

HOW WOULD EU CORPORATE TAX REFORM AFFECT US INVESTMENT IN EUROPE?

MICHAEL P. DEVEREUX AND SIMON LORETZ



OXFORD UNIVERSITY CENTRE FOR BUSINESS TAXATION
SAÏD BUSINESS SCHOOL, PARK END STREET,
OXFORD, OX1 1HP

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Michael P. Devereux

Centre for Business Taxation, University of Oxford

Simon Loretz

University of Bayreuth and Centre for Business Taxation, University of Oxford

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Abstract

This paper examines the likely impact of a proposed formula apportionment system for corporation tax in the EU on the inbound investment of US multinational companies. We pay attention to tax planning strategies that may be employed by US multinationals and investigate whether effective tax rates in Europe of US companies differ from those of European companies. The proposal is for an optional system: we estimate the extent to which both European and US companies would be likely to choose it taking into account their existing structures and future investment incentives. The relative position of US and European companies depends crucially on the taxation of foreign passive income.

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1. Introduction

For several years the European Commission has been considering how to create a harmonized system of corporation tax within the EU. A formal proposal was finally made in March 2011.¹ The proposal is to implement a “common consolidated corporate tax base (CCCTB)”. The Commission announced that aim of the proposal is

“[...] to significantly reduce the administrative burden, compliance costs and legal uncertainties that businesses in the EU currently face in having to comply with up to 27 different national systems for determining their taxable profits. The proposed Common Consolidated Corporate Tax Base (CCCTB) would mean that companies would benefit from a "one-stop-shop" system for filing their tax returns and would be able to consolidate all the profits and losses they incur across the EU. Member States would maintain their full sovereign right to set their own corporate tax rate. The Commission estimates that, every year, the CCCTB will save businesses across the EU €700 million in reduced compliance costs, and €1.3 billion through consolidation. In addition, businesses looking to expand cross-border will benefit from up to €1 billion in savings. The CCCTB will also make the EU a much more attractive market for foreign investors.”²

Since the CCCTB has been debated for around a decade before becoming a formal proposal, it has already received considerable academic attention. Contributions have examined a number of aspects of the proposals including the likely effects on incentives³, tax revenues,⁴ the wider effects on the European economy,⁵ and many aspects of implementation.⁶

The aim of this paper is to extend existing research to consider the impact on inbound investment into Europe, especially from the USA. This is a far from straightforward exercise. Although there is now a considerable literature examining the impact of various measures of effective tax rates on

¹ European Commission (2011a).

² European Commission (2011b).

³ For example, Devereux and Loretz (2011).

⁴ For example, Fuest et al (2007), Devereux and Loretz (2008).

⁵ For example, Bettendorf et al (2010).

⁶ For example, Fuest (2008) and the papers in Lang et al (2008).

foreign direct investment decisions,⁷ the construction of such effective tax rates typically requires assumptions to be made regarding the form that the investment takes.⁸ In particular, such measures typically do not take into account the tax planning opportunities open to multinational companies. An extreme example of such tax planning is the strategy apparently used by Google – known as the “Double Irish” and the “Dutch Sandwich” – which, it is alleged, led to the company saving \$60 billion in tax, and having an overseas tax rate of 2.4 percent.⁹ To the extent to which companies take into account taxes in determining their investment policy, they are presumably concerned with the tax that they will actually be liable to pay, and so the extent to which they engage in such strategies is likely to affect their decisions about real activities.

It is not feasible to take all possible tax planning strategies into account in assessing the impact of tax reform in the EU. However, in this paper we make some attempt to assess its importance. We begin by investigating indirectly the tax planning strategies currently used by US multinational companies when they undertake real investment in Europe. We also compare measures of the effective tax rates faced by US companies to those faced by European companies. This makes some contribution to the question of the extent to which European taxes differentially affect the competitiveness of US companies relative to their European rivals.

We then examine the effect of the proposed reform on US and European companies. Of course, post-reform it is likely that companies would rearrange their affairs to plan around the new corporate tax system in Europe. So it is not valid to make a simple comparison between incentives under the existing system taking into account tax planning, with the proposed system in the absence of tax planning. However, this paper is not intended to devise and set out tax planning strategies that could

⁷ See, for example, the survey of De Mooij and Ederveen (2008).

⁸ Measures based on ex-post declarations of profit can potentially avoid this problem, but use of such measures tends to induce problems of endogeneity.

⁹ The tax planning activities by Google involve an Irish company with (for tax purposes) management in Bermuda (Double Irish) which routes their profits in royalty payments to Bermuda via a Dutch company (Dutch sandwich). See Drucker (2010).

be used by US companies after a tax reform in the EU. The paper therefore only considers in very broad terms whether the proposed reform would significantly affect tax planning opportunities.

Before examining the position of US companies, it is useful to review the proposed EU reforms. There are six aspects of the proposals that are particularly relevant for our purposes. We discuss them in turn.

- Harmonization of corporate tax base

The intention is to harmonize the tax base across all EU member states. Clearly this would represent a major reform in all countries. As an example, depreciation allowances are proposed to be based on a length of life of buildings of 40 years and for long-life tangible assets other than buildings a life of 15 years. Other fixed assets would be depreciated at a rate of 25%.¹⁰ Most of the proposal is taken up with defining the tax base, although a considerable amount of additional detail would be required before it could be implemented. There appears to be no intention to institute a radical reform compared to existing corporation taxes. For example, interest payments would continue to be deductible (subject to anti-abuse rules), and there would be no relief for the costs of equity finance.

One important element of the proposals is the anti-abuse rules. Currently these differ substantially across EU member states, and the existence of such differences to some extent offers both European and US companies a menu of options in choosing the location of their activities. For example, Ireland has no controlled foreign company (CFC) rules relating to the income of foreign subsidiaries of Irish companies, although many other countries do.¹¹ Some countries – but not all – currently have thin capitalization rules that restrict the deductibility of interest. The new proposal includes both a thin

¹⁰ Compared to the existing tax rules this implies on average significant broadening of the tax base for industrial buildings and patents and a moderate change for plant and machinery. However for individual countries the picture can be substantially different. See Section 4 and Table 4 a for a more detailed analysis.

¹¹ Broadly equivalent to the Sub-part F rules in the USA.

capitalization rule and a CFC rule that would apply to all EU member states and which build on the varying existing practice in the EU.

- No harmonization of corporate tax rate

There are no proposals to harmonize corporate tax rates. The intention is that each country would be able to apply its own tax rate to the profit allocated to it. In the short run, this may lead to some lack of balance in corporate tax systems. Typically it is common for countries to pair a high tax rate with a narrow tax base, or a low tax rate with a broad tax base. Harmonizing the base but not the rate would upset this pattern, with consequential effects on investment incentives. It is therefore likely that in the longer run (or possibly immediately) countries would adjust their tax rates either down or up depending on whether the harmonized base was larger or smaller than the existing base. Beyond that, there would arguably be even greater pressure of competition in rates between member states. At present such competition can also take place over the definition of tax bases, and competition in rates is to some extent obscured by differences in bases. This would no longer be true for competition in rates under the proposed system.

- Consolidation of corporate tax base across all European subsidiaries

A key feature of the proposal is the consolidation of profit and loss across all EU member states. This has two major implications. The first is that under the proposed system taxable profit would be independent of the country in which profit is located. Tax planning arrangements to shift profits between European countries would therefore no longer be worthwhile.¹² The second is that, with a small number of exceptions, companies currently cannot generally offset losses in one country against profits in another.¹³ However, this will be possible, indeed required, under the proposed system. Start-up losses encountered on a new investment in another EU country will therefore be

¹² Subject to differences in withholding tax rates, discussed below.

¹³ Austria and Denmark do have forms of international loss consolidation. In addition, a ruling by the European Court of Justice in *Marks & Spencer v. Her Majesty's Inspector of Taxes* (ECJ Case C-446/03), requires that losses can be used in the parent company if there is no possibility of carrying them forward in the subsidiary.

treated more favorably than at present for companies that have some existing taxable profit somewhere in the EU. But this benefit would not accrue to a US company making its first investment in the EU.

- Formula Apportionment

The proposal has a three equal-factor allocation formula, based on the location of sales, employment and assets. The employment factor is further split into two equal factors based on payroll and the number of employees. This formula would be common to all countries; there would therefore be no opportunity to exploit differences in the formula between countries. The asset factor would be based solely on fixed tangible assets; intangible assets would not be used. The sales factor would be based on the destination of sales.

As has been well known since at least the contribution of Gordon and Wilson (1986), a corporation tax with such an apportionment factor has the effect of a tax on each of the factors. When tax rates also differ between countries, then the apportionment can affect the location of activity. For example, companies have an incentive to shift valuable tangible assets to a country with a low tax rate. The impact of the sales factor here is less clear, though. A direct sale to a third party customer would generate a tax in the location of the customer; this is less likely to affect the location decisions of the company itself.¹⁴

- Optional

Another important feature of the proposal is that the system would be optional for taxpayers. It is envisaged that countries would maintain their existing systems and introduce the CCCTB as a possible tax system as an option for each group of companies. Tax authorities would be obliged to operate two systems simultaneously.

¹⁴ There may be an opportunity for companies to route sales via third parties in low tax countries.

However, from the perspective of the company, and assuming that the existing combination of bases and rates continued to be available in each country, the introduction of an optional new tax would create an asymmetric effect: tax liabilities may fall, but presumably companies would not choose the CCCTB if they expected tax liabilities to rise. At first sight, then, the introduction of this optional system could only reduce tax liabilities and increase incentives to invest, or have no effect; it could not worsen investment incentives. However, there may be general equilibrium effects. For example, if European companies see a greater advantage than US companies, then US companies may suffer a relative disadvantage. We discuss this possibility further below.

