years in the original company. We account for this reduction in the loss carried forward (relative to the existing system, which we observe) by adding back the 'consumed' loss to profit in subsequent years. If a company claimed group relief in period t the taxable profit in the next period is increased by the loss which is offset in the previous period. Hence our measure of taxable income needs to be adjusted for the loss carry forward and equation (2) needs to be rewritten as

$$\widehat{\pi_{it}} = \begin{cases} \frac{TAX_{it}}{\tau_t} + LCF_{it-1} & \text{if } \quad TAX_{it} > 0 \\ min\left[EBIT_{it}, \frac{TAX_{it}}{\tau_t} + LCF_{it-1}\right] & \text{if } \quad TAX_{it} \leq 0 \end{cases} \tag{4}$$

These taxable profits are combined into a group consolidated tax base (CTB_t). We assume that if this consolidated tax base is negative, that the group loss can be offset against future consolidated group profits. Hence the tax base to be apportioned is given by

$$CTB_t = \sum_{i=1}^{n} \widehat{\pi_{it}} + CTB_{t-1} \quad \text{if } CTB_{t-1} < 0 \tag{5}$$

Denoting the proportion of group taxable profit allocated to country j as θ_j the tax burden for the corporate group under the new formula apportionment system is

$$T_t^{FA} = \begin{cases} \sum_{j=1}^{m} CTB_t \theta_{jt} \tau_{jt} & \text{if } CTB_t > 0 \\ 0 & \text{if } CTB_t \leq 0 \end{cases} \tag{6}$$

We follow the proposal of Agúndez-García (2006) concerning the apportionment factor

$$\theta_{tj} = \frac{X_{jt}}{\sum_{j=1}^{m} X_{jt}} \tag{7}$$

where X_{jt} is the value of the apportionment factor in country j. To identify the individual effects of a particular apportionment factor, we consider separately the property factor, measured through the tangibles assets (TFA_t), the gross receipts factor, measured as turnover ($SALE_t$) and the payroll factor measured either through the number of employees (EMP_t) or the cost of employees ($CEMP_t$). Note that we use turnover as a measure of sales, which implies that this apportionment factor is to be interpreted as sales by origin, rather than sales by destination. We also present results based on a weighted average of these factors, as envisioned in Commission of the European Communities (2007b).

The decision whether to participate: We treat the choice of the corporate group as to whether or not to participate as irreversible.[16] Hence, based on the hypothetical introduction of the new system in 2000, the firm is deemed to decide in 2000 whether to participate. In effect, we assume that the corporate group has full information about the future profit situation until 2004.

Therefore a corporate group compares the tax payments under the current system with the potential tax payments under a system with international loss consolidation for all future periods. Participation in the formula apportionment system is beneficial if the net present value of the tax payments is lower than under the current system. There are other factors that influence the participation decision, above all the potential reduction of compliance costs.[17] Unfortunately compliance cost under both the current and the hypothetical new system can not credibly estimated from the data available. Therefore, we restrict the modeling of the participation decision of the corporate group to a comparison of the sum of the discounted value of the tax payments over the period 2000 to 2004

[16] This can be motivated by the fact that even under the existing systems companies might not be permitted to choose every year. For example, in Austria a tax group must be constituted for at least three years. (See also Niemann and Treisch 2005 p.5.)

[17] See for example Mintz (2004) for a discussion of the importance of compliance costs

under the two possibilities.[18] Define η as an indicator variable taking the value one if the corporate group participates in the new system and zero otherwise, the decision of the corporate group can be written as

$$\eta = \begin{cases} 0 & \text{if } \sum_{t=0}^{T} \frac{T_t^{SA}}{(1+\rho)^t} < \sum_{t=0}^{T} \frac{T_t^{FA}}{(1+\rho)^t} \\ 1 & \text{if } \sum_{t=0}^{T} \frac{T_t^{SA}}{(1+\rho)^t} > \sum_{t=0}^{T} \frac{T_t^{FA}}{(1+\rho)^t} \end{cases} \tag{8}$$

Both under the separate accounting system or under a hypothetical formula apportionment system a company can have unused corporate losses at the end of period T. However given that the loss consolidation allows a corporate group to use the losses earlier against foreign subsidiaries the unused losses accumulated at the end of period T could be substantially less than under the current system. So far it is assumed that these losses are irrecoverable. As the alternative extreme assumption, we suppose that these accumulated losses could be offset in the very next period. In this case companies would have a tax asset of accumulated losses (L_{iT}) that needs to be accounted for. For the current system we approximate these 'unused' losses with the loss carry forward as defined in equation (3).

$$L_{iT}^{SA} = \tau_{jT} LCF_{iT} \tag{9}$$

For the formula apportionment case it is simply the negative consolidated group tax base carried forward at the end of period T. For simplicity we assume unchanged apportionment shares for period $T+1$. Hence the tax asset can be written as

$$L_{iT}^{FA} = max \left[\sum_{j=1}^{m} -\tau_{jT} CTB_T \theta_{jT}, 0 \right] \tag{10}$$

When these taxable assets are taken into account in the participation decision, we have:

$$\widetilde{\eta} = \begin{cases} 0 & \text{if } \left(\sum_{t=0}^{T} \frac{T_t^{SA}}{(1+\rho)^t} - \sum_{i=1}^{n} \frac{L_{iT}^{SA}}{1+\rho} \right) < \left(\sum_{t=0}^{T} \frac{T_t^{FA}}{(1+\rho)^t} - \frac{L_{iT}^{FA}}{1+\rho} \right) \\ 1 & \text{if } \left(\sum_{t=0}^{T} \frac{T_t^{SA}}{(1+\rho)^t} - \sum_{i=1}^{n} \frac{L_{iT}^{SA}}{1+\rho} \right) > \left(\sum_{t=0}^{T} \frac{T_t^{FA}}{(1+\rho)^t} - \frac{L_{iT}^{FA}}{1+\rho} \right) \end{cases} \tag{11}$$

[18] For the discount factor ρ we assume a value of 0.05.