- No harmonization of double tax treaties or withholding tax rates

The Commission's proposal does not include harmonization of international aspects of taxation, except within the EU. Thus each country can choose its own withholding tax rate on cross-border payments of dividends, interest and royalties. The Commission proposes that the revenues from withholding taxes on interest and royalties are shared according to the apportionment factor. But it does not propose to harmonize the rate. In this case, then there may still be an incentive to shift profits within EU countries. For example, overall tax may be reduced by having a European holding company in a country that does not charge withholding tax on the payment of dividends to a non-EU parent company. Shifting profit into that company would not affect the European-wide tax payment (unless the apportionment factors were also affected). But it would affect the tax paid on the dividend to the non-EU parent. The same would be true for payments of interest and royalties out of the EU. The lack of harmonization of these international aspects of tax could therefore be important for the tax-minimizing strategies open to, say, US companies.

The remainder of the paper is organized as follows. Section 2 provides some evidence on the existing activities of US multinational companies within the EU. We examine structures used by US companies

operating in Europe, and we compare measures of effective tax rates of US and European companies. In Section 3 we examine whether the introduction of the CCCTB, at existing tax rates, would induce US companies and European companies to choose the CCCTB assuming that existing tax systems were still in place as an option. The approach we use here is to apply the rules of the CCCTB to existing structures – this therefore does not take into account any tax advantage that could be gained by adjusting structures in the light of the CCCTB alternative. This is therefore a form of ex-post evaluation: what would tax liabilities have been if the tax system had been consistent with the CCCTB, but all investment decisions and structures were as under the actual system? Section 4 considers an ex-ante analysis in the sense of identifying investment incentives under existing systems, and potential incentives under the CCCTB. Section 5 briefly concludes.

2. How do US companies invest in Europe?

To understand how US firms would be affected by the proposed CCCTB tax reform it is useful to start with a description of the existing corporate activities of US firms in the European Union. To this end we use the ORBIS dataset provided by Bureau Van Dijk, comprising financial accounts and ownership information for 444,934 companies.¹⁵ We are able to allocate 253,158 companies to 109,490 ultimate corporate owners. Of these companies, 15,586 are subsidiaries ultimately owned by one of 4,111 US parents. Unfortunately balance sheet and profit and loss account information is only available for a substantially smaller number of companies which results in a reduced sample size for some of the analysis below. In order to exploit as much of the information as possible we allow the sample size to vary between the analyses in the different sections of the paper. A full description of the dataset is provided in the Data Appendix.

¹⁵ We restrict the original dataset to companies with either more than 10 million Euros of turnover, 20 million Euros of total assets or 150 employees.

a. Ownership structures of US companies in Europe

A starting point for the analysis of how US companies invest in Europe is to analyze patterns of ownership. Post-tax profits arising in any particular subsidiary ultimately flow back to the parent as a dividend, which may trigger withholding taxes. Given that withholding taxes on dividends paid to non-EU countries vary across EU member states, and also given other differences in the treatment of holding companies, US companies may have an incentive to structure their European activities in a particular way.

A first look at this is shown in Table 1, which uses the ownership data from ORBIS to construct ownership trees for 4,111 US-based multinational companies with a total of 15,586 subsidiaries within Europe. Some European subsidiaries of these companies may be owned directly by the US parent. Many are instead owned indirectly, via intermediate companies. In the Table we focus on cross-border ownership. We ignore companies in one country that are owned directly by another company in the same country.

Table 1 reports on the immediate ownership of the resulting 10,090 European subsidiaries of US-based multinational companies. The table indicates how many companies located in the row country are directly owned by companies located in the column country. For example, 115 German companies are owned directly by a Netherlands parent, while 831 German companies are owned directly by a US parent.¹⁶

Overall, the table indicates that over 70% of these companies are owned directly by a US company (7,215 out of 10,090). Of these, one third is located in the UK, with a further 12% in France and 11% in Germany. The remaining companies are not owned directly by US companies. By far the largest

¹⁶ Some EU countries are excluded from the columns in Table 1 since they host no immediate parent companies.

host of intermediate European companies is the Netherlands; 970 non-Netherlands subsidiaries have direct parent companies in the Netherlands (just under 10% of this group). A further 386 European subsidiaries have direct parents outside the EU and the USA. Another country which features relatively heavily as a location for parent companies is Luxembourg, which hosts the parents of 191 non-Luxembourg subsidiaries.

The Table therefore provides mixed evidence. A large majority of European subsidiaries are owned directly by US parents. Dividends paid back to those parents may well be subject to US tax, especially since the US tax rate tends to exceed most EU tax rates. Of course, dividends may not be paid, and instead any profit may be reinvested. However, a considerable proportion of subsidiaries in Europe are owned indirectly through another country. Of course, this may be explained for non-tax reasons. But it is also possible that the US companies are exploiting particular aspects of EU, non-EU and US tax systems by arranging their ownership structure in this way. Particularly, the use of the Netherlands seems likely to be related to its relatively favorable tax treatment.

This pattern is remarkably robust to the exclusion of smaller corporate groups. It might be thought that the proportion of US companies directly owning a subsidiary in a country might be affected by size: larger companies with more sophisticated techniques seem more likely to route investment through intermediary countries. However, this is generally not true. For example, excluding all US companies with less than 3 European subsidiaries yields a very similar pattern to that shown in Table 1.

The share of directly-held subsidiaries is remarkably similar for corporate groups with the ultimate owner in other countries. Typically, around two thirds of subsidiaries appear to be held directly, while the Netherlands and to lesser extent Belgium and Luxembourg make up a disproportionately large share of the European holding companies.

b. Co-location in Europe of US companies

Ownership structures are important for the flow of profits from subsidiary to parent as a dividend. But income can be shifted between different parts of a multinational group using other forms of income, such as interest and royalties. In this case, profit shifting opportunities can arise without a specific ownership structure in place. For example, if one subsidiary owns the relevant intangible assets, then other companies within the group can pay royalties to that subsidiary whatever the precise ownership structure. A more general analysis of the location of US multinationals therefore needs to identify clusters of countries in which subsidiaries of US companies tend to be located. Dyreng et al (2011) take this approach. Specifically, they analyze the location of pairs of subsidiaries. They find that certain pairs are more likely to include a tax haven than would be expected by chance, that pairs are more likely to form if the host countries share a bilateral tax treaty and less likely to form as income and dividend withholding taxes between the countries, and with the US parent, increase.

We are interested in the same factors, but take a different approach. First, we identify the location of each subsidiary within each US multinational group. The first column in Table 2a shows the number of US corporate groups operating in each country. For example, 2,501 (or 60.8 percent of the 4,111 corporate groups analyzed) are active in the UK. At the other end of the spectrum are small countries like Austria and Slovenia with subsidiaries of only 21 (0.5 per cent) and 8 (0.2 per cent) corporate groups represented.¹⁷

For each group in each country, we then identify the frequency with each other EU country is also part of the overall group. Thus, for example, 50% of US multinational companies that have a

¹⁷ The Table suppresses Cyprus with only one corporate group and Malta with no subsidiaries of US corporate groups.

subsidiary in Belgium also have a subsidiary in the Netherlands, and 78% also have a subsidiary in the UK. The last row of the Table presents the weighted mean of the entries in each column, weighted by the number of companies in each row. Obviously, we would expect the larger countries to appear more frequently since greater economic activity takes place in those countries, and so we would expect to see significant numbers of groups with subsidiaries in, say, Germany or the UK. We might expect the prevalence of some countries also to depend on cultural and language similarities in the US. Both of these factors are reflected in the last row: for example, 75% of US companies with a European, but non-UK, subsidiary also have a subsidiary in the UK.

But, relative to their size, some countries do appear to be more prevalent. For example, just over one third of US companies with a European, but non-Netherlands, subsidiary also have a subsidiary in the Netherlands. The equivalent number of Belgium is 32%, and for Ireland it is 25%. These proportions appear to be large, and may well reflect tax advantages. However, they may also reflect other factors.

To explore this further, in Table 2b we make an adjustment for the size of the country, measured by GDP. Specifically, for each US group, conditional on the total number of EU countries in which that group has at least one subsidiary and conditional on having a subsidiary in country i , we calculate an approximation of the probability that the group also has a subsidiary in country j , where the probability is based on the contribution of the GDP of country j to EU-wide GDP. Aggregating over US groups with different numbers of subsidiaries, we can then generate a prediction of each element of Table 2a based on the economic size of each country. Table 2b presents the results of deducting those predictions from the actual proportion in Table 2a for each element of the Table. Table 2b therefore gives an indication of the extent to which the observed pattern in Table 2a deviates from what would be expected, based only on GDP, and conditional on the actual number of subsidiaries. The last row presents weighted averages, as in Table 2a.

Correcting for incentives due to differences in GDP, Table 2b presents a rather different picture. For example, Table 2a reveals that 49% of US companies with an EU, but non-German, subsidiary also have a subsidiary in Germany. Table 2b shows that, abstracting from the incentive to be present in Germany because it has a large GDP, US companies are likely to avoid locating a subsidiary in Germany (virtually all the entries in the Germany column are negative). There remains a prevalence for locating in the UK, which could reflect cultural and language similarities to the US. Apart from the UK, the most popular countries in Table 2b are Belgium, Ireland, the Czech Republic, Slovenia and Netherlands. Obviously non-tax factors may be important in determining location decisions; but the inclusion of Ireland and the Netherlands in this list is certainly consistent with a degree of tax planning.

c. European effective tax rates for US companies

The analysis so far has represented an indirect attempt to infer the extent to which US companies engage in tax planning when they undertake real investment in the Europe. The evidence is mixed. A large majority of US companies do not use an intermediary company when investing in Europe. However, a sizable minority tend to have holding companies in countries such as the Netherlands, or outside of the EU. There is also evidence that corporate groups have more subsidiaries in tax-favored countries such as the Netherlands and Ireland than would be expected by the size of their economies.

A more direct question is whether US companies succeed in paying relatively low rates of tax on their activities in Europe, and whether they appear to face a competitive advantage or disadvantage relative to European companies. We do not directly observe tax payments. However, we are able to

extract information on the tax charged to the profit and loss account for a subsample of companies using the ORBIS dataset. Using this as a basis, we are able to construct backward-looking measures of effective tax rates for any subsidiary or for the corporate group as a whole. We focus on the latter, and compare effective tax rates across groups according to the location of the parent company.

The construction of effective tax rates is not straightforward. For each group we sum all tax charges for all subsidiaries for up to a ten year period to 2010 (we use fewer years when the subsidiary does not exist for the entire period, or where data is not available for all ten years). Analyzing the position over a ten year period should mean that the importance of the difference between the tax charge in the profit and loss statement and the tax actually paid is much less important, since timing differences tend to cancel out in the longer run.

To compare these tax charges, we define effective tax rates by scaling by a measure of profit. We consider two measures.¹⁸ The first is EBIT (earnings before interest and tax). Although this is not a direct estimate of taxable profit this nevertheless is an interesting benchmark, precisely because it is before tax-deductible interest payments, and hence before one of the measures that companies can take to reduce tax liabilities in a particular jurisdiction. The second is profit and loss before tax (PLBT), measured after interest payments (and receipts). If a company that pays interest from a subsidiary in a high-tax rate EU country to another member of the group in a low tax-rate EU country, then the aggregate values of both measures of profit should in principle be unaffected. However, the tax charge will be lower, reflecting the difference in tax rates in the two countries. A company that pays interest to any other party (another subsidiary outside the EU, or simply to a third party) would generate a higher tax-to-PLBT ratio than tax-to-EBIT ratio.

¹⁸ We have also considered a third measure as the ratio of the tax charge to gross profit; the denominator here should reflect profit before royalties are deducted. Companies that pay high royalties may have a very low effective tax rate on this measure though not necessarily on the other measures. We have fewer observations for this measure. However, the results using this measure are very similar to those using the other two measures.

All measures of effective tax rates ultimately reflect the difference between the measure of accounting profit used and taxable profit. Since standard measures also depend on the statutory tax rate, it is useful also to analyze this difference directly. To do so, we simply scale up the tax charge by the local statutory tax rate in order to generate a measure of taxable profit for each subsidiary. We then aggregate the measure of taxable profit across time and subsidiaries and scale by the aggregate values of the two accounting measures of profit.

To summarize, we define four measures as:

$$ETR_i^{EBIT} = \frac{\sum_{t=2000}^{2009} \sum_{j=1}^{J_i} TAX_{ijt}}{\sum_{t=2000}^{2009} \sum_{j=1}^{J_i} EBIT_{ijt}}$$

$$ETR_i^{PLBT} = \frac{\sum_{t=2000}^{2009} \sum_{j=1}^{J_i} TAX_{ijt}}{\sum_{t=2000}^{2009} \sum_{j=1}^{J_i} PLBT_{ijt}}$$

$$ETR_i^{RATIO1} = \frac{\sum_{t=2000}^{2009} \sum_{j=1}^{J_i} TAX_{ijt} / \tau_{ijt}}{\sum_{t=2000}^{2009} \sum_{j=1}^{J_i} EBIT_{ijt}}$$

$$ETR_i^{RATIO2} = \frac{\sum_{t=2000}^{2009} \sum_{j=1}^{J_i} TAX_{ijt} / \tau_{ijt}}{\sum_{t=2000}^{2009} \sum_{j=1}^{J_i} PLBT_{ijt}}$$

where τ denotes the statutory corporate tax rate (including local profit taxes), J_i denotes the total number of subsidiaries of corporate group i . When constructing our effective tax rate measures we exclude all corporate groups for which the numerator is negative.

We also construct an unweighted statutory tax rate for each company based on the location of its component subsidiaries, as

$$\tau_i = \frac{\sum_{t=2000}^{2009} \sum_{j=1}^{J_i} \tau_{ijt}}{J_i T_{ij}}$$

where T_{ij} describes the number of years we can observe subsidiary j . These measures tend to generate a number of outliers. We exclude observations where the values of the first two measures lie outside the range zero to 70 percent, or where the values of the last two measures lie outside the

range of zero to 2. Additionally we exclude all firms for which the average debt to total assets ratio exceeds 1.

Table 3 presents a summary of these measures, listed according to the location of the ultimate parent company. Note, of course, that these figures represent only taxes paid in Europe. They do not include any further tax paid in the USA, or in any other country. On average, groups have an ETR_i^{EBIT} of just over 28 percent and an ETR_i^{PLBT} of nearly 32 percent. The higher latter figure reflects a net payment of interest to parties that are not EU members of the same group. This difference between the two measures holds for all groups, whatever the location of the ultimate parent company, with one exception: the USA. This seems to indicate that, on average, subsidiaries of US groups do not pay interest to third parties, though they may pay interest to each other in order to shift their taxable profit within the EU, and of course the parent may borrow in the US. If European subsidiaries of US companies were following a strategy of paying interest from high-tax European countries to low-tax European countries, this would tend to reduce their consolidated ETR_i^{PLBT} . Table 3 presents some evidence that, on average, US groups do have lower values than European companies.

To abstract from tax rate differences, columns 3 and 4 show estimated taxable profit as a proportion of EBIT (column 3) and PLBT (column 4). Again, as expected, the ratios in column 4 tend to be higher since net interest paid is positive, reducing PLBT below EBIT, and on average the proportionate rise from column 3 to column 4 matches that from column 1 to column 2. However, again this is not true for companies that are part of US groups, for whom the two ratios in columns 3 and 4 are very similar.

In fact, US companies tend to have a higher ratio of taxable profit to EBIT than European companies, but a slightly lower ratio of taxable profit to PLBT. This suggests that, like European companies, US

companies have a taxable profit close to their PLBT. However, unlike European companies they do not reach this position by paying interest to third parties.

We take this analysis one step further in Table 4, which considers how various factors determine the different ETR measures. Here we regress each of the ETR measures on a number of variables. We are particularly interested whether corporate groups with a US company as the ultimate owner differ with respect to their effective tax burden. We identify this effect with a dummy variable indicating whether the corporate group has a US owner.¹⁹ To control for the location of companies we include a full set of dummy variables for whether the group has a subsidiary in each country and we also include the subsidiary-weighted statutory tax rate for the corporate group. Finally we include a full set of sector dummies (in the interests of space the coefficients on these variables are not reported).

We control for firm size, which we measure by (the logarithm) of total assets. The theoretical prediction for the impact of firm size on the effective tax burden is ambiguous. A longstanding debate in the accounting literature is whether larger firms face a higher burden because they are under more scrutiny from the governments (cf. Zimmermann (1983) or Omer et. al (1993)) or whether larger firms can exploit their larger resources to reduce their tax burden.²⁰ We find robust evidence that larger companies have lower effective tax rates. They also tend to have a lower ratio of taxable profit to the two measures of accounting profit. This suggests that they are able to reduce their Europe-wide taxable profit, rather than simply shifting it between European countries.

With respect to our main variable of interest, companies with a US parent generally tend to have a higher effective tax rates than European companies. This does not appear to be solely due to operating in higher-taxed countries, since controlling for the tax rate – either by including it as a

¹⁹ We have also examined regressions with a complete set of similar ultimate ownership dummy variables representing the different countries in which the ultimate parent company could be located. However, including these other dummies has little impact on the results since for the large part of the sample the parent country is the same as the country of the subsidiaries.

²⁰ See also Rego (2003) for a more comprehensive summary of this literature.

separate regressor, or by considering only the ratios of taxable to accounting profit - does not remove this effect. It is possible that this effect could be due to higher profitability of US companies. Apart from this, it would appear that US companies are less able to manage their tax affairs in Europe.

However, it is possible that some firms may be more sophisticated in managing their tax affairs. To investigate this we include an interaction term between the US-owner dummy and a dummy for whether the group has a subsidiary in the Netherlands. Conditional on the other effects discussed, the coefficient on this interaction term is of the opposite sign, but roughly of the same magnitude, as the effect of the US dummy. This suggests that the high effective tax rates faced by US companies apply only to those that are relatively unsophisticated in their tax planning (i.e. not having a Dutch subsidiary). However, it also implies that sophisticated tax planning techniques by US companies apparently do not generally lead to them facing lower tax effective tax rates in Europe than European companies.

However, it is also plausible that larger companies engage in more sophisticated tax-planning strategies. To examine this we further interact the interaction variable (indicating a US company with a Netherlands subsidiary) with our measure of firm size. On including this term, the coefficient on the original interaction term becomes significantly positive, while the variable interacting it with firm size is highly significant and negative. Interpreting these two coefficients together this would indicate that only larger firms benefit from a lower effective tax burden because of tax planning strategies involving a Dutch subsidiary. Broadly, there is a positive effect for companies below 12 million of total assets for the measures based on EBIT and 35 million of total assets for the measure based on

pre-tax profits, and a negative effect for those above these amounts.²¹ Further exploring this effect lies beyond the scope of the current paper and is an issue for future research.

In sum, a careful analysis of the data generates results that are not consistent with the popular view that sophisticated tax planning operations of US companies – such as the Google example identified earlier – allow these companies pay low effective rates of tax in Europe. It is much more likely that companies differ - amongst others criteria with respect to their size - in the extent of their tax planning activities. Given this heterogeneity, it is interesting to study in more detail the likely impact of tax reform in the EU on the incentives faced by these companies.