The real role of the apportioning mechanism in the reform should therefore be something that allows a 'reasonable' distribution of taxable profits across taxing jurisdictions and does not reintroduce the problems we want to resolve in the first instance.
Agúndez-García (2006) p. 86

5 Results

This section presents the results from our base case and compares them to the existing system. As noted above, we hypothetically assume that the new system was introduced in the year 2000, and we consider the impact on tax liabilities in each year from 2000 to 2004 inclusive.

Our base case makes the following assumptions:

(a) two or more companies which share a non-EU parent are permitted to consolidate profits, even if they are not directly linked through an EU company.

(b) losses remaining in the consolidated group at the end of 2004 are deemed to be worthless.

(c) groups are allowed to choose whether or not to participate.

(d) all EU member states introduce the new system.

Table 2 presents the base case results. First, in order to provide a basis for comparison, column 1 reports the total tax revenue for the 5 years 2000 to 2004 from corporation tax in each country as reported by the OECD or Eurostat. This ranges from $270 billion in the UK to only $609 million in Estonia. Column 2 presents the total tax payments in each country for the same years, as aggregated over our sample of companies. As would be expected, since we do not have the population of all taxpayers in our sample, the aggregate tax revenues from our dataset is smaller than the actual total revenues.[19] On average, our sample represents a little under two thirds of total corporation tax payments. However, the proportion of the total tax revenues varies between countries.

[19] It should be noted that the tax revenue data only compares imperfectly to the tax numbers from the financial accounts.

Table 2: **Tax revenues: OECD, current system and base cases (Sum 2000-2004)**

Country	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**
Austria	28,702	7,846	97.3%	91.3%	93.2%	94.6%	95.1%
Belgium	51,813	30,701	90.3%	97.1%	89.5%	90.7%	93.3%
Czech Republic	18,692	8,727	134.2%	113.4%	127.2%	96.5%	119.5%
Denmark	29,642	20,502	94.8%	95.3%	88.1%	98.3%	95.2%
Estonia	610	187	288.1%	224.4%	616.0%	165.4%	288.4%
Finland	32,315	24,310	83.1%	82.7%	82.1%	84.6%	83.2%
France	245,609	151,772	95.1%	100.9%	98.5%	99.8%	98.1%
Germany	150,411	124,630	82.3%	87.1%	87.2%	90.9%	86.7%
Greece	29,131	12,788	96.4%	97.2%	97.6%	93.0%	95.6%
Hungary	8,559	3,867	117.5%	110.6%	159.5%	105.2%	119.5%
Ireland	26,120	9,518	100.4%	100.2%	100.8%	100.9%	100.3%
Italy	213,517	197,490	94.1%	95.0%	93.5%	93.3%	94.3%
Latvia	929	657	99.9%	99.9%	114.0%	97.5%	99.8%
Lithuania	995	309	114.8%	97.4%	111.3%	91.8%	104.2%
Luxembourg	9,445	1,565	88.2%	84.8%	87.5%	90.6%	88.2%
Netherlands	84,755	22,399	98.8%	104.0%	93.7%	95.9%	99.7%
Poland	21,926	17,104	108.9%	99.0%	112.7%	92.2%	102.7%
Portugal	23,849	14,097	94.5%	94.9%	106.2%	99.0%	96.9%
Slovak Republic	3,968	2,054	144.6%	121.5%	149.0%	108.1%	131.9%
Spain	128,663	76,246	102.6%	99.4%	98.0%	93.6%	99.5%
Sweden	42,920	25,782	112.7%	112.7%	109.8%	113.5%	111.6%
United Kingdom	270,834	133,358	111.8%	105.3%	106.3%	112.1%	108.4%
Total	**1,423,405**	**885,799**	**97.3%**	**97.8%**	**97.3%**	**97.7%**	**97.6%**

Notes: [1] Corporate Tax Revenues (OECD, Eurostat), in $ millions;
[2] Current system, sum of all tax payments, in $ millions;
[3] Apportioning according to tangible assets; [4] Apportioning according to turnover;
[5] Apportioning according to number of employees; [6] Apportioning according to cost of employees;
[7] Apportioning according to a weighted factor (1/3 tangibles assets, 1/3 turnover,
1/6 number of employees and 1/6 cost of employees);

It is relatively low in some countries, such as the Netherlands and Luxembourg, but higher in others, such as Germany. These differences across countries reflect the differences in sample size in each country indicated in Table 1.

The next five columns indicate the impact on the aggregate sample tax revenues if the consolidation and formula apportionment system had been introduced in 2000. The columns are based on alternative factors for the allocation mechanism, identifying the effect of each factor, one at a time. Thus, column 3 indicates the percentage of the existing tax revenue which would have been raised under the new system if the allocation mechanism had been based on the value of tangible assets. The remaining columns show the position if the allocation mechanism were based on turnover (measuring sales by origin), the number of employees, the total cost of employees, and a weighted average. The weights are assumed to be one third turnover, one third sales and one sixth of each number and cost of employees. The overall position for the EU is given at the foot of each column. These columns are further illustrated in Figure 2. Each part of the Figure represents one of the apportionment factors - though the one indicating the relative size of labour indicates both the number of employees and total labour costs. Each bar represents the percentage shown in the equivalent column in Table 2. The horizontal line shows the overall effect on tax revenues, as shown at the foot of the table: so countries with values above this line gain tax revenue relative to those below the line.

The overall effects on EU tax revenues are rather small. The overall loss in tax revenue amounts to approximately 2.5% depending on the apportionment factor used. However, there is a more significant impact for individual member states. Some countries would see a reduction in tax revenues irrespective of the apportionment factor: these include Germany, Italy, Belgium, Denmark, Finland, Luxembourg and Greece. This at least partly reflects the pattern shown in Figure 1, which indicated that most of these countries had high current taxable income relative to all of the apportionment factors. Denmark, Finland and Luxembourg, for example, have very low shares of all of the apportionment factors relative to its current taxable income; it is then not surprising that it tends to reduce revenue under the proposed system. However, it should be noted that the scale of the revenue loss is small relative to the shares of the apportionment factors - this indicates the fact that overall revenue effects also depend on the structure and profitability of the multinational groups. Ireland, which also has low relative shares of all the apportionment factors, would not lose at all from the introduction of the new system under the base case assumptions.

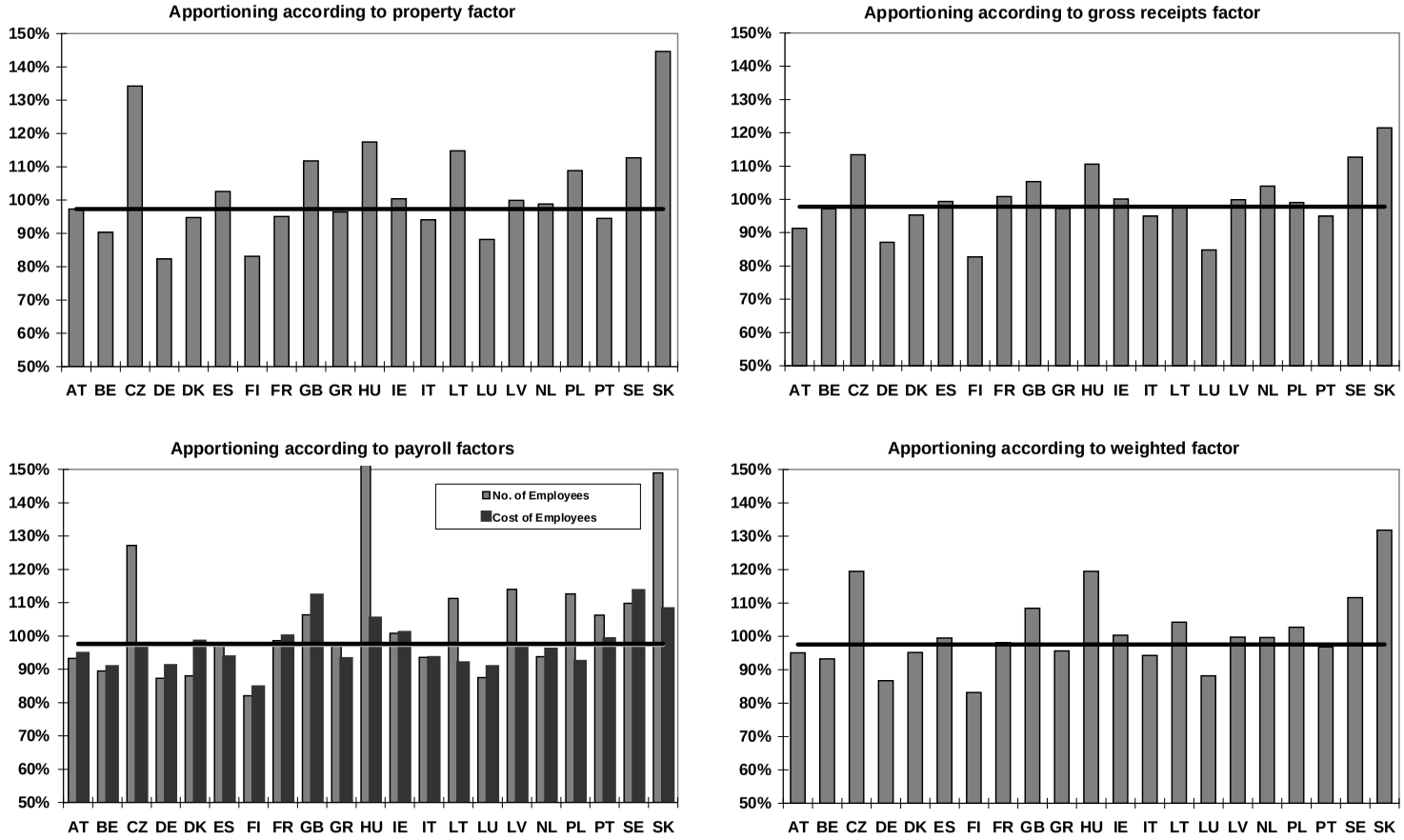

Figure 2: **Tax revenues under a formula apportionment system: Base Case**
(Unused losses irrecoverable, voluntary participation, including Non-EU Parents affiliates, all countries participate)

Obviously, other countries would gain from the new system. The most striking cases are the United Kingdom, Sweden and some of the new member states, in particular, Hungary, the Czech Republic, the Slovak Republic and Estonia. The latter countries experience large increases that deserve some explanation. Estonia currently does not tax retained earnings, with the consequence that many companies currently pay no taxes on their profit in that country; not surprisingly, other things being equal, the taxable income allocated to Estonia would therefore rise under the new system.[20] For the other two countries, their substantial increases are partly driven by the production sites of Volkswagen in Slovakia and Audi in Hungary. As this corporate group is mainly located within Germany, these large increases in tax revenues in the Eastern European countries come largely to the expense of Germany. In fact, Germany would tend to raise significantly lower revenue under the new system. Another reason for this is that we have assumed that participation is voluntary. Corporate groups tend to opt out if a large share of the profit is likely to be allocated to a high tax rate country, such as Germany. Italy also comes into the category.

The redistributive impact is most pronounced using the property factor or the number of employees. Both these factors can be linked to large production sites in countries with lower labour costs. The gross receipts factor, measured by turnover in our analysis, is more closely linked to the profits, and therefore this way of apportioning has a smaller effect on the distribution of tax revenues. In the lower left part of Figure 2 we compare the tax revenue implications of apportioning according to the two possible payroll factors. The lighter bars represent the outcome if the number of employees is used and the darker bars the use of cost of employees. It is easily observable that the use of number of employees has an much stronger influence on the tax revenues. In contrast if the payroll is used, tax revenues would be much lower in low labour cost countries, notably the Czech Republic, Hungary and the Slovak Republic. With a weighted formula, these three countries still would attract large tax revenues, although the redistributive effects would be somewhat reduced.