3. Would US companies choose the CCCTB if their activities were unchanged?

The initial question for understanding the likely effects of EU tax reform on inward investment by US companies is whether these companies would opt into the new system, or would prefer to remain paying tax under the existing systems. In general this depends on the extent to which the companies rearrange their businesses in the light of the tax reform. They may invest more or less, change the location of their investment, and engage in different tax planning operations. Allowing for all of these factors would require a sophisticated general equilibrium model. We do not follow that route. Instead we undertake a more basic analysis. We aim to identify the tax liabilities that companies would have faced if the tax reform had taken place 8 years ago but companies had exactly the same operations. That is, we aim to identify what tax liabilities of groups of companies would have been

²¹ Dividing the coefficients for the dummy and the interaction terms yields $0.141/0.015=9.4$ for the logarithm of total assets, which corresponds to 12 million Euros in absolute value.

assuming no behavioral change. This approach should generate a minimum bound on the proportion of companies that would choose to be taxed under the CCCTB.²²

We therefore approach this question by taking as given the location of subsidiaries and their accounting information, including investment, employment, sales and profit. The need for more accounting information in this exercise necessitates a reduction in the size of the sample, since relevant data is missing for a number of companies in the samples used above. We consider only companies that operate in more than one EU country.²³ We proceed by making adjustments to the corporation tax charge in the accounts, in a number of steps.

- a. First, we derive a measure of taxable profits and losses , accounting for loss carry forwards included in the corporation tax charge in the accounts.
- b. Second, we consolidate the profits and losses of subsidiaries that are in the same group within the EU, to generate a measure of EU-wide taxable profit.
- c. Third, we allocate this taxable profit to individual countries based on the proposed CCCTB allocation formula. This is essentially a three-way split between tangible assets, employment and sales.
- d. Fourth, we apply the existing statutory tax rate in each country to estimate the tax liability in each country. We then aggregate tax liabilities to estimate of the total tax liability for each group, and compare that with the liability under the existing system.

The results of this exercise are presented in Table 5. We analyze 5,413 corporate groups. The first column shows the number of groups with an ultimate parent company in each country. Due to low

²² This analysis updates that of Devereux and Loretz (2008), and identifies in particular the effects of the reform on companies with parent companies in specific countries.

²³ This implies a reduction in the number of corporate groups to 5,413 and in the number of subsidiaries to 42,288. In sum our analysis is based on 217,848 observations, which implies that we observe each subsidiary for 5.15 years on average. Unfortunately we have only 30 companies based in Ireland with usable data. These may not be representative.

numbers, we combine groups from the new member states, and from non-EU countries. We show the case for US companies separately. The second column shows the proportion of these groups that we estimate would see a reduction in their aggregate tax liability under the CCCTB assuming unchanged behavior. Overall, this proportion is close to 50%. There is some variation between countries: 64% of Finnish companies and 63% of French companies would benefit. At the other extreme, only 33% of Greek companies would benefit.

The remainder of the table separates companies that would gain or lose from the reform. The next two columns show the mean tax liability under the existing system and estimated under the reformed system of groups that gain from the reform. On average the gain across all groups that would benefit is around 5 percent of their existing tax liability. Again this varies across countries, with companies based in the new member states benefitting particularly. US companies that would gain would have an average benefit of around 6 percent.

The next section of the Table considers the case of groups that would lose under the reform, i.e. face a higher tax burden if the tax burden were calculated according to the CCCTB rules. On average these tend to be smaller companies, with tax liabilities roughly half of the first group. One reason is that smaller companies are less likely to have at least one subsidiary with an unused loss under the existing system. These companies would, on average, see their tax liabilities rise by around 9 percent if they were required to be taxed under the CCCTB. The average rise for such US companies would be over 15 percent.

Among the individual EU Member States there would also be winners and losers, although this result needs to be interpreted with caution because it is based on a small number of companies. In line with previous studies, Eastern European countries like the Czech Republic, the Slovak Republic or Romania would benefit from increased revenues while the high tax countries like Germany, Spain or

Italy would lose significantly. The overall reduction in tax revenues in all countries is approximately 2.5 percent in our sample (about half the companies would save 5.2 percent on average), with individual countries losing or gaining up to 20 percent of their tax revenue.

4. How would the future investment of US companies be affected?

The previous section was to some extent an ex-post analysis, identifying which companies would gain from the CCCTB, assuming unchanged behaviour. Clearly, though, the introduction of the CCCTB could change behavior. We now address this issue indirectly by assessing its impact on investment incentives. Given the optional nature of the CCCTB, companies would be able to choose not only where to locate a new investment (and how much to invest), but under which system they would prefer to be taxed.

Below, we address this by reporting forward-looking measures of effective tax rates. However, before doing so, we consider the building blocks of those measures: the statutory tax rate and the present value of depreciation allowances, expressed as a proportion of an asset's initial cost. Here we use depreciation allowances as a proxy for the size of the tax base; this clearly excludes other factors such as restrictions on interest deductibility and other anti-abuse provisions; we discuss those further below.

The first column of Table 6 reports current EU statutory corporate rates, including applicable local profit taxes. The remaining three columns present, in turn, the present value of depreciation allowances for industrial buildings, plant and machinery and patents, and the last column presents an unweighted average of the three. Each row presents values for a given country; the last two rows present the net present value for the proposed CCCTB and the unweighted average of the current

systems across the 27 countries. Comparing these last two rows, it is clear that the depreciation allowances offered under the CCCTB would be, on average, less generous than those currently existing within the EU. This does not hold for all individual countries; for example, the tax depreciation for industrial buildings in the UK falls substantially short of that in the CCCTB.²⁴ As a result, the decision of a company as to whether or not to opt for the CCCTB system will depend, among other things, on existing provisions in each country and the asset mix of a company's investment.

We combine these measures of the statutory rate and the tax base into two measures of effective tax rates: an effective marginal tax rate (EMTR) and an effective average tax rate (EATR). The first is a conventional way of measuring the increase in the cost of capital due to taxation. In principle, a rise in the cost of capital or EMTR would tend to reduce aggregate investment undertaken. The second is essentially a measure of the economic rent taken in tax, which in principle affects the location of discrete investment projects. Both measures are constructed using the approach of Devereux and Griffith (1998). Table 7 reports these measures both under existing tax systems, and under the CCCTB. Details of the parameters used are based on the financial information in the ORBIS sample, and are shown in the note to the Table.

On these measures, the introduction of the CCCTB would increase the average EATR in the EU slightly from 24.4 percent to 25.1 percent. The rise in the EMTR would be more pronounced at 4.5 percentage points. This larger rise in the EMTR occurs because the EMTR is more sensitive to the definition of the tax base, since it applies to a marginal investment. Note that the EMTR is negative for all countries – a result that hinges on the assumption that two thirds of the investment is financed by debt. This assumption is based on our ORBIS sample which has an average debt to total

²⁴ In fact the UK is currently phasing out depreciation allowances for industrial buildings. Starting with fiscal year 2011/12 industrial buildings will no longer be tax depreciable, hence the net present value will be zero.

assets ratio of about 66 percent. There are clearly differences in the effects of the CCCTB across countries. However, these are relatively small.

In practice we may expect to see greater differences in the effects of the CCCTB across individual companies, with different debt levels and asset mix. In principle, firm-specific measures could be constructed along the approach of Egger et al. (2008) and Egger and Loretz (2010), using firm-specific weights. However, this approach on its own would not distinguish the effects of taxation on investment by a US company from investment by a European company.

It seems likely that there would be two main differences in the effects for US and European companies. First, if an existing company invests in an EU country it may well face start-up losses, and indeed with some probability may end up making an overall loss. If that existing company is in the EU and has existing taxable profit, then under the CCCTB the losses would be consolidated with the existing taxable profit, and would in effect receive immediate loss offset. This would also be the case for a US multinational that was already established in the EU and also had existing taxable profit in the EU. However, a new venture into Europe by a US company would not, in general, receive such favorable treatment of losses. Thus, the possibility of consolidation of losses in one country with profit in another country is advantageous only to the extent that the multinational already has existing EU profit.

Beyond this, a more complex effect applies to inbound investment. That is because it is not proposed that there should be harmonization of withholding taxes on dividends, interest or royalties paid to non-EU parents or other non-EU members of the group. For a purely European company this may make little difference since its profits would remain in the CCCTB area, and no withholding taxes would be charged. But for a US company, incentives would remain to make payments of dividends, interest or royalties from an EU country with low or zero withholding tax rates. This is likely to give

rise to continuing tax planning opportunities for US companies - in particular, there may be an incentive for such companies to shift profits within the EU to take advantage of favorable withholding tax rates.

At first sight, it may appear that avoiding any payment of withholding tax would simply put US companies on a par with European companies that would typically not be liable to withholding taxes. However, the situation is more complex. US companies could in principle direct payments of dividends, interest and royalties to another part of the group in a non-EU low-tax jurisdiction. If the recipient also exploited the US “check the box” rules, then the receipt would not be taxed by the US until and unless the proceeds were distributed back to the US, and would not therefore be subject to the subpart F rules for the taxation of passive foreign income.

Of course, European companies could do likewise. But then the specific anti-abuse rules existing in European countries, and proposed for the CCCTB, become important in whether the part of the group that receives the payment is taxed by the country of the parent company. Currently, there is wide variation in such CFC rules between European companies. Under the CCCTB, these rules would be harmonized, and may result in European companies being taxed on such income. If this is indeed the case, then it may be that ultimately US companies would have a competitive advantage over European companies.

5. Conclusions

This paper set out to examine the likely impact on incentives for US companies to invest in the EU following the European Commission’s proposal for an EU-wide corporation tax based on formula apportionment. A significant complication in assessing this is the extent to which US companies

engage in tax planning under the existing systems. We therefore first address that issue directly, by considering the structure of the EU operations of US companies and by comparing their European effective tax rates to those of European companies. We do not find that, on average, US companies successfully engage in sophisticated tax planning, or that they have significantly lower effective tax rates than European companies. However, there is evidence that some companies arrange their affairs with a strategic tax planning motive. For example, we find some evidence that larger US companies make use of the favorable Dutch tax regime to reduce their overall European liabilities.