[20] To avoid misinterpretation we therefore exclude Estonia from the Figures.

The possibility of including the EU income of non-EU affiliates in the water's edge report has received scant attention so far and its implications deserve thorough consideration.

EU Commission (2006) p. 30

6 Alternative Scenarios

In this section we investigate how sensitive the base case results are to variations in the main assumptions made. We consider, one by one, five alternatives to the base case assumptions. Specifically, we assume that:

(a) accumulated losses in 2004 can be set against profit arising in 2005. This is effectively the opposite of the base case, where we assumed that such losses could never be used.

(b) tax rebates are not actually paid out under the current system.

(c) loss consolidation is only permitted within a group of companies located in the EU. Two companies, or groups of companies, owned by a non-EU parent are not permitted to consolidate with each other.

(d) participation in the new system is obligatory.

(e) the new system is introduced only in a subgroup of 8 member states.

In each case, we allow only that assumption to be changed: all others remain as in the base case.

Accounting for 'unused' losses: If companies assume that losses accumulated at the end of the planing horizon can be offset in the subsequent period, they incorporate the value of this into their decision as to whether or not to participate in the new system.[21] As an alternative to the base case, we make this alternative assumption, both for the existing system and the hypothetical systems. Technically this means that the decision is given through $\widetilde{\eta}$ in equation (11) rather than η from equation (8). This lowers the total revenue impact to a reduction of between 1.8% and 2.2% depending on the apportionment factor, because some additional corporate groups choose not to participate. The countries gaining most relative to the base case are Denmark, Finland, Italy the Netherlands and Poland, while other countries would lose relative to the base case, notably Austria, Estonia, Greece and the United Kingdom. However, the

[21] For consistency we also include the tax assets in the tax revenues.

relative positions of the countries change little, so we do not present the results in detail but only the change in the average participation. Figure 3 compares the percentage of individual companies that participate (with a weighted apportionment factor) to the base case. It can be seen that the participation drops most in the new member states which reflects the large unused loss positions that existed under the existing system in 2004 in Eastern European companies. At the other end of the spectrum, taking into account the unused losses even increases participation in Denmark and the United Kingdom. This is due to the fact that under the current system some of the losses are allowed as tax rebates, which we do not allow in the hypothetical system.

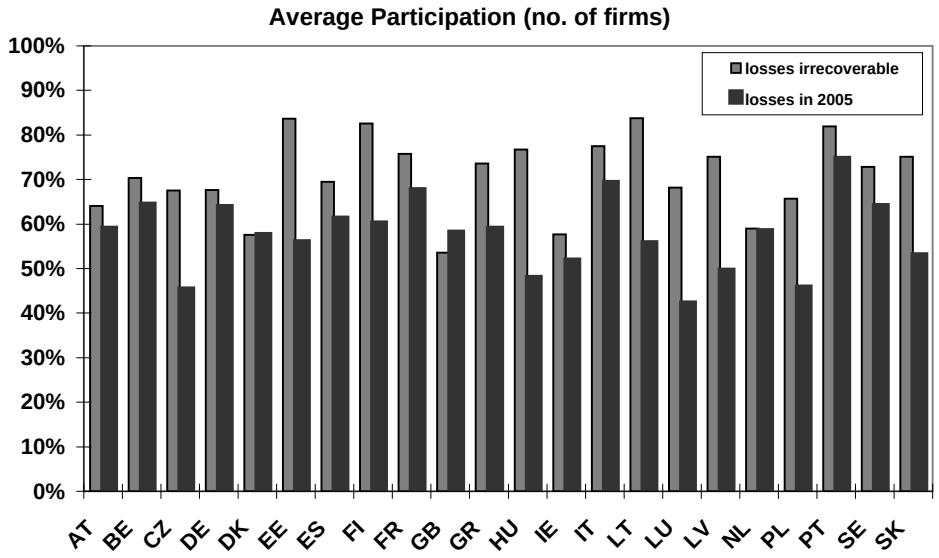

Figure 3: **Percentage of companies participating in the new formula apportionment system (by country, with weighted apportionment factor)**

Not allowing tax rebates: The previous robustness check indicates that we are looking at two systems with different treatments of negative tax payments: in some cases companies receive tax rebates under the existing system; however we do not permit this under the hypothetical consolidation. In order to make the comparison more similar, we also consider the case in which no tax rebates are permitted under the current system, but losses must be carried forward into the next period. This results in substantially larger tax revenues under the current system in a number of countries, most notably Spain, Sweden, Greece, France, Denmark and the United Kingdom. In comparison with these larger revenues under the existing system, the change to consolidation would

reduce revenues in these countries. The Eastern European countries, in particular Hungary and the Czech and Slovak Republic, nevertheless increase their tax revenues. However, there is no indication that the reported tax rebates were not paid and ignoring them seems to be a very strong assumption, therefore we do not want to place to much emphasis on the results of this robustness check.

Not including the EU-affiliates of Non-EU parents. The base case assumed that the profits and losses of all European subsidiaries within a worldwide group could be consolidated. This is an issue which is still under debate in the EU, although our base case is consistent with the proposals in Commission of the European Communities (2007a). However, to explore this, we instead allow loss consolidation only up to the European parent. This is achieved by defining the group as follows. Companies are part of a European group if (a) within our sample one European company directly or indirectly owns more than 50% of another European company (in which case both companies are part of the group), or (b) if the database reports a European global owner with a BvD identification number. This reduces the number of companies within a corporate group by roughly a quarter.

The results are shown in Figure 4, which is in the same format as Figure 2: the horizontal line indicates the overall position. Overall, there is little change from the base case, in that the reduction in total revenue is now limited to between 1.6% and 2%, depending on the apportionment factor used. The distribution of changes due to the new system is now also more moderate, with large changes in tax revenues being moderated. Germany would benefit through higher revenue in this case, while Slovakia would receive much lower revenue. The UK would also generate lower revenues compared to the base case. This could be linked to the relative importance of international (most notably US) inward investment.