We also consider whether both US and European companies would be likely to choose to the option of being taxed under the new system. Again we find mixed results: roughly half of US companies would gain from the new system assuming unchanged behaviour. Others would only benefit if they could adjust their location, investment and financing strategies to take account of the new system. This is similar to the position for European companies.

However, this assessment depends crucially on the details of the taxation of foreign passive income. While there may be some advantage to European companies from consolidating profits and loss in different EU countries, US companies may continue to benefit from the “check the box” system which effectively permits them to receive passive income in a low-taxed jurisdiction tax-free, and hence creates an incentive to pay such income from European countries. However, since this possibility appears to exist for US companies at present, it is perhaps surprising that the data do not indicate that US companies face relatively low effective tax rates in the EU.

References

Bettendorf, L., R. de Mooij, M.P. Devereux, S. Loretz and A. van der Horst (2009) “Corporate tax harmonization in the EU”, *Economic Policy* 25, 537-590.

De Mooij, R. and S. Ederveen (2008) “Corporate tax elasticities: a reader's guide to empirical findings”, *Oxford Review of Economic Policy* 24.4, 680-697.

- Devereux, M.P. and R. Griffith (1999) "The taxation of discrete investment choices", IFS Working Paper W98/16, London: Institute for Fiscal Studies.
- Devereux, M.P. and S. Loretz (2008) "The Effects of EU Formula Apportionment on Corporate Tax Revenues", *Fiscal Studies* 29.1, 1-33.
- Devereux, M.P. and S. Loretz (2010) "Evaluating Neutrality Properties of Corporate Tax Reforms", *Centre for Business Taxation Working Paper* 10/07.
- Drucker, J. (2010) "Google 2.4% Rate Shows How \$60 Billion Lost to Tax Loopholes", Bloomberg, October 21, <http://www.bloomberg.com/news/2010-10-21/google-2-4-rate-shows-how-60-billion-u-s-revenue-lost-to-tax-loopholes.html>.
- Dyregang, S.D., B. P. Lindsey, K.S. Markle and D. Shackelford (2011) "Taxes and the clustering of foreign subsidiaries", in preparation.
- Egger, P. and S. Loretz (2010) "Homogeneous Profit Tax Effects for Heterogeneous Firms?" *The World Economy*, 33, 1023–1041
- Egger, P., S. Loretz, M. Pfaffermayr and H. Winner (2009) "Firm-specific Forward-looking Effective Tax Rates", *International Tax and Public Finance*, 16, 850–70.
- European Commission (2011a) "Proposal for a Council Directive on a Common Consolidated Corporate Tax Base (CCCTB)", Brussels: European Commission COM(2011) 121/4, http://ec.europa.eu/taxation_customs/taxation/company_tax/common_tax_base/index_en.htm.
- European Commission (2011b) "European corporate tax base: making business easier and cheaper", Brussels: European Commission press release, <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/319&format=HTML&aged=0&language=en&guiLanguage=en>
- Fuest, C. (2008) "The European Commission's proposal for a common consolidated corporate tax base", *Oxford Review of Economic Policy* 24.4, 720-739.
- Fuest, C., T. Hemmelgarn and F. Ramb (2007) "How would the introduction of an EU-wide formula apportionment affect the distribution and size of the corporate tax base? An analysis based on German multinationals", *International Tax and Public Finance* 14.5, 605-626.
- Gordon, R.H. and J.D. Wilson (1986) "An Examination of Multijurisdictional Corporate Income Taxation under Formula Apportionment", *Econometrica* 54, 1357-1373.
- Lang, M., P. Pistone, J. Schuch and C. Staringer eds. (2008) "Common Consolidated Corporate Tax Base", Series on International Tax Law, Vienna: Linde Verlag.
- Omer, T, K. Molloy, and Ziebart, D. (1993) "An investigation of the firm size-effective tax rate relation in the 1980s", *Journal of Accounting, Auditing, and Finance* 8 (2), 167-82.
- Rego, S. O. (2003) "Tax Avoidance Activities of U.S. Multinational Corporations", *Contemporary Accounting Research* 20 (4), 805-833.
- Zimmerman, J. (1983) "Taxes and firm size", *Journal of Accounting and Economics* 5 (2), 119-49.

Table 1. Number of subsidiaries in row country with immediate (foreign) parent in column country, and ultimately owned by a US parent

	AT	BE	CY	CZ	DE	DK	ES	FI	FR	GB	HU	IE	IT	LU	LV	MT	NL	PL	PT	SE	SK	Non-EU	US	Total	Per cent
AT	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	10	19	0.2
BE	0	0	0	0	4	5	4	0	18	19	0	3	3	8	0	0	67	0	1	3	0	13	378	526	5.2
BG	0	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	4	0	0	0	0	0	31	39	0.4
CY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.0
CZ	6	4	0	0	20	0	3	0	8	9	0	2	1	7	0	0	54	1	0	1	2	10	129	257	2.5
DE	1	13	0	0	0	9	5	1	20	59	0	15	8	22	0	0	115	0	0	5	0	47	831	1,151	11.4
DK	0	2	0	0	5	0	1	1	1	6	0	0	0	4	0	0	24	0	0	9	0	6	127	186	1.8
EE	0	0	0	0	0	0	0	5	0	0	0	0	0	2	1	0	2	0	0	1	0	0	36	47	0.5
ES	1	13	0	0	24	6	0	1	27	54	0	9	8	13	0	0	103	0	0	4	0	30	387	680	6.7
FI	1	1	0	0	6	8	2	0	1	5	0	0	2	3	0	0	17	0	0	22	0	7	135	210	2.1
FR	0	31	0	0	26	10	15	1	0	55	0	5	4	14	0	0	89	0	0	7	0	26	895	1,178	11.7
GB	3	12	5	0	48	14	12	3	23	0	0	42	3	50	0	0	204	1	0	12	0	131	2,400	2,963	29.4
GR	0	3	0	0	2	1	3	0	7	5	0	2	2	1	0	0	17	0	0	0	0	6	41	90	0.9
HU	1	2	0	0	4	2	1	0	2	2	0	0	0	0	0	0	5	1	0	1	0	2	45	68	0.7
IE	0	1	0	0	0	0	4	0	2	35	0	0	0	13	0	0	23	0	0	0	0	16	353	447	4.4
IT	0	9	0	0	16	4	9	1	37	35	0	8	0	8	0	0	81	0	0	3	0	26	365	602	6.0
LT	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	3	0	0	1	0	3	15	25	0.2
LU	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	3	0	0	0	0	2	58	66	0.7
LV	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	26	32	0.3
NL	1	8	0	1	12	6	14	0	7	22	1	9	1	24	0	1	0	0	0	1	0	30	353	491	4.9
PL	4	8	0	0	30	3	3	2	20	16	1	1	7	14	0	0	75	0	0	3	0	14	209	410	4.1
PT	0	2	0	0	4	0	22	0	6	4	0	0	0	3	0	0	24	0	0	1	0	4	62	132	1.3
RO	0	0	0	0	1	1	0	0	0	3	0	0	0	0	0	0	9	1	0	0	0	0	47	62	0.6
SE	1	8	0	0	1	13	0	8	2	12	0	1	1	2	0	0	30	0	0	0	0	9	244	332	3.3
SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	6	8	0.1
SK	2	0	1	3	2	1	1	0	3	1	0	0	4	3	0	0	13	0	0	0	0	3	31	68	0.7
Total	21	117	7	4	212	85	101	24	184	345	2	97	45	191	1	1	970	4	1	75	2	386	7,215	10,090	100.0

Table 2a. Proportion of US companies with a subsidiary in the column country that also have a subsidiary in a row country