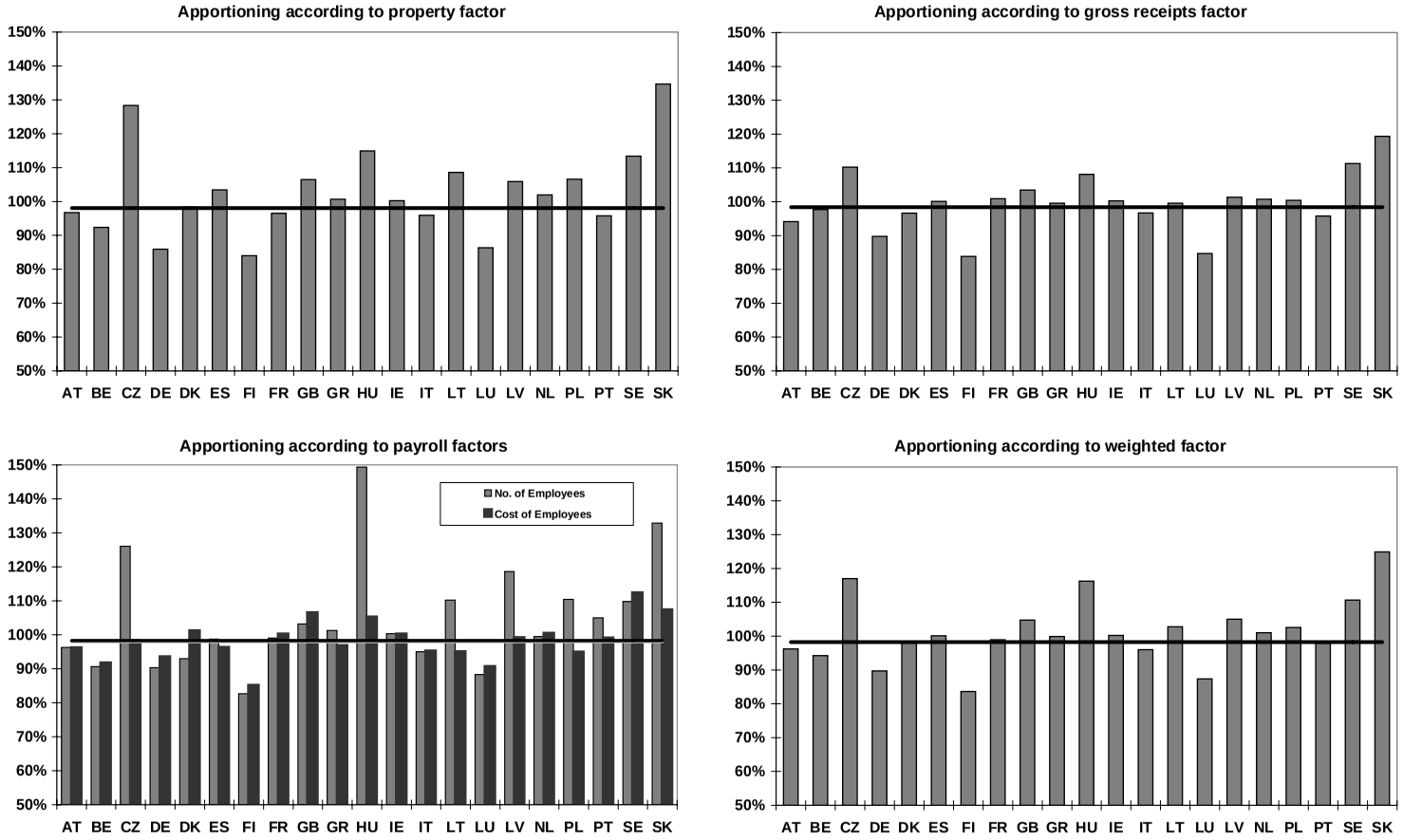

Figure 4: **Tax revenues under a formula apportionment system: only European parents included (Voluntary Participation, unused losses irrecoverable, all countries participate)**

Obligatory participation. The two previous empirical studies both modelled the formula apportionment system as obligatory.[22] To compare our result to theirs, we also model the new system as obligatory for all companies within a corporate group. Technically this is done by fixing $\eta = 1$ in equation (8). This forces the companies to offset losses - if they have any - immediately in their subsidiaries and potentially pay higher taxes on future profits in the same company. This is of particular importance for corporate groups who have most of their profits in Ireland. Unfortunately for some of these larger corporate tax payers we do not have sufficient employment data. In order to analyse a larger sample, we therefore drop the apportionment according to employment factors for the obligatory system.

The results are presented in Figure 5, which deviates somewhat from the format of the other Figures. The upper part of the Figure displays the results of obligatory consolidation and formula apportionment according to a property or a gross receipts factor for the original sample, i.e. excluding the companies that report insufficient employment data. The lower part reports the results of the same exercise with the larger sample, which now also includes companies that report insufficient employment data. It is clear that forcing companies to participate significantly affects the results. Overall, most notably, tax revenues would now increase by 1.3% with a property factor and 2% with the gross receipts factor. For the larger sample the increase is even larger, with 2% and 2.9% respectively. This difference is mainly due to the fact that with the larger sample Ireland now significantly loses tax revenues. The shift of this tax base into a country with a higher tax rate increases the overall tax revenues significantly. Comparing the upper and the lower half of Figure 5 it can be noted that apart from Ireland only Denmark loses substantially more revenue if more firms are included. [23]

Generally, if the consolidation and formula apportionment is obligatory, not only is the revenue impact much more pronounced, the distribution of tax revenues is also significantly affected relative to the base case. In particular, Spain now emerges with considerable additional revenue. This is most likely exaggerated by the effects of large negative tax payments reported for the Spanish

[22] See Shackelford and Slemrod (1998) and Fuest et al. (2007).

[23] This indicates that the additional companies do not change the result qualitatively for most of the countries. In fact, calculated the other cases for the larger sample as well, and found that the results are only change to a small extent. The full results are available from the authors upon request.

mobile phone providers under the current system. Nevertheless the fact that Spain would increase its tax revenues under an obligatory formula apportionment system seems plausible, as the currently high corporate tax rate may induce some outward profit shifting. For Sweden, the United Kingdom and the Slovak Republic the new system would continue to raise more revenue, though Finland would lose a significant part of its revenue regardless the choice of apportionment factor.