	no	AT	BE	BG	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	NL	PL	PT	RO	SE	SI	SK
AT	21	1	0.33	0.1	0.48	0.81	0.24	0.1	0.67	0.29	0.71	0.86	0.29	0.24	0.29	0.52	0.05	0.14	0.1	0.52	0.57	0.19	0.19	0.52	0.05	0.1
BE	373	0.02	1	0.03	0.3	0.56	0.22	0.04	0.54	0.26	0.66	0.78	0.14	0.11	0.31	0.52	0.03	0.07	0.03	0.5	0.36	0.17	0.09	0.4	0.02	0.08
BG	38	0.05	0.34	1	0.32	0.39	0.21	0.11	0.42	0.39	0.39	0.42	0.24	0.16	0.26	0.45	0.13	0.08	0.05	0.42	0.32	0.26	0.21	0.39	0.05	0.11
CZ	215	0.05	0.53	0.06	1	0.61	0.26	0.06	0.57	0.3	0.6	0.79	0.19	0.17	0.36	0.55	0.03	0.07	0.06	0.53	0.52	0.2	0.16	0.42	0.03	0.15
DE	1008	0.02	0.21	0.01	0.13	1	0.11	0.02	0.28	0.12	0.37	0.52	0.05	0.05	0.16	0.27	0.01	0.03	0.01	0.24	0.18	0.08	0.04	0.19	0.01	0.04
DK	167	0.03	0.49	0.05	0.33	0.66	1	0.07	0.53	0.39	0.59	0.7	0.18	0.17	0.37	0.51	0.05	0.06	0.08	0.49	0.44	0.2	0.11	0.46	0.04	0.14
EE	45	0.04	0.33	0.09	0.27	0.38	0.24	1	0.38	0.4	0.42	0.44	0.24	0.18	0.31	0.36	0.13	0.13	0.2	0.36	0.38	0.2	0.24	0.31	0.09	0.13
ES	560	0.03	0.36	0.03	0.22	0.5	0.16	0.03	1	0.18	0.51	0.67	0.1	0.09	0.23	0.4	0.03	0.06	0.02	0.38	0.29	0.14	0.07	0.28	0.01	0.07
FI	196	0.03	0.49	0.08	0.33	0.64	0.33	0.09	0.51	1	0.63	0.72	0.2	0.15	0.37	0.55	0.06	0.05	0.06	0.47	0.44	0.23	0.12	0.56	0.03	0.11
FR	975	0.02	0.25	0.02	0.13	0.38	0.1	0.02	0.29	0.13	1	0.54	0.05	0.05	0.18	0.3	0.01	0.04	0.02	0.24	0.19	0.08	0.04	0.21	0.01	0.03
GB	2501	0.01	0.12	0.01	0.07	0.21	0.05	0.01	0.15	0.06	0.21	1	0.02	0.02	0.1	0.13	0.01	0.02	0.01	0.12	0.09	0.03	0.02	0.09	0	0.02
GR	77	0.08	0.66	0.12	0.52	0.65	0.39	0.14	0.75	0.51	0.66	0.74	1	0.31	0.53	0.61	0.12	0.06	0.14	0.6	0.64	0.38	0.27	0.62	0.06	0.21
HU	63	0.08	0.67	0.1	0.57	0.75	0.44	0.13	0.78	0.48	0.71	0.84	0.38	1	0.49	0.75	0.13	0.06	0.14	0.7	0.65	0.29	0.3	0.62	0.06	0.27
IE	361	0.02	0.32	0.03	0.21	0.46	0.17	0.04	0.36	0.2	0.48	0.71	0.11	0.09	1	0.36	0.02	0.06	0.03	0.34	0.27	0.13	0.06	0.29	0.02	0.07
IT	432	0.03	0.45	0.04	0.27	0.63	0.2	0.04	0.52	0.25	0.68	0.76	0.11	0.11	0.3	1	0.03	0.06	0.03	0.45	0.34	0.17	0.09	0.4	0.02	0.08
LT	23	0.04	0.48	0.22	0.3	0.57	0.35	0.26	0.61	0.52	0.57	0.57	0.39	0.35	0.39	0.57	1	0.09	0.22	0.52	0.48	0.39	0.35	0.57	0.13	0.22
LU	71	0.04	0.35	0.04	0.23	0.48	0.14	0.08	0.45	0.14	0.49	0.62	0.07	0.06	0.28	0.35	0.03	1	0.04	0.38	0.31	0.13	0.07	0.27	0.03	0.03
LV	32	0.06	0.38	0.06	0.38	0.47	0.41	0.28	0.41	0.38	0.47	0.56	0.34	0.28	0.38	0.38	0.16	0.09	1	0.44	0.41	0.22	0.28	0.44	0.19	0.19
NL	486	0.02	0.38	0.03	0.23	0.5	0.17	0.03	0.44	0.19	0.49	0.64	0.09	0.09	0.26	0.4	0.02	0.06	0.03	1	0.3	0.13	0.07	0.28	0.01	0.07
PL	333	0.04	0.4	0.04	0.34	0.54	0.22	0.05	0.48	0.26	0.55	0.65	0.15	0.12	0.29	0.44	0.03	0.07	0.04	0.44	1	0.16	0.11	0.33	0.02	0.1
PT	108	0.04	0.59	0.09	0.41	0.71	0.31	0.08	0.71	0.42	0.73	0.75	0.27	0.17	0.43	0.67	0.08	0.08	0.06	0.6	0.49	1	0.18	0.49	0.06	0.15
RO	53	0.08	0.6	0.15	0.64	0.68	0.36	0.21	0.74	0.43	0.68	0.83	0.4	0.36	0.43	0.7	0.15	0.09	0.17	0.62	0.68	0.36	1	0.58	0.08	0.28
SE	288	0.04	0.51	0.05	0.32	0.66	0.27	0.05	0.55	0.38	0.71	0.82	0.17	0.14	0.36	0.59	0.05	0.07	0.05	0.47	0.38	0.18	0.11	1	0.02	0.08
SI	8	0.13	0.88	0.25	0.88	0.88	0.75	0.5	0.75	0.75	0.88	0.88	0.63	0.5	0.88	0.88	0.38	0.25	0.75	0.88	0.75	0.75	0.5	0.88	1	0.25
SK	57	0.04	0.51	0.07	0.56	0.67	0.4	0.11	0.65	0.39	0.58	0.75	0.28	0.3	0.47	0.63	0.09	0.04	0.11	0.63	0.6	0.28	0.26	0.42	0.04	1
<i>mean</i>		<i>0.03</i>	<i>0.32</i>	<i>0.03</i>	<i>0.21</i>	<i>0.49</i>	<i>0.16</i>	<i>0.04</i>	<i>0.39</i>	<i>0.19</i>	<i>0.5</i>	<i>0.75</i>	<i>0.1</i>	<i>0.09</i>	<i>0.25</i>	<i>0.36</i>	<i>0.03</i>	<i>0.05</i>	<i>0.03</i>	<i>0.34</i>	<i>0.27</i>	<i>0.12</i>	<i>0.07</i>	<i>0.27</i>	<i>0.02</i>	<i>0.07</i>

Table 2b. Proportion of US companies with a subsidiary in the column country that also have a subsidiary in a row country, adjusting for GDP of the column country

	no	AT	BE	BG	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	NL	PL	PT	RO	SE	SI	SK
AT	21	0	0.07	0.07	0.36	0.07	0.05	0.09	0.14	0.14	0.03	0.23	0.09	0.15	0.15	-0.11	0.02	0.10	0.08	0.15	0.33	0.04	0.08	0.29	0.02	0.04
BE	373	-0.14	0	0.01	0.21	-0.09	0.09	0.03	0.11	0.15	0.07	0.24	0.00	0.05	0.21	-0.01	0.01	0.04	0.02	0.21	0.18	0.07	0.02	0.23	0.00	0.04
BG	38	-0.12	0.14	0	0.22	-0.06	0.07	0.10	0.06	0.27	-0.04	0.01	0.09	0.09	0.15	0.04	0.11	0.05	0.03	0.15	0.14	0.14	0.13	0.21	0.02	0.06
CZ	215	-0.14	0.31	0.03	0	-0.08	0.10	0.05	0.09	0.17	-0.03	0.20	0.03	0.10	0.24	-0.03	0.01	0.04	0.04	0.20	0.31	0.08	0.07	0.22	0.00	0.10
DE	1008	-0.06	0.12	0.00	0.09	0	0.04	0.02	0.05	0.07	0.05	0.23	-0.02	0.02	0.11	-0.02	0.00	0.02	0.00	0.09	0.09	0.03	0.00	0.11	0.00	0.02
DK	167	-0.16	0.27	0.02	0.23	0.00	0	0.06	0.06	0.27	-0.02	0.14	0.02	0.10	0.25	-0.05	0.03	0.03	0.06	0.17	0.24	0.08	0.02	0.27	0.01	0.09
EE	45	-0.13	0.13	0.06	0.17	-0.06	0.09	0	0.02	0.28	0.00	0.04	0.09	0.11	0.20	-0.04	0.11	0.10	0.18	0.09	0.19	0.08	0.15	0.13	0.06	0.08
ES	560	-0.09	0.21	0.01	0.15	-0.03	0.06	0.02	0	0.10	0.03	0.24	-0.01	0.04	0.15	-0.03	0.02	0.04	0.01	0.16	0.15	0.06	0.01	0.15	-0.01	0.04
FI	196	-0.16	0.27	0.05	0.23	-0.03	0.17	0.08	0.03	0	0.01	0.14	0.03	0.08	0.25	-0.02	0.04	0.02	0.04	0.14	0.23	0.11	0.03	0.36	0.00	0.06
FR	975	-0.06	0.15	0.01	0.09	-0.01	0.03	0.02	0.05	0.08	0	0.23	-0.02	0.02	0.13	0.00	0.00	0.03	0.01	0.09	0.10	0.03	0.00	0.12	0.00	0.01
GB	2501	-0.03	0.07	0.00	0.05	0.01	0.02	0.01	0.03	0.03	0.04	0	-0.01	0.01	0.08	-0.02	0.01	0.01	0.01	0.05	0.05	0.01	0.00	0.05	-0.01	0.01
GR	77	-0.18	0.35	0.08	0.37	-0.11	0.17	0.12	0.15	0.33	-0.06	0.05	0	0.21	0.36	-0.07	0.09	0.02	0.12	0.16	0.35	0.20	0.14	0.35	0.02	0.14
HU	63	-0.20	0.34	0.06	0.41	-0.09	0.21	0.11	0.14	0.29	-0.08	0.10	0.14	0	0.31	0.01	0.10	0.01	0.12	0.24	0.35	0.10	0.17	0.33	0.02	0.19
IE	361	-0.10	0.17	0.01	0.14	-0.05	0.07	0.03	0.02	0.12	0.02	0.29	0.00	0.04	0	-0.05	0.01	0.04	0.02	0.12	0.13	0.05	0.00	0.16	0.00	0.04
IT	432	-0.12	0.27	0.02	0.19	-0.01	0.07	0.03	0.10	0.15	0.10	0.23	-0.02	0.05	0.21	0	0.01	0.04	0.02	0.17	0.17	0.07	0.02	0.24	0.00	0.04
LT	23	-0.21	0.19	0.18	0.15	-0.06	0.13	0.24	0.09	0.34	-0.03	-0.01	0.16	0.25	0.22	-0.01	0	0.04	0.20	0.12	0.20	0.22	0.22	0.31	0.09	0.15
LU	71	-0.09	0.19	0.02	0.16	-0.01	0.03	0.07	0.11	0.05	0.04	0.20	-0.05	0.01	0.20	-0.06	0.01	0	0.03	0.15	0.16	0.04	0.01	0.13	0.01	-0.01
LV	32	-0.15	0.13	0.02	0.26	-0.05	0.23	0.27	-0.02	0.23	-0.03	0.08	0.15	0.19	0.24	-0.09	0.13	0.05	0	0.11	0.18	0.07	0.17	0.22	0.15	0.13
NL	486	-0.11	0.23	0.01	0.16	-0.03	0.07	0.02	0.09	0.11	0.01	0.21	-0.02	0.04	0.18	-0.03	0.01	0.04	0.02	0	0.16	0.05	0.01	0.15	-0.01	0.04
PL	333	-0.11	0.22	0.02	0.26	-0.04	0.09	0.04	0.08	0.16	0.02	0.16	0.02	0.06	0.20	-0.04	0.01	0.05	0.03	0.17	0	0.06	0.04	0.17	0.00	0.06
PT	108	-0.19	0.32	0.06	0.29	-0.03	0.12	0.07	0.16	0.27	0.04	0.10	0.07	0.08	0.29	0.03	0.05	0.04	0.04	0.21	0.24	0	0.07	0.25	0.03	0.09
RO	53	-0.20	0.27	0.11	0.48	-0.10	0.12	0.19	0.12	0.24	-0.06	0.12	0.15	0.25	0.25	0.00	0.12	0.04	0.15	0.16	0.37	0.17	0	0.29	0.03	0.20
SE	288	-0.14	0.30	0.02	0.22	-0.04	0.12	0.04	0.07	0.26	0.07	0.23	0.01	0.07	0.25	0.01	0.03	0.04	0.04	0.15	0.18	0.06	0.03	0	-0.01	0.03
SI	8	-0.32	0.36	0.17	0.61	0.01	0.36	0.47	-0.06	0.43	0.02	0.03	0.22	0.30	0.57	0.03	0.32	0.16	0.71	0.21	0.26	0.43	0.26	0.41	0	0.11
SK	57	-0.20	0.23	0.03	0.43	-0.07	0.20	0.10	0.10	0.23	-0.11	0.10	0.07	0.21	0.32	-0.01	0.06	0.00	0.09	0.23	0.34	0.12	0.15	0.17	0.00	0
<i>mean</i>		<i>-0.08</i>	<i>0.16</i>	<i>0.01</i>	<i>0.13</i>	<i>-0.02</i>	<i>0.06</i>	<i>0.03</i>	<i>0.06</i>	<i>0.10</i>	<i>0.03</i>	<i>0.15</i>	<i>0.00</i>	<i>0.04</i>	<i>0.14</i>	<i>-0.02</i>	<i>0.01</i>	<i>0.03</i>	<i>0.02</i>	<i>0.10</i>	<i>0.12</i>	<i>0.04</i>	<i>0.02</i>	<i>0.13</i>	<i>0.00</i>	<i>0.03</i>