By contrast the Netherlands and Ireland, which would gain revenue under the voluntary system, would lose under an obligatory system. This reflects the fact that a substantial number of the multinationals with operations (headquarters) in these countries would not participate under the base case assumptions. The reduction in revenue in the Netherlands is particularly more pronounced for the property option, which suggests that the companies operating in the Netherlands have a high profit to assets ratio. This might be expected if the companies are mainly multinational headquarters. Overall the picture now resembles more closely to Figure 1 with Finland, Denmark and Ireland losing substantial tax revenues.

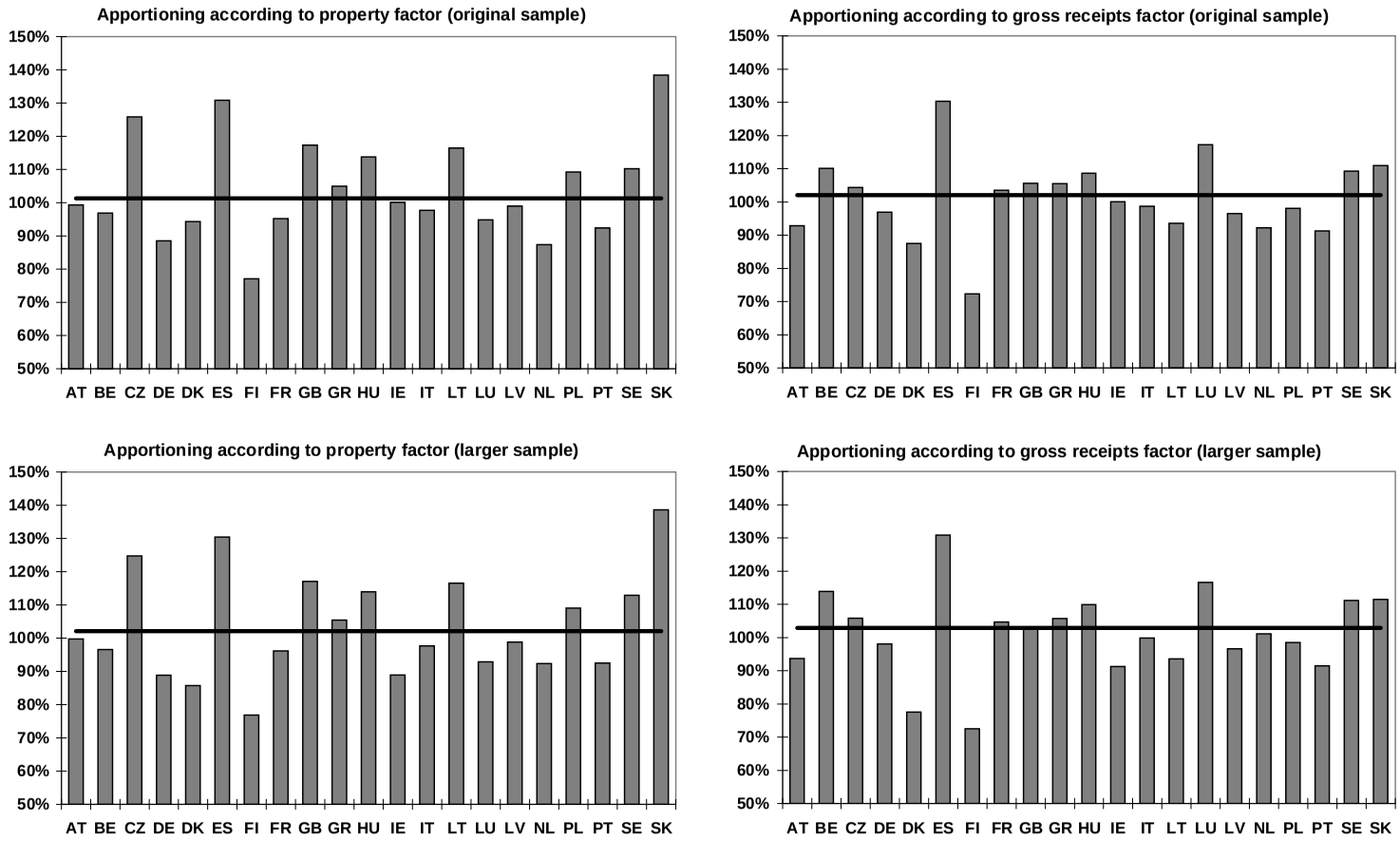

Figure 5: **Tax revenues under a formula apportionment system: Obligatory Participation (Unused losses irrecoverable, including Non-EU Parents affiliates, all countries participate)**

Only a subgroup of countries: It is possible that only a subset of countries would be willing to introduce the new system. We therefore also consider the case in which only 8 countries take part.[24] Clearly this affects the degree of consolidation that can take place. We consider the case in which the countries taking part are the six founding countries, Germany, France, Italy, Belgium, Luxembourg and the Netherlands, and the two countries that already allow for international loss consolidation, Austria and Denmark. The results are presented in Figure 6, where the upper part shows the result with voluntary participation and the lower part the case where all companies are required to participate.

In the upper part of the Figure, where companies can choose to participate, total tax revenues must again fall. However, given the limited number of countries participating, the reduction in the overall tax revenue is lower than in the base case, with a reduction of approximately 1.5%. In fact the choice of the apportionment factor has less impact on the distribution if only eight countries participate. This can be linked to the fact that the participating countries are more similar than the countries in the rest of the European Union. In particular the differences between the two payroll factors are now negligible. In line with the base case, the countries with the highest tax rates, Germany and Italy lose tax revenue. The countries benefitting from the new system regardless of the choice of apportionment factors are Austria, the Netherlands and France.

The lower part of Figure 6 shows the tax revenues under an obligatory system with only 8 countries participating. This case is almost revenue neutral with only a slight increase in overall tax revenues up to 0.4%. However, the tax revenues are more unevenly distributed. Belgium, France, and to a lesser extent Germany and Italy would gain higher tax revenue, while the smaller countries like Luxembourg and the Netherlands would face a substantial drop in tax revenues. The Netherlands in particular would lose roughly a quarter of the tax revenues if a payroll based apportionment factor were employed. One reason for this is the relatively large number of headquarters located in the Netherlands that report high profits, but that employ few people.

[24] This is the minimum number of countries which could take part.

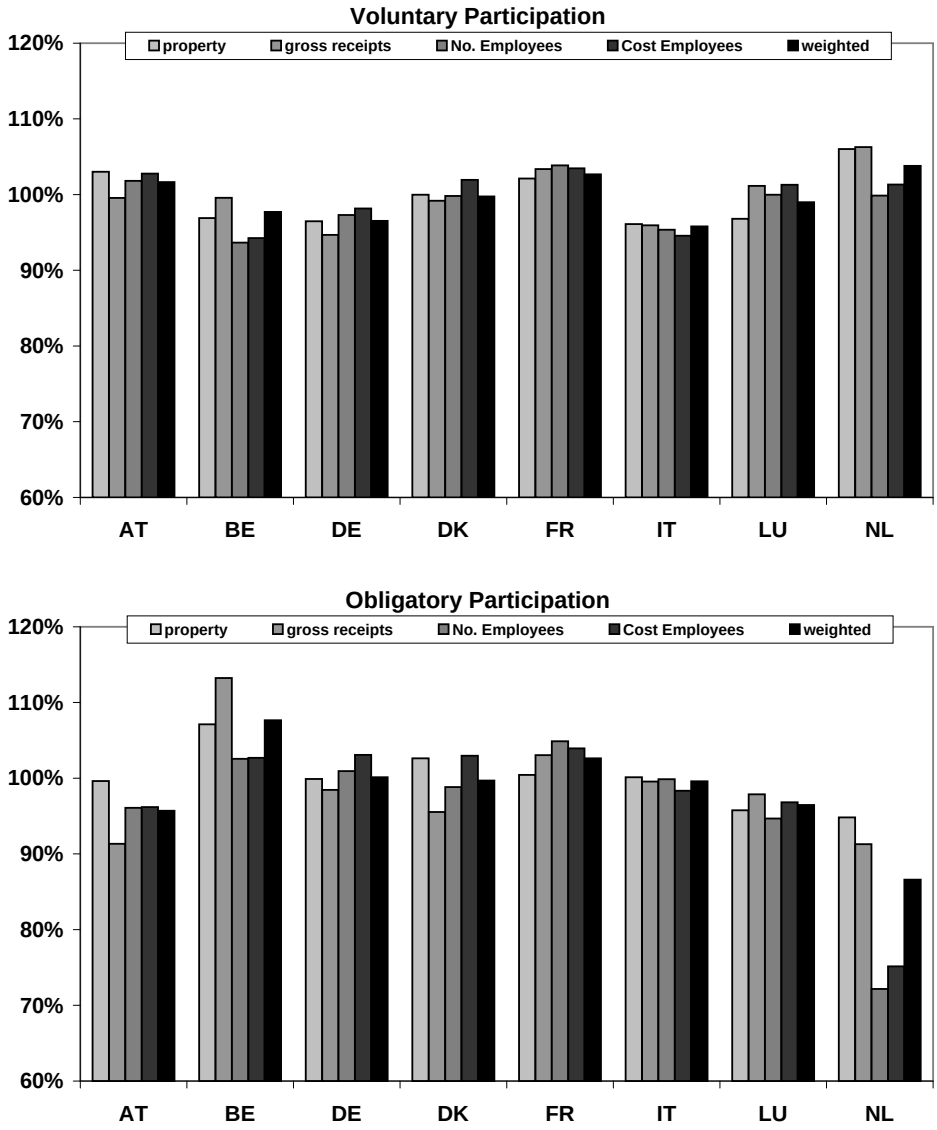

Figure 6: **Tax revenues under a formulary apportionment system (Unused losses irrecoverable, including Non-EU Parents affiliates, only 8 countries participate)**

This last specification is the closest to that of Fuest et al (2007), in that it assumes that all companies participate and excludes new member states from the loss consolidation system. In fact we identify broadly the same countries which gain revenue (Germany, France, Italy) and which lose revenue (Luxembourg and the Netherlands). However, in contrast to the 20% decline in tax revenues identified by Fuest et al. (2007) our results suggest an increase in tax revenues. This is mainly due to the fact that we add the used losses to future profits to account for the fact that losses can only be used once. Additionally we use a broader dataset and a different time period.[25] The fact that we calculate the tax revenues rather than the taxable base also contributes to the overall increase, as a shift of tax base into Germany increases the tax revenues more than the reduction in a low tax country. This effect is not included in the calculation of Fuest et al. (2007) as they examine only tax bases.

[25] As mentioned by Fuest et al. (2007), German multinational companies exhibited extraordinarily large losses in the relevant period.

You must pay taxes.
But there's no law that says you gotta leave a tip.
Morgan Stanley advertisement

7 Conclusion

This paper assesses a recent proposals for an international corporation tax system based on loss consolidation and formula apportionment system within the European Union. We do not model the possibility of a common tax base. We also abstract from any behavioural response by companies which would affect their level of profit. However, we allow groups to endogenously choose whether they participate in the new system.

Using the largest dataset currently available we find that, under our base case, the corporate tax revenues of the EU Member States would be reduced by approximately 2.5% on average. However, depending on the exact design of the apportionment factors, for some countries like the Slovak Republic or Hungary the tax receipts could increase by up to almost 50%. Their increased tax income comes primarily at the expense of Germany, Denmark or Italy.

However, if all companies were forced to consolidate and apportion their profits the total tax payments would increase roughly 2% on average. In this case, the large and high tax countries would be likely to gain revenue. It should be noted that the results are highly dependent on the choice of apportionment factors. This is especially true for the new Member States, where differences in the share of employees and labour costs are important.