Table 3. Measures of Effective Tax Rates, by country of ultimate owner

Country	Observations	ETR_i^{EBIT}	ETR_i^{PLBT}	ETR_i^{RATIO1}	ETR_i^{RATIO2}	%
Austria	271	24.8	29.0	86.5	101.0	
Belgium	1,876	30.5	35.3	86.6	100.2	
Bulgaria	228	11.6	14.0	87.2	105.8	
Cyprus	72	19.9	24.0	85.7	103.1	
Czech Republic	205	19.5	25.2	78.5	100.7	
Germany	2,965	26.0	29.9	77.4	88.7	
Denmark	824	26.1	26.7	93.0	95.5	
Spain	4,230	25.8	31.5	75.7	92.1	
Estonia	98	7.9	9.3	37.6	44.5	
Finland	688	21.8	23.2	77.9	83.3	
France	9,548	31.0	33.2	87.6	93.5	
United Kingdom	5,954	26.1	26.9	87.6	90.2	
Greece	178	22.0	28.7	80.3	104.6	
Hungary	13	16.8	19.4	92.1	107.7	
Ireland	227	20.1	20.9	100.0	104.6	
Italy	4,184	39.8	51.3	108.1	139.2	
Lithuania	81	15.5	17.8	92.5	104.1	
Luxembourg	461	27.3	30.4	84.5	93.8	
Latvia	55	17.5	20.6	99.7	117.7	
Malta	8	25.0	29.9	83.7	98.2	
Netherlands	1,242	28.1	30.9	87.0	95.6	
Non-EU	1,853	27.9	30.2	89.3	96.7	
Poland	480	22.0	26.1	98.6	116.9	
Portugal	809	23.1	31.4	80.2	108.7	
Romania	42	17.4	24.0	83.7	112.4	
Slovak Republic	33	20.8	22.9	98.3	108.6	
Slovenia	38	20.7	23.8	82.5	96.3	
Sweden	3,871	22.3	24.6	79.9	88.2	
United States	1,574	29.7	29.6	95.9	95.5	
Total	42,108	28.2	31.8	87.1	97.9	

Table 4. Determination of Effective Tax Rates

Variables	(1) ETR_i^{EBIT}	(2) ETR_i^{EBIT}	(3) ETR_i^{PLBT}	(4) ETR_i^{PLBT}	(5) ETR_i^{RATIO1}	(6) ETR_i^{RATIO1}	(7) ETR_i^{RATIO2}	(8) ETR_i^{RATIO2}
τ_i	0.849 *** 0.020	0.850 *** 0.020	0.983 *** 0.020	0.985 *** 0.020				
Log (total assets)	-0.008 *** 0.001	-0.008 *** 0.001	-0.009 *** 0.000	-0.009 *** 0.000	-0.026 *** 0.002	-0.026 *** 0.002	-0.028 *** 0.002	-0.027 *** 0.002
USA_owner	0.018 *** 0.003	0.018 *** 0.003	0.008 *** 0.003	0.008 *** 0.003	0.061 *** 0.010	0.061 *** 0.010	0.030 *** 0.009	0.030 *** 0.009
USA*NLD	-0.020 ** 0.008	0.141 ** 0.055	-0.008 0.008	0.223 *** 0.054	-0.063 *** 0.024	0.421 ** 0.171	-0.025 0.024	0.700 *** 0.165
USA*NLD*size		-0.015 *** 0.005		-0.021 *** 0.005		-0.045 *** 0.016		-0.067 *** 0.015
Observations	41,929	41,929	41,929	41,929	41,929	41,929	41,929	41,929
adjusted R-squared	0.227	0.227	0.297	0.297	0.122	0.122	0.153	0.154

All regressions include a full set of dummies representing EU countries in which the group has subsidiaries, and 2-digit NACE industry dummies. Standard errors in brackets. ***, **, * indicate significance at 1 percent, 5 percent and 10 percent.

Table 5. Estimated Effect of Tax Reform on Tax Liabilities

	Nr Groups	Percentage of groups with lower tax burden	Groups gaining from CCCTB			Groups not gaining from CCCTB		
			Current system €m	Consolidation & Appportionment €m	Benefit in percent	Current system €m	Consolidation & Appportionment €m	Costs in percent
Austria	89	47.2	16.8	15.9	5.2	25.5	26.3	-3.2
Belgium	261	56.7	22.5	20.9	7.4	11.9	12.3	-3.1
Germany	554	48.0	146.0	138.9	4.9	18.5	19.4	-4.6
Denmark	182	46.2	28.3	27.2	3.9	81.0	84.2	-3.9
Spain	282	46.8	80.6	78.6	2.5	85.4	92.3	-8.2
Finland	141	63.8	37.0	35.7	3.6	36.4	38.1	-4.8
France	635	62.8	136.5	130.3	4.6	46.6	48.9	-5.0
United Kingdom	450	43.1	157.8	150.2	4.8	108.9	118.9	-9.2
Greece	12	33.3	6.2	3.8	39.3	23.2	23.8	-2.8
Ireland	30	43.3	58.4	55.4	5.1	15.6	17.1	-9.3
Italy	447	58.4	71.3	68.2	4.3	70.8	75.3	-6.4
Luxembourg	159	44.7	45.8	43.7	4.6	11.5	13.5	-17.4
Netherlands	307	48.5	43.9	41.5	5.5	19.9	22.2	-11.3
New Member States	61	49.2	42.9	16.8	60.8	9.4	10.4	-11.0
Non-EU States	695	48.8	34.8	32.8	5.6	27.1	32.1	-18.6
Portugal	46	37.0	90.4	89.8	0.7	30.2	31.7	-4.8
Sweden	356	46.3	48.0	45.7	4.9	25.8	28.4	-9.7
United States	706	51.0	76.2	71.5	6.2	37.9	43.8	-15.4
Total	5,413	51.1	80.8	76.7	5.2	43.8	47.8	-9.2

Table 6. Net present value of depreciation allowances

Country	Statutory tax rate	Net present value of depreciation allowances (% of initial cost) for				equally weighted
		Industrial buildings	plant and machinery	patents		
Austria	25.0	38.7	81.1	78.4	66.1	
Belgium	34.0	64.1	84.2	86.8	78.4	
Bulgaria	10.0	47.5	88.1	82.0	72.5	
Cyprus	10.0	47.5	73.5	67.9	62.9	
Czech Republic	19.0	50.3	74.0	84.0	69.5	
Germany	29.4	38.7	73.5	86.8	66.3	
Denmark	25.0	43.5	82.5	100.0	75.3	
Spain	30.0	38.7	81.7	54.3	58.2	
Estonia	21.0	n.a.	n.a.	n.a.	n.a.	
Finland	26.0	58.1	91.0	73.5	74.2	
France	34.4	54.3	81.7	86.8	74.3	
United Kingdom	26.0	14.1	77.9	82.5	58.2	
Greece	24.0	67.9	78.6	73.5	73.3	
Hungary	19.0	27.5	96.5	96.5	73.5	
Ireland	12.5	47.5	78.4	73.5	66.4	
Italy	31.3	45.8	75.7	96.5	72.7	
Lithuania	15.0	82.5	90.4	96.5	89.8	
Luxembourg	28.8	47.5	85.3	86.8	73.2	
Latvia	15.0	61.1	90.4	86.8	79.4	
Malta	35.0	35.3	86.8	67.9	63.3	
Netherlands	25.0	38.7	86.8	73.5	66.3	
Poland	19.0	33.4	73.5	86.8	64.6	
Portugal	26.5	54.3	86.5	73.5	71.4	
Romania	16.0	33.4	89.0	85.2	69.2	
Slovak Republic	19.0	60.3	81.0	86.8	76.0	
Slovenia	20.0	38.7	86.8	73.5	66.3	
Sweden	26.3	47.5	88.1	87.4	74.3	
CCCTB		33.4	82.5	62.8	59.6	
Average	23.0	46.8	83.2	81.8	70.6	

Assumptions for discount rate: real interest rate 5 percent, inflation rate 2.5 percent.