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Table A.1: Data Available from Orbis: Balance Sheet

Item	Description	Definition	Variable
1	**Fixed Assets**	1a + 1b + 1c	FA_t
1a	Intangible Fixed Assets		IFA_t
1b	Tangible Fixed Assets		TFA_t
1c	Other Fixed Assets		OFA_t
2	**Current Assets**	2a + 2b + 2c + 2d	CA_t
2a	Stocks		STO_t
2b	Debtors		DBT_t
2c	Other Current Assets		OCA_t
2d	Cash and Cash Equivalent		CSH_t
3	**Total Assets**	**1 + 2**	TA_t
4	**Shareholders Funds**	4a + 4b	SF_t
4a	Capital		CAP_t
4b	Other Shareholders Funds		OSF_t
5	**Non Current Liabilities**	5a + 5b	NL_t
5a	Long Term Debt		LTD_t
5b	Other Non Current Liabilities		ONL_t
6	**Current Liabilities**	6a + 6b + 6c	CL_t
6a	Loans		LNS_t
6b	Creditors		CRD_t
6c	Other Current Liabilities		OCL_t
7	**Total Shareholders Funds and Liabilities**	**1 + 2**	TL_t
8	**Memo Lines**		
8a	Working Capital	2a + 2b - 6b	WKC_t
8b	Net Current Assets	**2 - 6**	NCA_t
8c	Enterprise Value		EVA_t
8d	Employees		EMP_t

Table A.2: Data Available from Orbis: Profit & Loss Account

Item	Description	Definition	Variable
1	**Operating revenue**		$OREV_t$
1a	Sales		$SALE_t$
2	**Cost of Goods Sold**		$CGDS_t$
3	**Gross Profit**	**1 - 2**	$GRPR_t$
4	**Other Operating Expenses**		$OOPE_t$
5	**Operating Profit/Loss [=EBIT]**	**3 - 4**	$EBIT_t$
5a	Financial Revenues		$FREV_t$
5b	Financial Expenses		$FEXP_t$
6	**Financial Profit/Loss**	5a - 5b	FPL_t
7	**Profit/Loss before Tax and Extraordinary Items**	**5 - 6**	$PLBT_t$
7a	Taxation		TAX_t
8	**Profit/Loss after Tax**	**7** - 7a	$PLAT_t$
8a	Extraordinary Revenues		$EREV_t$
8b	Extraordinary Expenses		$EEXP_t$
9	**Extraordinary Profit/Loss**	8a - 8b	$EXPL_t$
10	**Profit/Loss for Period [=Net Income]**	**8 - 9**	$PRLO_t$
11	**Memo Lines**		
11a	Export Turnover		EXP_t
11b	Material costs		$MATC_t$
11c	Cost of employees		$CEMP_t$
11d	Depreciation		$DEPR_t$
11e	Interest paid		INT_t
11f	Cash flow	**10** + 11d	CF_t
11g	Added value	7a + **10** + 11c + 11d + 11e	$ADDV_t$
11h	EBITDA	**5** + 11d	$EBITDA_t$

Table A.3: Tax information for the 25 European Union Member States

	Loss treatment		Group taxation		Corporate tax rate
Country	**Carry forward**	**Carry back**	**Allowed**	**Includes**	**2006**
Austria	unlimited[a]	not allowed	yes (75% ownership)	complete group relief	25.00 %
Belgium	unlimited	not allowed	no	n.a	33.99 %
Cyprus	unlimited	not allowed	yes (75% ownership)	domestic subsidiaries	10.00 %
Czech Republic	7 years[b]	not allowed	no	n.a	24.00 %
Denmark	unlimited[c]	not allowed	yes (100% ownership)	complete group relief[h]	28.00 %
Estonia	not applicable	not applicable	no	n.a.	24.00 %
Finland	10 years	not allowed	yes (90% ownership)	domestic subsidiaries	26.00 %
France	unlimited	3 years	yes (95% ownership)	domestic subsidiaries	33.33 %
Germany	unlimited[d]	1 year[f]	yes (50% ownership)	domestic subsidiaries	38.34 %
Greece	5 years	not allowed	no	n.a.	29.00 %
Hungary	unlimited	not allowed	no	n.a.	17.50 %
Ireland	unlimited	3 years[g]	yes (75% ownership)	domestic subsidiaries	12.50 %
Italy	5 years	not allowed	yes (50% ownership)	domestic subsidiaries	37.25 %
Latvia	5 years	not allowed	yes (90% ownership)	all subsidiaries[i]	15.00 %
Lithuania	5 years	not allowed	no	n.a.	15.00 %
Luxembourg	unlimited	not allowed	yes (95% ownership)	domestic subsidiaries	29.60 %
Malta	unlimited	not allowed	yes (51% ownership)	domestic subsidiaries	35.00 %
The Netherlands	unlimited	3 years	yes (95% ownership)	domestic subsidiaries	29.00 %
Poland	5 years,[e]	not allowed	yes (95% ownership)	domestic subsidiaries	19.00 %
Portugal	6 years	not allowed	yes (90% ownership)	domestic subsidiaries	27.50 %
Slovak Republic	5 years	not allowed	no	n.a.	19.00 %
Slovenia	5 years	not allowed	yes (90% ownership)	domestic subsidiaries	25.00 %
Spain	15 years	not allowed	yes (75% ownership)	domestic subsidiaries	35.00 %
Sweden	unlimited	not allowed	yes (90% ownership)	domestic subsidiaries	28.00 %
United Kingdom	unlimited	1 year	yes (75% ownership)	all subsidiaries	30.00 %

Notes: [a] up to 75 % of income; [b] 5 years from 2004 on; [c] 5 years from 2002 on; [d] up to 1 Million Euro + 60% of income; [e] up to 50% of the loss each year; [f] up to 511,500 Euros; [g] only terminal losses; [h] EU and treaty countries; [i] For domestic and parents in treaty countries;

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