Table 7. Country-specific investment incentives

Country	Current system			CCCTB proposal		
	EATR	Cost of capital	EMTR	EATR	Cost of capital	EMTR
Austria	25.5	4.6	-9.7	26.7	4.8	-3.4
Belgium	31.3	4.2	-20.1	34.4	5.0	-0.5
Bulgaria	13.5	4.5	-10.6	14.2	4.7	-6.9
Cyprus	14.5	4.7	-5.4	14.2	4.7	-6.9
Czech Republic	21.4	4.7	-6.5	21.7	4.8	-5.0
Germany	29.3	4.6	-7.7	30.4	4.9	-2.1
Denmark	26.4	4.7	-6.5	26.7	4.8	-3.4
Spain	32.1	5.2	3.3	30.9	4.9	-1.9
Estonia	29.0	6.2	19.9	23.3	4.8	-4.5
Finland	27.2	4.7	-6.7	27.6	4.8	-3.1
France	33.3	4.6	-9.7	34.7	5.0	-0.4
United Kingdom	28.6	5.1	1.5	27.6	4.8	-3.1
Greece	24.4	4.5	-11.5	25.9	4.8	-3.7
Hungary	20.0	4.4	-14.5	21.7	4.8	-5.0
Ireland	16.1	4.7	-7.2	16.2	4.7	-6.5
Italy	30.0	4.4	-12.8	32.1	4.9	-1.5
Lithuania	17.4	4.5	-11.2	18.3	4.7	-5.9
Luxembourg	27.7	4.3	-15.3	29.9	4.9	-2.3
Latvia	17.4	4.5	-11.3	18.3	4.7	-5.9
Malta	33.4	4.6	-9.9	35.2	5.0	-0.1
Netherlands	25.3	4.5	-11.2	26.7	4.8	-3.4
Poland	21.1	4.6	-7.8	21.7	4.8	-5.0
Portugal	26.2	4.4	-13.2	28.0	4.9	-3.0
Romania	18.6	4.6	-8.8	19.2	4.7	-5.7
Slovak Republic	20.9	4.6	-9.6	21.7	4.8	-5.0
Slovenia	21.4	4.5	-10.6	22.5	4.8	-4.8
Sweden	27.3	4.7	-7.1	27.8	4.9	-3.0
Average	24.4	4.6	-8.2	25.1	4.8	-3.8

Assumptions: real interest rate 5 percent, inflation rate 2.5 percent, pre tax rate of return (for EATR) 20 percent, economic depreciation for buildings 3.1 percent, for plant and machinery 17.5 percent, for patents 15.35 percent. Asset and financing shares, taken from ORBIS, are 20 percent buildings, 40 percent inventories, 23 percent machinery, 10 percent patents and 7 percent non-depreciable land; and new investment is financed 2/3 by debt and 1/3 by retained earnings.

Data Appendix

We use data from the ORBIS Dataset comprising all very large and large companies. According to the criteria of the data provider Bureau Van Dijk this comprises companies which either have operating revenues of more than 10 million Euros, total assets of more than 20 million Euros or more than 150 employees. This leaves us with a total sample of 444,934 firms, of which 191,776 are independent companies and 253,158 can be attributed to one of 109,490 different ultimate owners.²⁵ Appendix Table 1 displays the geographical distribution of the companies across the 27 EU Member states. The last column displays the number of subsidiaries in corporate groups which are ultimately owned by an US parent. More than a third of the 15,586 EU subsidiaries of US parents are located in the United Kingdom.

Appendix Table 1: ORBIS sample according to subsidiary country owner type

Country	Standalone companies	Companies within groups	owned by US parent
Austria (AT)	992	589	29
Belgium (BE)	7,694	8,693	630
Bulgaria (BG)	1,605	1,436	43
Cyprus (CY)	269	12	1
Czech Republic (CZ)	7,069	3,400	263
Germany (DE)	21,924	33,692	1,824
Denmark (DK)	3,396	3,763	225
Estonia (EE)	351	1,414	50
Spain (ES)	21,940	23,145	936
Finland (FI)	2,671	4,696	232
France (FR)	16,516	55,015	2,022
United Kingdom (GB)	26,536	44,784	5,527
Greece (GR)	2,321	1,534	98
Hungary (HU)	3,183	789	71
Ireland (IE)	2,743	2,989	672
Italy (IT)	30,973	23,392	740
Lithuania (LT)	1,123	1,009	27
Luxembourg (LU)	475	849	95
Latvia (LV)	839	796	32
Malta (MT)	346	1	0
Netherlands (NL)	10,281	7,894	820
Poland (PL)	11,075	8,656	476
Portugal (PT)	3,568	4,860	161
Romania (RO)	5,674	784	64
Sweden (SE)	5,753	17,735	468
Slovenia (SI)	261	198	8
Slovak Republic (SK)	2,198	1,033	72
Total	191,776	253,158	15,586

²⁵ Note that we use information of the immediate shareholder to derive ownership chains and, if the database does not report a corporate ultimate owner, we use the highest corporate shareholder.

Appendix Table 2 further distinguishes the corporate groups according to their number of subsidiaries within the European Union and the number of European countries in which they have subsidiaries. Evidently the large majority of corporate groups are purely domestic, with 99,792 corporate groups which are only active in one country. At the other end of the spectrum there are 439 corporate groups active in more than 10 EU countries. The lower half of Appendix Table 2 repeats this exercise for the US owned corporate groups. Again a sizeable proportion is only active in one country. The ratio of the corporate groups only active in one country is substantially smaller for US owned groups – this is because we do not include purely US domestic groups.

Appendix Table 2: Size distribution and geographical scope of corporate groups

Size distribution and geographical scope of all corporate groups

No. of countries	No. of subsidiaries						Total
	1	2 to 5	6 to 10	11 to 50	51 to 100	more than 100	
1	76,002	21,280	1,837	657	15	1	99,792
2	0	4,207	547	254	9	1	5,018
3 to 5	0	1,629	975	504	25	8	3,141
6 to 10	0	0	376	678	36	10	1,100
more than 10	0	0	0	276	105	58	439
Total	76,002	27,116	3,735	2,369	190	78	109,490

Size distribution and geographical scope of US owned corporate groups

No. of countries	No. of subsidiaries						Total
	1	2 to 5	6 to 10	11 to 50	51 to 100	more than 100	
1	2,405	458	25	11	1	0	2,900
2	0	415	35	7	1	0	458
3 to 5	0	246	140	31	0	0	417
6 to 10	0	0	96	143	4	1	244
more than 10	0	0	0	69	18	5	92
Total	2,405	1,119	296	261	24	6	4,111

Depending on the data requirements we need to use different subsamples for our different analyses. For the analysis in Section 2, we need the information to calculate *backward looking effective tax rates*: the tax charge, and profits – measured as earnings before interest and taxation and the profit and losses before taxation. This results in a reduction of the dataset to 41,930 corporate groups, out of which 1,587 are owned by US companies. In total this subsample includes 95,900 subsidiaries, with a geographical distribution as shown in the first three columns in Appendix Table 3.

The second half of Appendix Table 3 shows the subsample we use in Section 3, when we restrict that the data to further include the information we need comprises the *apportionment factors*: the number of employees, the costs of employees, sales and tangibles assets. Further this sample only includes corporate groups with subsidiaries in more than one country, which results in a total number of 5,413 corporate groups. 706 of these are owned by US owners.

Appendix Table 3: Different sample Sizes

Country	Effective tax rate analysis (Section 2)			Loss consolidation and formula apportionment (Section 3)		
	Nr Groups (owner country)	Subsidiaries	Observations	Nr Groups (owner country)	Subsidiaries	Observations
Austria	267	97	317	89	43	105
Belgium	1,846	5,220	38,968	261	2,980	16,544
Germany	3,122	5,554	27,148	554	2,464	7,981
Denmark	841	1,784	11,889	182	1,037	5,616
Spain	4,299	11,540	74,053	282	4,987	25,832
Finland	758	2,087	13,101	141	1,088	5,658
France	9,588	25,735	177,563	635	11,029	58,766
United Kingdom	5,959	15,911	106,835	450	6,474	33,874
Greece	175	552	4,186	12	0	0
Ireland	205	439	1,415	30	0	0
Italy	3,520	8,043	59,235	447	4,128	23,763
Luxembourg	454	124	369	159	35	65
Netherlands	1,251	1,521	6,929	307	619	2,342
Portugal	791	1,944	11,942	46	768	2,087
Sweden	3,923	8,664	66,827	356	3,103	17,628
Bulgaria	232	640	4,315		153	800
Cyprus	83	2	6		0	0
Czech Republic	197	1,464	10,038		1,113	5,813
Estonia	209	619	4,809		193	1,182
Hungary	13	108	487		0	0
Lithuania	86	267	1,388	New Member	0	0
Latvia	60	233	1,614	States:	13	55
Malta	7	0	0	61	0	0
Poland	482	2,590	16,518		1,508	6,878
Romania	41	388	2,960		322	1,926
Slovak Republic	33	319	1,810		221	900
Slovenia	37	55	303		10	33
Non-EU	1,864	n.a.	n.a.	695	n.a.	n.a.
USA	1,587	n.a.	n.a.	706	n.a.	n.a.
Total	41,930	95,900	645,025	5,413	42,288	217,848

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